Chillers

Air-cooled chiller

- Wide capacity range (620 kW - 1860 kW)
- Multiple efficiency and sound versions
- Unique single screw compressor
- Best-in-class energy efficiency (EER up to 3.70 and ESEER up to 4.63)
- Large operation range (-18°C up to +52°C ambient temperature)

ECDEN12-417

EWAD-C-
620~1860 kW

R-134a

Daikin Europe N.V.

About Daikin

Daikin has a worldwide reputation based on over 80 years' experience in the successful manufacture of high quality air conditioning equipment for industrial, commercial and residential use. Daikin's much envied quality quite simply stems from the close attention paid to design, production and testing as well as aftersales support. To this end, every component is carefully selected and rigorously tested to verify its contribution to product quality and reliability.

The EWAD-C- series offers top efficiency, low sound levels and flexible solutions for a wide range of comfort and process applications

Daikin Europe's new air-cooled series has been engineered for flexibility and designed to exceed HVAC industry standards for operating efficiency, making it an ideal match for a wide range of building applications.

The EWAD-C- range, available in multiple efficiency and sound versions, incorporates unique single screw compressors and fans that result in maximum efficiency, both in partial and full load conditions, and ensure a low total cost of ownership over the life of the chiller. Further, the wide operating range makes the series suitable for comfort and process cooling applications in all climates.

The most commonly serviced parts are easily accessible, simplifying maintenance and service. Moreover, the new chillers allow flexible integration into a wide range of control and building management systems.

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The new air-cooled chiller features

Application flexibility

The EWAD-C- series is available in a wide range of capacities (620 kW to 1,860 kW), for ambient operating temperatures of -18°C up to 52°C, making the new chiller models suitable for comfort and process cooling applications in all climates.

The units' small footprint also makes this series the perfect choice for retrofit projects. The most commonly serviced parts are easily accessible, simplifying maintenance and service. Moreover, the new chillers allow flexible integration into a wide range of control and building management systems.

Low operating cost

Daikin equipped the new air-cooled series with a unique single-screw compressor (with asymmetric loading system) that results in maximum efficiency, both in partial and full load conditions, and ensures a low total cost of ownership over the life of the chiller.

With three levels of operating efficiency — standard, high and premium — the chiller allows building owners to specify an HVAC system that exactly meets their requirements. The unique premium version obtains the highest efficiency values in the industry: EER's up to 3.70, ESEER's up to 4.63.

Low operating sound levels

Very low sound levels - both at full load and part load conditions - are achieved by the latest compressor design that uses a single main rotor with two adjacent rotating composite gaterotors, making gas flow velocities and subsequent sound levels among the lowest available. Further, the unique new fan moves large volume of air at exceptionally low sound levels.

Outstanding reliability

The EWAD-C- chillers have two or three truly independant refrigerant circuits (depending on the size) in order to assure maximum safety for any maintenance. Equipped with a rugged compressor design with advanced composite compressor gaterotors and a proactive control logic, the units are full factory-run-tested to optimize trouble-free operation.

Superior control logic

The new MicroTech III controller 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 LonWorks, BACnet, Ethernet TCP/IP or Modbus communications.

Air cooled chillers

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EWAD-C-XS

1 Features

- Wide capacity range: 19 sizes to cover a range from 756 to 2,008 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 50ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2-3 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 760C-XS	EWAD 830C-XS	EWAD 890C-XS	EWAD 990C-XS	EWAD C10C-XS	EWAD C11C-XS	EWAD C12C-XS	EWAD C13C-XS	EWAD H14C-XS	EWAD H15C-XS
Cooling capacity	Nom.			kW	756 (1)	830 (1)	889 (1)	1,001 (1)	1,074 (1)	1,196 (1)	1,280 (1)	1,349 (1)	1,415 (1)	1,525 (1)
Capacity control	Method				Stepless									
	Minimum capacity			%	12.5									
Power input	Cooling	Nom.		kW	233 (1)	253 (1)	278 (1)	307 (1)	338 (1)	364 (1)	400 (1)	410 (1)	443 (1)	475 (1)
EER					3.25 (1)	3.28 (1)	3.20 (1)	3.26 (1)	3.18 (1)	3.29 (1)	3.2 (1)	3.29 (1)	3.19 (1)	3.21 (1)
ESEER					4.02	4.11	4.02	4.11	4.05	4.14	4.02	4.28	4.30	4.33
IPLV					4.48		4.44	4.48	4.44	4.51	4.47	4.59	4.71	4.81
Casing	Colour				Ivory white									
	Material				Galvanized and painted steel sheet									
Dimensions	Unit	Height		mm	2,540									
		Width		mm	2,285									
		Depth		mm	6,185	7,085		7,985		9,785				
Weight	Unit			kg	5,990	6,340	6,360	7,190	7,470	8,220	8,240	8,900		
	Operation weight			kg	6,240	6,580	6,600	7,600	7,870	8,610	8,630	9,890		
Water heat exchanger	Type				Single pass shell & tube									
	Water volume			l	251	243		403		386		979		
	Nominal water flow	Cooling		l/s	36.1	39.6	42.4	47.8	51.2	57.1	61.1	64.4	67.5	72.8
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	81	57	64	61	69	45	51	68	77	84
	Insulation material				Closed cell									
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler									
Fan	Quantity				12	14		16		20				
	Type				Direct propeller									
	Diameter			mm	800									
	Air flow rate	Nom.		l/s	64,131	74,819		85,508		106,885				
	Speed			rpm	900									
Fan motor	Drive				DOL									
	Input	Cooling		W	21,000	24,500		28,000		35,000				
Sound power level	Cooling	Nom.		dBA	100.2	100.5		101.4	101.9	102.4	102.5			
Sound pressure level	Cooling	Nom.		dBA	79.7			80.2	80.7	80.3	80.4			
Compressor	Type				Asymm single screw									
	Quantity				2									
	Oil	Charged volume		l	38			44	50					
Operation range	Water side	Cooling	Min.	ºCDB	-8									
			Max.	ºCDB	15									
	Air side	Cooling	Min.	ºCDB	-18									
			Max.	ºCDB	52									
Refrigerant	Type				R-134a									
	Circuits	Quantity			2									
Refrigerant circuit	Charge			kg	146	162		182		214		225	248	
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm			219.1mm				273mm		
Safety devices	Item	01			High discharge pressure (pressure switch)									
		02			High discharge pressure (pressure transducer)									
		03			Low suction pressure (pressure transducer)									
		04			Compressor motor protection									
		05			High discharge temperature									
		06			Low oil pressure									
		07			Low pressure ratio									
		08			High oil filter pressure drop									
		09			Phase monitor									
		10			Emergency stop									
		11			Water freeze protection controller									

2 Specifications

2-1 Technical Specifications					EWAD C14C-XS	EWAD C15C-XS	EWAD C16C-XS	EWAD C17C-XS	EWAD C18C-XS	EWAD C19C-XS	EWAD C20C-XS	EWAD C21C-XS	EWAD 22C-XS
Cooling capacity	Nom.			kW	1,409 (1)	1,526 (1)	1,596 (1)	1,685 (1)	1,768 (1)	1,858 (1)	1,901 (1)	1,953 (1)	2,008 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	7								
Power input	Cooling	Nom.		kW	437 (1)	474 (1)	503 (1)	533 (1)	561 (1)	590 (1)	614 (1)	643 (1)	672 (1)
EER					3.23 (1)	3.22 (1)	3.17 (1)	3.16 (1)	3.15 (1)		3.09 (1)	3.04 (1)	2.99 (1)
ESEER					4.23	4.19	4.17	4.16	4.13		4.11	4.02	3.99
IPLV					4.56	4.54	4.52		4.47		4.48	4.39	
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,540								
		Width		mm	2,285								
		Depth		mm	11,985			12,885	13,785	14,685			
Weight	Unit			kg	10,560	11,310	11,570	11,900	12,260	12,600			
	Operation weight			kg	11,040	12,170	12,430	12,760	13,140	13,470			
Water heat exchanger	Type				Single pass shell & tube								
	Water volume			l	491	850			871	850			
	Nominal water flow	Cooling		l/s	67.34	72.9	76.1	80.4	84.4	88.6	90.7	93.2	95.8
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	77	57	62	68		74	39	41	43
	Insulation material				Closed cell								
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler								
Fan	Quantity				24			26	28	30			
	Type				Direct propeller								
	Diameter			mm	800								
	Air flow rate	Nom.		l/s	128,266		128,262	138,950	149,639	160,327			
	Speed			rpm	920		900						
Fan motor	Drive				DOL								
	Input	Cooling		W	1,750		42,000	45,500	49,000	52,500			
Sound power level	Cooling	Nom.		dBA	102.9	103.1	103.2	103.5	103.7	103.9			
Sound pressure level	Cooling	Nom.		dBA	80.5	80.7	80.9	80.8	81.0				
Compressor	Type				Semi-hermetic single screw compressor		Asymm single screw						
	Quantity				3								
	Oil	Charged volume		l	63	69	75						
Operation range	Water side	Cooling	Min.	ºCDB	-8								
			Max.	ºCDB	15								
	Air side	Cooling	Min.	ºCDB	-18								
			Max.	ºCDB	50		52						
Refrigerant	Type				R-134a								
	Circuits	Quantity			3								
Refrigerant circuit	Charge			kg	-		297	312	328	343			
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm	273mm							
Safety devices	Item	01			High discharge pressure (pressure switch)								
		02			High discharge pressure (pressure transducer)								
		03			Low suction pressure (pressure transducer)								
		04			Compressor motor protection								
		05			High discharge temperature								
		06			Low oil pressure								
		07			Low pressure ratio								
		08			High oil filter pressure drop								
		09			Phase monitor								
		10			Emergency stop								
		11			Water freeze protection controller								

2 Specifications

2-2 Electrical Specifications				EWAD 760C-XS	EWAD 830C-XS	EWAD 890C-XS	EWAD 990C-XS	EWAD C10C-XS	EWAD C11C-XS	EWAD C12C-XS	EWAD C13C-XS	EWAD H14C-XS	EWAD H15C-XS
Compressor	Phase			3~									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
	Maximum running current		A	231		274		333		398			451
	Starting method			Wye-delta									
Compressor 2	Maximum running current		A	231	274		333		398			451	
Power supply	Phase			3~									
	Frequency		Hz	50									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
Unit	Maximum starting current		A	618	657		923	970	1,029			1,072	1,085
	Nominal running current (RLA)	Cooling	A	387	423	463	511	559	607	667.0	686	731	778
	Maximum running current		A	510	561	605	672	731	811	875		929	982
	Max unit current for wires sizing		A	556	612	660	733	797	884	955		1,013	1,072
Fans	Nominal running current (RLA)		A	48	56		64		80				

2-2 Electrical Specifications				EWAD C14C-XS	EWAD C15C-XS	EWAD C16C-XS	EWAD C17C-XS	EWAD C18C-XS	EWAD C19C-XS	EWAD C20C-XS	EWAD C21C-XS	EWAD 22C-XS
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	269	326	333		398			451	
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	269	326	333		398			451	
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	1,167.4	1,213	1,268	1,328	1,387		1,430	1,472	1,486
	Nominal running current (RLA)	Cooling	A	729 (5)	787 (5)	835	885	934.0	984	1,018	1,059	1,100
	Maximum running current		A	960	1,017	1,096	1,168	1,241	1,313	1,366	1,419	1,473
	Max unit current for wires sizing		A	1,056	1,119	1,196	1,275	1,354	1,432	1,491	1,549	1,608
Fans	Nominal running current (RLA)		A	96			104	112	120			

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

(9) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

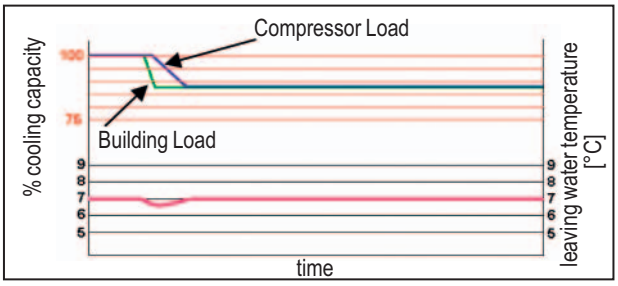
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

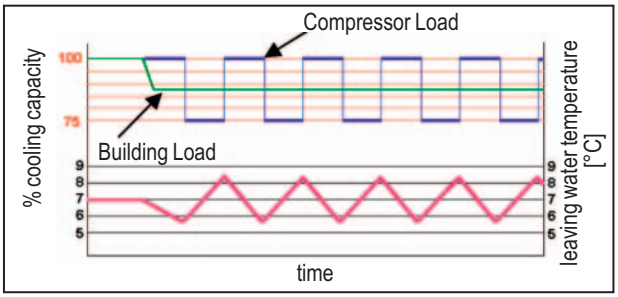
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

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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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.
Power Section The power section includes compressors and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
• Chiller enabled to work in partial failure condition.
• Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
• Display of evaporator entering/leaving water temperature.
• Display of Outdoor Ambient Temperature.
• Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
• Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
• Compressor and evaporator pumps hours counter.
• Display of Status Safety Devices.
• Number of starts and compressor working hours.
• Optimized management of compressor load.
• Fan management according to condensing pressure.
• 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).
• OAT (Outside Ambient temperature) Reset.
• Set point Reset (optional).
• Application and system upgrade with commercial SD cards.
• Ethernet port for remote or local servicing using standard web browsers.
• Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
• High pressure (pressure switch).
• High pressure (transducer).
• Low pressure (transducer).
• Fans circuit breaker.
• 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.

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4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

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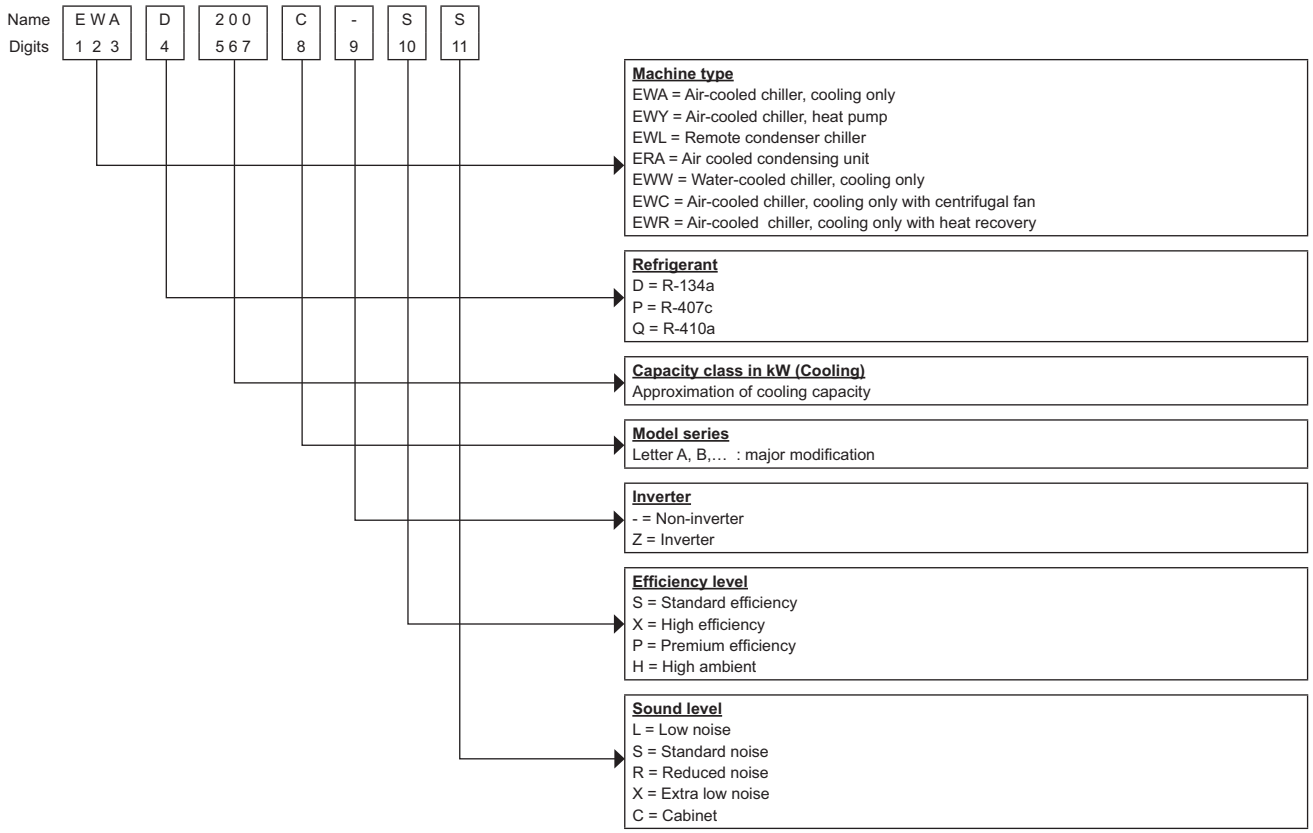
5 Nomenclature

5 - 1 Nomenclature

Nomenclature



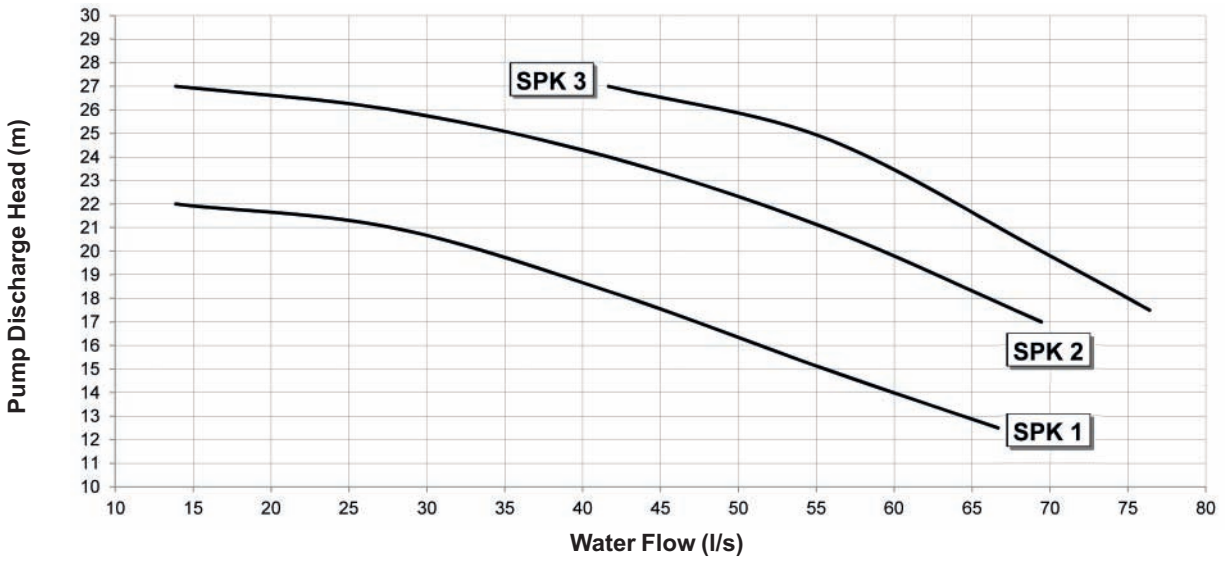
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

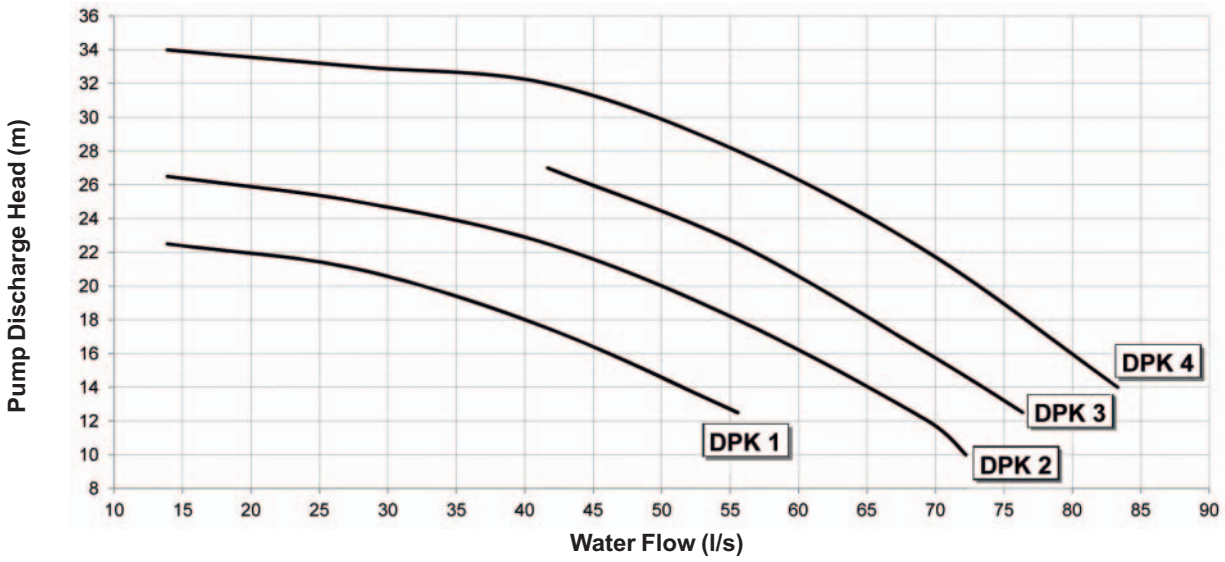
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

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6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
760	25	734	189	35,0	76	756	192	36,0	80	777	194	37,1	85
	30	715	206	34,1	73	736	209	35,1	77	757	212	36,1	81
	35	694	223	33,1	69	715	226	34,1	73	735	229	35,1	77
	40	668	242	31,8	64	687	245	32,8	68	707	249	33,7	72
	46	625	267	29,8	57	643	270	30,7	60	662	274	31,6	64
	48	607	276	28,9	54	625	279	29,8	57	644	283	30,7	60
	50	587	285	28,0	51	605	289	28,8	54	624	293	29,7	57
830	25	805	206	38,3	54	829	208	39,5	57	853	211	40,7	60
	30	784	224	37,3	51	807	227	38,5	54	831	230	39,6	57
	35	761	243	36,3	49	784	246	37,4	51	807	250	38,5	54
	40	734	263	35,0	45	755	267	36,0	48	777	270	37,1	50
	46	690	290	32,8	41	710	294	33,8	43	731	298	34,8	45
	48	671	300	32,0	39	691	304	32,9	41	712	308	33,9	43
	50	651	311	31,0	37	670	315	32,0	39	690	319	32,9	41
890	25	864	226	41,2	61	889	229	42,4	64	915	232	43,6	68
	30	842	246	40,1	58	866	249	41,3	61	891	253	42,5	64
	35	817	266	38,9	55	840	270	40,1	58	865	274	41,2	61
	40	786	289	37,4	51	808	293	38,5	54	831	297	39,6	57
	46	736	319	35,0	46	757	323	36,1	48	779	328	37,1	51
	48	715	330	34,0	43	736	335	35,1	46	757	339	36,1	48
	50	692	342	32,9	41	712	346	33,9	43	733	351	35,0	45
990	25	972	249	46,3	58	1001	253	47,7	61	1031	256	49,1	64
	30	946	271	45,0	55	974	275	46,4	58	1003	279	47,8	61
	35	917	294	43,7	52	945	298	45,0	55	973	303	46,4	58
	40	881	319	42,0	48	908	323	43,3	51	935	328	44,6	54
	46	824	351	39,3	43	849	356	40,5	45	874	361	41,7	48
	48	801	363	38,2	41	825	368	39,3	43	850	373	40,5	45
	50	775	376	36,9	38	799	381	38,1	41	823	386	39,2	43
C10	25	1045	274	49,8	66	1076	278	51,3	69	1108	282	52,8	73
	30	1017	298	48,5	63	1047	302	49,9	66	1078	307	51,4	70
	35	985	323	46,9	59	1014	328	48,3	62	1044	333	49,8	66
	40	945	350	45,0	55	973	355	46,4	58	1001	361	47,7	61
	46	880	387	41,9	48	906	392	43,2	51	932	398	44,4	54
	48	853	400	40,6	46	878	406	41,9	48	904	412	43,1	51
	50	824	414	39,2	43	849	420	40,4	45	874	426	41,7	48
C11	25	1161	295	55,3	43	1194	299	56,9	45	1229	303	58,6	47
	30	1130	322	53,8	41	1164	326	55,5	43	1197	331	57,1	45
	35	1097	349	52,3	39	1130	354	53,9	41	1163	359	55,5	43
	40	1057	378	50,3	36	1088	383	51,9	38	1120	389	53,4	40
	46	992	417	47,2	32	1022	423	48,7	34	1052	428	50,1	36
	48	965	431	46,0	31	994	437	47,4	32	1024	443	48,8	34
	50	935	446	44,5	29	963	452	45,9	31	993	458	47,3	32
C12	25	1245	325	59,3	49	1280	329	61,0	51	1316	334	62,8	54
	30	1213	354	57,8	46	1248	359	59,5	49	1283	364	61,2	51
	35	1177	384	56,1	44	1211	389	57,7	46	1245	395	59,4	49
	40	1132	416	53,9	41	1165	422	55,5	43	1198	428	57,1	45
	46	1058	460	50,4	36	1089	466	51,9	38	1120	472	53,4	40
	48	1028	475	48,9	34	1058	482	50,4	36	1089	489	51,9	38
	50	994	492	47,3	32	1024	499	48,8	34	1054	506	50,3	36
C13	25	1311	332	62,5	64	1352	337	64,4	68	1392	343	66,4	71
	30	1274	361	60,7	61	1314	367	62,6	64	1354	373	64,6	68
	35	1233	392	58,7	57	1271	398	60,6	61	1310	404	62,5	64
	40	1181	424	56,3	53	1218	430	58,0	56	1254	437	59,8	59
	46	1099	467	52,4	47	1133	474	54,0	49	1167	481	55,7	52
	48	1066	482	50,8	44	1099	490	52,4	47	1132	497	54,0	49
	50	1029	499	49,0	41	1061	506	50,6	44	1094	513	52,2	46

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
760	25	799	197	38,1	89	821	200	39,2	94	843	203	40,2	98
	30	779	215	37,2	85	801	218	38,2	89	822	221	39,3	94
	35	756	233	36,1	81	777	236	37,1	85	798	239	38,1	89
	40	727	252	34,7	75	748	256	35,7	79	768	259	36,7	83
	46	681	278	32,5	67	701	282	33,4	70	720	286	34,4	74
	48	662	287	31,6	64	681	291	32,5	67	700	295	33,4	70
	50	642	297	30,6	60	660	301	31,5	63	679	305	32,4	67
830	25	877	214	41,8	63	900	217	42,9	66	923	220	44,1	69
	30	855	233	40,8	60	878	237	41,9	63	901	240	43,0	66
	35	830	253	39,6	57	853	257	40,7	60	877	260	41,9	63
	40	800	274	38,2	53	822	278	39,2	56	845	282	40,4	59
	46	752	302	35,9	47	773	306	36,9	50	794	310	37,9	53
	48	732	312	34,9	45	753	316	35,9	48	774	321	36,9	50
	50	710	323	33,9	43	731	327	34,9	45	751	332	35,9	48
890	25	940	235	44,9	71	963	238	46,0	74	986	241	47,1	77
	30	916	256	43,7	68	942	260	45,0	71	964	263	46,0	74
	35	889	278	42,4	64	914	282	43,6	68	939	286	44,8	71
	40	855	301	40,8	60	878	305	41,9	63	902	310	43,1	66
	46	800	332	38,2	53	822	337	39,2	56	845	342	40,3	59
	48	778	344	37,1	51	800	348	38,2	53	822	353	39,2	56
	50	754	356	36,0	48	775	361	37,0	50	796	365	38,0	53
990	25	1060	260	50,6	68	1090	264	52,0	71	1121	268	53,5	75
	30	1033	283	49,3	64	1062	287	50,7	68	1092	292	52,1	71
	35	1001	307	47,8	61	1030	312	49,2	64	1059	316	50,6	68
	40	962	332	45,9	57	989	337	47,2	60	1017	342	48,6	63
	46	900	366	42,9	50	926	371	44,2	53	952	377	45,5	56
	48	875	379	41,7	48	900	384	43,0	50	926	389	44,2	53
	50	847	391	40,4	45	872	397	41,6	48	887	398	42,4	49
C10	25	1139	286	54,4	77	1170	290	55,9	81	1202	295	57,4	85
	30	1109	312	52,9	73	1141	316	54,4	77	1171	321	55,9	81
	35	1074	338	51,2	69	1104	343	52,7	73	1135	348	54,2	76
	40	1029	366	49,1	64	1058	371	50,5	67	1088	377	51,9	71
	46	959	404	45,7	56	986	410	47,1	59	1013	416	48,4	62
	48	930	417	44,4	53	956	423	45,7	56	983	429	47,0	59
	50	899	432	42,9	50	925	438	44,1	53	931	435	44,5	54
C11	25	1263	307	60,3	50	1298	311	62,0	52	1333	316	63,7	55
	30	1231	335	58,7	48	1266	340	60,4	50	1300	344	62,1	53
	35	1196	364	57,1	45	1230	368	58,7	48	1264	374	60,3	50
	40	1152	394	55,0	42	1185	399	56,5	44	1217	405	58,1	47
	46	1082	434	51,6	38	1113	440	53,1	40	1144	446	54,6	42
	48	1053	449	50,3	36	1084	455	51,7	38	1114	461	53,2	40
	50	1022	464	48,8	34	1051	470	50,2	36	1081	477	51,6	38
C12	25	1353	338	64,5	56	1389	343	66,3	59	1425	348	68,1	62
	30	1319	369	62,9	54	1355	374	64,7	57	1391	379	66,4	59
	35	1280	400	61,1	51	1315	406	62,8	54	1350	411	64,5	56
	40	1231	434	58,7	48	1265	440	60,4	50	1299	446	62,0	53
	46	1152	479	55,0	42	1184	486	56,5	44	1216	492	58,1	47
	48	1120	495	53,4	40	1151	502	54,9	42	1183	509	56,5	44
	50	1085	512	51,7	38	1115	519	53,2	40	1146	526	54,7	42
C13	25	1433	348	68,4	75	1475	353	70,4	79	1518	359	72,5	84
	30	1394	378	66,5	72	1435	384	68,5	76	1476	390	70,5	80
	35	1349	410	64,4	68	1388	416	66,3	71	1428	423	68,2	75
	40	1292	444	61,6	62	1329	450	63,5	66	1368	457	65,3	69
	46	1202	488	57,3	55	1237	495	59,0	58	1273	503	60,8	61
	48	1166	504	55,6	52	1200	512	57,3	55	1235	519	59,0	58
	50	1127	521	53,8	49	1160	528	55,4	52	1185	533	56,6	54

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	10 Pi (kW)	10 qw (l/s)	10 dpw (kPa)	11 Cc (kW)	11 Pi (kW)	11 qw (l/s)	11 dpw (kPa)	12 Cc (kW)	12 Pi (kW)	12 qw (l/s)	12 dpw (kPa)
760	25	865	205	41,3	103	887	208	42,4	108	909	211	43,5	113
	30	844	224	40,3	98	865	227	41,4	103	887	230	42,4	108
	35	819	243	39,1	93	840	246	40,2	98	862	249	41,2	102
	40	789	263	37,7	87	809	266	38,7	91	830	270	39,7	96
	46	739	290	35,3	78	759	294	36,3	81	779	298	37,2	85
	48	720	299	34,4	74	739	303	35,3	78	758	308	36,3	81
	50	698	309	33,3	70	717	314	34,3	73	716	309	34,2	73
830	25	946	223	45,2	72	970	225	46,4	75	994	228	47,6	79
	30	924	243	44,2	69	948	246	45,3	72	971	249	46,4	76
	35	899	263	43,0	66	922	267	44,1	69	945	270	45,2	72
	40	868	285	41,5	62	891	289	42,6	65	913	293	43,6	68
	46	816	314	39,0	55	838	319	40,1	58	860	323	41,1	61
	48	795	325	38,0	53	817	329	39,0	55	838	334	40,1	58
	50	772	336	36,9	50	788	338	37,6	52	798	337	38,1	53
890	25	1009	244	48,2	81	1032	247	49,3	84	1056	251	50,5	88
	30	987	266	47,2	78	1010	270	48,3	81	1033	273	49,4	84
	35	961	289	45,9	74	983	293	47,0	77	1006	297	48,1	80
	40	927	314	44,3	69	950	318	45,4	73	971	322	46,5	76
	46	867	346	41,4	62	891	351	42,6	65	914	356	43,7	68
	48	844	358	40,3	59	866	363	41,4	61	889	368	42,5	64
	50	818	370	39,1	55	829	371	39,6	57	828	364	39,6	57
990	25	1151	272	55,0	79	1182	276	56,5	82	1214	279	58,0	86
	30	1122	296	53,6	75	1152	300	55,1	79	1183	304	56,6	83
	35	1088	321	52,0	71	1117	325	53,4	74	1147	330	54,9	78
	40	1046	347	50,0	66	1074	352	51,3	69	1102	357	52,7	73
	46	978	382	46,7	59	1005	387	48,0	62	1032	393	49,4	65
	48	951	395	45,5	56	978	400	46,7	59	1004	406	48,0	61
	50	902	398	43,1	51	914	396	43,7	52	928	395	44,4	53
C10	25	1234	299	58,9	89	1266	303	60,5	93	1297	308	62,0	97
	30	1202	325	57,4	85	1234	330	59,0	89	1265	335	60,5	93
	35	1165	353	55,7	80	1195	358	57,1	84	1226	363	58,6	88
	40	1117	383	53,4	74	1147	388	54,8	78	1176	394	56,2	82
	46	1041	422	49,7	65	1069	428	51,1	69	1097	434	52,5	72
	48	1010	436	48,3	62	1037	442	49,6	65	1065	448	50,9	68
	50	938	431	44,8	54	936	422	44,7	54	940	415	45,0	55
C11	25	1369	320	65,4	58	1405	324	67,1	61	1441	329	68,9	63
	30	1335	349	63,8	55	1370	354	65,5	58	1406	358	67,2	61
	35	1298	379	62,0	52	1332	384	63,7	55	1366	389	65,3	58
	40	1250	410	59,7	49	1284	416	61,4	51	1317	421	63,0	54
	46	1175	452	56,2	44	1207	458	57,7	46	1239	464	59,2	48
	48	1145	467	54,7	42	1176	473	56,2	44	1207	480	57,7	46
	50	1112	483	53,1	40	1130	484	54,0	41	1144	482	54,7	42
C12	25	1462	352	69,9	65	1500	357	71,7	68	1538	362	73,5	71
	30	1427	384	68,2	62	1463	389	70,0	65	1501	395	71,8	68
	35	1385	417	66,2	59	1421	423	67,9	62	1457	428	69,6	65
	40	1333	452	63,7	55	1367	458	65,3	58	1401	465	67,0	60
	46	1249	499	59,7	49	1281	506	61,2	51	1314	513	62,8	54
	48	1215	516	58,0	47	1247	523	59,6	49	1279	530	61,1	51
	50	1177	534	56,2	44	1185	530	56,6	45	1183	520	56,6	45
C13	25	1561	364	74,6	88	1605	370	76,7	93	1650	376	78,9	97
	30	1518	396	72,5	84	1561	403	74,6	88	1604	409	76,7	93
	35	1468	429	70,1	79	1509	436	72,1	83	1550	443	74,1	87
	40	1406	464	67,2	73	1445	471	69,1	77	1484	479	71,0	80
	46	1309	510	62,5	64	1346	518	64,3	67	1382	526	66,1	71
	48	1270	527	60,7	61	1306	535	62,4	64	1342	543	64,2	67
	50	1185	524	56,6	54	1182	513	56,5	53	1187	506	56,8	54

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

		Condenser Inlet Air Temperature (°C)											
	Twout	13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
760	25	931	214	44,5	118	954	217	45,6	123	977	220	46,8	129
	30	909	233	43,5	113	931	236	44,6	118	953	239	45,6	123
	35	883	253	42,2	107	904	256	43,3	112	926	260	44,3	117
	40	850	274	40,7	100	871	277	41,7	105	892	281	42,7	109
	46	799	302	38,2	89	819	306	39,2	94	839	310	40,1	98
	48	778	312	37,2	85	798	316	38,2	89	817	320	39,1	93
	50	720	305	34,4	74	717	299	34,3	74	719	294	34,4	74
830	25	1018	231	48,7	82	1041	234	49,8	86	1064	237	50,9	89
	30	995	252	47,6	79	1018	255	48,7	82	1041	259	49,8	86
	35	968	274	46,3	75	992	277	47,5	79	1014	281	48,6	82
	40	935	297	44,7	71	958	301	45,8	74	980	304	46,9	77
	46	883	327	42,2	64	904	331	43,3	67	926	336	44,3	69
	48	860	338	41,2	61	883	343	42,2	64	904	347	43,3	67
	50	810	336	38,7	55	819	334	39,2	56	830	333	39,7	57
890	25	1079	254	51,6	91	1103	257	52,8	95	1127	260	54,0	99
	30	1056	276	50,5	88	1079	280	51,7	91	1103	283	52,8	95
	35	1028	300	49,2	84	1051	304	50,3	87	1074	308	51,4	91
	40	993	326	47,5	79	1015	330	48,6	82	1037	334	49,7	85
	46	938	361	44,9	71	959	365	45,9	74	979	370	46,9	77
	48	912	373	43,6	68	935	378	44,8	71	956	383	45,8	74
	50	832	359	39,8	57	829	351	39,7	57	831	345	39,8	57
990	25	1245	283	59,5	90	1276	288	61,1	95	1308	292	62,6	99
	30	1214	309	58,1	86	1244	313	59,5	90	1275	318	61,0	95
	35	1177	335	56,3	82	1207	339	57,8	86	1237	344	59,2	90
	40	1131	362	54,1	76	1160	367	55,5	80	1189	373	56,9	83
	46	1060	399	50,7	68	1087	404	52,0	71	1115	410	53,4	74
	48	1027	410	49,2	64	1040	409	49,8	66	1051	407	50,3	67
	50	939	393	44,9	54	956	393	45,8	56	966	391	46,2	57
C10	25	1330	312	63,6	102	1362	317	65,2	107	1395	321	66,8	111
	30	1296	340	62,0	97	1328	344	63,6	102	1360	349	65,1	106
	35	1256	368	60,1	92	1287	374	61,6	96	1318	379	63,1	100
	40	1205	399	57,7	85	1235	405	59,1	89	1264	411	60,5	93
	46	1126	440	53,8	76	1153	446	55,2	79	1181	453	56,6	83
	48	1086	452	51,9	71	1084	444	51,9	71	1081	434	51,8	70
	50	935	405	44,7	54	945	401	45,2	55	945	393	45,2	55
C11	25	1478	333	70,7	66	1515	338	72,5	69	1552	342	74,3	73
	30	1442	363	69,0	64	1478	368	70,8	67	1515	373	72,5	70
	35	1401	394	67,0	60	1437	399	68,7	63	1472	405	70,5	66
	40	1350	427	64,6	56	1384	433	66,2	59	1419	438	67,9	62
	46	1271	470	60,8	51	1303	477	62,4	53	1336	483	63,9	55
	48	1239	486	59,3	48	1271	493	60,8	51	1298	497	62,2	53
	50	1162	481	55,6	43	1175	478	56,2	44	1191	477	57,0	45
C12	25	1576	367	75,4	75	1615	373	77,3	78	1655	378	79,2	82
	30	1538	400	73,6	71	1576	406	75,4	75	1614	411	77,3	78
	35	1493	434	71,4	68	1529	440	73,2	71	1566	446	75,0	74
	40	1436	471	68,7	63	1471	477	70,4	66	1506	484	72,1	69
	46	1347	520	64,5	56	1380	527	66,0	59	1413	534	67,7	61
	48	1311	537	62,7	54	1344	544	64,3	56	1368	549	65,5	58
	50	1189	513	56,9	45	1184	501	56,7	45	1186	492	56,8	45
C13	25	1694	382	81,0	102	1739	388	83,2	107	1784	394	85,4	112
	30	1648	415	78,8	97	1691	422	80,9	102	1735	428	83,1	107
	35	1592	450	76,2	91	1635	457	78,2	96	1677	464	80,3	100
	40	1524	486	72,9	84	1564	493	74,8	89	1605	501	76,8	93
	46	1419	534	67,9	74	1456	542	69,7	78	1494	550	71,5	82
	48	1368	547	65,5	70	1366	537	65,4	69	1371	531	65,6	70
	50	1191	498	57,0	54	1193	489	57,1	54	1193	480	57,1	54

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
H14	25	1381	357	65,8	74	1422	363	67,8	78	1463	368	69,8	82
	30	1342	390	63,9	70	1382	396	65,9	74	1423	402	67,8	78
	35	1298	423	61,8	66	1337	430	63,7	70	1375	436	65,6	74
	40	1242	460	59,2	61	1279	467	61,0	65	1316	474	62,7	68
	46	1153	509	54,9	53	1187	516	56,6	56	1221	524	58,2	59
	48	1116	527	53,2	50	1149	534	54,8	53	1183	542	56,4	56
	50	1076	545	51,2	47	1097	547	52,3	49	1114	545	53,1	50
H15	25	1492	382	71,1	81	1536	388	73,2	85	1581	394	75,4	90
	30	1450	417	69,1	77	1493	424	71,2	81	1536	430	73,3	85
	35	1401	454	66,7	72	1442	461	68,7	76	1483	468	70,7	80
	40	1338	495	63,7	66	1376	502	65,6	70	1416	510	67,5	74
	46	1237	550	58,9	58	1273	558	60,7	61	1309	566	62,4	64
	48	1195	570	56,9	54	1231	578	58,6	57	1266	586	60,4	60
	50	1150	590	54,8	51	1160	587	55,3	51	1162	575	55,4	52
C16	25	1555	408	74,1	59	1599	414	76,2	62	1642	420	78,3	65
	30	1515	445	72,2	56	1559	451	74,3	59	1601	457	76,4	62
	35	1469	483	70,0	53	1511	489	72,0	56	1554	497	74,1	59
	40	1411	524	67,2	50	1451	531	69,2	52	1492	539	71,1	55
	46	1316	579	62,7	44	1354	587	64,5	46	1392	595	66,4	49
	48	1278	599	60,9	42	1315	607	62,7	44	1352	616	64,5	46
	50	1236	620	58,9	39	1272	629	60,6	41	1308	637	62,4	43
C17	25	1641	433	78,2	65	1686	439	80,4	68	1732	445	82,6	72
	30	1600	471	76,2	62	1645	478	78,4	65	1690	485	80,6	69
	35	1553	512	74,0	59	1597	519	76,1	62	1641	526	78,2	65
	40	1494	555	71,1	55	1535	563	73,2	58	1578	571	75,2	61
	46	1397	614	66,6	49	1437	623	68,5	51	1477	631	70,4	54
	48	1357	636	64,7	46	1396	645	66,6	49	1436	653	68,5	51
	50	1313	658	62,6	44	1351	667	64,4	46	1390	676	66,3	48
C18	25	1720	456	81,9	65	1768	462	84,3	68	1817	468	86,6	71
	30	1677	497	79,9	62	1724	503	82,2	65	1772	510	84,5	68
	35	1629	539	77,6	59	1675	546	79,8	62	1721	554	82,1	65
	40	1568	585	74,7	55	1612	593	76,8	58	1657	601	79,0	60
	46	1468	647	69,9	49	1510	656	72,0	51	1552	665	74,0	54
	48	1427	670	68,0	46	1468	679	70,0	49	1509	688	72,0	51
	50	1380	693	65,8	43	1422	703	67,8	46	1462	712	69,7	48
C19	25	1807	479	86,1	71	1857	485	88,5	74	1908	492	91,0	78
	30	1762	522	83,9	67	1812	529	86,3	71	1861	536	88,8	75
	35	1713	567	81,6	64	1761	574	83,9	67	1809	582	86,3	71
	40	1650	615	78,6	60	1696	624	80,9	63	1743	632	83,1	66
	46	1549	681	73,8	53	1592	690	75,9	56	1636	699	78,0	59
	48	1507	705	71,8	51	1549	714	73,8	54	1592	724	75,9	56
	50	1458	730	69,5	48	1502	740	71,6	51	1544	750	73,6	53
C20	25	1853	498	88,3	37	1901	504	90,6	39	1950	510	93,0	41
	30	1810	544	86,2	36	1857	550	88,5	37	1905	557	90,8	39
	35	1762	592	83,9	34	1808	599	86,2	35	1854	607	88,4	37
	40	1698	644	80,9	32	1743	653	83,1	33	1788	661	85,3	35
	46	1592	716	75,8	28	1635	725	77,9	30	1679	734	80,1	31
	48	1547	743	73,7	27	1590	752	75,8	28	1633	762	77,9	30
	50	1498	770	71,4	25	1540	780	73,4	27	1582	790	75,5	28
C21	25	1906	520	90,8	39	1955	526	93,2	41	2005	532	95,6	43
	30	1862	568	88,7	37	1910	575	91,0	39	1959	582	93,4	41
	35	1811	620	86,3	36	1858	627	88,6	37	1905	635	90,8	39
	40	1744	676	83,1	33	1790	685	85,3	35	1836	693	87,5	37
	46	1633	754	77,8	30	1677	764	79,9	31	1720	773	82,0	32
	48	1585	783	75,5	28	1629	793	77,6	29	1673	803	79,8	31
	50	1533	813	73,0	26	1576	823	75,1	28	1619	833	77,2	29
C22	25	1963	542	93,5	41	2013	549	95,9	43	2063	555	98,4	45
	30	1917	593	91,3	39	1966	601	93,7	41	2016	608	96,1	43
	35	1864	648	88,8	37	1912	656	91,1	39	1960	664	93,4	41
	40	1794	709	85,5	35	1840	718	87,7	37	1886	726	89,9	38
	46	1676	793	79,9	31	1721	803	82,0	32	1765	812	84,2	34
	48	1626	824	77,5	29	1671	834	79,6	31	1715	844	81,8	32
	50	1570	856	74,8	28	1614	867	76,9	29	1658	877	79,1	30

NOTES

Fluid: water
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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
H14	25	1505	374	71,8	87	1547	379	73,9	91	1590	385	75,9	96
	30	1464	408	69,8	82	1505	414	71,9	87	1547	420	73,9	91
	35	1415	443	67,5	77	1455	450	69,4	82	1495	456	71,4	86
	40	1353	481	64,6	72	1391	488	66,4	75	1429	495	68,3	79
	46	1256	532	59,9	63	1292	539	61,7	66	1327	547	63,4	69
	48	1217	550	58,1	59	1252	558	59,8	62	1273	559	60,8	64
	50	1130	542	53,9	52	1149	542	54,9	53	1160	537	55,4	54
H15	25	1626	400	77,6	95	1670	406	79,7	99	1714	412	81,9	104
	30	1580	437	75,4	90	1624	443	77,5	94	1667	450	79,6	99
	35	1525	475	72,8	84	1567	483	74,8	89	1610	490	76,9	93
	40	1455	517	69,4	77	1495	525	71,4	81	1536	533	73,3	85
	46	1346	574	64,2	67	1383	582	66,0	71	1420	591	67,8	74
	48	1302	594	62,1	63	1338	603	63,9	67	1348	598	64,4	68
	50	1162	562	55,4	52	1168	553	55,8	52	1173	544	56,0	53
C16	25	1686	426	80,4	69	1731	432	82,6	72	1776	438	84,8	75
	30	1645	464	78,5	66	1688	470	80,6	69	1732	477	82,7	72
	35	1596	503	76,1	62	1638	510	78,2	65	1681	518	80,3	68
	40	1533	546	73,1	58	1575	554	75,2	61	1615	562	77,1	64
	46	1431	603	68,3	51	1470	612	70,2	54	1510	620	72,1	56
	48	1390	624	66,3	48	1428	633	68,2	51	1467	642	70,0	53
	50	1345	646	64,2	46	1382	655	66,0	48	1401	656	66,9	49
C17	25	1778	451	84,8	75	1825	457	87,1	79	1872	463	89,4	83
	30	1735	491	82,8	72	1781	498	85,0	76	1827	505	87,2	79
	35	1685	533	80,4	68	1729	540	82,5	72	1774	548	84,7	75
	40	1621	579	77,3	64	1664	587	79,4	67	1707	595	81,5	70
	46	1517	640	72,4	57	1558	648	74,4	59	1599	657	76,4	62
	48	1475	662	70,4	54	1515	671	72,3	57	1555	680	74,3	59
	50	1429	685	68,2	51	1467	694	70,0	53	1494	698	71,4	55
C18	25	1866	474	89,0	75	1916	481	91,5	79	1967	487	93,9	83
	30	1820	517	86,9	72	1869	524	89,2	75	1919	531	91,6	79
	35	1768	561	84,4	68	1815	569	86,7	71	1863	577	89,0	75
	40	1702	609	81,2	64	1747	617	83,4	67	1793	626	85,6	70
	46	1595	673	76,1	56	1638	682	78,2	59	1682	692	80,3	62
	48	1551	697	74,0	54	1593	706	76,0	56	1636	716	78,1	59
	50	1503	721	71,7	51	1544	731	73,7	53	1582	740	75,6	56
C19	25	1959	498	93,5	82	2012	505	96,0	86	2065	512	98,6	90
	30	1912	543	91,2	78	1963	550	93,7	82	2015	558	96,2	86
	35	1858	590	88,6	74	1908	598	91,1	78	1958	606	93,5	82
	40	1790	640	85,4	70	1838	649	87,7	73	1886	657	90,1	77
	46	1680	708	80,2	62	1725	717	82,4	65	1771	727	84,6	68
	48	1636	733	78,0	59	1680	743	80,2	62	1724	752	82,3	65
	50	1586	759	75,7	56	1629	769	77,8	59	1673	779	79,9	62
C20	25	1999	516	95,4	43	2048	523	97,8	45	2098	529	100,2	47
	30	1953	564	93,2	41	2002	571	95,5	43	2051	578	97,9	45
	35	1901	614	90,7	39	1948	622	93,0	41	1996	629	95,3	43
	40	1833	669	87,5	36	1879	677	89,7	38	1925	686	91,9	40
	46	1723	744	82,2	33	1767	753	84,3	34	1810	762	86,4	36
	48	1676	771	80,0	31	1720	781	82,1	33	1763	790	84,2	34
	50	1625	800	77,5	29	1655	802	79,0	30	1684	802	80,4	31
C21	25	2055	539	98,0	45	2106	546	100,5	47	2157	552	103,0	49
	30	2008	590	95,8	43	2057	597	98,2	45	2108	604	100,6	47
	35	1953	643	93,2	41	2001	651	95,5	43	2049	659	97,9	45
	40	1882	702	89,8	38	1928	711	92,0	40	1974	719	94,3	42
	46	1764	783	84,2	34	1809	792	86,3	36	1853	802	88,5	37
	48	1716	812	81,9	32	1759	822	84,0	34	1803	832	86,1	35
	50	1662	843	79,3	31	1679	838	80,1	31	1694	830	80,9	32
C22	25	2115	562	100,9	47	2166	569	103,4	49	2219	576	106,0	51
	30	2066	616	98,6	45	2116	623	101,0	47	2168	631	103,5	49
	35	2008	672	95,8	43	2057	681	98,2	45	2106	689	100,6	47
	40	1933	735	92,2	40	1980	744	94,5	42	2027	754	96,8	44
	46	1809	822	86,3	36	1854	832	88,5	37	1898	842	90,7	39
	48	1758	854	83,9	34	1802	864	86,0	35	1846	875	88,1	37
	50	1702	888	81,2	32	1702	873	81,3	32	1708	858	81,5	32

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	10 Pi (kW)	10 qw (l/s)	10 dpw (kPa)	11 Cc (kW)	11 Pi (kW)	11 qw (l/s)	11 dpw (kPa)	12 Cc (kW)	12 Pi (kW)	12 qw (l/s)	12 dpw (kPa)
H14	25	1633	391	78,0	100	1676	397	80,1	105	1718	403	82,2	110
	30	1588	426	75,9	96	1630	433	77,9	100	1672	439	80,0	105
	35	1535	463	73,4	90	1576	470	75,3	94	1616	477	77,3	99
	40	1468	503	70,1	83	1507	511	72,0	87	1546	518	73,9	91
	46	1363	555	65,1	73	1399	563	66,9	76	1436	572	68,7	80
	48	1295	560	61,9	66	1311	557	62,6	68	1331	556	63,6	70
	50	1166	529	55,7	55	1165	518	55,7	55	1169	528	55,9	55
H15	25	1759	418	84,0	109	1804	424	86,2	114	1850	430	88,4	120
	30	1710	456	81,7	104	1754	463	83,8	109	1798	470	86,0	114
	35	1653	497	79,0	98	1694	505	81,0	102	1736	512	83,0	107
	40	1577	541	75,3	90	1618	550	77,3	94	1658	558	79,3	98
	46	1458	599	69,7	78	1496	608	71,5	82	1535	617	73,4	85
	48	1356	591	64,8	68	1354	578	64,7	68	1359	569	65,0	69
	50	1177	533	56,2	53	1178	522	56,3	53	1180	548	56,4	53
C16	25	1822	444	87,0	79	1868	450	89,3	83	1915	456	91,6	86
	30	1777	483	84,9	75	1822	490	87,1	79	1868	497	89,3	83
	35	1724	525	82,4	71	1767	532	84,5	75	1811	539	86,6	78
	40	1657	569	79,1	67	1698	577	81,2	70	1740	585	83,2	73
	46	1550	629	74,1	59	1590	638	76,0	62	1629	646	77,9	65
	48	1506	650	71,9	56	1545	659	73,9	59	1585	669	75,8	62
	50	1401	644	66,9	49	1409	636	67,3	50	1404	621	67,2	50
C17	25	1920	469	91,7	87	1969	476	94,1	91	2018	482	96,5	95
	30	1874	511	89,5	83	1921	518	91,8	87	1969	525	94,1	91
	35	1819	555	86,9	79	1865	563	89,1	82	1911	570	91,4	86
	40	1750	603	83,6	73	1794	611	85,8	77	1838	619	87,9	80
	46	1641	666	78,4	65	1682	675	80,4	68	1724	684	82,4	72
	48	1596	689	76,2	62	1637	698	78,2	65	1678	708	80,2	68
	50	1509	694	72,1	56	1528	692	73,1	58	1529	680	73,1	58
C18	25	2018	494	96,4	87	2070	501	99,0	91	2123	508	101,5	95
	30	1969	538	94,1	83	2020	546	96,5	87	2071	553	99,0	91
	35	1912	585	91,3	78	1961	592	93,7	82	2011	601	96,1	86
	40	1840	634	87,9	73	1887	643	90,2	77	1934	652	92,5	80
	46	1725	701	82,4	65	1769	710	84,6	68	1814	720	86,7	71
	48	1679	725	80,2	62	1722	735	82,3	65	1766	744	84,4	68
	50	1612	742	77,0	58	1641	745	78,4	60	1650	738	78,9	60
C19	25	2118	519	101,2	94	2173	526	103,8	99	2228	533	106,5	103
	30	2067	565	98,8	90	2121	573	101,4	95	2174	581	104,0	99
	35	2009	614	96,0	86	2060	622	98,5	90	2112	630	101,0	94
	40	1935	666	92,4	80	1984	675	94,8	84	2034	684	97,2	88
	46	1817	736	86,8	72	1863	746	89,1	75	1910	756	91,3	78
	48	1769	762	84,5	68	1814	772	86,7	72	1860	782	89,0	75
	50	1717	789	82,0	65	1761	799	84,2	68	1772	793	84,7	69
C20	25	2149	536	102,7	49	2200	542	105,2	51	2252	549	107,7	53
	30	2100	585	100,4	47	2151	593	102,8	49	2201	600	105,3	51
	35	2044	637	97,6	44	2092	645	100,0	46	2141	653	102,4	48
	40	1971	694	94,2	42	2018	703	96,4	43	2065	712	98,7	45
	46	1854	771	88,6	37	1898	781	90,7	39	1943	790	92,9	41
	48	1806	800	86,3	36	1850	809	88,4	37	1893	819	90,5	39
	50	1716	805	82,0	32	1747	806	83,5	34	1774	807	84,8	34
C21	25	2209	559	105,5	51	2261	566	108,1	53	2314	573	110,6	56
	30	2158	612	103,1	49	2209	619	105,6	51	2261	627	108,1	53
	35	2098	667	100,3	47	2148	676	102,7	49	2198	684	105,1	51
	40	2021	728	96,6	44	2069	737	98,9	45	2117	746	101,2	47
	46	1897	812	90,6	39	1942	821	92,8	41	1987	831	95,0	42
	48	1847	842	88,2	37	1891	852	90,4	39	1935	863	92,5	40
	50	1715	825	82,0	32	1735	819	82,9	33	1749	811	83,7	34
C22	25	2272	583	108,5	54	2325	590	111,1	56	2379	598	113,8	58
	30	2219	639	106,0	52	2271	647	108,6	54	2324	655	111,1	56
	35	2156	698	103,0	49	2207	706	105,5	51	2257	715	107,9	53
	40	2075	763	99,1	46	2123	772	101,5	48	2172	782	103,9	50
	46	1943	852	92,8	41	1989	863	95,1	42	2035	873	97,3	44
	48	1890	885	90,3	39	1934	896	92,5	40	1979	907	94,6	42
	50	1714	843	81,9	32	1722	829	82,3	33	1728	814	82,6	33

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 13 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	14 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	15 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1762	409	84,3	115	1805	415	86,4	121	1850	421	88,6	126
	30	1714	446	82,0	110	1756	452	84,1	115	1799	459	86,1	120
	35	1657	484	79,3	103	1698	492	81,2	108	1738	499	83,2	113
	40	1585	526	75,8	95	1624	534	77,7	100	1664	542	79,6	104
	46	1458	573	69,8	82	1475	570	70,6	84	1496	570	71,6	86
	48	1346	553	64,4	71	1350	545	64,6	72	1348	534	64,5	71
	50	1167	516	55,8	55	1168	505	55,9	55	1177	499	56,3	56
H15	25	1896	437	90,7	125	1943	443	93,0	131	1990	450	95,3	137
	30	1842	477	88,1	119	1887	484	90,3	124	1932	491	92,5	130
	35	1778	520	85,1	111	1821	527	87,1	116	1864	535	89,2	121
	40	1698	566	81,2	103	1739	574	83,2	107	1779	583	85,2	112
	46	1543	612	73,8	86	1540	599	73,7	86	1546	590	74,0	87
	48	1363	559	65,2	69	1365	548	65,3	69	1365	536	65,4	69
	50	1183	537	56,6	54	1183	525	56,6	54	1191	516	57,0	54
C16	25	1962	463	93,9	90	2010	470	96,2	94	2059	476	98,6	99
	30	1914	504	91,5	86	1960	511	93,8	90	2007	518	96,1	94
	35	1856	547	88,8	82	1901	555	91,0	85	1946	562	93,2	89
	40	1783	593	85,3	76	1825	602	87,4	79	1869	610	89,5	83
	46	1669	655	79,8	68	1709	664	81,8	71	1749	673	83,7	74
	48	1623	677	77,7	64	1622	667	77,6	64	1629	659	78,0	65
	50	1409	611	67,4	50	1411	600	67,5	50	1412	588	67,6	50
C17	25	2067	489	98,9	99	2118	496	101,3	104	2168	503	103,8	108
	30	2017	533	96,5	95	2066	540	98,9	99	2116	548	101,3	104
	35	1958	578	93,7	90	2005	586	95,9	94	2052	594	98,3	98
	40	1883	627	90,1	84	1928	636	92,3	88	1973	645	94,5	91
	46	1766	693	84,5	75	1808	702	86,5	78	1851	712	88,6	81
	48	1719	717	82,2	71	1733	713	82,9	72	1753	711	83,9	74
	50	1531	668	73,3	58	1536	657	73,5	58	1534	643	73,4	58
C18	25	2176	515	104,1	99	2230	522	106,7	104	2285	530	109,4	108
	30	2123	561	101,6	95	2176	569	104,1	99	2229	577	106,7	104
	35	2061	609	98,6	90	2112	617	101,0	94	2163	626	103,5	98
	40	1982	660	94,8	84	2031	669	97,2	88	2080	679	99,6	92
	46	1859	729	88,9	75	1905	739	91,1	78	1951	749	93,4	82
	48	1810	754	86,6	71	1844	759	88,3	74	1875	762	89,7	76
	50	1659	729	79,3	61	1657	715	79,3	61	1661	703	79,5	61
C19	25	2283	540	109,2	108	2340	547	112,0	113	2397	555	114,8	118
	30	2229	589	106,6	104	2284	597	109,3	108	2339	605	112,0	113
	35	2165	639	103,6	98	2218	648	106,1	103	2271	656	108,7	107
	40	2084	693	99,7	92	2135	702	102,2	96	2186	712	104,7	100
	46	1957	766	93,6	82	2005	776	96,0	86	2054	786	98,3	90
	48	1907	792	91,2	78	1953	802	93,5	82	2001	813	95,8	85
	50	1782	785	85,3	69	1778	768	85,1	69	1784	757	85,4	70
C20	25	2304	556	110,2	55	2357	563	112,8	58	2411	570	115,4	60
	30	2252	607	107,8	53	2304	615	110,3	55	2356	623	112,8	58
	35	2191	661	104,8	50	2241	670	107,2	53	2291	678	109,7	55
	40	2113	720	101,1	47	2161	729	103,4	49	2209	738	105,8	51
	46	1988	800	95,1	42	2033	810	97,3	44	2079	820	99,5	46
	48	1926	823	92,2	40	1955	823	93,6	41	1988	826	95,2	42
	50	1771	791	84,7	34	1777	779	85,0	35	1775	780	85,0	35
C21	25	2367	580	113,2	58	2421	588	115,9	60	2476	595	118,5	63
	30	2313	635	110,6	56	2366	643	113,2	58	2419	651	115,8	60
	35	2248	693	107,5	53	2299	701	110,0	55	2350	710	112,5	57
	40	2165	756	103,6	49	2214	765	105,9	51	2263	775	108,3	53
	46	2033	842	97,2	44	2079	852	99,5	46	2125	862	101,7	48
	48	1957	861	93,6	41	1971	852	94,3	42	1992	847	95,3	43
	50	1752	795	83,8	34	1756	781	84,0	34	1756	802	84,1	34
C22	25	2434	605	116,4	61	2489	613	119,1	63	2545	620	121,8	66
	30	2377	663	113,7	58	2431	671	116,3	61	2485	680	119,0	63
	35	2309	724	110,4	55	2360	733	113,0	58	2412	743	115,5	60
	40	2221	792	106,2	52	2270	802	108,6	54	2320	812	111,1	56
	46	2081	884	99,5	46	2127	895	101,8	48	2174	906	104,1	50
	48	1987	897	95,1	42	1990	881	95,2	42	1994	866	95,5	43
	50	1732	798	82,8	33	1733	781	83,0	33	1741	824	83,3	33

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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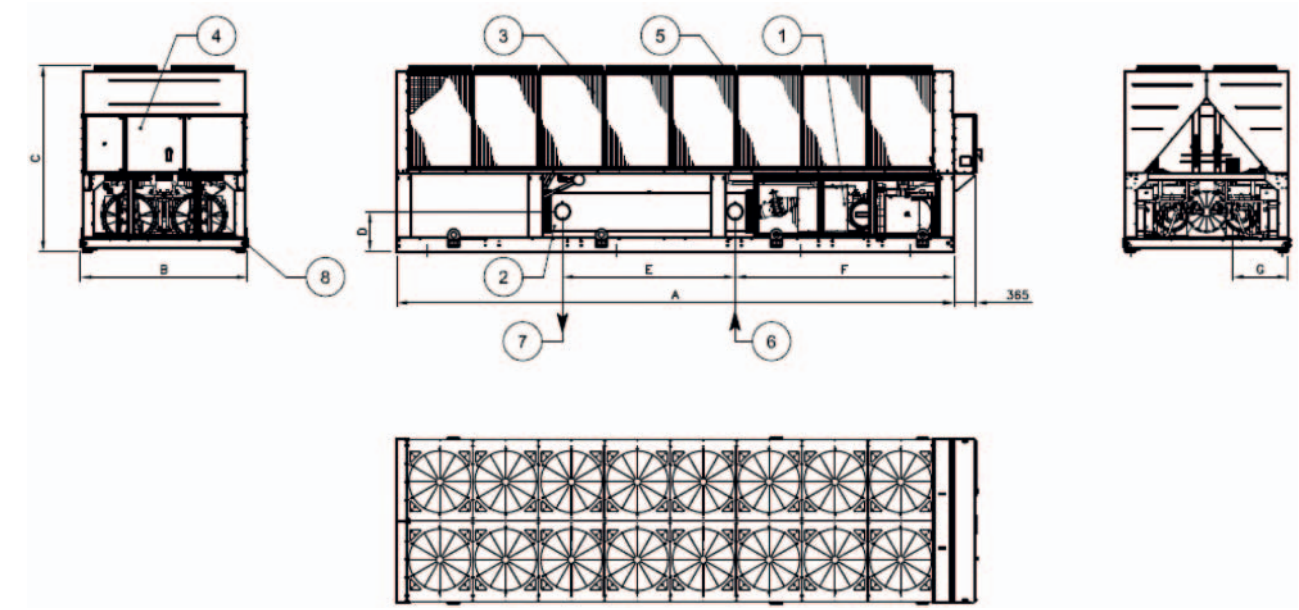
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

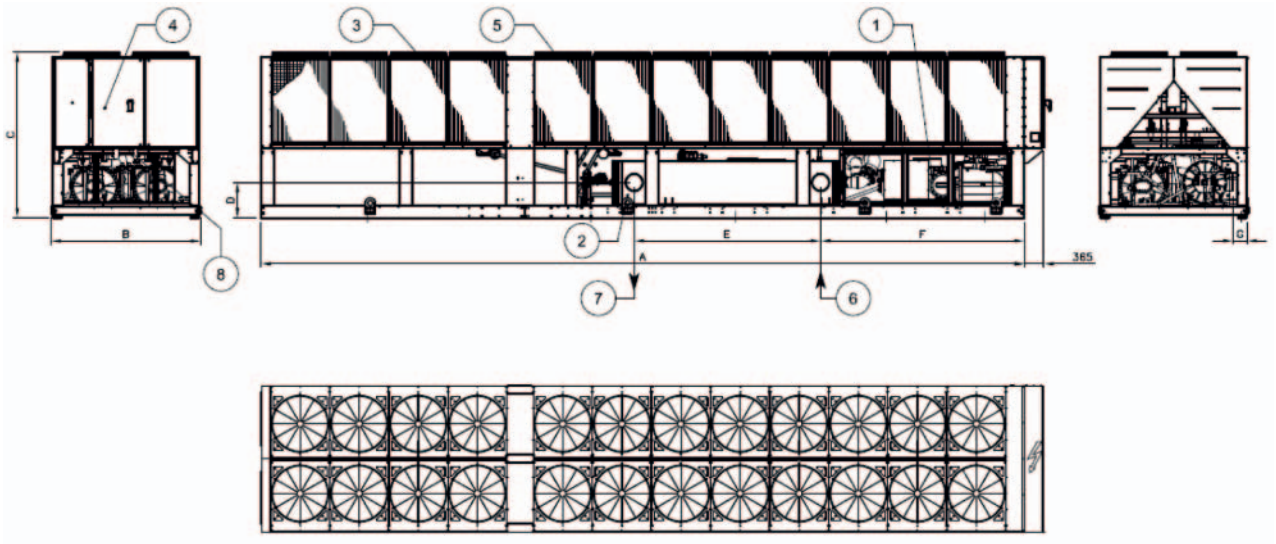
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (3 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-		Dimensions (mm)							Fans
Size	Size	A	B	C	D	E	F	G	
EWADC14÷C15C-SS/SL	EWADC13÷C14C-SR	10185	2285	2540	4440	2360	540	285	Nr 20
EWADC16÷C17C-SS/SL	EWADC15÷C16C-SR	11085	2285	2540	5340	2360	540	285	Nr 22
EWADC18C-SS/SL	EWADC17C-SR	11085	2285	2540	4780	2840	540	210	Nr 22
EWADC19÷C20C-SS/SL	EWADC18÷C19C-SR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC14C-XS/XL	EWADC14C-XR	11985	2285	2540	5680	2910	540	285	Nr 24
EWADC15÷C16C-XS/XL	EWADC15÷C16C-XR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC17C-XS/XL	EWADC17C-XR	12885	2285	2540	6580	2840	540	210	Nr 26
EWADC18C-XS/XL	EWADC18C-XR	13785	2285	2540	7480	2840	540	210	Nr 28
EWADC19C- XS/XL	EWADC19C-XR	14685	2285	2540	8380	2840	540	210	Nr 30
EWADH14÷H15C-XS/XL/XR		14685	2285	2285	8380	2840	540	210	Nr 30

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-XS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
760	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,2**
830	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,5**
890	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,5**
990	75,1	77,2	80,0	79,2	75,1	70,6	61,0	51,9	**80,2**	**101,4**
C10	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
C11	75,2	77,3	80,1	79,3	75,2	70,7	61,1	52,0	**80,3**	**102,4**
C12	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
C13	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
H14	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
H15	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
C16	75,8	77,9	80,7	79,9	75,8	71,3	61,7	52,6	**80,9**	**103,2**
C17	75,7	77,8	80,6	79,8	75,7	71,2	61,6	52,5	**80,8**	**103,5**
C18	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,7**
C19	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C20	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C21	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C22	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**

EWAD~C-XL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
760	71,2	73,3	76,1	75,3	71,2	66,7	57,1	48,0	**76,3**	**96,8**
830	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,4**
890	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,4**
990	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,0**
C10	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**98,2**
C11	71,6	73,7	76,5	75,7	71,6	67,1	57,5	48,4	**76,7**	**98,8**
C12	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
C13	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
H14	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
H15	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
C16	72,2	74,3	77,1	76,3	72,2	67,7	58,1	49,0	**77,3**	**99,6**
C17	72,3	74,4	77,2	76,4	72,3	67,8	58,2	49,1	**77,4**	**100,0**
C18	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,2**
C19	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C20	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C21	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C22	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**

EWAD~C-XR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
740	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
810	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,3**
870	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,3**
970	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**93,5**
C10	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**93,7**
C11	68,8	62,0	69,1	74,3	61,7	58,1	49,8	37,2	**72,2**	**94,3**
C12	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,5**
C13	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,5**
H14	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**94,6**
H15	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**94,6**
C16	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**95,3**
C17	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**95,6**
C18	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,7**
C19	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,9**
C20	69,9	63,1	70,2	75,4	62,8	59,2	50,9	38,3	**73,3**	**96,2**
C21	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**96,6**
C22	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**96,6**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

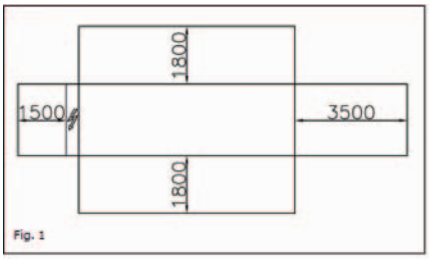

Fig. 1

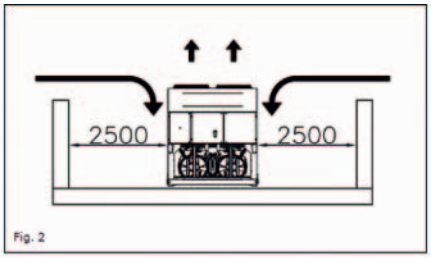

Fig. 2

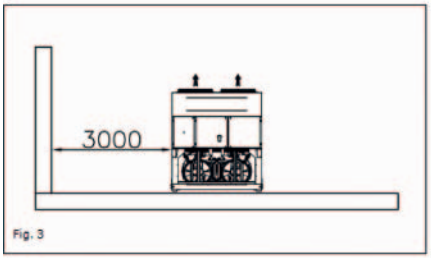

Fig. 3

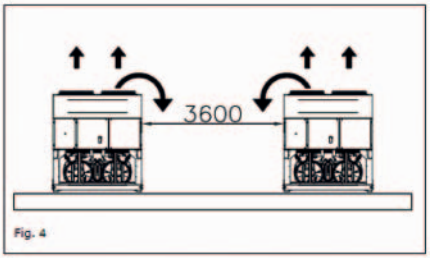

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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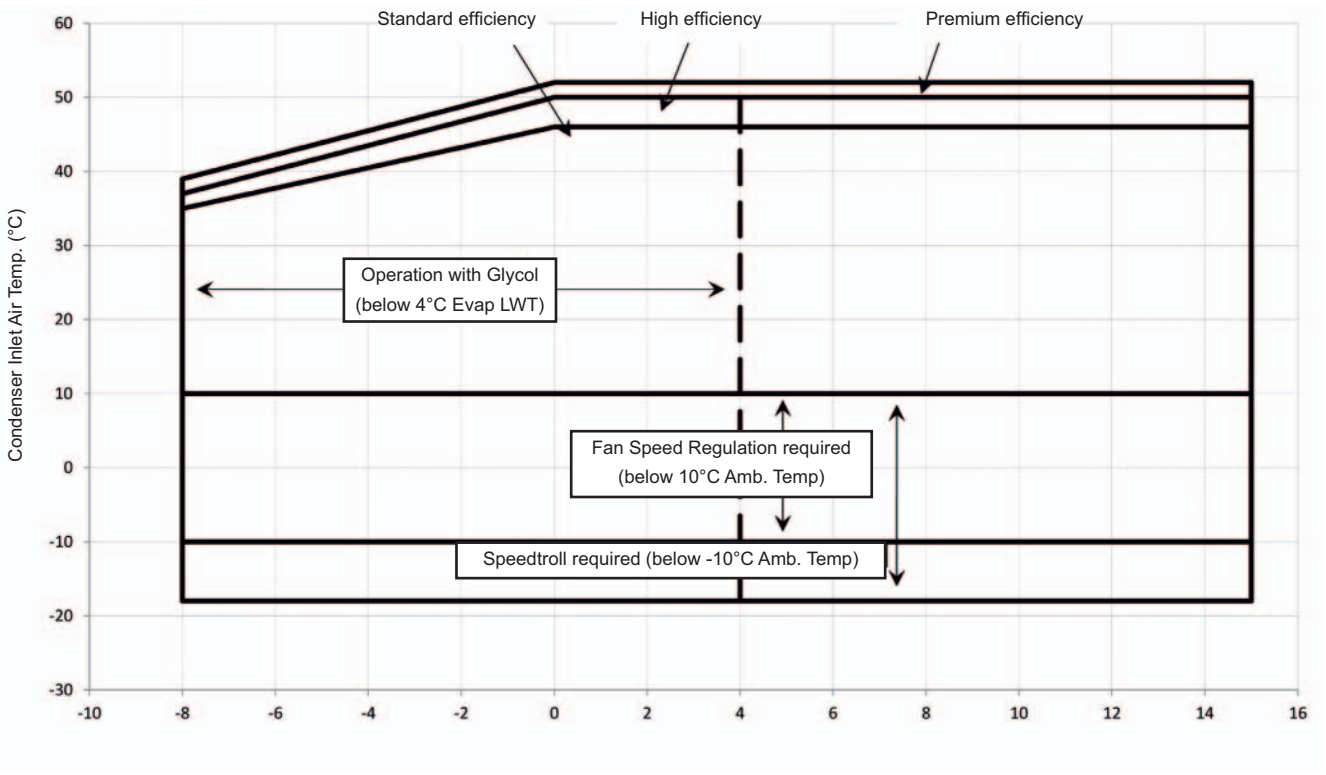
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

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13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

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TABLE OF CONTENTS

EWAD-C-XL

1 Features

- Wide capacity range: 19 sizes to cover a range from 756 to 2,008 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 50ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2-3 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 760C-XL	EWAD 830C-XL	EWAD 890C-XL	EWAD 990C-XL	EWAD C10C-XL	EWAD C11C-XL	EWAD C12C-XL	EWAD C13C-XL	EWAD H14C-XL	EWAD H15C-XL
Cooling capacity	Nom.			kW	756 (1)	830 (1)	889 (1)	1,001 (1)	1,074 (1)	1,196 (1)	1,280 (1)	1,349 (1)	1,415 (1)	1,525 (1)
Capacity control	Method				Stepless									
	Minimum capacity			%	12.5									
Power input	Cooling	Nom.		kW	233 (1)	253 (1)	278 (1)	307 (1)	338 (1)	364 (1)	400 (1)	410 (1)	443 (1)	475 (1)
EER					3.25 (1)	3.28 (1)	3.20 (1)	3.26 (1)	3.18 (1)	3.29 (1)	3.2 (1)	3.29 (1)	3.19 (1)	3.21 (1)
ESEER					4.02	4.11	4.02	4.11	4.05	4.14	4.02	4.28	4.30	4.33
IPLV					4.48		4.44	4.48	4.44	4.51	4.47	4.59	4.71	4.81
Casing	Colour				Ivory white									
	Material				Galvanized and painted steel sheet									
Dimensions	Unit	Height		mm	2,540									
		Width		mm	2,285									
		Depth		mm	6,185	7,085		7,985		9,785				
Weight	Unit			kg	6,280	6,630	6,650	7,480	7,760	8,510	8,530	9,190		
	Operation weight			kg	6,520	6,870	6,890	7,880	8,160	8,900	8,920	10,180		
Water heat exchanger	Type				Single pass shell & tube									
	Water volume			l	251	243		403		386		979		
	Nominal water flow	Cooling		l/s	36.1	39.6	42.4	47.8	51.2	57.1	61.1	64.4	67.5	72.8
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	81	57	64	61	69	45	51	68	77	84
	Insulation material				Closed cell									
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler									
Fan	Quantity				12	14		16		20				
	Type				Direct propeller									
	Diameter			mm	800									
	Air flow rate	Nom.		l/s	64,131	74,819		85,508		106,885				
	Speed			rpm	900									
Fan motor	Drive				DOL									
	Input	Cooling		W	21,000	24,500		28,000		35,000				
Sound power level	Cooling	Nom.		dBA	96.8	97.4		98.0	98.2	98.8	98.9			
Sound pressure level	Cooling	Nom.		dBA	76.3	76.5		76.9	77.1	76.7	76.8			
Compressor	Type				Asymm single screw									
	Quantity				2									
	Oil	Charged volume		l	38			44	50					
Operation range	Water side	Cooling	Min.	ºCDB	-8									
			Max.	ºCDB	15									
	Air side	Cooling	Min.	ºCDB	-18									
			Max.	ºCDB	52									
Refrigerant	Type				R-134a									
	Circuits	Quantity			2									
Refrigerant circuit	Charge			kg	146	162		182		214		225	248	
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm			219.1mm				273mm		
Safety devices	Item	01			High discharge pressure (pressure switch)									
		02			High discharge pressure (pressure transducer)									
		03			Low suction pressure (pressure transducer)									
		04			Compressor motor protection									
		05			High discharge temperature									
		06			Low oil pressure									
		07			Low pressure ratio									
		08			High oil filter pressure drop									
		09			Phase monitor									
		10			Emergency stop									
		11			Water freeze protection controller									

2 Specifications

2-1 Technical Specifications					EWAD C14C-XL	EWAD C15C-XL	EWAD C16C-XL	EWAD C17C-XL	EWAD C18C-XL	EWAD C19C-XL	EWAD C20C-XL	EWAD C21C-XL	EWAD C22C-XL
Cooling capacity	Nom.			kW	1,409 (1)	1,526 (1)	1,596 (1)	1,685 (1)	1,768 (1)	1,858 (1)	1,901 (1)	1,953 (1)	2,008 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	7								
Power input	Cooling	Nom.		kW	437 (1)	474 (1)	503 (1)	533 (1)	561 (1)	590 (1)	614 (1)	643 (1)	672 (1)
EER					3.23 (1)	3.22 (1)	3.17 (1)	3.16 (1)	3.15 (1)		3.09 (1)	3.04 (1)	2.99 (1)
ESEER					4.23	4.19	4.17	4.16	4.13		4.11	4.02	3.99
IPLV					4.56	4.54	4.52		4.47		4.48	4.39	
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,540								
		Width		mm	2,285								
		Depth		mm	11,985			12,885	13,785	14,685			
Weight	Unit			kg	11,000	11,760	12,010	12,350	12,700	13,040			
	Operation weight			kg	11,490	12,610	12,870	13,200	13,580	13,910			
Water heat exchanger	Type				Single pass shell & tube								
	Water volume			l	491	850			871	850			
	Nominal water flow	Cooling		l/s	67.34	72.9	76.1	80.4	84.4	88.6	90.7	93.2	95.8
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	77	57	62	68		74	39	41	43
	Insulation material				Closed cell								
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler								
Fan	Quantity				24			26	28	30			
	Type				Direct propeller								
	Diameter			mm	800								
	Air flow rate	Nom.		l/s	128,266		128,262	138,950	149,639	160,327			
	Speed			rpm	920		900						
Fan motor	Drive				DOL								
	Input	Cooling		W	1,750		42,000	45,500	49,000	52,500			
Sound power level	Cooling	Nom.		dBA	99.6			100.0	100.2	100.4			
Sound pressure level	Cooling	Nom.		dBA	77.1	77.2	77.3	77.4	77.5				
Compressor	Type				Semi-hermetic single screw compressor		Asymm single screw						
	Quantity				3								
	Oil	Charged volume		l	63	69	75						
Operation range	Water side	Cooling	Min.	ºCDB	-8								
			Max.	ºCDB	15								
	Air side	Cooling	Min.	ºCDB	-18								
			Max.	ºCDB	50		52						
Refrigerant	Type				R-134a								
	Circuits	Quantity			3								
Refrigerant circuit	Charge			kg	-		297	312	328	343			
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm	273mm							
Safety devices	Item	01			High discharge pressure (pressure switch)								
		02			High discharge pressure (pressure transducer)								
		03			Low suction pressure (pressure transducer)								
		04			Compressor motor protection								
		05			High discharge temperature								
		06			Low oil pressure								
		07			Low pressure ratio								
		08			High oil filter pressure drop								
		09			Phase monitor								
		10			Emergency stop								
		11			Water freeze protection controller								

2 Specifications

2-2 Electrical Specifications				EWAD 760C-XL	EWAD 830C-XL	EWAD 890C-XL	EWAD 990C-XL	EWAD C10C-XL	EWAD C11C-XL	EWAD C12C-XL	EWAD C13C-XL	EWAD H14C-XL	EWAD H15C-XL
Compressor	Phase			3~									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
	Maximum running current		A	231		274		333		398			451
	Starting method			Wye-delta									
Compressor 2	Maximum running current		A	231	274		333		398			451	
Power supply	Phase			3~									
	Frequency		Hz	50									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
Unit	Maximum starting current		A	618	657		923	970	1,029			1,072	1,085
	Nominal running current (RLA)	Cooling	A	387	423	463	511	559	607	667.0	686	731	778
	Maximum running current		A	510	561	605	672	731	811	875		929	982
	Max unit current for wires sizing		A	556	612	660	733	797	884	955		1,013	1,072
Fans	Nominal running current (RLA)		A	48	56		64		80				

2-2 Electrical Specifications				EWAD C14C-XL	EWAD C15C-XL	EWAD C16C-XL	EWAD C17C-XL	EWAD C18C-XL	EWAD C19C-XL	EWAD C20C-XL	EWAD C21C-XL	EWAD C22C-XL
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	269	326	333		398			451	
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	269	326	333		398			451	
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	1,167.4	1,213	1,268	1,328	1,387		1,430	1,472	1,486
	Nominal running current (RLA)	Cooling	A	729 (5)	787 (5)	835	885	934.0	984	1,018	1,059	1,100
	Maximum running current		A	960	1,017	1,096	1,168	1,241	1,313	1,366	1,419	1,473
	Max unit current for wires sizing		A	1,056	1,119	1,196	1,275	1,354	1,432	1,491	1,549	1,608
Fans	Nominal running current (RLA)		A	96			104	112	120			

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

(9) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

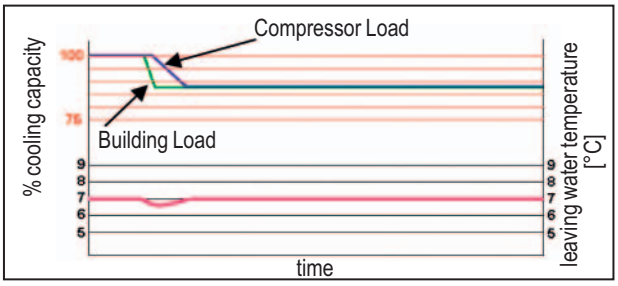
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

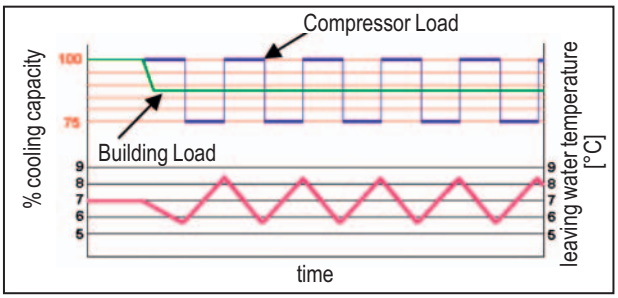
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

FTA_1-2b_Rev.02_1

3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

FTA_1-2b_Rev.02_2b

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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

GNC_1a-2a-3a-4a_Rev.01_1a

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 and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
- High pressure (pressure switch).
- High pressure (transducer).
- Low pressure (transducer).
- Fans circuit breaker.
- 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.

GNC_1a-2a-3a-4a_Rev.01_2a

4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

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5 Nomenclature

5 - 1 Nomenclature

Nomenclature

Name	E W A	D	2 0 0	C	-	S	S
Digits	1 2 3	4	5 6 7	8	9	10	11

Machine type
EWA = Air-cooled chiller, cooling only
EWY = Air-cooled chiller, heat pump
EWL = Remote condenser chiller
ERA = Air cooled condensing unit
EWW = Water-cooled chiller, cooling only
EWC = Air-cooled chiller, cooling only with centrifugal fan
EWR = Air-cooled chiller, cooling only with heat recovery

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

Capacity class in kW (Cooling)
Approximation of cooling capacity

Model series
Letter A, B,… : major modification

Inverter
- = Non-inverter
Z = Inverter

Efficiency level
S = Standard efficiency
X = High efficiency
P = Premium efficiency
H = High ambient

Sound level
L = Low noise
S = Standard noise
R = Reduced noise
X = Extra low noise
C = Cabinet

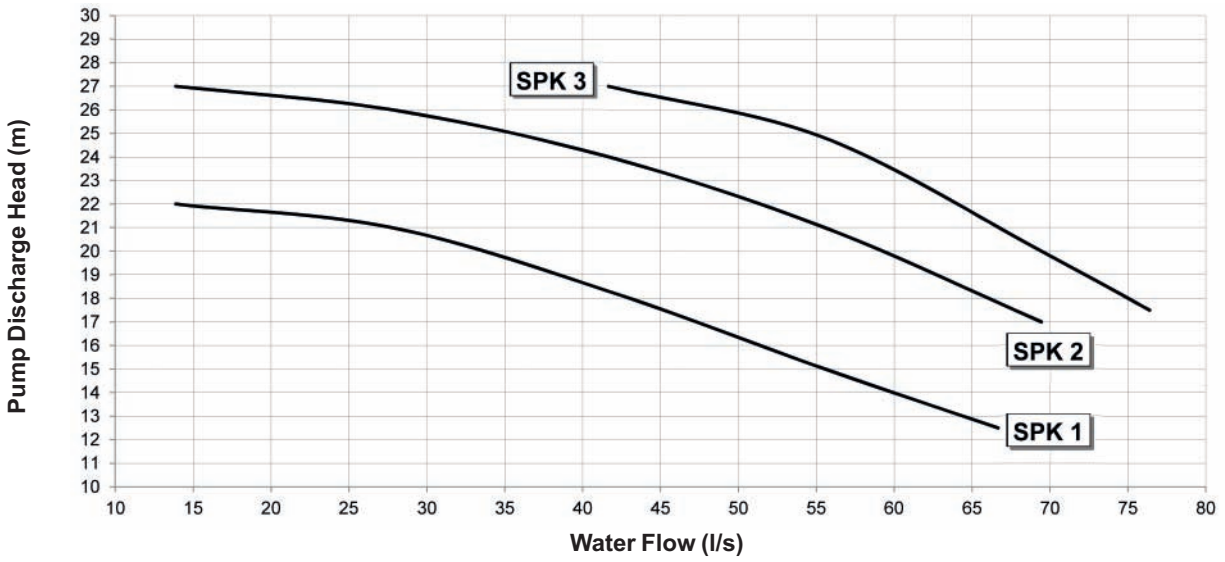
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

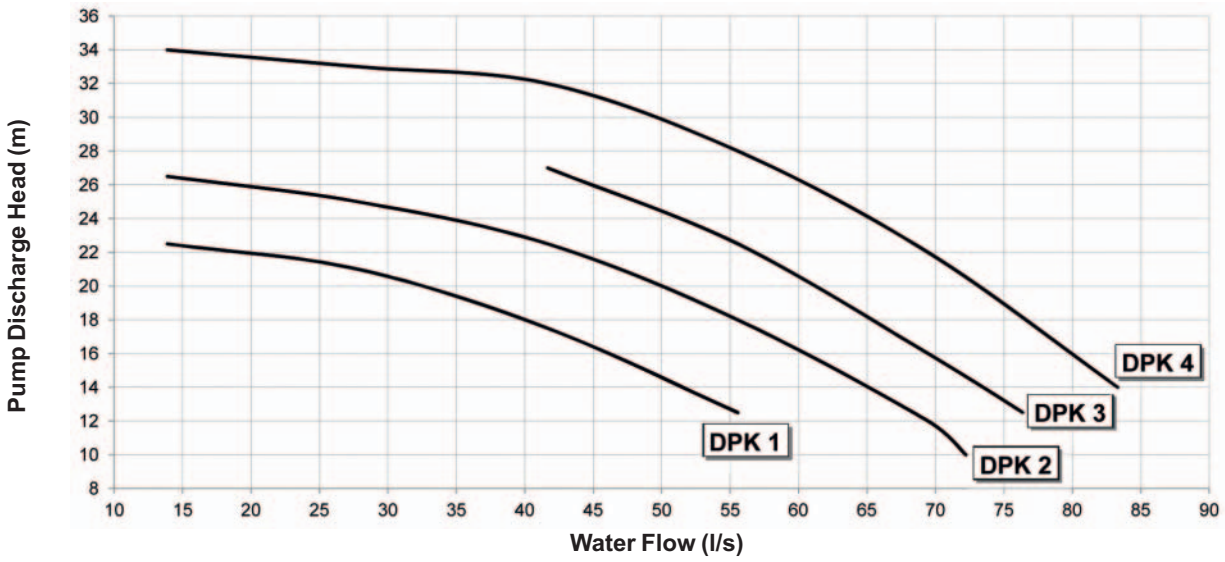
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

WPKTI_1a-2a-3a_Rev.03_1a

6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

WPKCM_1a-2a-3a_Rev.03_2a

7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
760	25	734	189	35,0	76	756	192	36,0	80	777	194	37,1	85
	30	715	206	34,1	73	736	209	35,1	77	757	212	36,1	81
	35	694	223	33,1	69	715	226	34,1	73	735	229	35,1	77
	40	668	242	31,8	64	687	245	32,8	68	707	249	33,7	72
	46	625	267	29,8	57	643	270	30,7	60	662	274	31,6	64
	48	607	276	28,9	54	625	279	29,8	57	644	283	30,7	60
	50	587	285	28,0	51	605	289	28,8	54	624	293	29,7	57
830	25	805	206	38,3	54	829	208	39,5	57	853	211	40,7	60
	30	784	224	37,3	51	807	227	38,5	54	831	230	39,6	57
	35	761	243	36,3	49	784	246	37,4	51	807	250	38,5	54
	40	734	263	35,0	45	755	267	36,0	48	777	270	37,1	50
	46	690	290	32,8	41	710	294	33,8	43	731	298	34,8	45
	48	671	300	32,0	39	691	304	32,9	41	712	308	33,9	43
	50	651	311	31,0	37	670	315	32,0	39	690	319	32,9	41
890	25	864	226	41,2	61	889	229	42,4	64	915	232	43,6	68
	30	842	246	40,1	58	866	249	41,3	61	891	253	42,5	64
	35	817	266	38,9	55	840	270	40,1	58	865	274	41,2	61
	40	786	289	37,4	51	808	293	38,5	54	831	297	39,6	57
	46	736	319	35,0	46	757	323	36,1	48	779	328	37,1	51
	48	715	330	34,0	43	736	335	35,1	46	757	339	36,1	48
	50	692	342	32,9	41	712	346	33,9	43	733	351	35,0	45
990	25	972	249	46,3	58	1001	253	47,7	61	1031	256	49,1	64
	30	946	271	45,0	55	974	275	46,4	58	1003	279	47,8	61
	35	917	294	43,7	52	945	298	45,0	55	973	303	46,4	58
	40	881	319	42,0	48	908	323	43,3	51	935	328	44,6	54
	46	824	351	39,3	43	849	356	40,5	45	874	361	41,7	48
	48	801	363	38,2	41	825	368	39,3	43	850	373	40,5	45
	50	775	376	36,9	38	799	381	38,1	41	823	386	39,2	43
C10	25	1045	274	49,8	66	1076	278	51,3	69	1108	282	52,8	73
	30	1017	298	48,5	63	1047	302	49,9	66	1078	307	51,4	70
	35	985	323	46,9	59	1014	328	48,3	62	1044	333	49,8	66
	40	945	350	45,0	55	973	355	46,4	58	1001	361	47,7	61
	46	880	387	41,9	48	906	392	43,2	51	932	398	44,4	54
	48	853	400	40,6	46	878	406	41,9	48	904	412	43,1	51
	50	824	414	39,2	43	849	420	40,4	45	874	426	41,7	48
C11	25	1161	295	55,3	43	1194	299	56,9	45	1229	303	58,6	47
	30	1130	322	53,8	41	1164	326	55,5	43	1197	331	57,1	45
	35	1097	349	52,3	39	1130	354	53,9	41	1163	359	55,5	43
	40	1057	378	50,3	36	1088	383	51,9	38	1120	389	53,4	40
	46	992	417	47,2	32	1022	423	48,7	34	1052	428	50,1	36
	48	965	431	46,0	31	994	437	47,4	32	1024	443	48,8	34
	50	935	446	44,5	29	963	452	45,9	31	993	458	47,3	32
C12	25	1245	325	59,3	49	1280	329	61,0	51	1316	334	62,8	54
	30	1213	354	57,8	46	1248	359	59,5	49	1283	364	61,2	51
	35	1177	384	56,1	44	1211	389	57,7	46	1245	395	59,4	49
	40	1132	416	53,9	41	1165	422	55,5	43	1198	428	57,1	45
	46	1058	460	50,4	36	1089	466	51,9	38	1120	472	53,4	40
	48	1028	475	48,9	34	1058	482	50,4	36	1089	489	51,9	38
	50	994	492	47,3	32	1024	499	48,8	34	1054	506	50,3	36
C13	25	1311	332	62,5	64	1352	337	64,4	68	1392	343	66,4	71
	30	1274	361	60,7	61	1314	367	62,6	64	1354	373	64,6	68
	35	1233	392	58,7	57	1271	398	60,6	61	1310	404	62,5	64
	40	1181	424	56,3	53	1218	430	58,0	56	1254	437	59,8	59
	46	1099	467	52,4	47	1133	474	54,0	49	1167	481	55,7	52
	48	1066	482	50,8	44	1099	490	52,4	47	1132	497	54,0	49
	50	1029	499	49,0	41	1061	506	50,6	44	1094	513	52,2	46

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
760	25	799	197	38,1	89	821	200	39,2	94	843	203	40,2	98
	30	779	215	37,2	85	801	218	38,2	89	822	221	39,3	94
	35	756	233	36,1	81	777	236	37,1	85	798	239	38,1	89
	40	727	252	34,7	75	748	256	35,7	79	768	259	36,7	83
	46	681	278	32,5	67	701	282	33,4	70	720	286	34,4	74
	48	662	287	31,6	64	681	291	32,5	67	700	295	33,4	70
	50	642	297	30,6	60	660	301	31,5	63	679	305	32,4	67
830	25	877	214	41,8	63	900	217	42,9	66	923	220	44,1	69
	30	855	233	40,8	60	878	237	41,9	63	901	240	43,0	66
	35	830	253	39,6	57	853	257	40,7	60	877	260	41,9	63
	40	800	274	38,2	53	822	278	39,2	56	845	282	40,4	59
	46	752	302	35,9	47	773	306	36,9	50	794	310	37,9	53
	48	732	312	34,9	45	753	316	35,9	48	774	321	36,9	50
	50	710	323	33,9	43	731	327	34,9	45	751	332	35,9	48
890	25	940	235	44,9	71	963	238	46,0	74	986	241	47,1	77
	30	916	256	43,7	68	942	260	45,0	71	964	263	46,0	74
	35	889	278	42,4	64	914	282	43,6	68	939	286	44,8	71
	40	855	301	40,8	60	878	305	41,9	63	902	310	43,1	66
	46	800	332	38,2	53	822	337	39,2	56	845	342	40,3	59
	48	778	344	37,1	51	800	348	38,2	53	822	353	39,2	56
	50	754	356	36,0	48	775	361	37,0	50	796	365	38,0	53
990	25	1060	260	50,6	68	1090	264	52,0	71	1121	268	53,5	75
	30	1033	283	49,3	64	1062	287	50,7	68	1092	292	52,1	71
	35	1001	307	47,8	61	1030	312	49,2	64	1059	316	50,6	68
	40	962	332	45,9	57	989	337	47,2	60	1017	342	48,6	63
	46	900	366	42,9	50	926	371	44,2	53	952	377	45,5	56
	48	875	379	41,7	48	900	384	43,0	50	926	389	44,2	53
	50	847	391	40,4	45	872	397	41,6	48	887	398	42,4	49
C10	25	1139	286	54,4	77	1170	290	55,9	81	1202	295	57,4	85
	30	1109	312	52,9	73	1141	316	54,4	77	1171	321	55,9	81
	35	1074	338	51,2	69	1104	343	52,7	73	1135	348	54,2	76
	40	1029	366	49,1	64	1058	371	50,5	67	1088	377	51,9	71
	46	959	404	45,7	56	986	410	47,1	59	1013	416	48,4	62
	48	930	417	44,4	53	956	423	45,7	56	983	429	47,0	59
	50	899	432	42,9	50	925	438	44,1	53	931	435	44,5	54
C11	25	1263	307	60,3	50	1298	311	62,0	52	1333	316	63,7	55
	30	1231	335	58,7	48	1266	340	60,4	50	1300	344	62,1	53
	35	1196	364	57,1	45	1230	368	58,7	48	1264	374	60,3	50
	40	1152	394	55,0	42	1185	399	56,5	44	1217	405	58,1	47
	46	1082	434	51,6	38	1113	440	53,1	40	1144	446	54,6	42
	48	1053	449	50,3	36	1084	455	51,7	38	1114	461	53,2	40
	50	1022	464	48,8	34	1051	470	50,2	36	1081	477	51,6	38
C12	25	1353	338	64,5	56	1389	343	66,3	59	1425	348	68,1	62
	30	1319	369	62,9	54	1355	374	64,7	57	1391	379	66,4	59
	35	1280	400	61,1	51	1315	406	62,8	54	1350	411	64,5	56
	40	1231	434	58,7	48	1265	440	60,4	50	1299	446	62,0	53
	46	1152	479	55,0	42	1184	486	56,5	44	1216	492	58,1	47
	48	1120	495	53,4	40	1151	502	54,9	42	1183	509	56,5	44
	50	1085	512	51,7	38	1115	519	53,2	40	1146	526	54,7	42
C13	25	1433	348	68,4	75	1475	353	70,4	79	1518	359	72,5	84
	30	1394	378	66,5	72	1435	384	68,5	76	1476	390	70,5	80
	35	1349	410	64,4	68	1388	416	66,3	71	1428	423	68,2	75
	40	1292	444	61,6	62	1329	450	63,5	66	1368	457	65,3	69
	46	1202	488	57,3	55	1237	495	59,0	58	1273	503	60,8	61
	48	1166	504	55,6	52	1200	512	57,3	55	1235	519	59,0	58
	50	1127	521	53,8	49	1160	528	55,4	52	1185	533	56,6	54

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	10 Pi (kW)	10 qw (l/s)	10 dpw (kPa)	11 Cc (kW)	11 Pi (kW)	11 qw (l/s)	11 dpw (kPa)	12 Cc (kW)	12 Pi (kW)	12 qw (l/s)	12 dpw (kPa)
760	25	865	205	41,3	103	887	208	42,4	108	909	211	43,5	113
	30	844	224	40,3	98	865	227	41,4	103	887	230	42,4	108
	35	819	243	39,1	93	840	246	40,2	98	862	249	41,2	102
	40	789	263	37,7	87	809	266	38,7	91	830	270	39,7	96
	46	739	290	35,3	78	759	294	36,3	81	779	298	37,2	85
	48	720	299	34,4	74	739	303	35,3	78	758	308	36,3	81
	50	698	309	33,3	70	717	314	34,3	73	716	309	34,2	73
830	25	946	223	45,2	72	970	225	46,4	75	994	228	47,6	79
	30	924	243	44,2	69	948	246	45,3	72	971	249	46,4	76
	35	899	263	43,0	66	922	267	44,1	69	945	270	45,2	72
	40	868	285	41,5	62	891	289	42,6	65	913	293	43,6	68
	46	816	314	39,0	55	838	319	40,1	58	860	323	41,1	61
	48	795	325	38,0	53	817	329	39,0	55	838	334	40,1	58
	50	772	336	36,9	50	788	338	37,6	52	798	337	38,1	53
890	25	1009	244	48,2	81	1032	247	49,3	84	1056	251	50,5	88
	30	987	266	47,2	78	1010	270	48,3	81	1033	273	49,4	84
	35	961	289	45,9	74	983	293	47,0	77	1006	297	48,1	80
	40	927	314	44,3	69	950	318	45,4	73	971	322	46,5	76
	46	867	346	41,4	62	891	351	42,6	65	914	356	43,7	68
	48	844	358	40,3	59	866	363	41,4	61	889	368	42,5	64
	50	818	370	39,1	55	829	371	39,6	57	828	364	39,6	57
990	25	1151	272	55,0	79	1182	276	56,5	82	1214	279	58,0	86
	30	1122	296	53,6	75	1152	300	55,1	79	1183	304	56,6	83
	35	1088	321	52,0	71	1117	325	53,4	74	1147	330	54,9	78
	40	1046	347	50,0	66	1074	352	51,3	69	1102	357	52,7	73
	46	978	382	46,7	59	1005	387	48,0	62	1032	393	49,4	65
	48	951	395	45,5	56	978	400	46,7	59	1004	406	48,0	61
	50	902	398	43,1	51	914	396	43,7	52	928	395	44,4	53
C10	25	1234	299	58,9	89	1266	303	60,5	93	1297	308	62,0	97
	30	1202	325	57,4	85	1234	330	59,0	89	1265	335	60,5	93
	35	1165	353	55,7	80	1195	358	57,1	84	1226	363	58,6	88
	40	1117	383	53,4	74	1147	388	54,8	78	1176	394	56,2	82
	46	1041	422	49,7	65	1069	428	51,1	69	1097	434	52,5	72
	48	1010	436	48,3	62	1037	442	49,6	65	1065	448	50,9	68
	50	938	431	44,8	54	936	422	44,7	54	940	415	45,0	55
C11	25	1369	320	65,4	58	1405	324	67,1	61	1441	329	68,9	63
	30	1335	349	63,8	55	1370	354	65,5	58	1406	358	67,2	61
	35	1298	379	62,0	52	1332	384	63,7	55	1366	389	65,3	58
	40	1250	410	59,7	49	1284	416	61,4	51	1317	421	63,0	54
	46	1175	452	56,2	44	1207	458	57,7	46	1239	464	59,2	48
	48	1145	467	54,7	42	1176	473	56,2	44	1207	480	57,7	46
	50	1112	483	53,1	40	1130	484	54,0	41	1144	482	54,7	42
C12	25	1462	352	69,9	65	1500	357	71,7	68	1538	362	73,5	71
	30	1427	384	68,2	62	1463	389	70,0	65	1501	395	71,8	68
	35	1385	417	66,2	59	1421	423	67,9	62	1457	428	69,6	65
	40	1333	452	63,7	55	1367	458	65,3	58	1401	465	67,0	60
	46	1249	499	59,7	49	1281	506	61,2	51	1314	513	62,8	54
	48	1215	516	58,0	47	1247	523	59,6	49	1279	530	61,1	51
	50	1177	534	56,2	44	1185	530	56,6	45	1183	520	56,6	45
C13	25	1561	364	74,6	88	1605	370	76,7	93	1650	376	78,9	97
	30	1518	396	72,5	84	1561	403	74,6	88	1604	409	76,7	93
	35	1468	429	70,1	79	1509	436	72,1	83	1550	443	74,1	87
	40	1406	464	67,2	73	1445	471	69,1	77	1484	479	71,0	80
	46	1309	510	62,5	64	1346	518	64,3	67	1382	526	66,1	71
	48	1270	527	60,7	61	1306	535	62,4	64	1342	543	64,2	67
	50	1185	524	56,6	54	1182	513	56,5	53	1187	506	56,8	54

NOTES

Fluid: water
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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

		Condenser Inlet Air Temperature (°C)											
	Twout	13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
760	25	931	214	44,5	118	954	217	45,6	123	977	220	46,8	129
	30	909	233	43,5	113	931	236	44,6	118	953	239	45,6	123
	35	883	253	42,2	107	904	256	43,3	112	926	260	44,3	117
	40	850	274	40,7	100	871	277	41,7	105	892	281	42,7	109
	46	799	302	38,2	89	819	306	39,2	94	839	310	40,1	98
	48	778	312	37,2	85	798	316	38,2	89	817	320	39,1	93
	50	720	305	34,4	74	717	299	34,3	74	719	294	34,4	74
830	25	1018	231	48,7	82	1041	234	49,8	86	1064	237	50,9	89
	30	995	252	47,6	79	1018	255	48,7	82	1041	259	49,8	86
	35	968	274	46,3	75	992	277	47,5	79	1014	281	48,6	82
	40	935	297	44,7	71	958	301	45,8	74	980	304	46,9	77
	46	883	327	42,2	64	904	331	43,3	67	926	336	44,3	69
	48	860	338	41,2	61	883	343	42,2	64	904	347	43,3	67
	50	810	336	38,7	55	819	334	39,2	56	830	333	39,7	57
890	25	1079	254	51,6	91	1103	257	52,8	95	1127	260	54,0	99
	30	1056	276	50,5	88	1079	280	51,7	91	1103	283	52,8	95
	35	1028	300	49,2	84	1051	304	50,3	87	1074	308	51,4	91
	40	993	326	47,5	79	1015	330	48,6	82	1037	334	49,7	85
	46	938	361	44,9	71	959	365	45,9	74	979	370	46,9	77
	48	912	373	43,6	68	935	378	44,8	71	956	383	45,8	74
	50	832	359	39,8	57	829	351	39,7	57	831	345	39,8	57
990	25	1245	283	59,5	90	1276	288	61,1	95	1308	292	62,6	99
	30	1214	309	58,1	86	1244	313	59,5	90	1275	318	61,0	95
	35	1177	335	56,3	82	1207	339	57,8	86	1237	344	59,2	90
	40	1131	362	54,1	76	1160	367	55,5	80	1189	373	56,9	83
	46	1060	399	50,7	68	1087	404	52,0	71	1115	410	53,4	74
	48	1027	410	49,2	64	1040	409	49,8	66	1051	407	50,3	67
	50	939	393	44,9	54	956	393	45,8	56	966	391	46,2	57
C10	25	1330	312	63,6	102	1362	317	65,2	107	1395	321	66,8	111
	30	1296	340	62,0	97	1328	344	63,6	102	1360	349	65,1	106
	35	1256	368	60,1	92	1287	374	61,6	96	1318	379	63,1	100
	40	1205	399	57,7	85	1235	405	59,1	89	1264	411	60,5	93
	46	1126	440	53,8	76	1153	446	55,2	79	1181	453	56,6	83
	48	1086	452	51,9	71	1084	444	51,9	71	1081	434	51,8	70
	50	935	405	44,7	54	945	401	45,2	55	945	393	45,2	55
C11	25	1478	333	70,7	66	1515	338	72,5	69	1552	342	74,3	73
	30	1442	363	69,0	64	1478	368	70,8	67	1515	373	72,5	70
	35	1401	394	67,0	60	1437	399	68,7	63	1472	405	70,5	66
	40	1350	427	64,6	56	1384	433	66,2	59	1419	438	67,9	62
	46	1271	470	60,8	51	1303	477	62,4	53	1336	483	63,9	55
	48	1239	486	59,3	48	1271	493	60,8	51	1298	497	62,2	53
	50	1162	481	55,6	43	1175	478	56,2	44	1191	477	57,0	45
C12	25	1576	367	75,4	75	1615	373	77,3	78	1655	378	79,2	82
	30	1538	400	73,6	71	1576	406	75,4	75	1614	411	77,3	78
	35	1493	434	71,4	68	1529	440	73,2	71	1566	446	75,0	74
	40	1436	471	68,7	63	1471	477	70,4	66	1506	484	72,1	69
	46	1347	520	64,5	56	1380	527	66,0	59	1413	534	67,7	61
	48	1311	537	62,7	54	1344	544	64,3	56	1368	549	65,5	58
	50	1189	513	56,9	45	1184	501	56,7	45	1186	492	56,8	45
C13	25	1694	382	81,0	102	1739	388	83,2	107	1784	394	85,4	112
	30	1648	415	78,8	97	1691	422	80,9	102	1735	428	83,1	107
	35	1592	450	76,2	91	1635	457	78,2	96	1677	464	80,3	100
	40	1524	486	72,9	84	1564	493	74,8	89	1605	501	76,8	93
	46	1419	534	67,9	74	1456	542	69,7	78	1494	550	71,5	82
	48	1368	547	65,5	70	1366	537	65,4	69	1371	531	65,6	70
	50	1191	498	57,0	54	1193	489	57,1	54	1193	480	57,1	54

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
H14	25	1381	357	65,8	74	1422	363	67,8	78	1463	368	69,8	82
	30	1342	390	63,9	70	1382	396	65,9	74	1423	402	67,8	78
	35	1298	423	61,8	66	1337	430	63,7	70	1375	436	65,6	74
	40	1242	460	59,2	61	1279	467	61,0	65	1316	474	62,7	68
	46	1153	509	54,9	53	1187	516	56,6	56	1221	524	58,2	59
	48	1116	527	53,2	50	1149	534	54,8	53	1183	542	56,4	56
	50	1076	545	51,2	47	1097	547	52,3	49	1114	545	53,1	50
H15	25	1492	382	71,1	81	1536	388	73,2	85	1581	394	75,4	90
	30	1450	417	69,1	77	1493	424	71,2	81	1536	430	73,3	85
	35	1401	454	66,7	72	1442	461	68,7	76	1483	468	70,7	80
	40	1338	495	63,7	66	1376	502	65,6	70	1416	510	67,5	74
	46	1237	550	58,9	58	1273	558	60,7	61	1309	566	62,4	64
	48	1195	570	56,9	54	1231	578	58,6	57	1266	586	60,4	60
	50	1150	590	54,8	51	1160	587	55,3	51	1162	575	55,4	52
C16	25	1555	408	74,1	59	1599	414	76,2	62	1642	420	78,3	65
	30	1515	445	72,2	56	1559	451	74,3	59	1601	457	76,4	62
	35	1469	483	70,0	53	1511	489	72,0	56	1554	497	74,1	59
	40	1411	524	67,2	50	1451	531	69,2	52	1492	539	71,1	55
	46	1316	579	62,7	44	1354	587	64,5	46	1392	595	66,4	49
	48	1278	599	60,9	42	1315	607	62,7	44	1352	616	64,5	46
	50	1236	620	58,9	39	1272	629	60,6	41	1308	637	62,4	43
C17	25	1641	433	78,2	65	1686	439	80,4	68	1732	445	82,6	72
	30	1600	471	76,2	62	1645	478	78,4	65	1690	485	80,6	69
	35	1553	512	74,0	59	1597	519	76,1	62	1641	526	78,2	65
	40	1494	555	71,1	55	1535	563	73,2	58	1578	571	75,2	61
	46	1397	614	66,6	49	1437	623	68,5	51	1477	631	70,4	54
	48	1357	636	64,7	46	1396	645	66,6	49	1436	653	68,5	51
	50	1313	658	62,6	44	1351	667	64,4	46	1390	676	66,3	48
C18	25	1720	456	81,9	65	1768	462	84,3	68	1817	468	86,6	71
	30	1677	497	79,9	62	1724	503	82,2	65	1772	510	84,5	68
	35	1629	539	77,6	59	1675	546	79,8	62	1721	554	82,1	65
	40	1568	585	74,7	55	1612	593	76,8	58	1657	601	79,0	60
	46	1468	647	69,9	49	1510	656	72,0	51	1552	665	74,0	54
	48	1427	670	68,0	46	1468	679	70,0	49	1509	688	72,0	51
	50	1380	693	65,8	43	1422	703	67,8	46	1462	712	69,7	48
C19	25	1807	479	86,1	71	1857	485	88,5	74	1908	492	91,0	78
	30	1762	522	83,9	67	1812	529	86,3	71	1861	536	88,8	75
	35	1713	567	81,6	64	1761	574	83,9	67	1809	582	86,3	71
	40	1650	615	78,6	60	1696	624	80,9	63	1743	632	83,1	66
	46	1549	681	73,8	53	1592	690	75,9	56	1636	699	78,0	59
	48	1507	705	71,8	51	1549	714	73,8	54	1592	724	75,9	56
	50	1458	730	69,5	48	1502	740	71,6	51	1544	750	73,6	53
C20	25	1853	498	88,3	37	1901	504	90,6	39	1950	510	93,0	41
	30	1810	544	86,2	36	1857	550	88,5	37	1905	557	90,8	39
	35	1762	592	83,9	34	1808	599	86,2	35	1854	607	88,4	37
	40	1698	644	80,9	32	1743	653	83,1	33	1788	661	85,3	35
	46	1592	716	75,8	28	1635	725	77,9	30	1679	734	80,1	31
	48	1547	743	73,7	27	1590	752	75,8	28	1633	762	77,9	30
	50	1498	770	71,4	25	1540	780	73,4	27	1582	790	75,5	28
C21	25	1906	520	90,8	39	1955	526	93,2	41	2005	532	95,6	43
	30	1862	568	88,7	37	1910	575	91,0	39	1959	582	93,4	41
	35	1811	620	86,3	36	1858	627	88,6	37	1905	635	90,8	39
	40	1744	676	83,1	33	1790	685	85,3	35	1836	693	87,5	37
	46	1633	754	77,8	30	1677	764	79,9	31	1720	773	82,0	32
	48	1585	783	75,5	28	1629	793	77,6	29	1673	803	79,8	31
	50	1533	813	73,0	26	1576	823	75,1	28	1619	833	77,2	29
C22	25	1963	542	93,5	41	2013	549	95,9	43	2063	555	98,4	45
	30	1917	593	91,3	39	1966	601	93,7	41	2016	608	96,1	43
	35	1864	648	88,8	37	1912	656	91,1	39	1960	664	93,4	41
	40	1794	709	85,5	35	1840	718	87,7	37	1886	726	89,9	38
	46	1676	793	79,9	31	1721	803	82,0	32	1765	812	84,2	34
	48	1626	824	77,5	29	1671	834	79,6	31	1715	844	81,8	32
	50	1570	856	74,8	28	1614	867	76,9	29	1658	877	79,1	30

NOTES

Fluid: water
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CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
H14	25	1505	374	71,8	87	1547	379	73,9	91	1590	385	75,9	96
	30	1464	408	69,8	82	1505	414	71,9	87	1547	420	73,9	91
	35	1415	443	67,5	77	1455	450	69,4	82	1495	456	71,4	86
	40	1353	481	64,6	72	1391	488	66,4	75	1429	495	68,3	79
	46	1256	532	59,9	63	1292	539	61,7	66	1327	547	63,4	69
	48	1217	550	58,1	59	1252	558	59,8	62	1273	559	60,8	64
	50	1130	542	53,9	52	1149	542	54,9	53	1160	537	55,4	54
H15	25	1626	400	77,6	95	1670	406	79,7	99	1714	412	81,9	104
	30	1580	437	75,4	90	1624	443	77,5	94	1667	450	79,6	99
	35	1525	475	72,8	84	1567	483	74,8	89	1610	490	76,9	93
	40	1455	517	69,4	77	1495	525	71,4	81	1536	533	73,3	85
	46	1346	574	64,2	67	1383	582	66,0	71	1420	591	67,8	74
	48	1302	594	62,1	63	1338	603	63,9	67	1348	598	64,4	68
	50	1162	562	55,4	52	1168	553	55,8	52	1173	544	56,0	53
C16	25	1686	426	80,4	69	1731	432	82,6	72	1776	438	84,8	75
	30	1645	464	78,5	66	1688	470	80,6	69	1732	477	82,7	72
	35	1596	503	76,1	62	1638	510	78,2	65	1681	518	80,3	68
	40	1533	546	73,1	58	1575	554	75,2	61	1615	562	77,1	64
	46	1431	603	68,3	51	1470	612	70,2	54	1510	620	72,1	56
	48	1390	624	66,3	48	1428	633	68,2	51	1467	642	70,0	53
	50	1345	646	64,2	46	1382	655	66,0	48	1401	656	66,9	49
C17	25	1778	451	84,8	75	1825	457	87,1	79	1872	463	89,4	83
	30	1735	491	82,8	72	1781	498	85,0	76	1827	505	87,2	79
	35	1685	533	80,4	68	1729	540	82,5	72	1774	548	84,7	75
	40	1621	579	77,3	64	1664	587	79,4	67	1707	595	81,5	70
	46	1517	640	72,4	57	1558	648	74,4	59	1599	657	76,4	62
	48	1475	662	70,4	54	1515	671	72,3	57	1555	680	74,3	59
	50	1429	685	68,2	51	1467	694	70,0	53	1494	698	71,4	55
C18	25	1866	474	89,0	75	1916	481	91,5	79	1967	487	93,9	83
	30	1820	517	86,9	72	1869	524	89,2	75	1919	531	91,6	79
	35	1768	561	84,4	68	1815	569	86,7	71	1863	577	89,0	75
	40	1702	609	81,2	64	1747	617	83,4	67	1793	626	85,6	70
	46	1595	673	76,1	56	1638	682	78,2	59	1682	692	80,3	62
	48	1551	697	74,0	54	1593	706	76,0	56	1636	716	78,1	59
	50	1503	721	71,7	51	1544	731	73,7	53	1582	740	75,6	56
C19	25	1959	498	93,5	82	2012	505	96,0	86	2065	512	98,6	90
	30	1912	543	91,2	78	1963	550	93,7	82	2015	558	96,2	86
	35	1858	590	88,6	74	1908	598	91,1	78	1958	606	93,5	82
	40	1790	640	85,4	70	1838	649	87,7	73	1886	657	90,1	77
	46	1680	708	80,2	62	1725	717	82,4	65	1771	727	84,6	68
	48	1636	733	78,0	59	1680	743	80,2	62	1724	752	82,3	65
	50	1586	759	75,7	56	1629	769	77,8	59	1673	779	79,9	62
C20	25	1999	516	95,4	43	2048	523	97,8	45	2098	529	100,2	47
	30	1953	564	93,2	41	2002	571	95,5	43	2051	578	97,9	45
	35	1901	614	90,7	39	1948	622	93,0	41	1996	629	95,3	43
	40	1833	669	87,5	36	1879	677	89,7	38	1925	686	91,9	40
	46	1723	744	82,2	33	1767	753	84,3	34	1810	762	86,4	36
	48	1676	771	80,0	31	1720	781	82,1	33	1763	790	84,2	34
	50	1625	800	77,5	29	1655	802	79,0	30	1684	802	80,4	31
C21	25	2055	539	98,0	45	2106	546	100,5	47	2157	552	103,0	49
	30	2008	590	95,8	43	2057	597	98,2	45	2108	604	100,6	47
	35	1953	643	93,2	41	2001	651	95,5	43	2049	659	97,9	45
	40	1882	702	89,8	38	1928	711	92,0	40	1974	719	94,3	42
	46	1764	783	84,2	34	1809	792	86,3	36	1853	802	88,5	37
	48	1716	812	81,9	32	1759	822	84,0	34	1803	832	86,1	35
	50	1662	843	79,3	31	1679	838	80,1	31	1694	830	80,9	32
C22	25	2115	562	100,9	47	2166	569	103,4	49	2219	576	106,0	51
	30	2066	616	98,6	45	2116	623	101,0	47	2168	631	103,5	49
	35	2008	672	95,8	43	2057	681	98,2	45	2106	689	100,6	47
	40	1933	735	92,2	40	1980	744	94,5	42	2027	754	96,8	44
	46	1809	822	86,3	36	1854	832	88,5	37	1898	842	90,7	39
	48	1758	854	83,9	34	1802	864	86,0	35	1846	875	88,1	37
	50	1702	888	81,2	32	1702	873	81,3	32	1708	858	81,5	32

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	10 Pi (kW)	10 qw (l/s)	10 dpw (kPa)	11 Cc (kW)	11 Pi (kW)	11 qw (l/s)	11 dpw (kPa)	12 Cc (kW)	12 Pi (kW)	12 qw (l/s)	12 dpw (kPa)
H14	25	1633	391	78,0	100	1676	397	80,1	105	1718	403	82,2	110
	30	1588	426	75,9	96	1630	433	77,9	100	1672	439	80,0	105
	35	1535	463	73,4	90	1576	470	75,3	94	1616	477	77,3	99
	40	1468	503	70,1	83	1507	511	72,0	87	1546	518	73,9	91
	46	1363	555	65,1	73	1399	563	66,9	76	1436	572	68,7	80
	48	1295	560	61,9	66	1311	557	62,6	68	1331	556	63,6	70
	50	1166	529	55,7	55	1165	518	55,7	55	1169	528	55,9	55
H15	25	1759	418	84,0	109	1804	424	86,2	114	1850	430	88,4	120
	30	1710	456	81,7	104	1754	463	83,8	109	1798	470	86,0	114
	35	1653	497	79,0	98	1694	505	81,0	102	1736	512	83,0	107
	40	1577	541	75,3	90	1618	550	77,3	94	1658	558	79,3	98
	46	1458	599	69,7	78	1496	608	71,5	82	1535	617	73,4	85
	48	1356	591	64,8	68	1354	578	64,7	68	1359	569	65,0	69
	50	1177	533	56,2	53	1178	522	56,3	53	1180	548	56,4	53
C16	25	1822	444	87,0	79	1868	450	89,3	83	1915	456	91,6	86
	30	1777	483	84,9	75	1822	490	87,1	79	1868	497	89,3	83
	35	1724	525	82,4	71	1767	532	84,5	75	1811	539	86,6	78
	40	1657	569	79,1	67	1698	577	81,2	70	1740	585	83,2	73
	46	1550	629	74,1	59	1590	638	76,0	62	1629	646	77,9	65
	48	1506	650	71,9	56	1545	659	73,9	59	1585	669	75,8	62
	50	1401	644	66,9	49	1409	636	67,3	50	1404	621	67,2	50
C17	25	1920	469	91,7	87	1969	476	94,1	91	2018	482	96,5	95
	30	1874	511	89,5	83	1921	518	91,8	87	1969	525	94,1	91
	35	1819	555	86,9	79	1865	563	89,1	82	1911	570	91,4	86
	40	1750	603	83,6	73	1794	611	85,8	77	1838	619	87,9	80
	46	1641	666	78,4	65	1682	675	80,4	68	1724	684	82,4	72
	48	1596	689	76,2	62	1637	698	78,2	65	1678	708	80,2	68
	50	1509	694	72,1	56	1528	692	73,1	58	1529	680	73,1	58
C18	25	2018	494	96,4	87	2070	501	99,0	91	2123	508	101,5	95
	30	1969	538	94,1	83	2020	546	96,5	87	2071	553	99,0	91
	35	1912	585	91,3	78	1961	592	93,7	82	2011	601	96,1	86
	40	1840	634	87,9	73	1887	643	90,2	77	1934	652	92,5	80
	46	1725	701	82,4	65	1769	710	84,6	68	1814	720	86,7	71
	48	1679	725	80,2	62	1722	735	82,3	65	1766	744	84,4	68
	50	1612	742	77,0	58	1641	745	78,4	60	1650	738	78,9	60
C19	25	2118	519	101,2	94	2173	526	103,8	99	2228	533	106,5	103
	30	2067	565	98,8	90	2121	573	101,4	95	2174	581	104,0	99
	35	2009	614	96,0	86	2060	622	98,5	90	2112	630	101,0	94
	40	1935	666	92,4	80	1984	675	94,8	84	2034	684	97,2	88
	46	1817	736	86,8	72	1863	746	89,1	75	1910	756	91,3	78
	48	1769	762	84,5	68	1814	772	86,7	72	1860	782	89,0	75
	50	1717	789	82,0	65	1761	799	84,2	68	1772	793	84,7	69
C20	25	2149	536	102,7	49	2200	542	105,2	51	2252	549	107,7	53
	30	2100	585	100,4	47	2151	593	102,8	49	2201	600	105,3	51
	35	2044	637	97,6	44	2092	645	100,0	46	2141	653	102,4	48
	40	1971	694	94,2	42	2018	703	96,4	43	2065	712	98,7	45
	46	1854	771	88,6	37	1898	781	90,7	39	1943	790	92,9	41
	48	1806	800	86,3	36	1850	809	88,4	37	1893	819	90,5	39
	50	1716	805	82,0	32	1747	806	83,5	34	1774	807	84,8	34
C21	25	2209	559	105,5	51	2261	566	108,1	53	2314	573	110,6	56
	30	2158	612	103,1	49	2209	619	105,6	51	2261	627	108,1	53
	35	2098	667	100,3	47	2148	676	102,7	49	2198	684	105,1	51
	40	2021	728	96,6	44	2069	737	98,9	45	2117	746	101,2	47
	46	1897	812	90,6	39	1942	821	92,8	41	1987	831	95,0	42
	48	1847	842	88,2	37	1891	852	90,4	39	1935	863	92,5	40
	50	1715	825	82,0	32	1735	819	82,9	33	1749	811	83,7	34
C22	25	2272	583	108,5	54	2325	590	111,1	56	2379	598	113,8	58
	30	2219	639	106,0	52	2271	647	108,6	54	2324	655	111,1	56
	35	2156	698	103,0	49	2207	706	105,5	51	2257	715	107,9	53
	40	2075	763	99,1	46	2123	772	101,5	48	2172	782	103,9	50
	46	1943	852	92,8	41	1989	863	95,1	42	2035	873	97,3	44
	48	1890	885	90,3	39	1934	896	92,5	40	1979	907	94,6	42
	50	1714	843	81,9	32	1722	829	82,3	33	1728	814	82,6	33

NOTES

Fluid: water
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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XS and EWAD~C-XL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 13 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	14 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	15 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1762	409	84,3	115	1805	415	86,4	121	1850	421	88,6	126
	30	1714	446	82,0	110	1756	452	84,1	115	1799	459	86,1	120
	35	1657	484	79,3	103	1698	492	81,2	108	1738	499	83,2	113
	40	1585	526	75,8	95	1624	534	77,7	100	1664	542	79,6	104
	46	1458	573	69,8	82	1475	570	70,6	84	1496	570	71,6	86
	48	1346	553	64,4	71	1350	545	64,6	72	1348	534	64,5	71
	50	1167	516	55,8	55	1168	505	55,9	55	1177	499	56,3	56
H15	25	1896	437	90,7	125	1943	443	93,0	131	1990	450	95,3	137
	30	1842	477	88,1	119	1887	484	90,3	124	1932	491	92,5	130
	35	1778	520	85,1	111	1821	527	87,1	116	1864	535	89,2	121
	40	1698	566	81,2	103	1739	574	83,2	107	1779	583	85,2	112
	46	1543	612	73,8	86	1540	599	73,7	86	1546	590	74,0	87
	48	1363	559	65,2	69	1365	548	65,3	69	1365	536	65,4	69
	50	1183	537	56,6	54	1183	525	56,6	54	1191	516	57,0	54
C16	25	1962	463	93,9	90	2010	470	96,2	94	2059	476	98,6	99
	30	1914	504	91,5	86	1960	511	93,8	90	2007	518	96,1	94
	35	1856	547	88,8	82	1901	555	91,0	85	1946	562	93,2	89
	40	1783	593	85,3	76	1825	602	87,4	79	1869	610	89,5	83
	46	1669	655	79,8	68	1709	664	81,8	71	1749	673	83,7	74
	48	1623	677	77,7	64	1622	667	77,6	64	1629	659	78,0	65
	50	1409	611	67,4	50	1411	600	67,5	50	1412	588	67,6	50
C17	25	2067	489	98,9	99	2118	496	101,3	104	2168	503	103,8	108
	30	2017	533	96,5	95	2066	540	98,9	99	2116	548	101,3	104
	35	1958	578	93,7	90	2005	586	95,9	94	2052	594	98,3	98
	40	1883	627	90,1	84	1928	636	92,3	88	1973	645	94,5	91
	46	1766	693	84,5	75	1808	702	86,5	78	1851	712	88,6	81
	48	1719	717	82,2	71	1733	713	82,9	72	1753	711	83,9	74
	50	1531	668	73,3	58	1536	657	73,5	58	1534	643	73,4	58
C18	25	2176	515	104,1	99	2230	522	106,7	104	2285	530	109,4	108
	30	2123	561	101,6	95	2176	569	104,1	99	2229	577	106,7	104
	35	2061	609	98,6	90	2112	617	101,0	94	2163	626	103,5	98
	40	1982	660	94,8	84	2031	669	97,2	88	2080	679	99,6	92
	46	1859	729	88,9	75	1905	739	91,1	78	1951	749	93,4	82
	48	1810	754	86,6	71	1844	759	88,3	74	1875	762	89,7	76
	50	1659	729	79,3	61	1657	715	79,3	61	1661	703	79,5	61
C19	25	2283	540	109,2	108	2340	547	112,0	113	2397	555	114,8	118
	30	2229	589	106,6	104	2284	597	109,3	108	2339	605	112,0	113
	35	2165	639	103,6	98	2218	648	106,1	103	2271	656	108,7	107
	40	2084	693	99,7	92	2135	702	102,2	96	2186	712	104,7	100
	46	1957	766	93,6	82	2005	776	96,0	86	2054	786	98,3	90
	48	1907	792	91,2	78	1953	802	93,5	82	2001	813	95,8	85
	50	1782	785	85,3	69	1778	768	85,1	69	1784	757	85,4	70
C20	25	2304	556	110,2	55	2357	563	112,8	58	2411	570	115,4	60
	30	2252	607	107,8	53	2304	615	110,3	55	2356	623	112,8	58
	35	2191	661	104,8	50	2241	670	107,2	53	2291	678	109,7	55
	40	2113	720	101,1	47	2161	729	103,4	49	2209	738	105,8	51
	46	1988	800	95,1	42	2033	810	97,3	44	2079	820	99,5	46
	48	1926	823	92,2	40	1955	823	93,6	41	1988	826	95,2	42
	50	1771	791	84,7	34	1777	779	85,0	35	1775	780	85,0	35
C21	25	2367	580	113,2	58	2421	588	115,9	60	2476	595	118,5	63
	30	2313	635	110,6	56	2366	643	113,2	58	2419	651	115,8	60
	35	2248	693	107,5	53	2299	701	110,0	55	2350	710	112,5	57
	40	2165	756	103,6	49	2214	765	105,9	51	2263	775	108,3	53
	46	2033	842	97,2	44	2079	852	99,5	46	2125	862	101,7	48
	48	1957	861	93,6	41	1971	852	94,3	42	1992	847	95,3	43
	50	1752	795	83,8	34	1756	781	84,0	34	1756	802	84,1	34
C22	25	2434	605	116,4	61	2489	613	119,1	63	2545	620	121,8	66
	30	2377	663	113,7	58	2431	671	116,3	61	2485	680	119,0	63
	35	2309	724	110,4	55	2360	733	113,0	58	2412	743	115,5	60
	40	2221	792	106,2	52	2270	802	108,6	54	2320	812	111,1	56
	46	2081	884	99,5	46	2127	895	101,8	48	2174	906	104,1	50
	48	1987	897	95,1	42	1990	881	95,2	42	1994	866	95,5	43
	50	1732	798	82,8	33	1733	781	83,0	33	1741	824	83,3	33

NOTES

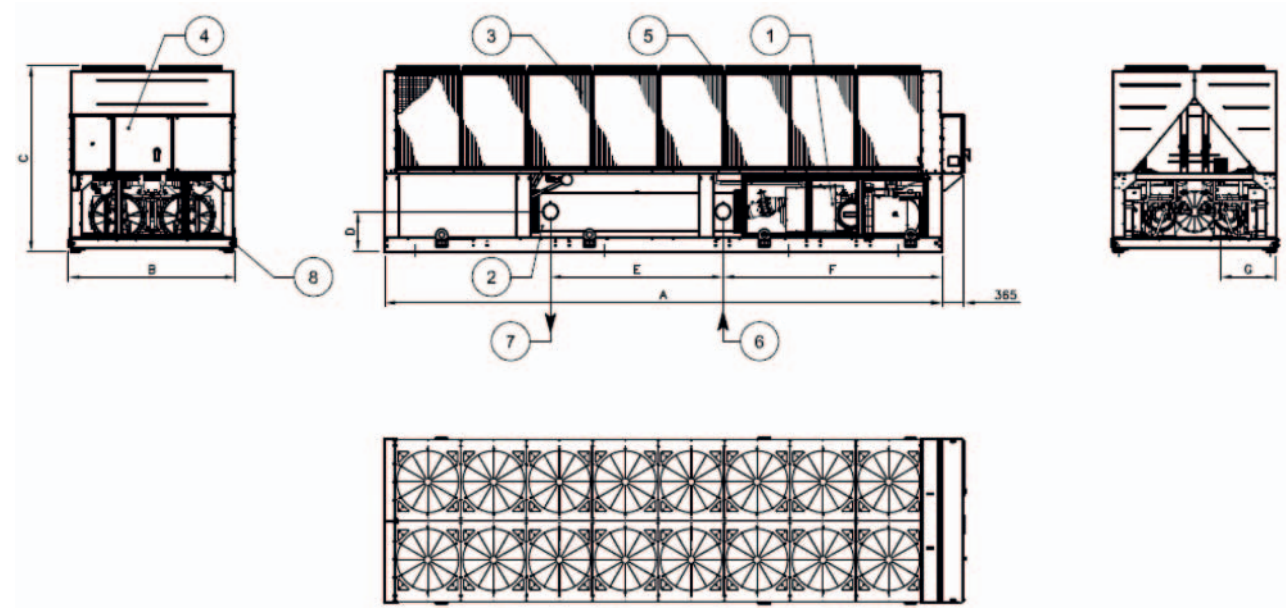
Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

SRC_1a-2a-3a-4a-5a-6a_Rev.01_3a_(8-8)

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

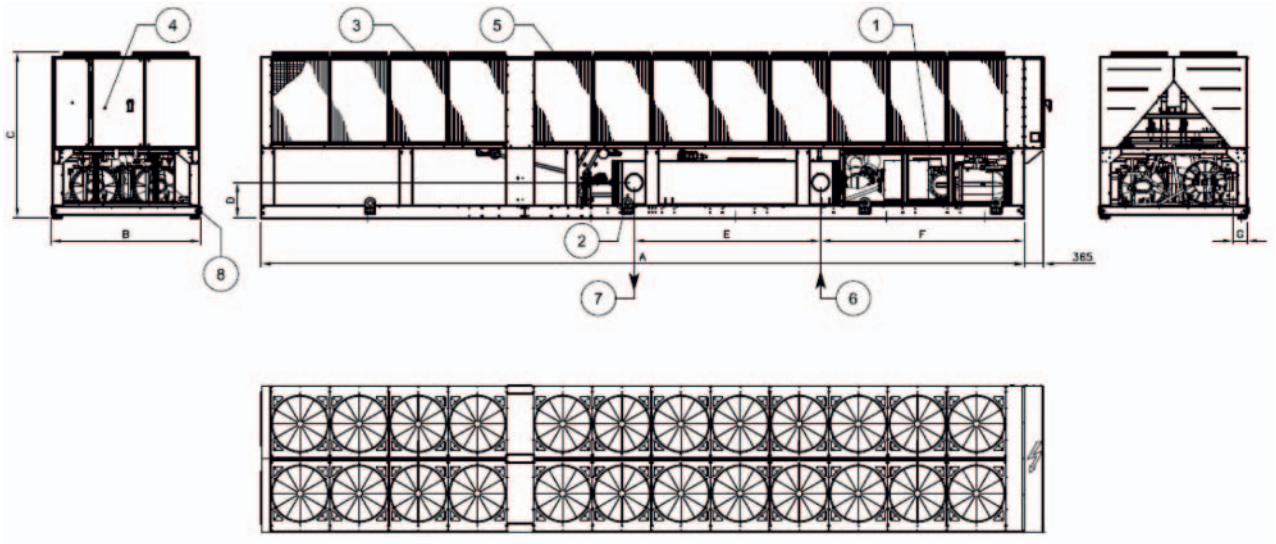
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (3 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-		Dimensions (mm)							Fans
Size	Size	A	B	C	D	E	F	G	
EWADC14÷C15C-SS/SL	EWADC13÷C14C-SR	10185	2285	2540	4440	2360	540	285	Nr 20
EWADC16÷C17C-SS/SL	EWADC15÷C16C-SR	11085	2285	2540	5340	2360	540	285	Nr 22
EWADC18C-SS/SL	EWADC17C-SR	11085	2285	2540	4780	2840	540	210	Nr 22
EWADC19÷C20C-SS/SL	EWADC18÷C19C-SR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC14C-XS/XL	EWADC14C-XR	11985	2285	2540	5680	2910	540	285	Nr 24
EWADC15÷C16C-XS/XL	EWADC15÷C16C-XR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC17C-XS/XL	EWADC17C-XR	12885	2285	2540	6580	2840	540	210	Nr 26
EWADC18C-XS/XL	EWADC18C-XR	13785	2285	2540	7480	2840	540	210	Nr 28
EWADC19C- XS/XL	EWADC19C-XR	14685	2285	2540	8380	2840	540	210	Nr 30
EWADH14÷H15C-XS/XL/XR		14685	2285	2285	8380	2840	540	210	Nr 30

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-XS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
760	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,2**
830	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,5**
890	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,5**
990	75,1	77,2	80,0	79,2	75,1	70,6	61,0	51,9	**80,2**	**101,4**
C10	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
C11	75,2	77,3	80,1	79,3	75,2	70,7	61,1	52,0	**80,3**	**102,4**
C12	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
C13	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
H14	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
H15	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
C16	75,8	77,9	80,7	79,9	75,8	71,3	61,7	52,6	**80,9**	**103,2**
C17	75,7	77,8	80,6	79,8	75,7	71,2	61,6	52,5	**80,8**	**103,5**
C18	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,7**
C19	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C20	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C21	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C22	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**

EWAD~C-XL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
760	71,2	73,3	76,1	75,3	71,2	66,7	57,1	48,0	**76,3**	**96,8**
830	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,4**
890	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,4**
990	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,0**
C10	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**98,2**
C11	71,6	73,7	76,5	75,7	71,6	67,1	57,5	48,4	**76,7**	**98,8**
C12	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
C13	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
H14	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
H15	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
C16	72,2	74,3	77,1	76,3	72,2	67,7	58,1	49,0	**77,3**	**99,6**
C17	72,3	74,4	77,2	76,4	72,3	67,8	58,2	49,1	**77,4**	**100,0**
C18	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,2**
C19	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C20	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C21	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C22	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**

EWAD~C-XR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
740	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
810	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,3**
870	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,3**
970	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**93,5**
C10	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**93,7**
C11	68,8	62,0	69,1	74,3	61,7	58,1	49,8	37,2	**72,2**	**94,3**
C12	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,5**
C13	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,5**
H14	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**94,6**
H15	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**94,6**
C16	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**95,3**
C17	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**95,6**
C18	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,7**
C19	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,9**
C20	69,9	63,1	70,2	75,4	62,8	59,2	50,9	38,3	**73,3**	**96,2**
C21	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**96,6**
C22	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**96,6**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

NSL_1a-2b-3b-4a_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

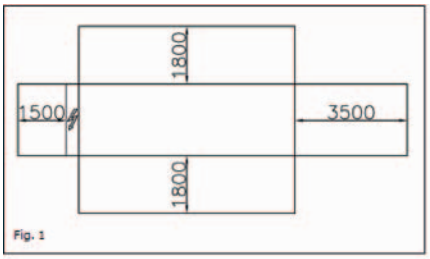

Fig. 1

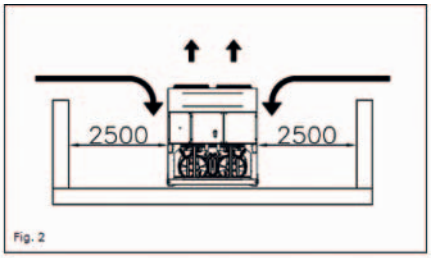

Fig. 2

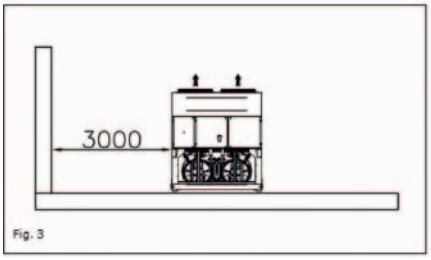

Fig. 3

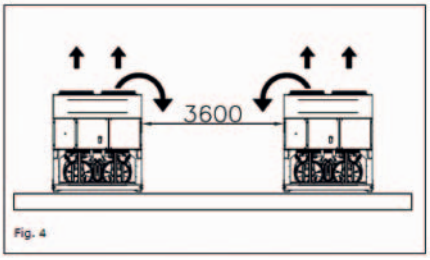

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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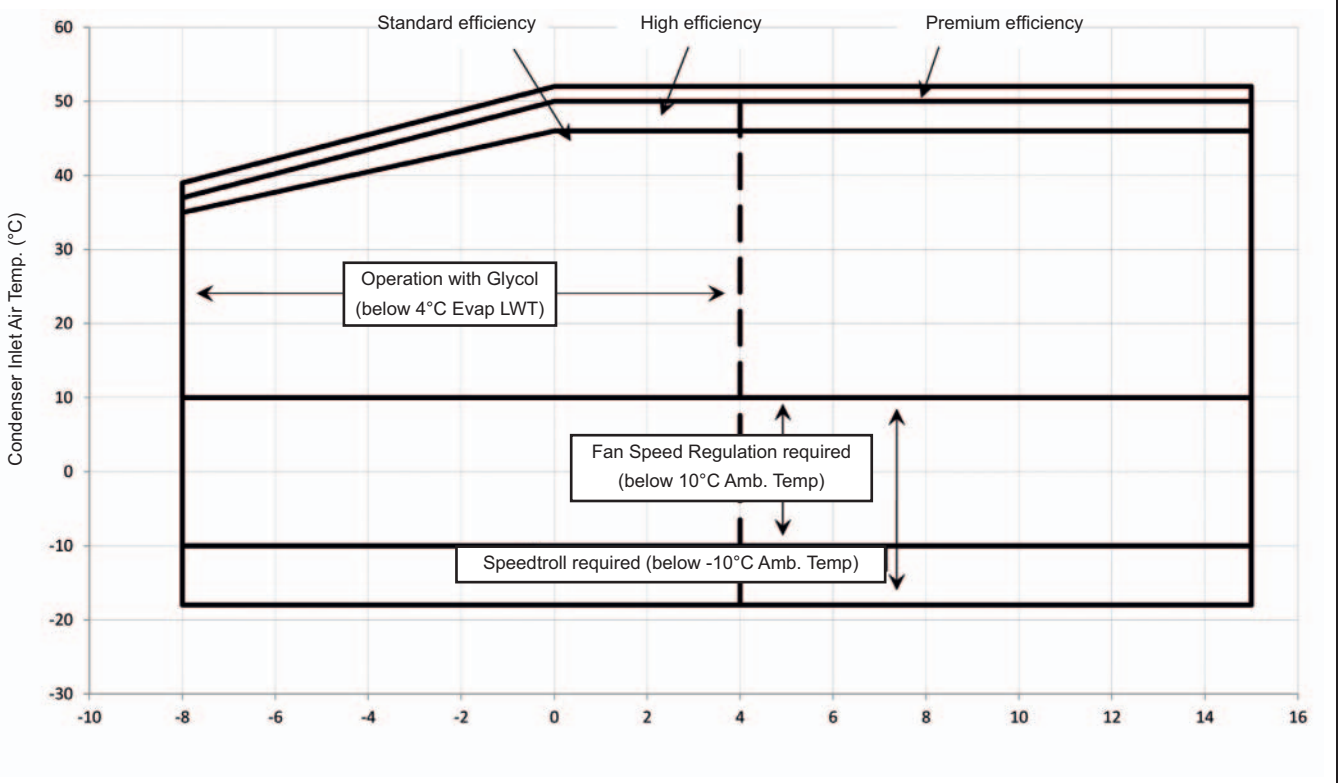
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

EPD_1-2-3-4_Rev.00_1-4

13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

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

- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.

- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features

- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:

- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

SPC_1b-2a-3_Rev.02_3

TABLE OF CONTENTS

EWAD-C-XR

1 Features

- Wide capacity range: 19 sizes to cover a range from 736 to 1,959 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 50ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2-3 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 740C-XR	EWAD 810C-XR	EWAD 870C-XR	EWAD 970C-XR	EWAD C10C-XR	EWAD C11C-XR	EWAD C12C-XR	EWAD C13C-XR	EWAD H14C-XR	EWAD H15C-XR
Cooling capacity	Nom.			kW	736 (1)	811 (1)	866 (1)	974 (1)	1,041 (1)	1,168 (1)	1,247 (1)	1,302 (1)	1,367 (1)	1,468 (1)
Capacity control	Method				Stepless									
	Minimum capacity			%	12.5									
Power input	Cooling	Nom.		kW	234 (1)	253 (1)	281 (1)	309 (1)	344 (1)	365 (1)	405 (1)	415 (1)	454 (1)	491 (1)
EER					3.14 (1)	3.20 (1)	3.08 (1)	3.15 (1)	3.03 (1)	3.20 (1)	3.08 (1)	3.14 (1)	3.01 (1)	2.99 (1)
ESEER					4.28	4.36	4.23	4.34	4.24	4.38	4.25	4.33	4.36	4.40
IPLV					4.55	4.62	4.51	4.63	4.54	4.65	4.54	4.58	4.68	4.77
Casing	Colour				Ivory white									
	Material				Galvanized and painted steel sheet									
Dimensions	Unit	Height		mm	2,540									
		Width		mm	2,285									
		Depth		mm	6,185	7,085		7,985		9,785				
Weight	Unit			kg	6,280	6,630	6,650	7,480	7,760	8,510	8,530	9,190		
	Operation weight			kg	6,520	6,870	6,890	7,880	8,160	8,900	8,920	10,180		
Water heat exchanger	Type				Single pass shell & tube									
	Water volume			l	251	243		403		386		979		
	Nominal water flow	Cooling		l/s	35.1	38.7	41.3	46.5	49.7	55.7	59.5	62.1	65.2	70.0
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	77	54	61	58	65	43	49	64	73	79
	Insulation material				Closed cell									
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler									
Fan	Quantity				12	14		16		20				
	Type				Direct propeller									
	Diameter			mm	800									
	Air flow rate	Nom.		l/s	49,209	57,410		65,611		82,014				
	Speed			rpm	700									
Fan motor	Drive				DOL									
	Input	Cooling		W	9,400	11,000		12,500		15,700				
Sound power level	Cooling	Nom.		dBA	92.0	92.3		93.5	93.7	94.3	94.5		94.6	
Sound pressure level	Cooling	Nom.		dBA	71.5			72.3	72.5	72.2	72.3		72.5	
Compressor	Type				Asymm single screw									
	Quantity				2									
	Oil	Charged volume		l	38			44	50					
Operation range	Water side	Cooling	Min.	ºCDB	-8									
			Max.	ºCDB	15									
	Air side	Cooling	Min.	ºCDB	-18									
			Max.	ºCDB	52									
Refrigerant	Type				R-134a									
	Circuits	Quantity			2									
Refrigerant circuit	Charge			kg	146	162		182		214		225	248	
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm			219.1mm				273mm		
Safety devices	Item	01			High discharge pressure (pressure switch)									
		02			High discharge pressure (pressure transducer)									
		03			Low suction pressure (pressure transducer)									
		04			Compressor motor protection									
		05			High discharge temperature									
		06			Low oil pressure									
		07			Low pressure ratio									
		08			High oil filter pressure drop									
		09			Phase monitor									
		10			Emergency stop									
		11			Water freeze protection controller									

2 Specifications

2-1 Technical Specifications					EWAD C14C-XR	EWAD C15C-XR	EWAD C16C-XR	EWAD C17C-XR	EWAD C18C-XR	EWAD C19C-XR	EWAD C20C-XR	EWAD C21C-XR	EWAD C22C-XR
Cooling capacity	Nom.			kW	1,378 (1)	1,486 (1)	1,550 (1)	1,639 (1)	1,722 (1)	1,813 (1)	1,854 (1)	1,902 (1)	1,952 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	7								
Power input	Cooling	Nom.		kW	438 (1)	479 (1)	512 (1)	541 (1)	566 (1)	596 (1)	624 (1)	657 (1)	691 (1)
EER					3.15 (1)	3.1 (1)	3.03 (1)		3.04 (1)		2.97 (1)	2.89 (1)	2.83 (1)
ESEER					4.34	4.26		4.20	4.21	4.20	4.18	4.09	4.06
IPLV					4.72	4.65	4.60	4.59		4.57	4.58	4.51	4.49
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,540								
		Width		mm	2,285								
		Depth		mm	11,985			12,885	13,785	14,685			
Weight	Unit			kg	11,000	11,760	12,010	12,350	12,700	13,040			
	Operation weight			kg	11,490	12,610	12,870	13,200	13,580	13,910			
Water heat exchanger	Type				Single pass shell & tube								
	Water volume			l	491	850			871	850			
	Nominal water flow	Cooling		l/s	65.85	70.98	74.0	78.2	82.2	86.5	88.5	90.7	93.1
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	74	54	59	65		71	37	39	41
	Insulation material				Closed cell								
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler								
Fan	Quantity				24			26	28	30			
	Type				Direct propeller								
	Diameter			mm	800								
	Air flow rate	Nom.		l/s	98,414		98,417	106,619	114,820	123,021			
	Speed			rpm	715		700						
Fan motor	Drive				DOL								
	Input	Cooling		W	780		18,800	20,400	22,000	23,500			
Sound power level	Cooling	Nom.		dBA	95.1	95.2	95.3	95.6	95.7	95.9	96.2	96.6	
Sound pressure level	Cooling	Nom.		dBA	72.6	72.8	72.9		73.0		73.3	73.7	
Compressor	Type				Semi-hermetic single screw compressor		Asymm single screw						
	Quantity				3								
	Oil	Charged volume		l	63	69	75						
Operation range	Water side	Cooling	Min.	°CDB	-8								
			Max.	°CDB	15								
	Air side	Cooling	Min.	°CDB	-18								
			Max.	°CDB	50		52						
Refrigerant	Type				R-134a								
	Circuits	Quantity			3								
Refrigerant circuit	Charge			kg	-		297	312	328	343			
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm	273mm							
Safety devices	Item	01			High discharge pressure (pressure switch)								
		02			High discharge pressure (pressure transducer)								
		03			Low suction pressure (pressure transducer)								
		04			Compressor motor protection								
		05			High discharge temperature								
		06			Low oil pressure								
		07			Low pressure ratio								
		08			High oil filter pressure drop								
		09			Phase monitor								
		10			Emergency stop								
		11			Water freeze protection controller								

2 Specifications

2-2 Electrical Specifications				EWAD 740C-XR	EWAD 810C-XR	EWAD 870C-XR	EWAD 970C-XR	EWAD C10C-XR	EWAD C11C-XR	EWAD C12C-XR	EWAD C13C-XR	EWAD H14C-XR	EWAD H15C-XR
Compressor	Phase			3~									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
	Maximum running current		A	231		274		333		398			451
	Starting method			Wye-delta									
Compressor 2	Maximum running current		A	231	274		333		398			451	
Power supply	Phase			3~									
	Frequency		Hz	50									
	Voltage		V	400									
	Voltage range	Min.	%	-10									
		Max.	%	10									
Unit	Maximum starting current		A	610	647		911	959	1,015			1,058	1,071
	Nominal running current (RLA)	Cooling	A	392	426	470	518	572	613	679	699	753	807
	Maximum running current		A	493	542	585	649	708	783	847		901	954
	Max unit current for wires sizing		A	540	592	640	710	775	856	927		985	1,044
Fans	Nominal running current (RLA)		A	31	36		42		52				

2-2 Electrical Specifications				EWAD C14C-XR	EWAD C15C-XR	EWAD C16C-XR	EWAD C17C-XR	EWAD C18C-XR	EWAD C19C-XR	EWAD C20C-XR	EWAD C21C-XR	EWAD C22C-XR
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	269	326	333		398			451	
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	269	326	333		398			451	
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	1,133.8	1,179.4	1,246	1,303	1,359		1,402	1,444	1,458
	Nominal running current (RLA)	Cooling	A	734 (5)	799 (5)	854	903	951	1,000	1,040	1,087	1,136
	Maximum running current		A	926	983	1,063	1,132	1,201	1,271	1,324	1,377	1,431
	Max unit current for wires sizing		A	1,019	1,082	1,163	1,238	1,314	1,390	1,449	1,507	1,566
Fans	Nominal running current (RLA)		A	62			68	73	78			

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

(9) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

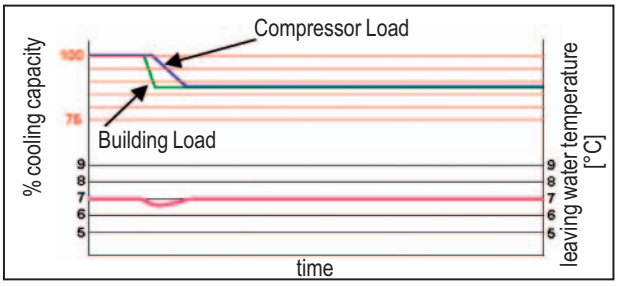
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

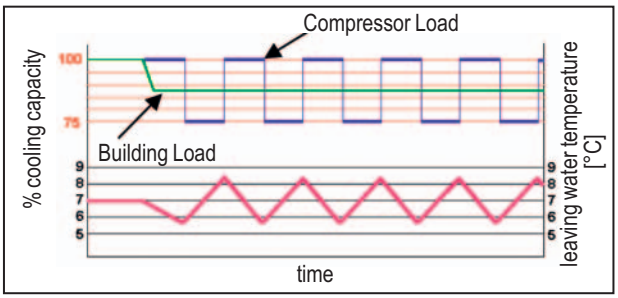
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

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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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.
Power Section The power section includes compressors and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
- High pressure (pressure switch).
- High pressure (transducer).
- Low pressure (transducer).
- Fans circuit breaker.
- 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.

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4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

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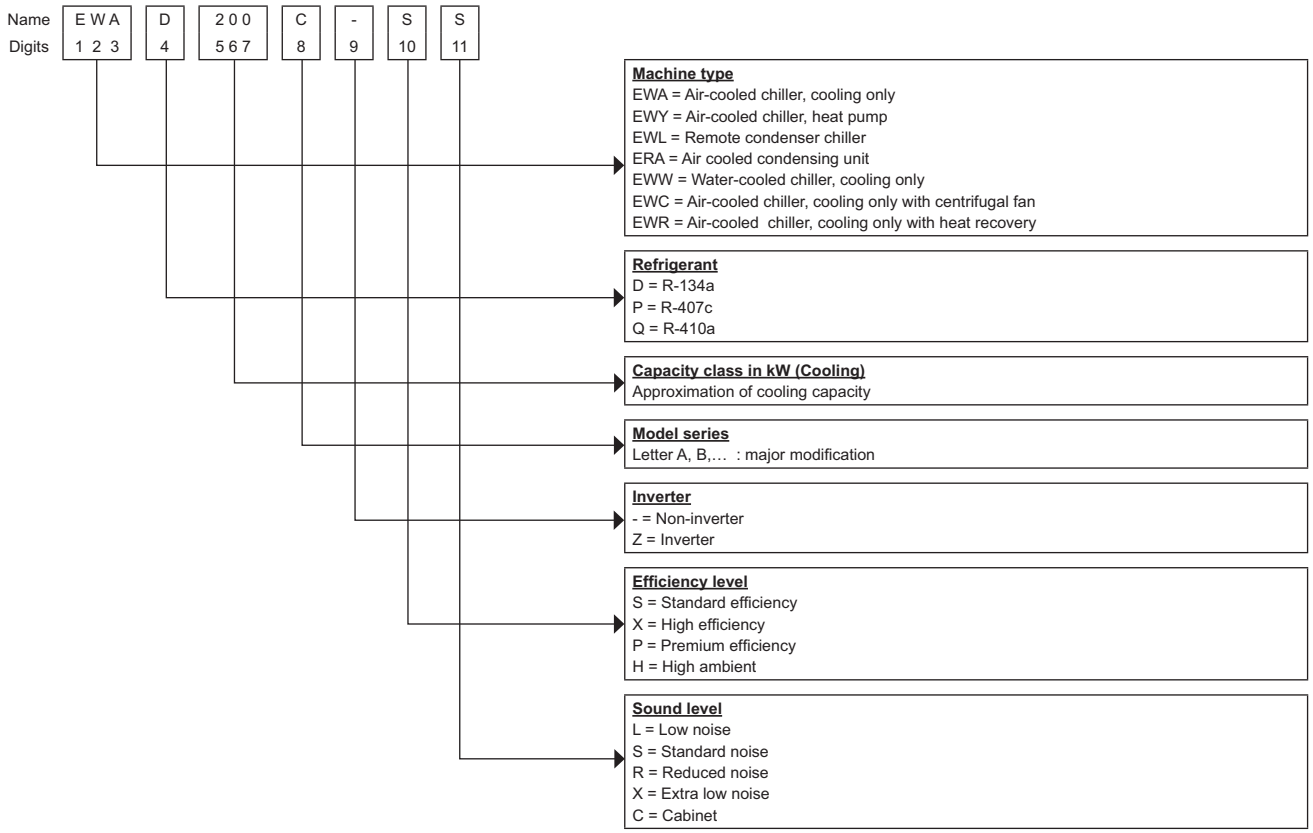
5 Nomenclature

5 - 1 Nomenclature

Nomenclature



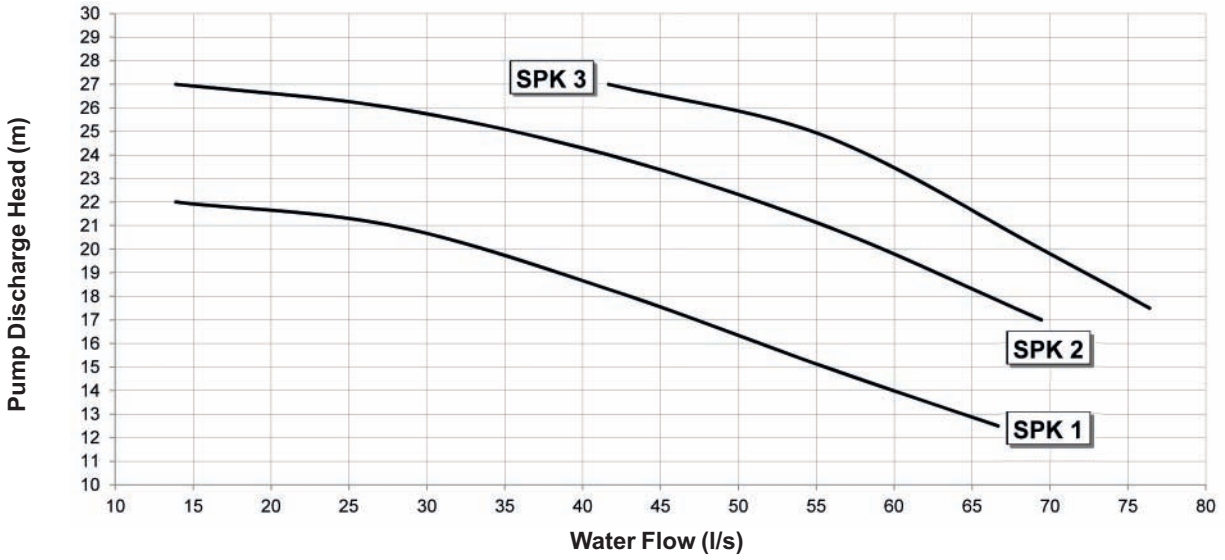
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

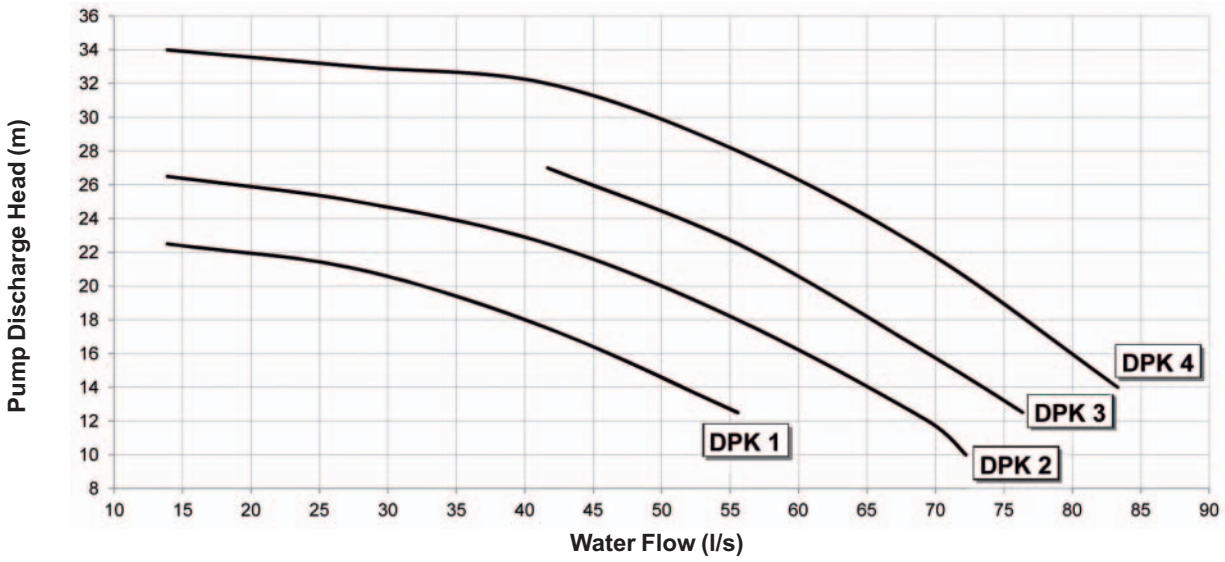
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

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6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
740	25	721	188	34,4	74	742	191	35,4	78	763	195	36,4	82
	30	701	205	33,4	70	722	209	34,4	74	742	212	35,4	78
	35	677	223	32,2	66	697	227	33,2	70	716	231	34,2	73
	40	646	243	30,8	61	664	247	31,7	64	683	251	32,6	67
	46	595	269	28,4	52	613	274	29,2	55	630	278	30,1	58
	48	563	273	26,8	47	568	271	27,1	48	572	268	27,3	49
	50	488	250	23,2	37	490	245	23,4	37	496	243	23,7	38
810	25	792	204	37,7	52	816	207	38,9	55	839	210	40,0	58
	30	771	222	36,7	50	793	226	37,8	52	816	229	38,9	55
	35	746	242	35,5	47	767	246	36,6	49	789	249	37,6	52
	40	714	263	34,0	43	734	267	35,0	45	755	271	36,0	48
	46	662	292	31,5	38	681	296	32,4	40	700	301	33,4	42
	48	629	296	30,0	34	639	295	30,4	35	650	295	31,0	36
	50	576	287	27,4	29	579	283	27,6	30	583	280	27,8	30
870	25	850	226	40,5	59	874	230	41,7	62	899	233	42,9	65
	30	826	246	39,3	56	850	250	40,5	59	874	254	41,7	62
	35	798	268	38,0	53	820	272	39,1	55	843	277	40,2	58
	40	761	292	36,3	48	782	296	37,3	51	804	301	38,3	53
	46	702	324	33,4	42	722	329	34,4	44	742	334	35,4	46
	48	655	324	31,2	37	656	318	31,3	37	660	313	31,5	37
	50	568	295	27,1	29	571	290	27,2	29	577	287	27,5	29
970	25	954	248	45,5	56	983	252	46,8	59	1011	257	48,2	62
	30	927	271	44,2	53	954	275	45,5	56	982	280	46,8	59
	35	894	294	42,6	50	921	299	43,9	52	947	304	45,2	55
	40	853	320	40,6	46	877	325	41,8	48	902	331	43,0	51
	46	786	355	37,5	39	806	359	38,4	41	818	358	39,0	42
	48	730	350	34,8	34	743	350	35,4	36	756	349	36,1	37
	50	653	331	31,1	28	650	337	31,0	28	654	332	31,2	28
C10	25	1025	276	48,8	63	1055	280	50,3	67	1086	285	51,8	70
	30	995	300	47,4	60	1024	305	48,8	63	1053	311	50,2	67
	35	957	327	45,6	56	985	332	46,9	59	1013	338	48,3	62
	40	909	355	43,3	51	935	361	44,6	54	961	367	45,8	57
	46	833	394	39,7	44	851	399	40,6	45	852	392	40,6	46
	48	744	373	35,5	36	749	368	35,7	36	753	362	35,9	36
	50	644	339	30,7	28	634	355	30,2	27	636	348	30,4	27
C11	25	1142	293	54,4	41	1175	298	56,0	44	1208	302	57,6	46
	30	1111	320	52,9	39	1143	325	54,5	42	1175	330	56,1	44
	35	1074	348	51,1	37	1105	354	52,7	39	1136	359	54,2	41
	40	1026	379	48,9	34	1056	385	50,3	36	1086	391	51,8	38
	46	950	420	45,2	30	978	426	46,6	31	1006	433	48,0	33
	48	899	424	42,8	27	916	425	43,7	28	933	425	44,5	29
	50	824	412	39,2	23	826	406	39,4	23	834	402	39,8	24
C12	25	1225	325	58,3	47	1259	330	60,0	49	1294	336	61,7	52
	30	1191	354	56,7	45	1224	360	58,4	47	1258	366	60,0	49
	35	1149	386	54,7	42	1181	392	56,3	44	1214	398	57,9	46
	40	1095	420	52,2	38	1126	427	53,7	40	1157	434	55,2	43
	46	1008	466	48,0	33	1037	474	49,4	35	1066	481	50,8	37
	48	934	462	44,5	29	941	457	44,8	29	947	451	45,2	30
	50	812	424	38,7	23	816	416	38,9	23	826	412	39,4	23
C13	25	1280	333	61,0	62	1319	339	62,9	65	1359	345	64,8	69
	30	1241	362	59,1	58	1279	369	60,9	62	1317	375	62,8	65
	35	1194	393	56,9	54	1229	400	58,6	57	1265	407	60,3	61
	40	1133	427	54,0	50	1167	435	55,6	52	1200	442	57,2	55
	46	1038	473	49,5	42	1069	480	50,9	45	1077	478	51,4	45
	48	938	455	44,7	35	944	449	45,0	36	949	442	45,3	36
	50	810	413	38,6	27	820	409	39,1	28	800	424	38,1	27

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
740	25	784	198	37,4	86	806	201	38,5	91	827	204	39,5	95
	30	763	216	36,4	82	783	219	37,4	86	804	223	38,4	90
	35	736	234	35,1	77	756	238	36,1	81	776	242	37,1	85
	40	702	255	33,5	71	721	259	34,4	74	740	263	35,3	78
	46	648	282	30,9	61	652	281	31,1	62	656	278	31,3	63
	48	575	264	27,4	49	578	260	27,6	50	579	255	27,7	50
	50	497	238	23,7	38	489	249	23,4	37	494	246	23,6	38
810	25	862	214	41,1	61	886	217	42,3	64	908	220	43,4	67
	30	839	233	40,0	58	862	237	41,2	61	885	241	42,3	64
	35	811	253	38,7	54	833	257	39,8	57	856	262	40,9	60
	40	775	276	37,0	50	797	280	38,0	53	818	284	39,1	55
	46	717	305	34,2	44	727	304	34,7	45	738	304	35,3	46
	48	663	296	31,6	38	674	296	32,2	39	682	294	32,5	40
	50	578	283	27,6	30	582	280	27,8	30	588	277	28,1	31
870	25	924	237	44,1	69	948	241	45,3	72	971	245	46,3	75
	30	898	259	42,8	65	923	263	44,0	69	947	267	45,2	72
	35	866	281	41,3	61	889	286	42,5	64	913	290	43,6	67
	40	825	306	39,4	56	847	311	40,4	59	870	316	41,5	62
	46	757	338	36,1	48	757	332	36,1	48	761	328	36,4	49
	48	668	312	31,9	38	671	307	32,0	39	673	301	32,1	39
	50	565	298	26,9	28	570	295	27,2	29	575	291	27,5	29
970	25	1041	261	49,6	65	1070	266	51,1	69	1099	270	52,5	72
	30	1010	285	48,2	62	1039	289	49,6	65	1068	294	51,0	69
	35	974	309	46,5	58	1001	314	47,8	61	1029	320	49,1	64
	40	928	336	44,3	53	953	342	45,5	56	979	347	46,8	59
	46	832	359	39,7	44	846	359	40,4	45	859	358	41,0	46
	48	766	348	36,5	38	773	345	36,9	38	779	341	37,2	39
	50	659	328	31,4	29	663	322	31,6	29	669	318	31,9	30
C10	25	1116	290	53,3	74	1147	295	54,7	78	1177	300	56,2	82
	30	1083	316	51,7	70	1113	322	53,1	74	1142	327	54,6	77
	35	1041	344	49,7	65	1069	349	51,0	69	1098	355	52,4	72
	40	988	374	47,1	60	1014	380	48,4	62	1041	386	49,7	66
	46	857	387	40,9	46	862	382	41,2	47	866	376	41,4	47
	48	756	355	36,0	37	764	352	36,5	38	772	349	36,9	38
	50	643	344	30,7	28	649	339	31,0	28	654	333	31,2	28
C11	25	1242	307	59,3	48	1276	312	60,9	51	1310	317	62,6	53
	30	1208	335	57,6	46	1242	341	59,3	48	1275	346	60,9	51
	35	1168	365	55,7	43	1200	371	57,3	46	1232	377	58,8	48
	40	1116	397	53,3	40	1147	403	54,8	42	1178	409	56,2	44
	46	1027	437	49,0	34	1041	435	49,7	35	1058	435	50,5	36
	48	948	424	45,2	30	964	423	46,0	31	976	422	46,6	31
	50	827	407	39,5	23	833	402	39,8	24	835	394	39,9	24
C12	25	1329	341	63,4	55	1365	347	65,1	57	1400	352	66,9	60
	30	1292	372	61,7	52	1327	378	63,3	55	1362	384	65,0	57
	35	1247	405	59,5	49	1280	411	61,1	51	1313	418	62,7	54
	40	1188	441	56,7	45	1220	448	58,2	47	1251	455	59,8	49
	46	1081	482	51,6	38	1081	473	51,6	38	1087	468	51,9	38
	48	952	444	45,4	30	955	436	45,6	30	966	433	46,1	31
	50	807	427	38,5	22	815	422	38,9	23	816	413	39,0	23
C13	25	1398	351	66,7	73	1438	357	68,7	76	1479	364	70,6	80
	30	1355	382	64,7	69	1394	389	66,5	72	1433	396	68,4	76
	35	1302	415	62,1	64	1339	422	63,9	67	1376	429	65,7	71
	40	1235	450	58,9	58	1269	458	60,6	61	1304	466	62,3	64
	46	1084	473	51,7	46	1091	467	52,1	46	1096	461	52,3	47
	48	953	434	45,5	36	964	431	46,0	37	965	422	46,1	37
	50	809	419	38,6	27	816	414	39,0	28	823	408	39,3	28

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	10 Pi (kW)	10 qw (l/s)	10 dpw (kPa)	11 Cc (kW)	11 Pi (kW)	11 qw (l/s)	11 dpw (kPa)	12 Cc (kW)	12 Pi (kW)	12 qw (l/s)	12 dpw (kPa)
740	25	848	208	40,5	100	870	211	41,6	104	891	214	42,6	109
	30	825	226	39,4	95	846	230	40,4	99	867	234	41,4	104
	35	796	246	38,1	89	816	250	39,0	93	836	254	40,0	97
	40	759	267	36,3	82	779	272	37,2	85	798	276	38,2	89
	46	659	274	31,5	63	662	270	31,6	64	669	269	32,0	65
	48	586	253	28,0	51	586	248	28,0	51	591	246	28,3	52
	50	498	243	23,8	38	502	239	24,0	39	505	234	24,1	39
810	25	931	224	44,5	70	954	227	45,6	73	978	231	46,8	76
	30	907	244	43,4	67	930	248	44,4	70	953	252	45,6	73
	35	879	266	42,0	63	900	270	43,0	66	922	274	44,1	69
	40	840	289	40,1	58	861	293	41,2	61	883	298	42,2	64
	46	750	304	35,8	47	764	305	36,5	49	775	304	37,1	50
	48	687	292	32,8	40	692	288	33,1	41	686	291	32,8	40
	50	591	272	28,3	31	596	269	28,5	31	598	264	28,6	32
870	25	993	248	47,4	78	1015	252	48,5	82	1038	256	49,6	85
	30	968	271	46,3	75	990	275	47,3	78	1012	279	48,4	81
	35	937	295	44,8	71	959	300	45,8	74	980	304	46,9	77
	40	892	321	42,6	65	915	326	43,7	68	938	331	44,9	71
	46	765	324	36,5	49	773	322	37,0	50	775	316	37,1	50
	48	680	298	32,5	40	686	295	32,8	40	671	304	32,1	39
	50	580	286	27,7	30	584	281	27,9	30	586	276	28,0	30
970	25	1129	275	53,9	76	1159	279	55,4	79	1189	284	56,8	83
	30	1096	299	52,4	72	1125	304	53,8	75	1154	309	55,2	79
	35	1057	325	50,5	67	1084	330	51,8	71	1112	336	53,2	74
	40	1006	353	48,0	62	1032	359	49,3	65	1059	365	50,6	68
	46	876	360	41,8	48	889	359	42,5	49	892	355	42,7	50
	48	772	344	36,9	38	776	339	37,1	39	780	334	37,3	39
	50	671	312	32,1	30	676	307	32,3	30	676	312	32,3	30
C10	25	1208	305	57,7	86	1238	311	59,2	90	1269	316	60,7	94
	30	1172	333	56,0	81	1201	338	57,4	85	1231	344	58,9	89
	35	1127	362	53,9	76	1155	368	55,2	79	1184	374	56,6	83
	40	1068	393	51,0	69	1096	399	52,4	72	1124	406	53,7	75
	46	876	374	41,8	48	878	367	42,0	48	886	364	42,4	49
	48	754	360	36,0	37	760	355	36,3	37	766	350	36,6	38
	50	658	327	31,4	29	661	321	31,6	29	670	317	32,0	30
C11	25	1345	322	64,2	56	1380	327	65,9	59	1415	333	67,7	61
	30	1309	352	62,5	53	1342	357	64,2	56	1377	363	65,8	58
	35	1265	383	60,4	50	1297	389	62,0	52	1330	395	63,6	55
	40	1209	416	57,7	46	1240	422	59,3	48	1271	429	60,8	51
	46	1079	437	51,5	38	1095	437	52,3	39	1111	436	53,1	40
	48	979	415	46,8	32	986	411	47,1	32	981	416	46,9	32
	50	844	389	40,3	24	850	384	40,6	25	857	379	41,0	25
C12	25	1436	358	68,6	63	1472	364	70,4	66	1509	370	72,1	69
	30	1396	390	66,7	60	1431	397	68,4	63	1466	403	70,1	65
	35	1347	425	64,4	56	1381	431	66,0	59	1414	438	67,6	61
	40	1283	462	61,3	51	1315	469	62,9	54	1348	477	64,4	56
	46	1100	466	52,5	39	1104	458	52,8	39	1106	450	52,9	39
	48	967	424	46,2	31	976	419	46,7	31	963	436	46,0	31
	50	822	406	39,3	23	835	403	39,9	24	839	396	40,1	24
C13	25	1520	371	72,6	85	1562	377	74,7	89	1604	384	76,7	93
	30	1472	403	70,3	80	1512	410	72,3	84	1552	418	74,2	88
	35	1413	437	67,5	74	1451	445	69,4	78	1489	453	71,2	82
	40	1340	474	64,0	67	1375	482	65,7	71	1411	490	67,5	74
	46	1100	453	52,5	47	1102	445	52,7	47	1113	442	53,2	48
	48	975	418	46,6	38	961	435	45,9	37	960	424	45,9	37
	50	829	401	39,6	28	833	393	39,8	29	836	385	40,0	29

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

		Condenser Inlet Air Temperature (°C)											
	Twout	13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
740	25	912	218	43,6	114	934	221	44,7	119	956	225	45,8	124
	30	888	237	42,5	108	909	241	43,5	113	930	245	44,5	118
	35	857	258	41,0	102	877	262	42,0	106	897	266	42,9	110
	40	817	280	39,1	93	837	285	40,0	97	856	289	41,0	102
	46	671	264	32,1	65	677	262	32,4	66	677	256	32,4	66
	48	582	254	27,9	51	586	250	28,0	51	589	246	28,2	52
	50	507	230	24,2	39	513	227	24,5	40	514	222	24,6	41
810	25	1001	234	47,9	80	1024	237	49,0	83	1046	241	50,1	86
	30	976	255	46,7	76	999	259	47,8	79	1021	263	48,9	83
	35	944	278	45,2	72	966	282	46,2	75	989	286	47,3	78
	40	905	302	43,3	66	926	307	44,3	69	947	311	45,3	72
	46	786	303	37,6	52	791	301	37,8	52	796	298	38,1	53
	48	689	287	33,0	41	692	282	33,1	41	699	280	33,5	42
	50	604	261	28,9	32	602	263	28,8	32	607	259	29,0	32
870	25	1061	259	50,8	89	1084	263	51,9	92	1107	267	53,0	96
	30	1034	283	49,5	85	1057	287	50,6	88	1079	291	51,7	91
	35	1001	308	47,9	80	1022	313	48,9	83	1044	317	50,0	86
	40	959	336	45,9	74	979	341	46,8	77	999	346	47,8	80
	46	777	311	37,1	50	783	308	37,5	51	790	305	37,8	52
	48	676	299	32,3	39	680	294	32,5	40	688	292	33,0	41
	50	594	273	28,4	31	595	267	28,5	31	602	263	28,8	32
970	25	1219	289	58,3	87	1249	294	59,8	91	1279	298	61,3	95
	30	1184	314	56,6	83	1213	320	58,1	87	1242	325	59,5	90
	35	1140	341	54,5	77	1169	347	55,9	81	1197	353	57,3	84
	40	1085	370	51,9	71	1112	376	53,2	74	1139	383	54,5	77
	46	894	349	42,8	50	893	354	42,7	50	897	349	43,0	50
	48	786	330	37,6	40	791	325	37,9	40	796	320	38,1	41
	50	677	304	32,4	30	685	301	32,8	31	690	297	33,0	31
C10	25	1300	321	62,2	98	1331	326	63,7	102	1362	332	65,2	107
	30	1261	350	60,3	93	1291	355	61,8	97	1321	361	63,2	101
	35	1212	380	58,0	86	1241	386	59,4	90	1269	392	60,8	94
	40	1150	413	55,0	79	1177	419	56,3	82	1205	426	57,7	85
	46	886	356	42,4	49	875	369	41,9	48	880	363	42,1	49
	48	770	343	36,8	38	780	341	37,3	39	783	334	37,5	39
	50	671	310	32,1	30	678	306	32,4	30	684	301	32,8	31
C11	25	1451	338	69,4	64	1486	343	71,1	67	1522	349	72,9	70
	30	1411	368	67,5	61	1446	374	69,2	64	1481	380	70,9	67
	35	1363	401	65,2	57	1396	407	66,8	60	1430	413	68,5	63
	40	1303	435	62,3	53	1334	442	63,9	55	1366	449	65,4	58
	46	1127	436	53,9	41	1129	429	54,0	41	1136	424	54,4	41
	48	986	410	47,2	32	994	405	47,6	33	997	398	47,7	33
	50	862	372	41,2	25	858	375	41,1	25	861	367	41,2	25
C12	25	1546	376	73,9	72	1583	382	75,8	75	1621	388	77,6	78
	30	1502	409	71,9	68	1538	416	73,6	71	1574	423	75,4	74
	35	1448	445	69,3	64	1482	452	70,9	67	1516	459	72,6	70
	40	1380	484	66,0	59	1412	492	67,6	61	1444	499	69,1	64
	46	1117	447	53,4	40	1117	438	53,5	40	1126	433	53,9	41
	48	970	430	46,4	31	976	423	46,7	31	980	415	46,9	32
	50	842	387	40,3	24	852	383	40,8	25	853	373	40,8	25
C13	25	1647	392	78,8	98	1689	399	80,8	102	1732	406	82,9	107
	30	1593	425	76,2	92	1634	433	78,2	97	1675	441	80,2	101
	35	1527	461	73,1	85	1566	469	75,0	89	1605	477	76,9	94
	40	1446	499	69,2	77	1483	507	71,0	81	1519	516	72,7	85
	46	1113	432	53,2	48	1122	427	53,7	49	1109	442	53,1	48
	48	974	421	46,6	38	979	414	46,9	38	983	405	47,0	39
	50	847	380	40,5	30	856	376	41,0	30	856	366	41,0	30

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
H14	25	1352	362	64,4	71	1392	369	66,3	75	1431	375	68,3	79
	30	1310	395	62,4	67	1348	402	64,2	71	1386	409	66,1	75
	35	1258	431	59,9	63	1294	438	61,7	66	1330	446	63,4	69
	40	1191	470	56,7	57	1225	478	58,4	60	1259	486	60,0	63
	46	1045	496	49,8	45	1064	495	50,7	46	1067	488	50,9	47
	48	931	465	44,3	36	935	456	44,6	37	933	462	44,5	37
	50	797	434	38,0	28	803	427	38,3	28	798	431	38,0	28
H15	25	1460	390	69,5	78	1502	397	71,6	82	1544	404	73,6	86
	30	1412	427	67,3	73	1453	434	69,2	77	1493	442	71,2	81
	35	1353	466	64,5	68	1391	474	66,3	71	1429	482	68,2	75
	40	1277	510	60,8	61	1312	518	62,5	64	1348	527	64,3	67
	46	1074	516	51,2	45	1081	507	51,5	45	1086	498	51,8	46
	48	948	476	45,2	36	951	465	45,3	36	941	484	44,9	35
	50	798	452	38,0	26	807	446	38,4	27	814	439	38,8	27
C16	25	1526	410	72,7	57	1570	417	74,8	60	1612	424	76,9	63
	30	1483	447	70,6	54	1525	455	72,7	57	1567	462	74,7	60
	35	1429	487	68,1	51	1469	495	70,0	53	1509	503	72,0	56
	40	1360	531	64,8	46	1397	539	66,6	49	1435	548	68,4	51
	46	1249	589	59,5	40	1275	596	60,8	41	1285	591	61,3	42
	48	1116	558	53,1	33	1123	550	53,5	33	1128	541	53,8	33
	50	964	506	45,9	25	948	530	45,2	24	952	520	45,4	25
C17	25	1612	434	76,8	63	1657	441	79,0	66	1701	448	81,1	70
	30	1568	474	74,7	60	1611	481	76,8	63	1655	489	78,9	66
	35	1513	516	72,1	56	1555	524	74,1	59	1597	532	76,1	62
	40	1443	562	68,7	52	1482	571	70,6	54	1521	580	72,5	57
	46	1329	625	63,3	45	1360	633	64,8	47	1380	633	65,8	48
	48	1211	606	57,7	38	1216	597	58,0	38	1223	588	58,3	38
	50	1047	550	49,9	29	1041	564	49,6	29	1045	553	49,8	29
C18	25	1691	455	80,6	63	1738	462	82,8	66	1785	469	85,1	69
	30	1645	496	78,4	60	1691	504	80,6	63	1737	512	82,8	66
	35	1589	540	75,7	56	1633	549	77,8	59	1678	558	80,0	62
	40	1516	589	72,2	52	1558	598	74,3	54	1600	608	76,3	57
	46	1399	655	66,6	45	1438	665	68,5	47	1468	671	70,0	49
	48	1299	651	61,9	39	1309	644	62,4	40	1318	635	62,8	40
	50	1128	594	53,7	30	1136	585	54,1	31	1137	587	54,2	31
C19	25	1778	479	84,7	69	1827	486	87,1	72	1877	494	89,5	76
	30	1732	523	82,5	65	1779	531	84,8	69	1827	539	87,1	72
	35	1675	570	79,8	62	1720	578	82,0	65	1766	587	84,2	68
	40	1601	621	76,2	57	1644	631	78,3	60	1688	640	80,5	62
	46	1480	692	70,5	49	1521	702	72,5	52	1562	712	74,5	54
	48	1392	698	66,3	44	1403	690	66,9	45	1413	682	67,4	45
	50	1210	638	57,6	34	1216	627	57,9	35	1230	621	58,7	35
C20	25	1824	499	86,9	36	1871	507	89,2	38	1918	514	91,5	40
	30	1779	547	84,7	34	1824	555	86,9	36	1870	563	89,2	38
	35	1721	598	82,0	32	1765	606	84,1	34	1809	615	86,3	36
	40	1644	654	78,3	30	1686	664	80,4	31	1730	673	82,5	33
	46	1508	726	71,8	26	1535	727	73,2	26	1566	730	74,7	27
	48	1395	711	66,4	22	1405	702	67,0	23	1417	695	67,6	23
	50	1197	656	57,0	17	1213	651	57,8	17	1217	638	58,0	17
C21	25	1876	524	89,3	38	1923	532	91,7	40	1972	539	94,0	42
	30	1828	574	87,1	36	1874	583	89,3	38	1921	591	91,6	40
	35	1767	629	84,2	34	1812	638	86,3	36	1856	648	88,5	37
	40	1685	691	80,3	31	1728	701	82,4	33	1771	711	84,5	34
	46	1531	764	72,9	26	1547	757	73,7	27	1568	753	74,8	28
	48	1382	723	65,8	22	1391	711	66,3	22	1405	704	67,0	23
	50	1177	677	56,1	16	1192	670	56,8	17	1197	656	57,1	17
C22	25	1930	549	91,9	40	1979	557	94,3	42	2028	565	96,7	44
	30	1880	603	89,6	38	1927	612	91,9	40	1975	621	94,2	42
	35	1816	662	86,5	36	1861	671	88,7	37	1906	681	90,9	39
	40	1730	728	82,4	33	1773	738	84,5	34	1816	749	86,6	36
	46	1555	800	74,1	27	1562	787	74,4	27	1573	776	75,0	28
	48	1371	734	65,3	22	1379	720	65,7	22	1392	711	66,4	22
	50	1160	698	55,2	16	1172	689	55,9	16	1180	676	56,2	16

NOTES

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
H14	25	1472	382	70,2	83	1513	389	72,2	87	1553	396	74,2	92
	30	1425	417	68,0	78	1464	424	69,9	82	1504	432	71,8	87
	35	1367	454	65,2	73	1404	462	67,0	76	1441	470	68,8	80
	40	1293	494	61,7	66	1327	502	63,4	69	1362	511	65,1	72
	46	1076	483	51,4	47	1081	475	51,6	48	1088	469	52,0	48
	48	940	456	44,9	37	946	449	45,2	38	955	443	45,6	38
	50	805	425	38,4	28	811	418	38,7	29	820	412	39,2	29
H15	25	1587	412	75,7	91	1631	419	77,8	95	1673	426	79,9	100
	30	1534	450	73,2	85	1576	458	75,2	89	1617	466	77,2	94
	35	1468	491	70,0	79	1507	500	71,9	82	1546	508	73,8	86
	40	1384	536	66,0	71	1420	545	67,8	74	1456	554	69,5	78
	46	1099	494	52,4	47	1102	484	52,6	47	1113	479	53,2	48
	48	945	475	45,1	36	955	468	45,6	36	963	461	46,0	37
	50	821	431	39,2	28	826	422	39,4	28	838	418	40,0	29
C16	25	1654	431	78,9	66	1697	438	81,0	69	1741	445	83,1	73
	30	1608	470	76,7	63	1650	477	78,7	66	1692	485	80,8	69
	35	1550	512	74,0	59	1590	520	75,9	62	1630	528	77,9	65
	40	1473	557	70,3	54	1512	566	72,2	56	1551	575	74,1	59
	46	1285	579	61,3	42	1292	571	61,7	43	1307	568	62,4	43
	48	1142	537	54,5	34	1145	527	54,7	34	1157	522	55,3	35
	50	962	514	45,9	25	971	507	46,4	25	979	498	46,7	26
C17	25	1746	455	83,3	73	1791	462	85,5	77	1837	470	87,7	80
	30	1698	497	81,0	69	1742	504	83,2	73	1786	512	85,3	76
	35	1639	541	78,2	65	1681	549	80,3	68	1723	558	82,3	71
	40	1561	589	74,5	60	1602	599	76,5	63	1642	608	78,4	66
	46	1393	629	66,5	49	1401	622	66,9	49	1415	618	67,6	50
	48	1235	582	58,9	39	1242	573	59,3	40	1252	566	59,8	40
	50	1045	558	49,9	29	1052	549	50,2	29	1061	541	50,7	30
C18	25	1833	477	87,5	73	1881	484	89,8	76	1930	492	92,2	80
	30	1783	520	85,1	69	1830	528	87,4	72	1878	537	89,7	76
	35	1722	566	82,2	65	1767	575	84,3	68	1812	584	86,5	71
	40	1642	617	78,4	60	1685	627	80,4	62	1728	637	82,5	65
	46	1496	674	71,4	50	1512	673	72,2	51	1514	661	72,3	52
	48	1325	626	63,2	41	1333	617	63,7	41	1345	610	64,2	42
	50	1125	602	53,7	30	1131	592	54,0	31	1141	584	54,5	31
C19	25	1927	502	91,9	79	1978	509	94,4	83	2029	517	96,9	87
	30	1876	547	89,5	76	1925	556	91,9	79	1975	565	94,3	83
	35	1813	596	86,5	71	1860	606	88,8	75	1908	615	91,1	78
	40	1732	650	82,6	66	1776	660	84,8	69	1821	670	87,0	72
	46	1603	723	76,5	57	1624	724	77,5	58	1623	711	77,5	58
	48	1421	673	67,8	46	1428	662	68,1	46	1444	657	69,0	47
	50	1207	647	57,6	34	1211	635	57,8	34	1223	627	58,4	35
C20	25	1966	521	93,8	41	2014	529	96,1	43	2063	537	98,5	45
	30	1916	571	91,4	39	1963	579	93,7	41	2010	587	96,0	43
	35	1854	624	88,5	37	1899	633	90,6	39	1944	642	92,8	41
	40	1772	683	84,6	34	1815	693	86,6	36	1858	703	88,7	37
	46	1600	736	76,3	29	1623	736	77,5	29	1625	723	77,6	29
	48	1425	683	68,0	23	1425	686	68,0	23	1430	673	68,3	23
	50	1230	630	58,7	18	1217	643	58,1	17	1225	632	58,5	18
C21	25	2020	547	96,4	43	2069	555	98,8	45	2119	563	101,2	47
	30	1968	600	93,9	41	2015	609	96,2	43	2063	617	98,5	45
	35	1902	657	90,7	39	1947	666	92,9	41	1993	676	95,2	42
	40	1814	721	86,6	36	1858	731	88,7	37	1901	742	90,8	39
	46	1595	753	76,1	28	1611	747	76,9	29	1615	733	77,1	29
	48	1411	690	67,3	23	1404	706	67,0	23	1409	692	67,3	23
	50	1209	648	57,7	17	1208	648	57,7	17	1221	641	58,3	18
C22	25	2078	574	99,1	46	2128	582	101,6	48	2178	591	104,0	50
	30	2023	630	96,5	44	2071	639	98,9	45	2120	648	101,2	47
	35	1952	691	93,1	41	1998	701	95,4	43	2045	711	97,7	44
	40	1859	760	88,7	37	1903	770	90,8	39	1947	781	93,0	41
	46	1589	769	75,8	28	1597	756	76,2	28	1607	744	76,8	29
	48	1400	697	66,8	22	1383	724	66,0	22	1392	712	66,5	22
	50	1191	666	56,8	17	1201	654	57,3	17	1217	647	58,1	17

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	10 Pi (kW)	10 qw (l/s)	10 dpw (kPa)	11 Cc (kW)	11 Pi (kW)	11 qw (l/s)	11 dpw (kPa)	12 Cc (kW)	12 Pi (kW)	12 qw (l/s)	12 dpw (kPa)
H14	25	1594	403	76,2	96	1635	410	78,2	101	1676	417	80,2	105
	30	1543	439	73,7	91	1582	447	75,6	95	1622	455	77,6	99
	35	1478	478	70,6	84	1516	486	72,5	88	1554	495	74,3	92
	40	1397	520	66,8	76	1428	527	68,2	79	1449	528	69,3	81
	46	1087	475	51,9	48	1093	468	52,2	49	1098	460	52,5	49
	48	949	446	45,3	38	955	439	45,7	38	965	434	46,1	39
	50	824	404	39,4	29	831	397	39,7	30	841	392	40,2	31
H15	25	1715	434	81,9	104	1757	441	84,0	109	1800	449	86,1	114
	30	1658	474	79,2	98	1699	482	81,2	103	1739	491	83,2	107
	35	1585	517	75,7	91	1625	526	77,7	95	1664	536	79,6	99
	40	1493	564	71,3	81	1520	570	72,7	84	1528	563	73,0	85
	46	1098	494	52,5	47	1108	488	52,9	48	1108	476	53,0	48
	48	970	453	46,3	37	975	444	46,6	38	989	440	47,3	39
	50	841	408	40,2	29	851	402	40,7	30	860	397	41,1	30
C16	25	1785	452	85,3	76	1829	460	87,4	80	1874	467	89,6	83
	30	1734	493	82,8	72	1777	501	84,9	76	1820	509	87,0	79
	35	1670	537	79,8	68	1711	545	81,8	71	1752	554	83,8	74
	40	1590	584	75,9	62	1628	593	77,8	65	1666	603	79,7	67
	46	1311	559	62,7	44	1314	549	62,8	44	1327	544	63,4	45
	48	1130	538	54,0	33	1140	531	54,5	34	1148	523	54,9	34
	50	985	489	47,1	26	999	485	47,7	27	1002	474	47,9	27
C17	25	1883	477	90,0	84	1929	485	92,2	88	1977	493	94,5	92
	30	1831	521	87,5	80	1876	529	89,7	83	1921	537	91,9	87
	35	1766	567	84,4	75	1809	576	86,4	78	1852	585	88,6	81
	40	1683	617	80,4	69	1723	627	82,4	72	1764	637	84,4	75
	46	1421	608	67,9	51	1425	598	68,1	51	1435	591	68,6	51
	48	1239	575	59,2	39	1245	566	59,5	40	1243	568	59,4	40
	50	1068	532	51,0	30	1080	525	51,6	31	1085	514	51,9	31
C18	25	1980	500	94,6	84	2030	508	97,0	88	2081	516	99,5	92
	30	1925	545	92,0	80	1974	554	94,3	83	2023	563	96,7	87
	35	1858	594	88,8	75	1904	603	91,0	78	1950	612	93,3	81
	40	1771	646	84,6	68	1815	656	86,7	72	1859	667	88,9	75
	46	1525	654	72,8	52	1530	644	73,2	53	1546	640	73,9	54
	48	1341	609	64,1	41	1354	602	64,7	42	1338	614	64,0	41
	50	1150	575	54,9	31	1157	565	55,3	32	1166	556	55,8	32
C19	25	2081	526	99,4	91	2134	534	102,0	96	2187	542	104,6	100
	30	2025	573	96,8	87	2076	582	99,2	91	2127	592	101,7	95
	35	1956	624	93,4	82	2004	634	95,8	85	2053	644	98,2	89
	40	1867	680	89,2	75	1913	691	91,4	79	1959	701	93,7	82
	46	1632	702	78,0	59	1639	692	78,3	60	1656	688	79,2	61
	48	1447	645	69,2	48	1462	638	69,9	48	1434	660	68,6	47
	50	1233	617	58,9	36	1241	607	59,3	36	1248	596	59,7	36
C20	25	2112	545	100,9	47	2162	553	103,3	49	2212	561	105,8	51
	30	2058	596	98,3	45	2106	605	100,7	47	2154	613	103,0	49
	35	1990	651	95,1	42	2035	661	97,3	44	2082	670	99,5	46
	40	1901	713	90,8	39	1945	723	93,0	41	1989	733	95,1	42
	46	1637	715	78,2	30	1643	703	78,5	30	1659	698	79,3	31
	48	1444	667	69,0	24	1449	654	69,3	24	1461	645	69,8	24
	50	1234	622	59,0	18	1242	610	59,4	18	1258	605	60,2	19
C21	25	2169	572	103,6	49	2219	580	106,1	52	2270	589	108,6	54
	30	2112	626	100,9	47	2160	636	103,3	49	2209	645	105,7	51
	35	2039	686	97,4	44	2086	696	99,7	46	2132	706	102,0	48
	40	1945	752	92,9	41	1989	763	95,1	42	2033	774	97,2	44
	46	1629	726	77,8	30	1633	712	78,1	30	1648	705	78,8	30
	48	1423	684	68,0	23	1431	672	68,4	23	1442	662	68,9	24
	50	1229	629	58,7	18	1236	615	59,1	18	1251	609	59,8	18
C22	25	2229	599	106,5	52	2281	608	109,0	54	2333	617	111,5	56
	30	2169	657	103,6	49	2218	667	106,0	52	2268	677	108,5	54
	35	2092	721	99,9	46	2139	732	102,2	48	2186	742	104,5	50
	40	1991	792	95,1	42	2036	804	97,3	44	2080	815	99,5	46
	46	1620	735	77,4	29	1627	721	77,7	29	1641	713	78,4	30
	48	1405	702	67,1	23	1416	692	67,7	23	1425	679	68,2	23
	50	1223	633	58,5	18	1232	621	58,9	18	1247	614	59,6	18

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-XR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 13 Cc (kW)	13 Pi (kW)	13 qw (l/s)	13 dpw (kPa)	14 Cc (kW)	14 Pi (kW)	14 qw (l/s)	14 dpw (kPa)	15 Cc (kW)	15 Pi (kW)	15 qw (l/s)	15 dpw (kPa)
H14	25	1717	424	82,1	110	1758	432	84,2	115	1800	439	86,2	120
	30	1662	462	79,5	104	1701	470	81,4	108	1740	478	83,3	113
	35	1591	503	76,1	96	1629	512	78,0	100	1667	520	79,8	105
	40	1470	528	70,3	83	1490	528	71,3	85	1516	531	72,6	88
	46	1106	454	52,9	50	1113	447	53,3	51	1109	449	53,1	50
	48	969	425	46,4	39	977	418	46,8	40	983	411	47,1	40
	50	846	384	40,5	31	854	379	40,9	31	861	373	41,2	32
H15	25	1843	457	88,2	119	1887	465	90,3	124	1931	473	92,4	129
	30	1780	499	85,2	112	1821	508	87,2	116	1863	517	89,2	121
	35	1702	545	81,4	103	1740	554	83,3	107	1779	563	85,2	112
	40	1534	556	73,4	85	1539	548	73,7	86	1554	545	74,4	88
	46	1123	473	53,7	49	1129	464	54,0	49	1133	454	54,2	50
	48	992	430	47,4	39	1003	425	48,0	40	1003	413	48,0	40
	50	868	390	41,5	31	875	384	41,9	31	882	377	42,2	32
C16	25	1920	475	91,8	87	1965	483	94,1	91	2012	491	96,3	95
	30	1863	517	89,1	82	1907	526	91,3	86	1951	534	93,4	90
	35	1793	563	85,8	77	1835	572	87,8	80	1877	581	89,8	84
	40	1705	612	81,6	70	1744	622	83,5	73	1783	632	85,4	76
	46	1338	538	64,0	45	1319	557	63,1	44	1327	549	63,5	45
	48	1155	514	55,2	35	1170	510	56,0	36	1174	499	56,2	36
	50	1014	469	48,5	28	1015	457	48,6	28	1025	450	49,1	28
C17	25	2024	501	96,8	96	2072	509	99,2	100	2121	517	101,5	104
	30	1967	546	94,1	91	2013	554	96,3	95	2060	563	98,6	99
	35	1895	594	90,7	85	1939	603	92,8	89	1983	613	95,0	92
	40	1805	646	86,3	78	1846	656	88,4	81	1888	667	90,4	85
	46	1448	586	69,3	52	1435	593	68,7	52	1445	586	69,2	52
	48	1251	559	59,8	40	1264	553	60,5	41	1269	542	60,8	41
	50	1098	509	52,5	32	1099	496	52,6	32	1110	489	53,1	33
C18	25	2132	525	102,0	96	2184	533	104,5	100	2236	542	107,1	104
	30	2072	572	99,1	91	2122	581	101,5	95	2172	590	104,0	99
	35	1997	622	95,5	85	2045	632	97,8	89	2092	642	100,2	93
	40	1903	677	91,0	78	1947	687	93,2	81	1992	698	95,4	85
	46	1549	628	74,1	54	1563	623	74,8	55	1556	619	74,5	54
	48	1348	605	64,5	42	1356	596	64,9	42	1366	587	65,4	43
	50	1178	548	56,4	33	1184	537	56,7	33	1197	531	57,3	34
C19	25	2240	551	107,2	105	2295	560	109,8	109	2350	569	112,5	114
	30	2179	601	104,2	99	2231	610	106,8	104	2284	620	109,3	108
	35	2102	654	100,6	93	2152	664	103,0	97	2203	674	105,4	102
	40	2006	712	95,9	86	2053	723	98,2	89	2100	734	100,5	93
	46	1660	676	79,4	61	1675	670	80,2	62	1676	657	80,2	62
	48	1445	651	69,1	48	1455	641	69,6	48	1463	630	70,0	49
	50	1264	590	60,5	37	1268	577	60,7	38	1282	570	61,4	38
C20	25	2262	569	108,2	53	2313	577	110,7	56	2365	586	113,2	58
	30	2203	622	105,4	51	2252	631	107,8	53	2302	641	110,2	55
	35	2128	680	101,8	48	2175	690	104,1	50	2223	700	106,4	52
	40	2033	744	97,2	44	2077	754	99,4	46	2122	765	101,6	48
	46	1657	699	79,3	31	1668	689	79,8	31	1675	679	80,2	31
	48	1455	661	69,6	24	1463	650	70,0	24	1474	640	70,6	25
	50	1267	594	60,6	19	1281	587	61,3	19	1287	574	61,6	19
C21	25	2322	597	111,1	56	2374	606	113,6	58	2426	615	116,1	61
	30	2259	654	108,1	53	2309	664	110,5	55	2359	674	112,9	58
	35	2180	716	104,3	50	2227	727	106,6	52	2275	737	108,9	54
	40	2078	785	99,4	46	2122	796	101,6	48	2167	808	103,8	50
	46	1640	719	78,4	30	1646	705	78,8	30	1660	698	79,5	31
	48	1448	667	69,3	24	1456	654	69,7	24	1469	646	70,3	25
	50	1263	599	60,4	19	1276	592	61,1	19	1285	581	61,5	19
C22	25	2385	626	114,1	59	2438	635	116,7	61	2491	645	119,2	64
	30	2318	687	110,9	56	2369	697	113,4	58	2420	707	115,8	60
	35	2234	753	106,9	52	2282	764	109,2	54	2330	775	111,6	56
	40	2125	827	101,7	48	2170	839	103,9	50	2216	851	106,1	52
	46	1622	737	77,6	29	1627	722	77,8	30	1644	715	78,7	30
	48	1441	671	68,9	24	1447	657	69,2	24	1463	650	70,0	24
	50	1257	603	60,1	19	1269	594	60,7	19	1281	584	61,3	19

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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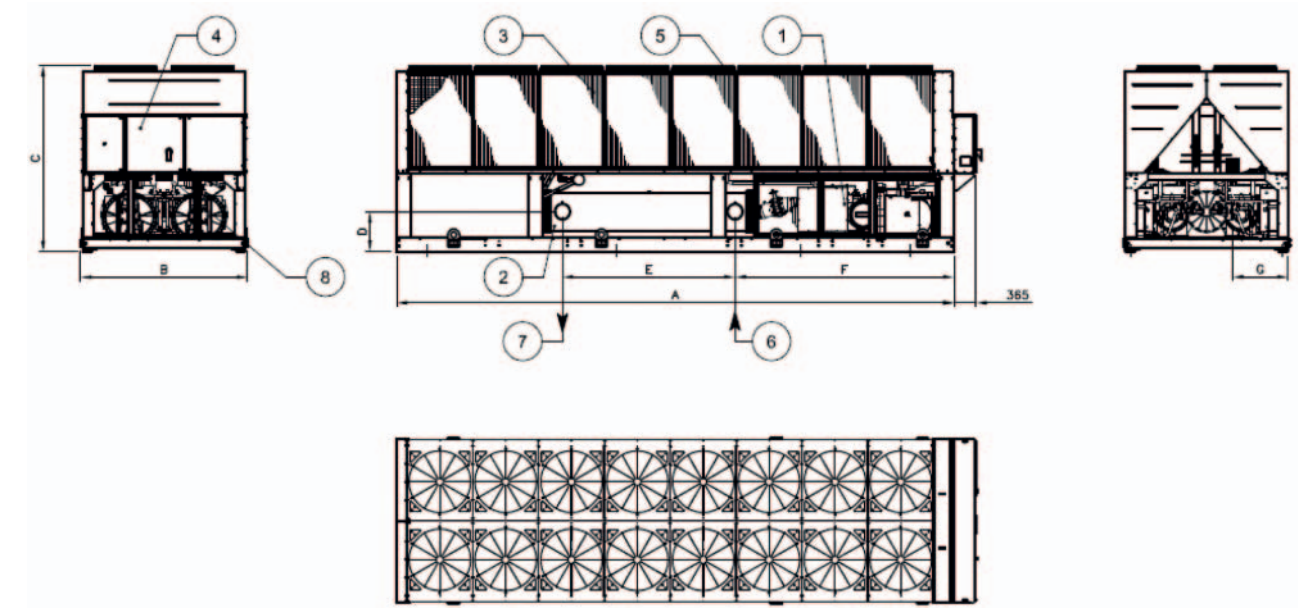
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

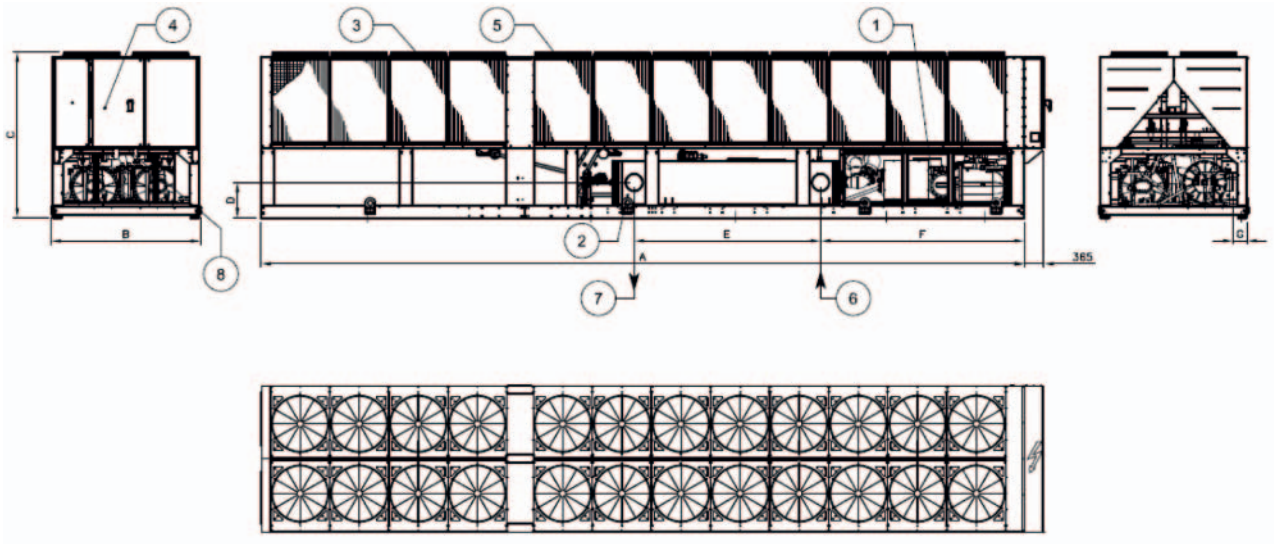
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (3 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-		Dimensions (mm)							Fans
Size	Size	A	B	C	D	E	F	G	
EWADC14÷C15C-SS/SL	EWADC13÷C14C-SR	10185	2285	2540	4440	2360	540	285	Nr 20
EWADC16÷C17C-SS/SL	EWADC15÷C16C-SR	11085	2285	2540	5340	2360	540	285	Nr 22
EWADC18C-SS/SL	EWADC17C-SR	11085	2285	2540	4780	2840	540	210	Nr 22
EWADC19÷C20C-SS/SL	EWADC18÷C19C-SR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC14C-XS/XL	EWADC14C-XR	11985	2285	2540	5680	2910	540	285	Nr 24
EWADC15÷C16C-XS/XL	EWADC15÷C16C-XR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC17C-XS/XL	EWADC17C-XR	12885	2285	2540	6580	2840	540	210	Nr 26
EWADC18C-XS/XL	EWADC18C-XR	13785	2285	2540	7480	2840	540	210	Nr 28
EWADC19C- XS/XL	EWADC19C-XR	14685	2285	2540	8380	2840	540	210	Nr 30
EWADH14÷H15C-XS/XL/XR		14685	2285	2285	8380	2840	540	210	Nr 30

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-XS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
760	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,2**
830	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,5**
890	74,6	76,7	79,5	78,7	74,6	70,1	60,5	51,4	**79,7**	**100,5**
990	75,1	77,2	80,0	79,2	75,1	70,6	61,0	51,9	**80,2**	**101,4**
C10	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
C11	75,2	77,3	80,1	79,3	75,2	70,7	61,1	52,0	**80,3**	**102,4**
C12	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
C13	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
H14	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
H15	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,5**
C16	75,8	77,9	80,7	79,9	75,8	71,3	61,7	52,6	**80,9**	**103,2**
C17	75,7	77,8	80,6	79,8	75,7	71,2	61,6	52,5	**80,8**	**103,5**
C18	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,7**
C19	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C20	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C21	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**
C22	75,9	78,0	80,8	80,0	75,9	71,4	61,8	52,7	**81,0**	**103,9**

EWAD~C-XL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
760	71,2	73,3	76,1	75,3	71,2	66,7	57,1	48,0	**76,3**	**96,8**
830	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,4**
890	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,4**
990	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,0**
C10	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**98,2**
C11	71,6	73,7	76,5	75,7	71,6	67,1	57,5	48,4	**76,7**	**98,8**
C12	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
C13	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
H14	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
H15	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**98,9**
C16	72,2	74,3	77,1	76,3	72,2	67,7	58,1	49,0	**77,3**	**99,6**
C17	72,3	74,4	77,2	76,4	72,3	67,8	58,2	49,1	**77,4**	**100,0**
C18	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,2**
C19	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C20	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C21	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**
C22	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**100,4**

EWAD~C-XR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
740	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
810	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,3**
870	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,3**
970	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**93,5**
C10	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**93,7**
C11	68,8	62,0	69,1	74,3	61,7	58,1	49,8	37,2	**72,2**	**94,3**
C12	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,5**
C13	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,5**
H14	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**94,6**
H15	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**94,6**
C16	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**95,3**
C17	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**95,6**
C18	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,7**
C19	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,9**
C20	69,9	63,1	70,2	75,4	62,8	59,2	50,9	38,3	**73,3**	**96,2**
C21	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**96,6**
C22	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**96,6**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

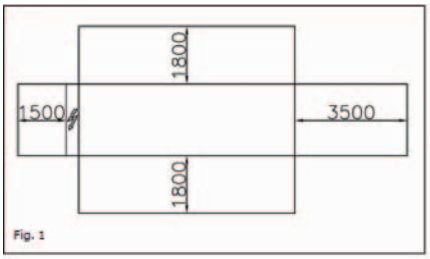

Fig. 1

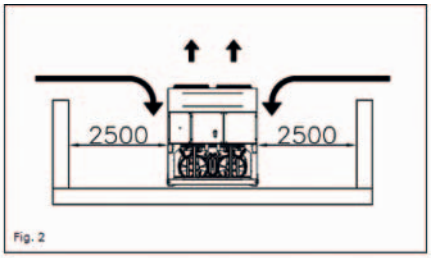

Fig. 2

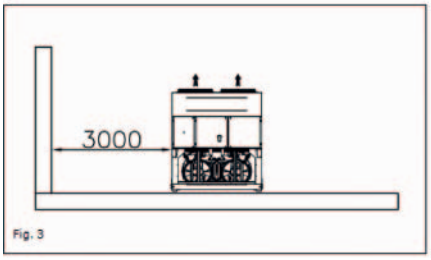

Fig. 3

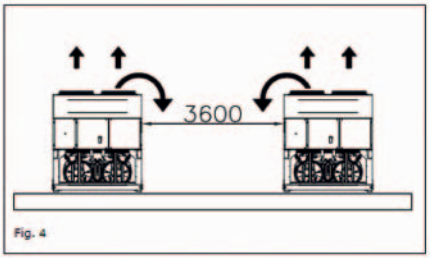

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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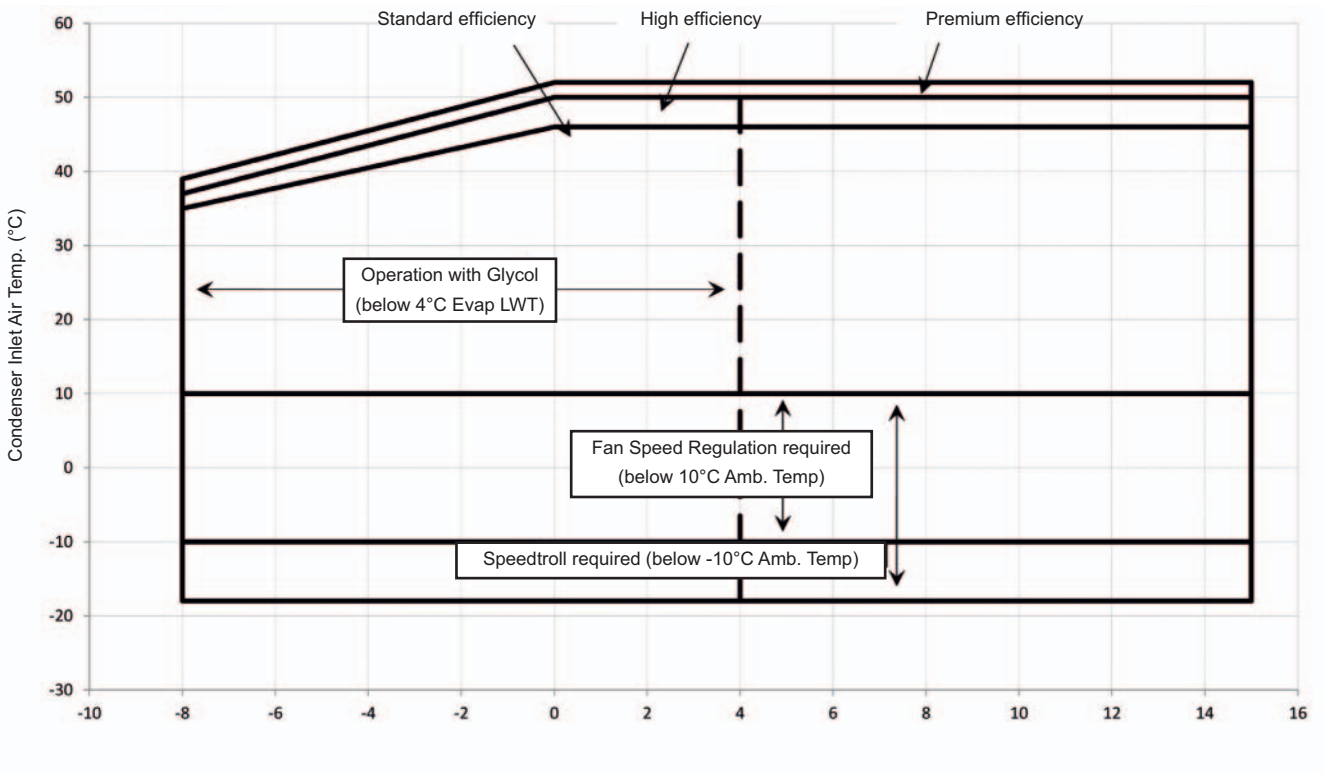
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

OPL_1-2a-3a_Rev.01_3a

12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

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13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

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TABLE OF CONTENTS

EWAD-C-SS

1 Features

- Wide capacity range: 16 sizes to cover a range from 647 to 1,922 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 46ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2-3 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 650C-SS	EWAD 740C-SS	EWAD 830C-SS	EWAD 910C-SS	EWAD 970C-SS	EWAD C11C-SS	EWAD C12C-SS	EWAD C13C-SS
Cooling capacity	Nom.			kW	647 (1)	744 (1)	832 (1)	912 (1)	967 (1)	1,064 (1)	1,152 (1)	1,319 (1)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5							
Power input	Cooling	Nom.		kW	221 (1)	262 (1)	299 (1)	318 (1)	350 (1)	377 (1)	403 (1)	441 (1)
EER					2.93 (1)	2.84 (1)	2.78 (1)	2.87 (1)	2.76 (1)	2.82 (1)	2.86 (1)	2.99 (1)
ESEER					3.95	3.87	3.89	3.84	3.80	3.88	3.84	4.06
IPLV					4.30	4.17	4.16	4.23	4.14	4.17	4.19	4.42
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,540							
		Width		mm	2,285							
		Depth		mm	6,185					7,085	7,985	8,885
Weight	Unit			kg	5,630	5,740	5,760	6,280	6,560	7,010	7,280	7,900
	Operation weight			kg	5,910	5,990	6,010	6,530	6,810	7,250	7,520	8,280
Water heat exchanger	Type				Single pass shell & tube							
	Water volume			l	266		251			243		386
	Nominal water flow	Cooling		l/s	30.9	35.5	39.7	43.5	46.1	50.8	55.0	62.9
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	47	54	53	62	69	64	74	54
	Insulation material				Closed cell							
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler							
Fan	Quantity				10			12		14	16	18
	Type				Direct propeller							
	Diameter			mm	800							
	Air flow rate	Nom.		l/s	53,442			64,131		74,819	85,508	96,196
	Speed			rpm	900							
Fan motor	Drive				DOL							
	Input	Cooling		W	17,500			21,000		24,500	28,000	31,500
Sound power level	Cooling	Nom.		dBA	99.5	100.0		100.9	101.1	101.5	101.7	101.9
Sound pressure level	Cooling	Nom.		dBA	79.0	79.5		80.4	80.6			80.7
Compressor	Type				Asymm single screw							
	Quantity				2							
	Oil	Charged volume		l	38			44	50			
Operation range	Water side	Cooling	Min.	ºCDB	-8							
			Max.	ºCDB	15							
	Air side	Cooling	Min.	ºCDB	-18							
			Max.	ºCDB	52							
Refrigerant	Type				R-134a							
	Circuits	Quantity			2							
Refrigerant circuit	Charge			kg	128			146	144	162	178	196
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm							219.1mm
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 pressure drop							
		09			Phase monitor							
		10			Emergency stop							
		11			Water freeze protection controller							

2 Specifications

2-1 Technical Specifications					EWAD H14C-SS	EWAD C14C-SS	EWAD C15C-SS	EWAD C16C-SS	EWAD C17C-SS	EWAD C18C-SS	EWAD C19C-SS	EWAD C20C-SS
Cooling capacity	Nom.			kW	1,418 (1)	1,419 (1)	1,538 (1)	1,622	1,714	1,802 (1)	1,875 (1)	1,922 (1)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5	7						
Power input	Cooling	Nom.		kW	474 (1)	500 (1)	551 (1)	579 (1)	619 (1)	665 (1)	682 (1)	716 (1)
EER					2.99 (1)	2.84 (1)	2.79 (1)	2.8 (1)	2.77 (1)	2.71 (1)	2.75 (1)	2.69 (1)
ESEER					4.05	3.88	3.90	3.87	3.78		3.79	3.76
IPLV					4.42	4.19	4.22	4.18	4.13	4.18		4.15
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,540							
		Width		mm	2,285							
		Depth		mm	8,885	10,185		11,085			11,985	
Weight	Unit			kg	7,900	10,310	10,320	10,710	10,770	11,240	11,600	
	Operation weight			kg	8,280	10,730		11,110	11,260	12,110	12,480	
Water heat exchanger	Type				Single pass shell & tube							
	Water volume			l	386	421	408		474	850		
	Nominal water flow	Cooling		l/s	67.6	67.78	73.4	77.4	81.8	86.0	89.5	91.7
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	58	47	62	68	75	36	39	40
	Insulation material				Closed cell							
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler							
Fan	Quantity				18	20		22			24	
	Type				Direct propeller							
	Diameter			mm	800							
	Air flow rate	Nom.		l/s	96,196	106,888	106,885	117,573			128,262	
	Speed			rpm	900	920	900					
Fan motor	Drive				DOL							
	Input	Cooling		W	31,500	1,750	35,000	38,500			42,000	
Sound power level	Cooling	Nom.		dBA	101.9	102.9	103.0	103.2	103.3	103.5	103.7	
Sound pressure level	Cooling	Nom.		dBA	80.7	81.0	81.1		81.2	81.5	81.9	
Compressor	Type				Asymm single screw	Semi-hermetic single screw compressor	Asymm single screw					
	Quantity				2	3						
	Oil	Charged volume		l	50	75						
Operation range	Water side	Cooling	Min.	ºCDB	-8							
			Max.	ºCDB	15							
	Air side	Cooling	Min.	ºCDB	-18							
			Max.	ºCDB	52	46	52					
Refrigerant	Type				R-134a							
	Circuits	Quantity			2	3						
Refrigerant circuit	Charge			kg	196	-	260	261		275	305	
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm					273mm		
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 pressure drop							
		09			Phase monitor							
		10			Emergency stop							
		11			Water freeze protection controller							

2 Specifications

2-2 Electrical Specifications				EWAD 650C-SS	EWAD 740C-SS	EWAD 830C-SS	EWAD 910C-SS	EWAD 970C-SS	EWAD C11C-SS	EWAD C12C-SS	EWAD C13C-SS
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	218	231	274		333		398	
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	218	274		333		398		451
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	604	649		915	962	1,017	1,021	1,068
	Nominal running current (RLA)	Cooling	A	366	432	492	524	577	624	667	726
	Maximum running current		A	476	545	589	656	715	787	859	921
	Max unit current for wires sizing		A	520	596	644	717	781	860	939	1,005
Fans	Nominal running current (RLA)		A	40			48		56	64	72

2-2 Electrical Specifications				EWAD H14C-SS	EWAD C14C-SS	EWAD C15C-SS	EWAD C16C-SS	EWAD C17C-SS	EWAD C18C-SS	EWAD C19C-SS	EWAD C20C-SS
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	451	326	398				451	
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	451	326	333	398			451	
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	1,081	1,242.6	1,312	1,363	1,367	1,410	1,456	1,470
	Nominal running current (RLA)	Cooling	A	773	823 (5)	909	959.0	1,023	1,092	1,116	1,164
	Maximum running current		A	974	1,058	1,144	1,217	1,281	1,334	1,395	1,449
	Max unit current for wires sizing		A	1,064	1,164	1,251	1,330	1,400	1,459	1,525	1,584
Fans	Nominal running current (RLA)		A	72	80		88			96	

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

(9) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

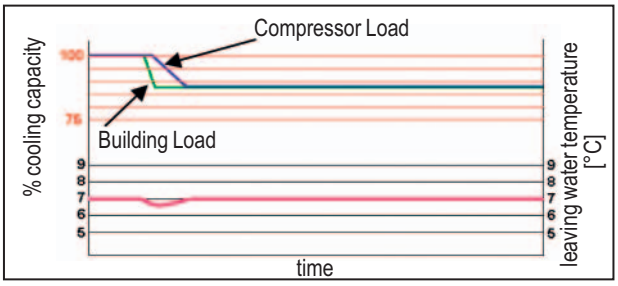
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

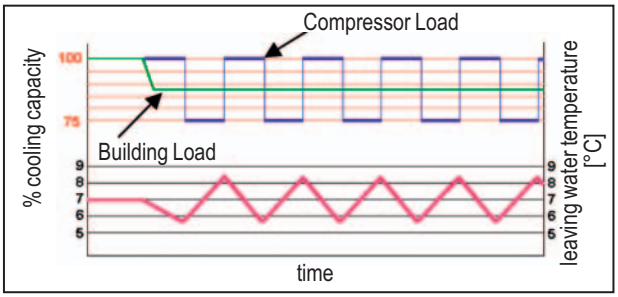
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

FTA_1-2b_Rev.02_1

3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

FTA_1-2b_Rev.02_2b

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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

GNC_1a-2a-3a-4a_Rev.01_1a

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 and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
• Chiller enabled to work in partial failure condition.
• Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
• Display of evaporator entering/leaving water temperature.
• Display of Outdoor Ambient Temperature.
• Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
• Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
• Compressor and evaporator pumps hours counter.
• Display of Status Safety Devices.
• Number of starts and compressor working hours.
• Optimized management of compressor load.
• Fan management according to condensing pressure.
• 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).
• OAT (Outside Ambient temperature) Reset.
• Set point Reset (optional).
• Application and system upgrade with commercial SD cards.
• Ethernet port for remote or local servicing using standard web browsers.
• Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
• High pressure (pressure switch).
• High pressure (transducer).
• Low pressure (transducer).
• Fans circuit breaker.
• 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.

GNC_1a-2a-3a-4a_Rev.01_2a

4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

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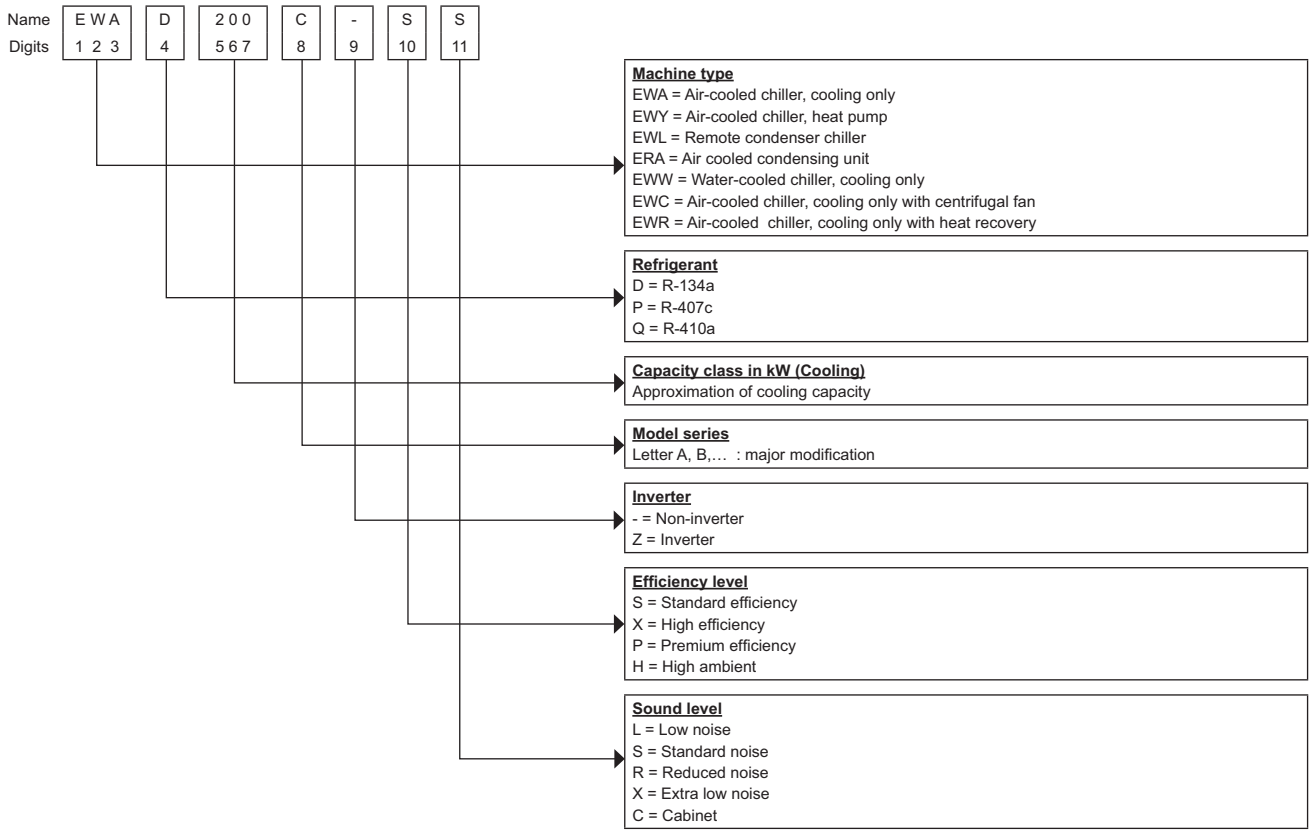
5 Nomenclature

5 - 1 Nomenclature

Nomenclature



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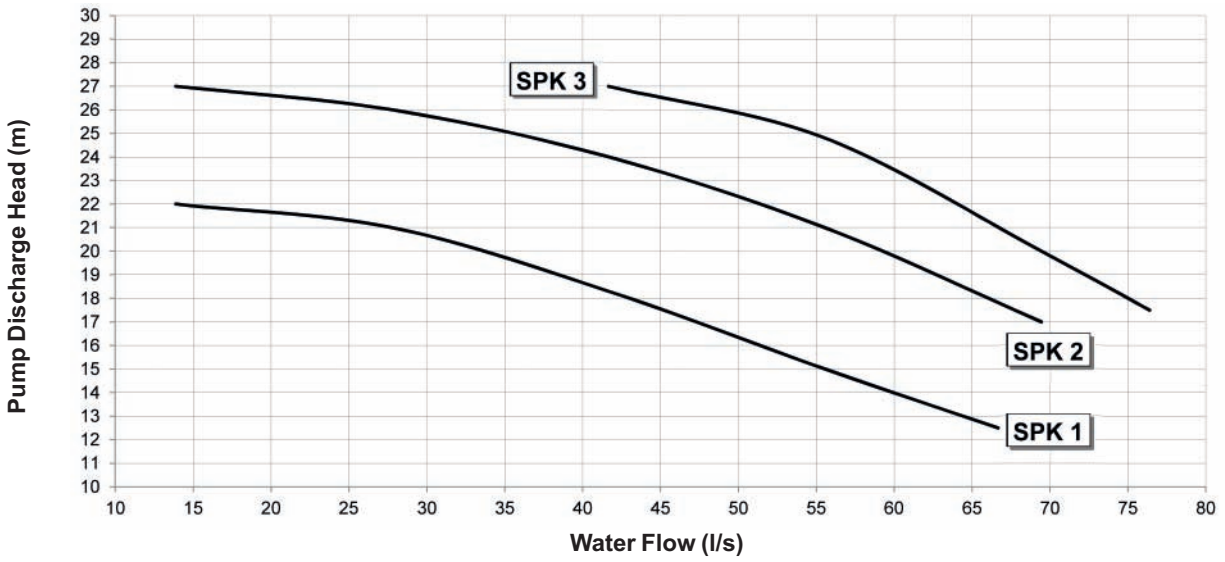
6 Options

6 - 1 Water Pump Kit - Technical Information

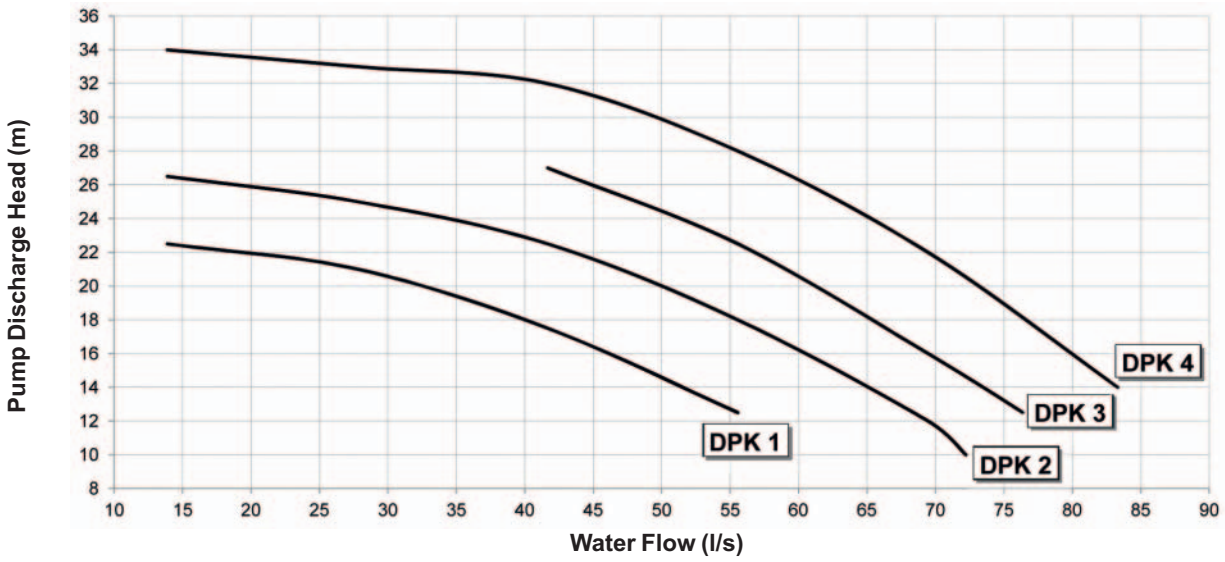
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

WPKTI_1a-2a-3a_Rev.03_1a

6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

WPKCM_1a-2a-3a_Rev.03_2a

7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		4				5				6			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	653	182	31,1	47	673	185	32,1	50	693	188	33,1	53
	30	624	196	29,7	43	643	199	30,6	46	662	202	31,6	48
	35	592	211	28,2	40	610	214	29,1	42	628	217	30,0	44
	40	555	227	26,4	35	573	230	27,3	37	591	234	28,2	39
	42	538	233	25,6	33	556	237	26,5	35	574	241	27,3	37
	44	521	240	24,8	31	538	244	25,6	33	555	248	26,5	35
	46	503	247	23,9	29	519	251	24,8	31	536	255	25,6	33
740	25	732	212	34,9	52	752	215	35,8	55	771	218	36,8	58
	30	712	230	33,9	50	732	234	34,9	52	751	237	35,8	55
	35	689	251	32,8	47	707	254	33,7	49	725	258	34,6	52
	40	657	273	31,3	43	675	277	32,1	45	692	281	33,0	48
	42	642	283	30,6	41	659	287	31,4	43	676	291	32,2	46
	44	625	293	29,8	39	642	297	30,6	41	658	301	31,4	43
	46	601	300	28,6	37	611	301	29,1	38	621	301	29,6	39
830	25	825	241	39,3	52	847	245	40,4	54	870	249	41,5	57
	30	801	262	38,2	49	822	267	39,2	52	844	271	40,3	54
	35	770	285	36,7	46	791	290	37,7	48	811	295	38,7	50
	40	729	310	34,7	41	749	315	35,7	44	768	320	36,6	46
	42	710	321	33,8	39	729	326	34,7	41	748	332	35,7	43
	44	688	332	32,8	37	707	338	33,7	39	716	339	34,2	40
	46	631	324	30,1	32	635	320	30,3	32	639	315	30,5	33
910	25	898	257	42,8	60	922	261	43,9	63	946	265	45,1	66
	30	874	280	41,6	58	898	284	42,8	60	921	288	43,9	63
	35	844	304	40,2	54	867	308	41,3	57	889	313	42,4	59
	40	806	331	38,4	50	827	336	39,4	52	848	341	40,4	55
	42	787	343	37,5	48	807	348	38,5	50	828	353	39,5	52
	44	765	355	36,5	45	786	360	37,5	48	807	365	38,5	50
	46	730	361	34,8	42	743	361	35,4	43	756	361	36,0	44
970	25	957	283	45,6	68	982	287	46,8	71	1008	291	48,0	74
	30	931	308	44,3	64	955	312	45,5	67	979	317	46,7	71
	35	897	335	42,7	60	920	340	43,9	63	944	345	45,0	66
	40	853	365	40,6	55	875	371	41,7	58	897	376	42,8	60
	42	832	378	39,6	53	853	384	40,7	55	874	390	41,7	58
	44	808	392	38,5	50	829	398	39,5	52	850	404	40,5	55
	46	758	392	36,1	44	764	388	36,4	45	769	383	36,7	46
C11	25	1049	305	50,0	62	1076	309	51,3	65	1105	314	52,7	69
	30	1021	332	48,6	59	1048	337	49,9	62	1075	342	51,3	65
	35	986	361	47,0	56	1012	366	48,2	59	1038	372	49,5	61
	40	940	393	44,8	51	965	399	46,0	54	989	405	47,2	56
	42	918	408	43,7	49	942	414	44,9	51	966	420	46,1	54
	44	894	422	42,6	47	917	429	43,7	49	940	435	44,8	51
	46	851	428	40,5	43	863	426	41,1	44	877	426	41,8	45
C12	25	1130	326	53,8	71	1160	331	55,3	75	1190	335	56,8	78
	30	1102	355	52,5	68	1131	360	53,9	72	1160	365	55,3	75
	35	1067	386	50,8	64	1095	392	52,2	68	1124	397	53,6	71
	40	1022	421	48,7	60	1048	427	50,0	62	1075	433	51,3	65
	42	1000	436	47,6	57	1026	442	48,9	60	1052	448	50,2	63
	44	975	452	46,4	55	1000	458	47,7	57	1026	464	48,9	60
	46	947	468	45,1	52	972	475	46,3	54	997	481	47,5	57
C13	25	1293	355	61,6	52	1329	361	63,4	55	1366	366	65,1	57
	30	1258	388	59,9	49	1294	393	61,7	52	1329	399	63,4	55
	35	1216	422	57,9	46	1250	428	59,6	49	1285	434	61,3	51
	40	1161	459	55,3	43	1194	466	56,9	45	1227	473	58,5	47
	42	1135	476	54,1	41	1167	483	55,6	43	1199	490	57,2	45
	44	1106	493	52,7	39	1137	500	54,2	41	1168	507	55,7	43
	46	1073	510	51,1	37	1104	518	52,6	39	1127	522	53,7	41

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		7				8				9			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	713	191	34,0	55	733	194	35,0	58	753	197	36,0	61
	30	682	205	32,5	51	702	209	33,5	54	721	212	34,4	57
	35	647	221	30,9	47	666	224	31,8	49	685	228	32,7	52
	40	608	238	29,0	42	626	241	29,9	44	644	245	30,8	46
	42	591	245	28,2	40	609	248	29,1	42	626	252	29,9	44
	44	573	252	27,3	37	591	256	28,2	40	608	260	29,0	42
	46	553	259	26,4	35	571	263	27,2	37	588	268	28,1	39
740	25	792	221	37,8	61	812	225	38,8	63	833	228	39,8	66
	30	770	241	36,8	58	790	245	37,7	60	810	248	38,7	63
	35	744	262	35,5	54	763	266	36,4	57	782	270	37,3	59
	40	710	285	33,9	50	728	289	34,7	52	746	294	35,6	54
	42	693	295	33,1	48	711	300	33,9	50	728	304	34,8	52
	44	675	306	32,2	45	688	308	32,8	47	699	309	33,4	48
	46	631	301	30,1	40	641	300	30,6	41	650	300	31,1	43
830	25	892	253	42,6	60	915	257	43,7	63	938	262	44,8	65
	30	866	275	41,3	57	887	280	42,4	59	909	284	43,4	62
	35	832	299	39,7	53	853	304	40,7	55	873	309	41,7	58
	40	788	326	37,6	48	808	331	38,5	50	827	336	39,5	52
	42	767	337	36,6	46	786	342	37,5	48	805	348	38,5	50
	44	721	336	34,4	41	726	332	34,6	41	730	328	34,8	42
	46	647	313	30,9	34	649	308	31,0	34	656	305	31,3	34
910	25	971	269	46,3	70	995	273	47,5	73	1020	277	48,7	76
	30	944	292	45,1	66	968	297	46,2	69	992	301	47,4	73
	35	912	318	43,5	62	935	323	44,6	65	958	327	45,7	68
	40	870	346	41,5	57	891	351	42,6	60	913	356	43,6	62
	42	849	358	40,5	55	871	363	41,6	57	892	369	42,6	60
	44	822	368	39,2	52	835	369	39,9	53	848	369	40,5	55
	46	768	361	36,6	46	779	360	37,2	47	788	358	37,6	48
970	25	1033	296	49,3	78	1059	300	50,5	81	1085	305	51,8	85
	30	1004	322	47,9	74	1029	327	49,1	77	1054	332	50,3	81
	35	967	350	46,1	69	991	356	47,3	72	1014	361	48,4	75
	40	919	382	43,8	63	941	388	44,9	66	963	394	46,0	69
	42	896	396	42,7	60	917	402	43,8	63	939	408	44,8	66
	44	861	405	41,1	56	866	401	41,3	57	871	396	41,6	57
	46	773	378	36,9	46	777	372	37,1	47	779	365	37,2	47
C11	25	1133	319	54,0	72	1162	323	55,4	75	1190	328	56,9	79
	30	1102	347	52,6	68	1130	352	53,9	72	1158	357	55,3	75
	35	1064	377	50,8	64	1090	383	52,1	67	1117	389	53,4	70
	40	1014	411	48,4	59	1039	417	49,6	62	1064	423	50,8	64
	42	990	426	47,2	56	1015	432	48,4	59	1039	438	49,6	62
	44	958	438	45,7	53	970	437	46,3	54	985	437	47,0	56
	46	893	427	42,6	47	906	426	43,3	48	913	423	43,6	49
C12	25	1221	340	58,2	82	1251	345	59,7	86	1283	350	61,3	90
	30	1190	370	56,8	79	1220	376	58,2	82	1250	381	59,7	86
	35	1152	403	55,0	74	1181	409	56,4	77	1210	414	57,8	81
	40	1102	439	52,6	68	1130	445	53,9	72	1157	451	55,3	75
	42	1078	454	51,4	66	1105	461	52,7	69	1132	467	54,1	72
	44	1052	471	50,2	63	1078	477	51,4	66	1104	484	52,7	69
	46	1022	488	48,8	60	1042	493	49,7	62	1048	488	50,1	63
C13	25	1403	371	66,9	60	1440	377	68,7	63	1477	382	70,5	66
	30	1365	405	65,1	57	1402	411	66,9	60	1438	417	68,7	63
	35	1319	441	62,9	54	1354	447	64,7	57	1390	454	66,4	59
	40	1260	480	60,1	50	1293	487	61,7	52	1327	494	63,4	55
	42	1231	497	58,7	48	1264	504	60,3	50	1297	511	61,9	52
	44	1199	514	57,2	45	1231	522	58,8	48	1263	529	60,3	50
	46	1146	522	54,7	42	1165	522	55,6	43	1184	522	56,5	44

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

		Condenser Inlet Air Temperature (°C)											
	Twout	10				11				12			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	774	200	37,0	64	794	203	38,0	68	815	206	39,0	71
	30	741	215	35,4	60	761	218	36,4	62	781	222	37,3	66
	35	705	231	33,7	54	724	235	34,6	57	743	238	35,5	60
	40	663	249	31,7	49	681	253	32,6	51	700	257	33,5	54
	42	644	256	30,8	46	663	260	31,7	49	681	264	32,6	51
	44	625	264	29,9	44	643	268	30,7	46	661	272	31,6	49
	46	605	272	28,9	41	622	276	29,7	44	640	280	30,6	46
740	25	853	232	40,8	69	874	235	41,8	73	896	239	42,8	76
	30	830	252	39,7	66	850	256	40,6	69	871	260	41,6	72
	35	801	274	38,3	62	820	278	39,2	65	840	282	40,2	68
	40	764	298	36,5	57	782	302	37,4	59	800	307	38,3	62
	42	746	309	35,6	55	764	313	36,5	57	777	315	37,2	59
	44	709	309	33,9	50	719	308	34,4	51	729	308	34,9	52
	46	660	300	31,5	44	660	294	31,6	44	665	291	31,8	44
830	25	961	266	45,9	68	984	270	47,0	71	1007	275	48,2	75
	30	931	289	44,5	65	954	294	45,6	68	976	298	46,7	70
	35	894	314	42,7	60	915	319	43,8	63	936	324	44,8	65
	40	847	341	40,5	55	867	347	41,4	57	887	352	42,4	59
	42	810	346	38,7	50	814	342	38,9	51	818	338	39,1	51
	44	733	323	35,0	42	740	321	35,4	43	742	315	35,5	43
	46	657	299	31,4	35	649	312	31,0	34	649	305	31,0	34
910	25	1045	281	49,9	80	1071	285	51,2	83	1096	290	52,4	87
	30	1017	306	48,6	76	1041	310	49,8	79	1066	315	51,0	83
	35	981	332	46,9	71	1004	337	48,0	74	1028	342	49,1	77
	40	935	361	44,7	65	957	367	45,7	68	979	372	46,8	71
	42	913	374	43,6	63	929	377	44,4	65	942	377	45,1	66
	44	860	369	41,1	56	872	368	41,7	58	887	369	42,4	59
	46	794	355	37,9	49	800	351	38,2	49	794	355	38,0	49
970	25	1111	310	53,1	89	1138	315	54,4	93	1164	319	55,7	97
	30	1079	337	51,6	84	1104	342	52,8	88	1130	348	54,0	92
	35	1038	367	49,6	79	1062	372	50,8	82	1087	378	52,0	86
	40	986	400	47,1	72	1008	406	48,2	75	1031	412	49,3	78
	42	961	414	45,9	68	972	414	46,5	70	977	410	46,7	71
	44	875	391	41,8	58	879	385	42,0	58	887	383	42,4	59
	46	787	362	37,6	48	794	358	37,9	49	779	371	37,3	47
C11	25	1220	333	58,3	82	1249	338	59,7	86	1279	343	61,2	90
	30	1186	363	56,7	78	1215	368	58,1	82	1243	374	59,5	85
	35	1144	394	54,7	73	1171	400	56,0	77	1199	406	57,3	80
	40	1090	430	52,1	67	1115	436	53,3	70	1141	442	54,6	73
	42	1064	445	50,8	64	1079	446	51,6	66	1095	446	52,3	68
	44	999	436	47,7	57	1016	438	48,6	59	1030	437	49,3	61
	46	920	419	44,0	50	927	414	44,3	50	920	418	44,0	50
C12	25	1314	355	62,8	94	1346	360	64,3	98	1378	365	65,9	103
	30	1281	386	61,2	90	1311	392	62,7	94	1342	397	64,2	98
	35	1239	420	59,2	85	1268	426	60,6	88	1298	432	62,1	92
	40	1185	458	56,6	78	1213	464	58,0	81	1241	471	59,3	85
	42	1159	474	55,4	75	1186	480	56,7	78	1214	487	58,0	82
	44	1131	491	54,0	72	1157	498	55,3	75	1184	505	56,6	78
	46	1055	483	50,4	63	1060	477	50,7	64	1064	470	50,9	64
C13	25	1515	388	72,4	69	1552	394	74,2	73	1591	400	76,1	76
	30	1474	423	70,4	66	1511	429	72,2	69	1548	436	74,0	72
	35	1425	461	68,1	62	1460	467	69,8	65	1495	474	71,5	68
	40	1361	502	65,0	57	1395	509	66,7	60	1428	516	68,3	62
	42	1330	519	63,5	55	1363	527	65,2	57	1397	534	66,8	60
	44	1288	533	61,5	52	1308	534	62,5	53	1327	534	63,5	55
	46	1201	521	57,4	46	1211	517	57,9	46	1215	510	58,1	47

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		13				14				15			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	836	209	40,0	74	858	212	41,0	78	879	215	42,1	81
	30	801	225	38,3	69	822	228	39,3	72	842	232	40,3	75
	35	762	242	36,5	63	782	246	37,4	66	802	249	38,4	69
	40	719	260	34,4	56	737	264	35,3	59	756	268	36,2	62
	42	700	268	33,5	54	718	272	34,4	56	736	276	35,3	59
	44	679	276	32,5	51	697	280	33,4	54	716	285	34,3	56
	46	657	284	31,4	48	671	287	32,1	50	677	285	32,4	51
740	25	917	243	43,9	79	939	246	44,9	83	961	250	46,0	86
	30	892	264	42,7	75	912	268	43,7	79	933	272	44,7	82
	35	860	286	41,1	71	879	291	42,1	74	899	295	43,1	77
	40	819	312	39,2	65	838	316	40,1	67	856	321	41,0	70
	42	788	316	37,7	60	799	316	38,2	62	809	315	38,7	63
	44	739	307	35,4	54	751	308	35,9	55	753	304	36,1	56
	46	663	296	31,7	44	666	292	31,9	45	669	287	32,0	45
830	25	1031	279	49,3	78	1055	284	50,5	81	1079	289	51,7	85
	30	999	303	47,8	73	1021	308	48,9	77	1044	313	50,0	80
	35	958	329	45,8	68	979	335	46,9	71	1001	340	47,9	74
	40	901	356	43,1	61	905	352	43,3	62	909	348	43,5	62
	42	821	333	39,3	52	829	331	39,7	53	830	325	39,7	53
	44	749	312	35,8	44	749	305	35,8	44	740	317	35,4	43
	46	654	300	31,3	34	662	298	31,7	35	665	293	31,9	35
910	25	1122	294	53,7	91	1148	299	55,0	95	1175	303	56,2	99
	30	1091	320	52,2	86	1116	325	53,4	90	1141	329	54,6	94
	35	1052	347	50,3	81	1075	353	51,5	84	1100	358	52,6	88
	40	1002	378	47,9	74	1024	383	49,0	77	1041	386	49,8	79
	42	955	377	45,7	68	968	377	46,3	70	983	378	47,1	72
	44	898	368	43,0	61	904	365	43,3	62	909	361	43,5	62
	46	798	350	38,2	49	805	346	38,5	50	807	340	38,7	50
970	25	1191	324	57,0	101	1218	330	58,3	105	1246	335	59,6	110
	30	1156	353	55,3	96	1182	358	56,6	100	1208	364	57,8	104
	35	1111	384	53,1	89	1136	390	54,3	93	1160	396	55,5	96
	40	1054	418	50,4	81	1077	424	51,5	84	1088	425	52,1	86
	42	981	405	46,9	71	985	399	47,1	72	994	397	47,6	73
	44	889	376	42,5	60	897	372	42,9	61	904	369	43,3	61
	46	785	366	37,6	48	790	360	37,8	48	794	354	38,0	49
C11	25	1309	349	62,6	94	1340	354	64,1	98	1370	359	65,6	102
	30	1272	379	60,9	89	1302	385	62,3	93	1331	391	63,7	97
	35	1226	412	58,7	83	1254	419	60,0	87	1282	425	61,4	90
	40	1167	449	55,8	76	1193	455	57,1	79	1209	456	57,9	81
	42	1110	446	53,1	70	1128	448	54,0	72	1142	447	54,7	73
	44	1044	437	49,9	62	1047	430	50,1	63	1053	425	50,4	63
	46	928	414	44,4	50	932	408	44,6	51	935	400	44,8	51
C12	25	1410	370	67,5	107	1443	376	69,1	112	1476	381	70,7	116
	30	1374	403	65,7	102	1405	409	67,3	106	1437	415	68,8	111
	35	1328	438	63,5	96	1358	445	65,0	100	1389	451	66,5	104
	40	1270	477	60,7	89	1298	484	62,1	92	1327	491	63,5	96
	42	1242	494	59,4	85	1270	501	60,8	89	1298	508	62,1	92
	44	1191	501	57,0	79	1196	496	57,2	80	1201	489	57,5	80
	46	1067	462	51,1	65	1077	459	51,5	66	1078	450	51,6	66
C13	25	1629	406	77,9	79	1668	412	79,8	83	1708	418	81,8	86
	30	1585	442	75,8	75	1623	449	77,7	79	1661	455	79,5	82
	35	1531	481	73,2	71	1567	488	75,0	74	1603	495	76,7	77
	40	1462	524	69,9	65	1496	531	71,6	68	1530	539	73,3	71
	42	1430	542	68,4	63	1454	546	69,6	65	1474	546	70,6	66
	44	1346	533	64,4	56	1369	535	65,5	58	1374	528	65,8	58
	46	1223	504	58,5	47	1230	498	58,9	48	1223	500	58,6	47

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		4				5				6			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1394	380	66,4	56	1432	386	68,3	59	1470	392	70,1	62
	30	1355	416	64,6	54	1393	422	66,4	56	1431	428	68,2	59
	35	1307	453	62,3	50	1344	460	64,1	53	1381	467	65,9	56
	40	1245	495	59,3	46	1279	502	61,0	48	1314	510	62,7	51
	42	1216	513	57,9	44	1249	521	59,5	46	1282	528	61,1	49
	44	1183	533	56,4	42	1215	540	57,9	44	1248	548	59,5	46
	46	1146	552	54,6	40	1178	560	56,2	42	1195	561	57,0	43
C15	25	1517	445	72,3	60	1558	452	74,3	63	1600	459	76,3	67
	30	1475	484	70,3	57	1515	492	72,2	60	1555	499	74,2	63
	35	1423	527	67,8	54	1461	535	69,6	56	1499	543	71,5	59
	40	1354	574	64,5	49	1390	582	66,2	52	1426	591	68,0	54
	42	1321	594	62,9	47	1356	603	64,6	49	1391	612	66,3	52
	44	1284	616	61,2	45	1318	625	62,8	47	1352	634	64,5	49
	46	1221	625	58,2	41	1236	621	58,9	42	1253	619	59,7	43
C16	25	1598	468	76,1	66	1641	475	78,2	70	1684	482	80,3	73
	30	1554	509	74,0	63	1596	517	76,1	66	1638	525	78,1	69
	35	1500	554	71,5	59	1541	562	73,4	62	1581	571	75,4	65
	40	1430	604	68,1	54	1468	613	70,0	57	1507	622	71,8	60
	42	1396	625	66,5	52	1433	634	68,3	55	1471	644	70,1	57
	44	1359	648	64,7	50	1395	657	66,5	52	1431	667	68,2	54
	46	1291	655	61,5	45	1310	653	62,4	46	1328	650	63,3	48
C17	25	1692	499	80,6	73	1737	507	82,8	76	1782	514	85,0	80
	30	1647	544	78,4	69	1690	552	80,5	73	1733	560	82,7	76
	35	1589	592	75,7	65	1630	601	77,7	68	1672	610	79,7	71
	40	1513	646	72,1	60	1552	655	74,0	62	1591	665	75,9	65
	42	1476	669	70,3	57	1514	679	72,2	60	1553	689	74,0	62
	44	1436	694	68,4	54	1473	704	70,2	57	1510	714	72,0	59
	46	1359	699	64,7	49	1378	697	65,7	50	1397	695	66,6	52
C18	25	1788	534	85,2	35	1833	542	87,4	37	1879	550	89,6	39
	30	1739	583	82,8	34	1783	591	85,0	35	1827	600	87,1	37
	35	1674	635	79,7	31	1717	645	81,8	33	1759	655	83,9	34
	40	1588	694	75,6	29	1628	705	77,6	30	1669	715	79,6	31
	42	1547	720	73,7	27	1586	731	75,6	29	1626	742	77,5	30
	44	1500	747	71,5	26	1539	758	73,4	27	1560	759	74,4	28
	46	1377	727	65,6	22	1387	717	66,1	22	1395	707	66,5	23
C20	25	1853	547	88,3	38	1900	555	90,6	40	1948	563	92,9	41
	30	1805	598	86,0	36	1851	607	88,2	38	1896	615	90,4	39
	35	1743	653	83,0	34	1787	663	85,2	35	1831	672	87,3	37
	40	1660	716	79,1	31	1702	726	81,1	32	1744	736	83,2	34
	42	1619	743	77,1	30	1661	753	79,2	31	1702	764	81,2	32
	44	1573	771	74,9	28	1614	782	76,9	29	1655	793	78,9	31
	46	1481	771	70,5	25	1502	768	71,6	26	1521	763	72,5	27
C20	25	1904	573	90,7	40	1952	581	93,0	41	2000	589	95,4	43
	30	1853	626	88,3	38	1900	635	90,5	39	1946	644	92,8	41
	35	1788	686	85,2	35	1832	696	87,3	37	1877	706	89,5	39
	40	1701	753	81,0	32	1743	764	83,0	34	1785	774	85,1	35
	42	1657	782	78,9	31	1699	793	81,0	32	1740	804	83,0	34
	44	1608	812	76,6	29	1649	824	78,6	31	1691	836	80,6	32
	46	1492	801	71,1	26	1503	791	71,6	26	1513	779	72,1	26

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

		Condenser Inlet Air Temperature (°C)											
	Twout	7				8				9			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1509	397	72,0	65	1548	403	73,9	68	1587	409	75,8	72
	30	1468	434	70,0	62	1506	441	71,9	65	1543	447	73,7	68
	35	1418	474	67,6	58	1454	481	69,4	61	1490	488	71,1	64
	40	1350	517	64,4	53	1386	525	66,1	56	1420	533	67,8	59
	42	1317	536	62,8	51	1352	544	64,5	54	1387	552	66,2	56
	44	1280	555	61,1	49	1314	564	62,7	51	1349	572	64,4	53
	46	1204	555	57,4	43	1211	548	57,8	44	1217	540	58,1	44
C15	25	1642	466	78,3	70	1685	473	80,4	73	1728	481	82,5	77
	30	1596	507	76,1	66	1637	515	78,1	69	1679	523	80,2	73
	35	1538	551	73,4	62	1577	560	75,3	65	1617	568	77,2	68
	40	1463	600	69,8	57	1500	609	71,6	59	1537	619	73,4	62
	42	1427	622	68,1	54	1463	631	69,8	57	1499	640	71,6	59
	44	1382	642	65,9	51	1400	641	66,8	52	1415	637	67,6	53
	46	1272	618	60,7	44	1287	614	61,4	45	1305	612	62,3	46
C16	25	1729	489	82,5	77	1774	497	84,7	80	1819	504	86,9	84
	30	1681	533	80,2	73	1724	541	82,3	76	1768	549	84,4	80
	35	1622	579	77,4	68	1663	588	79,4	71	1705	597	81,4	75
	40	1545	631	73,7	63	1584	640	75,6	65	1624	650	77,5	68
	42	1508	653	72,0	60	1547	663	73,8	63	1585	673	75,7	66
	44	1462	675	69,8	57	1482	673	70,7	58	1495	666	71,4	59
	46	1345	646	64,2	49	1361	641	65,0	50	1383	641	66,1	51
C17	25	1828	522	87,2	84	1874	530	89,4	88	1920	538	91,7	92
	30	1777	568	84,8	80	1822	577	87,0	83	1867	586	89,1	87
	35	1714	619	81,8	75	1756	628	83,8	78	1799	638	85,9	82
	40	1631	675	77,8	68	1671	685	79,8	71	1711	695	81,7	75
	42	1591	699	75,9	65	1630	709	77,8	68	1669	720	79,7	71
	44	1536	719	73,3	61	1556	717	74,3	63	1576	715	75,2	64
	46	1415	691	67,5	53	1431	687	68,3	54	1441	681	68,8	55
C18	25	1925	559	91,9	41	1972	567	94,1	42	2019	575	96,4	44
	30	1871	609	89,3	38	1916	618	91,5	40	1961	628	93,7	42
	35	1802	665	86,0	36	1844	675	88,0	38	1887	685	90,1	39
	40	1710	726	81,6	33	1751	737	83,6	34	1791	748	85,6	36
	42	1666	753	79,5	31	1706	764	81,4	33	1746	776	83,4	34
	44	1571	753	75,0	28	1581	744	75,5	28	1590	734	75,9	29
	46	1406	698	67,1	23	1418	690	67,7	23	1422	676	67,9	24
C20	25	1996	571	95,2	43	2044	579	97,6	45	2093	588	100,0	47
	30	1943	624	92,7	41	1990	633	95,0	43	2037	642	97,3	45
	35	1875	682	89,5	39	1920	692	91,6	40	1965	701	93,8	42
	40	1787	746	85,2	35	1829	757	87,3	37	1871	768	89,4	39
	42	1744	775	83,2	34	1785	785	85,2	35	1827	796	87,2	37
	44	1677	793	80,0	32	1698	790	81,1	32	1719	786	82,1	33
	46	1544	762	73,7	27	1549	749	73,9	27	1555	736	74,3	28
C20	25	2049	597	97,8	45	2098	606	100,2	47	2148	615	102,6	49
	30	1993	654	95,1	43	2041	663	97,4	45	2089	673	99,8	47
	35	1922	716	91,7	40	1967	726	93,9	42	2013	736	96,1	44
	40	1827	785	87,2	37	1870	796	89,3	38	1913	807	91,4	40
	42	1782	815	85,0	35	1823	827	87,0	37	1865	838	89,1	38
	44	1704	830	81,3	33	1715	821	81,9	33	1725	810	82,4	33
	46	1532	774	73,1	27	1538	760	73,4	27	1543	744	73,7	27

NOTES

Fluid: water
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CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

	Twout	Condenser Inlet Air Temperature (°C)											
		10				11				12			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1627	415	77,7	75	1667	421	79,7	78	1707	427	81,6	82
	30	1582	454	75,6	71	1620	460	77,5	74	1659	467	79,4	78
	35	1526	495	72,9	67	1563	502	74,7	70	1600	510	76,5	73
	40	1455	541	69,5	61	1490	548	71,2	64	1525	556	72,9	67
	42	1421	560	67,9	59	1455	568	69,6	61	1489	576	71,2	64
	44	1366	573	65,3	55	1374	566	65,7	55	1380	559	66,0	56
	46	1223	532	58,4	45	1235	528	59,1	46	1238	518	59,2	46
C15	25	1772	488	84,6	80	1816	496	86,8	84	1860	504	89,0	88
	30	1721	531	82,2	76	1763	539	84,3	80	1806	548	86,4	83
	35	1657	577	79,1	71	1697	586	81,1	74	1737	595	83,1	78
	40	1574	628	75,2	65	1612	638	77,1	68	1650	647	78,9	71
	42	1535	650	73,4	62	1560	654	74,6	64	1578	652	75,5	65
	44	1432	634	68,4	55	1451	633	69,4	56	1467	629	70,1	57
	46	1313	605	62,7	47	1318	595	63,0	47	1311	611	62,7	47
C16	25	1865	512	89,1	88	1911	520	91,3	92	1957	528	93,6	96
	30	1812	557	86,6	84	1857	566	88,8	87	1902	574	90,9	91
	35	1747	606	83,5	78	1789	615	85,5	82	1832	624	87,6	85
	40	1663	660	79,5	72	1703	669	81,4	75	1744	679	83,4	78
	42	1624	683	77,6	69	1650	686	78,9	71	1669	684	79,8	72
	44	1512	663	72,3	60	1536	663	73,4	62	1553	658	74,3	63
	46	1398	635	66,8	52	1419	633	67,8	54	1417	653	67,8	54
C17	25	1967	546	94,0	96	2014	555	96,3	100	2062	563	98,6	105
	30	1912	595	91,3	91	1957	604	93,6	95	2003	613	95,8	99
	35	1842	647	88,0	85	1885	657	90,1	89	1929	667	92,2	93
	40	1752	705	83,7	78	1792	716	85,7	81	1833	726	87,7	85
	42	1709	730	81,6	74	1736	735	83,0	77	1756	733	84,0	78
	44	1594	712	76,2	66	1612	709	77,1	67	1629	704	77,9	68
	46	1446	669	69,1	55	1457	662	69,7	56	1447	677	69,2	55
C18	25	2066	584	98,7	46	2114	593	101,0	48	2162	602	103,4	50
	30	2007	637	95,9	44	2053	647	98,1	46	2099	656	100,4	47
	35	1930	695	92,2	41	1974	705	94,4	42	2018	716	96,5	44
	40	1832	759	87,5	37	1873	770	89,5	39	1914	782	91,5	40
	42	1767	776	84,4	35	1780	771	85,1	35	1788	762	85,5	36
	44	1596	723	76,3	29	1613	718	77,1	30	1617	704	77,3	30
	46	1436	669	68,6	24	1427	684	68,2	24	1421	682	68,0	24
C20	25	2142	596	102,4	49	2192	605	104,8	51	2242	613	107,2	53
	30	2084	651	99,6	47	2132	661	101,9	49	2180	670	104,3	51
	35	2010	711	96,0	44	2056	722	98,3	46	2102	732	100,5	48
	40	1914	778	91,5	40	1957	789	93,6	42	2001	801	95,7	44
	42	1868	808	89,3	38	1897	811	90,7	40	1917	808	91,7	40
	44	1737	781	83,0	34	1763	781	84,3	35	1766	768	84,5	35
	46	1567	728	74,9	28	1582	721	75,6	29	1570	733	75,1	28
C20	25	2198	624	105,0	52	2249	633	107,5	54	2300	642	110,0	56
	30	2137	682	102,1	49	2185	692	104,5	51	2234	702	106,8	53
	35	2058	747	98,3	46	2105	757	100,6	48	2151	768	102,9	50
	40	1956	819	93,5	42	2000	830	95,6	43	2043	842	97,7	45
	42	1907	850	91,1	40	1929	851	92,2	41	1939	841	92,7	41
	44	1733	798	82,8	34	1751	792	83,7	34	1756	778	84,0	34
	46	1558	737	74,4	28	1572	728	75,2	28	1552	752	74,2	28

NOTES

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

		Condenser Inlet Air Temperature (°C)											
	Twout	13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1748	434	83,6	85	1790	440	85,7	89	1832	447	87,7	93
	30	1699	474	81,3	81	1739	481	83,2	85	1779	488	85,2	88
	35	1638	517	78,3	76	1675	525	80,2	79	1713	532	82,0	82
	40	1560	564	74,6	70	1596	573	76,4	72	1631	581	78,1	75
	42	1524	585	72,9	67	1540	585	73,7	68	1547	578	74,0	69
	44	1386	551	66,3	56	1399	547	67,0	57	1402	537	67,1	57
	46	1249	513	59,8	47	1260	507	60,3	47	1243	520	59,5	46
C15	25	1905	512	91,1	92	1950	520	93,3	96	1996	528	95,6	100
	30	1849	556	88,4	87	1892	565	90,6	90	1936	574	92,7	94
	35	1778	604	85,1	81	1819	614	87,1	84	1861	623	89,1	88
	40	1688	657	80,8	74	1727	667	82,7	77	1746	667	83,6	78
	42	1596	650	76,3	67	1613	647	77,2	68	1636	647	78,3	70
	44	1484	626	71,0	58	1492	619	71,4	59	1502	613	71,9	60
	46	1316	600	63,0	47	1326	593	63,5	48	1335	585	63,9	48
C16	25	2005	536	95,9	100	2052	544	98,2	105	2100	552	100,5	109
	30	1947	583	93,1	95	1993	592	95,4	99	2039	601	97,6	104
	35	1875	634	89,7	89	1919	643	91,8	93	1963	653	94,0	97
	40	1784	690	85,3	81	1825	700	87,3	85	1845	699	88,3	87
	42	1688	681	80,8	74	1706	677	81,6	75	1731	677	82,9	77
	44	1568	652	75,0	65	1591	651	76,1	66	1613	650	77,2	68
	46	1431	646	68,5	55	1456	647	69,7	56	1471	641	70,4	58
C17	25	2110	572	101,0	109	2159	580	103,3	114	2208	589	105,7	118
	30	2050	622	98,1	103	2096	632	100,3	108	2143	641	102,6	112
	35	1973	677	94,4	97	2017	687	96,5	101	2062	697	98,7	105
	40	1875	737	89,7	88	1916	748	91,7	92	1937	748	92,7	94
	42	1775	731	84,9	80	1794	727	85,9	81	1812	723	86,7	83
	44	1645	701	78,7	70	1657	695	79,3	71	1660	682	79,5	71
	46	1459	669	69,8	56	1466	658	70,2	57	1476	649	70,7	57
C18	25	2211	611	105,8	52	2260	621	108,1	54	2309	630	110,5	56
	30	2145	666	102,6	49	2192	676	104,9	51	2239	687	107,2	53
	35	2062	727	98,6	46	2106	737	100,8	48	2150	749	102,9	50
	40	1948	790	93,2	42	1969	789	94,2	42	1981	783	94,8	43
	42	1796	751	85,9	36	1801	739	86,2	36	1817	734	87,0	37
	44	1631	698	78,0	30	1640	688	78,5	30	1630	700	78,0	30
	46	1438	676	68,8	24	1447	665	69,2	24	1454	653	69,6	25
C20	25	2293	622	109,7	56	2344	631	112,2	58	2395	641	114,7	60
	30	2229	680	106,6	53	2278	690	109,0	55	2327	700	111,4	57
	35	2148	742	102,8	50	2194	753	105,0	51	2241	764	107,3	54
	40	2044	812	97,8	45	2088	824	99,9	47	2117	827	101,3	48
	42	1937	804	92,7	41	1956	799	93,6	42	1982	799	94,9	43
	44	1779	760	85,1	35	1786	748	85,5	36	1797	739	86,0	36
	46	1579	722	75,6	28	1591	712	76,1	29	1601	701	76,7	29
C20	25	2351	651	112,5	58	2403	661	115,0	61	2455	670	117,5	63
	30	2284	712	109,2	55	2333	723	111,7	57	2383	733	114,1	60
	35	2198	779	105,1	52	2245	791	107,4	54	2292	802	109,7	56
	40	2087	854	99,8	47	2131	866	102,0	49	2153	866	103,1	50
	42	1948	830	93,2	42	1956	817	93,6	42	1974	812	94,5	43
	44	1772	771	84,8	35	1774	754	84,9	35	1787	745	85,6	36
	46	1564	742	74,8	28	1574	730	75,3	28	1583	718	75,8	29

NOTES

Fluid: water
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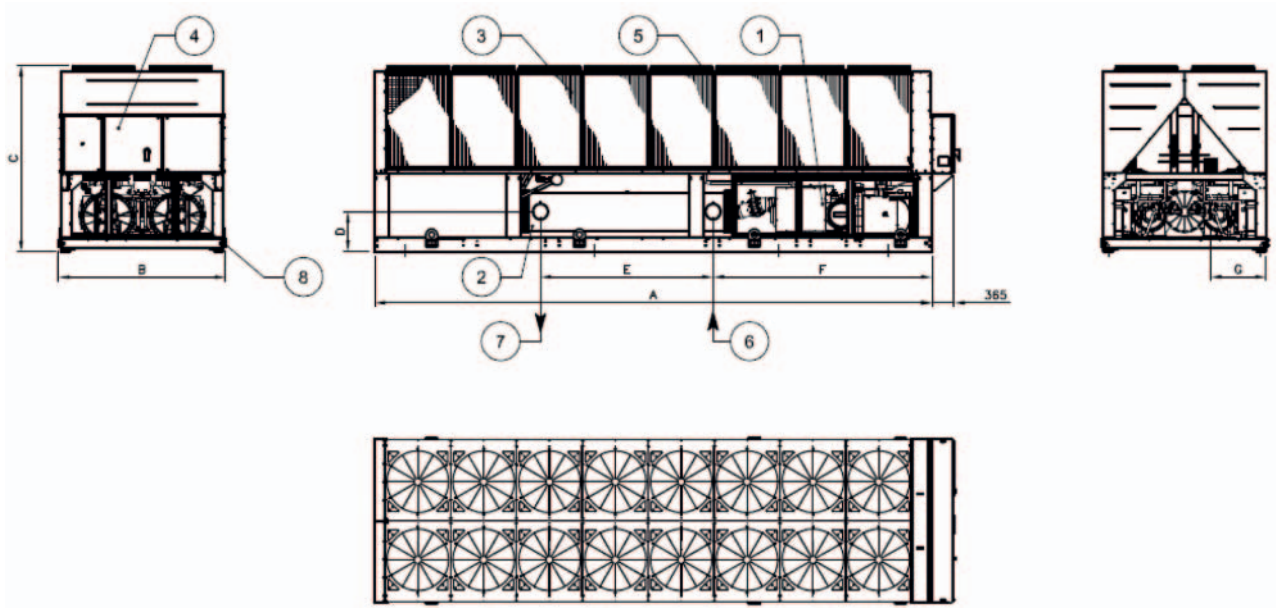
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

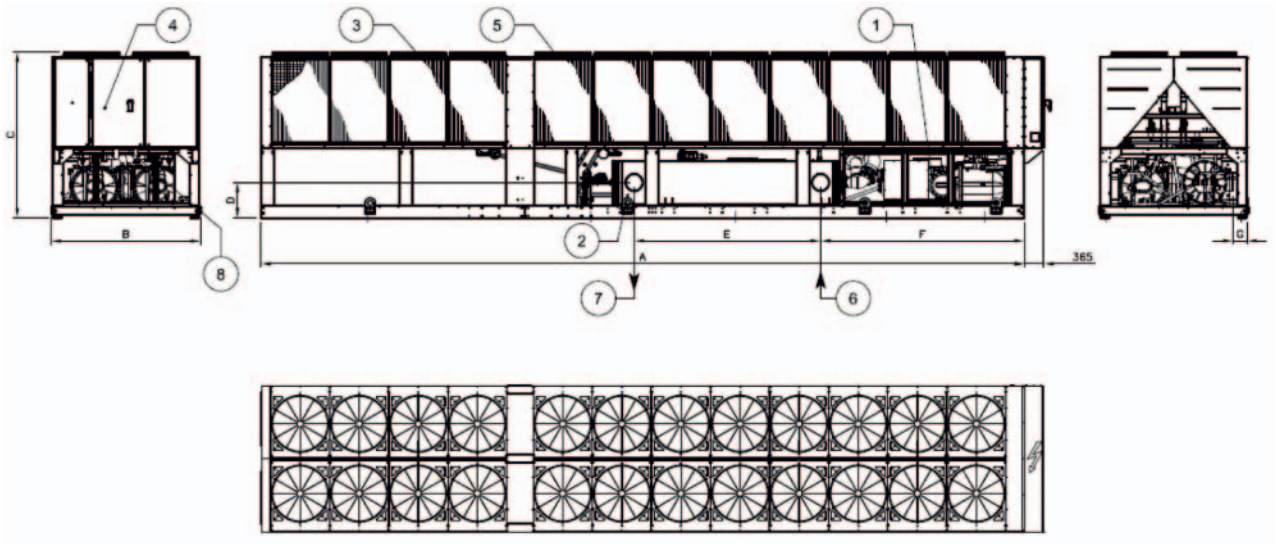
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (3 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-		Dimensions (mm)							Fans
Size	Size	A	B	C	D	E	F	G	
EWADC14÷C15C-SS/SL	EWADC13÷C14C-SR	10185	2285	2540	4440	2360	540	285	Nr 20
EWADC16÷C17C-SS/SL	EWADC15÷C16C-SR	11085	2285	2540	5340	2360	540	285	Nr 22
EWADC18C-SS/SL	EWADC17C-SR	11085	2285	2540	4780	2840	540	210	Nr 22
EWADC19÷C20C-SS/SL	EWADC18÷C19C-SR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC14C-XS/XL	EWADC14C-XR	11985	2285	2540	5680	2910	540	285	Nr 24
EWADC15÷C16C-XS/XL	EWADC15÷C16C-XR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC17C-XS/XL	EWADC17C-XR	12885	2285	2540	6580	2840	540	210	Nr 26
EWADC18C-XS/XL	EWADC18C-XR	13785	2285	2540	7480	2840	540	210	Nr 28
EWADC19C- XS/XL	EWADC19C-XR	14685	2285	2540	8380	2840	540	210	Nr 30
EWADH14÷H15C-XS/XL/XR		14685	2285	2285	8380	2840	540	210	Nr 30

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-SS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	dB(A)
650	73,9	76,0	78,8	78,0	73,9	69,4	59,8	50,7	**79,0**	**99,5**
740	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**100,0**
830	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**100,0**
910	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**100,9**
970	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,1**
C11	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,5**
C12	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,7**
C13	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
H14	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
C15	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,0**
C16	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,2**
C17	76,1	78,2	81,0	80,2	76,1	71,6	62,0	52,9	**81,2**	**103,3**
C18	76,4	78,5	81,3	80,5	76,4	71,9	62,3	53,2	**81,5**	**103,5**
C19	76,8	78,9	81,7	80,9	76,8	72,3	62,7	53,6	**81,9**	**103,7**
C20	76,8	78,9	81,7	80,9	76,8	72,3	62,7	53,6	**81,9**	**103,7**

EWAD~C-SL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
650	70,4	72,5	75,3	74,5	70,4	65,9	56,3	47,2	**75,5**	**96,0**
740	70,5	72,6	75,4	74,6	70,5	66,0	56,4	47,3	**75,6**	**96,1**
830	70,5	72,6	75,4	74,6	70,5	66,0	56,4	47,3	**75,6**	**96,1**
910	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,5**
970	71,5	73,6	76,4	75,6	71,5	67,0	57,4	48,3	**76,6**	**97,1**
C11	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**97,6**
C12	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,1**
C13	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,2**
H14	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,2**
C15	72,1	74,2	77,0	76,2	72,1	67,6	58,0	48,9	**77,2**	**99,1**
C16	72,2	74,3	77,1	76,3	72,2	67,7	58,1	49,0	**77,3**	**99,5**
C17	72,3	74,4	77,2	76,4	72,3	67,8	58,2	49,1	**77,4**	**99,5**
C18	72,8	74,9	77,7	76,9	72,8	68,3	58,7	49,6	**77,9**	**99,9**
C19	72,9	75,0	77,8	77,0	72,9	68,4	58,8	49,7	**78,0**	**101,0**
C20	72,9	75,0	77,8	77,0	72,9	68,4	58,8	49,7	**78,0**	**101,0**

EWAD~C-SR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
620	67,6	60,8	67,9	73,1	60,5	56,9	48,6	36,0	**71,0**	**91,5**
720	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
790	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
880	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**92,5**
920	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**93,0**
C10	69,2	62,4	69,5	74,7	62,1	58,5	50,2	37,6	**72,6**	**93,5**
C11	69,3	62,5	69,6	74,8	62,2	58,6	50,3	37,7	**72,7**	**93,8**
C12	69,4	62,6	69,7	74,9	62,3	58,7	50,4	37,8	**72,9**	**94,0**
H14	69,4	62,6	69,7	74,9	62,3	58,7	50,4	37,8	**72,9**	**94,0**
C13	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**94,8**
C14	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**94,9**
C15	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,1**
C16	69,7	62,9	70,0	75,2	62,6	59,0	50,7	38,1	**73,1**	**95,2**
C17	70,2	63,4	70,5	75,7	63,1	59,5	51,2	38,6	**73,6**	**95,7**
C18	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**95,8**
C19	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**95,8**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

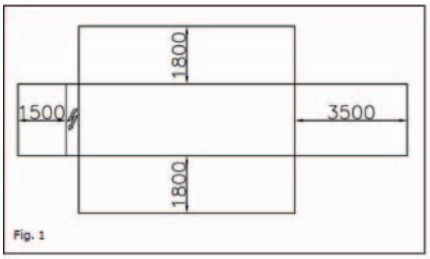

Fig. 1

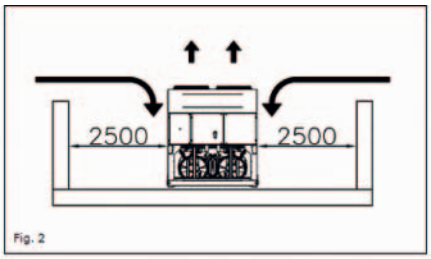

Fig. 2

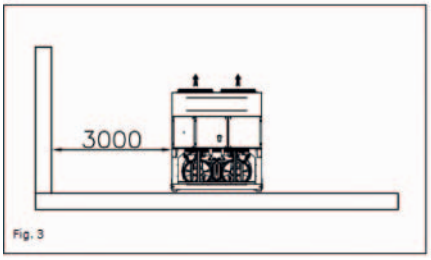

Fig. 3

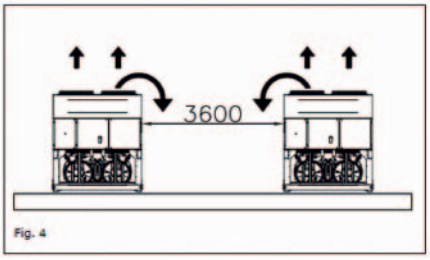

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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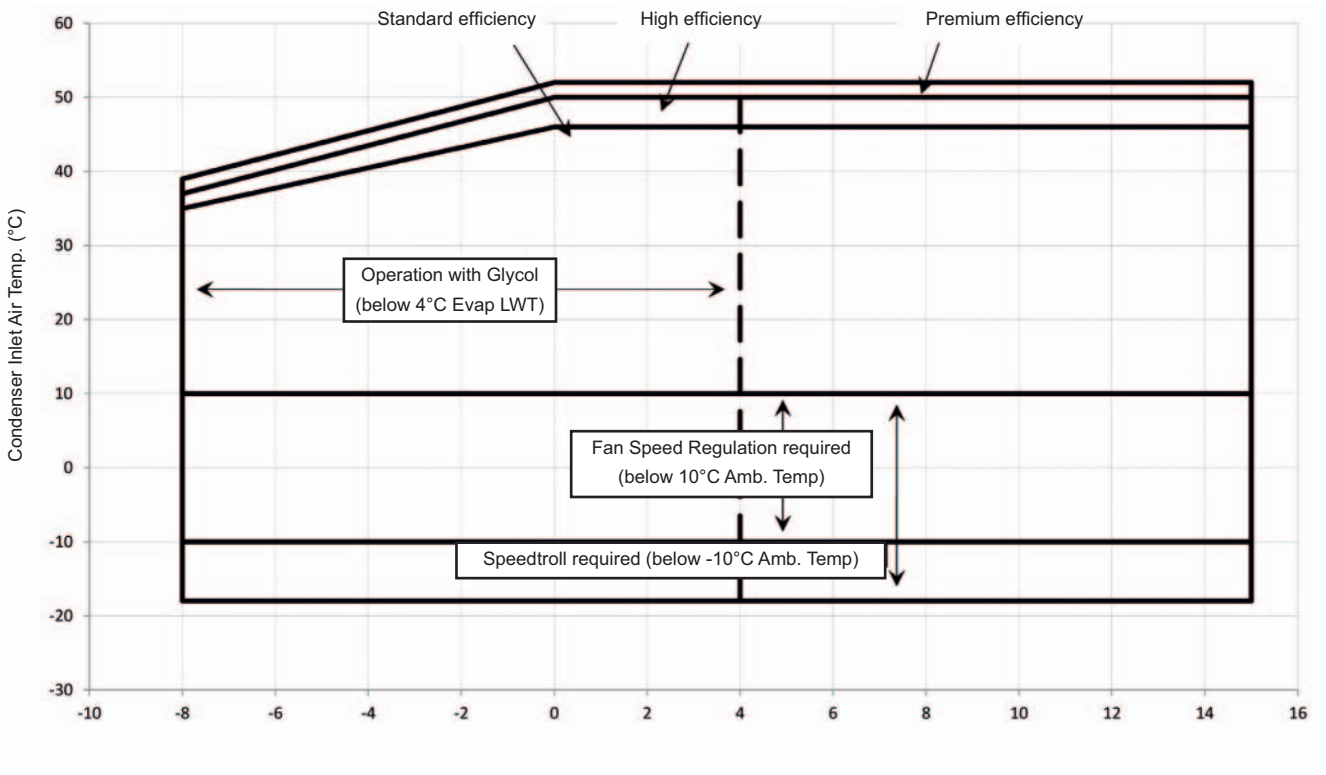
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

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13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

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TABLE OF CONTENTS

EWAD-C-SL

1 Features

- Wide capacity range: 16 sizes to cover a range from 647 to 1,922 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 46ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2-3 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 650C-SL	EWAD 740C-SL	EWAD 830C-SL	EWAD 910C-SL	EWAD 970C-SL	EWAD C11C-SL	EWAD C12C-SL	EWAD C13C-SL
Cooling capacity	Nom.			kW	647 (1)	744 (1)	832 (1)	912 (1)	967 (1)	1,064 (1)	1,152 (1)	1,319 (1)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5							
Power input	Cooling	Nom.		kW	221 (1)	262 (1)	299 (1)	318 (1)	350 (1)	377 (1)	403 (1)	441 (1)
EER					2.93 (1)	2.84 (1)	2.78 (1)	2.87 (1)	2.76 (1)	2.82 (1)	2.86 (1)	2.99 (1)
ESEER					3.95	3.87	3.89	3.84	3.80	3.88	3.84	4.08
IPLV					4.30	4.17	4.16	4.23	4.14	4.17	4.19	4.43
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,540							
		Width		mm	2,285							
		Depth		mm	6,185					7,085	7,985	8,885
Weight	Unit			kg	5,920	6,030	6,050	6,570	6,850	7,300	7,570	8,190
	Operation weight			kg	6,200	6,280	6,300	6,820	7,100	7,540	7,810	8,570
Water heat exchanger	Type				Single pass shell & tube							
	Water volume			l	266		251			243		386
	Nominal water flow	Cooling		l/s	30.9	35.5	39.7	43.5	46.1	50.8	55.0	62.9
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	47	54	53	62	69	64	74	54
	Insulation material				Closed cell							
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler							
Fan	Quantity				10			12		14	16	-
	Type				Direct propeller							
	Diameter			mm	800							
	Air flow rate	Nom.		l/s	53,442			64,131		74,819	85,508	96,199
	Speed			rpm	900							920
Fan motor	Quantity				-							18
	Drive				DOL							
	Input	Cooling		W	17,500			21,000		24,500	28,000	1,750
Sound power level	Cooling	Nom.		dBA	96.0	96.1		97.5	97.1	97.6	98.1	98.2
Sound pressure level	Cooling	Nom.		dBA	75.5	75.6		76.5	76.6	76.8	76.9	77
Compressor	Type				Asymm single screw							Semi-hermetic single screw compressor
	Quantity				2							
	Oil	Charged volume		l	38			44	50			
Operation range	Water side	Cooling	Min.	ºCDB	-8							-
			Max.	ºCDB	15							-
	Air side	Cooling	Min.	ºCDB	-18							-
			Max.	ºCDB	52							-
Refrigerant	Type				R-134a							
	Circuits	Quantity			2							
Refrigerant circuit	Charge			kg	128			146	144	162	178	196
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm							219.1mm
Safety devices	Item	01			High discharge pressure (pressure switch)							
		02			High discharge pressure (pressure transducer)							
		03			Low suction pressure (pressure transducer)							
		04			Compressor motor protection							
		05			High discharge temperature							
		06			Low oil pressure							
		07			Low pressure ratio							
		08			High oil filter pressure drop							
		09			Phase monitor							
		10			Emergency stop							
		11			Water freeze protection controller							

2 Specifications

2-1 Technical Specifications					EWAD H14C-SL	EWAD C14C-SL	EWAD C15C-SL	EWAD C16C-SL	EWAD C17C-SL	EWAD C18C-SL	EWAD C19C-SL	EWAD C20C-SL
Cooling capacity	Nom.			kW	1,418 (1)	1,419 (1)	1,538 (1)	1,622	1,714	1,802 (1)	1,875 (1)	1,922 (1)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5	7						
Power input	Cooling	Nom.		kW	474 (1)	500 (1)	551 (1)	579 (1)	619 (1)	665 (1)	682 (1)	714 (1)
EER					2.99 (1)	2.84 (1)	2.79 (1)	2.80 (1)	2.77 (1)	2.71 (1)	2.75 (1)	2.69 (1)
ESEER					4.05	3.88	3.90	3.87	3.78		3.79	3.77
IPLV					4.42	4.19	4.22	4.18	4.13	4.18		4.16
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,540							
		Width		mm	2,285							
		Depth		mm	8,885	10,185		11,085			11,985	
Weight	Unit			kg	8,190	10,750	10,770	11,150	11,210	11,680	12,040	
	Operation weight			kg	8,570	11,170		11,550	11,700	12,560	12,920	
Water heat exchanger	Type				Single pass shell & tube							
	Water volume			l	386	421	408		474	850		
	Nominal water flow	Cooling		l/s	67.6	67.78	73.4	77.4	81.8	86.0	89.5	91.70
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	58	47	62	68	75	36	39	40
	Insulation material				Closed cell							
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler							
Fan	Quantity				18	20		22			24	-
	Type				Direct propeller							
	Diameter			mm	800							
	Air flow rate	Nom.		l/s	96,196	106,888	106,885	117,573			128,262	128,266
	Speed			rpm	900	920	900					920
Fan motor	Quantity				-							24
	Drive				DOL							
	Input	Cooling		W	31,500	1,750	35,000	38,500			42,000	1,750
Sound power level	Cooling	Nom.		dBA	98.2	99.1		99.5		99.9	101.0	
Sound pressure level	Cooling	Nom.		dBA	77.0	77.2		77.3	77.4	77.9	78.0	
Compressor	Type				Asymm single screw	Semi-hermetic single screw compressor	Asymm single screw					Semi-hermetic single screw compressor
	Quantity				2	3						
	Oil	Charged volume		l	50	75						
Operation range	Water side	Cooling	Min.	ºCDB	-8							-
			Max.	ºCDB	15							-
	Air side	Cooling	Min.	ºCDB	-18							-
			Max.	ºCDB	52	46	52					-
Refrigerant	Type				R-134a							
	Circuits	Quantity			2	3						
Refrigerant circuit	Charge			kg	196	-	260	261		275	305	
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm					273mm		
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 pressure drop							
		09			Phase monitor							
		10			Emergency stop							
		11			Water freeze protection controller							

2 Specifications

2-2 Electrical Specifications				EWAD 650C-SL	EWAD 740C-SL	EWAD 830C-SL	EWAD 910C-SL	EWAD 970C-SL	EWAD C11C-SL	EWAD C12C-SL	EWAD C13C-SL
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	218	231	274		333		398	397
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	218	274		333		398		450
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	604	649		915	962	1,017	1,021	1,067
	Nominal running current (RLA)	Cooling	A	366	432	492	524	577	624	667	726
	Maximum running current		A	476	545	589	656	715	787	859	919
	Max unit current for wires sizing		A	520	596	644	717	781	860	939	1,011
Fans	Nominal running current (RLA)		A	40			48		56	64	72

2-2 Electrical Specifications				EWAD H14C-SL	EWAD C14C-SL	EWAD C15C-SL	EWAD C16C-SL	EWAD C17C-SL	EWAD C18C-SL	EWAD C19C-SL	EWAD C20C-SL
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	451	326	398				451	450
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	451	326	333	398			451	450
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	1,081	1,242.6	1,312	1,363	1,367	1,410	1,456	1,469
	Nominal running current (RLA)	Cooling	A	773	823 (5)	909	959	1,023	1,092	1,116	1,164
	Maximum running current		A	974	1,058	1,144	1,217	1,281	1,334	1,395	1,446
	Max unit current for wires sizing		A	1,064	1,164	1,251	1,330	1,400	1,459	1,525	1,591
Fans	Nominal running current (RLA)		A	72	80		88			96	

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

(9) Cooling: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

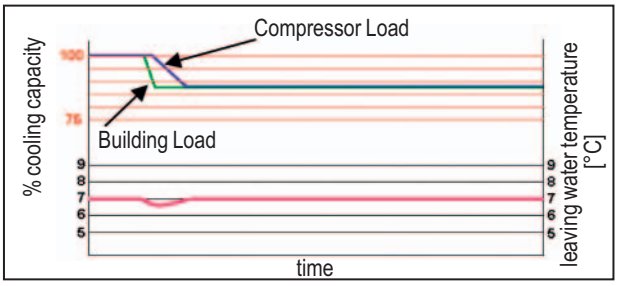
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

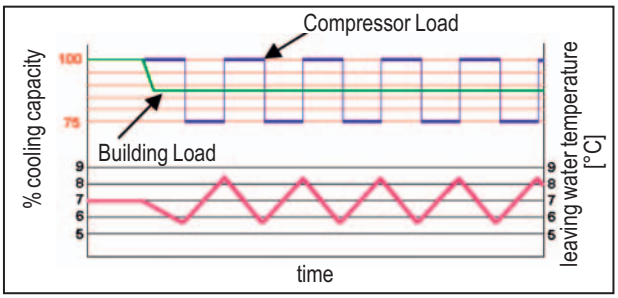
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

FTA_1-2b_Rev.02_1

3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

FTA_1-2b_Rev.02_2b

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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

GNC_1a-2a-3a-4a_Rev.01_1a

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 and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
• Chiller enabled to work in partial failure condition.
• Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
• Display of evaporator entering/leaving water temperature.
• Display of Outdoor Ambient Temperature.
• Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
• Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
• Compressor and evaporator pumps hours counter.
• Display of Status Safety Devices.
• Number of starts and compressor working hours.
• Optimized management of compressor load.
• Fan management according to condensing pressure.
• 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).
• OAT (Outside Ambient temperature) Reset.
• Set point Reset (optional).
• Application and system upgrade with commercial SD cards.
• Ethernet port for remote or local servicing using standard web browsers.
• Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
• High pressure (pressure switch).
• High pressure (transducer).
• Low pressure (transducer).
• Fans circuit breaker.
• 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.

GNC_1a-2a-3a-4a_Rev.01_2a

4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

GNC_1a-2a-3a-4a_Rev.01_3a

4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

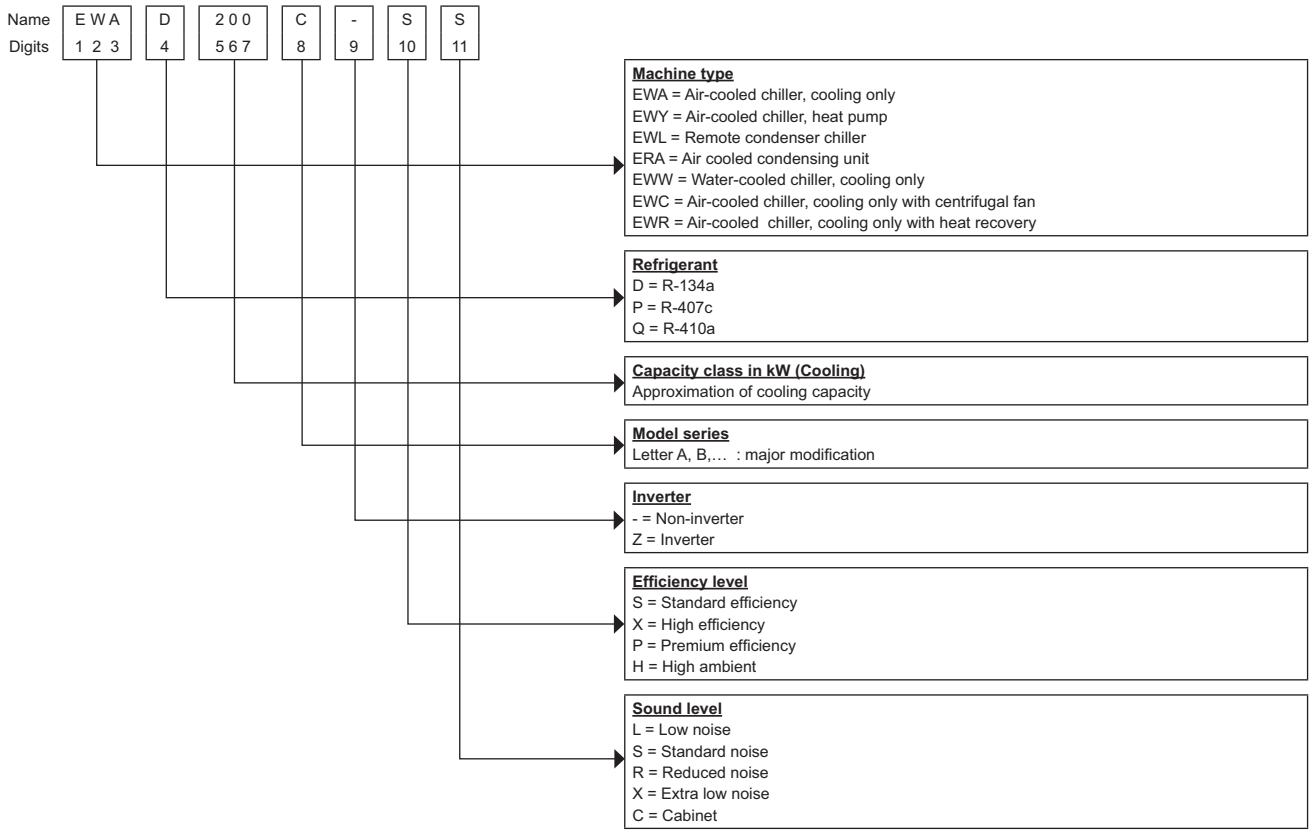
OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

GNC_1a-2a-3a-4a_Rev.01_4a

5 Nomenclature

5 - 1 Nomenclature

Nomenclature



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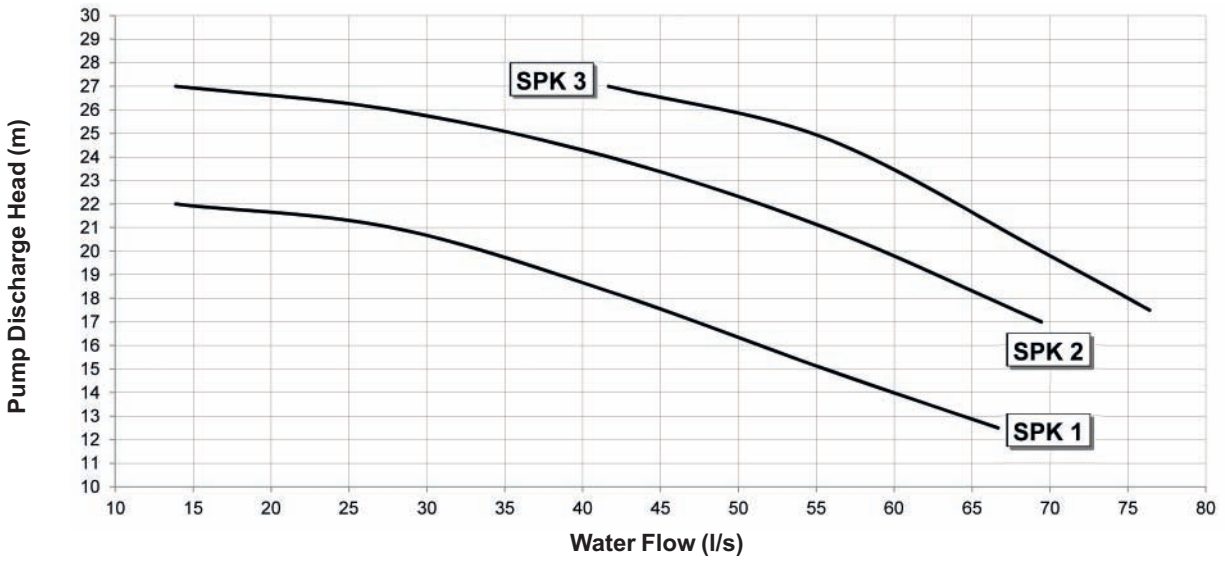
6 Options

6 - 1 Water Pump Kit - Technical Information

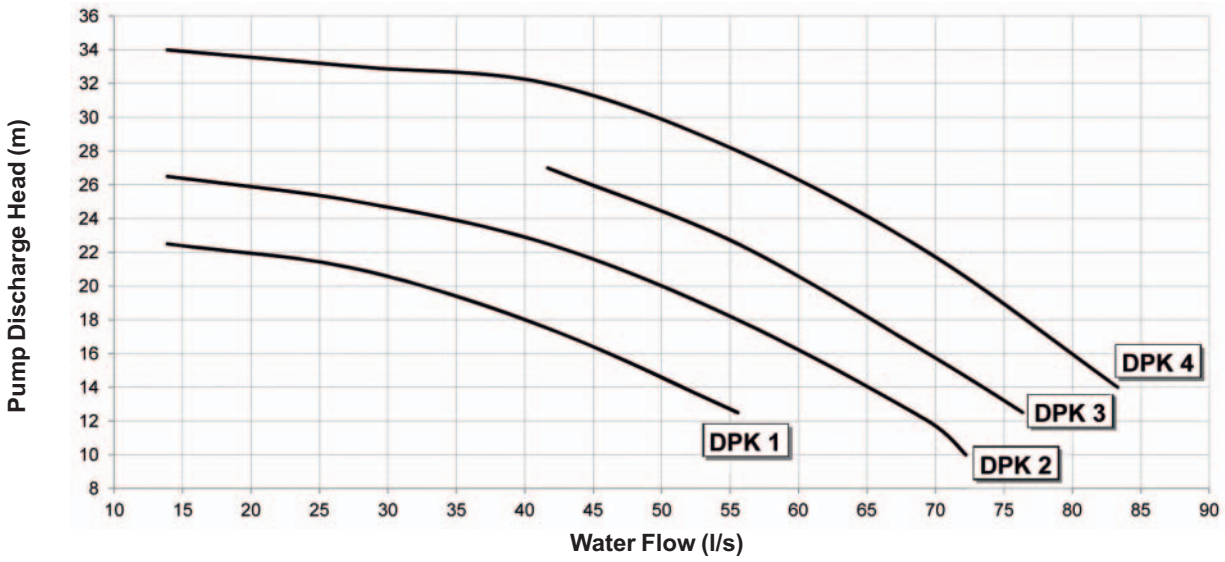
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

WPKTI_1a-2a-3a_Rev.03_1a

6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

	Twout	Condenser Inlet Air Temperature (°C)											
		4				5				6			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	653	182	31,1	47	673	185	32,1	50	693	188	33,1	53
	30	624	196	29,7	43	643	199	30,6	46	662	202	31,6	48
	35	592	211	28,2	40	610	214	29,1	42	628	217	30,0	44
	40	555	227	26,4	35	573	230	27,3	37	591	234	28,2	39
	42	538	233	25,6	33	556	237	26,5	35	574	241	27,3	37
	44	521	240	24,8	31	538	244	25,6	33	555	248	26,5	35
	46	503	247	23,9	29	519	251	24,8	31	536	255	25,6	33
740	25	732	212	34,9	52	752	215	35,8	55	771	218	36,8	58
	30	712	230	33,9	50	732	234	34,9	52	751	237	35,8	55
	35	689	251	32,8	47	707	254	33,7	49	725	258	34,6	52
	40	657	273	31,3	43	675	277	32,1	45	692	281	33,0	48
	42	642	283	30,6	41	659	287	31,4	43	676	291	32,2	46
	44	625	293	29,8	39	642	297	30,6	41	658	301	31,4	43
	46	601	300	28,6	37	611	301	29,1	38	621	301	29,6	39
830	25	825	241	39,3	52	847	245	40,4	54	870	249	41,5	57
	30	801	262	38,2	49	822	267	39,2	52	844	271	40,3	54
	35	770	285	36,7	46	791	290	37,7	48	811	295	38,7	50
	40	729	310	34,7	41	749	315	35,7	44	768	320	36,6	46
	42	710	321	33,8	39	729	326	34,7	41	748	332	35,7	43
	44	688	332	32,8	37	707	338	33,7	39	716	339	34,2	40
	46	631	324	30,1	32	635	320	30,3	32	639	315	30,5	33
910	25	898	257	42,8	60	922	261	43,9	63	946	265	45,1	66
	30	874	280	41,6	58	898	284	42,8	60	921	288	43,9	63
	35	844	304	40,2	54	867	308	41,3	57	889	313	42,4	59
	40	806	331	38,4	50	827	336	39,4	52	848	341	40,4	55
	42	787	343	37,5	48	807	348	38,5	50	828	353	39,5	52
	44	765	355	36,5	45	786	360	37,5	48	807	365	38,5	50
	46	730	361	34,8	42	743	361	35,4	43	756	361	36,0	44
970	25	957	283	45,6	68	982	287	46,8	71	1008	291	48,0	74
	30	931	308	44,3	64	955	312	45,5	67	979	317	46,7	71
	35	897	335	42,7	60	920	340	43,9	63	944	345	45,0	66
	40	853	365	40,6	55	875	371	41,7	58	897	376	42,8	60
	42	832	378	39,6	53	853	384	40,7	55	874	390	41,7	58
	44	808	392	38,5	50	829	398	39,5	52	850	404	40,5	55
	46	758	392	36,1	44	764	388	36,4	45	769	383	36,7	46
C11	25	1049	305	50,0	62	1076	309	51,3	65	1105	314	52,7	69
	30	1021	332	48,6	59	1048	337	49,9	62	1075	342	51,3	65
	35	986	361	47,0	56	1012	366	48,2	59	1038	372	49,5	61
	40	940	393	44,8	51	965	399	46,0	54	989	405	47,2	56
	42	918	408	43,7	49	942	414	44,9	51	966	420	46,1	54
	44	894	422	42,6	47	917	429	43,7	49	940	435	44,8	51
	46	851	428	40,5	43	863	426	41,1	44	877	426	41,8	45
C12	25	1130	326	53,8	71	1160	331	55,3	75	1190	335	56,8	78
	30	1102	355	52,5	68	1131	360	53,9	72	1160	365	55,3	75
	35	1067	386	50,8	64	1095	392	52,2	68	1124	397	53,6	71
	40	1022	421	48,7	60	1048	427	50,0	62	1075	433	51,3	65
	42	1000	436	47,6	57	1026	442	48,9	60	1052	448	50,2	63
	44	975	452	46,4	55	1000	458	47,7	57	1026	464	48,9	60
	46	947	468	45,1	52	972	475	46,3	54	997	481	47,5	57
C13	25	1293	355	61,6	52	1329	361	63,4	55	1366	366	65,1	57
	30	1258	388	59,9	49	1294	393	61,7	52	1329	399	63,4	55
	35	1216	422	57,9	46	1250	428	59,6	49	1285	434	61,3	51
	40	1161	459	55,3	43	1194	466	56,9	45	1227	473	58,5	47
	42	1135	476	54,1	41	1167	483	55,6	43	1199	490	57,2	45
	44	1106	493	52,7	39	1137	500	54,2	41	1168	507	55,7	43
	46	1073	510	51,1	37	1104	518	52,6	39	1127	522	53,7	41

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		7				8				9			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	713	191	34,0	55	733	194	35,0	58	753	197	36,0	61
	30	682	205	32,5	51	702	209	33,5	54	721	212	34,4	57
	35	647	221	30,9	47	666	224	31,8	49	685	228	32,7	52
	40	608	238	29,0	42	626	241	29,9	44	644	245	30,8	46
	42	591	245	28,2	40	609	248	29,1	42	626	252	29,9	44
	44	573	252	27,3	37	591	256	28,2	40	608	260	29,0	42
	46	553	259	26,4	35	571	263	27,2	37	588	268	28,1	39
740	25	792	221	37,8	61	812	225	38,8	63	833	228	39,8	66
	30	770	241	36,8	58	790	245	37,7	60	810	248	38,7	63
	35	744	262	35,5	54	763	266	36,4	57	782	270	37,3	59
	40	710	285	33,9	50	728	289	34,7	52	746	294	35,6	54
	42	693	295	33,1	48	711	300	33,9	50	728	304	34,8	52
	44	675	306	32,2	45	688	308	32,8	47	699	309	33,4	48
	46	631	301	30,1	40	641	300	30,6	41	650	300	31,1	43
830	25	892	253	42,6	60	915	257	43,7	63	938	262	44,8	65
	30	866	275	41,3	57	887	280	42,4	59	909	284	43,4	62
	35	832	299	39,7	53	853	304	40,7	55	873	309	41,7	58
	40	788	326	37,6	48	808	331	38,5	50	827	336	39,5	52
	42	767	337	36,6	46	786	342	37,5	48	805	348	38,5	50
	44	721	336	34,4	41	726	332	34,6	41	730	328	34,8	42
	46	647	313	30,9	34	649	308	31,0	34	656	305	31,3	34
910	25	971	269	46,3	70	995	273	47,5	73	1020	277	48,7	76
	30	944	292	45,1	66	968	297	46,2	69	992	301	47,4	73
	35	912	318	43,5	62	935	323	44,6	65	958	327	45,7	68
	40	870	346	41,5	57	891	351	42,6	60	913	356	43,6	62
	42	849	358	40,5	55	871	363	41,6	57	892	369	42,6	60
	44	822	368	39,2	52	835	369	39,9	53	848	369	40,5	55
	46	768	361	36,6	46	779	360	37,2	47	788	358	37,6	48
970	25	1033	296	49,3	78	1059	300	50,5	81	1085	305	51,8	85
	30	1004	322	47,9	74	1029	327	49,1	77	1054	332	50,3	81
	35	967	350	46,1	69	991	356	47,3	72	1014	361	48,4	75
	40	919	382	43,8	63	941	388	44,9	66	963	394	46,0	69
	42	896	396	42,7	60	917	402	43,8	63	939	408	44,8	66
	44	861	405	41,1	56	866	401	41,3	57	871	396	41,6	57
	46	773	378	36,9	46	777	372	37,1	47	779	365	37,2	47
C11	25	1133	319	54,0	72	1162	323	55,4	75	1190	328	56,9	79
	30	1102	347	52,6	68	1130	352	53,9	72	1158	357	55,3	75
	35	1064	377	50,8	64	1090	383	52,1	67	1117	389	53,4	70
	40	1014	411	48,4	59	1039	417	49,6	62	1064	423	50,8	64
	42	990	426	47,2	56	1015	432	48,4	59	1039	438	49,6	62
	44	958	438	45,7	53	970	437	46,3	54	985	437	47,0	56
	46	893	427	42,6	47	906	426	43,3	48	913	423	43,6	49
C12	25	1221	340	58,2	82	1251	345	59,7	86	1283	350	61,3	90
	30	1190	370	56,8	79	1220	376	58,2	82	1250	381	59,7	86
	35	1152	403	55,0	74	1181	409	56,4	77	1210	414	57,8	81
	40	1102	439	52,6	68	1130	445	53,9	72	1157	451	55,3	75
	42	1078	454	51,4	66	1105	461	52,7	69	1132	467	54,1	72
	44	1052	471	50,2	63	1078	477	51,4	66	1104	484	52,7	69
	46	1022	488	48,8	60	1042	493	49,7	62	1048	488	50,1	63
C13	25	1403	371	66,9	60	1440	377	68,7	63	1477	382	70,5	66
	30	1365	405	65,1	57	1402	411	66,9	60	1438	417	68,7	63
	35	1319	441	62,9	54	1354	447	64,7	57	1390	454	66,4	59
	40	1260	480	60,1	50	1293	487	61,7	52	1327	494	63,4	55
	42	1231	497	58,7	48	1264	504	60,3	50	1297	511	61,9	52
	44	1199	514	57,2	45	1231	522	58,8	48	1263	529	60,3	50
	46	1146	522	54,7	42	1165	522	55,6	43	1184	522	56,5	44

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

		Condenser Inlet Air Temperature (°C)											
	Twout	10				11				12			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	774	200	37,0	64	794	203	38,0	68	815	206	39,0	71
	30	741	215	35,4	60	761	218	36,4	62	781	222	37,3	66
	35	705	231	33,7	54	724	235	34,6	57	743	238	35,5	60
	40	663	249	31,7	49	681	253	32,6	51	700	257	33,5	54
	42	644	256	30,8	46	663	260	31,7	49	681	264	32,6	51
	44	625	264	29,9	44	643	268	30,7	46	661	272	31,6	49
	46	605	272	28,9	41	622	276	29,7	44	640	280	30,6	46
740	25	853	232	40,8	69	874	235	41,8	73	896	239	42,8	76
	30	830	252	39,7	66	850	256	40,6	69	871	260	41,6	72
	35	801	274	38,3	62	820	278	39,2	65	840	282	40,2	68
	40	764	298	36,5	57	782	302	37,4	59	800	307	38,3	62
	42	746	309	35,6	55	764	313	36,5	57	777	315	37,2	59
	44	709	309	33,9	50	719	308	34,4	51	729	308	34,9	52
	46	660	300	31,5	44	660	294	31,6	44	665	291	31,8	44
830	25	961	266	45,9	68	984	270	47,0	71	1007	275	48,2	75
	30	931	289	44,5	65	954	294	45,6	68	976	298	46,7	70
	35	894	314	42,7	60	915	319	43,8	63	936	324	44,8	65
	40	847	341	40,5	55	867	347	41,4	57	887	352	42,4	59
	42	810	346	38,7	50	814	342	38,9	51	818	338	39,1	51
	44	733	323	35,0	42	740	321	35,4	43	742	315	35,5	43
	46	657	299	31,4	35	649	312	31,0	34	649	305	31,0	34
910	25	1045	281	49,9	80	1071	285	51,2	83	1096	290	52,4	87
	30	1017	306	48,6	76	1041	310	49,8	79	1066	315	51,0	83
	35	981	332	46,9	71	1004	337	48,0	74	1028	342	49,1	77
	40	935	361	44,7	65	957	367	45,7	68	979	372	46,8	71
	42	913	374	43,6	63	929	377	44,4	65	942	377	45,1	66
	44	860	369	41,1	56	872	368	41,7	58	887	369	42,4	59
	46	794	355	37,9	49	800	351	38,2	49	794	355	38,0	49
970	25	1111	310	53,1	89	1138	315	54,4	93	1164	319	55,7	97
	30	1079	337	51,6	84	1104	342	52,8	88	1130	348	54,0	92
	35	1038	367	49,6	79	1062	372	50,8	82	1087	378	52,0	86
	40	986	400	47,1	72	1008	406	48,2	75	1031	412	49,3	78
	42	961	414	45,9	68	972	414	46,5	70	977	410	46,7	71
	44	875	391	41,8	58	879	385	42,0	58	887	383	42,4	59
	46	787	362	37,6	48	794	358	37,9	49	779	371	37,3	47
C11	25	1220	333	58,3	82	1249	338	59,7	86	1279	343	61,2	90
	30	1186	363	56,7	78	1215	368	58,1	82	1243	374	59,5	85
	35	1144	394	54,7	73	1171	400	56,0	77	1199	406	57,3	80
	40	1090	430	52,1	67	1115	436	53,3	70	1141	442	54,6	73
	42	1064	445	50,8	64	1079	446	51,6	66	1095	446	52,3	68
	44	999	436	47,7	57	1016	438	48,6	59	1030	437	49,3	61
	46	920	419	44,0	50	927	414	44,3	50	920	418	44,0	50
C12	25	1314	355	62,8	94	1346	360	64,3	98	1378	365	65,9	103
	30	1281	386	61,2	90	1311	392	62,7	94	1342	397	64,2	98
	35	1239	420	59,2	85	1268	426	60,6	88	1298	432	62,1	92
	40	1185	458	56,6	78	1213	464	58,0	81	1241	471	59,3	85
	42	1159	474	55,4	75	1186	480	56,7	78	1214	487	58,0	82
	44	1131	491	54,0	72	1157	498	55,3	75	1184	505	56,6	78
	46	1055	483	50,4	63	1060	477	50,7	64	1064	470	50,9	64
C13	25	1515	388	72,4	69	1552	394	74,2	73	1591	400	76,1	76
	30	1474	423	70,4	66	1511	429	72,2	69	1548	436	74,0	72
	35	1425	461	68,1	62	1460	467	69,8	65	1495	474	71,5	68
	40	1361	502	65,0	57	1395	509	66,7	60	1428	516	68,3	62
	42	1330	519	63,5	55	1363	527	65,2	57	1397	534	66,8	60
	44	1288	533	61,5	52	1308	534	62,5	53	1327	534	63,5	55
	46	1201	521	57,4	46	1211	517	57,9	46	1215	510	58,1	47

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		13				14				15			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	836	209	40,0	74	858	212	41,0	78	879	215	42,1	81
	30	801	225	38,3	69	822	228	39,3	72	842	232	40,3	75
	35	762	242	36,5	63	782	246	37,4	66	802	249	38,4	69
	40	719	260	34,4	56	737	264	35,3	59	756	268	36,2	62
	42	700	268	33,5	54	718	272	34,4	56	736	276	35,3	59
	44	679	276	32,5	51	697	280	33,4	54	716	285	34,3	56
	46	657	284	31,4	48	671	287	32,1	50	677	285	32,4	51
740	25	917	243	43,9	79	939	246	44,9	83	961	250	46,0	86
	30	892	264	42,7	75	912	268	43,7	79	933	272	44,7	82
	35	860	286	41,1	71	879	291	42,1	74	899	295	43,1	77
	40	819	312	39,2	65	838	316	40,1	67	856	321	41,0	70
	42	788	316	37,7	60	799	316	38,2	62	809	315	38,7	63
	44	739	307	35,4	54	751	308	35,9	55	753	304	36,1	56
	46	663	296	31,7	44	666	292	31,9	45	669	287	32,0	45
830	25	1031	279	49,3	78	1055	284	50,5	81	1079	289	51,7	85
	30	999	303	47,8	73	1021	308	48,9	77	1044	313	50,0	80
	35	958	329	45,8	68	979	335	46,9	71	1001	340	47,9	74
	40	901	356	43,1	61	905	352	43,3	62	909	348	43,5	62
	42	821	333	39,3	52	829	331	39,7	53	830	325	39,7	53
	44	749	312	35,8	44	749	305	35,8	44	740	317	35,4	43
	46	654	300	31,3	34	662	298	31,7	35	665	293	31,9	35
910	25	1122	294	53,7	91	1148	299	55,0	95	1175	303	56,2	99
	30	1091	320	52,2	86	1116	325	53,4	90	1141	329	54,6	94
	35	1052	347	50,3	81	1075	353	51,5	84	1100	358	52,6	88
	40	1002	378	47,9	74	1024	383	49,0	77	1041	386	49,8	79
	42	955	377	45,7	68	968	377	46,3	70	983	378	47,1	72
	44	898	368	43,0	61	904	365	43,3	62	909	361	43,5	62
	46	798	350	38,2	49	805	346	38,5	50	807	340	38,7	50
970	25	1191	324	57,0	101	1218	330	58,3	105	1246	335	59,6	110
	30	1156	353	55,3	96	1182	358	56,6	100	1208	364	57,8	104
	35	1111	384	53,1	89	1136	390	54,3	93	1160	396	55,5	96
	40	1054	418	50,4	81	1077	424	51,5	84	1088	425	52,1	86
	42	981	405	46,9	71	985	399	47,1	72	994	397	47,6	73
	44	889	376	42,5	60	897	372	42,9	61	904	369	43,3	61
	46	785	366	37,6	48	790	360	37,8	48	794	354	38,0	49
C11	25	1309	349	62,6	94	1340	354	64,1	98	1370	359	65,6	102
	30	1272	379	60,9	89	1302	385	62,3	93	1331	391	63,7	97
	35	1226	412	58,7	83	1254	419	60,0	87	1282	425	61,4	90
	40	1167	449	55,8	76	1193	455	57,1	79	1209	456	57,9	81
	42	1110	446	53,1	70	1128	448	54,0	72	1142	447	54,7	73
	44	1044	437	49,9	62	1047	430	50,1	63	1053	425	50,4	63
	46	928	414	44,4	50	932	408	44,6	51	935	400	44,8	51
C12	25	1410	370	67,5	107	1443	376	69,1	112	1476	381	70,7	116
	30	1374	403	65,7	102	1405	409	67,3	106	1437	415	68,8	111
	35	1328	438	63,5	96	1358	445	65,0	100	1389	451	66,5	104
	40	1270	477	60,7	89	1298	484	62,1	92	1327	491	63,5	96
	42	1242	494	59,4	85	1270	501	60,8	89	1298	508	62,1	92
	44	1191	501	57,0	79	1196	496	57,2	80	1201	489	57,5	80
	46	1067	462	51,1	65	1077	459	51,5	66	1078	450	51,6	66
C13	25	1629	406	77,9	79	1668	412	79,8	83	1708	418	81,8	86
	30	1585	442	75,8	75	1623	449	77,7	79	1661	455	79,5	82
	35	1531	481	73,2	71	1567	488	75,0	74	1603	495	76,7	77
	40	1462	524	69,9	65	1496	531	71,6	68	1530	539	73,3	71
	42	1430	542	68,4	63	1454	546	69,6	65	1474	546	70,6	66
	44	1346	533	64,4	56	1369	535	65,5	58	1374	528	65,8	58
	46	1223	504	58,5	47	1230	498	58,9	48	1223	500	58,6	47

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

	Twout	Condenser Inlet Air Temperature (°C)											
		4				5				6			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1394	380	66,4	56	1432	386	68,3	59	1470	392	70,1	62
	30	1355	416	64,6	54	1393	422	66,4	56	1431	428	68,2	59
	35	1307	453	62,3	50	1344	460	64,1	53	1381	467	65,9	56
	40	1245	495	59,3	46	1279	502	61,0	48	1314	510	62,7	51
	42	1216	513	57,9	44	1249	521	59,5	46	1282	528	61,1	49
	44	1183	533	56,4	42	1215	540	57,9	44	1248	548	59,5	46
	46	1146	552	54,6	40	1178	560	56,2	42	1195	561	57,0	43
C15	25	1517	445	72,3	60	1558	452	74,3	63	1600	459	76,3	67
	30	1475	484	70,3	57	1515	492	72,2	60	1555	499	74,2	63
	35	1423	527	67,8	54	1461	535	69,6	56	1499	543	71,5	59
	40	1354	574	64,5	49	1390	582	66,2	52	1426	591	68,0	54
	42	1321	594	62,9	47	1356	603	64,6	49	1391	612	66,3	52
	44	1284	616	61,2	45	1318	625	62,8	47	1352	634	64,5	49
	46	1221	625	58,2	41	1236	621	58,9	42	1253	619	59,7	43
C16	25	1598	468	76,1	66	1641	475	78,2	70	1684	482	80,3	73
	30	1554	509	74,0	63	1596	517	76,1	66	1638	525	78,1	69
	35	1500	554	71,5	59	1541	562	73,4	62	1581	571	75,4	65
	40	1430	604	68,1	54	1468	613	70,0	57	1507	622	71,8	60
	42	1396	625	66,5	52	1433	634	68,3	55	1471	644	70,1	57
	44	1359	648	64,7	50	1395	657	66,5	52	1431	667	68,2	54
	46	1291	655	61,5	45	1310	653	62,4	46	1328	650	63,3	48
C17	25	1692	499	80,6	73	1737	507	82,8	76	1782	514	85,0	80
	30	1647	544	78,4	69	1690	552	80,5	73	1733	560	82,7	76
	35	1589	592	75,7	65	1630	601	77,7	68	1672	610	79,7	71
	40	1513	646	72,1	60	1552	655	74,0	62	1591	665	75,9	65
	42	1476	669	70,3	57	1514	679	72,2	60	1553	689	74,0	62
	44	1436	694	68,4	54	1473	704	70,2	57	1510	714	72,0	59
	46	1359	699	64,7	49	1378	697	65,7	50	1397	695	66,6	52
C18	25	1788	534	85,2	35	1833	542	87,4	37	1879	550	89,6	39
	30	1739	583	82,8	34	1783	591	85,0	35	1827	600	87,1	37
	35	1674	635	79,7	31	1717	645	81,8	33	1759	655	83,9	34
	40	1588	694	75,6	29	1628	705	77,6	30	1669	715	79,6	31
	42	1547	720	73,7	27	1586	731	75,6	29	1626	742	77,5	30
	44	1500	747	71,5	26	1539	758	73,4	27	1560	759	74,4	28
	46	1377	727	65,6	22	1387	717	66,1	22	1395	707	66,5	23
C20	25	1853	547	88,3	38	1900	555	90,6	40	1948	563	92,9	41
	30	1805	598	86,0	36	1851	607	88,2	38	1896	615	90,4	39
	35	1743	653	83,0	34	1787	663	85,2	35	1831	672	87,3	37
	40	1660	716	79,1	31	1702	726	81,1	32	1744	736	83,2	34
	42	1619	743	77,1	30	1661	753	79,2	31	1702	764	81,2	32
	44	1573	771	74,9	28	1614	782	76,9	29	1655	793	78,9	31
	46	1481	771	70,5	25	1502	768	71,6	26	1521	763	72,5	27
C20	25	1904	573	90,7	40	1952	581	93,0	41	2000	589	95,4	43
	30	1853	626	88,3	38	1900	635	90,5	39	1946	644	92,8	41
	35	1788	686	85,2	35	1832	696	87,3	37	1877	706	89,5	39
	40	1701	753	81,0	32	1743	764	83,0	34	1785	774	85,1	35
	42	1657	782	78,9	31	1699	793	81,0	32	1740	804	83,0	34
	44	1608	812	76,6	29	1649	824	78,6	31	1691	836	80,6	32
	46	1492	801	71,1	26	1503	791	71,6	26	1513	779	72,1	26

NOTES

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		7				8				9			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1509	397	72,0	65	1548	403	73,9	68	1587	409	75,8	72
	30	1468	434	70,0	62	1506	441	71,9	65	1543	447	73,7	68
	35	1418	474	67,6	58	1454	481	69,4	61	1490	488	71,1	64
	40	1350	517	64,4	53	1386	525	66,1	56	1420	533	67,8	59
	42	1317	536	62,8	51	1352	544	64,5	54	1387	552	66,2	56
	44	1280	555	61,1	49	1314	564	62,7	51	1349	572	64,4	53
	46	1204	555	57,4	43	1211	548	57,8	44	1217	540	58,1	44
C15	25	1642	466	78,3	70	1685	473	80,4	73	1728	481	82,5	77
	30	1596	507	76,1	66	1637	515	78,1	69	1679	523	80,2	73
	35	1538	551	73,4	62	1577	560	75,3	65	1617	568	77,2	68
	40	1463	600	69,8	57	1500	609	71,6	59	1537	619	73,4	62
	42	1427	622	68,1	54	1463	631	69,8	57	1499	640	71,6	59
	44	1382	642	65,9	51	1400	641	66,8	52	1415	637	67,6	53
	46	1272	618	60,7	44	1287	614	61,4	45	1305	612	62,3	46
C16	25	1729	489	82,5	77	1774	497	84,7	80	1819	504	86,9	84
	30	1681	533	80,2	73	1724	541	82,3	76	1768	549	84,4	80
	35	1622	579	77,4	68	1663	588	79,4	71	1705	597	81,4	75
	40	1545	631	73,7	63	1584	640	75,6	65	1624	650	77,5	68
	42	1508	653	72,0	60	1547	663	73,8	63	1585	673	75,7	66
	44	1462	675	69,8	57	1482	673	70,7	58	1495	666	71,4	59
	46	1345	646	64,2	49	1361	641	65,0	50	1383	641	66,1	51
C17	25	1828	522	87,2	84	1874	530	89,4	88	1920	538	91,7	92
	30	1777	568	84,8	80	1822	577	87,0	83	1867	586	89,1	87
	35	1714	619	81,8	75	1756	628	83,8	78	1799	638	85,9	82
	40	1631	675	77,8	68	1671	685	79,8	71	1711	695	81,7	75
	42	1591	699	75,9	65	1630	709	77,8	68	1669	720	79,7	71
	44	1536	719	73,3	61	1556	717	74,3	63	1576	715	75,2	64
	46	1415	691	67,5	53	1431	687	68,3	54	1441	681	68,8	55
C18	25	1925	559	91,9	41	1972	567	94,1	42	2019	575	96,4	44
	30	1871	609	89,3	38	1916	618	91,5	40	1961	628	93,7	42
	35	1802	665	86,0	36	1844	675	88,0	38	1887	685	90,1	39
	40	1710	726	81,6	33	1751	737	83,6	34	1791	748	85,6	36
	42	1666	753	79,5	31	1706	764	81,4	33	1746	776	83,4	34
	44	1571	753	75,0	28	1581	744	75,5	28	1590	734	75,9	29
	46	1406	698	67,1	23	1418	690	67,7	23	1422	676	67,9	24
C20	25	1996	571	95,2	43	2044	579	97,6	45	2093	588	100,0	47
	30	1943	624	92,7	41	1990	633	95,0	43	2037	642	97,3	45
	35	1875	682	89,5	39	1920	692	91,6	40	1965	701	93,8	42
	40	1787	746	85,2	35	1829	757	87,3	37	1871	768	89,4	39
	42	1744	775	83,2	34	1785	785	85,2	35	1827	796	87,2	37
	44	1677	793	80,0	32	1698	790	81,1	32	1719	786	82,1	33
	46	1544	762	73,7	27	1549	749	73,9	27	1555	736	74,3	28
C20	25	2049	597	97,8	45	2098	606	100,2	47	2148	615	102,6	49
	30	1993	654	95,1	43	2041	663	97,4	45	2089	673	99,8	47
	35	1922	716	91,7	40	1967	726	93,9	42	2013	736	96,1	44
	40	1827	785	87,2	37	1870	796	89,3	38	1913	807	91,4	40
	42	1782	815	85,0	35	1823	827	87,0	37	1865	838	89,1	38
	44	1704	830	81,3	33	1715	821	81,9	33	1725	810	82,4	33
	46	1532	774	73,1	27	1538	760	73,4	27	1543	744	73,7	27

NOTES

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

	Twout	Condenser Inlet Air Temperature (°C)											
		10				11				12			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1627	415	77,7	75	1667	421	79,7	78	1707	427	81,6	82
	30	1582	454	75,6	71	1620	460	77,5	74	1659	467	79,4	78
	35	1526	495	72,9	67	1563	502	74,7	70	1600	510	76,5	73
	40	1455	541	69,5	61	1490	548	71,2	64	1525	556	72,9	67
	42	1421	560	67,9	59	1455	568	69,6	61	1489	576	71,2	64
	44	1366	573	65,3	55	1374	566	65,7	55	1380	559	66,0	56
	46	1223	532	58,4	45	1235	528	59,1	46	1238	518	59,2	46
C15	25	1772	488	84,6	80	1816	496	86,8	84	1860	504	89,0	88
	30	1721	531	82,2	76	1763	539	84,3	80	1806	548	86,4	83
	35	1657	577	79,1	71	1697	586	81,1	74	1737	595	83,1	78
	40	1574	628	75,2	65	1612	638	77,1	68	1650	647	78,9	71
	42	1535	650	73,4	62	1560	654	74,6	64	1578	652	75,5	65
	44	1432	634	68,4	55	1451	633	69,4	56	1467	629	70,1	57
	46	1313	605	62,7	47	1318	595	63,0	47	1311	611	62,7	47
C16	25	1865	512	89,1	88	1911	520	91,3	92	1957	528	93,6	96
	30	1812	557	86,6	84	1857	566	88,8	87	1902	574	90,9	91
	35	1747	606	83,5	78	1789	615	85,5	82	1832	624	87,6	85
	40	1663	660	79,5	72	1703	669	81,4	75	1744	679	83,4	78
	42	1624	683	77,6	69	1650	686	78,9	71	1669	684	79,8	72
	44	1512	663	72,3	60	1536	663	73,4	62	1553	658	74,3	63
	46	1398	635	66,8	52	1419	633	67,8	54	1417	653	67,8	54
C17	25	1967	546	94,0	96	2014	555	96,3	100	2062	563	98,6	105
	30	1912	595	91,3	91	1957	604	93,6	95	2003	613	95,8	99
	35	1842	647	88,0	85	1885	657	90,1	89	1929	667	92,2	93
	40	1752	705	83,7	78	1792	716	85,7	81	1833	726	87,7	85
	42	1709	730	81,6	74	1736	735	83,0	77	1756	733	84,0	78
	44	1594	712	76,2	66	1612	709	77,1	67	1629	704	77,9	68
	46	1446	669	69,1	55	1457	662	69,7	56	1447	677	69,2	55
C18	25	2066	584	98,7	46	2114	593	101,0	48	2162	602	103,4	50
	30	2007	637	95,9	44	2053	647	98,1	46	2099	656	100,4	47
	35	1930	695	92,2	41	1974	705	94,4	42	2018	716	96,5	44
	40	1832	759	87,5	37	1873	770	89,5	39	1914	782	91,5	40
	42	1767	776	84,4	35	1780	771	85,1	35	1788	762	85,5	36
	44	1596	723	76,3	29	1613	718	77,1	30	1617	704	77,3	30
	46	1436	669	68,6	24	1427	684	68,2	24	1421	682	68,0	24
C20	25	2142	596	102,4	49	2192	605	104,8	51	2242	613	107,2	53
	30	2084	651	99,6	47	2132	661	101,9	49	2180	670	104,3	51
	35	2010	711	96,0	44	2056	722	98,3	46	2102	732	100,5	48
	40	1914	778	91,5	40	1957	789	93,6	42	2001	801	95,7	44
	42	1868	808	89,3	38	1897	811	90,7	40	1917	808	91,7	40
	44	1737	781	83,0	34	1763	781	84,3	35	1766	768	84,5	35
	46	1567	728	74,9	28	1582	721	75,6	29	1570	733	75,1	28
C20	25	2198	624	105,0	52	2249	633	107,5	54	2300	642	110,0	56
	30	2137	682	102,1	49	2185	692	104,5	51	2234	702	106,8	53
	35	2058	747	98,3	46	2105	757	100,6	48	2151	768	102,9	50
	40	1956	819	93,5	42	2000	830	95,6	43	2043	842	97,7	45
	42	1907	850	91,1	40	1929	851	92,2	41	1939	841	92,7	41
	44	1733	798	82,8	34	1751	792	83,7	34	1756	778	84,0	34
	46	1558	737	74,4	28	1572	728	75,2	28	1552	752	74,2	28

NOTES

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SS and EWAD~C-SL

	Twout	Condenser Inlet Air Temperature (°C)											
		13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1748	434	83,6	85	1790	440	85,7	89	1832	447	87,7	93
	30	1699	474	81,3	81	1739	481	83,2	85	1779	488	85,2	88
	35	1638	517	78,3	76	1675	525	80,2	79	1713	532	82,0	82
	40	1560	564	74,6	70	1596	573	76,4	72	1631	581	78,1	75
	42	1524	585	72,9	67	1540	585	73,7	68	1547	578	74,0	69
	44	1386	551	66,3	56	1399	547	67,0	57	1402	537	67,1	57
	46	1249	513	59,8	47	1260	507	60,3	47	1243	520	59,5	46
C15	25	1905	512	91,1	92	1950	520	93,3	96	1996	528	95,6	100
	30	1849	556	88,4	87	1892	565	90,6	90	1936	574	92,7	94
	35	1778	604	85,1	81	1819	614	87,1	84	1861	623	89,1	88
	40	1688	657	80,8	74	1727	667	82,7	77	1746	667	83,6	78
	42	1596	650	76,3	67	1613	647	77,2	68	1636	647	78,3	70
	44	1484	626	71,0	58	1492	619	71,4	59	1502	613	71,9	60
	46	1316	600	63,0	47	1326	593	63,5	48	1335	585	63,9	48
C16	25	2005	536	95,9	100	2052	544	98,2	105	2100	552	100,5	109
	30	1947	583	93,1	95	1993	592	95,4	99	2039	601	97,6	104
	35	1875	634	89,7	89	1919	643	91,8	93	1963	653	94,0	97
	40	1784	690	85,3	81	1825	700	87,3	85	1845	699	88,3	87
	42	1688	681	80,8	74	1706	677	81,6	75	1731	677	82,9	77
	44	1568	652	75,0	65	1591	651	76,1	66	1613	650	77,2	68
	46	1431	646	68,5	55	1456	647	69,7	56	1471	641	70,4	58
C17	25	2110	572	101,0	109	2159	580	103,3	114	2208	589	105,7	118
	30	2050	622	98,1	103	2096	632	100,3	108	2143	641	102,6	112
	35	1973	677	94,4	97	2017	687	96,5	101	2062	697	98,7	105
	40	1875	737	89,7	88	1916	748	91,7	92	1937	748	92,7	94
	42	1775	731	84,9	80	1794	727	85,9	81	1812	723	86,7	83
	44	1645	701	78,7	70	1657	695	79,3	71	1660	682	79,5	71
	46	1459	669	69,8	56	1466	658	70,2	57	1476	649	70,7	57
C18	25	2211	611	105,8	52	2260	621	108,1	54	2309	630	110,5	56
	30	2145	666	102,6	49	2192	676	104,9	51	2239	687	107,2	53
	35	2062	727	98,6	46	2106	737	100,8	48	2150	749	102,9	50
	40	1948	790	93,2	42	1969	789	94,2	42	1981	783	94,8	43
	42	1796	751	85,9	36	1801	739	86,2	36	1817	734	87,0	37
	44	1631	698	78,0	30	1640	688	78,5	30	1630	700	78,0	30
	46	1438	676	68,8	24	1447	665	69,2	24	1454	653	69,6	25
C20	25	2293	622	109,7	56	2344	631	112,2	58	2395	641	114,7	60
	30	2229	680	106,6	53	2278	690	109,0	55	2327	700	111,4	57
	35	2148	742	102,8	50	2194	753	105,0	51	2241	764	107,3	54
	40	2044	812	97,8	45	2088	824	99,9	47	2117	827	101,3	48
	42	1937	804	92,7	41	1956	799	93,6	42	1982	799	94,9	43
	44	1779	760	85,1	35	1786	748	85,5	36	1797	739	86,0	36
	46	1579	722	75,6	28	1591	712	76,1	29	1601	701	76,7	29
C20	25	2351	651	112,5	58	2403	661	115,0	61	2455	670	117,5	63
	30	2284	712	109,2	55	2333	723	111,7	57	2383	733	114,1	60
	35	2198	779	105,1	52	2245	791	107,4	54	2292	802	109,7	56
	40	2087	854	99,8	47	2131	866	102,0	49	2153	866	103,1	50
	42	1948	830	93,2	42	1956	817	93,6	42	1974	812	94,5	43
	44	1772	771	84,8	35	1774	754	84,9	35	1787	745	85,6	36
	46	1564	742	74,8	28	1574	730	75,3	28	1583	718	75,8	29

NOTES

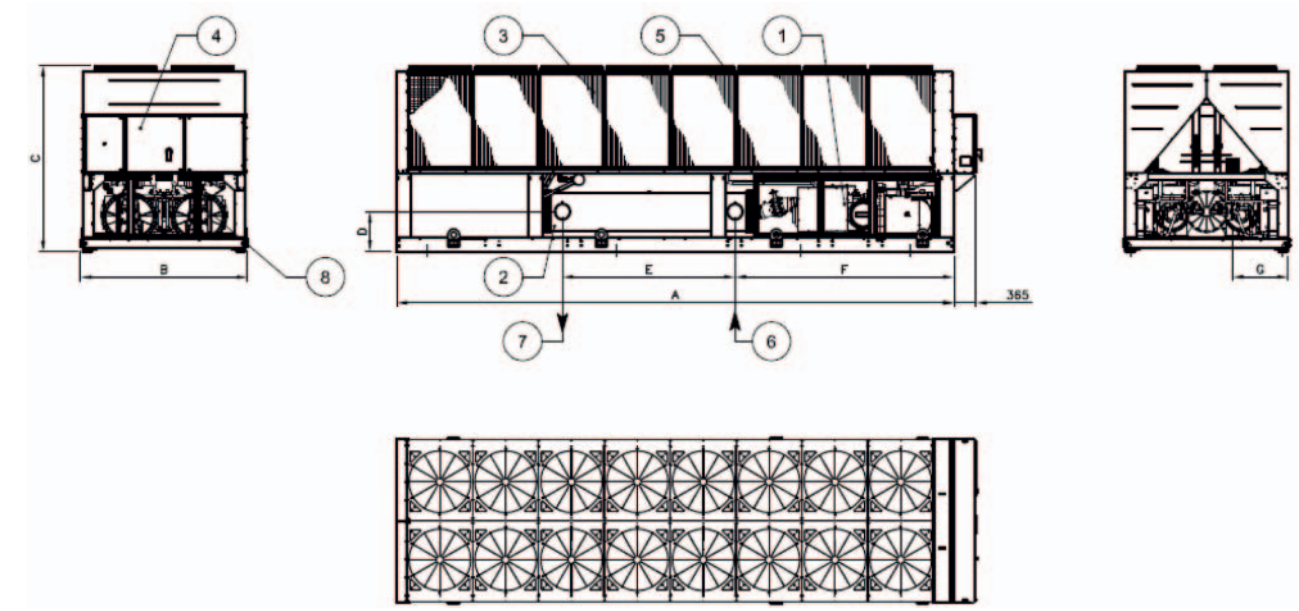
Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

SRC_1a-2a-3a-4a-5a-6a_Rev.01_1a_(8-8)

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

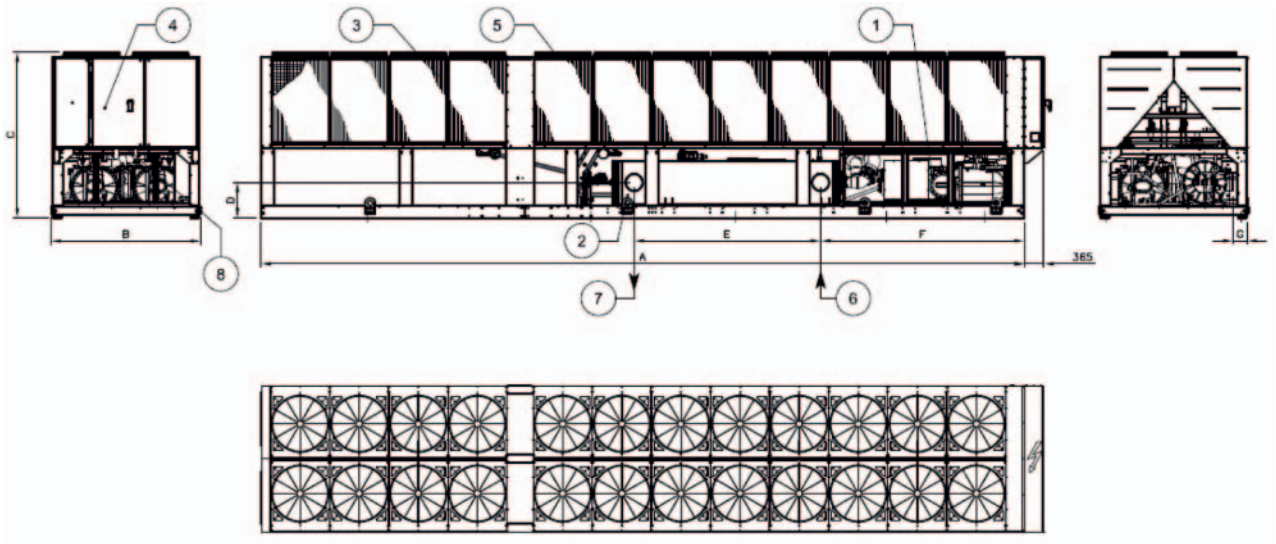
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (3 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-		Dimensions (mm)							Fans
Size	Size	A	B	C	D	E	F	G	
EWADC14÷C15C-SS/SL	EWADC13÷C14C-SR	10185	2285	2540	4440	2360	540	285	Nr 20
EWADC16÷C17C-SS/SL	EWADC15÷C16C-SR	11085	2285	2540	5340	2360	540	285	Nr 22
EWADC18C-SS/SL	EWADC17C-SR	11085	2285	2540	4780	2840	540	210	Nr 22
EWADC19÷C20C-SS/SL	EWADC18÷C19C-SR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC14C-XS/XL	EWADC14C-XR	11985	2285	2540	5680	2910	540	285	Nr 24
EWADC15÷C16C-XS/XL	EWADC15÷C16C-XR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC17C-XS/XL	EWADC17C-XR	12885	2285	2540	6580	2840	540	210	Nr 26
EWADC18C-XS/XL	EWADC18C-XR	13785	2285	2540	7480	2840	540	210	Nr 28
EWADC19C- XS/XL	EWADC19C-XR	14685	2285	2540	8380	2840	540	210	Nr 30
EWADH14÷H15C-XS/XL/XR		14685	2285	2285	8380	2840	540	210	Nr 30

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-SS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	dB(A)
650	73,9	76,0	78,8	78,0	73,9	69,4	59,8	50,7	**79,0**	**99,5**
740	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**100,0**
830	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**100,0**
910	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**100,9**
970	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,1**
C11	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,5**
C12	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,7**
C13	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
H14	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
C15	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,0**
C16	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,2**
C17	76,1	78,2	81,0	80,2	76,1	71,6	62,0	52,9	**81,2**	**103,3**
C18	76,4	78,5	81,3	80,5	76,4	71,9	62,3	53,2	**81,5**	**103,5**
C19	76,8	78,9	81,7	80,9	76,8	72,3	62,7	53,6	**81,9**	**103,7**
C20	76,8	78,9	81,7	80,9	76,8	72,3	62,7	53,6	**81,9**	**103,7**

EWAD~C-SL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
650	70,4	72,5	75,3	74,5	70,4	65,9	56,3	47,2	**75,5**	**96,0**
740	70,5	72,6	75,4	74,6	70,5	66,0	56,4	47,3	**75,6**	**96,1**
830	70,5	72,6	75,4	74,6	70,5	66,0	56,4	47,3	**75,6**	**96,1**
910	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,5**
970	71,5	73,6	76,4	75,6	71,5	67,0	57,4	48,3	**76,6**	**97,1**
C11	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**97,6**
C12	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,1**
C13	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,2**
H14	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,2**
C15	72,1	74,2	77,0	76,2	72,1	67,6	58,0	48,9	**77,2**	**99,1**
C16	72,2	74,3	77,1	76,3	72,2	67,7	58,1	49,0	**77,3**	**99,5**
C17	72,3	74,4	77,2	76,4	72,3	67,8	58,2	49,1	**77,4**	**99,5**
C18	72,8	74,9	77,7	76,9	72,8	68,3	58,7	49,6	**77,9**	**99,9**
C19	72,9	75,0	77,8	77,0	72,9	68,4	58,8	49,7	**78,0**	**101,0**
C20	72,9	75,0	77,8	77,0	72,9	68,4	58,8	49,7	**78,0**	**101,0**

EWAD~C-SR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
620	67,6	60,8	67,9	73,1	60,5	56,9	48,6	36,0	**71,0**	**91,5**
720	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
790	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
880	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**92,5**
920	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**93,0**
C10	69,2	62,4	69,5	74,7	62,1	58,5	50,2	37,6	**72,6**	**93,5**
C11	69,3	62,5	69,6	74,8	62,2	58,6	50,3	37,7	**72,7**	**93,8**
C12	69,4	62,6	69,7	74,9	62,3	58,7	50,4	37,8	**72,9**	**94,0**
H14	69,4	62,6	69,7	74,9	62,3	58,7	50,4	37,8	**72,9**	**94,0**
C13	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**94,8**
C14	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**94,9**
C15	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,1**
C16	69,7	62,9	70,0	75,2	62,6	59,0	50,7	38,1	**73,1**	**95,2**
C17	70,2	63,4	70,5	75,7	63,1	59,5	51,2	38,6	**73,6**	**95,7**
C18	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**95,8**
C19	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**95,8**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

NSL_1a-2b-3b-4a_Rev.03_1a

9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

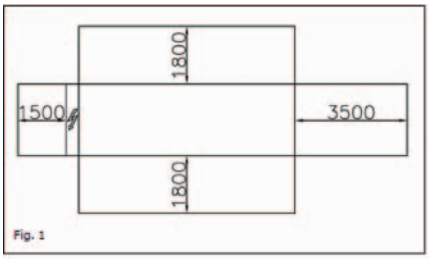


Fig. 1

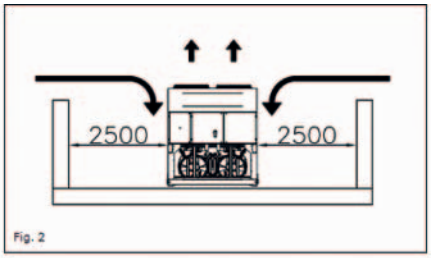


Fig. 2

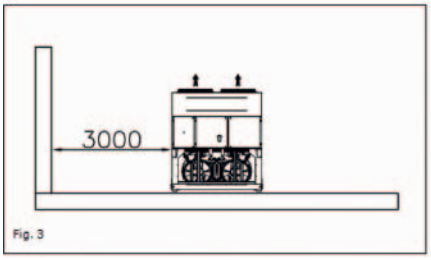


Fig. 3

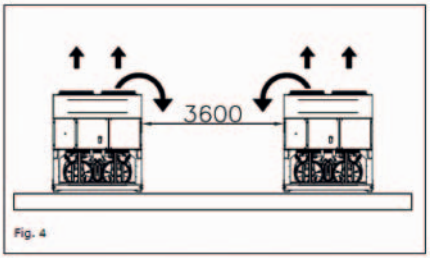


Fig. 4

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

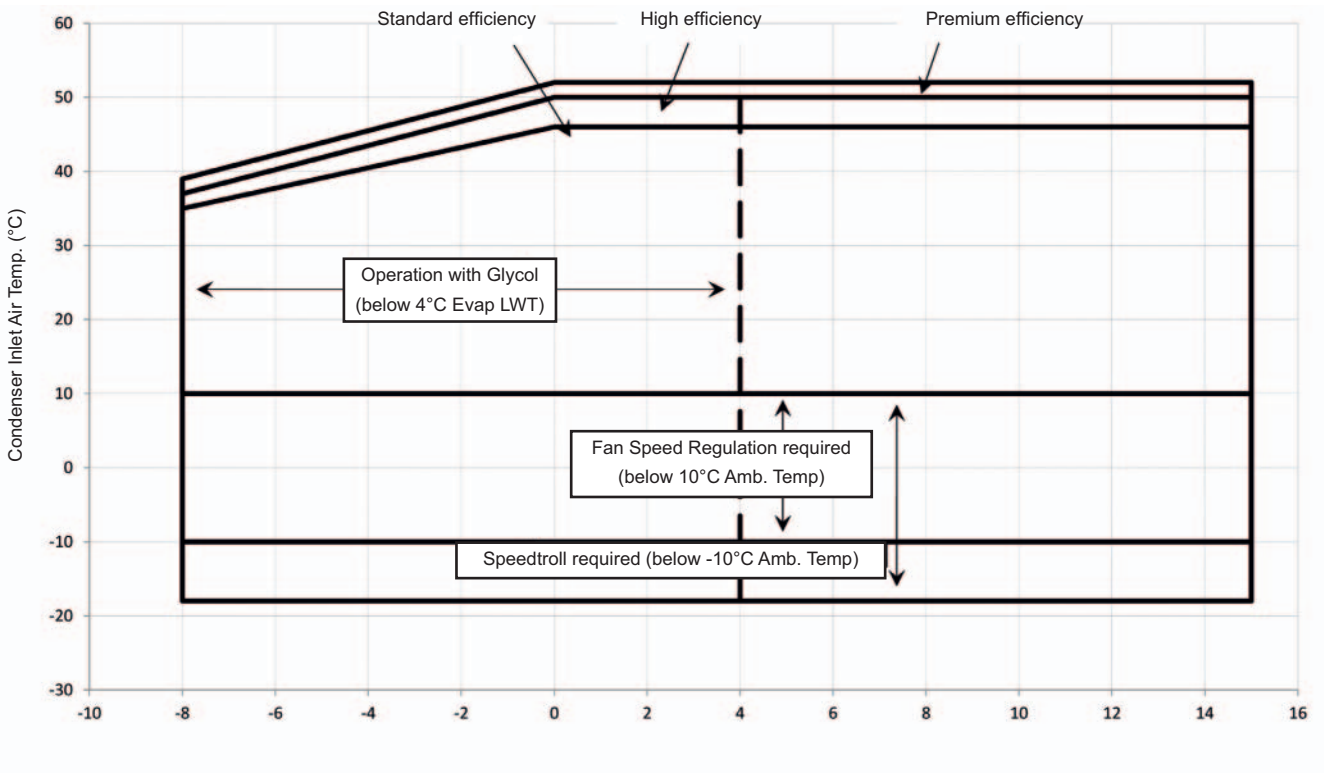
Storage The environment conditions have to be in the following limits:

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

INN_1a-2a_Rev.01_1a-2a

11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

EPD_1-2-3-4_Rev.00_1-4

13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

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TABLE OF CONTENTS

EWAD-C-SR

1 Features

- Wide capacity range: 16 sizes to cover a range from 619 to 1,833 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 46ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2-3 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 620C-SR	EWAD 720C-SR	EWAD 790C-SR	EWAD 880C-SR	EWAD 920C-SR	EWAD C10C-SR	EWAD C11C-SR	EWAD C12C-SR
Cooling capacity	Nom.			kW	619 (1)	715 (1)	789 (1)	876 (1)	922 (1)	1,020 (1)	1,112 (1)	1,270 (1)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5							
Power input	Cooling	Nom.		kW	223 (1)	273 (1)	314 (1)	331 (1)	369 (1)	394 (1)	416 (1)	456 (1)
EER					2.77 (1)	2.62 (1)	2.51 (1)	2.65 (1)	2.50 (1)	2.59 (1)	2.67 (1)	2.78 (1)
ESEER					4.08	3.96	3.98	3.99	4.00	3.96		4.10
IPLV					4.37	4.23	4.19	4.29	4.21	4.20	4.29	4.47
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,540							
		Width		mm	2,285							
		Depth		mm	6,185					7,085	7,985	8,885
Weight	Unit			kg	5,920	6,030	6,050	6,570	6,850	7,300	7,570	8,190
	Operation weight			kg	6,200	6,280	6,300	6,820	7,100	7,540	7,810	8,570
Water heat exchanger	Type				Single pass shell & tube							
	Water volume			l	266		251			243		386
	Nominal water flow	Cooling		l/s	29.5	34.1	37.6	41.8	44.0	48.7	53.1	60.6
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	43	50	48	58	63	60	69	50
	Insulation material				Closed cell							
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler							
Fan	Quantity				10			12		14	16	18
	Type				Direct propeller							
	Diameter			mm	800							
	Air flow rate	Nom.		l/s	41,007			49,209		57,410	65,611	73,813
	Speed			rpm	700							
Fan motor	Drive				DOL							
	Input	Cooling		W	7,800			9,400		11,000	12,500	14,100
Sound power level	Cooling	Nom.		dBA	91.5	92.0		92.5	93.0	93.5	93.8	94.0
Sound pressure level	Cooling	Nom.		dBA	71.0	71.5		72.0	72.5	72.6	72.7	72.9
Compressor	Type				Asymm single screw							
	Quantity				2							
	Oil	Charged volume		l	38			44	50			
Operation range	Water side	Cooling	Min.	ºCDB	-8							
			Max.	ºCDB	15							
	Air side	Cooling	Min.	ºCDB	-18							
			Max.	ºCDB	52							
Refrigerant	Type				R-134a							
	Circuits	Quantity			2							
Refrigerant circuit	Charge			kg	128			146	144	162	178	196
Piping connections	Evaporator water inlet/outlet (OD)				168.3mm							219.1mm
Safety devices	Item	01			High discharge pressure (pressure switch)							
		02			High discharge pressure (pressure transducer)							
		03			Low suction pressure (pressure transducer)							
		04			Compressor motor protection							
		05			High discharge temperature							
		06			Low oil pressure							
		07			Low pressure ratio							
		08			High oil filter pressure drop							
		09			Phase monitor							
		10			Emergency stop							
		11			Water freeze protection controller							

2 Specifications

2-1 Technical Specifications					EWAD H14C-SR	EWAD C13C-SR	EWAD C14C-SR	EWAD C15C-SR	EWAD C16C-SR	EWAD C17C-SR	EWAD C18C-SR	EWAD C19C-SR
Cooling capacity	Nom.			kW	1,321 (1)	1,367 (1)	1,471 (1)	1,556 (1)	1,623 (1)	1,714 (1)	1,795 (1)	1,833 (1)
Capacity control	Method				Stepless							
	Minimum capacity			%	12.5	7.0						
Power input	Cooling	Nom.		kW	495 (1)	518 (1)	577 (1)	603 (1)	647 (1)	702 (1)	718 (1)	758 (1)
EER					2.67 (1)	2.64 (1)	2.55 (1)	2.58 (1)	2.51 (1)	2.44 (1)	2.50 (1)	2.42 (1)
ESEER					3.98	3.90	3.87	3.90	3.83	3.78	3.81	3.75
IPLV					4.35	4.24	4.22	4.24	4.18	4.23	4.20	4.16
Casing	Colour				Ivory white							
	Material				Galvanized and painted steel sheet							
Dimensions	Unit	Height		mm	2,540							
		Width		mm	2,285							
		Depth		mm	8,885	10,185		11,085			11,985	
Weight	Unit			kg	8,190	10,750	10,770	11,150	11,210	11,680	12,040	
	Operation weight			kg	8,570	11,170		11,550	11,700	12,560	12,920	
Water heat exchanger	Type				Single pass shell & tube							
	Water volume			l	386	421	408		474	850		
	Nominal water flow	Cooling		l/s	63.0	65.2	70.2	74.2	77.4	81.8	85.6	87.5
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	54	45	57	63	69	33	36	37
	Insulation material				Closed cell							
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler							
Fan	Quantity				18	20		22			24	
	Type				Direct propeller							
	Diameter			mm	800							
	Air flow rate	Nom.		l/s	73,813	82,014		90,216			98,417	
	Speed			rpm	700							
Fan motor	Drive				DOL							
	Input	Cooling		W	14,100	15,700		17,300			18,800	
Sound power level	Cooling	Nom.		dBA	94.0	94.8	94.9	95.1	95.2	95.7	95.8	
Sound pressure level	Cooling	Nom.		dBA	72.9		73.0		73.1	73.6	73.7	
Compressor	Type				Asymm single screw							
	Quantity				2	3						
	Oil	Charged volume		l	50	75						
Operation range	Water side	Cooling	Min.	°CDB	-8							
			Max.	°CDB	15							
	Air side	Cooling	Min.	°CDB	-18							
			Max.	°CDB	52							
Refrigerant	Type				R-134a							
	Circuits	Quantity			2	3						
Refrigerant circuit	Charge			kg	196	260		261		275	305	
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm					273mm		
Safety devices	Item	01			High discharge pressure (pressure switch)							
		02			High discharge pressure (pressure transducer)							
		03			Low suction pressure (pressure transducer)							
		04			Compressor motor protection							
		05			High discharge temperature							
		06			Low oil pressure							
		07			Low pressure ratio							
		08			High oil filter pressure drop							
		09			Phase monitor							
		10			Emergency stop							
		11			Water freeze protection controller							

2 Specifications

2-2 Electrical Specifications				EWAD 620C-SR	EWAD 720C-SR	EWAD 790C-SR	EWAD 880C-SR	EWAD 920C-SR	EWAD C10C-SR	EWAD C11C-SR	EWAD C12C-SR
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	218	231	274		333		398	
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	218	274		333		398		451
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	597	642		906	953	1,007	1,010	1,055
	Nominal running current (RLA)	Cooling	A	371	450	518	548	609	654	694	755
	Maximum running current		A	462	531	575	639	698	767	837	895
	Max unit current for wires sizing		A	506	582	630	700	765	841	916	980
Fans	Nominal running current (RLA)		A	26			31		36	42	47

2-2 Electrical Specifications				EWAD H14C-SR	EWAD C13C-SR	EWAD C14C-SR	EWAD C15C-SR	EWAD C16C-SR	EWAD C17C-SR	EWAD C18C-SR	EWAD C19C-SR
Compressor	Phase			3~							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
	Maximum running current		A	451	333	398				451	
	Starting method			Wye-delta							
Compressor 2	Maximum running current		A	451	333		398			451	
Power supply	Phase			3~							
	Frequency		Hz	50							
	Voltage		V	400							
	Voltage range	Min.	%	-10							
		Max.	%	10							
Unit	Maximum starting current		A	1,068	1,241	1,292	1,344	1,346	1,389	1,434	1,447
	Nominal running current (RLA)	Cooling	A	811	857	954	1,002	1,075	1,158	1,179	1,238
	Maximum running current		A	949	1,052	1,116	1,186	1,250	1,303	1,362	1,415
	Max unit current for wires sizing		A	1,039	1,152	1,223	1,299	1,369	1,428	1,492	1,550
Fans	Nominal running current (RLA)		A	47	52		57			62	

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

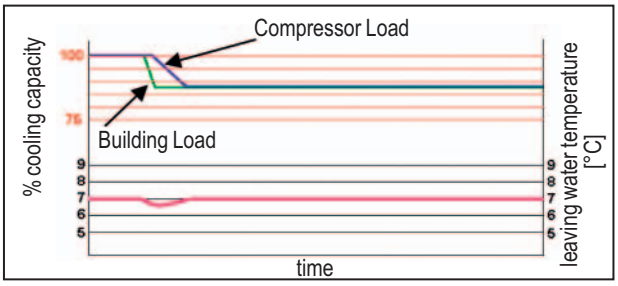
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

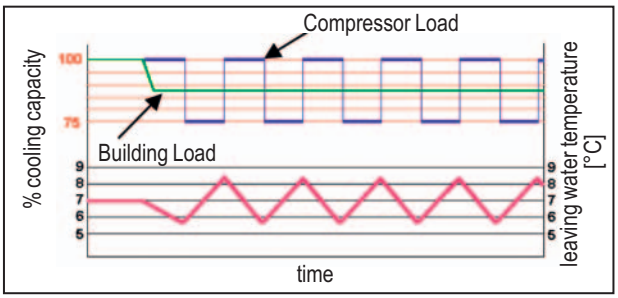
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

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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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.
Power Section The power section includes compressors and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
- High pressure (pressure switch).
- High pressure (transducer).
- Low pressure (transducer).
- Fans circuit breaker.
- 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.

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4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

GNC_1a-2a-3a-4a_Rev.01_4a

5 Nomenclature

5 - 1 Nomenclature

Nomenclature

Name	EWA	D	200	C	-	S	S
Digits	1 2 3	4	5 6 7	8	9	10	11

Machine type
EWA = Air-cooled chiller, cooling only
EWY = Air-cooled chiller, heat pump
EWL = Remote condenser chiller
ERA = Air cooled condensing unit
EWW = Water-cooled chiller, cooling only
EWC = Air-cooled chiller, cooling only with centrifugal fan
EWR = Air-cooled chiller, cooling only with heat recovery

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

Capacity class in kW (Cooling)
Approximation of cooling capacity

Model series
Letter A, B,… : major modification

Inverter
- = Non-inverter
Z = Inverter

Efficiency level
S = Standard efficiency
X = High efficiency
P = Premium efficiency
H = High ambient

Sound level
L = Low noise
S = Standard noise
R = Reduced noise
X = Extra low noise
C = Cabinet

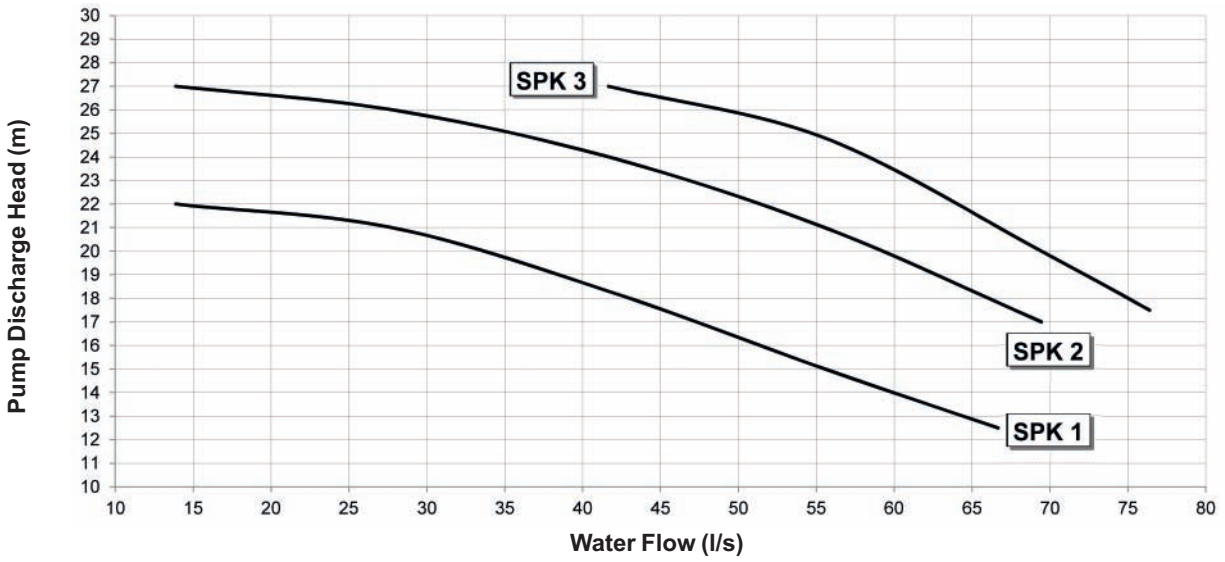
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

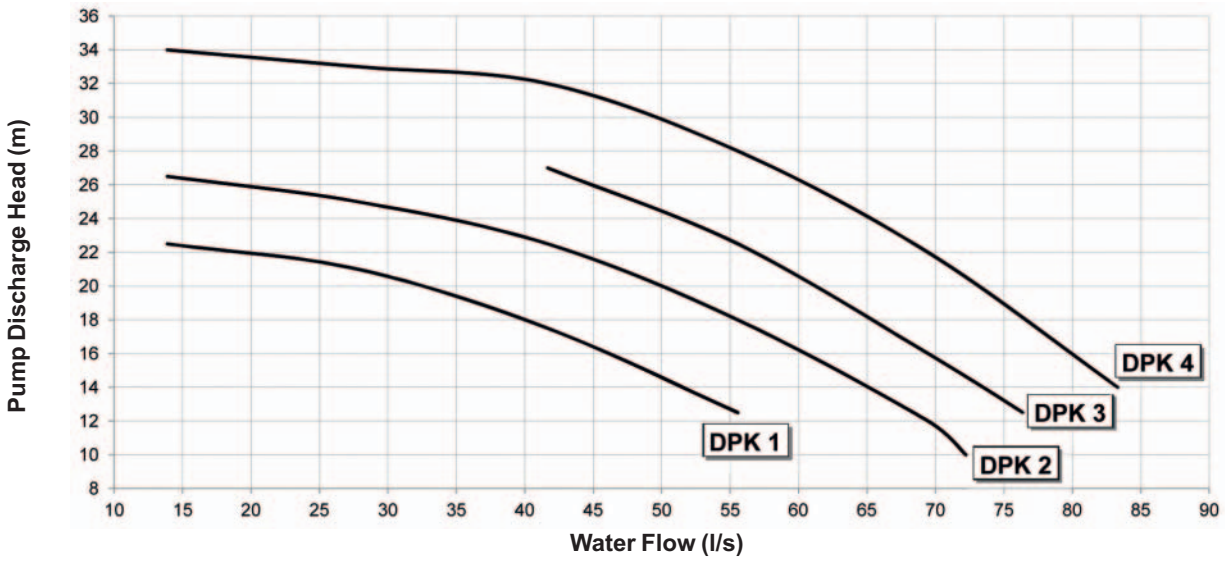
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

WPKTI_1a-2a-3a_Rev.03_1a

6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

WPKCM_1a-2a-3a_Rev.03_2a

7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		4				5				6			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	633	182	30,10	45	651	186	31,00	47	670	189	32,00	50
	30	602	197	28,70	41	620	200	29,50	43	638	204	30,40	45
	35	567	212	27,00	37	585	216	27,90	39	602	220	28,70	41
	38	544	221	25,90	34	561	226	26,70	36	578	230	27,50	38
	40	527	228	25,10	32	544	232	25,90	34	560	236	26,70	36
	43	501	238	23,80	29	516	243	24,60	31	532	247	25,40	33
	46	472	249	22,50	26	487	254	23,20	28	502	258	23,90	29
720	25	717	218	34,10	50	735	222	35,00	53	754	225	36,00	55
	30	694	238	33,00	48	712	242	33,90	50	730	246	34,80	52
	35	664	259	31,60	44	681	264	32,50	46	698	268	33,30	48
	38	642	274	30,60	41	658	278	31,40	43	674	283	32,20	45
	40	625	284	29,80	39	641	289	30,50	41	657	293	31,30	43
	43	580	286	27,60	34	590	286	28,10	36	601	288	28,60	37
	46	502	278	23,90	27	506	273	24,10	27	510	270	24,30	27
790	25	802	250	38,20	49	823	255	39,20	52	845	260	40,30	54
	30	772	273	36,80	46	792	278	37,80	48	812	283	38,70	50
	35	733	297	34,90	42	752	303	35,80	44	771	309	36,70	46
	38	704	313	33,60	39	722	319	34,40	41	740	325	35,30	43
	40	683	324	32,50	37	696	329	33,20	38	697	323	33,20	38
	43	599	304	28,50	29	602	299	28,70	29	605	294	28,90	30
	46	492	288	23,40	20	494	282	23,60	21	500	279	23,80	21
880	25	879	264	41,90	58	902	268	43,00	61	925	273	44,10	64
	30	851	288	40,50	55	873	293	41,60	57	895	298	42,70	60
	35	814	314	38,80	50	834	320	39,80	53	855	325	40,80	55
	38	786	331	37,50	47	806	337	38,40	50	826	343	39,40	52
	40	765	343	36,50	45	785	349	37,40	47	800	352	38,10	49
	43	704	342	33,60	39	718	344	34,20	40	730	344	34,80	42
	46	606	330	28,90	30	610	325	29,10	30	615	320	29,30	31
920	25	934	294	44,50	65	958	299	45,60	68	981	304	46,80	71
	30	902	320	42,90	61	924	326	44,00	64	946	332	45,10	66
	35	859	350	40,90	56	880	356	41,90	58	901	362	43,00	61
	38	828	370	39,40	52	848	376	40,40	54	868	382	41,40	57
	40	804	383	38,30	49	823	390	39,20	52	834	391	39,80	53
	43	713	364	33,90	40	722	363	34,40	41	726	357	34,60	41
	46	588	346	28,00	28	592	340	28,20	29	598	336	28,50	29
C10	25	1025	314	48,80	60	1052	319	50,10	63	1079	325	51,40	66
	30	992	343	47,30	56	1017	349	48,50	59	1043	355	49,70	62
	35	949	374	45,20	52	972	381	46,30	55	996	387	47,50	57
	38	916	395	43,70	49	939	402	44,80	51	962	409	45,90	54
	40	892	410	42,50	47	914	417	43,60	49	929	419	44,30	50
	43	820	407	39,10	40	833	407	39,70	41	849	409	40,50	43
	46	700	388	33,30	30	706	383	33,70	31	712	377	33,90	31
C11	25	1109	333	52,80	69	1138	338	54,20	72	1167	344	55,60	76
	30	1076	363	51,30	65	1104	369	52,60	68	1131	375	53,90	72
	35	1033	397	49,20	61	1059	403	50,50	64	1086	410	51,80	66
	38	1001	419	47,70	57	1027	426	48,90	60	1052	432	50,10	63
	40	977	434	46,50	55	1001	441	47,70	57	1026	449	48,90	60
	43	936	459	44,60	51	959	467	45,70	53	971	468	46,30	54
	46	818	432	38,90	40	822	425	39,20	40	826	418	39,40	41
C12	25	1266	363	60,30	50	1301	370	62,00	53	1336	376	63,70	55
	30	1226	397	58,40	47	1259	404	60,00	50	1293	411	61,70	52
	35	1174	433	55,90	44	1206	441	57,50	46	1238	448	59,00	48
	38	1137	457	54,10	41	1167	465	55,60	43	1198	473	57,10	45
	40	1108	474	52,80	39	1137	482	54,20	41	1167	490	55,70	43
	43	1052	497	50,10	36	1071	498	51,00	37	1089	498	51,90	38
	46	929	474	44,30	29	935	467	44,60	29	944	462	45,00	30

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		7				8				9			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	689	192	32,90	52	709	196	33,80	55	728	199	34,80	58
	30	656	207	31,30	48	674	211	32,20	50	693	215	33,10	53
	35	619	223	29,50	43	636	227	30,40	45	654	231	31,20	48
	38	595	234	28,40	40	611	238	29,20	42	628	242	30,00	44
	40	577	241	27,50	38	594	245	28,30	40	610	249	29,10	42
	43	548	252	26,20	35	565	256	26,90	36	581	261	27,70	38
	46	518	263	24,70	31	520	260	24,80	31	523	256	25,00	32
720	25	773	229	36,90	58	793	233	37,80	61	812	237	38,80	63
	30	748	250	35,70	55	766	254	36,60	57	785	259	37,50	60
	35	715	273	34,10	50	732	278	35,00	53	750	282	35,80	55
	38	691	288	33,00	47	707	293	33,80	49	724	298	34,60	52
	40	669	296	31,90	45	679	297	32,40	46	687	295	32,80	47
	43	610	287	29,10	38	615	285	29,30	38	620	282	29,60	39
	46	512	265	24,40	28	517	262	24,70	28	519	257	24,80	28
790	25	865	265	41,30	57	886	270	42,30	59	908	275	43,30	62
	30	832	289	39,70	53	852	294	40,70	55	872	299	41,60	57
	35	789	314	37,60	48	808	320	38,50	50	826	326	39,50	52
	38	758	331	36,20	45	771	335	36,80	46	772	329	36,80	46
	40	702	319	33,50	39	706	315	33,70	39	709	310	33,90	40
	43	607	288	29,00	30	613	286	29,30	31	601	296	28,70	29
	46	504	275	24,10	21	508	270	24,30	22	512	265	24,40	22
880	25	948	278	45,20	67	972	283	46,40	70	995	288	47,50	73
	30	917	303	43,70	63	939	308	44,80	65	961	314	45,90	68
	35	876	331	41,80	58	897	336	42,80	60	918	342	43,80	63
	38	846	348	40,40	54	866	354	41,30	57	884	359	42,20	59
	40	812	353	38,80	50	825	354	39,40	52	837	354	40,00	53
	43	738	342	35,20	42	745	339	35,50	43	748	334	35,70	44
	46	619	315	29,50	31	623	310	29,70	31	628	305	30,00	32
920	25	1005	310	48,00	74	1030	315	49,10	77	1054	321	50,30	81
	30	969	338	46,20	69	992	344	47,30	72	1015	350	48,50	75
	35	922	369	44,00	63	943	375	45,00	66	964	382	46,10	69
	38	888	389	42,40	59	908	396	43,30	62	923	400	44,10	64
	40	840	388	40,10	54	845	383	40,30	54	849	378	40,50	55
	43	729	350	34,80	42	736	347	35,10	42	738	340	35,20	43
	46	603	331	28,80	30	608	326	29,00	30	613	320	29,30	30
C10	25	1105	331	52,70	69	1133	336	54,10	72	1160	342	55,40	75
	30	1068	361	51,00	65	1094	367	52,20	68	1120	373	53,50	71
	35	1020	394	48,70	60	1044	401	49,80	62	1068	407	51,00	65
	38	985	415	47,00	56	1008	422	48,10	58	1028	428	49,10	60
	40	943	419	45,00	52	957	420	45,70	53	971	420	46,40	55
	43	856	405	40,80	43	863	401	41,20	44	857	407	40,90	44
	46	717	371	34,20	32	724	367	34,50	32	730	361	34,80	33
C11	25	1196	349	57,00	79	1225	355	58,50	83	1255	361	59,90	86
	30	1159	381	55,30	75	1187	388	56,70	78	1216	394	58,10	82
	35	1112	416	53,10	69	1139	423	54,30	73	1165	430	55,60	76
	38	1077	439	51,40	66	1103	447	52,60	68	1128	454	53,90	71
	40	1051	456	50,10	63	1075	463	51,30	65	1100	470	52,50	68
	43	978	464	46,70	55	985	458	47,00	56	990	452	47,30	56
	46	836	414	39,90	42	838	405	40,00	42	823	423	39,30	41
C12	25	1371	383	65,40	58	1407	389	67,20	61	1442	396	68,90	63
	30	1327	418	63,30	55	1361	425	65,00	57	1396	433	66,70	60
	35	1270	456	60,60	50	1303	464	62,20	53	1335	472	63,80	55
	38	1228	481	58,60	47	1260	489	60,10	50	1291	497	61,60	52
	40	1197	498	57,10	45	1227	507	58,60	47	1250	511	59,70	49
	43	1107	499	52,80	39	1124	498	53,70	41	1130	492	54,00	41
	46	937	464	44,70	29	944	458	45,10	30	951	451	45,40	30

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		10				11				12			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	747	203	35,70	60	766	206	36,60	63	786	210	37,60	66
	30	712	219	34,00	55	730	222	34,90	58	749	226	35,80	61
	35	672	235	32,10	50	690	240	33,00	52	708	244	33,90	55
	38	645	246	30,80	46	663	251	31,70	49	680	255	32,50	51
	40	627	254	29,90	44	644	258	30,80	46	661	263	31,60	48
	43	597	265	28,50	40	613	270	29,30	42	629	274	30,10	44
	46	528	253	25,20	32	532	250	25,40	33	532	244	25,50	33
720	25	832	242	39,70	66	852	246	40,70	69	872	250	41,70	72
	30	803	263	38,40	62	822	268	39,30	65	841	273	40,20	68
	35	767	287	36,60	57	785	292	37,50	60	802	297	38,40	62
	38	739	302	35,30	54	749	302	35,80	55	760	303	36,30	56
	40	699	297	33,40	49	709	297	33,90	50	718	296	34,30	51
	43	624	279	29,80	40	619	282	29,60	39	622	278	29,80	39
	46	525	254	25,10	29	523	257	25,00	29	526	253	25,20	29
790	25	929	280	44,40	64	950	285	45,40	67	972	291	46,50	70
	30	892	305	42,60	60	912	310	43,60	62	932	316	44,50	65
	35	845	332	40,40	54	863	338	41,30	57	882	344	42,20	59
	38	776	325	37,10	47	784	324	37,50	48	787	319	37,60	48
	40	716	308	34,20	40	718	303	34,30	41	725	300	34,70	41
	43	606	292	28,90	30	611	288	29,20	30	615	283	29,40	31
	46	515	260	24,60	22	521	257	24,90	23	523	250	25,00	23
880	25	1019	293	48,70	76	1043	298	49,80	79	1067	303	51,00	83
	30	984	319	47,00	71	1006	325	48,10	74	1029	330	49,20	77
	35	939	348	44,90	66	960	354	45,90	68	981	360	46,90	71
	38	897	360	42,80	60	909	360	43,40	62	921	360	44,00	63
	40	848	353	40,50	55	862	355	41,20	56	873	354	41,80	58
	43	743	338	35,50	43	747	334	35,70	44	751	328	35,90	44
	46	633	301	30,20	32	630	304	30,10	32	637	300	30,40	33
920	25	1078	326	51,50	84	1103	332	52,70	88	1128	338	53,90	91
	30	1038	356	49,60	79	1061	362	50,70	82	1084	369	51,80	85
	35	986	388	47,10	72	1007	395	48,10	75	1028	402	49,20	77
	38	929	397	44,40	64	933	392	44,60	65	938	387	44,80	66
	40	853	372	40,70	55	861	370	41,20	56	863	363	41,30	57
	43	725	354	34,60	41	731	349	34,90	42	736	343	35,20	42
	46	616	313	29,40	31	624	310	29,80	32	631	306	30,20	32
C10	25	1187	348	56,70	78	1215	354	58,10	82	1243	360	59,40	85
	30	1146	380	54,70	74	1172	386	56,00	77	1198	393	57,30	80
	35	1093	414	52,20	68	1117	421	53,40	70	1142	429	54,60	73
	38	1040	427	49,70	62	1055	427	50,40	63	1069	427	51,10	65
	40	987	422	47,20	56	1000	421	47,80	58	1010	419	48,30	59
	43	861	400	41,10	44	866	394	41,40	44	870	387	41,60	45
	46	725	364	34,60	32	732	360	35,00	33	736	352	35,20	33
C11	25	1285	367	61,40	90	1315	373	62,90	94	1345	379	64,30	98
	30	1244	400	59,50	85	1273	407	60,80	89	1302	414	62,30	93
	35	1192	437	57,00	79	1219	444	58,30	82	1246	452	59,60	86
	38	1154	461	55,10	74	1180	469	56,40	77	1206	476	57,70	81
	40	1125	478	53,80	71	1150	486	55,00	74	1157	482	55,30	75
	43	994	445	47,50	57	1005	442	48,00	58	1007	434	48,20	58
	46	831	418	39,70	41	837	412	40,00	42	843	405	40,30	42
C12	25	1478	403	70,60	66	1514	410	72,40	69	1550	417	74,10	72
	30	1430	440	68,30	62	1464	447	70,00	65	1498	455	71,60	68
	35	1368	480	65,30	58	1400	488	66,90	60	1433	496	68,50	63
	38	1322	506	63,20	54	1354	514	64,70	57	1382	521	66,10	59
	40	1269	512	60,60	50	1288	512	61,50	52	1306	512	62,50	53
	43	1136	485	54,30	41	1139	477	54,50	42	1150	473	55,00	42
	46	956	444	45,70	30	964	438	46,10	31	963	444	46,10	31

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		13				14				15			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
650	25	805	214	38,50	69	825	217	39,50	72	845	221	40,50	76
	30	768	230	36,70	64	787	234	37,60	66	806	238	38,60	69
	35	726	248	34,70	57	744	252	35,60	60	762	257	36,50	63
	38	698	259	33,40	54	715	264	34,20	56	733	268	35,10	59
	40	678	267	32,40	51	695	272	33,30	53	712	277	34,10	56
	43	632	271	30,20	45	633	266	30,30	45	638	263	30,50	46
	46	540	243	25,80	34	543	238	26,00	34	545	233	26,10	34
720	25	892	255	42,70	75	912	259	43,60	78	932	264	44,60	82
	30	860	277	41,10	71	879	282	42,10	73	898	287	43,00	76
	35	820	302	39,20	65	838	307	40,10	67	851	310	40,70	69
	38	770	303	36,80	58	780	302	37,30	59	789	302	37,80	60
	40	730	297	34,90	52	730	292	34,90	53	734	288	35,10	53
	43	627	274	30,00	40	632	271	30,20	41	636	267	30,40	41
	46	528	247	25,30	29	535	245	25,60	30	538	241	25,80	30
790	25	993	296	47,50	73	1015	302	48,60	76	1037	307	49,60	79
	30	952	322	45,50	67	972	328	46,50	70	992	334	47,50	73
	35	886	342	42,40	59	890	338	42,60	60	893	333	42,80	60
	38	789	313	37,70	48	796	311	38,10	49	797	304	38,10	49
	40	725	293	34,70	41	719	307	34,40	41	724	302	34,70	41
	43	618	278	29,60	31	625	276	29,90	32	627	269	30,00	32
	46	528	247	25,30	23	533	244	25,50	24	538	240	25,70	24
880	25	1091	308	52,20	86	1115	314	53,40	90	1140	319	54,60	93
	30	1052	336	50,30	81	1075	342	51,40	84	1098	348	52,60	87
	35	1002	366	48,00	74	1018	369	48,70	76	1031	369	49,40	78
	38	933	360	44,60	65	947	362	45,30	67	959	361	45,90	68
	40	879	351	42,00	58	881	345	42,20	59	879	351	42,10	58
	43	757	324	36,20	45	762	320	36,50	45	766	314	36,70	46
	46	639	294	30,60	33	644	289	30,80	33	648	284	31,00	34
920	25	1152	344	55,10	95	1177	351	56,30	99	1202	357	57,60	103
	30	1107	375	53,00	88	1130	382	54,10	92	1154	389	55,20	95
	35	1050	409	50,20	80	1060	410	50,70	82	1065	405	51,00	83
	38	941	381	45,00	66	949	378	45,40	67	951	371	45,50	67
	40	871	359	41,70	57	871	351	41,70	58	864	367	41,40	57
	43	740	337	35,40	43	749	335	35,90	44	752	328	36,00	44
	46	633	298	30,30	32	639	294	30,60	33	644	290	30,80	33
C10	25	1271	367	60,80	89	1299	373	62,20	92	1328	380	63,60	96
	30	1225	400	58,60	83	1251	407	59,90	86	1278	414	61,20	90
	35	1166	436	55,80	76	1185	439	56,70	78	1200	440	57,40	80
	38	1086	429	51,90	67	1099	429	52,60	68	1116	430	53,40	70
	40	1017	415	48,60	59	1023	410	49,00	60	1016	414	48,70	59
	43	877	382	41,90	46	882	377	42,20	46	887	371	42,50	47
	46	742	347	35,50	34	747	341	35,80	34	752	335	36,00	35
C11	25	1376	386	65,80	102	1407	392	67,30	106	1438	399	68,80	111
	30	1331	421	63,70	96	1360	428	65,10	100	1390	435	66,50	104
	35	1274	459	60,90	89	1301	466	62,30	93	1329	474	63,60	96
	38	1232	484	58,90	84	1258	492	60,20	87	1278	496	61,20	90
	40	1163	477	55,60	76	1168	471	55,90	76	1172	464	56,10	77
	43	1016	430	48,60	59	1017	421	48,70	59	1006	439	48,20	58
	46	847	397	40,50	43	858	394	41,00	44	861	385	41,20	44
C12	25	1586	424	75,90	75	1623	431	77,70	79	1659	439	79,40	82
	30	1532	463	73,30	71	1567	471	75,00	74	1602	479	76,70	77
	35	1465	505	70,10	65	1497	513	71,70	68	1530	522	73,30	71
	38	1401	522	67,00	60	1419	522	67,90	62	1437	522	68,80	63
	40	1328	515	63,60	55	1333	508	63,80	55	1342	503	64,20	56
	43	1145	476	54,80	42	1154	471	55,20	43	1158	463	55,50	43
	46	969	436	46,40	31	974	428	46,60	31	982	422	47,00	32

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		4				5				6			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1324	392	63,10	54	1360	399	64,80	57	1396	406	66,60	60
	30	1279	429	60,90	51	1314	437	62,60	53	1349	444	64,30	56
	35	1222	470	58,20	47	1254	478	59,80	49	1287	486	61,40	52
	38	1180	497	56,20	44	1211	505	57,70	46	1242	513	59,20	48
	40	1149	516	54,70	42	1179	524	56,20	44	1208	533	57,60	46
	43	1081	538	51,50	38	1090	532	52,00	38	1098	526	52,40	39
	46	919	486	43,80	28	923	477	44,00	28	935	472	44,60	29
C13	25	1363	413	64,90	45	1399	420	66,70	47	1436	428	68,50	49
	30	1321	451	62,90	42	1356	459	64,60	44	1391	467	66,40	47
	35	1267	493	60,40	39	1300	501	62,00	41	1334	509	63,60	43
	38	1227	520	58,40	37	1259	528	60,00	39	1291	537	61,50	41
	40	1196	539	57,00	35	1227	548	58,50	37	1258	557	60,00	39
	43	1130	559	53,80	32	1153	563	55,00	33	1176	566	56,10	34
	46	1012	543	48,20	26	1012	547	48,30	26	1019	539	48,60	27
C14	25	1482	460	70,60	58	1521	468	72,50	61	1560	476	74,40	64
	30	1431	501	68,20	54	1469	510	70,00	57	1506	519	71,80	60
	35	1366	547	65,10	50	1401	557	66,80	52	1436	567	68,50	55
	38	1318	578	62,80	47	1351	588	64,40	49	1384	598	66,00	51
	40	1281	599	61,00	45	1313	609	62,60	47	1341	618	63,90	48
	43	1171	593	55,80	38	1187	590	56,60	39	1204	589	57,40	40
	46	993	566	47,30	28	999	556	47,60	28	1007	549	48,00	29
C15	25	1563	481	74,40	64	1604	489	76,40	67	1646	498	78,50	70
	30	1511	525	72,00	60	1550	534	73,90	63	1590	543	75,80	66
	35	1445	573	68,80	55	1481	583	70,60	58	1519	593	72,40	61
	38	1395	605	66,50	52	1431	615	68,20	54	1466	625	69,90	57
	40	1358	627	64,70	49	1392	638	66,40	52	1422	646	67,80	54
	43	1244	620	59,30	42	1261	617	60,10	43	1277	612	60,90	44
	46	1079	604	51,40	33	1094	599	52,10	34	1112	597	53,00	35
C16	25	1637	515	78,00	70	1679	524	80,00	73	1721	533	82,10	77
	30	1582	562	75,40	66	1622	572	77,30	69	1662	582	79,30	72
	35	1511	614	72,00	60	1548	625	73,80	63	1585	636	75,60	66
	38	1457	649	69,40	57	1493	660	71,20	59	1529	671	72,90	62
	40	1417	673	67,50	54	1452	684	69,20	56	1476	690	70,40	58
	43	1294	664	61,60	46	1311	662	62,50	47	1324	657	63,10	48
	46	1085	622	51,70	33	1095	615	52,20	34	1107	608	52,80	35
C17	25	1743	557	83,00	34	1786	567	85,10	35	1829	577	87,20	37
	30	1680	609	80,00	32	1722	620	82,10	33	1763	631	84,10	35
	35	1598	667	76,10	29	1636	679	78,00	30	1675	690	79,90	32
	38	1536	705	73,20	27	1574	717	75,00	28	1611	729	76,80	29
	40	1490	731	71,00	25	1510	734	72,00	26	1521	727	72,60	27
	43	1300	678	61,90	20	1308	667	62,30	20	1320	659	63,00	21
	46	1073	641	51,10	14	1079	628	51,40	14	1090	620	52,00	15
C18	25	1812	568	86,30	36	1857	578	88,50	38	1902	587	90,70	40
	30	1752	623	83,50	34	1795	633	85,60	36	1838	644	87,60	37
	35	1673	683	79,70	31	1713	695	81,70	33	1754	706	83,60	34
	38	1613	723	76,80	29	1653	735	78,80	31	1692	747	80,70	32
	40	1567	751	74,60	28	1606	764	76,50	29	1627	764	77,60	30
	43	1420	733	67,70	23	1433	726	68,30	24	1442	714	68,80	24
	46	1188	682	56,60	17	1195	670	57,00	17	1206	660	57,50	17
C19	25	1859	597	88,60	38	1904	607	90,80	40	1950	618	93,00	41
	30	1796	656	85,50	36	1839	667	87,60	37	1882	678	89,70	39
	35	1712	722	81,50	33	1752	734	83,50	34	1792	746	85,50	36
	38	1647	765	78,50	31	1688	778	80,40	32	1726	790	82,30	33
	40	1598	795	76,10	29	1637	808	78,00	30	1650	803	78,70	31
	43	1411	750	67,20	23	1421	737	67,70	23	1429	723	68,10	24
	46	1167	702	55,60	16	1175	689	56,00	17	1188	681	56,70	17

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		7				8				9			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1431	413	68,30	62	1467	420	70,00	65	1503	427	71,80	68
	30	1383	452	66,00	59	1417	460	67,70	61	1452	468	69,30	64
	35	1321	495	63,00	54	1354	503	64,60	57	1386	512	66,20	59
	38	1273	522	60,80	51	1305	531	62,30	53	1338	540	63,90	55
	40	1238	541	59,10	48	1269	551	60,60	50	1285	552	61,40	52
	43	1105	518	52,70	39	1111	510	53,00	40	1116	500	53,30	40
	46	915	484	43,70	28	925	479	44,20	29	928	468	44,30	29
C13	25	1473	435	70,30	52	1511	442	72,10	54	1549	450	74,00	57
	30	1427	474	68,10	49	1463	482	69,80	51	1499	491	71,60	53
	35	1367	518	65,20	45	1401	526	66,90	47	1435	535	68,50	49
	38	1323	546	63,10	43	1355	555	64,70	44	1388	564	66,30	46
	40	1289	566	61,50	41	1314	571	62,70	42	1338	575	63,90	44
	43	1199	570	57,20	36	1221	572	58,30	37	1231	569	58,80	37
	46	1026	531	49,00	27	1033	523	49,30	27	1043	518	49,80	28
C14	25	1600	485	76,40	67	1641	494	78,30	70	1681	503	80,30	73
	30	1544	529	73,70	62	1582	538	75,50	65	1620	548	77,40	68
	35	1471	577	70,20	57	1506	587	71,90	60	1542	597	73,60	62
	38	1418	608	67,70	54	1452	619	69,30	56	1486	629	70,90	58
	40	1358	617	64,80	50	1373	613	65,50	51	1389	611	66,40	52
	43	1218	585	58,10	41	1224	577	58,40	41	1232	569	58,80	42
	46	1018	543	48,60	30	1025	534	48,90	30	1033	526	49,40	30
C15	25	1688	506	80,50	73	1730	515	82,60	77	1773	524	84,70	80
	30	1630	553	77,80	69	1670	562	79,70	72	1711	572	81,70	75
	35	1556	603	74,20	63	1594	613	76,10	66	1631	624	77,90	69
	38	1502	636	71,70	59	1538	647	73,40	62	1574	658	75,20	65
	40	1441	645	68,70	55	1454	638	69,40	56	1471	635	70,30	57
	43	1293	607	61,70	45	1313	607	62,70	47	1327	601	63,40	48
	46	1125	592	53,70	35	1131	582	54,00	36	1138	573	54,40	36
C16	25	1764	542	84,20	80	1807	552	86,20	84	1850	561	88,40	87
	30	1703	592	81,20	75	1743	602	83,20	78	1784	613	85,20	82
	35	1623	647	77,40	69	1661	658	79,30	72	1699	669	81,10	75
	38	1565	682	74,70	65	1601	694	76,40	67	1632	703	77,90	70
	40	1495	689	71,30	60	1514	687	72,30	61	1532	685	73,20	62
	43	1331	647	63,50	48	1340	639	64,00	49	1351	631	64,50	50
	46	1115	598	53,20	35	1125	590	53,70	36	1122	591	53,60	36
C17	25	1872	587	89,30	39	1916	597	91,50	40	1960	607	93,60	42
	30	1804	642	86,10	36	1845	653	88,10	38	1886	664	90,10	39
	35	1714	702	81,80	33	1753	715	83,70	34	1791	727	85,50	36
	38	1648	742	78,60	31	1673	748	79,90	32	1690	746	80,70	32
	40	1532	719	73,10	27	1541	709	73,50	27	1548	698	73,90	27
	43	1329	648	63,40	21	1342	642	64,10	21	1314	662	62,80	20
	46	1101	611	52,50	15	1110	600	53,00	15	1123	593	53,60	15
C18	25	1947	597	92,90	41	1993	607	95,10	43	2038	617	97,30	45
	30	1881	654	89,70	39	1924	665	91,80	40	1968	676	94,00	42
	35	1795	718	85,60	36	1835	730	87,60	37	1876	742	89,60	39
	38	1731	760	82,60	33	1770	772	84,50	35	1803	781	86,10	36
	40	1648	762	78,60	31	1668	758	79,60	31	1687	754	80,60	32
	43	1456	707	69,50	25	1469	699	70,10	25	1452	707	69,30	24
	46	1219	652	58,10	18	1218	653	58,10	18	1228	642	58,60	18
C19	25	1996	628	95,20	43	2042	638	97,50	45	2089	649	99,80	47
	30	1926	689	91,90	41	1969	701	94,00	42	2013	712	96,10	44
	35	1833	758	87,50	37	1874	770	89,40	39	1915	783	91,40	40
	38	1765	803	84,20	35	1804	816	86,10	36	1834	825	87,60	37
	40	1662	794	79,30	31	1673	783	79,80	31	1682	771	80,30	32
	43	1445	716	68,90	24	1460	709	69,70	25	1431	726	68,30	24
	46	1201	672	57,30	17	1212	661	57,80	18	1221	649	58,30	18

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

	Twout	Condenser Inlet Air Temperature (°C)											
		10				11				12			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1539	434	73,50	71	1576	442	75,30	74	1612	450	77,10	78
	30	1486	475	71,00	67	1520	484	72,70	70	1555	492	74,40	73
	35	1418	520	67,80	62	1451	529	69,30	64	1483	538	70,90	67
	38	1369	549	65,40	58	1400	559	66,90	60	1423	564	68,10	62
	40	1293	545	61,80	52	1300	538	62,10	53	1305	530	62,40	53
	43	1127	496	53,90	41	1130	485	54,00	41	1140	480	54,50	42
	46	936	462	44,70	29	943	454	45,10	30	957	451	45,70	30
C13	25	1587	458	75,80	59	1626	465	77,70	62	1664	473	79,60	65
	30	1535	499	73,40	56	1572	507	75,10	58	1609	516	76,90	61
	35	1469	544	70,20	51	1503	553	71,90	54	1538	563	73,50	56
	38	1420	574	67,90	48	1448	580	69,20	50	1474	584	70,50	52
	40	1363	579	65,10	45	1387	582	66,30	46	1411	586	67,50	48
	43	1240	563	59,20	38	1237	564	59,10	38	1244	557	59,50	38
	46	1047	507	50,00	28	1056	501	50,50	28	1048	514	50,10	28
C14	25	1722	512	82,30	76	1763	521	84,30	80	1804	530	86,30	83
	30	1658	558	79,20	71	1697	568	81,10	74	1736	578	83,00	77
	35	1578	608	75,40	65	1614	619	77,10	68	1650	629	78,90	71
	38	1498	626	71,60	59	1515	624	72,40	61	1532	622	73,30	62
	40	1408	610	67,30	53	1423	606	68,00	54	1440	604	68,90	55
	43	1220	582	58,30	41	1229	574	58,70	42	1239	567	59,30	42
	46	1029	525	49,20	30	1041	519	49,80	31	1046	508	50,00	31
C15	25	1816	534	86,70	84	1859	543	88,90	87	1903	553	91,00	91
	30	1751	582	83,70	78	1792	592	85,70	82	1833	603	87,70	85
	35	1669	635	79,80	72	1708	646	81,60	75	1746	657	83,50	78
	38	1588	654	75,90	66	1606	651	76,80	67	1624	648	77,70	69
	40	1494	636	71,40	59	1511	631	72,20	60	1526	626	73,00	61
	43	1326	622	63,30	48	1345	620	64,30	49	1363	617	65,20	50
	46	1144	563	54,70	37	1158	558	55,40	37	1162	546	55,60	38
C16	25	1894	571	90,50	91	1937	581	92,60	95	1981	592	94,70	99
	30	1825	623	87,20	85	1866	634	89,20	89	1908	645	91,20	93
	35	1737	681	83,00	78	1775	692	84,90	81	1814	704	86,70	85
	38	1651	702	78,90	71	1670	701	79,80	73	1688	698	80,70	74
	40	1549	682	74,00	64	1565	678	74,80	65	1578	673	75,50	66
	43	1339	646	64,00	49	1348	636	64,40	50	1355	626	64,80	50
	46	1127	578	53,80	36	1139	571	54,40	37	1150	564	55,00	37
C17	25	2004	618	95,70	44	2048	629	97,90	45	2092	640	100,10	47
	30	1927	676	92,10	41	1969	687	94,10	42	2010	699	96,10	44
	35	1829	739	87,40	37	1868	752	89,30	38	1906	765	91,20	40
	38	1696	735	81,00	32	1708	727	81,60	33	1715	716	82,00	33
	40	1561	690	74,60	28	1569	680	75,00	28	1579	671	75,50	28
	43	1326	654	63,30	21	1336	645	63,90	21	1346	634	64,30	21
	46	1129	581	54,00	16	1144	574	54,70	16	1147	560	54,80	16
C18	25	2085	628	99,60	47	2131	638	101,90	49	2178	649	104,10	51
	30	2011	687	96,10	44	2055	699	98,20	46	2099	711	100,40	47
	35	1917	754	91,60	40	1957	766	93,60	42	1999	779	95,60	43
	38	1817	774	86,80	37	1843	776	88,10	38	1862	772	89,00	38
	40	1701	748	81,30	33	1715	741	82,00	33	1721	728	82,30	33
	43	1462	697	69,90	25	1475	689	70,50	25	1483	678	70,90	25
	46	1237	631	59,10	18	1250	623	59,80	19	1256	610	60,10	19
C19	25	2136	660	102,00	49	2183	671	104,30	51	2230	683	106,60	53
	30	2057	724	98,30	46	2101	737	100,40	48	2146	749	102,60	49
	35	1956	796	93,40	42	1997	809	95,40	43	2038	822	97,40	45
	38	1835	808	87,70	37	1855	805	88,70	38	1864	793	89,10	38
	40	1689	758	80,70	32	1706	752	81,50	33	1710	736	81,80	33
	43	1444	717	69,00	24	1456	708	69,60	25	1467	697	70,20	25
	46	1229	636	58,70	18	1245	630	59,50	19	1250	614	59,80	19

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-SR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C)											
		13				14				15			
		Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
H14	25	1650	458	78,90	81	1687	466	80,70	84	1725	474	82,60	88
	30	1590	500	76,10	76	1625	509	77,80	79	1661	518	79,50	82
	35	1516	547	72,50	70	1548	556	74,10	72	1581	566	75,70	75
	38	1430	558	68,40	63	1436	550	68,70	63	1441	542	69,00	64
	40	1319	527	63,10	54	1322	517	63,30	54	1334	513	63,90	55
	43	1125	495	53,80	41	1133	488	54,20	41	1141	480	54,60	42
	46	962	441	46,00	31	965	431	46,20	31	976	426	46,70	32
C13	25	1704	482	81,50	67	1743	490	83,40	70	1783	498	85,30	73
	30	1646	525	78,70	63	1683	534	80,60	66	1721	543	82,40	69
	35	1573	572	75,20	58	1608	582	76,90	61	1643	592	78,60	63
	38	1499	588	71,70	53	1524	592	72,90	55	1549	595	74,20	57
	40	1437	591	68,80	50	1455	591	69,60	51	1464	585	70,10	51
	43	1256	552	60,10	39	1260	542	60,30	39	1271	536	60,80	40
	46	1055	505	50,50	28	1063	498	50,90	29	1071	489	51,30	29
C14	25	1846	540	88,30	86	1888	550	90,30	90	1930	560	92,40	94
	30	1775	588	84,90	81	1814	599	86,80	84	1854	609	88,70	87
	35	1686	640	80,70	73	1710	645	81,80	75	1728	643	82,70	77
	38	1554	623	74,30	63	1569	619	75,10	65	1584	615	75,80	66
	40	1448	597	69,30	56	1458	591	69,80	57	1454	593	69,60	56
	43	1245	557	59,60	43	1254	549	60,00	43	1260	539	60,30	44
	46	1056	501	50,50	32	1065	494	51,00	32	1073	485	51,30	33
C15	25	1947	563	93,10	95	1991	573	95,30	99	2035	583	97,40	103
	30	1875	613	89,70	89	1916	624	91,70	92	1958	635	93,80	96
	35	1785	668	85,40	81	1811	672	86,70	84	1830	670	87,60	85
	38	1648	649	78,80	70	1665	644	79,70	72	1680	639	80,40	73
	40	1548	625	74,00	63	1569	624	75,10	65	1562	639	74,80	64
	43	1374	610	65,80	51	1382	600	66,10	51	1387	589	66,40	52
	46	1174	539	56,20	38	1181	531	56,50	39	1192	523	57,00	39
C16	25	2026	602	96,90	103	2070	613	99,10	107	2115	624	101,20	112
	30	1949	657	93,20	96	1991	668	95,30	100	2033	680	97,30	104
	35	1853	716	88,60	88	1879	721	89,90	90	1898	719	90,90	92
	38	1706	695	81,60	76	1722	691	82,40	77	1742	690	83,40	79
	40	1583	661	75,70	66	1593	654	76,20	67	1587	670	76,00	67
	43	1365	617	65,30	51	1373	606	65,70	51	1374	609	65,80	51
	46	1157	552	55,30	38	1165	543	55,80	38	1173	533	56,20	39
C17	25	2137	651	102,20	49	2182	663	104,40	51	2227	675	106,60	53
	30	2052	712	98,20	46	2094	724	100,20	47	2136	737	102,20	49
	35	1926	766	92,10	41	1942	763	92,90	41	1950	753	93,30	42
	38	1727	709	82,60	33	1731	695	82,90	34	1746	689	83,60	34
	40	1592	664	76,20	29	1579	674	75,60	28	1577	674	75,50	28
	43	1353	622	64,70	22	1366	614	65,40	22	1375	603	65,80	22
	46	1159	552	55,40	16	1170	544	56,00	17	1176	532	56,30	17
C18	25	2225	660	106,40	53	2272	671	108,70	55	2320	683	111,00	57
	30	2143	722	102,50	49	2188	735	104,70	51	2232	747	106,90	53
	35	2040	792	97,60	45	2074	801	99,30	47	2094	798	100,30	47
	38	1879	767	89,90	39	1889	757	90,40	39	1903	750	91,10	40
	40	1733	720	82,90	34	1747	713	83,60	34	1731	720	82,90	34
	43	1494	667	71,50	26	1491	665	71,30	26	1505	658	72,10	26
	46	1268	600	60,60	19	1281	593	61,30	20	1282	576	61,40	20
C19	25	2277	694	108,90	55	2325	706	111,30	57	2373	718	113,60	59
	30	2190	762	104,80	51	2235	774	106,90	53	2279	788	109,10	55
	35	2079	836	99,50	47	2110	844	101,00	48	2120	835	101,50	48
	38	1871	780	89,50	39	1876	765	89,80	39	1892	759	90,60	39
	40	1724	728	82,50	33	1737	720	83,10	34	1711	737	81,90	33
	43	1477	685	70,60	25	1484	671	71,00	26	1501	665	71,90	26
	46	1264	606	60,50	19	1277	598	61,10	19	1276	580	61,10	19

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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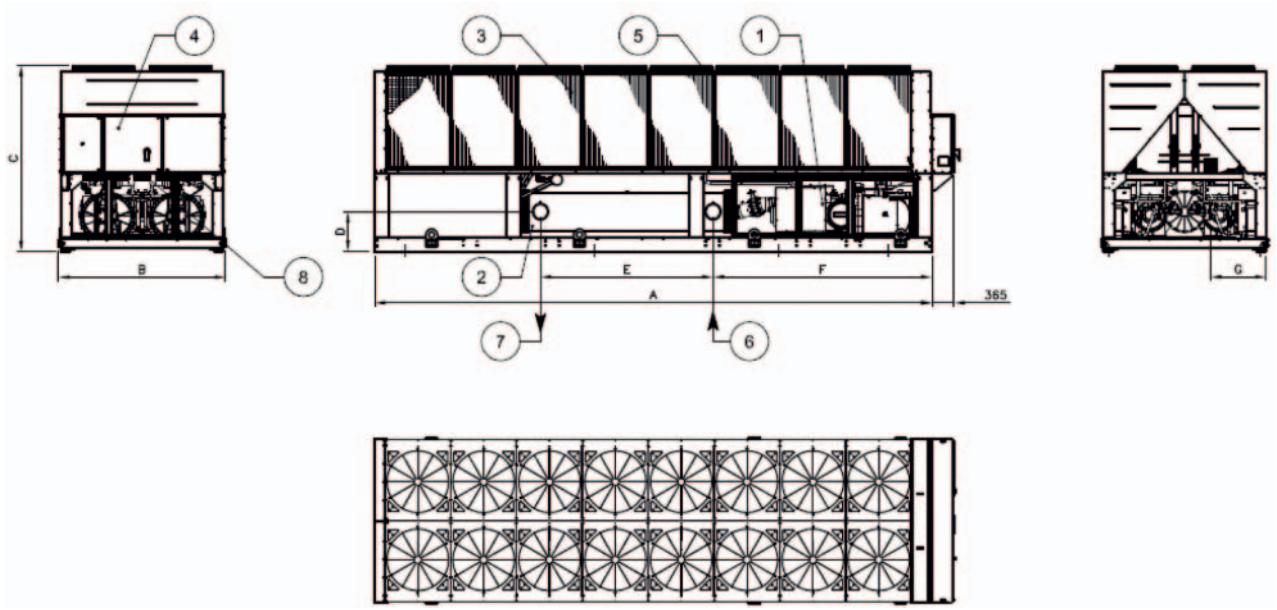
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

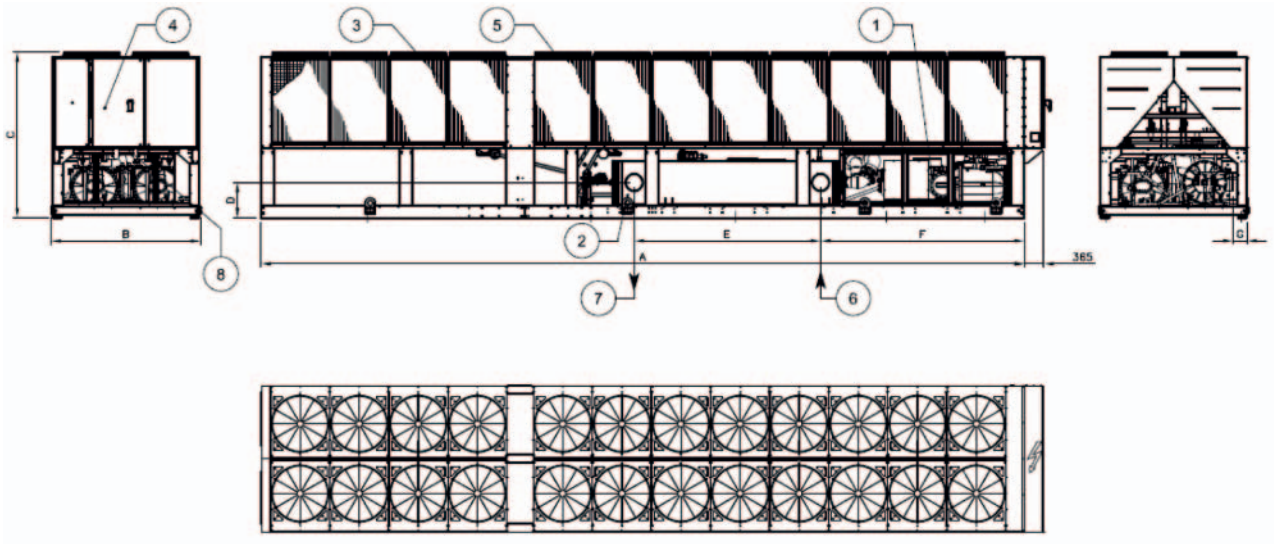
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (3 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-		Dimensions (mm)							Fans
Size	Size	A	B	C	D	E	F	G	
EWADC14÷C15C-SS/SL	EWADC13÷C14C-SR	10185	2285	2540	4440	2360	540	285	Nr 20
EWADC16÷C17C-SS/SL	EWADC15÷C16C-SR	11085	2285	2540	5340	2360	540	285	Nr 22
EWADC18C-SS/SL	EWADC17C-SR	11085	2285	2540	4780	2840	540	210	Nr 22
EWADC19÷C20C-SS/SL	EWADC18÷C19C-SR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC14C-XS/XL	EWADC14C-XR	11985	2285	2540	5680	2910	540	285	Nr 24
EWADC15÷C16C-XS/XL	EWADC15÷C16C-XR	11985	2285	2540	5680	2840	540	210	Nr 24
EWADC17C-XS/XL	EWADC17C-XR	12885	2285	2540	6580	2840	540	210	Nr 26
EWADC18C-XS/XL	EWADC18C-XR	13785	2285	2540	7480	2840	540	210	Nr 28
EWADC19C- XS/XL	EWADC19C-XR	14685	2285	2540	8380	2840	540	210	Nr 30
EWADH14÷H15C-XS/XL/XR		14685	2285	2285	8380	2840	540	210	Nr 30

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_2b

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-SS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	dB(A)
650	73,9	76,0	78,8	78,0	73,9	69,4	59,8	50,7	**79,0**	**99,5**
740	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**100,0**
830	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**100,0**
910	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**100,9**
970	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,1**
C11	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,5**
C12	75,5	77,6	80,4	79,6	75,5	71,0	61,4	52,3	**80,6**	**101,7**
C13	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
H14	75,6	77,7	80,5	79,7	75,6	71,1	61,5	52,4	**80,7**	**101,9**
C15	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,0**
C16	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,2**
C17	76,1	78,2	81,0	80,2	76,1	71,6	62,0	52,9	**81,2**	**103,3**
C18	76,4	78,5	81,3	80,5	76,4	71,9	62,3	53,2	**81,5**	**103,5**
C19	76,8	78,9	81,7	80,9	76,8	72,3	62,7	53,6	**81,9**	**103,7**
C20	76,8	78,9	81,7	80,9	76,8	72,3	62,7	53,6	**81,9**	**103,7**

EWAD~C-SL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
650	70,4	72,5	75,3	74,5	70,4	65,9	56,3	47,2	**75,5**	**96,0**
740	70,5	72,6	75,4	74,6	70,5	66,0	56,4	47,3	**75,6**	**96,1**
830	70,5	72,6	75,4	74,6	70,5	66,0	56,4	47,3	**75,6**	**96,1**
910	71,4	73,5	76,3	75,5	71,4	66,9	57,3	48,2	**76,5**	**97,5**
970	71,5	73,6	76,4	75,6	71,5	67,0	57,4	48,3	**76,6**	**97,1**
C11	71,7	73,8	76,6	75,8	71,7	67,2	57,6	48,5	**76,8**	**97,6**
C12	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,1**
C13	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,2**
H14	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,2**
C15	72,1	74,2	77,0	76,2	72,1	67,6	58,0	48,9	**77,2**	**99,1**
C16	72,2	74,3	77,1	76,3	72,2	67,7	58,1	49,0	**77,3**	**99,5**
C17	72,3	74,4	77,2	76,4	72,3	67,8	58,2	49,1	**77,4**	**99,5**
C18	72,8	74,9	77,7	76,9	72,8	68,3	58,7	49,6	**77,9**	**99,9**
C19	72,9	75,0	77,8	77,0	72,9	68,4	58,8	49,7	**78,0**	**101,0**
C20	72,9	75,0	77,8	77,0	72,9	68,4	58,8	49,7	**78,0**	**101,0**

EWAD~C-SR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
620	67,6	60,8	67,9	73,1	60,5	56,9	48,6	36,0	**71,0**	**91,5**
720	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
790	68,1	61,3	68,4	73,6	61,0	57,4	49,1	36,5	**71,5**	**92,0**
880	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**92,5**
920	69,1	62,3	69,4	74,6	62,0	58,4	50,1	37,5	**72,5**	**93,0**
C10	69,2	62,4	69,5	74,7	62,1	58,5	50,2	37,6	**72,6**	**93,5**
C11	69,3	62,5	69,6	74,8	62,2	58,6	50,3	37,7	**72,7**	**93,8**
C12	69,4	62,6	69,7	74,9	62,3	58,7	50,4	37,8	**72,9**	**94,0**
H14	69,4	62,6	69,7	74,9	62,3	58,7	50,4	37,8	**72,9**	**94,0**
C13	69,5	62,7	69,8	75,0	62,4	58,8	50,5	37,9	**72,9**	**94,8**
C14	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**94,9**
C15	69,6	62,8	69,9	75,1	62,5	58,9	50,6	38,0	**73,0**	**95,1**
C16	69,7	62,9	70,0	75,2	62,6	59,0	50,7	38,1	**73,1**	**95,2**
C17	70,2	63,4	70,5	75,7	63,1	59,5	51,2	38,6	**73,6**	**95,7**
C18	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**95,8**
C19	70,3	63,5	70,6	75,8	63,2	59,6	51,3	38,7	**73,7**	**95,8**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

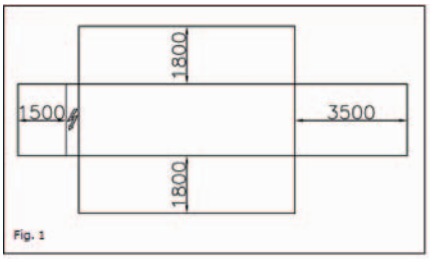

Fig. 1

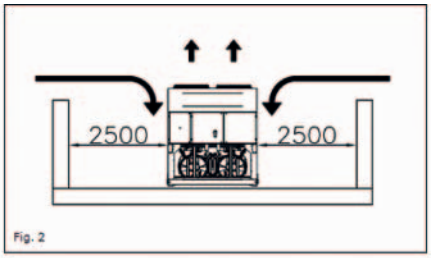

Fig. 2

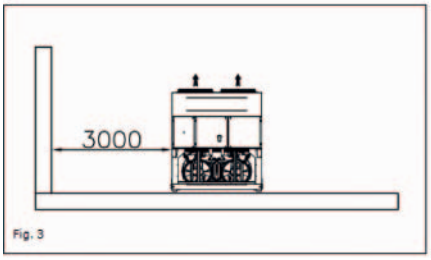

Fig. 3

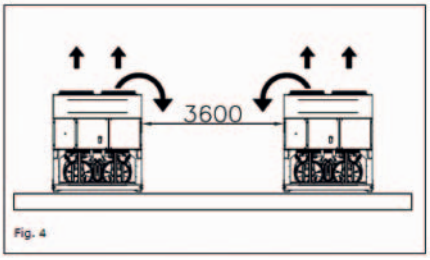

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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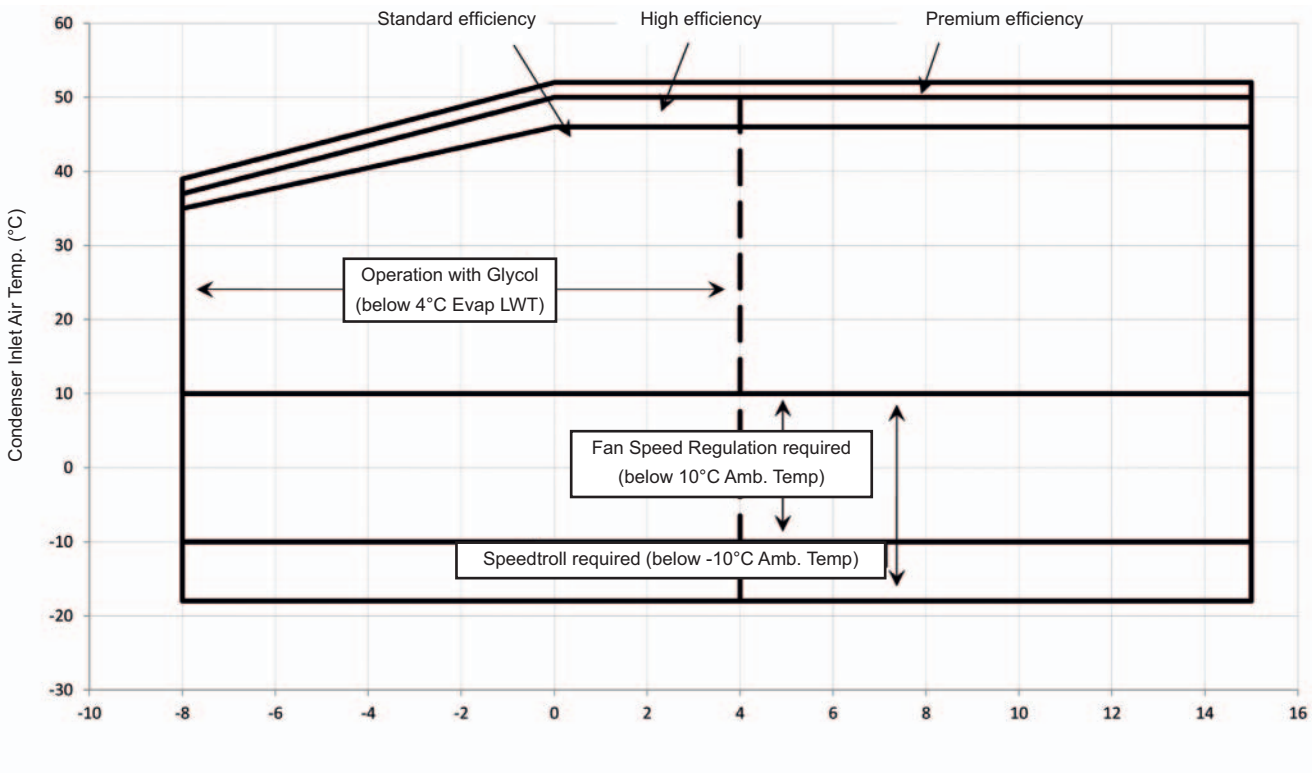
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

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12

13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

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TABLE OF CONTENTS

EWAD-C-PS

1 Features

- Wide capacity range: 9 sizes to cover a range from 821 to 1,562 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 52ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 820C-PS	EWAD 890C-PS	EWAD 980C-PS	EWAD C11C-PS	EWAD C12C-PS	EWAD C13C-PS	EWAD C14C-PS	EWAD C15C-PS	EWAD C16C-PS
Cooling capacity	Nom.			kW	821 (1)	890 (1)	975 (1)	1,074 (1)	1,158 (1)	1,279 (1)	1,390 (1)	1,474 (1)	1,562 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	12.5								
Power input	Cooling	Nom.		kW	226 (1)	249 (1)	274 (1)	302 (1)	330 (1)	363 (1)	396 (1)	424 (1)	453 (1)
EER					3.64 (1)	3.58 (1)	3.56 (1)		3.51 (1)	3.52 (1)	3.51 (1)	3.48 (1)	3.45 (1)
ESEER					4.44	4.50	4.41	4.53	4.39	4.44	4.31	4.33	4.30
IPLV					4.78	4.67	4.71	4.69	4.73	4.65	4.73		4.71
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,540								
		Width		mm	2,285								
		Depth		mm	8,885			9,785		11,085	11,985		
Weight	Unit			kg	7,530		7,660	8,290	8,550	9,390	9,730		
	Operation weight			kg	8,130		8,700	9,330	9,590	10,380	10,720		
Water heat exchanger	Type				Single pass shell & tube								
	Water volume			l	599		1,043	1,027		995	979		
	Nominal water flow	Cooling		l/s	39.2	42.5	46.5	51.2	55.2	61.0	66.3	70.3	74.5
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	58	67	31	61	70	60	70	81	88
	Insulation material				Closed cell								
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler								
Fan	Quantity				18			20		22	24		
	Type				Direct propeller								
	Diameter			mm	800								
	Air flow rate	Nom.		l/s	96,196			106,885		117,573	128,262		
	Speed			rpm	900								
Fan motor	Drive				DOL								
	Input	Cooling		W	31,500			35,000		38,500	42,000		
Sound power level	Cooling	Nom.		dBA	101.0			101.8	102.3	102.6	102.9	103.2	103.5
Sound pressure level	Cooling	Nom.		dBA	79.5			80.0	80.5	80.4	80.5	80.8	81.1
Compressor	Type				Asymm single screw								
	Quantity				2								
	Oil	Charged volume		l	38			44	50				
Operation range	Water side	Cooling	Min.	ºCDB	-8								
			Max.	ºCDB	15								
	Air side	Cooling	Min.	ºCDB	-18								
			Max.	ºCDB	52								
Refrigerant	Type				R-134a								
	Charge			kg	204	202	204	220		252	254		
	Circuits	Quantity			2								
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm	273mm							
Safety devices	Item	01			High discharge pressure (pressure switch)								
		02			High discharge pressure (pressure transducer)								
		03			Low suction pressure (pressure transducer)								
		04			Compressor motor protection								
		05			High discharge temperature								
		06			Low oil pressure								
		07			Low pressure ratio								
		08			High oil filter pressure drop								
		09			Phase monitor								
		10			Emergency stop								
		11			Water freeze protection controller								

2 Specifications

2-2 Electrical Specifications				EWAD 820C-PS	EWAD 890C-PS	EWAD 980C-PS	EWAD C11C-PS	EWAD C12C-PS	EWAD C13C-PS	EWAD C14C-PS	EWAD C15C-PS	EWAD C16C-PS
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	231		274		333		398		451
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	231	274		316	333	398		451	
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	630	665		702	978	1,037		1,080	1,093
	Nominal running current (RLA)	Cooling	A	386	424	465	511	555	614	671	711	752
	Maximum running current		A	534	577	621	670	747	819	891	945	998
	Max unit current for wires sizing		A	580	628	676	729	813	892	971	1,029	1,088
Fans	Nominal running current (RLA)		A	72			80		88	96		

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

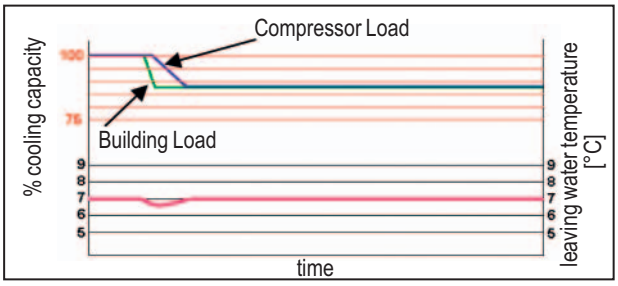
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

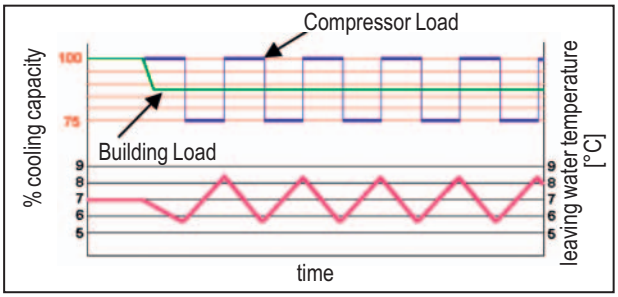
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

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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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.
Power Section The power section includes compressors and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
• Chiller enabled to work in partial failure condition.
• Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
• Display of evaporator entering/leaving water temperature.
• Display of Outdoor Ambient Temperature.
• Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
• Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
• Compressor and evaporator pumps hours counter.
• Display of Status Safety Devices.
• Number of starts and compressor working hours.
• Optimized management of compressor load.
• Fan management according to condensing pressure.
• 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).
• OAT (Outside Ambient temperature) Reset.
• Set point Reset (optional).
• Application and system upgrade with commercial SD cards.
• Ethernet port for remote or local servicing using standard web browsers.
• Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
• High pressure (pressure switch).
• High pressure (transducer).
• Low pressure (transducer).
• Fans circuit breaker.
• 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.

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4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

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5 Nomenclature

5 - 1 Nomenclature

Nomenclature

Name	E W A	D	2 0 0	C	-	S	S
Digits	1 2 3	4	5 6 7	8	9	10	11

Machine type
EWA = Air-cooled chiller, cooling only
EWY = Air-cooled chiller, heat pump
EWL = Remote condenser chiller
ERA = Air cooled condensing unit
EWW = Water-cooled chiller, cooling only
EWC = Air-cooled chiller, cooling only with centrifugal fan
EWR = Air-cooled chiller, cooling only with heat recovery

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

Capacity class in kW (Cooling)
Approximation of cooling capacity

Model series
Letter A, B,… : major modification

Inverter
- = Non-inverter
Z = Inverter

Efficiency level
S = Standard efficiency
X = High efficiency
P = Premium efficiency
H = High ambient

Sound level
L = Low noise
S = Standard noise
R = Reduced noise
X = Extra low noise
C = Cabinet

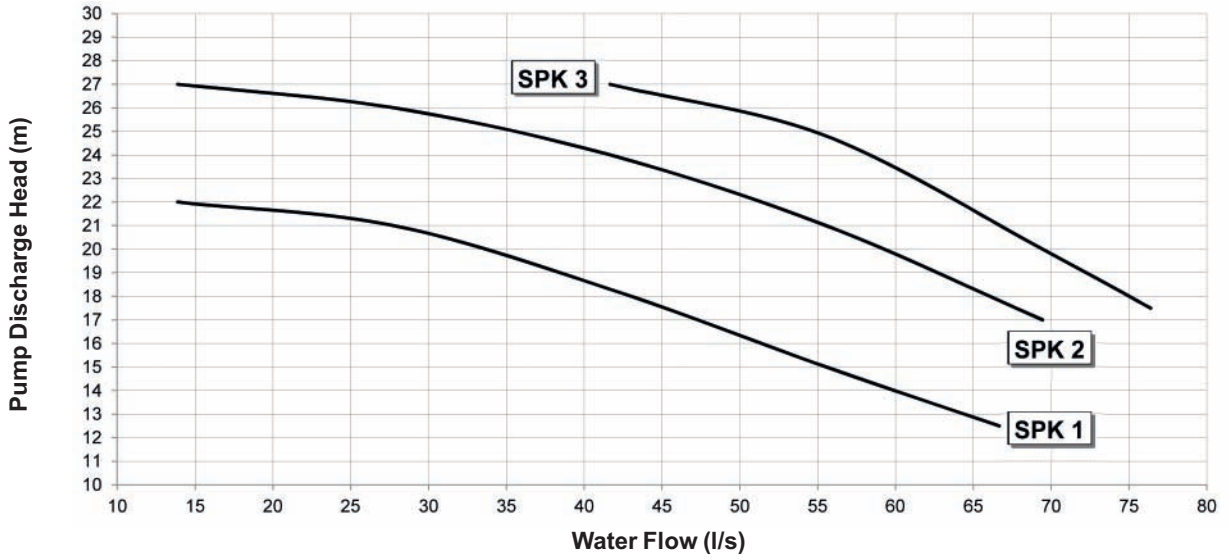
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

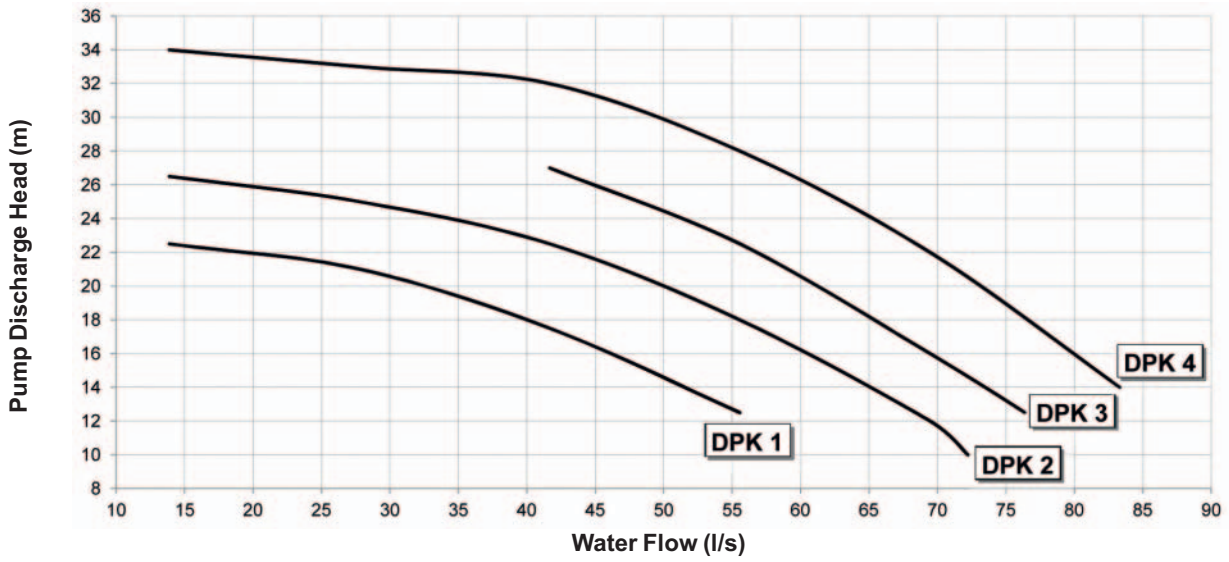
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

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6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
820	25	792	183	37,7	54	817	186	38,9	57	842	188	40,2	60
	30	770	201	36,7	51	794	203	37,8	54	819	206	39,0	57
	35	749	218	35,7	49	772	220	36,8	51	796	223	38,0	54
	40	725	235	34,5	46	748	238	35,7	49	772	241	36,8	51
	46	688	257	32,8	42	710	260	33,9	44	733	264	35,0	47
	49	665	270	31,7	39	687	273	32,7	42	709	276	33,8	44
	52	637	283	30,4	36	659	286	31,4	39	680	290	32,4	41
890	25	859	202	40,9	62	886	205	42,2	66	913	207	43,5	70
	30	836	221	39,8	59	862	224	41,1	63	888	226	42,4	66
	35	812	239	38,7	56	838	242	39,9	60	864	245	41,2	63
	40	786	259	37,4	53	810	262	38,6	56	835	265	39,8	59
	46	744	284	35,4	48	767	287	36,6	51	791	291	37,7	54
	49	717	298	34,2	45	740	301	35,3	48	764	305	36,4	50
	52	686	313	32,7	42	709	316	33,8	44	731	320	34,9	47
980	25	942	223	44,8	29	971	226	46,3	31	1001	229	47,7	32
	30	915	243	43,6	27	944	246	45,0	29	974	249	46,4	31
	35	889	263	42,3	26	917	267	43,7	28	946	270	45,1	29
	40	858	284	40,9	24	885	288	42,2	26	913	292	43,5	27
	46	810	312	38,6	22	835	316	39,8	23	861	320	41,1	25
	49	779	327	37,1	21	804	332	38,3	22	829	336	39,5	23
	52	743	344	35,4	19	767	348	36,6	20	792	353	37,8	21
C11	25	1037	245	49,4	57	1070	248	51,0	60	1103	252	52,6	64
	30	1008	267	48,0	54	1040	271	49,6	57	1073	275	51,2	61
	35	979	290	46,6	51	1010	294	48,1	54	1042	298	49,7	58
	40	945	313	45,0	48	975	317	46,5	51	1006	322	47,9	54
	46	891	344	42,5	43	920	348	43,8	46	949	353	45,2	49
	49	857	361	40,8	40	885	366	42,2	43	913	370	43,5	45
	52	818	379	39,0	37	844	384	40,2	39	861	385	41,1	41
C12	25	1120	268	53,4	65	1155	271	55,0	69	1190	275	56,7	73
	30	1089	292	51,9	62	1123	296	53,5	66	1158	300	55,2	70
	35	1057	317	50,4	59	1090	321	52,0	62	1124	325	53,6	66
	40	1019	342	48,5	55	1051	347	50,1	58	1083	352	51,6	62
	46	958	376	45,6	49	988	382	47,1	52	1019	387	48,6	55
	49	919	395	43,8	46	949	400	45,2	49	979	406	46,7	51
	52	875	415	41,7	42	903	421	43,0	44	910	418	43,4	45
C13	25	1237	295	58,9	57	1275	299	60,8	60	1314	303	62,7	63
	30	1202	322	57,3	54	1240	326	59,1	57	1279	331	61,0	60
	35	1167	348	55,6	51	1203	353	57,4	54	1241	358	59,2	57
	40	1124	377	53,5	48	1159	382	55,3	50	1195	387	57,0	53
	46	1056	414	50,3	43	1090	420	51,9	45	1124	426	53,6	48
	49	1014	435	48,3	40	1046	441	49,9	42	1079	447	51,5	44
	52	964	457	45,9	36	996	463	47,5	38	1000	459	47,7	39
C14	25	1344	321	64,0	66	1386	326	66,0	70	1428	330	68,1	73
	30	1307	350	62,3	63	1348	355	64,3	66	1390	360	66,3	70
	35	1268	380	60,4	59	1308	385	62,4	63	1349	391	64,3	66
	40	1222	411	58,2	55	1261	416	60,1	59	1300	422	62,0	62
	46	1149	452	54,7	50	1185	458	56,5	52	1222	464	58,3	56
	49	1103	474	52,5	46	1138	481	54,2	49	1174	487	56,0	52
	52	1050	498	50,0	42	1083	505	51,6	45	1092	502	52,1	45
C15	25	1429	343	68,1	76	1472	347	70,2	80	1516	352	72,3	85
	30	1391	375	66,3	72	1433	380	68,3	76	1476	385	70,4	81
	35	1350	407	64,3	69	1391	413	66,3	72	1432	418	68,3	76
	40	1301	442	61,9	64	1340	448	63,9	68	1379	454	65,8	71
	46	1221	488	58,1	57	1258	495	60,0	60	1296	501	61,8	64
	49	1170	514	55,7	53	1206	520	57,5	56	1243	527	59,3	59
	52	1064	518	50,7	45	1084	517	51,7	46	1091	511	52,0	47
C16	25	1517	365	72,3	83	1562	370	74,5	88	1609	375	76,7	93
	30	1476	399	70,3	79	1520	405	72,5	84	1565	410	74,6	88
	35	1432	435	68,2	75	1475	441	70,3	79	1518	447	72,4	83
	40	1377	473	65,6	70	1418	479	67,6	74	1460	486	69,6	78
	46	1290	524	61,4	62	1328	531	63,3	66	1367	538	65,2	69
	49	1234	553	58,8	57	1272	560	60,6	61	1310	567	62,5	64
	52	1074	537	51,2	45	1081	529	51,5	45	1086	520	51,8	46

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
820	25	868	190	41,4	64	894	192	42,7	67	920	195	44,0	71
	30	844	208	40,3	60	870	211	41,5	64	896	213	42,8	67
	35	821	226	39,2	58	846	228	40,4	61	871	231	41,6	64
	40	795	244	37,9	54	820	247	39,1	57	844	250	40,3	61
	46	756	267	36,1	50	779	270	37,2	52	803	273	38,3	55
	49	731	280	34,9	47	754	283	36,0	49	777	286	37,1	52
	52	702	293	33,5	43	724	297	34,6	46	747	300	35,7	49
890	25	940	210	44,8	73	968	212	46,2	77	996	215	47,5	82
	30	915	229	43,7	70	942	232	45,0	74	970	235	46,3	78
	35	890	249	42,5	67	917	252	43,8	70	943	255	45,1	74
	40	861	269	41,1	63	887	272	42,3	66	913	276	43,6	70
	46	816	295	38,9	57	841	298	40,1	60	866	302	41,3	63
	49	787	309	37,6	53	812	313	38,7	56	836	317	39,9	60
	52	754	324	36,0	49	778	328	37,1	52	792	329	37,8	54
980	25	1032	232	49,2	34	1063	235	50,7	36	1095	238	52,3	38
	30	1004	253	47,9	32	1035	256	49,4	34	1066	260	50,9	36
	35	975	274	46,5	31	1005	278	48,0	33	1035	282	49,4	34
	40	941	296	44,9	29	970	300	46,3	31	999	304	47,7	32
	46	888	325	42,4	26	915	329	43,7	28	943	333	45,0	29
	49	855	340	40,8	24	881	345	42,1	26	908	350	43,3	27
	52	817	357	39,0	22	835	360	39,9	23	841	357	40,2	24
C11	25	1136	255	54,2	67	1170	258	55,9	71	1205	262	57,6	75
	30	1106	278	52,7	64	1139	282	54,4	68	1173	286	56,0	71
	35	1074	302	51,2	61	1107	306	52,8	64	1140	310	54,4	68
	40	1037	326	49,5	57	1068	330	51,0	60	1100	335	52,5	64
	46	978	358	46,7	51	1008	363	48,1	54	1038	367	49,6	57
	49	942	375	44,9	48	971	380	46,3	51	1000	385	47,8	54
	52	877	385	41,8	42	893	385	42,6	44	909	384	43,4	45
C12	25	1225	279	58,5	77	1262	283	60,2	81	1298	287	62,0	86
	30	1193	304	56,9	74	1228	309	58,6	78	1264	313	60,4	82
	35	1158	330	55,2	70	1193	335	56,9	74	1227	339	58,6	78
	40	1116	357	53,2	65	1149	362	54,9	69	1183	367	56,5	73
	46	1050	392	50,1	58	1081	397	51,6	62	1114	403	53,2	65
	49	1009	411	48,1	54	1039	417	49,6	57	1070	423	51,1	61
	52	917	414	43,7	46	922	410	44,0	46	926	404	44,2	47
C13	25	1354	307	64,6	67	1395	312	66,6	71	1436	316	68,6	74
	30	1318	335	62,9	64	1358	340	64,8	67	1398	345	66,8	71
	35	1279	363	61,0	60	1318	368	62,9	64	1357	374	64,8	67
	40	1232	393	58,8	56	1269	398	60,6	60	1307	404	62,4	63
	46	1158	432	55,3	50	1193	438	57,0	53	1229	444	58,7	56
	49	1112	453	53,1	47	1146	459	54,7	50	1181	465	56,4	52
	52	1007	454	48,0	39	1012	449	48,3	40	1017	443	48,6	40
C14	25	1471	335	70,2	77	1514	339	72,3	82	1559	344	74,4	86
	30	1432	365	68,3	74	1474	370	70,4	78	1518	376	72,5	82
	35	1390	396	66,3	70	1431	402	68,3	74	1473	407	70,4	78
	40	1339	428	63,9	66	1380	434	65,9	69	1420	440	67,8	73
	46	1260	470	60,1	59	1298	477	61,9	62	1336	484	63,8	65
	49	1210	494	57,7	55	1247	500	59,5	58	1284	507	61,3	61
	52	1100	497	52,5	46	1106	491	52,8	46	1111	485	53,1	47
C15	25	1560	357	74,4	89	1603	361	76,5	94	1648	366	78,7	99
	30	1519	390	72,5	85	1562	395	74,6	90	1606	401	76,7	94
	35	1474	424	70,3	81	1517	430	72,4	85	1559	436	74,5	89
	40	1420	460	67,7	75	1460	466	69,7	79	1502	473	71,7	83
	46	1334	508	63,6	67	1372	515	65,5	71	1411	521	67,4	75
	49	1280	534	61,1	62	1317	541	62,9	66	1340	542	64,0	68
	52	1097	505	52,3	47	1101	497	52,6	48	1109	491	53,0	48
C16	25	1654	379	78,9	97	1699	384	81,1	102	1744	389	83,3	107
	30	1611	416	76,9	93	1656	421	79,0	98	1700	427	81,2	103
	35	1562	453	74,5	88	1607	459	76,7	93	1651	465	78,8	97
	40	1502	492	71,7	82	1545	499	73,7	86	1588	506	75,8	91
	46	1407	545	67,1	73	1447	553	69,1	77	1488	560	71,0	81
	49	1348	575	64,3	67	1387	582	66,2	71	1395	578	66,6	72
	52	1099	516	52,4	47	1101	506	52,6	47	1113	500	53,1	48

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

		Condenser Inlet Air Temperature (°C)											
	Twout	10				11				12			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
820	25	947	197	45,3	75	975	199	46,6	79	1002	202	47,9	83
	30	922	216	44,1	71	949	218	45,4	75	977	221	46,7	79
	35	897	234	42,9	68	924	237	44,2	71	951	240	45,5	75
	40	869	253	41,5	64	895	256	42,8	67	921	259	44,0	71
	46	827	277	39,5	58	851	280	40,7	62	876	284	41,9	65
	49	800	290	38,2	55	824	293	39,4	58	848	297	40,6	61
	52	770	304	36,8	51	793	307	37,9	54	816	311	39,0	57
890	25	1024	218	48,9	86	1053	221	50,3	90	1082	223	51,7	95
	30	998	238	47,7	82	1026	241	49,0	86	1055	244	50,4	91
	35	971	258	46,4	78	998	262	47,7	82	1026	265	49,1	86
	40	939	279	44,9	73	966	283	46,2	77	994	286	47,5	81
	46	891	306	42,6	67	917	310	43,8	70	943	314	45,1	74
	49	861	321	41,1	63	886	325	42,3	66	911	329	43,6	70
	52	806	329	38,5	56	819	329	39,2	57	832	328	39,8	59
980	25	1128	242	53,9	40	1161	245	55,5	42	1195	249	57,1	45
	30	1098	264	52,4	38	1130	267	54,0	40	1163	271	55,6	42
	35	1066	285	50,9	36	1097	289	52,4	38	1129	294	54,0	40
	40	1028	308	49,1	34	1058	313	50,6	36	1089	317	52,1	38
	46	970	338	46,4	31	999	343	47,7	32	1028	347	49,1	34
	49	935	354	44,7	29	962	359	46,0	30	990	364	47,3	32
	52	845	353	40,4	24	849	349	40,6	24	851	344	40,7	24
C11	25	1240	265	59,3	79	1276	269	61,0	83	1312	273	62,7	87
	30	1208	290	57,7	75	1243	294	59,4	79	1278	298	61,1	83
	35	1173	314	56,0	71	1207	318	57,7	75	1242	323	59,4	79
	40	1132	339	54,1	67	1165	344	55,7	71	1198	349	57,3	74
	46	1069	372	51,1	60	1100	377	52,6	64	1132	382	54,1	67
	49	1030	390	49,2	57	1060	395	50,7	60	1091	401	52,2	63
	52	924	384	44,1	46	939	383	44,9	48	950	381	45,4	49
C12	25	1336	291	63,8	90	1374	295	65,7	95	1412	299	67,5	100
	30	1301	317	62,2	86	1338	322	64,0	91	1376	326	65,8	95
	35	1263	344	60,3	82	1299	349	62,1	86	1336	354	63,9	90
	40	1217	372	58,2	76	1252	377	59,8	80	1287	382	61,5	85
	46	1146	408	54,8	69	1179	414	56,3	72	1212	420	57,9	76
	49	1102	428	52,6	64	1134	434	54,2	67	1166	440	55,7	71
	52	929	398	44,4	47	931	392	44,5	47	941	388	45,0	48
C13	25	1479	321	70,6	78	1521	325	72,7	83	1563	330	74,8	87
	30	1439	350	68,8	75	1481	355	70,8	79	1523	360	72,8	83
	35	1397	379	66,7	71	1437	384	68,7	75	1478	390	70,7	78
	40	1345	410	64,3	66	1384	415	66,1	70	1423	421	68,0	73
	46	1265	450	60,4	59	1302	456	62,2	62	1339	462	64,0	66
	49	1216	472	58,1	55	1251	478	59,8	58	1287	485	61,5	61
	52	1020	436	48,7	40	1026	431	49,1	41	1032	425	49,4	41
C14	25	1604	349	76,6	91	1649	354	78,8	96	1695	359	81,0	100
	30	1562	381	74,6	87	1606	386	76,8	91	1652	392	79,0	96
	35	1516	413	72,4	82	1559	419	74,5	86	1603	425	76,7	91
	40	1461	446	69,8	77	1502	453	71,8	81	1545	459	73,9	85
	46	1376	490	65,7	69	1415	497	67,6	72	1454	504	69,5	76
	49	1322	514	63,2	64	1361	521	65,0	68	1399	528	66,9	71
	52	1115	478	53,3	47	1117	470	53,4	47	1128	466	54,0	48
C15	25	1693	371	80,9	104	1737	376	83,0	109	1782	381	85,2	114
	30	1650	406	78,8	99	1694	411	81,0	104	1738	417	83,1	109
	35	1602	442	76,5	94	1645	447	78,6	98	1689	453	80,7	103
	40	1544	479	73,8	88	1585	486	75,8	92	1627	492	77,8	97
	46	1451	528	69,3	78	1491	536	71,2	82	1531	543	73,2	87
	49	1362	542	65,1	70	1384	542	66,1	72	1411	544	67,5	75
	52	1108	497	53,0	48	1114	490	53,3	49	1124	484	53,8	50
C16	25	1790	394	85,5	113	1837	399	87,8	118	1885	405	90,1	124
	30	1745	432	83,4	108	1790	438	85,6	113	1836	444	87,8	118
	35	1694	471	80,9	102	1738	477	83,1	107	1782	484	85,2	112
	40	1632	513	78,0	95	1674	520	80,0	100	1716	526	82,1	104
	46	1529	568	73,0	85	1570	575	75,1	89	1612	583	77,1	93
	49	1403	571	67,0	73	1409	563	67,3	73	1425	560	68,1	75
	52	1098	516	52,5	47	1108	510	53,0	48	1116	502	53,4	48

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

		Condenser Inlet Air Temperature (°C)											
	Twout	13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
820	25	1030	204	49,3	87	1058	207	50,7	91	1087	210	52,0	96
	30	1004	224	48,0	83	1032	227	49,4	87	1060	229	50,8	92
	35	978	243	46,8	79	1005	246	48,1	83	1032	249	49,4	87
	40	947	262	45,3	75	974	266	46,6	79	1001	269	47,9	83
	46	901	287	43,1	68	927	291	44,3	72	953	294	45,6	76
	49	873	301	41,8	64	898	304	43,0	68	923	308	44,2	71
	52	840	315	40,2	60	864	319	41,4	63	875	318	41,9	65
890	25	1111	226	53,1	100	1141	229	54,6	104	1171	232	56,0	109
	30	1084	247	51,8	95	1113	251	53,3	100	1142	254	54,7	105
	35	1055	268	50,5	91	1083	272	51,8	95	1112	275	53,3	100
	40	1021	290	48,8	86	1049	294	50,2	90	1077	297	51,5	94
	46	969	318	46,4	78	996	322	47,6	82	1023	326	49,0	86
	49	937	333	44,8	73	963	337	46,1	77	989	341	47,4	81
	52	845	327	40,4	61	861	328	41,2	63	867	325	41,5	64
980	25	1229	252	58,8	47	1264	256	60,5	49	1299	260	62,2	52
	30	1197	275	57,2	45	1231	279	58,9	47	1265	283	60,6	50
	35	1162	298	55,6	42	1195	302	57,2	45	1228	306	58,8	47
	40	1120	321	53,6	40	1152	326	55,1	42	1184	330	56,7	44
	46	1057	352	50,6	36	1087	357	52,0	38	1117	362	53,5	40
	49	1019	369	48,7	33	1048	374	50,1	35	1077	379	51,6	37
	52	853	339	40,8	24	861	336	41,2	25	861	330	41,2	25
C11	25	1348	277	64,5	92	1385	281	66,3	97	1423	284	68,1	101
	30	1314	302	62,9	88	1350	306	64,6	92	1387	310	66,4	97
	35	1277	327	61,1	83	1312	332	62,8	88	1347	336	64,5	92
	40	1232	354	58,9	78	1266	358	60,6	82	1301	363	62,3	86
	46	1164	388	55,7	71	1196	393	57,2	74	1229	398	58,8	78
	49	1117	405	53,4	66	1135	405	54,3	67	1152	405	55,2	69
	52	957	377	45,8	50	958	371	45,8	50	953	375	45,6	49
C12	25	1450	303	69,4	105	1489	308	71,2	110	1528	312	73,1	115
	30	1413	331	67,6	100	1451	335	69,4	105	1490	340	71,3	110
	35	1373	359	65,7	95	1409	364	67,4	100	1446	369	69,2	105
	40	1322	388	63,3	89	1359	393	65,0	93	1394	399	66,8	98
	46	1245	425	59,6	80	1279	431	61,2	84	1313	437	62,9	88
	49	1189	443	56,9	73	1194	439	57,1	74	1198	434	57,4	75
	52	950	385	45,4	49	948	377	45,4	49	937	389	44,9	48
C13	25	1607	335	76,9	91	1650	340	79,0	96	1695	345	81,1	101
	30	1565	365	74,9	87	1608	370	77,0	91	1651	376	79,1	96
	35	1519	396	72,7	83	1561	401	74,7	87	1602	407	76,7	91
	40	1463	427	70,0	77	1503	433	71,9	81	1543	440	73,9	85
	46	1376	469	65,8	69	1414	475	67,7	73	1452	482	69,5	76
	49	1308	487	62,6	63	1314	482	62,9	64	1319	476	63,1	64
	52	1042	421	49,8	42	1045	414	50,0	42	1033	428	49,5	41
C14	25	1741	364	83,3	105	1787	369	85,5	111	1834	375	87,8	116
	30	1697	397	81,2	101	1742	403	83,4	106	1788	408	85,6	111
	35	1648	431	78,8	95	1692	437	81,0	100	1737	443	83,1	105
	40	1587	465	75,9	89	1631	472	78,0	94	1674	479	80,1	98
	46	1494	511	71,5	80	1535	518	73,5	84	1576	525	75,5	88
	49	1427	532	68,3	74	1433	527	68,6	74	1438	521	68,9	75
	52	1139	462	54,5	49	1137	452	54,4	49	1124	466	53,8	48
C15	25	1828	386	87,4	119	1874	391	89,7	125	1921	396	92,0	130
	30	1783	422	85,3	114	1828	428	87,5	119	1873	434	89,7	125
	35	1732	459	82,8	108	1775	466	85,0	113	1819	472	87,1	118
	40	1669	499	79,9	101	1712	505	81,9	106	1754	512	84,0	111
	46	1571	550	75,2	91	1612	557	77,1	95	1653	565	79,1	99
	49	1427	541	68,2	76	1431	534	68,5	77	1439	528	68,9	78
	52	1127	476	53,9	50	1135	469	54,3	51	1130	471	54,1	50
C16	25	1933	410	92,5	129	1981	415	94,8	135	2031	421	97,2	142
	30	1883	449	90,1	124	1930	455	92,4	129	1978	461	94,7	135
	35	1827	490	87,4	117	1873	497	89,6	122	1918	503	91,8	128
	40	1759	533	84,1	109	1802	540	86,3	114	1846	548	88,4	119
	46	1654	591	79,1	98	1695	598	81,1	102	1736	606	83,1	107
	49	1429	551	68,3	75	1430	542	68,5	75	1443	537	69,1	77
	52	1123	494	53,7	49	1129	486	54,0	49	1132	476	54,2	50

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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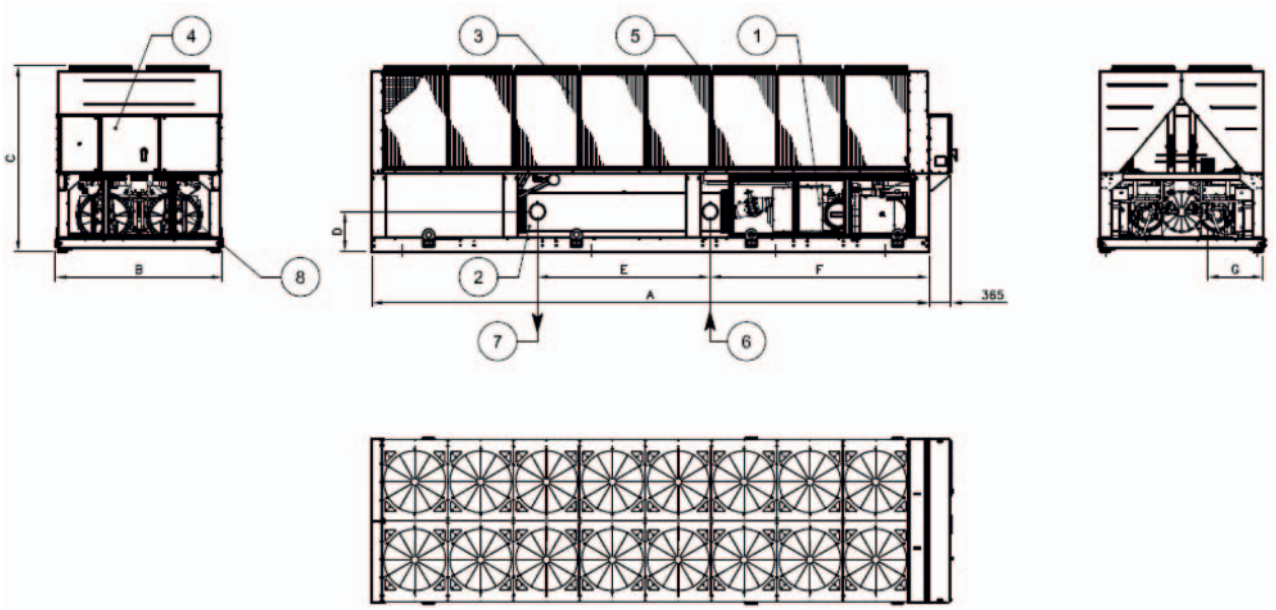
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-PS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
820	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
890	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
980	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
C11	74,9	77,0	79,8	79,0	74,9	70,4	60,8	51,7	**80,0**	**101,8**
C12	75,4	77,5	80,3	79,5	75,4	70,9	61,3	52,2	**80,5**	**102,3**
C13	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,6**
C14	75,4	77,5	80,3	79,5	75,4	70,9	61,3	52,2	**80,5**	**102,9**
C15	75,7	77,8	80,6	79,8	75,7	71,2	61,6	52,5	**80,8**	**103,2**
C16	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,5**

EWAD~C-PL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
820	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
890	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
980	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
C11	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,8**
C12	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**99,9**
C13	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**99,3**
C14	72,1	74,2	77,0	76,2	72,1	67,6	58,0	48,9	**77,2**	**99,6**
C15	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**99,9**
C16	72,7	74,8	77,6	76,8	72,7	68,2	58,6	49,5	**77,8**	**100,2**

EWAD~CPR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
810	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
880	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
960	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
C10	68,3	61,5	68,6	73,8	61,2	57,6	49,3	36,7	**71,7**	**93,4**
C11	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**93,8**
C13	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**94,1**
C14	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**94,4**
C15	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,7**
C16	69,2	62,4	69,5	74,7	62,1	58,5	50,2	37,6	**72,6**	**95,0**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

NSL_1a-2b-3b-4a_Rev.03_3b

9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

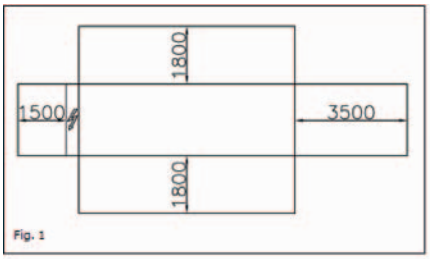

Fig. 1

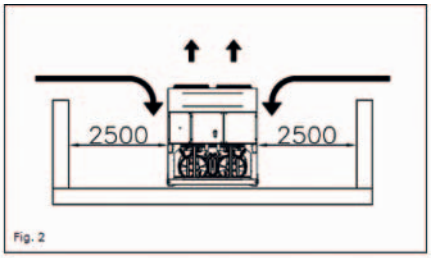

Fig. 2

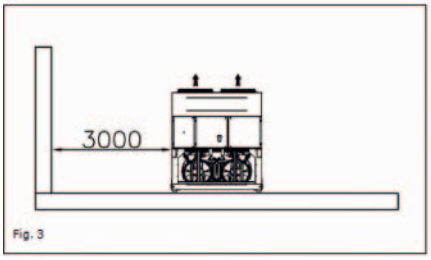

Fig. 3

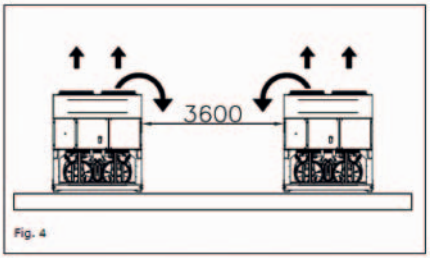

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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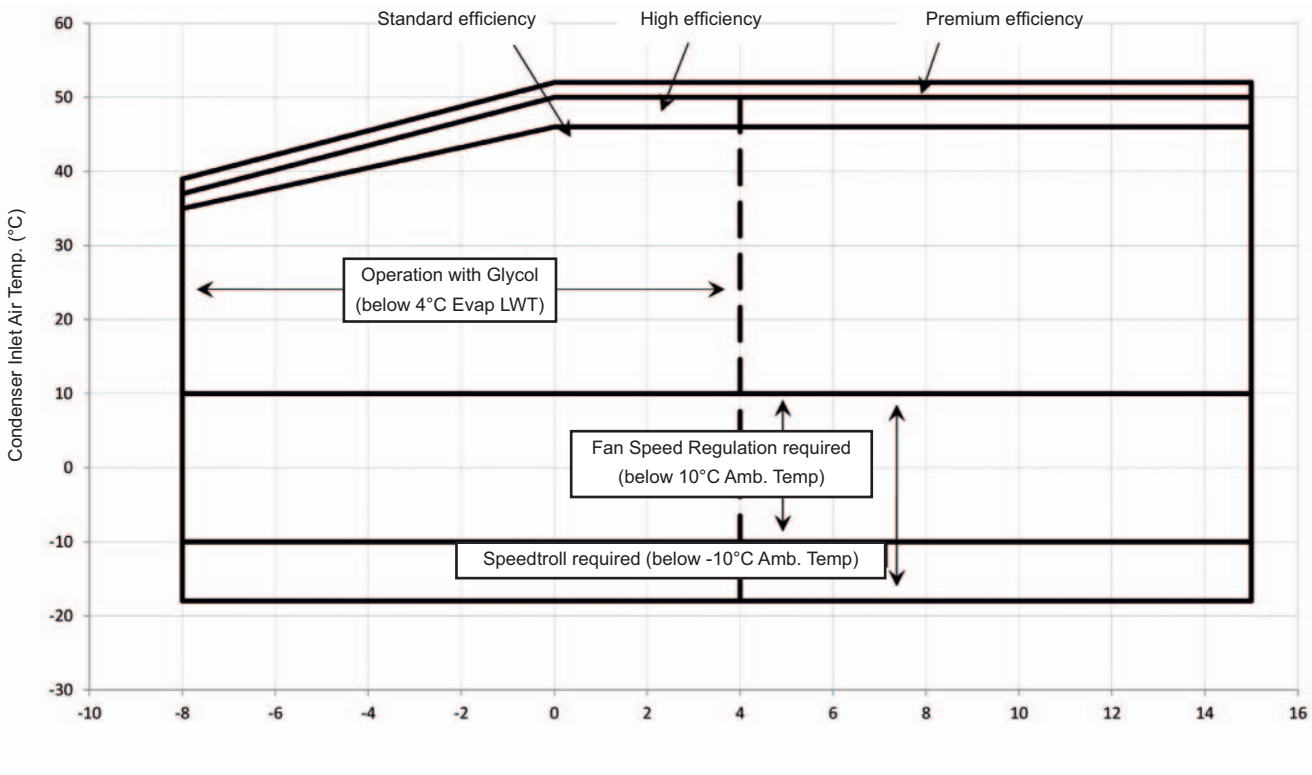
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

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12

13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

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TABLE OF CONTENTS

EWAD-C-PL

1 Features

- Wide capacity range: 9 sizes to cover a range from 821 to 1,562 kW
- Stepless single-screw compressor
- Large operation range (ambient temperature down to -18ºC and up to 52ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 820C-PL	EWAD 890C-PL	EWAD 980C-PL	EWAD C11C-PL	EWAD C12C-PL	EWAD C13C-PL	EWAD C14C-PL	EWAD C15C-PL	EWAD C16C-PL
Cooling capacity	Nom.			kW	821 (1)	890 (1)	975 (1)	1,074 (1)	1,158 (1)	1,279 (1)	1,390 (1)	1,474 (1)	1,562 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	12.5								
Power input	Cooling	Nom.		kW	226 (1)	249 (1)	274 (1)	302 (1)	330 (1)	363 (1)	396 (1)	424 (1)	453 (1)
EER					3.64 (1)	3.58 (1)	3.56 (1)		3.51 (1)	3.52 (1)	3.51 (1)	3.48 (1)	3.45 (1)
ESEER					4.44	4.50	4.41	4.53	4.39	4.44	4.31	4.33	4.30
IPLV					4.78	4.67	4.71	4.69	4.73	4.65	4.73		4.71
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,540								
		Width		mm	2,285								
		Depth		mm	8,885			9,785		11,085	11,985		
Weight	Unit			kg	7,820		7,950	8,580	8,840	10,380	10,720		
	Operation weight			kg	8,420		8,990	9,620	9,880	10,670	11,010		
Water heat exchanger	Type				Single pass shell & tube								
	Water volume			l	599		1,043	1,027		995	979		
	Nominal water flow	Cooling		l/s	39.2	42.5	46.5	51.2	55.2	61.0	66.3	70.3	74.5
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	58	67	31	61	70	60	70	81	88
	Insulation material				Closed cell								
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler								
Fan	Quantity				18			20		22	24		
	Type				Direct propeller								
	Diameter			mm	800								
	Air flow rate	Nom.		l/s	96,196			106,885		117,573	128,262		
	Speed			rpm	900								
Fan motor	Drive				DOL								
	Input	Cooling		W	31,500			35,000		38,500	42,000		
Sound power level	Cooling	Nom.		dBA	98.4			98.8	99.9	99.3	99.6	99.9	100.2
Sound pressure level	Cooling	Nom.		dBA	76.9			77.0	77.1		77.2	77.5	77.8
Compressor	Type				Asymm single screw								
	Quantity				2								
	Oil	Charged volume		l	38			44	50				
Operation range	Water side	Cooling	Min.	ºCDB	-8								
			Max.	ºCDB	15								
	Air side	Cooling	Min.	ºCDB	-18								
			Max.	ºCDB	52								
Refrigerant	Type				R-134a								
	Charge			kg	204	202	204	220		252	254		
	Circuits	Quantity			2								
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm	273mm							
Safety devices	Item	01			High discharge pressure (pressure switch)								
		02			High discharge pressure (pressure transducer)								
		03			Low suction pressure (pressure transducer)								
		04			Compressor motor protection								
		05			High discharge temperature								
		06			Low oil pressure								
		07			Low pressure ratio								
		08			High oil filter pressure drop								
		09			Phase monitor								
		10			Emergency stop								
		11			Water freeze protection controller								

2 Specifications

2-2 Electrical Specifications				EWAD 820C-PL	EWAD 890C-PL	EWAD 980C-PL	EWAD C11C-PL	EWAD C12C-PL	EWAD C13C-PL	EWAD C14C-PL	EWAD C15C-PL	EWAD C16C-PL
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	231		274		333		398		451
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	231	274		316	333	398		451	
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	630	665		702	978	1,037		1,080	1,093
	Nominal running current (RLA)	Cooling	A	386	424	465	511	555	614	671	711	752
	Maximum running current		A	534	577	621	670	747	819	891	945	998
	Max unit current for wires sizing		A	580	628	676	729	813	892	971	1,029	1,088
Fans	Nominal running current (RLA)		A	72			80		88	96		

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

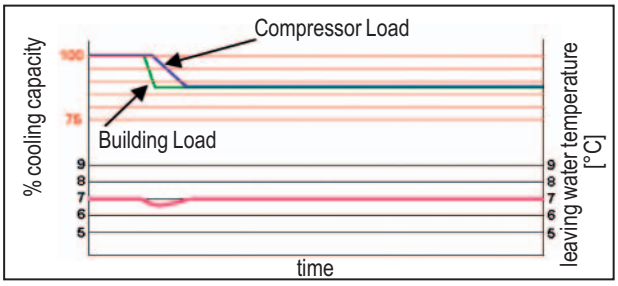
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

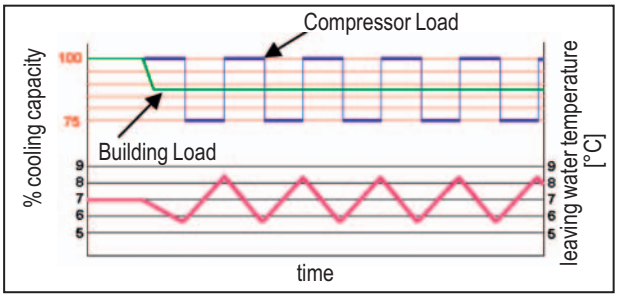
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

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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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.
Power Section The power section includes compressors and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
• Chiller enabled to work in partial failure condition.
• Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
• Display of evaporator entering/leaving water temperature.
• Display of Outdoor Ambient Temperature.
• Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
• Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
• Compressor and evaporator pumps hours counter.
• Display of Status Safety Devices.
• Number of starts and compressor working hours.
• Optimized management of compressor load.
• Fan management according to condensing pressure.
• 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).
• OAT (Outside Ambient temperature) Reset.
• Set point Reset (optional).
• Application and system upgrade with commercial SD cards.
• Ethernet port for remote or local servicing using standard web browsers.
• Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
• High pressure (pressure switch).
• High pressure (transducer).
• Low pressure (transducer).
• Fans circuit breaker.
• 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.

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4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

GNC_1a-2a-3a-4a_Rev.01_4a

5 Nomenclature

5 - 1 Nomenclature

Nomenclature

Name	E W A	D	2 0 0	C	-	S	S
Digits	1 2 3	4	5 6 7	8	9	10	11

Machine type
EWA = Air-cooled chiller, cooling only
EWY = Air-cooled chiller, heat pump
EWL = Remote condenser chiller
ERA = Air cooled condensing unit
EWW = Water-cooled chiller, cooling only
EWC = Air-cooled chiller, cooling only with centrifugal fan
EWR = Air-cooled chiller, cooling only with heat recovery

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

Capacity class in kW (Cooling)
Approximation of cooling capacity

Model series
Letter A, B,… : major modification

Inverter
- = Non-inverter
Z = Inverter

Efficiency level
S = Standard efficiency
X = High efficiency
P = Premium efficiency
H = High ambient

Sound level
L = Low noise
S = Standard noise
R = Reduced noise
X = Extra low noise
C = Cabinet

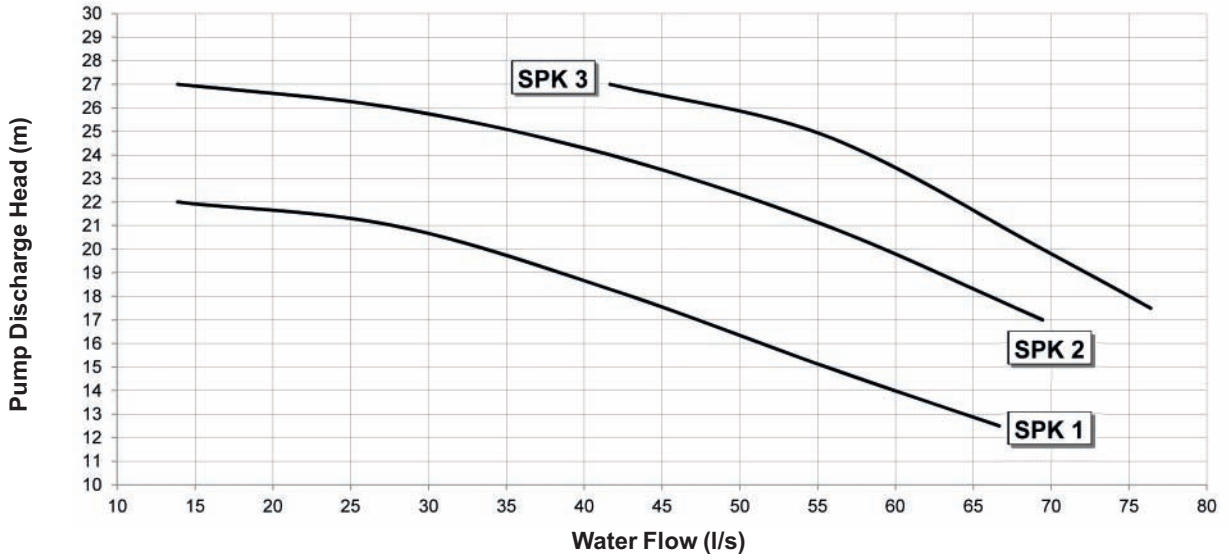
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

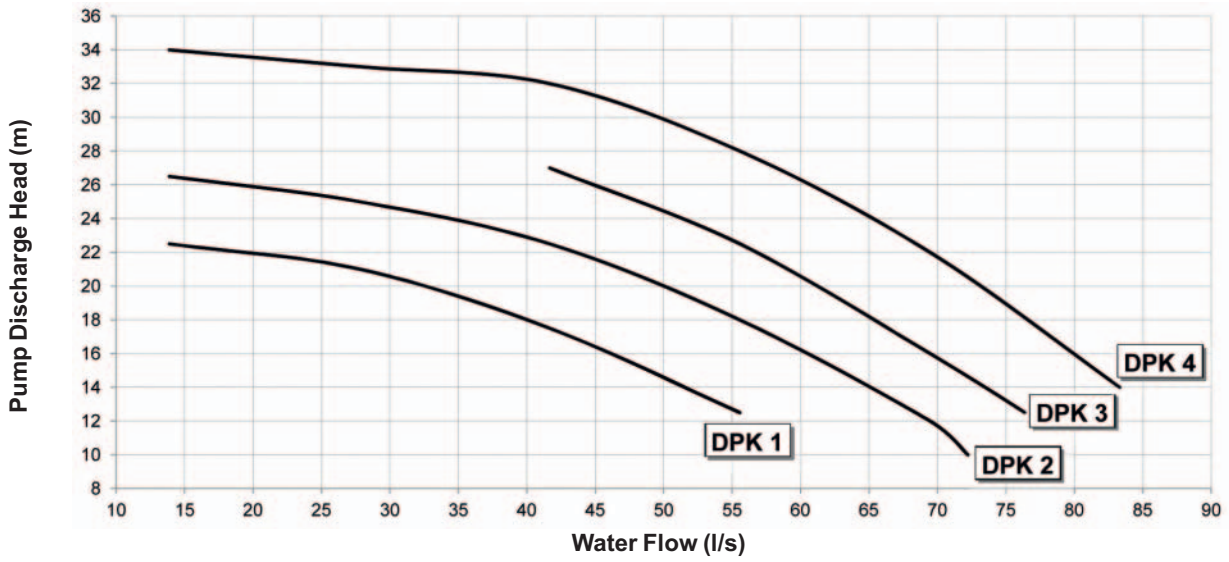
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

WPKTI_1a-2a-3a_Rev.03_1a

6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

WPKTI_1a-2a-3a_Rev.03_3a

6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

WPKCM_1a-2a-3a_Rev.03_2a

8
6

7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
820	25	792	183	37,7	54	817	186	38,9	57	842	188	40,2	60
	30	770	201	36,7	51	794	203	37,8	54	819	206	39,0	57
	35	749	218	35,7	49	772	220	36,8	51	796	223	38,0	54
	40	725	235	34,5	46	748	238	35,7	49	772	241	36,8	51
	46	688	257	32,8	42	710	260	33,9	44	733	264	35,0	47
	49	665	270	31,7	39	687	273	32,7	42	709	276	33,8	44
	52	637	283	30,4	36	659	286	31,4	39	680	290	32,4	41
890	25	859	202	40,9	62	886	205	42,2	66	913	207	43,5	70
	30	836	221	39,8	59	862	224	41,1	63	888	226	42,4	66
	35	812	239	38,7	56	838	242	39,9	60	864	245	41,2	63
	40	786	259	37,4	53	810	262	38,6	56	835	265	39,8	59
	46	744	284	35,4	48	767	287	36,6	51	791	291	37,7	54
	49	717	298	34,2	45	740	301	35,3	48	764	305	36,4	50
	52	686	313	32,7	42	709	316	33,8	44	731	320	34,9	47
980	25	942	223	44,8	29	971	226	46,3	31	1001	229	47,7	32
	30	915	243	43,6	27	944	246	45,0	29	974	249	46,4	31
	35	889	263	42,3	26	917	267	43,7	28	946	270	45,1	29
	40	858	284	40,9	24	885	288	42,2	26	913	292	43,5	27
	46	810	312	38,6	22	835	316	39,8	23	861	320	41,1	25
	49	779	327	37,1	21	804	332	38,3	22	829	336	39,5	23
	52	743	344	35,4	19	767	348	36,6	20	792	353	37,8	21
C11	25	1037	245	49,4	57	1070	248	51,0	60	1103	252	52,6	64
	30	1008	267	48,0	54	1040	271	49,6	57	1073	275	51,2	61
	35	979	290	46,6	51	1010	294	48,1	54	1042	298	49,7	58
	40	945	313	45,0	48	975	317	46,5	51	1006	322	47,9	54
	46	891	344	42,5	43	920	348	43,8	46	949	353	45,2	49
	49	857	361	40,8	40	885	366	42,2	43	913	370	43,5	45
	52	818	379	39,0	37	844	384	40,2	39	861	385	41,1	41
C12	25	1120	268	53,4	65	1155	271	55,0	69	1190	275	56,7	73
	30	1089	292	51,9	62	1123	296	53,5	66	1158	300	55,2	70
	35	1057	317	50,4	59	1090	321	52,0	62	1124	325	53,6	66
	40	1019	342	48,5	55	1051	347	50,1	58	1083	352	51,6	62
	46	958	376	45,6	49	988	382	47,1	52	1019	387	48,6	55
	49	919	395	43,8	46	949	400	45,2	49	979	406	46,7	51
	52	875	415	41,7	42	903	421	43,0	44	910	418	43,4	45
C13	25	1237	295	58,9	57	1275	299	60,8	60	1314	303	62,7	63
	30	1202	322	57,3	54	1240	326	59,1	57	1279	331	61,0	60
	35	1167	348	55,6	51	1203	353	57,4	54	1241	358	59,2	57
	40	1124	377	53,5	48	1159	382	55,3	50	1195	387	57,0	53
	46	1056	414	50,3	43	1090	420	51,9	45	1124	426	53,6	48
	49	1014	435	48,3	40	1046	441	49,9	42	1079	447	51,5	44
	52	964	457	45,9	36	996	463	47,5	38	1000	459	47,7	39
C14	25	1344	321	64,0	66	1386	326	66,0	70	1428	330	68,1	73
	30	1307	350	62,3	63	1348	355	64,3	66	1390	360	66,3	70
	35	1268	380	60,4	59	1308	385	62,4	63	1349	391	64,3	66
	40	1222	411	58,2	55	1261	416	60,1	59	1300	422	62,0	62
	46	1149	452	54,7	50	1185	458	56,5	52	1222	464	58,3	56
	49	1103	474	52,5	46	1138	481	54,2	49	1174	487	56,0	52
	52	1050	498	50,0	42	1083	505	51,6	45	1092	502	52,1	45
C15	25	1429	343	68,1	76	1472	347	70,2	80	1516	352	72,3	85
	30	1391	375	66,3	72	1433	380	68,3	76	1476	385	70,4	81
	35	1350	407	64,3	69	1391	413	66,3	72	1432	418	68,3	76
	40	1301	442	61,9	64	1340	448	63,9	68	1379	454	65,8	71
	46	1221	488	58,1	57	1258	495	60,0	60	1296	501	61,8	64
	49	1170	514	55,7	53	1206	520	57,5	56	1243	527	59,3	59
	52	1064	518	50,7	45	1084	517	51,7	46	1091	511	52,0	47
C16	25	1517	365	72,3	83	1562	370	74,5	88	1609	375	76,7	93
	30	1476	399	70,3	79	1520	405	72,5	84	1565	410	74,6	88
	35	1432	435	68,2	75	1475	441	70,3	79	1518	447	72,4	83
	40	1377	473	65,6	70	1418	479	67,6	74	1460	486	69,6	78
	46	1290	524	61,4	62	1328	531	63,3	66	1367	538	65,2	69
	49	1234	553	58,8	57	1272	560	60,6	61	1310	567	62,5	64
	52	1074	537	51,2	45	1081	529	51,5	45	1086	520	51,8	46

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
820	25	868	190	41,4	64	894	192	42,7	67	920	195	44,0	71
	30	844	208	40,3	60	870	211	41,5	64	896	213	42,8	67
	35	821	226	39,2	58	846	228	40,4	61	871	231	41,6	64
	40	795	244	37,9	54	820	247	39,1	57	844	250	40,3	61
	46	756	267	36,1	50	779	270	37,2	52	803	273	38,3	55
	49	731	280	34,9	47	754	283	36,0	49	777	286	37,1	52
	52	702	293	33,5	43	724	297	34,6	46	747	300	35,7	49
890	25	940	210	44,8	73	968	212	46,2	77	996	215	47,5	82
	30	915	229	43,7	70	942	232	45,0	74	970	235	46,3	78
	35	890	249	42,5	67	917	252	43,8	70	943	255	45,1	74
	40	861	269	41,1	63	887	272	42,3	66	913	276	43,6	70
	46	816	295	38,9	57	841	298	40,1	60	866	302	41,3	63
	49	787	309	37,6	53	812	313	38,7	56	836	317	39,9	60
	52	754	324	36,0	49	778	328	37,1	52	792	329	37,8	54
980	25	1032	232	49,2	34	1063	235	50,7	36	1095	238	52,3	38
	30	1004	253	47,9	32	1035	256	49,4	34	1066	260	50,9	36
	35	975	274	46,5	31	1005	278	48,0	33	1035	282	49,4	34
	40	941	296	44,9	29	970	300	46,3	31	999	304	47,7	32
	46	888	325	42,4	26	915	329	43,7	28	943	333	45,0	29
	49	855	340	40,8	24	881	345	42,1	26	908	350	43,3	27
	52	817	357	39,0	22	835	360	39,9	23	841	357	40,2	24
C11	25	1136	255	54,2	67	1170	258	55,9	71	1205	262	57,6	75
	30	1106	278	52,7	64	1139	282	54,4	68	1173	286	56,0	71
	35	1074	302	51,2	61	1107	306	52,8	64	1140	310	54,4	68
	40	1037	326	49,5	57	1068	330	51,0	60	1100	335	52,5	64
	46	978	358	46,7	51	1008	363	48,1	54	1038	367	49,6	57
	49	942	375	44,9	48	971	380	46,3	51	1000	385	47,8	54
	52	877	385	41,8	42	893	385	42,6	44	909	384	43,4	45
C12	25	1225	279	58,5	77	1262	283	60,2	81	1298	287	62,0	86
	30	1193	304	56,9	74	1228	309	58,6	78	1264	313	60,4	82
	35	1158	330	55,2	70	1193	335	56,9	74	1227	339	58,6	78
	40	1116	357	53,2	65	1149	362	54,9	69	1183	367	56,5	73
	46	1050	392	50,1	58	1081	397	51,6	62	1114	403	53,2	65
	49	1009	411	48,1	54	1039	417	49,6	57	1070	423	51,1	61
	52	917	414	43,7	46	922	410	44,0	46	926	404	44,2	47
C13	25	1354	307	64,6	67	1395	312	66,6	71	1436	316	68,6	74
	30	1318	335	62,9	64	1358	340	64,8	67	1398	345	66,8	71
	35	1279	363	61,0	60	1318	368	62,9	64	1357	374	64,8	67
	40	1232	393	58,8	56	1269	398	60,6	60	1307	404	62,4	63
	46	1158	432	55,3	50	1193	438	57,0	53	1229	444	58,7	56
	49	1112	453	53,1	47	1146	459	54,7	50	1181	465	56,4	52
	52	1007	454	48,0	39	1012	449	48,3	40	1017	443	48,6	40
C14	25	1471	335	70,2	77	1514	339	72,3	82	1559	344	74,4	86
	30	1432	365	68,3	74	1474	370	70,4	78	1518	376	72,5	82
	35	1390	396	66,3	70	1431	402	68,3	74	1473	407	70,4	78
	40	1339	428	63,9	66	1380	434	65,9	69	1420	440	67,8	73
	46	1260	470	60,1	59	1298	477	61,9	62	1336	484	63,8	65
	49	1210	494	57,7	55	1247	500	59,5	58	1284	507	61,3	61
	52	1100	497	52,5	46	1106	491	52,8	46	1111	485	53,1	47
C15	25	1560	357	74,4	89	1603	361	76,5	94	1648	366	78,7	99
	30	1519	390	72,5	85	1562	395	74,6	90	1606	401	76,7	94
	35	1474	424	70,3	81	1517	430	72,4	85	1559	436	74,5	89
	40	1420	460	67,7	75	1460	466	69,7	79	1502	473	71,7	83
	46	1334	508	63,6	67	1372	515	65,5	71	1411	521	67,4	75
	49	1280	534	61,1	62	1317	541	62,9	66	1340	542	64,0	68
	52	1097	505	52,3	47	1101	497	52,6	48	1109	491	53,0	48
C16	25	1654	379	78,9	97	1699	384	81,1	102	1744	389	83,3	107
	30	1611	416	76,9	93	1656	421	79,0	98	1700	427	81,2	103
	35	1562	453	74,5	88	1607	459	76,7	93	1651	465	78,8	97
	40	1502	492	71,7	82	1545	499	73,7	86	1588	506	75,8	91
	46	1407	545	67,1	73	1447	553	69,1	77	1488	560	71,0	81
	49	1348	575	64,3	67	1387	582	66,2	71	1395	578	66,6	72
	52	1099	516	52,4	47	1101	506	52,6	47	1113	500	53,1	48

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	11 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	12 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
820	25	947	197	45,3	75	975	199	46,6	79	1002	202	47,9	83
	30	922	216	44,1	71	949	218	45,4	75	977	221	46,7	79
	35	897	234	42,9	68	924	237	44,2	71	951	240	45,5	75
	40	869	253	41,5	64	895	256	42,8	67	921	259	44,0	71
	46	827	277	39,5	58	851	280	40,7	62	876	284	41,9	65
	49	800	290	38,2	55	824	293	39,4	58	848	297	40,6	61
	52	770	304	36,8	51	793	307	37,9	54	816	311	39,0	57
890	25	1024	218	48,9	86	1053	221	50,3	90	1082	223	51,7	95
	30	998	238	47,7	82	1026	241	49,0	86	1055	244	50,4	91
	35	971	258	46,4	78	998	262	47,7	82	1026	265	49,1	86
	40	939	279	44,9	73	966	283	46,2	77	994	286	47,5	81
	46	891	306	42,6	67	917	310	43,8	70	943	314	45,1	74
	49	861	321	41,1	63	886	325	42,3	66	911	329	43,6	70
	52	806	329	38,5	56	819	329	39,2	57	832	328	39,8	59
980	25	1128	242	53,9	40	1161	245	55,5	42	1195	249	57,1	45
	30	1098	264	52,4	38	1130	267	54,0	40	1163	271	55,6	42
	35	1066	285	50,9	36	1097	289	52,4	38	1129	294	54,0	40
	40	1028	308	49,1	34	1058	313	50,6	36	1089	317	52,1	38
	46	970	338	46,4	31	999	343	47,7	32	1028	347	49,1	34
	49	935	354	44,7	29	962	359	46,0	30	990	364	47,3	32
	52	845	353	40,4	24	849	349	40,6	24	851	344	40,7	24
C11	25	1240	265	59,3	79	1276	269	61,0	83	1312	273	62,7	87
	30	1208	290	57,7	75	1243	294	59,4	79	1278	298	61,1	83
	35	1173	314	56,0	71	1207	318	57,7	75	1242	323	59,4	79
	40	1132	339	54,1	67	1165	344	55,7	71	1198	349	57,3	74
	46	1069	372	51,1	60	1100	377	52,6	64	1132	382	54,1	67
	49	1030	390	49,2	57	1060	395	50,7	60	1091	401	52,2	63
	52	924	384	44,1	46	939	383	44,9	48	950	381	45,4	49
C12	25	1336	291	63,8	90	1374	295	65,7	95	1412	299	67,5	100
	30	1301	317	62,2	86	1338	322	64,0	91	1376	326	65,8	95
	35	1263	344	60,3	82	1299	349	62,1	86	1336	354	63,9	90
	40	1217	372	58,2	76	1252	377	59,8	80	1287	382	61,5	85
	46	1146	408	54,8	69	1179	414	56,3	72	1212	420	57,9	76
	49	1102	428	52,6	64	1134	434	54,2	67	1166	440	55,7	71
	52	929	398	44,4	47	931	392	44,5	47	941	388	45,0	48
C13	25	1479	321	70,6	78	1521	325	72,7	83	1563	330	74,8	87
	30	1439	350	68,8	75	1481	355	70,8	79	1523	360	72,8	83
	35	1397	379	66,7	71	1437	384	68,7	75	1478	390	70,7	78
	40	1345	410	64,3	66	1384	415	66,1	70	1423	421	68,0	73
	46	1265	450	60,4	59	1302	456	62,2	62	1339	462	64,0	66
	49	1216	472	58,1	55	1251	478	59,8	58	1287	485	61,5	61
	52	1020	436	48,7	40	1026	431	49,1	41	1032	425	49,4	41
C14	25	1604	349	76,6	91	1649	354	78,8	96	1695	359	81,0	100
	30	1562	381	74,6	87	1606	386	76,8	91	1652	392	79,0	96
	35	1516	413	72,4	82	1559	419	74,5	86	1603	425	76,7	91
	40	1461	446	69,8	77	1502	453	71,8	81	1545	459	73,9	85
	46	1376	490	65,7	69	1415	497	67,6	72	1454	504	69,5	76
	49	1322	514	63,2	64	1361	521	65,0	68	1399	528	66,9	71
	52	1115	478	53,3	47	1117	470	53,4	47	1128	466	54,0	48
C15	25	1693	371	80,9	104	1737	376	83,0	109	1782	381	85,2	114
	30	1650	406	78,8	99	1694	411	81,0	104	1738	417	83,1	109
	35	1602	442	76,5	94	1645	447	78,6	98	1689	453	80,7	103
	40	1544	479	73,8	88	1585	486	75,8	92	1627	492	77,8	97
	46	1451	528	69,3	78	1491	536	71,2	82	1531	543	73,2	87
	49	1362	542	65,1	70	1384	542	66,1	72	1411	544	67,5	75
	52	1108	497	53,0	48	1114	490	53,3	49	1124	484	53,8	50
C16	25	1790	394	85,5	113	1837	399	87,8	118	1885	405	90,1	124
	30	1745	432	83,4	108	1790	438	85,6	113	1836	444	87,8	118
	35	1694	471	80,9	102	1738	477	83,1	107	1782	484	85,2	112
	40	1632	513	78,0	95	1674	520	80,0	100	1716	526	82,1	104
	46	1529	568	73,0	85	1570	575	75,1	89	1612	583	77,1	93
	49	1403	571	67,0	73	1409	563	67,3	73	1425	560	68,1	75
	52	1098	516	52,5	47	1108	510	53,0	48	1116	502	53,4	48

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PS and EWAD~C-PL

		Condenser Inlet Air Temperature (°C)											
	Twout	13				14				15			
Size	Ta	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
820	25	1030	204	49,3	87	1058	207	50,7	91	1087	210	52,0	96
	30	1004	224	48,0	83	1032	227	49,4	87	1060	229	50,8	92
	35	978	243	46,8	79	1005	246	48,1	83	1032	249	49,4	87
	40	947	262	45,3	75	974	266	46,6	79	1001	269	47,9	83
	46	901	287	43,1	68	927	291	44,3	72	953	294	45,6	76
	49	873	301	41,8	64	898	304	43,0	68	923	308	44,2	71
	52	840	315	40,2	60	864	319	41,4	63	875	318	41,9	65
890	25	1111	226	53,1	100	1141	229	54,6	104	1171	232	56,0	109
	30	1084	247	51,8	95	1113	251	53,3	100	1142	254	54,7	105
	35	1055	268	50,5	91	1083	272	51,8	95	1112	275	53,3	100
	40	1021	290	48,8	86	1049	294	50,2	90	1077	297	51,5	94
	46	969	318	46,4	78	996	322	47,6	82	1023	326	49,0	86
	49	937	333	44,8	73	963	337	46,1	77	989	341	47,4	81
	52	845	327	40,4	61	861	328	41,2	63	867	325	41,5	64
980	25	1229	252	58,8	47	1264	256	60,5	49	1299	260	62,2	52
	30	1197	275	57,2	45	1231	279	58,9	47	1265	283	60,6	50
	35	1162	298	55,6	42	1195	302	57,2	45	1228	306	58,8	47
	40	1120	321	53,6	40	1152	326	55,1	42	1184	330	56,7	44
	46	1057	352	50,6	36	1087	357	52,0	38	1117	362	53,5	40
	49	1019	369	48,7	33	1048	374	50,1	35	1077	379	51,6	37
	52	853	339	40,8	24	861	336	41,2	25	861	330	41,2	25
C11	25	1348	277	64,5	92	1385	281	66,3	97	1423	284	68,1	101
	30	1314	302	62,9	88	1350	306	64,6	92	1387	310	66,4	97
	35	1277	327	61,1	83	1312	332	62,8	88	1347	336	64,5	92
	40	1232	354	58,9	78	1266	358	60,6	82	1301	363	62,3	86
	46	1164	388	55,7	71	1196	393	57,2	74	1229	398	58,8	78
	49	1117	405	53,4	66	1135	405	54,3	67	1152	405	55,2	69
	52	957	377	45,8	50	958	371	45,8	50	953	375	45,6	49
C12	25	1450	303	69,4	105	1489	308	71,2	110	1528	312	73,1	115
	30	1413	331	67,6	100	1451	335	69,4	105	1490	340	71,3	110
	35	1373	359	65,7	95	1409	364	67,4	100	1446	369	69,2	105
	40	1322	388	63,3	89	1359	393	65,0	93	1394	399	66,8	98
	46	1245	425	59,6	80	1279	431	61,2	84	1313	437	62,9	88
	49	1189	443	56,9	73	1194	439	57,1	74	1198	434	57,4	75
	52	950	385	45,4	49	948	377	45,4	49	937	389	44,9	48
C13	25	1607	335	76,9	91	1650	340	79,0	96	1695	345	81,1	101
	30	1565	365	74,9	87	1608	370	77,0	91	1651	376	79,1	96
	35	1519	396	72,7	83	1561	401	74,7	87	1602	407	76,7	91
	40	1463	427	70,0	77	1503	433	71,9	81	1543	440	73,9	85
	46	1376	469	65,8	69	1414	475	67,7	73	1452	482	69,5	76
	49	1308	487	62,6	63	1314	482	62,9	64	1319	476	63,1	64
	52	1042	421	49,8	42	1045	414	50,0	42	1033	428	49,5	41
C14	25	1741	364	83,3	105	1787	369	85,5	111	1834	375	87,8	116
	30	1697	397	81,2	101	1742	403	83,4	106	1788	408	85,6	111
	35	1648	431	78,8	95	1692	437	81,0	100	1737	443	83,1	105
	40	1587	465	75,9	89	1631	472	78,0	94	1674	479	80,1	98
	46	1494	511	71,5	80	1535	518	73,5	84	1576	525	75,5	88
	49	1427	532	68,3	74	1433	527	68,6	74	1438	521	68,9	75
	52	1139	462	54,5	49	1137	452	54,4	49	1124	466	53,8	48
C15	25	1828	386	87,4	119	1874	391	89,7	125	1921	396	92,0	130
	30	1783	422	85,3	114	1828	428	87,5	119	1873	434	89,7	125
	35	1732	459	82,8	108	1775	466	85,0	113	1819	472	87,1	118
	40	1669	499	79,9	101	1712	505	81,9	106	1754	512	84,0	111
	46	1571	550	75,2	91	1612	557	77,1	95	1653	565	79,1	99
	49	1427	541	68,2	76	1431	534	68,5	77	1439	528	68,9	78
	52	1127	476	53,9	50	1135	469	54,3	51	1130	471	54,1	50
C16	25	1933	410	92,5	129	1981	415	94,8	135	2031	421	97,2	142
	30	1883	449	90,1	124	1930	455	92,4	129	1978	461	94,7	135
	35	1827	490	87,4	117	1873	497	89,6	122	1918	503	91,8	128
	40	1759	533	84,1	109	1802	540	86,3	114	1846	548	88,4	119
	46	1654	591	79,1	98	1695	598	81,1	102	1736	606	83,1	107
	49	1429	551	68,3	75	1430	542	68,5	75	1443	537	69,1	77
	52	1123	494	53,7	49	1129	486	54,0	49	1132	476	54,2	50

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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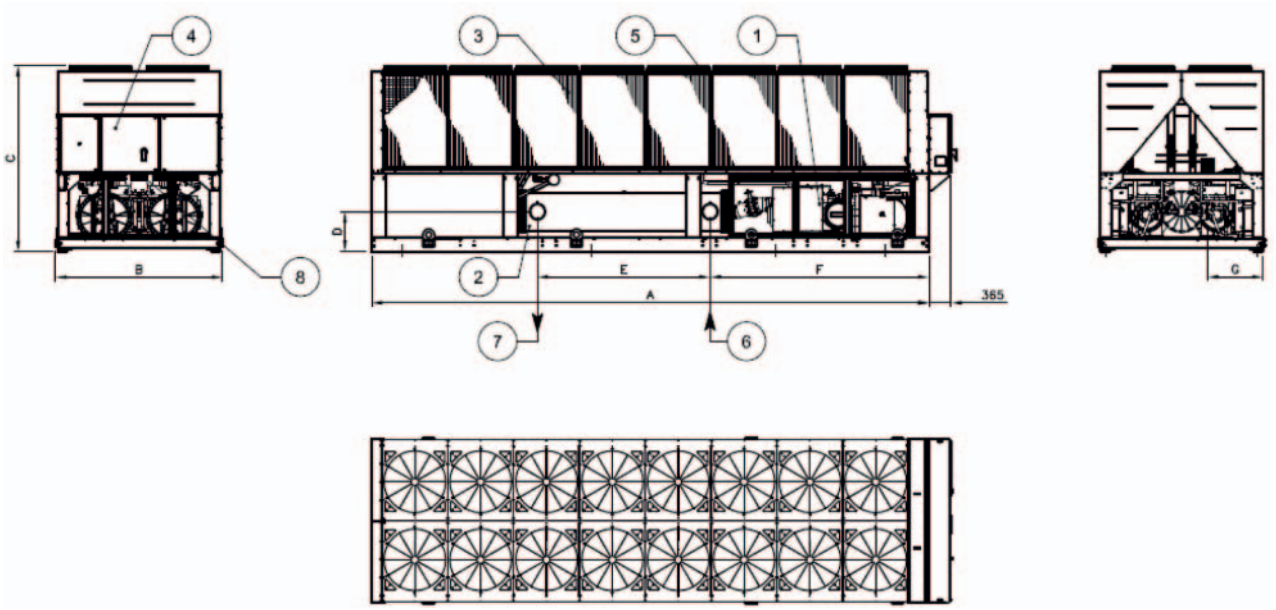
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

DMN_1c-2b_Rev.03_1c

9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-PS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
820	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
890	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
980	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
C11	74,9	77,0	79,8	79,0	74,9	70,4	60,8	51,7	**80,0**	**101,8**
C12	75,4	77,5	80,3	79,5	75,4	70,9	61,3	52,2	**80,5**	**102,3**
C13	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,6**
C14	75,4	77,5	80,3	79,5	75,4	70,9	61,3	52,2	**80,5**	**102,9**
C15	75,7	77,8	80,6	79,8	75,7	71,2	61,6	52,5	**80,8**	**103,2**
C16	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,5**

EWAD~C-PL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
820	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
890	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
980	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
C11	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,8**
C12	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**99,9**
C13	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**99,3**
C14	72,1	74,2	77,0	76,2	72,1	67,6	58,0	48,9	**77,2**	**99,6**
C15	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**99,9**
C16	72,7	74,8	77,6	76,8	72,7	68,2	58,6	49,5	**77,8**	**100,2**

EWAD~CPR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
810	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
880	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
960	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
C10	68,3	61,5	68,6	73,8	61,2	57,6	49,3	36,7	**71,7**	**93,4**
C11	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**93,8**
C13	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**94,1**
C14	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**94,4**
C15	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,7**
C16	69,2	62,4	69,5	74,7	62,1	58,5	50,2	37,6	**72,6**	**95,0**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

NSL_1a-2b-3b-4a_Rev.03_3b

9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

8
10

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

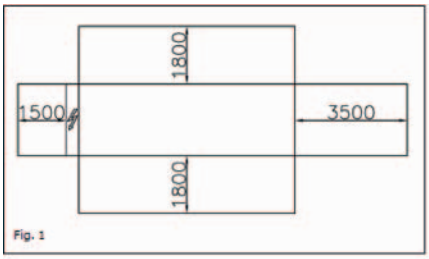

Fig. 1

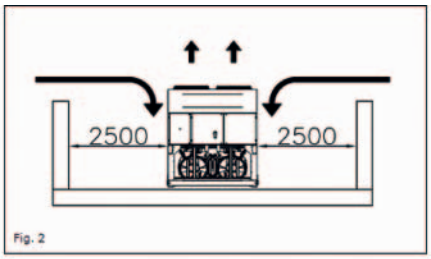

Fig. 2

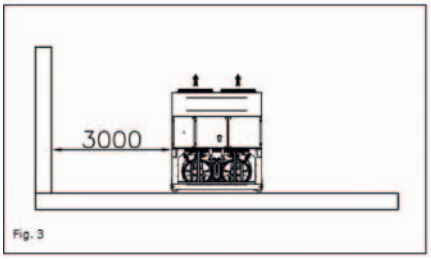

Fig. 3

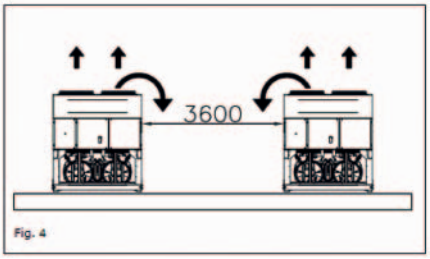

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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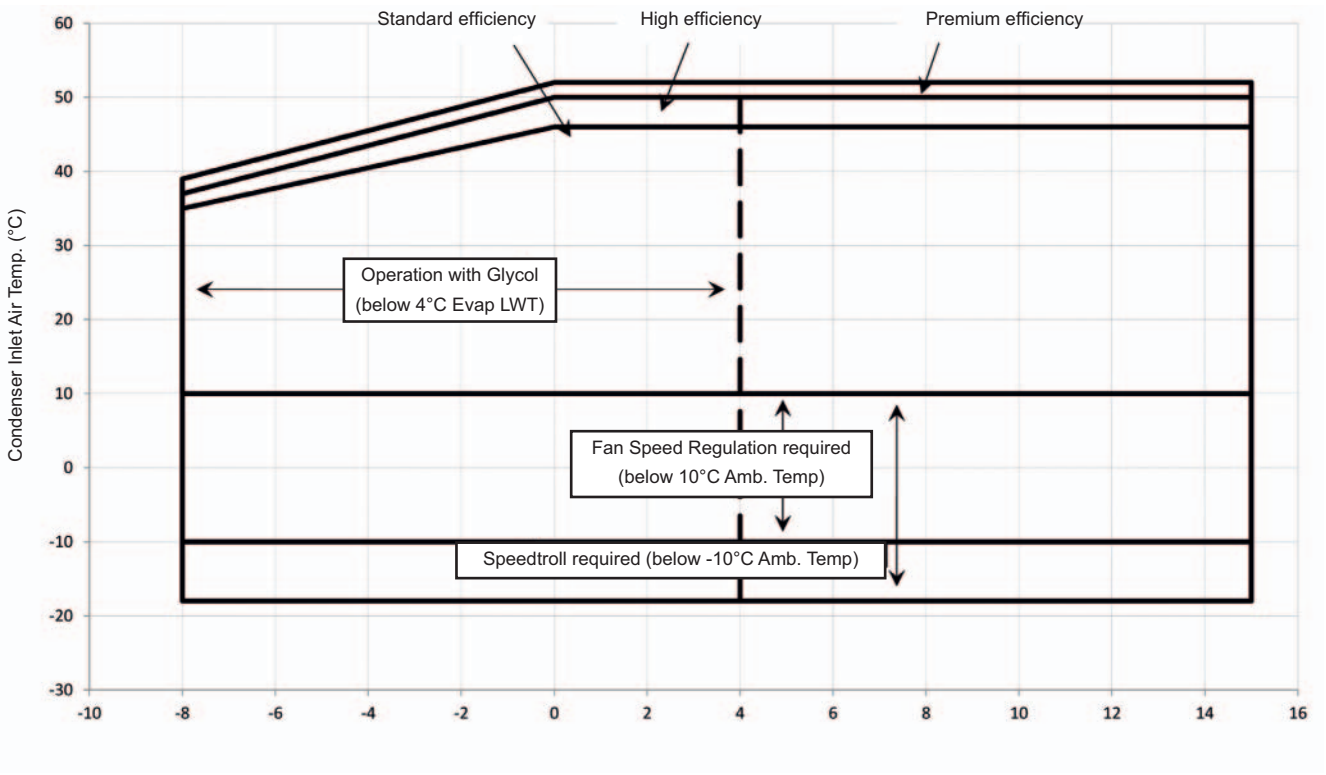
11 Operation range

11 - 1 Operation Range



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Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

OPL_1-2a-3a_Rev.01_3a

12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

EPD_1-2-3-4_Rev.00_1-4

13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

SPC_1b-2a-3_Rev.02_3

TABLE OF CONTENTS

EWAD-C-PR

1 Features

- Wide capacity range: 9 sizes to cover a range from 809 to 1,521 kW
- Stepless single-screw compressor
- Best in class energy efficiency (EER up to 3.7 and ESEER up to 4.63)
- Large operation range (ambient temperature down to -18ºC and up to 52ºC)
- All models are PED pressure vessel approved
- Optimised for use with R-134a
- 2 truly independent refrigerant circuits
- Standard electronic expansion valve
- DX shell and tube evaporator – one pass refrigerant side to minimize pressure drops
- Partial and total heat recovery option available
- MicroTech III controller

2 Specifications

2-1 Technical Specifications					EWAD 810C-PR	EWAD 880C-PR	EWAD 960C-PR	EWAD C10C-PR	EWAD C11C-PR	EWAD C13C-PR	EWAD C14C-PR	EWAD C15C-PR	EWAD C16C-PR
Cooling capacity	Nom.			kW	809 (1)	875 (1)	956 (1)	1,053 (1)	1,132 (1)	1,251 (1)	1,359 (1)	1,439 (1)	1,521 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	12.5								
Power input	Cooling	Nom.		kW	219 (1)	244 (1)	272 (1)	299 (1)	330 (1)	364 (1)	396 (1)	425 (1)	457 (1)
EER					3.70 (1)	3.58 (1)	3.51 (1)	3.52 (1)	3.43 (1)	3.44 (1)	3.43 (1)	3.39 (1)	3.33 (1)
ESEER					4.63	4.59	4.54	4.59	4.50	4.53	4.51	4.49	4.44
IPLV					5.04	4.89		4.86	4.82	4.81	4.82	4.83	4.79
Casing	Colour				Ivory white								
	Material				Galvanized and painted steel sheet								
Dimensions	Unit	Height		mm	2,540								
		Width		mm	2,285								
		Depth		mm	8,885			9,785		11,085	11,985		
Weight	Unit			kg	7,820		7,950	8,580	8,840	10,380	10,720		
	Operation weight			kg	8,420		8,990	9,620	9,880	10,670	11,010		
Water heat exchanger	Type				Single pass shell & tube								
	Water volume			l	599		1,043	1,027		995	979		
	Nominal water flow	Cooling		l/s	38.6	41.7	45.6	50.2	54.0	59.7	64.8	68.7	72.6
	Nominal water pressure drop	Cooling	Heat exchanger	kPa	56	65	30	59	67	58	67	77	84
	Insulation material				Closed cell								
Air heat exchanger	Type				High efficiency fin and tube type with integral subcooler								
Fan	Quantity				18			20		22	24		
	Type				Direct propeller								
	Diameter			mm	800								
	Air flow rate	Nom.		l/s	73,813			82,014		90,216	98,417		
	Speed			rpm	700								
Fan motor	Drive				DOL								
	Input	Cooling		W	14,100			15,700		17,300	18,800		
Sound power level	Cooling	Nom.		dBA	92.7			93.4	93.8	94.1	94.4	94.7	95
Sound pressure level	Cooling	Nom.		dBA	71.2			71.7	72.0			72.3	72.6
Compressor	Type				Asymm single screw								
	Quantity				2								
	Oil	Charged volume		l	38			44	50				
Operation range	Water side	Cooling	Min.	ºCDB	-8								
			Max.	ºCDB	15								
	Air side	Cooling	Min.	ºCDB	-18								
			Max.	ºCDB	52								
Refrigerant	Type				R-134a								
	Circuits	Quantity			2								
Refrigerant circuit	Charge			kg	204	202	204	220		252	254		
Piping connections	Evaporator water inlet/outlet (OD)				219.1mm		273mm						
Safety devices	Item	01			High discharge pressure (pressure switch)								
		02			High discharge pressure (pressure transducer)								
		03			Low suction pressure (pressure transducer)								
		04			Compressor motor protection								
		05			High discharge temperature								
		06			Low oil pressure								
		07			Low pressure ratio								
		08			High oil filter pressure drop								
		09			Phase monitor								
		10			Emergency stop button								
		11			Water freeze protection controller								

2 Specifications

2-2 Electrical Specifications				EWAD 810C-PR	EWAD 880C-PR	EWAD 960C-PR	EWAD C10C-PR	EWAD C11C-PR	EWAD C13C-PR	EWAD C14C-PR	EWAD C15C-PR	EWAD C16C-PR
Compressor	Phase			3~								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
	Maximum running current		A	231		274		333		398		451
	Starting method			Wye-delta								
Compressor 2	Maximum running current		A	231	274		333		398		451	
Power supply	Phase			3~								
	Frequency		Hz	50								
	Voltage		V	400								
	Voltage range	Min.	%	-10								
		Max.	%	10								
Unit	Maximum starting current		A	618	653		917	964	1,020		1,063	1,076
	Nominal running current (RLA)	Cooling	A	375	416	461	506	555	614	671	717	764
	Maximum running current		A	509	552	596	660	719	788	858	911	964
	Max unit current for wires sizing		A	555	603	651	712	785	861	937	996	1,054
Fans	Nominal running current (RLA)		A	47			52		57	62		

Notes

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

(2) Sound pressure levels are measured at entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC; full load operation; Standard: ISO3744

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

(4) Maximum starting current: starting current of biggest compressor + 75 % of maximum current of the other compressor + fans current for the circuit at 75 %

(5) Nominal current in cooling mode: entering evaporator water temp. 12ºC; leaving evaporator water temp. 7ºC; ambient air temp. 35ºC. Compressor + fans current.

(6) Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current

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

(8) Maximum current for wires sizing: (compressors full load ampere + fans current) x 1.1

3 Features and advantages

3 - 1 Features and Advantages

Low operating cost

This unit is the result of careful design, aimed to optimizing the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
A very high efficiency single rotor screw compressor design are used in this application, together with large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans, a single-pass pure counter-flow shell&tube direct-expansion evaporator with low refrigerant pressure drops.

Low operating sound levels

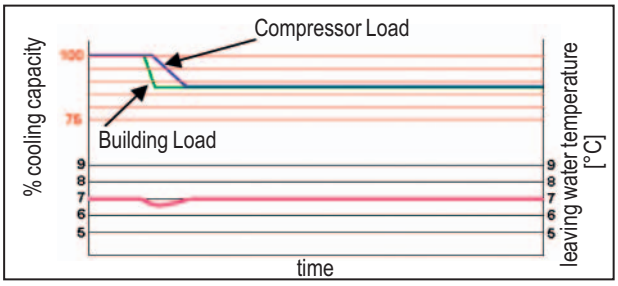
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves large volume of air at exceptionally low sound levels and by the virtually vibration-free operation.

Outstanding reliability

The chillers have two or three truly independent refrigerant circuits depending on the size, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with a rugged compressor design with advanced composite compressor gaterotors material, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

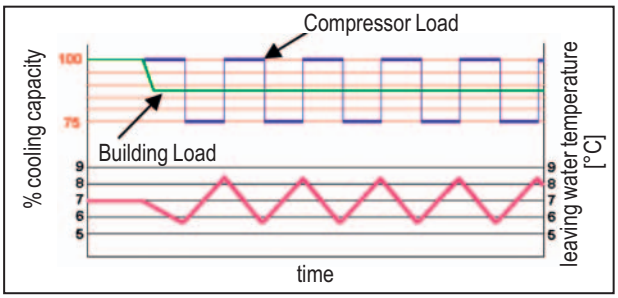
Infinite capacity control

Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressor unit), down to 7% (three compressors units). This modulation allows the compressor capacity to exactly match the building cooling load without any leaving evaporator water temperature fluctuation. This chilled water temperature fluctuation is avoided only with a stepless control.



ELWT fluctuation with stepless capacity control

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



ELWT fluctuation with steps capacity control (4 steps)

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

Superior control logic

The new MicroTech III controller 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 LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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3 Features and advantages

3 - 1 Features and Advantages

Code requirements – Safety and observant of laws/directives
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
Units 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
Three different Efficiency Versions available:

S: Standard Efficiency
15 sizes to cover a range from 647 up to 1922 kW with an EER up to 2.99 and an ESEER up to 4.08 (data referred to Standard Noise)

X: High Efficiency
17 sizes to cover a range from 756 up to 2008 kW with an EER up to 3.29 and an ESEER up to 4.33 (data referred to Standard Noise)

P: Premium Efficiency
9 sizes to cover a range from 821 up to 1562 kW with an EER up to 3.64 and an ESEER up to 4.53 (data referred to Standard Noise)

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 power input for fans.

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 air 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%)
Air inlet condenser temperature	35°C	30°C	25°C	20°C

Sound Configuration
Standard, low and reduced sound configurations available as follows:

SS: Standard Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

SL: Low Noise
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

SR: Reduced Noise
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

FTA_1-2b_Rev.02_2b

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) (±RAL7044).The base frame has an eye-hook to lift 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.

Compressor (Asymmetric Single Screw) The compressor is semi-hermetic, single-screw type with gate-rotor made with the latest high-strength fibre reinforced star material. The compressor has an asymmetric slide regulation managed by the unit controller for infinitely modulating capacity from 100% to 25%. An integrated high efficiency oil separator maximizes the oil separation and standard start is Wye-Delta (Y-Δ) type.

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), resulting in low TEWI (Total Equivalent Warming Impact).

Evaporator (Shell&Tube) The unit is equipped with a direct expansion shell&tube evaporator with refrigerant evaporating inside the tubes and water flowing outside. The tubes are enhanced for maximum heat transfer and rolled into steel tube sheet and sealed.
The evaporators are single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops. Both attributes contribute to the heat exchanger effectiveness and total unit's outstanding efficiency. The water side is designed for 10 bar of maximum operating pressure and is provided with vents and drain.
The external shell is covered with a 20mm closed cell insulation material and the evaporator water connections are provided with victaulic kit (as standard). Each evaporator has 2 or 3 circuits, one for each compressor and is manufactured in accordance to 97/23/EC directive (PED).

Condenser The condenser is manufactured with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increase cooling capacity without increasing the power input.

Heat Recovery Exchanger The unit is equipped with a plate to plate type heat exchanger for each circuit made of stainless steel brazed plates and manufactured in accordance to PED approval.

Condenser fans (ø 800) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is glass reinforced resin and each fan is protected by a guard. Fan motors are protected by circuit breakers (installed inside the electrical panel as a standard) and are IP54.

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 valves possess unique features: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.
Electronic expansion valves are typically working 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 2 or 3 independent refrigerant circuits and each one includes:
- Compressor with integrated oil separator
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Discharge line shut off valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- Oil pressure transducer

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4 General Characteristics

4 - 1 General characteristics

Electrical control panel Power and control are located in the main panel that is manufactured to ensure protection against all weather conditions. The electrical panel is IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20). The main panel is fitted with a main switch interlocked door.
Power Section The power section includes compressors and fans protection devices, compressors and fans starters and control circuit power supply.

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 and air, programmable values, set-points. A sophisticated software with predictive logic, selects the most energy efficient combination of compressors, EEXV and condenser fans 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 and fans modulation.
• Chiller enabled to work in partial failure condition.
• Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
• Display of evaporator entering/leaving water temperature.
• Display of Outdoor Ambient Temperature.
• Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
• Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
• Compressor and evaporator pumps hours counter.
• Display of Status Safety Devices.
• Number of starts and compressor working hours.
• Optimized management of compressor load.
• Fan management according to condensing pressure.
• 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).
• OAT (Outside Ambient temperature) Reset.
• Set point Reset (optional).
• Application and system upgrade with commercial SD cards.
• Ethernet port for remote or local servicing using standard web browsers.
• Two different sets of default parameters could be stored for easy restore.

Safety device / logic for each refrigerant circuit
• High pressure (pressure switch).
• High pressure (transducer).
• Low pressure (transducer).
• Fans circuit breaker.
• 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.

GNC_1a-2a-3a-4a_Rev.01_2a

4 General Characteristics

4 - 1 General characteristics

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

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

Standard Options (supplied on basic unit)

Wye-Delta compressor starter (Y-D) - For low inrush current and reduced starting torque
Double setpoint - Dual leaving water temperature setpoints.
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.
20mm evaporator insulation - The external shell is covered with a 20mm closed cell insulation material.
Evaporator electric heater - Electric heater (controlled by a thermostat) to protect the evaporator from freezing down to -28°C ambient temperature, providing the power supply is on.
Electronic expansion valve
Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.
Ambient outside temperature sensor and setpoint reset
Hour run meter
General fault contactor
Setpoint reset, Demand limit and Alarm from external device - (Set-point reset): 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. - (Demand limit): User can limit the load of the unit by 4-20mA signal or by network system. - (Alarm from external device): Microprocessor is able to receive an alarm signal from an external device (eg. pump, etc…). User can decide if this alarm signal will stop or not the unit.
Fans circuit breakers - Safety device against motor overloading and short circuit
Main switch interlock door
Emergency stop

Options (on request)

MECHANICAL
Total heat recovery - Produced with plate to plate or Shell&Tube heat exchangers to produce hot water.
Partial heat recovery - Produced with plate to plate heat exchangers to produce hot water.
Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required).
Evaporator flange kit
Condenser coil guards
Evaporator area guards
Cu-Cu condenser coil - To give better protection against corrosion by aggressive environments.
Cu-Cu-Sn condenser coil - To give better protection against corrosion in aggressive environments and by salty air.
Alucoat fins coil - Fins are protected by a special acrylic paint with a high resistance to corrosion.
Suction line shut-off valve - Installed on the suction port of the compressor to facilitate maintenance operation.
High pressure side manometers
Low pressure side manometers
One centrifugal pump (low lift) - Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.

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4 General Characteristics

4 - 1 General characteristics

One centrifugal pump (high lift) Hydronic kit consists of: single direct driven centrifugal pump, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pump are protected from freezing with an additional electrical heater.
Two centrifugal pump (low lift) - Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Two centrifugal pump (high lift) Hydronic kit consists of: twin direct driven centrifugal pumps, water filling system with pressure gauge, safety valve, drain valve. The motor pump is protected by a circuit breaker installed in control panel. The kit is assembled and wired to the control panel. The pipe and pumps are protected from freezing with an additional electrical heater.
Double pressure relief valve with diverter
Evaporator right water connections

ELECTRICAL / CONTROL
Soft starter - Electronic starting device to reduce the mechanical stress during compressor start-up
Compressor thermal overload relays - Safety devices against compressor motor overloading. This device together with internal motor protection (standard) guarantee the best safety system for compressor motor.
Under / Over voltage control - This device control the voltage value of power supply and stop the chiller if the value exceeds the allowed operating limits.
Energy meter - Device installed inside the control box showing ampere and volt values
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
Speedtrol (fan speed control device - ON/OFF - up to -18°C) - Continuous fan speed modulation on the first fan of each circuit. It allows the unit working with air temperature down to –18°C.
Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).
Compressors circuit breakers
Fans speed regulation (+ fan silent mode) - To control the fan speed revolution for smooth operating control of the unit. This option improves the sound level of the unit during low ambient temperature operation.
Ground fault relay - To shut down the entire unit if a ground fault condition is detected.
Rapid restart - It allows the unit to start as fast as 30 seconds after power is restored (in case of power failure).

INSTALLATION
Rubber anti vibration 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.
Spring anti vibration mounts - Supplied separately, these are positioned under the base of the unit during installation. Ideal for dampening vibrations for installation on roofs and metallic structures.

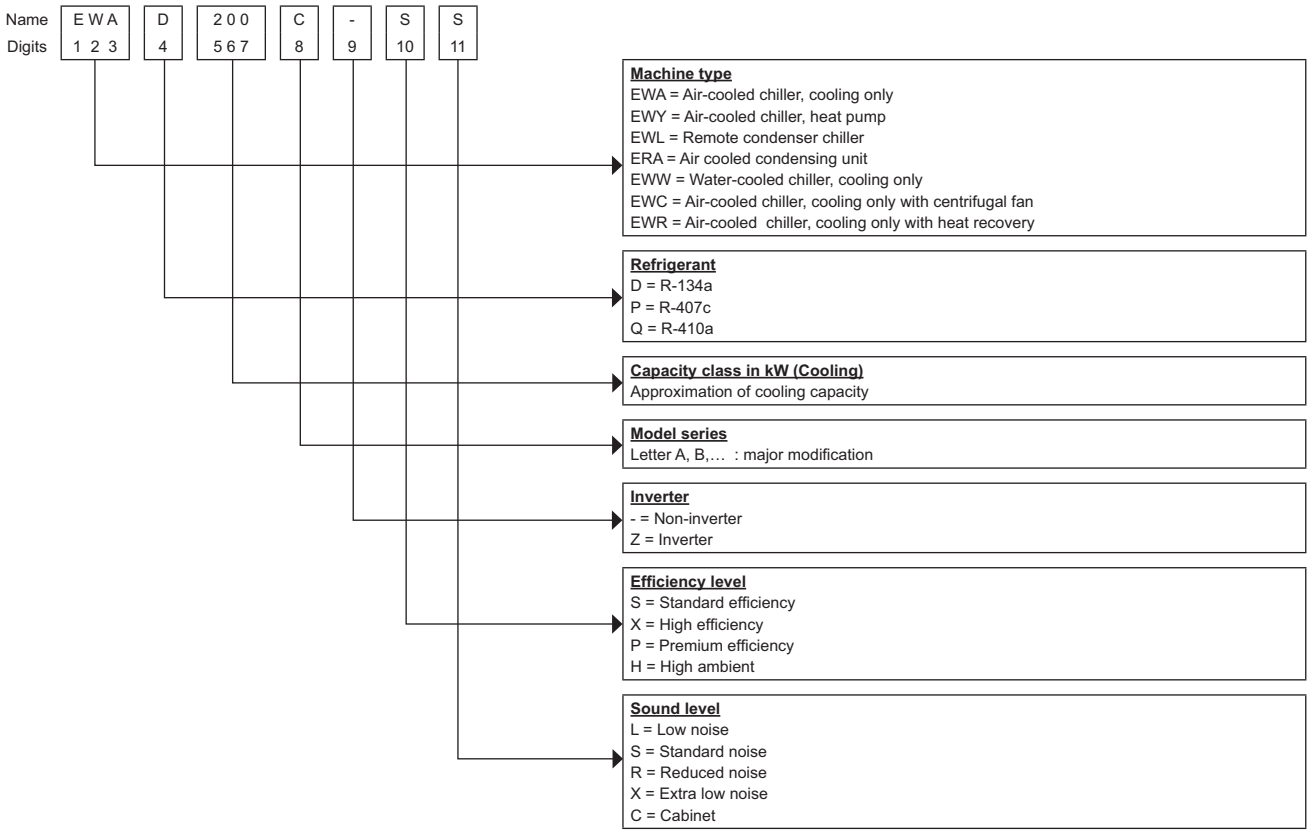
OTHER
Container Kit
Witness test
Acoustic test
Refrigerant recovery unit - This option allows to stock refrigerant charge of 1 circuit for maintenance operation. Liquid receiver includes in/out shut-off valve and relief valve.
Transport kit

GNC_1a-2a-3a-4a_Rev.01_4a

5 Nomenclature

5 - 1 Nomenclature

Nomenclature



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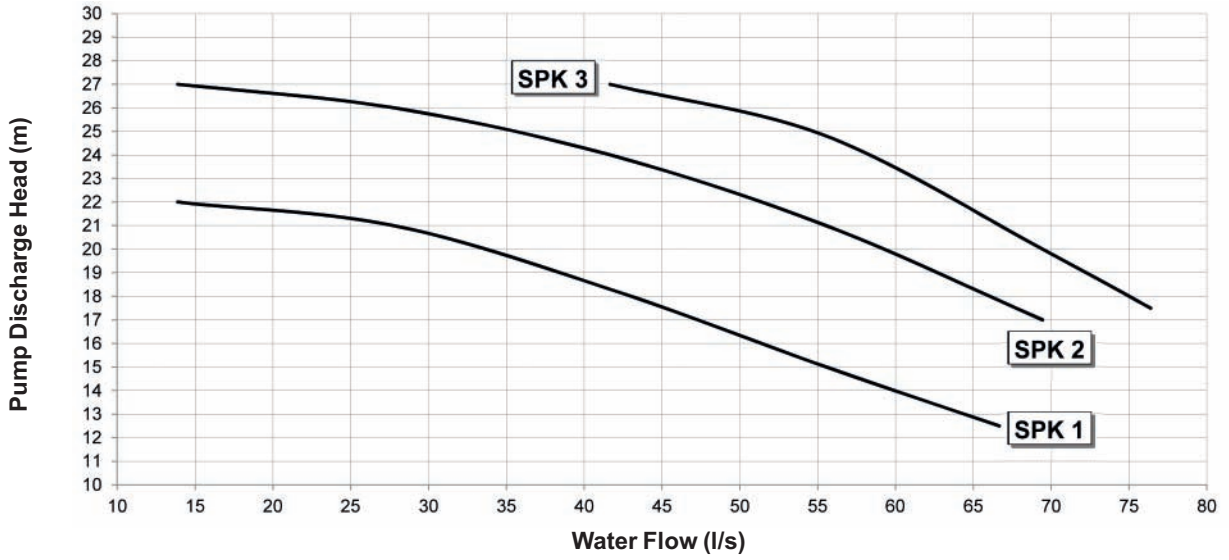
6 Options

6 - 1 Water Pump Kit - Technical Information

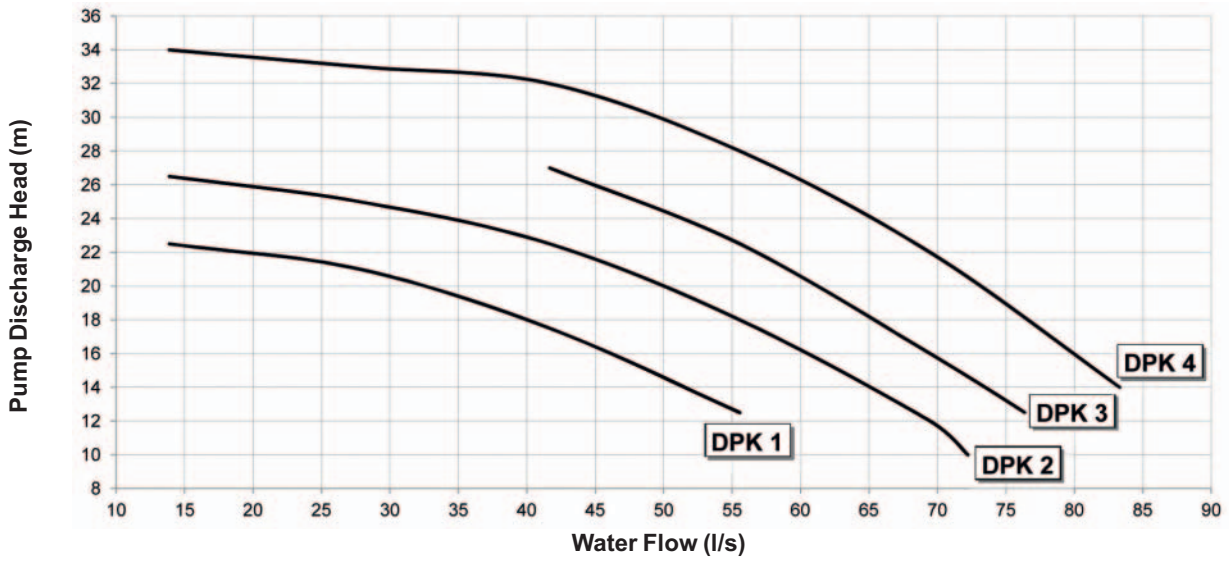
Water Pump Kit - Discharge Head

Single Pump (2 poles) - Discharge Head



Note
- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

Twin Pump (2 poles) - Discharge Head



NOTES

- the above curves are referred to the discharge head of the pump only
- when selecting the pump you have to consider the installation and evaporator pressure drops
- when using mixture of water and glycol please contact the factory as above specification can change

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6 Options

6 - 1 Water Pump Kit - Technical Information

		Pump Motor Power (kW)	Pump Motor Current (A)	Power supply (V-ph-Hz)	PN	Motor Protection	Insulation (Class)	Working Temp. (°C)
Single Pump	SPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
Double Pump	DPK 1	11,0	20,0	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 2	15,0	26,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 3	18,5	32,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK 4	22,0	39,0	400V-3ph-50hz	16	IP55	class F	-20 +140

NOTE

- When using mixture of water and glycol please contact the factory as above specificiation can change

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6 Options

6 - 2 Water Pump Kit - Combination Matrix

				Single Pump			Double Pump			
Version	**Size**	**Version**	**Size**	**SPK 1**	**SPK 2**	**SPK 3**	**DPK 1**	**DPK 2**	**DPK 3**	**DPK 4**
EWAD~C-SS EWAD~C-SL	650	EWAD~C-SR	620	X	X		X	X		
	740		720	X	X		X	X		
	830		790	X	X		X	X		
	910		880	X	X		X	X		
	970		920	X	X	X	X	X		
	C11		C10	X	X	X	X	X		
	C12		C11	X	X	X	X	X	X	X
	C13		C12		X	X			X	X
	H14		H14			X				X
EWAD~C-XS EWAD~C-XL	760	EWAD~C-XR	740	X	X		X	X		
	830		810	X	X		X	X		
	890		870	X	X		X	X		
	990		970	X	X	X	X	X	X	X
	C10		C10	X	X	X	X	X	X	X
	C11		C11	X	X	X		X	X	X
	C12		C12	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	H14		H14			X				X
	H15		H15			X				X
EWAD~C-PS EWAD~C-PL	820	EWAD~C-PR	810	X	X		X	X		
	890		880	X	X		X	X		
	980		960	X	X	X	X	X		
	C11		C10	X	X	X	X	X	X	X
	C12		C11	X	X	X		X	X	X
	C13		C13	X	X	X		X	X	X
	C14		C14		X	X		X	X	X
	C15		C15			X				X
	C16		C16							

WPKCM_1a-2a-3a_Rev.03_2a

7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 4 Cc (kW)	4 Pi (kW)	4 qw (l/s)	4 dpw (kPa)	5 Cc (kW)	5 Pi (kW)	5 qw (l/s)	5 dpw (kPa)	6 Cc (kW)	6 Pi (kW)	6 qw (l/s)	6 dpw (kPa)
810	25	782	175	37,2	53	806	178	38,4	56	831	180	39,6	59
	30	760	192	36,2	50	784	195	37,4	53	808	198	38,5	56
	35	738	209	35,2	47	762	213	36,3	50	785	216	37,4	53
	40	712	227	33,9	44	735	231	35,0	47	758	234	36,1	50
	46	671	251	32,0	40	693	254	33,0	42	715	258	34,1	45
	49	645	264	30,7	37	666	267	31,7	39	687	271	32,8	42
	52	615	278	29,3	34	635	281	30,3	36	656	285	31,3	38
880	25	847	196	40,4	61	873	199	41,6	64	900	202	42,9	68
	30	824	215	39,3	58	850	218	40,5	61	876	221	41,7	65
	35	800	234	38,1	55	824	237	39,3	58	850	241	40,5	61
	40	770	254	36,7	51	794	258	37,8	54	818	261	39,0	57
	46	723	280	34,4	46	745	284	35,5	48	768	289	36,6	51
	49	693	295	33,0	42	715	299	34,1	45	737	304	35,1	47
	52	632	298	30,1	36	644	298	30,7	37	656	298	31,3	38
960	25	927	219	44,1	28	956	222	45,6	30	985	226	47,0	31
	30	901	239	42,9	27	929	243	44,3	28	958	247	45,7	30
	35	873	260	41,6	25	900	264	42,9	27	928	268	44,3	28
	40	838	282	39,9	23	864	286	41,2	25	891	291	42,5	26
	46	783	312	37,3	21	807	316	38,5	22	832	321	39,7	23
	49	748	328	35,6	19	772	333	36,8	20	795	338	37,9	21
	52	650	317	31,0	15	654	313	31,2	15	663	311	31,6	15
C10	25	1021	240	48,7	55	1053	244	50,2	59	1085	248	51,8	62
	30	993	263	47,3	53	1024	267	48,8	56	1055	271	50,3	59
	35	962	285	45,8	50	992	290	47,3	53	1022	294	48,7	56
	40	923	310	44,0	46	952	315	45,4	49	981	320	46,8	52
	46	862	342	41,1	41	889	348	42,4	43	916	353	43,7	46
	49	824	360	39,2	38	850	366	40,5	40	869	368	41,4	42
	52	724	350	34,5	30	731	347	34,9	30	735	342	35,1	31
C11	25	1101	265	52,5	64	1135	269	54,1	67	1169	274	55,7	71
	30	1070	289	51,0	60	1103	294	52,6	64	1137	299	54,2	67
	35	1035	315	49,3	57	1067	320	50,9	60	1099	325	52,4	64
	40	992	342	47,2	53	1022	347	48,7	56	1052	353	50,2	59
	46	921	378	43,9	46	950	384	45,3	49	979	390	46,7	52
	49	878	397	41,8	42	905	403	43,1	45	919	404	43,8	46
	52	717	360	34,1	29	719	353	34,3	30	728	350	34,7	30
C13	25	1217	292	58,0	55	1255	297	59,8	58	1293	302	61,6	61
	30	1183	319	56,3	52	1219	324	58,1	55	1256	329	59,9	58
	35	1144	346	54,5	49	1179	352	56,2	52	1215	358	57,9	55
	40	1095	376	52,1	45	1128	382	53,8	48	1162	388	55,4	51
	46	1017	416	48,4	40	1049	422	50,0	42	1080	429	51,5	44
	49	969	437	46,2	36	999	444	47,6	39	1011	444	48,2	39
	52	791	396	37,7	25	794	389	37,8	26	800	383	38,1	26
C14	25	1322	318	63,0	64	1363	323	64,9	67	1403	328	66,9	71
	30	1285	347	61,2	61	1324	353	63,1	64	1365	359	65,1	68
	35	1243	378	59,2	57	1281	384	61,0	60	1319	390	62,9	64
	40	1190	410	56,7	53	1226	417	58,4	56	1263	423	60,2	59
	46	1106	453	52,7	46	1140	460	54,3	49	1174	467	56,0	52
	49	1054	477	50,2	42	1086	484	51,8	45	1103	485	52,6	46
	52	860	432	41,0	29	864	424	41,2	30	874	420	41,7	30
C15	25	1405	340	66,9	74	1447	345	69,0	78	1489	351	71,0	82
	30	1366	372	65,1	70	1407	378	67,0	74	1448	384	69,0	78
	35	1321	405	62,9	66	1360	412	64,8	70	1399	418	66,7	73
	40	1263	442	60,2	61	1300	449	62,0	64	1337	455	63,8	68
	46	1170	490	55,7	53	1205	498	57,4	56	1240	505	59,1	59
	49	1072	495	51,1	45	1092	495	52,0	47	1103	491	52,6	48
	52	847	444	40,3	30	857	440	40,9	30	863	433	41,1	31
C16	25	1490	364	71,0	81	1534	370	73,1	85	1579	376	75,3	90
	30	1448	399	69,0	76	1490	406	71,0	81	1533	412	73,1	85
	35	1398	436	66,6	72	1438	443	68,6	76	1479	450	70,5	80
	40	1334	477	63,5	66	1372	484	65,4	70	1411	491	67,3	73
	46	1231	531	58,6	57	1267	539	60,4	60	1303	547	62,1	63
	49	1086	517	51,7	46	1093	509	52,1	46	1098	501	52,4	47
	52	834	464	39,7	28	844	459	40,2	29	853	452	40,7	30

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 7 Cc (kW)	7 Pi (kW)	7 qw (l/s)	7 dpw (kPa)	8 Cc (kW)	8 Pi (kW)	8 qw (l/s)	8 dpw (kPa)	9 Cc (kW)	9 Pi (kW)	9 qw (l/s)	9 dpw (kPa)
810	25	856	183	40,8	62	881	186	42,1	65	907	189	43,3	69
	30	833	201	39,7	59	858	204	40,9	62	883	207	42,2	66
	35	809	219	38,6	56	833	222	39,8	59	858	225	41,0	62
	40	781	237	37,3	53	804	241	38,4	55	828	244	39,5	58
	46	737	262	35,1	47	759	265	36,2	50	782	269	37,3	53
	49	709	275	33,8	44	731	279	34,9	47	753	283	35,9	49
	52	676	289	32,3	41	681	287	32,5	41	685	284	32,7	42
880	25	926	205	44,2	71	953	208	45,5	75	981	211	46,8	79
	30	902	225	43,0	68	928	228	44,3	72	955	231	45,6	76
	35	875	244	41,7	65	901	248	43,0	68	927	252	44,3	72
	40	842	265	40,2	60	867	269	41,4	64	893	273	42,6	67
	46	791	293	37,8	54	815	297	38,9	57	838	301	40,0	60
	49	759	308	36,2	50	782	312	37,3	53	799	314	38,2	55
	52	670	298	32,0	40	674	295	32,2	40	679	292	32,4	41
960	25	1015	230	48,4	33	1045	233	49,9	35	1076	237	51,4	37
	30	987	251	47,1	32	1017	255	48,5	33	1047	259	50,0	35
	35	956	272	45,6	30	984	277	47,0	31	1013	281	48,4	33
	40	917	295	43,8	28	944	300	45,1	29	972	305	46,4	31
	46	857	326	40,9	24	882	331	42,1	26	908	336	43,4	27
	49	819	343	39,1	23	844	348	40,3	24	849	345	40,6	24
	52	665	306	31,7	16	666	300	31,8	16	673	297	32,1	16
C10	25	1118	252	53,3	65	1151	256	54,9	69	1185	260	56,6	73
	30	1087	275	51,9	62	1120	280	53,4	66	1153	284	55,0	69
	35	1053	299	50,2	59	1084	304	51,8	62	1116	309	53,3	65
	40	1010	325	48,2	54	1040	330	49,7	57	1071	335	51,1	61
	46	944	358	45,0	48	972	364	46,4	51	1000	369	47,8	54
	49	885	369	42,2	43	901	369	43,0	44	916	369	43,7	46
	52	730	347	34,8	30	736	343	35,1	31	741	338	35,4	31
C11	25	1204	278	57,4	75	1239	283	59,1	79	1274	287	60,9	83
	30	1170	304	55,8	71	1205	309	57,5	75	1239	314	59,2	79
	35	1132	330	54,0	67	1165	335	55,6	71	1198	341	57,2	74
	40	1083	358	51,7	62	1115	364	53,2	65	1147	370	54,8	69
	46	1007	395	48,1	54	1037	402	49,5	57	1066	408	50,9	60
	49	925	401	44,2	47	931	396	44,4	47	936	391	44,7	48
	52	713	363	34,0	29	721	359	34,4	30	721	351	34,5	30
C13	25	1331	307	63,5	65	1371	312	65,4	68	1411	317	67,4	72
	30	1294	335	61,7	62	1332	340	63,6	65	1371	346	65,5	68
	35	1251	364	59,7	58	1288	370	61,5	61	1325	376	63,3	64
	40	1197	395	57,1	53	1232	401	58,8	56	1267	407	60,5	59
	46	1112	435	53,1	47	1145	442	54,6	49	1178	449	56,2	52
	49	1018	439	48,6	40	1024	434	48,9	40	1029	428	49,1	41
	52	784	398	37,4	25	793	394	37,8	26	796	387	38,0	26
C14	25	1445	334	68,9	75	1487	339	71,0	79	1530	345	73,1	83
	30	1405	365	67,0	71	1446	370	69,0	75	1488	377	71,1	79
	35	1359	396	64,8	67	1398	403	66,8	71	1438	409	68,7	75
	40	1300	430	62,0	62	1338	437	63,9	66	1377	444	65,8	69
	46	1209	475	57,7	55	1244	482	59,4	57	1280	490	61,1	60
	49	1111	481	53,0	47	1117	475	53,3	47	1123	469	53,6	48
	52	856	436	40,9	29	865	431	41,3	30	866	422	41,4	30
C15	25	1532	356	73,1	86	1575	362	75,2	91	1618	368	77,3	95
	30	1489	390	71,1	82	1532	396	73,1	86	1574	402	75,1	91
	35	1439	425	68,7	77	1479	431	70,6	81	1520	438	72,6	85
	40	1375	463	65,6	71	1414	470	67,5	75	1452	477	69,4	79
	46	1275	513	60,8	62	1297	515	61,9	64	1319	515	63,0	66
	49	1109	485	52,9	48	1114	477	53,2	49	1122	471	53,6	49
	52	859	438	41,0	31	867	431	41,4	31	873	424	41,7	31
C16	25	1624	382	77,5	94	1668	388	79,6	99	1711	394	81,7	104
	30	1577	419	75,2	89	1621	425	77,4	94	1664	432	79,5	99
	35	1521	457	72,6	84	1563	465	74,6	88	1606	472	76,7	93
	40	1450	499	69,2	77	1490	507	71,1	81	1530	515	73,1	85
	46	1339	555	63,9	67	1348	551	64,4	68	1356	545	64,8	68
	49	1112	497	53,0	48	1115	487	53,2	48	1126	481	53,8	49
	52	861	445	41,1	30	868	438	41,4	31	873	429	41,7	31

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 10 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	11 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)	12 Cc (kW)	Pi (kW)	qw (l/s)	dpw (kPa)
810	25	934	191	44,6	73	961	194	45,9	77	988	197	47,2	80
	30	909	210	43,4	69	936	213	44,7	73	963	216	46,0	77
	35	883	228	42,2	66	909	232	43,4	69	935	235	44,7	73
	40	852	248	40,7	62	877	251	41,9	65	902	255	43,1	68
	46	804	273	38,4	56	828	277	39,6	59	851	281	40,7	62
	49	775	287	37,0	52	797	291	38,1	55	820	295	39,2	58
	52	689	281	32,9	42	691	277	33,0	42	699	275	33,4	43
880	25	1008	215	48,2	83	1037	218	49,5	88	1065	221	50,9	92
	30	982	235	46,9	80	1010	239	48,3	84	1038	242	49,6	88
	35	953	256	45,5	75	980	259	46,8	79	1007	263	48,2	83
	40	918	277	43,9	70	944	281	45,1	74	970	285	46,4	78
	46	863	306	41,2	63	887	310	42,4	66	912	315	43,6	70
	49	812	315	38,8	57	826	315	39,5	58	839	314	40,1	60
	52	673	295	32,2	40	678	291	32,4	41	684	288	32,7	42
960	25	1108	241	52,9	39	1140	245	54,5	41	1173	249	56,1	43
	30	1078	263	51,5	37	1109	267	53,0	39	1140	272	54,5	41
	35	1043	286	49,8	35	1073	290	51,3	37	1103	295	52,7	39
	40	1000	310	47,8	32	1028	314	49,2	34	1057	319	50,6	36
	46	934	341	44,6	29	960	346	45,9	30	987	352	47,2	32
	49	854	342	40,8	24	858	338	41,0	25	861	333	41,2	25
	52	660	307	31,5	15	665	303	31,8	16	670	299	32,0	16
C10	25	1219	264	58,3	77	1254	269	59,9	81	1289	273	61,6	85
	30	1186	289	56,7	73	1220	293	58,3	77	1254	298	60,0	81
	35	1148	314	54,9	69	1181	319	56,4	72	1214	324	58,0	76
	40	1101	340	52,6	64	1132	345	54,1	67	1164	351	55,7	71
	46	1029	375	49,2	56	1058	380	50,6	59	1084	385	51,8	62
	49	931	368	44,5	47	946	368	45,2	49	960	368	45,9	50
	52	745	333	35,6	32	748	327	35,7	32	757	324	36,2	33
C11	25	1311	292	62,6	87	1348	297	64,4	92	1385	302	66,2	97
	30	1274	319	60,9	83	1310	324	62,6	87	1346	329	64,4	92
	35	1232	346	58,9	78	1266	352	60,5	82	1301	358	62,2	86
	40	1179	376	56,3	72	1211	382	57,9	76	1244	388	59,5	80
	46	1096	414	52,4	63	1127	421	53,9	67	1149	424	55,0	69
	49	939	385	44,9	48	941	378	45,0	48	951	375	45,5	49
	52	727	346	34,7	30	732	340	35,0	31	742	337	35,5	31
C13	25	1452	322	69,4	76	1493	328	71,4	80	1534	333	73,4	84
	30	1411	352	67,4	72	1451	357	69,3	76	1491	364	71,3	80
	35	1363	382	65,1	68	1401	388	67,0	71	1440	394	68,8	75
	40	1303	414	62,3	62	1339	421	64,0	66	1376	427	65,8	69
	46	1211	456	57,9	55	1245	463	59,5	58	1266	466	60,5	59
	49	1032	422	49,3	41	1039	416	49,6	42	1045	411	50,0	42
	52	802	381	38,3	26	807	374	38,6	26	815	369	39,0	27
C14	25	1574	351	75,2	88	1618	357	77,3	92	1663	363	79,5	97
	30	1530	383	73,1	83	1573	389	75,2	88	1616	395	77,3	92
	35	1479	416	70,7	79	1520	422	72,6	83	1561	429	74,7	87
	40	1415	451	67,6	73	1454	458	69,5	76	1493	465	71,4	80
	46	1316	497	62,9	64	1353	505	64,7	67	1380	510	66,0	69
	49	1127	462	53,8	48	1129	454	54,0	48	1141	450	54,6	49
	52	873	415	41,7	30	878	408	42,0	31	891	405	42,6	32
C15	25	1662	373	79,4	100	1705	379	81,5	105	1749	385	83,6	110
	30	1616	409	77,2	95	1658	415	79,3	100	1701	422	81,4	105
	35	1561	445	74,6	90	1602	452	76,6	94	1643	459	78,6	98
	40	1492	485	71,3	82	1531	492	73,2	87	1571	500	75,1	91
	46	1340	515	64,0	68	1360	514	65,0	70	1381	515	66,0	72
	49	1120	477	53,5	49	1127	470	53,9	50	1132	462	54,2	50
	52	883	419	42,2	32	887	410	42,4	32	894	404	42,7	33
C16	25	1756	400	83,9	109	1801	406	86,1	114	1846	413	88,3	119
	30	1707	439	81,6	103	1750	445	83,7	108	1794	452	85,8	113
	35	1648	479	78,7	97	1689	487	80,8	102	1731	494	82,8	106
	40	1571	523	75,1	89	1612	531	77,1	93	1653	539	79,0	98
	46	1363	537	65,1	69	1368	529	65,4	69	1383	525	66,1	71
	49	1110	496	53,0	48	1120	490	53,5	48	1120	478	53,5	48
	52	885	425	42,3	32	888	415	42,4	32	898	409	43,0	33

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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7 Capacity tables

7 - 1 Cooling Capacity Tables

COOLING PERFORMANCE
EWAD~C-PR

Size	Twout / Ta	Condenser Inlet Air Temperature (°C) 13 Cc (kW)	13 Pi (kW)	13 qw (l/s)	13 dpw (kPa)	14 Cc (kW)	14 Pi (kW)	14 qw (l/s)	14 dpw (kPa)	15 Cc (kW)	15 Pi (kW)	15 qw (l/s)	15 dpw (kPa)
810	25	1015	200	48,6	85	1043	203	49,9	89	1070	206	51,2	93
	30	989	219	47,3	81	1016	222	48,6	85	1044	226	50,0	89
	35	961	239	46,0	77	987	242	47,3	81	1014	246	48,5	85
	40	927	259	44,4	72	953	262	45,6	76	979	266	46,9	79
	46	875	285	41,9	65	899	289	43,0	68	924	293	44,2	71
	49	843	299	40,3	61	867	303	41,5	64	891	307	42,6	67
	52	700	271	33,5	43	700	266	33,5	43	706	263	33,8	44
880	25	1094	225	52,3	97	1123	228	53,7	101	1152	232	55,1	106
	30	1066	246	51,0	92	1094	249	52,4	97	1123	253	53,8	102
	35	1034	267	49,5	88	1062	271	50,8	92	1090	275	52,2	96
	40	996	290	47,6	82	1022	294	48,9	86	1049	298	50,2	90
	46	936	319	44,8	73	961	324	46,0	77	987	328	47,2	81
	49	851	314	40,7	62	867	315	41,5	64	879	314	42,1	65
	52	686	283	32,8	42	688	278	32,9	42	695	275	33,3	43
960	25	1206	254	57,7	45	1240	258	59,3	48	1274	263	61,0	50
	30	1172	276	56,1	43	1205	281	57,7	45	1238	286	59,3	48
	35	1134	300	54,2	41	1165	305	55,8	43	1197	310	57,3	45
	40	1086	325	52,0	38	1116	330	53,4	40	1146	335	54,9	41
	46	1014	357	48,5	33	1042	363	49,9	35	1054	363	50,5	36
	49	862	327	41,3	25	871	325	41,7	25	871	319	41,7	25
	52	674	293	32,2	16	683	291	32,7	16	685	285	32,8	16
C10	25	1324	277	63,4	89	1360	282	65,1	93	1396	287	66,9	98
	30	1289	303	61,6	85	1323	308	63,3	89	1359	313	65,0	93
	35	1247	329	59,7	80	1281	334	61,3	84	1315	339	62,9	88
	40	1196	356	57,2	74	1228	362	58,8	78	1261	367	60,3	82
	46	1101	385	52,6	64	1117	385	53,5	66	1134	385	54,3	67
	49	963	362	46,1	50	969	358	46,4	51	964	361	46,2	50
	52	761	319	36,4	33	759	321	36,3	33	762	315	36,5	33
C11	25	1422	307	68,0	101	1459	312	69,8	106	1497	317	71,7	111
	30	1383	335	66,1	96	1419	340	67,9	101	1456	346	69,7	106
	35	1336	363	63,9	91	1371	369	65,6	95	1406	375	67,3	100
	40	1277	394	61,1	84	1311	400	62,7	88	1345	407	64,4	92
	46	1155	420	55,2	70	1159	415	55,5	70	1162	409	55,6	71
	49	951	368	45,5	49	959	364	45,9	50	947	375	45,3	49
	52	745	330	35,6	32	754	327	36,1	32	754	319	36,1	32
C13	25	1576	339	75,4	88	1618	345	77,5	92	1661	351	79,5	97
	30	1532	370	73,3	84	1573	376	75,3	88	1614	382	77,3	92
	35	1479	401	70,8	79	1519	408	72,7	82	1558	414	74,6	86
	40	1413	434	67,6	72	1451	441	69,4	76	1489	449	71,3	80
	46	1272	461	60,8	60	1276	455	61,1	60	1280	449	61,3	61
	49	1049	405	50,2	42	1058	400	50,6	43	1045	413	50,0	42
	52	822	363	39,3	27	828	357	39,6	28	832	351	39,9	28
C14	25	1707	369	81,7	102	1752	375	83,9	107	1798	381	86,1	112
	30	1660	402	79,4	97	1704	409	81,5	102	1748	415	83,7	106
	35	1604	436	76,7	91	1646	443	78,8	95	1689	451	80,8	100
	40	1533	473	73,4	84	1574	480	75,3	88	1615	488	77,3	92
	46	1386	504	66,3	70	1392	498	66,6	71	1395	491	66,8	71
	49	1141	441	54,6	49	1151	436	55,1	50	1136	450	54,4	49
	52	894	396	42,8	32	905	392	43,3	33	905	382	43,4	33
C15	25	1793	391	85,8	115	1837	397	87,9	120	1882	404	90,1	126
	30	1744	428	83,4	109	1787	435	85,5	114	1830	441	87,6	120
	35	1685	466	80,6	103	1726	474	82,6	108	1767	481	84,6	112
	40	1610	508	77,0	95	1650	515	79,0	99	1690	523	80,9	104
	46	1385	507	66,3	72	1394	502	66,7	73	1396	493	66,8	73
	49	1141	456	54,6	51	1148	450	55,0	52	1144	452	54,7	51
	52	905	399	43,3	34	904	388	43,3	34	913	383	43,7	34
C16	25	1892	419	90,5	125	1939	426	92,8	130	1986	432	95,1	136
	30	1838	459	87,9	118	1883	466	90,1	124	1928	474	92,3	129
	35	1773	502	84,8	111	1816	509	86,9	116	1858	517	89,0	121
	40	1692	548	81,0	102	1732	556	82,9	106	1772	564	84,9	111
	46	1385	516	66,3	71	1398	511	66,9	72	1397	500	66,9	72
	49	1136	475	54,4	50	1142	467	54,7	50	1147	457	54,9	51
	52	908	404	43,4	33	906	392	43,4	33	913	385	43,7	34

NOTES

Fluid: water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop

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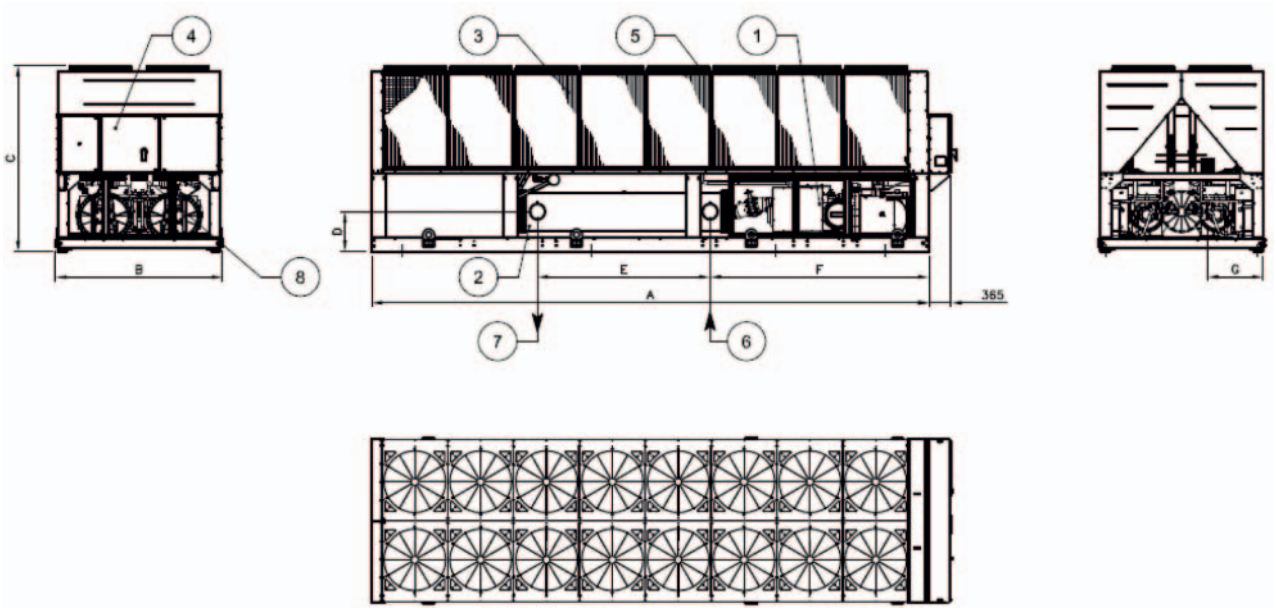
8 Dimensional drawings

8 - 1 Dimensional Drawings

EWAD-C- (2 circuits)



Drawing is for illustration only. Please refer to the table below for unit dimensions.

EWAD~C-	Dimensions (mm)								Fans
Size	Size	A	B	C	D	E	F	G	
EWAD650÷830C-SS/SL	EWAD620÷720C-SR	6185	2285	2540	450	2412	435	810	Nr 10
EWAD910÷970C-SS/SL	EWAD880÷920C-SR	6185	2285	2540	450	2412	435	810	Nr 12
EWADC11C-SS/SL	EWADC10C-SR	7085	2285	2540	1350	2412	435	810	Nr 14
EWADC12C-SS/SL	EWADC11C-SR	7985	2285	2540	2250	2412	435	810	Nr 16
EWADC13÷H14C-SS/SL	EWADC12÷H14C-SR	8885	2285	2540	3170	2360	540	760	Nr 18
EWAD760C-XS/XL	EWAD740C-XR	6185	2285	2540	470	2412	435	810	Nr 12
EWAD830÷890C-XS/XL	EWAD810÷870C-XR	7085	2285	2540	1370	2412	435	810	Nr 14
EWAD990÷C10C-XS/XL	EWAD970÷C10C-XR	7985	2285	2540	2270	2360	540	760	Nr 16
EWADC11÷C13C-XS/XL	EWADC11÷C13C-XR	9785	2285	2540	4070	2360	540	760	Nr 20
EWADH14÷H15C-XS/XL/XR		9785	2285	2285	2920	3440	540	685	Nr 20
EWAD820÷890C-PS/PL	EWAD810÷880C-PR	8885	2285	2540	2020	3510	540	760	Nr 18
EWAD980C-PS/PL	EWAD960C-PR	8885	2285	2540	2020	3440	540	685	Nr 18
EWADC11÷C12C-PS/PL	EWADC10÷C11C-PR	9785	2285	2540	2920	3440	540	685	Nr 20
EWADC13C-PS/PL	EWADC13C-PR	11085	2285	2540	4205	3440	540	685	Nr 22
EWADC14C-PS/PL	EWADC14C-PR	11985	2285	2540	5105	3440	540	685	Nr 24
EWADC15÷C16C-PS/PL/PR		11985	2285	2285	5130	3440	540	685	Nr 24

LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

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9 Sound data

9 - 1 Sound Power Spectrum

SOUND LEVELS
EWAD~C-PS

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
820	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
890	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
980	74,4	76,5	79,3	78,5	74,4	69,9	60,3	51,2	**79,5**	**101,0**
C11	74,9	77,0	79,8	79,0	74,9	70,4	60,8	51,7	**80,0**	**101,8**
C12	75,4	77,5	80,3	79,5	75,4	70,9	61,3	52,2	**80,5**	**102,3**
C13	75,3	77,4	80,2	79,4	75,3	70,8	61,2	52,1	**80,4**	**102,6**
C14	75,4	77,5	80,3	79,5	75,4	70,9	61,3	52,2	**80,5**	**102,9**
C15	75,7	77,8	80,6	79,8	75,7	71,2	61,6	52,5	**80,8**	**103,2**
C16	76,0	78,1	80,9	80,1	76,0	71,5	61,9	52,8	**81,1**	**103,5**

EWAD~C-PL

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
820	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
890	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
980	71,8	73,9	76,7	75,9	71,8	67,3	57,7	48,6	**76,9**	**98,4**
C11	71,9	74,0	76,8	76,0	71,9	67,4	57,8	48,7	**77,0**	**98,8**
C12	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**99,9**
C13	72,0	74,1	76,9	76,1	72,0	67,5	57,9	48,8	**77,1**	**99,3**
C14	72,1	74,2	77,0	76,2	72,1	67,6	58,0	48,9	**77,2**	**99,6**
C15	72,4	74,5	77,3	76,5	72,4	67,9	58,3	49,2	**77,5**	**99,9**
C16	72,7	74,8	77,6	76,8	72,7	68,2	58,6	49,5	**77,8**	**100,2**

EWAD~CPR

	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)									Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	**dB(A)**	**dB(A)**
810	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
880	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
960	67,8	61,0	68,1	73,3	60,7	57,1	48,8	36,2	**71,2**	**92,7**
C10	68,3	61,5	68,6	73,8	61,2	57,6	49,3	36,7	**71,7**	**93,4**
C11	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**93,8**
C13	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**94,1**
C14	68,6	61,8	68,9	74,1	61,5	57,9	49,6	37,0	**72,0**	**94,4**
C15	68,9	62,1	69,2	74,4	61,8	58,2	49,9	37,3	**72,3**	**94,7**
C16	69,2	62,4	69,5	74,7	62,1	58,5	50,2	37,6	**72,6**	**95,0**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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9 Sound data

9 - 1 Sound Power Spectrum

Sound pressure level correction factor for different distances

EWAD~C-SS / EWAD~C-SL / EWAD~C-SR

Unit size			Distance						
EWAD~C-SS	EWAD~C-SL	EWAD~C-SR	1m	5m	10m	15m	20m	25m	50m
650	650	620	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
740	740	720	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
830	830	790	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
910	910	880	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
970	970	920	0,0	-7.1	-11,6	-14,6	-16,8	-18,6	**-24,2**
C11	C11	C10	0,0	-6.9	-11,4	-14,3	-16,5	-18,3	**-23,9**
C12	C12	C11	0,0	-6,7	-11,2	-14,1	-16,3	-18,0	**-23,6**
C13	C13	C12	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
H14	H14	H14	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C15	C15	C14	0,0	-6,4	-10,7	-13,6	-15,7	-17,4	**-17,4**
C16	C16	C15	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C17	C17	C16	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-17,2**
C18	C18	C17	0,0	-6.3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C19	C19	C18	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C20	C20	C19	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

EWAD~C-XS / EWAD~C-XL / EWAD~C-XR

Unit size			Distance						
EWAD~C-XS	EWAD~C-XL	EWAD~C-XR	1m	5m	10m	15m	20m	25m	50m
760	760	740	0,0	-7,1	-11.6	-14,6	-16,8	-18,6	**-24,2**
830	830	810	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
890	890	870	0,0	-6,9	-11.4	-14,3	-16,5	-18,3	**-23,9**
990	990	970	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C10	C10	C10	0,0	-6,7	-11.2	-14,1	-16,3	-18,0	**-23,6**
C11	C11	C11	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C12	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H14	H14	H14	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
H15	H15	H15	0,0	-6,5	-10.8	-13,7	-15,8	-17,5	**-23,1**
C16	C16	C16	0,0	-6,2	-10.4	-13,2	-15,3	-17,0	**-22,5**
C17	C17	C17	0,0	-6,1	-10.3	-13,0	-15,1	-16,8	**-22,3**
C18	C18	C18	0,0	-6,0	-10.1	-12,9	-15,0	-16,7	**-22,1**
C19	C19	C19	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C20	C20	C20	0,0	-5,9	-10,0	-12,7	-14,8	-16,5	**-22,0**
C21	C21	C21	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**
C22	C22	C22	0,0	-5,9	-10	-12,7	-14,8	-16,5	**-22,0**

EWAD~C-PS / EWAD~C-PL / EWAD~C-PR

Unit size			Distance						
EWAD~C-PS	EWAD~C-PL	EWAD~C-PR	1m	5m	10m	15m	20m	25m	50m
820	820	810	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
890	890	880	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
980	980	960	0,0	-6,6	-11,0	-13,9	-16,0	-17,8	**-23,4**
C11	C11	C10	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C12	C12	C11	0,0	-6,5	-10,8	-13,7	-15,8	-17,5	**-23,1**
C13	C13	C13	0,0	-6,3	-10,5	-13,4	-15,5	-17,2	**-22,8**
C14	C14	C14	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C15	C15	C15	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**
C16	C16	C16	0,0	-6,2	-10,4	-13,2	-15,3	-17,0	**-22,5**

NOTE

Reduction to be applied to standard, low and reduced sound configuration.

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10 Installation

10 - 1 Installation Method

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

Handling Care should be taken to avoid rough handling or shock due to dropping the unit. Do not push or pull the unit from anything other than the base frame. Never allow the unit to fall during unloading or moving as this may result in serious damage. To lift the unit, rings are provided in the base frame of the unit. Spreader bar and cables should be arranged to prevent damage to the condenser coil or unit cabinet.

Location The units are produced for outside installation on roofs, floors or below ground level on condition that the area is free from obstacles for the passage of the condenser air. The unit should be positioned on solid foundations and perfectly level; in the case of installation on roofs or floors, it may be advisable to arrange the use of suitable weight distribution beams. When the units are installed on the ground, a concrete base at least 250 mm wider and longer than the unit's footprint should be laid. Furthermore, this base should withstand the unit weight mentioned in the technical data table.

Space requirements The units are air-cooled, then it is important to respect the minimum distances which guarantee the best ventilation of the condenser coils. Limitations of space reducing the air flow could cause significant reductions in cooling capacity and an increase in electricity consumption.
To determinate unit placement, careful consideration must be given to assure a sufficient air flow across the condenser heat transfer surface. Two conditions must be avoided to achieve the best performance: warm air recirculation and coil starvation. Both these conditions cause an increase of condensing pressures that results in reductions in unit efficiency and capacity.
Moreover the unique microprocessor has the ability to calculate the operating environment of the air cooled chiller and the capacity to optimize its performance staying on-line during abnormal conditions.
Each side of the unit must be accessible after installation for periodic service. Fig.1 shows you minimum recommended clearance requirements.
Vertical condenser air discharge must be unobstructed because the unit would have its capacity and efficiency significantly reduced.
If the units are positioned in places surrounded by walls or obstacles of the same height as the units, the units should be at least 2500 mm from obstacles (Fig.2). In the event the obstacles are higher than the units, the units should be at least 3000 mm from the obstacle (Fig.3). Units installed closer than the minimum recommended distance to a wall or other vertical riser may experience a combination of coil starvation and warm air recirculation, thus causing reduction in unit capacity and efficiency reductions. The microprocessor control is proactive in response "of design condition". In the case of single or compounded influences restricting airflow to the unit, the microprocessor will act to keep the compressor(s) running (at reduced capacity) rather than allowing a shut-off on high discharge pressure.
When two or more units are positioned side by side it is recommended that the condenser coils are at least 3600 mm distance from one another (Fig.4); strong wind could be the cause of air warm recirculation.
For other installation solutions, consult our technicians.

The above recommended information are representative of general installation. A specific evaluation should be done by contractor depending on the case.

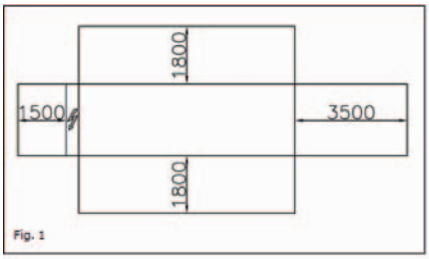

Fig. 1

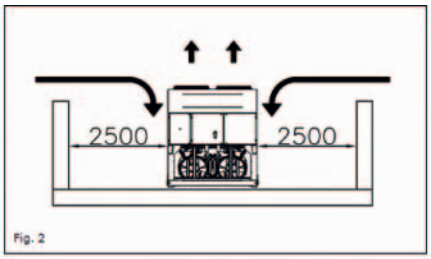

Fig. 2

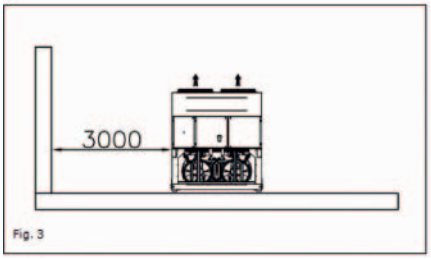

Fig. 3

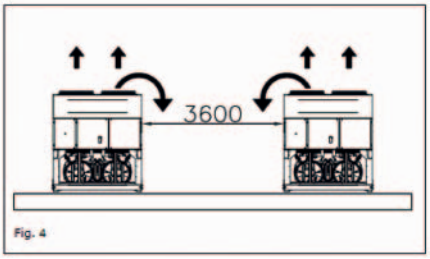

Fig. 4

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

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

Minimum ambient temperature:	-20°C
Maximum ambient temperature:	+57°C
Maximum R.H.:	95% not condensing

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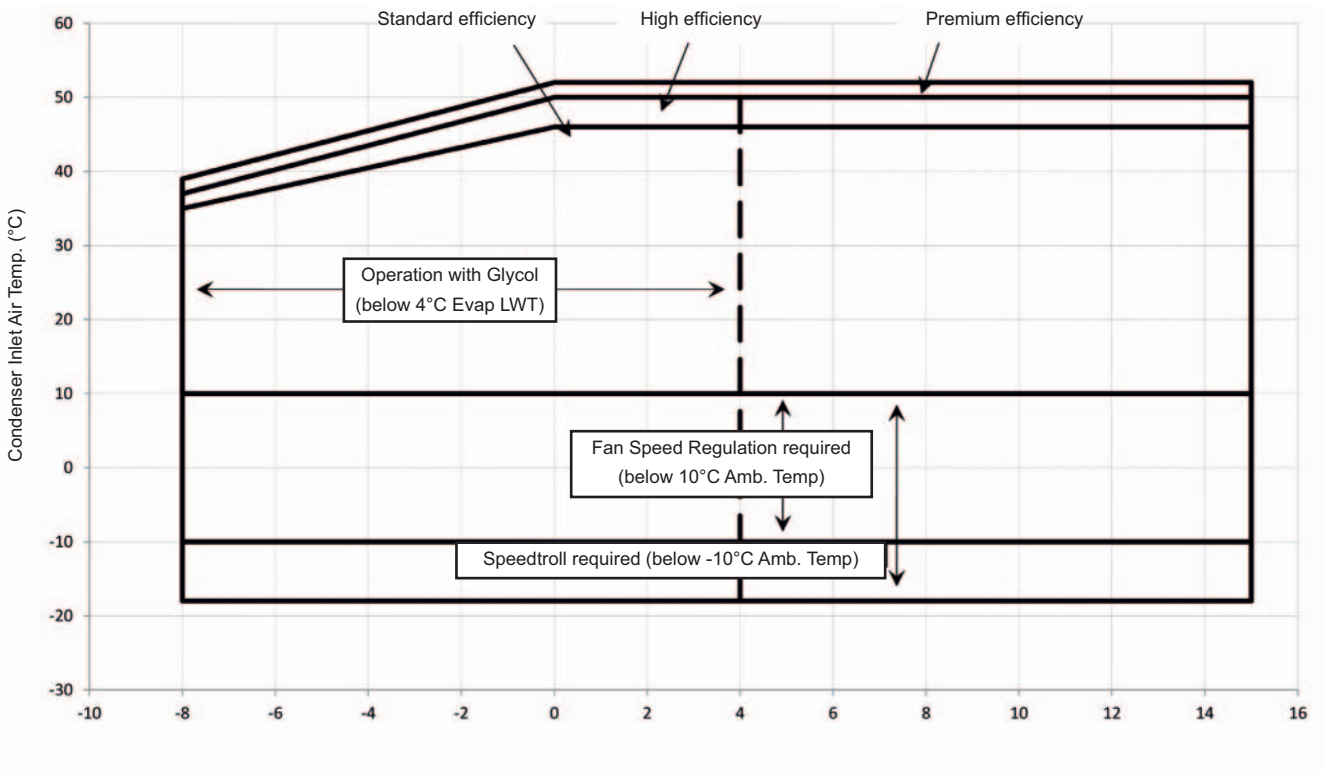
11 Operation range

11 - 1 Operation Range



OPL_1-2a-3a_Rev.01_1

Water charge, flow and quality

Items (1) (6)			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]	Supply water (4)	
Items to be controlled	pH	at 25°C	6.5 ~ 8.2	6.0 ~ 8.0	6.0 ~ 8.0	6.8 - 8.0	6.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	7.0 ~ 8.0	Corrosion + Scale
	Electrical conductivity	[mS/m] at 25°C	Below 80	Below 30	Below 40	Below 80	Below 80	Below 30	Below 30	Below 30	Below 30	Corrosion + Scale
		(µS/cm) at 25°C	(Below 800)	(Below 300)	(Below 400)	(Below 800)	(Below 800)	(Below 300)	(Below 300)	(Below 300)	(Below 300)	Corrosion + Scale
	Chloride ion	[mgCl2-/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO2-4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mgCaCO3/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mgCaCO3/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mgCaCO3/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg O2 /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 NO3- /l)	Below 100	Below 100	Below 100	Below 100	Below 101	Below 100	Below 101	Below 100	Below 101	Corrosion
	TOC Total organic carbon	(mg /l)	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Scale
	Iron	[mgFe/l]	Below 1.0	Below 0.3	Below 1.0	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Below 1.0	Below 0.3	Corrosion + Scale
	Copper	[mgCu/l]	Below 0.3	Below 0.1	Below 1.0	Below 1.0	Below 1.0	Below 1.0	Below 0.1	Below 1.0	Below 0.1	Corrosion
	Sulfite ion	[mgS2-/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH+4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

NOTES

1. Names, definitions and units are according to JIS K 0101. Units and figures between brackets are old units published as reference only.
2. In case of using heated water (more than 40°C), corrosion is generally noticeable.
   Especially when the iron materials is in direct contact with water without any protection shields, it is desireable 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 con 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.

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11 Operation range

11 - 1 Operation Range

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

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

For 2 compressors unit
M (liters) = (0.1595 x ΔT(°C) + 3.0825) x P(kW)

For 3 compressors unit
M (liters) = (0.0443 x ΔT(°C) + 1.6202) x P(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 °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.

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12 Hydraulic performance

12 - 1 Water Pressure Drop Curve Evaporator

Evaporating Pressure Drops

EWAD~C-SS EWAD~C-SL	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	647	744	832	912	967	1064	1152	1419	1538	1622	1714
Water Flow (l/s)	30.90	35.56	39.74	43.60	46.21	50.85	55.04	67.78	73.5	77.51	81.89
Pressure Drops (kPa)	73	59	52	61	68	63	72	47	59	65	73

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

EWAD~C-SR	650	740	830	910	970	C11	C12	C14	C15	C16	C17
Cooling Capacity (kW)	619	715	789	876	922	1020	1112	1367	1471	1556	1623
Water Flow (l/s)	29.57	34.15	37.71	41.83	44.05	48.75	53.11	65.32	70.28	74.32	77.57
Pressure Drops (kPa)	67	55	47	57	62	58	68	44	54	60	66

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

EWAD~C-XS EWAD~C-XL	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	756	830	889	1001	1074	1196	1280	1349	1409	1526	1596	1685	1768	1858
Water Flow (l/s)	36.10	39.67	42.49	47.82	51.32	57.13	61.18	64.45	67.34	72.90	76.24	80.48	84.47	88.79
Pressure Drops (kPa)	80	56	64	61	69	45	51	71	77	57	62	68	64	37

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

EWAD~C-XR	760	830	890	990	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19
Cooling Capacity (kW)	736	811	866	974	1041	1168	1247	1302	1378	1486	1550	1639	1722	1813
Water Flow (l/s)	35.17	38.74	41.36	46.54	49.76	55.78	59.56	62.21	65.85	70.98	74.07	78.32	82.3	86.61
Pressure Drops (kPa)	76	54	61	58	65	43	49	67	74	54	59	65	61	35

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

EWAD~C-PS EWAD~C-PL	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	821	890	975	1074	1158	1279	1390
Water Flow (l/s)	39.22	42.53	46.6	51.30	55.31	61.12	66.41
Pressure Drops (kPa)	57	65	30	61	69	60	73

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

EWAD~C-PR	820	890	980	C11	C12	C13	C14
Cooling Capacity (kW)	809	875	956	1053	1132	1251	1359
Water Flow (l/s)	38.65	41.81	45.69	50.30	54.11	59.76	64.95
Pressure Drops (kPa)	56	63	29	59	66	58	70

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

Evaporating Pressure Drops

To determinate the pressure drop for different versions or at different working conditions. please refer to the following formula:

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

where:

PD_2 Pressure drop to be determinate (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

The unit EWAD650C-SS has been selected for working at the following conditions:
- evaporator water in/out : 11/6°C
- condenser air inlet: 46°C
The cooling capacity at these working conditions is: 536 kW
The water flow at these working conditions is: 25.61 l/s

The unit EWAD650C-SS at nominal working conditions has the following data:
- evaporator water in/out : 12/7°C
- condenser air inlet: 35°C
The cooling capacity at these working conditions is: 647 kW
The water flow at these working conditions is: 30.90 l/s
The pressure drop at these working conditions is: 73 kPa

The pressure drop at the selected working condition will be:

$$PD_2\ (kPa) = 73\ (kPa) \times \left(\frac{25.61\ (l/s)}{30.90\ (l/s)} \right)^{1.8}$$

$$PD_2\ (kPa) = 52\ (kPa)$$

NOTES

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

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12

13 Specification text

13 - 1 Specification Text

General The chiller will be designed and manufactured in accordance with the 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 Standards UNI – EN ISO 9001:2004

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

The unit will be able to start up and operate (as standard) at full load with:
- outside air temperature from ..... °C to ..... °C
- evaporator leaving fluid temperature between ..... °C and ..... °C

Refrigerant Only R-134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- Heat exchanger entering water temperature in cooling mode : ..... °C
- Heat exchanger leaving water temperature in cooling mode : ..... °C
- Heat exchanger water flow : ..... l/s
- Nominal outside working ambient temperature in cooling mode : ..... °C

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

Unit description Chiller shall include as standard not less than: two or three independent refrigerant circuits (depending on the size), semi-hermetic asymmetric type rotary single screw compressors, electronic expansion device (EEXV), refrigerant direct expansion 'shell&tube' heat exchanger, air-cooled condenser section, R-134a refrigerant, lubrication system, motor starting components, discharge line shut-off valve, control system and all components necessary for a safe and stable unit operation. The chiller will be factory assembled on a robust base frame made of galvanized steel, protected by an epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, semispheric conditions, shall not exceed ……dB(A). The sound pressure levels must be rated in accordance to ISO 3744 (other types of rating can not be used). Vibration on the base frame should not exceed 2 mm/s.

Dimensions Unit dimensions shall not exceed following indications:
- Unit length ..... mm
- Unit width ..... mm
- Unit height ..... mm

Compressors (Asymmetric) The unit shall be equipped with:
- Semi-hermetic, single-screw asymmetric type with one main helical rotor meshing with two diametrical opposed gaterotors. The gaterotors' contact elements shall be constructed of composite material designed for extended life. Electrical motor shall be 2-pole, semi-hermetic, squirrel-cage induction type and cooled by suction gas.
- 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.
- The compressor shall be provided with a built in, high efficiency, mesh type oil separator and oil filter.
- Refrigerant system differential pressure shall provide oil injection on all moving compressor parts to correctly lubricate them. Electrical oil pump lubricating system is not allowed.
- Compressor cooling must be done by refrigerant liquid injection. An external dedicated heat exchanger and additional piping to carry the oil from compressor to heat exchanger and viceversa is not allowed.
- The compressor shall be direct electrical driven, without gear transmission between the screw and the electrical motor.
- The compressor casing shall be provided with ports to realize economized refrigerant cycles.
- The compressor must be protected by a temperature sensor for high discharge temperature and an electrical motor thermistor for high winding temperature.
- The compressor shall be equipped with an electric oil heater.
- The compressor shall be fully field serviceable. Compressor that must be removed and returned to the factory for service shall be unacceptable.

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13 Specification text

13 - 1 Specification Text

Evaporator The units shall be equipped with a direct expansion shell&tube evaporator with copper tubes rolled into steel tubesheets. The evaporator shall be single-pass on both the refrigerant and water sides for pure counter-flow heat exchange and low refrigerant pressure drops.

- The external shell shall be linked with an electrical heater to prevent freezing down to -28°C ambient temperature, controlled by a thermostat and shall be insulated with flexible, closed cell polyurethane insulation material (20-mm thick).
- The evaporator will have 2 or 3 circuits, one for each compressor and shall be single refrigerant pass.
- The water connections shall be VICTAULIC type connections as standard to ensure quick mechanical disconnection between the unit and the hydronic network.
- The evaporator will be manufactured in accordance to PED approval.

Condenser coil The unit shall be equipped with condenser coils constructed with internally finned seamless copper tubes and arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminium fins with full fin collars for higher efficiencies. The space between the fins is given by a collar that will increase the surface area in connection with the tubes, protecting them from ambient corrosion.

- The condenser coils will have an integral subcooler circuit that provides sufficient subcooling to effectively eliminate the possibility of liquid flashing and increase the unit's efficiency with 5% to 7% without increasing in energy consumption.
- The condenser coils shall be leak-tested and submitted to a pressure test with dry air.

Condenser fans The condenser fans used in conjunction with the condenser coils, shall be propeller type with glass reinforced resin blades for higher efficiencies and lower sound. Each fan shall be protected by a fan guard.

- The air discharge shall be vertical and each fan must be coupled to the electrical motor, supplied as standard to IP54 and capable to work to ambient temperatures of - 20°C to + 65°C.
- The condenser fans shall have as a standard a thermally protection by internal thermal motor protection and protected by circuit braker installed inside the electrical panel as a standard.

Refrigerant circuit The unit shall have two or three refrigerant circuits (depending on the size).

- The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, compressor discharge shut-off valve, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers, oil pressure transducer and insulated suction line.

Low sound unit configurations (on request) The unit compressor shall be connected with unit's metal base frame by rubber antivibration supports to prevent the transmission of vibrations to all metal unit structure, in order to control the unit sound.

- The chiller shall be provided with an acoustical compressor enclosure. This enclosure shall be realized with a light, corrosion resisting aluminium structure and metal panels. The compressor sound-proof enclosure shall be internally fitted with flexible, multi-layer, high density materials.

Hydronic kit options (on request) The hydronic module shall be integrated in the chiller chassis without increasing its dimensions and includes the following elements: centrifugal pump with motor protected by a circuit breaker installed in control panel, water filling system with pressure gauge, safety valve, drain valve.

- The hydronic module shall be assembled and wired to the control panel.
- The water piping shall be protected against corrosion and freezing and insulated to prevent condensation.
- A choice of two pump types shall be available:

- in-line single pump
- in-line twin pumps.

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13 Specification text

13 - 1 Specification Text

Electrical control panel Power and control shall be located in the main panel that will be manufactured to ensure protection against all weather conditions.
- The electrical panel shall be IP54 and (when opening the doors) internally protected with plexiglas panel against possible accidental contact with electrical components (IP20).
- The main panel shall be fitted with a main switch interlocked door.
- The power section will include compressors and funs protection devices, compressors and fans starters and control circuit power supply.

Controller The controller will be installed as standard and it will be used to modify unit set-points and check control parameters.
- A built-in display will shows chiller operating status plus temperatures and pressures of water, refrigerant and air, programmable values, set-points.
- A sophisticated software with predictive logic, will select the most energy efficient combination of compressors, EEXV and condenser fans to keep stable operating conditions to maximise chiller energy efficiency and reliability.
- The controller will be 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 will be an additional security for the equipment.
- Fast program cycle (200ms) for a precise monitoring of the system.
- Floating point calculations supported for increased accuracy in P/T conversions.

Controller main features
- Management of the compressor stepless capacity and fans modulation.
- Chiller enabled to work in partial failure condition.
- Full routine operation at condition of:
  - high ambient temperature value
  - high thermal load
  - high evaporator entering water temperature (start-up)
- Display of evaporator entering/leaving water temperature.
- Display of Outdoor Ambient Temperature.
- Display of condensing-evaporating temperature and pressure, suction and discharge superheat for each circuit.
- Leaving water evaporator temperature regulation (temperature tolerance = 0,1°C).
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of compressor load.
- Fan management according to condensing pressure.
- 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).
- OAT (Outside Ambient temperature) Reset.
- Set point Reset (optional).
- Application and system upgrade with commercial SD cards.
- Ethernet port for remote or local servicing using standard web browsers.
- Two different sets of default parameters could be stored for easy restore.

High Level Communications Interface (on request) The chiller shall be able to communicate to BMS (Building Management System) based on the most common protocols as:
- ModbusRTU
- LonWorks, now also based on the international 8040 Standard Chiller Profile and LonMark Technology
- BacNet BTP certifief over IP and MS/TP (class 4) (Native)
- Ethernet TCP/IP.

SPC_1b-2a-3_Rev.02_3

In all of us, a green heart

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

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

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