DAIKIN

Applied Systems

Technical Data

Air cooled chiller, high efficiency, low sound

EEDEN13-417

EWAD-C-XL

TABLE OF CONTENTS

EWAD-C-XL

1 Features

- High efficiency, low sound levels
- 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					EWAD760C-XL	EWAD830C-XL	EWAD890C-XL	EWAD990C-XL	EWADC10C-XL	EWADC11C-XL	EWADC12C-XL	EWADC13C-XL	EWADH14C-XL	EWADH15C-XL
Cooling capacity	Nom.			kW	752 (1)	827 (1)	885 (1)	997 (1)	1,069 (1)	1,192 (1)	1,276 (1)	1,343 (1)	1,408 (1)	1,517 (1)
Capacity control	Method				Stepless									
	Minimum capacity			%	13									
Power input	Cooling	Nom.		kW	237 (1)	256 (1)	282 (1)	311 (1)	343 (1)	367 (1)	404 (1)	416 (1)	451 (1)	483 (1)
EER					3.17 (1)	3.22 (1)	3.14 (1)	3.20 (1)	3.12 (1)	3.25 (1)	3.15 (1)	3.23 (1)	3.13 (1)	3.14 (1)
ESEER					3.77	3.91	3.81	3.91	3.83	3.98	3.86	4.05	4.04	4.05
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				Direct on line									
	Input	Cooling		W	21,000	24,500		28,000		35,000				
Sound power level	Cooling	Nom.		dBA	97			98		99				
Sound pressure level	Cooling	Nom.		dBA	76	77								
Compressor	Type				asymmetric 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	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									Emergency stop button
		11			Water freeze protection controller									

2 Specifications

2-2 Technical Specifications					EWADC1 4C-XL	EWADC1 5C-XL	EWADC1 6C-XL	EWADC1 7C-XL	EWADC1 8C-XL	EWADC1 9C-XL	EWADC2 0C-XL	EWADC2 1C-XL	EWADC2 2C-XL
Cooling capacity	Nom.			kW	1,409 (1)	1,526 (1)	1,590 (1)	1,678 (1)	1,760 (1)	1,849 (1)	1,896 (1)	1,948 (1)	2,002 (1)
Capacity control	Method				Stepless								
	Minimum capacity			%	7								
Power input	Cooling	Nom.		kW	437 (1)	474 (1)	510 (1)	541 (1)	569 (1)	598 (1)	620 (1)	648 (1)	677 (1)
EER					3.23 (1)	3.22 (1)	3.12 (1)	3.10 (1)	3.09 (1)		3.06 (1)	3.01 (1)	2.96 (1)
ESEER					4.23	4.19	3.97	3.94	3.92	3.90	3.98	3.89	3.86
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		Direct on line						
	Input	Cooling		W	1,750		42,000	45,500	49,000	52,500			
Sound power level	Cooling	Nom.		dBA	99.6		100						
Sound pressure level	Cooling	Nom.		dBA	77.1	77.2	77		78				
Compressor	Type				Semi-hermetic single screw compressor		asymmetric single screw compressor						
	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						Emergency stop button		
		11			Water freeze protection controller								

2 Specifications

2-3 Electrical Specifications				EWAD760C-XL	EWAD830C-XL	EWAD890C-XL	EWAD990C-XL	EWADC10C-XL	EWADC11C-XL	EWADC12C-XL	EWADC13C-XL	EWADH14C-XL	EWADH15C-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				

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.

2 Specifications

2-4 Electrical Specifications				EWADC1 4C-XL	EWADC1 5C-XL	EWADC1 6C-XL	EWADC1 7C-XL	EWADC1 8C-XL	EWADC1 9C-XL	EWADC2 0C-XL	EWADC2 1C-XL	EWADC2 2C-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

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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

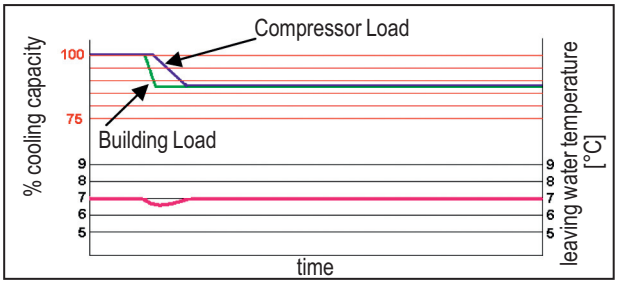
Very low noise levels both at full load and part load conditions are achieved by the latest compressor design that use a single main rotor with two adjacent rotating composite gaterotors making gas flow velocities and subsequent noise levels among the lowest available. By a unique new fan that moves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

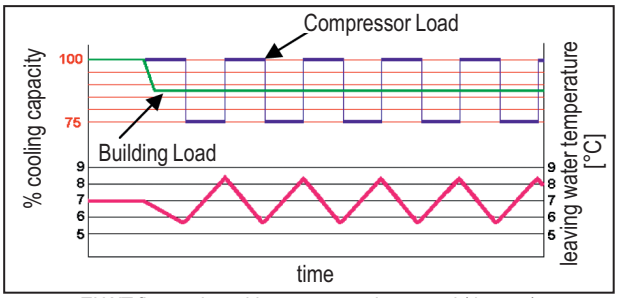
Infinite capacity control

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

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

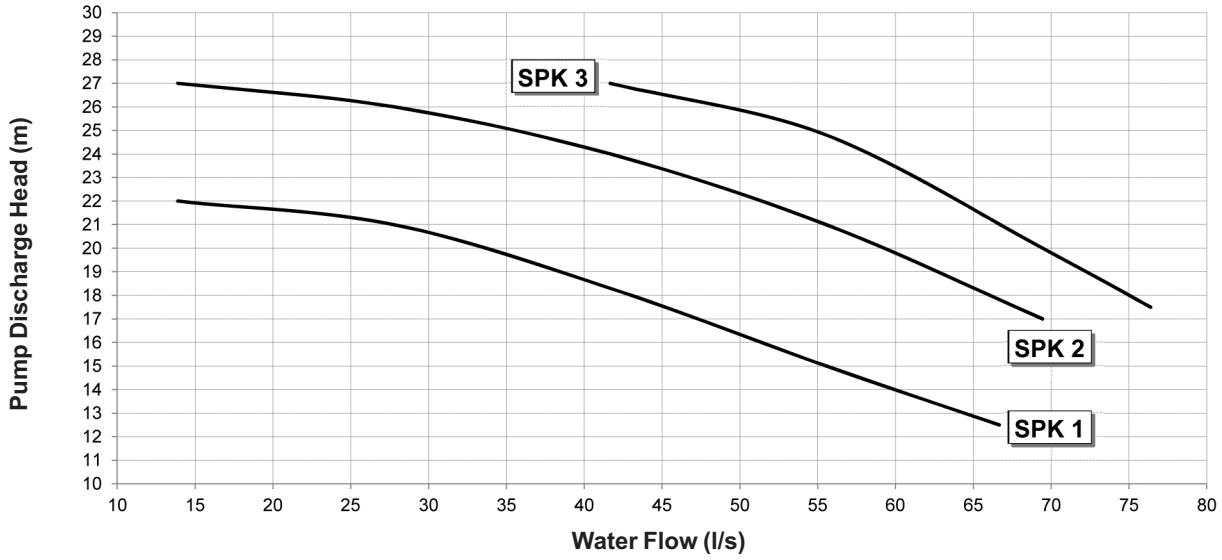
NMC_1-2_Rev.00

6 Options

6 - 1 Water Pump Kit - Technical Information

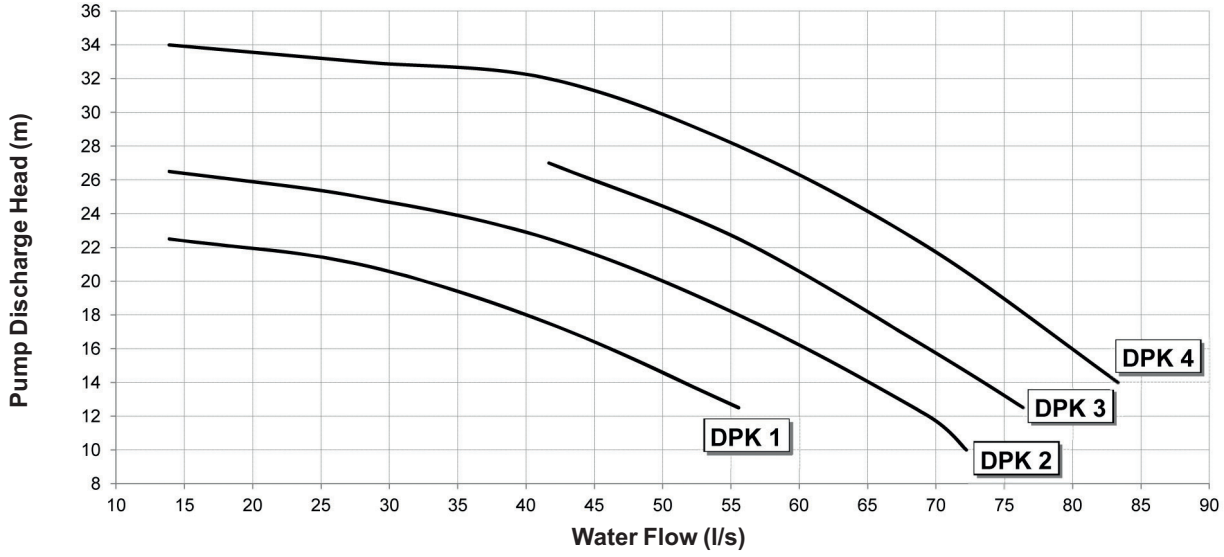
Water Pump Kit - Discharge Head

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

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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

EWAD760-H14C-XS/XL

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

	Condenser inlet air temperature	Twout																							
		5				7				9				11				13				15			
		CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw
Size	Ta	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa
760	30	732	213	35.1	77	775	219	37.2	85	817	226	39.3	94	860	233	41.4	103	902	240	43.5	113	946	247	45.6	123
	35	711	230	34.1	73	752	237	36.1	81	794	244	38.1	89	835	251	40.2	98	877	259	42.2	107	919	266	44.3	117
	40	684	248	32.8	68	723	256	34.7	75	764	263	36.7	83	804	271	38.7	91	845	279	40.7	100	886	288	42.7	109
	46	641	273	30.7	60	678	281	32.5	67	716	289	34.4	74	755	298	36.3	81	794	307	38.2	89	833	315	40.1	98
	48	623	282	29.8	57	659	290	31.6	64	697	299	33.4	70	735	307	35.3	78	773	316	37.2	85	812	325	39.1	93
	50	603	291	28.8	54	639	300	30.6	60	676	308	32.4	67	713	317	34.3	73	711	307	34.2	73	715	298	34.4	74
830	30	804	230	38.5	54	851	237	40.8	60	897	244	43	66	943	250	45.3	72	990	258	47.6	79	1035	264	49.8	86
	35	781	249	37.4	51	827	256	39.6	57	873	264	41.9	63	918	271	44.1	69	963	279	46.3	75	1009	286	48.6	82
	40	753	269	36	48	797	277	38.2	53	841	285	40.4	59	887	293	42.6	65	931	301	44.7	71	975	309	46.9	77
	46	708	296	33.8	43	749	305	35.9	47	791	313	37.9	53	835	322	40.1	58	879	331	42.2	64	921	340	44.3	69
	48	689	306	32.9	41	730	315	34.9	45	771	323	36.9	50	813	333	39	55	857	342	41.2	61	900	351	43.3	67
	50	668	317	32	39	708	325	33.9	43	749	334	35.9	48	785	341	37.6	52	804	338	38.6	54	827	337	39.7	57
890	30	862	253	41.3	61	912	261	43.7	68	959	268	46	74	1004	275	48.3	81	1050	283	50.5	88	1096	290	52.8	95
	35	837	274	40.1	58	885	282	42.4	64	935	290	44.8	71	978	298	47	77	1023	306	49.2	84	1067	314	51.4	91
	40	805	296	38.5	54	851	305	40.8	60	898	314	43.1	66	945	323	45.4	73	988	331	47.5	79	1031	340	49.7	85
	46	754	326	36.1	48	797	335	38.2	53	841	345	40.3	59	887	355	42.6	65	933	366	44.9	71	974	375	46.9	77
	48	733	337	35.1	46	776	347	37.1	51	818	356	39.2	56	862	367	41.4	61	908	377	43.6	68	952	388	45.8	74
	50	710	349	33.9	43	751	358	36	48	793	368	38	53	825	374	39.6	57	822	359	39.5	56	827	349	39.8	57
990	30	970	279	46.4	58	1028	288	49.3	64	1087	297	52.1	71	1146	306	55.1	79	1207	315	58.1	86	1268	325	61	95
	35	941	302	45	55	997	311	47.8	61	1054	321	50.6	68	1112	331	53.4	74	1171	341	56.3	82	1230	351	59.2	90
	40	904	326	43.3	51	958	336	45.9	57	1013	347	48.6	63	1069	357	51.3	69	1125	368	54.1	76	1183	379	56.9	83
	46	846	359	40.5	45	897	370	42.9	50	948	380	45.5	56	1001	392	48	62	1055	403	50.7	68	1109	415	53.4	74
	48	823	371	39.3	43	872	382	41.7	48	922	393	44.2	53	974	404	46.7	59	1023	415	49.2	64	1047	411	50.3	67
	50	796	383	38.1	41	844	394	40.4	45	884	401	42.4	49	911	399	43.7	52	935	396	44.9	54	958	393	46	57
C10	30	1043	307	49.9	66	1104	317	52.9	73	1165	327	55.9	81	1227	337	59	89	1288	348	62	97	1351	358	65.1	106
	35	1010	332	48.3	62	1069	343	51.2	69	1129	354	54.2	76	1189	364	57.1	84	1249	376	60.1	92	1309	387	63.1	100
	40	969	359	46.4	58	1025	370	49.1	64	1083	382	51.9	71	1141	394	54.8	78	1199	406	57.7	85	1257	418	60.5	93
	46	902	396	43.2	51	955	408	45.7	56	1009	420	48.4	62	1064	433	51.1	69	1120	446	53.8	76	1175	459	56.6	83
	48	875	409	41.9	48	927	421	44.4	53	979	433	47	59	1033	446	49.6	65	1081	457	51.9	71	1076	439	51.8	70
	50	846	423	40.4	45	896	435	42.9	50	928	439	44.5	54	932	425	44.7	54	932	408	44.7	54	933	392	44.8	54
C11	30	1160	330	55.5	43	1227	339	58.7	48	1296	349	62.1	53	1365	359	65.5	58	1436	369	69	64	1508	380	72.5	70
	35	1127	357	53.9	41	1192	367	57.1	45	1259	378	60.3	50	1327	389	63.7	55	1396	400	67	60	1466	411	70.5	66
	40	1085	386	51.9	38	1149	397	55	42	1213	409	58.1	47	1279	420	61.4	51	1345	432	64.6	56	1413	444	67.9	62
	46	1019	425	48.7	34	1079	437	51.6	38	1141	449	54.6	42	1203	462	57.7	46	1267	475	60.8	51	1331	488	63.9	55
	48	992	439	47.4	32	1051	452	50.3	36	1111	464	53.2	40	1172	477	56.2	44	1235	490	59.3	48	1294	502	62.2	53
	50	961	454	45.9	31	1019	467	48.8	34	1078	479	51.6	38	1127	487	54	41	1154	482	55.4	43	1188	480	57	45
C12	30	1244	363	59.5	49	1314	373	62.9	54	1385	384	66.4	59	1457	396	70	65	1531	407	73.6	71	1606	419	77.3	78
	35	1207	393	57.7	46	1276	404	61.1	51	1345	416	64.5	56	1415	428	67.9	62	1486	441	71.4	68	1559	454	75	74
	40	1161	425	55.5	43	1227	438	58.7	48	1294	451	62	53	1362	464	65.3	58	1430	477	68.7	63	1500	491	72.1	69
	46	1086	469	51.9	38	1149	482	55	42	1212	496	58.1	47	1277	510	61.2	51	1342	525	64.5	56	1408	539	67.7	61
	48	1056	485	50.4	36	1117	499	53.4	40	1179	513	56.5	44	1242	527	59.6	49	1306	542	62.7	54	1363	554	65.5	58
	50	1021	501	48.8	34	1082	515	51.7	38	1142	530	54.7	42	1181	534	56.6	45	1176	512	56.5	44	1183	496	56.8	45
C13	30	1309	373	62.6	64	1388	385	66.5	72	1469	398	70.5	80	1552	411	74.6	88	1638	425	78.8	97	1724	440	83.1	107
	35	1266	403	60.6	61	1343	416	64.4	68	1421	430	68.2	75	1501	444	72.1	83	1583	459	76.2	91	1667	474	80.3	100
	40	1213	435	58	56	1286	449	61.6	62	1361	463	65.3	69	1438	478	69.1	77	1516	494	72.9	84	1596	510	76.8	93
	46	1129	478	54	49	1197	493	57.3	55	1268	508	60.8	61	1340	524	64.3	67	1412	540	67.9	74	1486	557	71.5	82
	48	1095	493	52.4	47	1162	508	55.6	52	1230	524	59	58	1300	540	62.4	64	1362	554	65.5	70	1365	537	65.6	70
	50	1058	509	50.6	44	1123	525	53.8	49	1181	538	56.6	54	1178	518	56.5	53	1176	497	56.5	53	1178	479	56.6	54
H14	30	1376	403	65.9	74	1456	416	69.8	82	1538	429	73.9	91	1620	443	77.9	100	1703	458	82	110	1787	473	86.1	120
	35	1331	437	63.7	70	1408	451	67.5	77	1487	465	71.4	86	1567	480	75.3	94	1647	496	79.3	103	1727	511	83.2	113
	40	1274	473	61	65	1347	488	64.6	72	1422	503	68.3	79	1499	520	72.1	87	1576	536	75.8	95	1653	553	79.7	104
	46	1182	522	56.6	56	1251	538	60	63	1321	554	63.4	69	1393	571	66.9	76	1451	582	69.8	82	1489	579	71.7	86
	48	1145	540	54.8	53	1213	556	58.1	59	1268	566	60.8	64	1305	563	62.7	68	1340	560	64.4	71	1342	541	64.6	71
	50	1093	552	52.3	49	1126	547	53.9	52	1151	540	55.2	54	1161	523	55.7	55	1162	521	55.8	55	1167	501	56.1	55

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

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

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

SRC_1-2-3-4-5-6-7-8-9_Rev.02_4-5_(1-2)

7 Capacity tables

7 - 1 Cooling Capacity Tables

EWADH15-C22C-XS/XL

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

	Condenser inlet air temperature	Twout																							
		5				7				9				11				13				15			
		CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw	CC	PI	qw	dpw
Size	Ta	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa	kW	kW	l/s	kPa
H15	30	1485	431	71.2	81	1571	445	75.4	90	1657	460	79.6	99	1743	474	83.8	109	1829	490	88.1	119	1918	506	92.5	130
	35	1435	468	68.7	76	1517	483	72.8	84	1601	499	76.9	93	1684	515	81	102	1766	531	85.1	111	1851	548	89.2	121
	40	1370	508	65.6	70	1448	524	69.4	77	1528	541	73.3	85	1609	559	77.3	94	1688	576	81.3	103	1768	594	85.2	112
	46	1268	563	60.7	61	1340	579	64.2	67	1413	597	67.8	74	1489	616	71.5	82	1535	620	73.8	86	1537	599	74	87
	48	1226	582	58.6	57	1297	600	62.1	63	1342	604	64.4	68	1348	584	64.7	68	1357	565	65.2	69	1359	542	65.4	69
	50	1156	591	55.3	51	1158	566	55.4	52	1159	542	55.6	52	1174	526	56.3	53	1179	541	56.6	54	1187	521	57	54
C16	30	1553	457	74.3	59	1638	471	78.5	66	1724	485	82.7	72	1813	499	87.1	79	1904	514	91.5	86	1996	530	96.1	94
	35	1506	495	72	56	1590	510	76.1	62	1673	525	80.3	68	1759	540	84.5	75	1846	556	88.8	82	1935	573	93.2	89
	40	1446	536	69.2	52	1527	552	73.1	58	1609	568	77.1	64	1691	585	81.2	70	1774	602	85.3	76	1859	619	89.5	83
	46	1350	591	64.5	46	1426	608	68.3	51	1504	626	72.1	56	1583	644	76	62	1661	662	79.8	68	1741	681	83.7	74
	48	1311	611	62.7	44	1385	629	66.3	48	1462	647	70	53	1539	665	73.9	59	1617	684	77.7	64	1622	666	78	65
	50	1268	632	60.6	41	1341	650	64.2	46	1397	660	66.9	49	1394	635	66.9	49	1404	616	67.4	50	1407	593	67.6	50
C17	30	1638	485	78.4	65	1727	499	82.8	72	1818	513	87.2	79	1911	529	91.8	87	2006	544	96.5	95	2103	560	101.3	104
	35	1590	525	76.1	62	1678	541	80.4	68	1766	556	84.7	75	1855	572	89.1	82	1947	589	93.7	90	2040	606	98.3	98
	40	1530	569	73.2	58	1614	585	77.3	64	1699	602	81.5	70	1785	619	85.8	77	1873	637	90.1	84	1963	655	94.5	91
	46	1432	628	68.5	51	1511	645	72.4	57	1593	664	76.4	62	1675	682	80.4	68	1757	701	84.5	75	1841	721	88.6	81
	48	1392	649	66.6	49	1470	667	70.4	54	1549	686	74.3	59	1630	705	78.2	65	1711	725	82.2	71	1745	719	83.9	74
	50	1347	672	64.4	46	1424	690	68.2	51	1489	704	71.4	55	1516	694	72.7	57	1526	674	73.3	58	1528	649	73.4	58
C18	30	1717	510	82.2	65	1812	525	86.9	72	1910	540	91.6	79	2009	556	96.5	87	2111	573	101.6	95	2216	590	106.7	104
	35	1668	553	79.8	62	1760	569	84.4	68	1855	585	89	75	1951	602	93.7	82	2050	620	98.6	90	2150	638	103.5	98
	40	1606	599	76.8	58	1695	616	81.2	64	1785	634	85.6	70	1878	652	90.2	77	1972	671	94.8	84	2068	690	99.6	92
	46	1505	661	72	51	1589	679	76.1	56	1675	698	80.3	62	1762	718	84.6	68	1850	738	88.9	75	1941	759	93.4	82
	48	1463	684	70	49	1545	702	74	54	1630	722	78.1	59	1715	742	82.3	65	1802	762	86.6	71	1866	771	89.7	76
	50	1417	707	67.8	46	1498	727	71.7	51	1577	745	75.6	56	1634	751	78.4	60	1641	729	78.8	60	1642	703	78.9	60
C19	30	1803	537	86.3	71	1903	552	91.2	78	2004	568	96.2	86	2109	585	101.4	95	2215	602	106.6	104	2324	620	112	113
	35	1753	582	83.9	67	1849	598	88.6	74	1948	616	93.5	82	2049	633	98.5	90	2152	652	103.6	98	2257	671	108.7	107
	40	1690	630	80.9	63	1782	648	85.4	70	1877	666	90.1	77	1974	685	94.8	84	2073	705	99.7	92	2173	725	104.7	100
	46	1586	696	75.9	56	1674	715	80.2	62	1763	734	84.6	68	1854	755	89.1	75	1948	776	93.6	82	2042	797	98.3	90
	48	1544	720	73.8	54	1629	739	78	59	1717	759	82.3	65	1806	780	86.7	72	1897	801	91.2	78	1990	823	95.8	85
	50	1497	745	71.6	51	1581	765	75.7	56	1666	785	79.9	62	1753	806	84.2	68	1763	786	84.7	68	1763	757	84.8	69
C20	30	1853	556	88.5	37	1948	570	93.2	41	2045	585	98	45	2144	600	102.8	49	2245	616	107.8	53	2348	632	112.8	58
	35	1804	605	86.2	35	1896	620	90.7	39	1990	636	95.3	43	2086	653	100	46	2184	670	104.8	50	2284	687	109.7	55
	40	1739	658	83.1	33	1829	675	87.5	36	1920	692	91.9	40	2012	710	96.5	43	2106	728	101.1	47	2202	747	105.8	51
	46	1632	730	78	30	1719	749	82.2	33	1806	768	86.5	36	1894	787	90.7	39	1983	807	95.1	42	2073	827	99.5	46
	48	1587	757	75.8	28	1673	776	80	31	1760	796	84.2	34	1845	816	88.4	37	1922	830	92.2	40	1982	833	95.2	42
	50	1537	784	73.4	27	1622	804	77.6	29	1681	807	80.4	31	1739	809	83.3	33	1763	794	84.5	34	1771	786	85	35
C21	30	1905	580	91.1	39	2002	595	95.8	43	2101	610	100.7	47	2202	626	105.6	51	2305	642	110.7	56	2410	659	115.8	60
	35	1854	631	88.6	37	1948	648	93.2	41	2044	664	97.9	45	2141	682	102.7	49	2241	699	107.6	53	2342	718	112.5	57
	40	1786	688	85.3	35	1877	706	89.8	38	1969	724	94.3	42	2063	743	98.9	45	2158	762	103.6	49	2255	782	108.3	53
	46	1673	767	79.9	31	1761	786	84.2	34	1848	806	88.5	37	1937	826	92.8	41	2027	847	97.3	44	2118	868	101.7	48
	48	1626	795	77.6	29	1712	815	81.9	32	1799	836	86.1	35	1886	857	90.4	39	1952	866	93.6	41	1986	852	95.4	43
	50	1573	825	75.1	28	1659	846	79.3	31	1691	833	80.9	32	1723	817	82.6	33	1740	793	83.4	33	1752	805	84.1	34
C22	30	1961	605	93.7	41	2060	621	98.6	45	2161	637	103.5	49	2263	654	108.6	54	2368	671	113.7	58	2475	688	118.9	63
	35	1906	660	91.1	39	2002	677	95.8	43	2100	695	100.6	47	2199	713	105.5	51	2300	731	110.4	55	2403	751	115.5	60
	40	1835	721	87.7	37	1927	740	92.2	40	2021	759	96.8	44	2117	778	101.5	48	2213	798	106.2	52	2312	819	111.1	56
	46	1717	806	82	32	1805	826	86.3	36	1893	846	90.6	39	1983	867	95.1	42	2074	889	99.5	46	2167	912	104.1	50
	48	1667	837	79.6	31	1754	857	83.9	34	1841	878	88.1	37	1929	900	92.5	40	1982	902	95.1	42	1989	870	95.5	43
	50	1610	869	76.9	29	1698	891	81.2	32	1704	860	81.5	32	1710	827	81.9	32	1719	795	82.4	33	1733	824	83.2	33

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

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

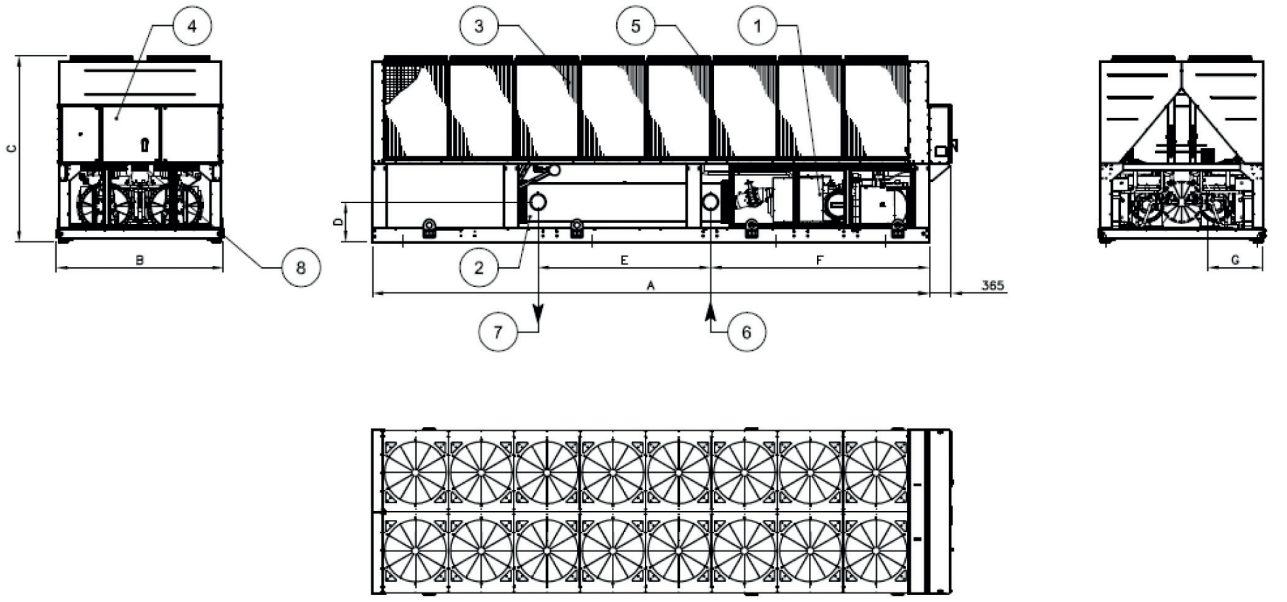
2 For working conditions where dpw values are in italic, please contact factory.
Für Arbeitsbedingungen mit kursiv gedruckten dpw-Werten, wenden Sie sich bitte an den Hersteller.
Για τις συνθήκες εργασίας όπου οι τιμές dpw είναι σε πλάγια γραφή, παρακαλούμε επικοινωνήστε με το εργοστάσιο.
Para las condiciones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

SRC_1-2-3-4-5-6-7-8-9_Rev.02_4-5_(2-2)

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

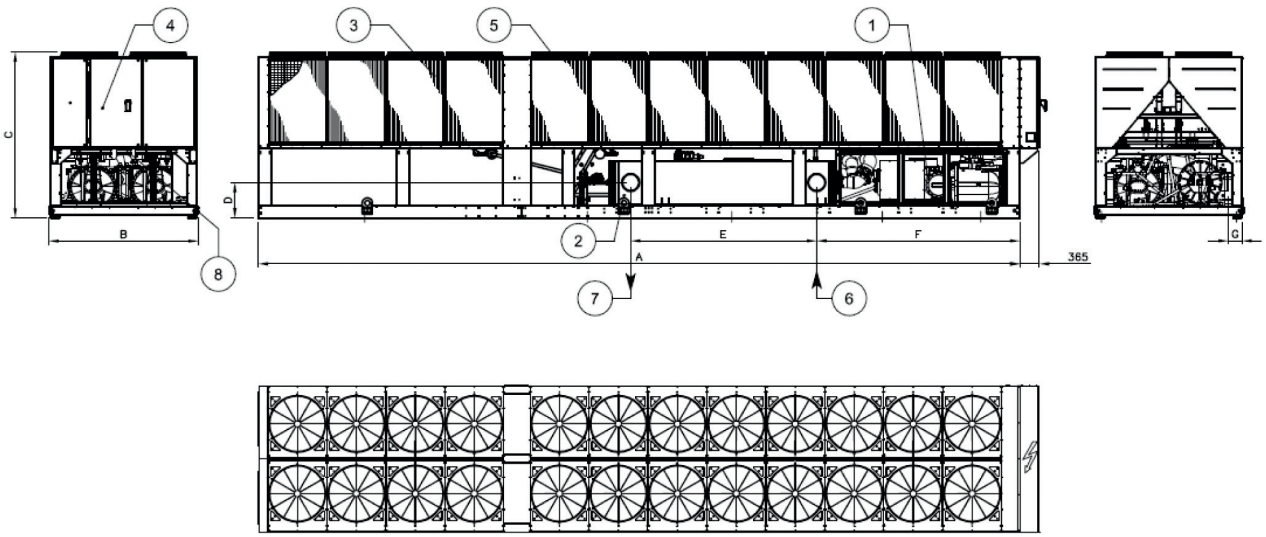
LEGEND
1. Compressor
2. Evaporator
3. Condenser coil
4. Electrical panel
5. Fan
6. Evaporator Water inlet
7. Evaporator Water outlet
8. Slot for power and control connection

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.

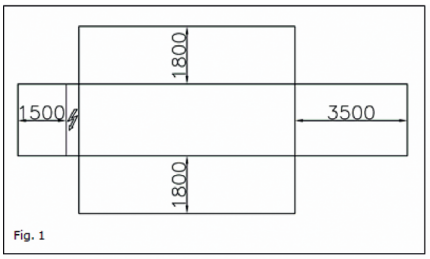

Fig. 1

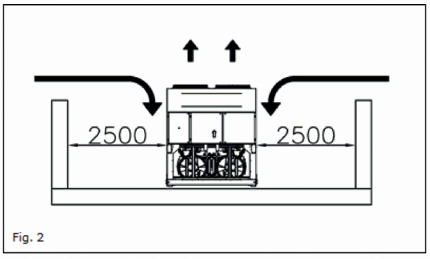

Fig. 2

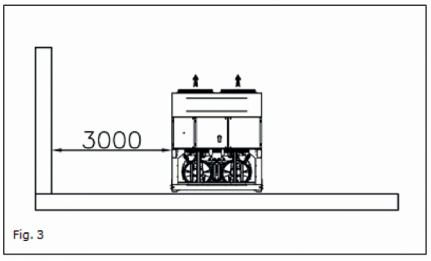

Fig. 3

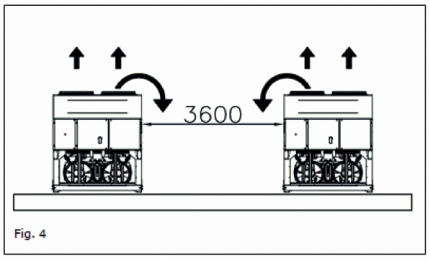

Fig. 4

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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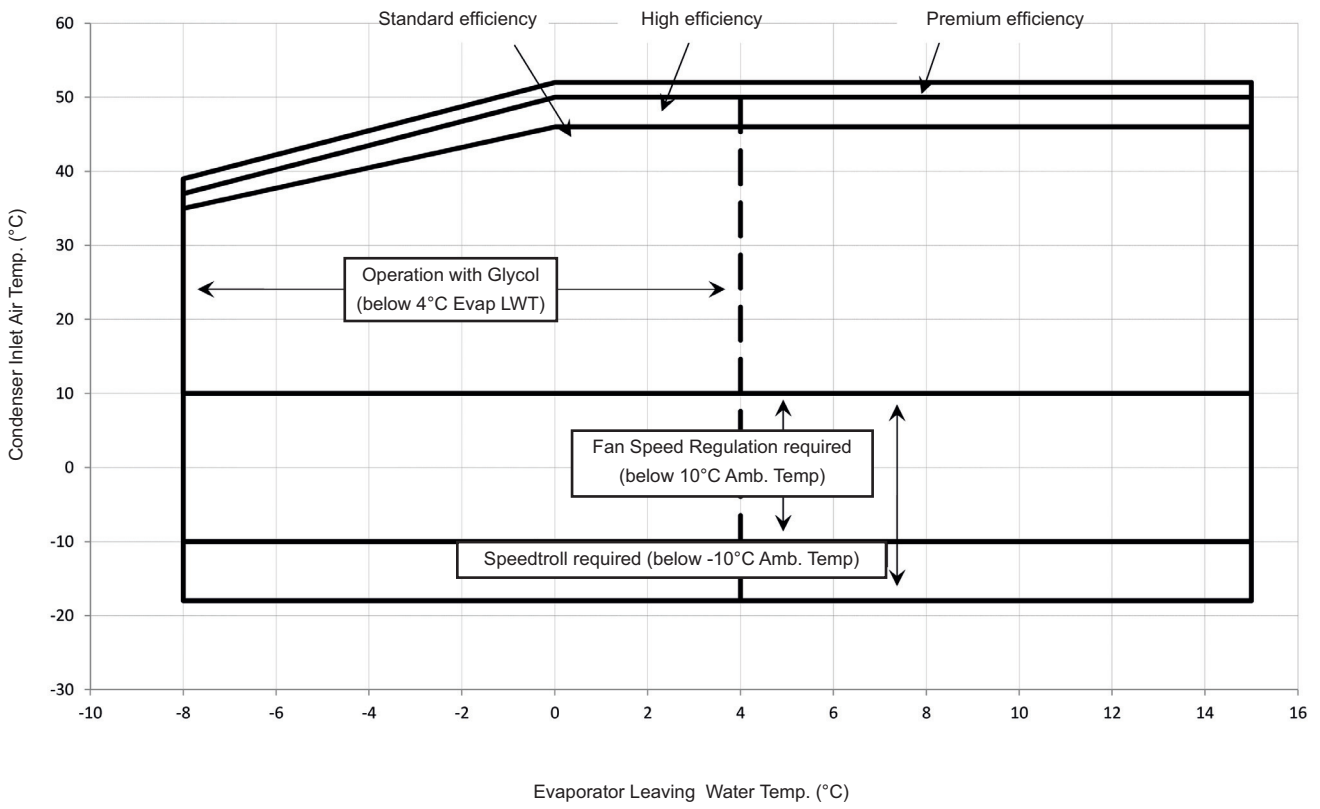
11 Operation range

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.

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In all of us, a green heart

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

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

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