Databook

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EWAD~C-	R3.7.6

Air cooled screw chillers

ECOLOGICAL HFC 134a REFRIGERANT

EWAD~C- Middle East optimized version (SPN16_190C)

Featuring low inrush current motors for compressors and high airflow fans

C-XS (High Efficiency - Standard Noise) - Cooling Capacity from 756 to 2008 kW
C-PS (Premium Efficiency - Standard Noise) - Cooling Capacity from 821 to 1562 kW

OPERATION UP TO 55°C

AHRI CERTIFIED® www.ahridirectory.org
Air-Cooled Water Chilling Packages
AHRI Standards 550/590 and 551/591

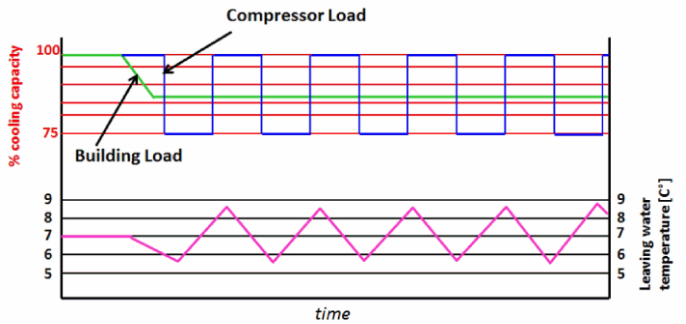
Low operating cost and extended operating life This chiller range is the result of careful design, aimed to optimize the energy efficiency of the chillers, with the objective of bringing down operating costs and improving installation profitability, effectiveness and economical management.
The chillers feature a high efficiency single screw compressor design, large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans and a 'shell&tube' evaporator with low refrigerant pressure drops.

Low operating sound levels Very low sound levels both at full load and part load conditions are achieved by the latest compressor design and 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, 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.

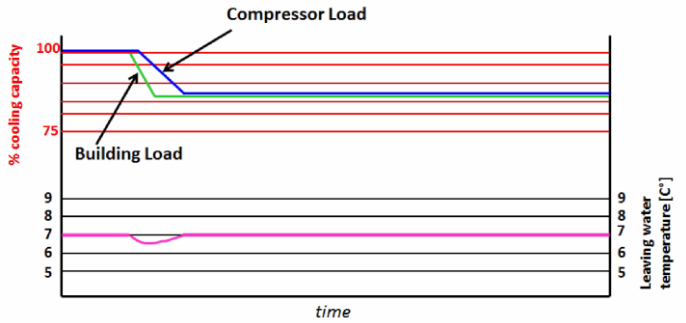
Infinite capacity control Cooling capacity control is infinitely variable by means of a single screw asymmetric compressor controlled by microprocessor system. Each unit has infinitely variable capacity control from 100% down to 12.5% (two compressors unit) down to 7% (three compressors unit). This modulation 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 with a stepless control.

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



EWLT fluctuaction 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 through the use of a unit with stepless regulation.



EWLT fluctuaction with stepless capacity control

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.

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 This range is available in three different versions:

STANDARD EFFICIENCY
11 sizes to cover a range from 647 up to 1714 kW with an EER up to 2.93 and an ESEER up to 3.96 (data referred to Standard Noise).

HIGH EFFICIENCY
14 sizes to cover a range from 756 up to 1858 kW with an EER up to 3.29 and an ESEER up to 4.23 (data referred to Standard Noise).

PREMIUM EFFICIENCY
7 sizes to cover a range from 821 up to 1390 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 x EER100% + B x EER75% + C x EER50% + D x EER25%

	A	B	C	D
K	0.03 (3%)	0.33 (33%)	0.41 (41%)	0.23 (23%)
T	35°C	30°C	25°C	20°C

K = Coefficient; T = Air inlet condenser temperature.

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

STANDARD SOUND
Condenser fan rotating at 900 rpm, rubber antivibration under compressor

LOW SOUND
Condenser fan rotating at 900 rpm, rubber antivibration under compressor, compressor sound enclosure.

REDUCED SOUND
Condenser fan rotating at 700 rpm, rubber antivibration under compressor, compressor sound enclosure.

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). Water filter not available.

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.

Condenser fans (ø 850) The condenser fans are propeller type with high efficiency design blades to maximize performances. The material of the blades is aluminum-magnesium alloy. Metallic frame of the fan is made of galvanized sheet and powder painted. Each fan is protected by a black powder painted grid. Fan motors are protected by circuit breakers installed inside the electrical panel as a standard. The motors are IP55 and insulation class F.

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
- Suction temperature sensor

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 against possible accidental contact with live parts. The main panel is fitted with a main switch interlocked door that shuts off power supply when opening.

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 signals 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

Control Section has the following feature.
- 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

The following devices / logics are available.
- 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

The following securities are available.
- Phase monitor.
- Low Ambient temperature lock-out.
- Freeze protection.

Regulation type

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

MicroTech III

MicroTech III built-in terminal has the following features.

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

Supervising systems (on request)

MicroTech III remote communication

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 - Device that monitors input voltage and stops the chiller in case of phase loss or wrong phase sequence.

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 - Setpoint Reset: The leaving water temperature set-point can be overwritten with an external 4-20mA, through the ambient temperature, or through the evaporator water temperature ΔT. Demand Limit: Chiller capacity can be limited through an external 4-20mA signal or via network. Alarm from external device: The unit controller is able to receive an external alarm signal. The user can decide whether this alarm signal will stop the unit or not.

Fans circuit breakers - Safety devices that, added to the standard protection devices, protect fan motors against overload and overcurrent.

Main switch interlock door

Emergency stop

Options (on request)

MECHANICAL

Total heat recovery - Plate to plate heat exchangers for hot water production.

Partial heat recovery - Plate to plate heat exchangers for hot water production.

Brine version - Allows the unit to operate down to -8°C leaving liquid temperature (antifreeze required). Reccomended below +4°C

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– 100 kPa available static pressure) - 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.

One centrifugal pump (high lift– 200 kPa available static pressure) 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 electronic devices that, added to the standard protection devices, protect compressor motors against overload and current unbalance.

Under / Over voltage control - Electronic device that monitors and displays input voltage, and stops the chiller in case of phase loss, wrong phase sequence, or voltage exceeding minimum and maximum allowed values.

Energy meter - Device installed inside the control box that displays all chiller electrical power parameters at line input such as line voltage and phase current, input active and reactive power, active and reactive energy. An integrated RS485 module allows a Modbus communication to an external BMS.

Capacitors for power factor correction - Devices that increase the power factor of the unit. The capacitors are "dry" self-regenerating type with over pressure disconnecting safety device insulated with a no toxic dielectric mix without 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 regulation on the first fan (VFD driven) of each circuit. It allows unit operation down to -18ºC.

Evaporator flow switch - Supplied separately to be wired and installed on the evaporator water piping (by the customer).

Compressors circuit breakers Safety devices that include in a single device all safety functions otherwise provided by standard fuses and optional thermal relays, such as protection against overcurrent, overload, current unbalance.

Fans speed regulation (+ fan silent mode) - Continuous fan speed regulation of all fans (VFD driven) for improved sound level of the unit during low ambient temperature operation. At very low temperatures, all fans except the first are switched off thus allowing unit operation down to -18°C.

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 reliefe valve.

Transport kit

Machine type

EWA	= Air cooled chiller cool. only
EWY	= Air cooled chiller heat pump
ERA	= Air cooled condensing unit

Refrigerant

D	= R-134a
P	= R-407C
Q	= R-410A

Capacity class in kW (Cooling)

Always 3-digit
code

Model series

A, B, …..

Inverter

-	= Non inverter

Efficiency level

S	= Standard Efficiency
X	= High Efficiency
P	= Premium Efficiency

Sound level

S	= Standard sound
L	= Low sound
R	= Reduced sound

EWAD C-XS

MODEL		760	830	890	990	C10	C11	C12	C13
Capacity - Cooling *	kW	764	838	898	1012	1087	1207	1293	1366
Capacity control - Type	---	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Unit power input - Cooling *	kW	232	253	277	307	336	364	399	408
EER *	---	3,29	3,31	3,24	3,30	3,24	3,32	3,24	3,35
ESEER	---	4,02	4,11	4,02	4,12	4,06	4,15	4,03	4,27
IPLV	---	4,48	4,48	4,52	4,50	4,44	4,50	4,47	4,60
CASING									
Colour **	---	IW	IW	IW	IW	IW	IW	IW	IW
Material **	---	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS									
Height	mm	2540	2540	2540	2540	2540	2540	2540	2540
Width	mm	2285	2285	2285	2285	2285	2285	2285	2285
Length	mm	6285	7185	7185	8085	8085	9885	9885	9885
WEIGHT									
Unit Weight	kg	5990	6340	6360	7190	7470	8220	8240	8900
Operating Weight	kg	6240	6580	6600	7600	7870	8610	8630	9890
WATER HEAT EXCHANGER									
Type **	---	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
Water Volume	l	251	243	243	403	403	386	386	979
Nominal water flow rate - Cooling	l/s	36,4	40,0	42,9	48,3	51,9	57,6	61,7	65,1
Nominal Water pressure drop - Cooling***	kPa	82	58	65	62	71	46	52	69
Insulation material **		CC	CC	CC	CC	CC	CC	CC	CC
AIR HEAT EXCHANGER									
Type **	---	HFP	HFP	HFP	HFP	HFP	HFP	HFP	HFP
FAN									
Type **	---	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Drive **	---	DOL	DOL	DOL	DOL	DOL	DOL	DOL	DOL
Diameter	mm	850	850	850	850	850	850	850	850
Nominal air flow	l/s	74396	86795	86795	99195	99195	123993	123993	123993
Quantity	No.	12	14	14	16	16	20	20	20
Speed	rpm	900	900	900	900	900	900	900	900
Motor input	kW	26,4	30,8	30,8	35,2	35,2	44,0	44,0	44,0
COMPRESSOR									
Type	---	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw
Oil charge	l	38	38	38	44	50	50	50	50
Quantity	No.	2	2	2	2	2	2	2	2
SOUND LEVEL****									
Sound Power - Cooling	dB(A)	100	101	101	101	102	102	103	103
Sound Pressure - Cooling	dB(A)	80	80	80	80	81	80	80	80
REFRIGERANT CIRCUIT									
Refrigerant type	---	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	150	162	168	195	200	244	254	250
N. of circuits	No.	2	2	2	2	2	2	2	2
PIPING CONNECTIONS									
Evaporator water inlet/outlet		168.3 mm	168.3 mm	168.3 mm	219.1 mm	219.1 mm	219.1 mm	219.1 mm	273 mm

** Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;*

*** IW: Ivory White - GPSS: Galvanized and Painted Steel Sheet - PHE: Plate Heat Exchanger - S&T: Single Pass Shell & Tube.*

***CC: Closed Cell - HFP: High efficiency fin and tube type - DPT: Direct Propeller Type - DOL: Direct On Line - VFD: Inverter - BRS: Brushless.*

**** If red contact factory. **** Details on measurement metods in the Sound Data section*

Unit performances are referred to ideal running conditions that are reproducible in laboratory test environment in accordance to recognized industry standards (i.e. EN14511). Weights and dimensions are indicative –For specific values refer to certified drawing issued by factory.

Data are referred to unit with standard options only. For specific information about additional options refer to databook specific section.

EWAD C-XS

MODEL		H14	H15	C16	C17	C18	C19	C20	C21
Capacity - Cooling *	kW	1434	1547	1613	1703	1786	1876	1919	1972
Capacity control - Type	---	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	12,5	12,5	7,0	7,0	7,0	7,0	7,0	7,0
Unit power input - Cooling *	kW	439	469	501	531	559	588	611	638
EER *	---	3,27	3,30	3,22	3,21	3,19	3,19	3,14	3,09
ESEER	---	4,30	4,34	4,21	4,18	4,16	4,16	4,15	4,04
IPLV	---	4,71	4,81	4,58	4,59	4,51	4,53	4,57	4,42
CASING									
Colour **	---	IW	IW	IW	IW	IW	IW	IW	IW
Material **	---	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS									
Height	mm	2540	2540	2540	2540	2540	2540	2540	2540
Width	mm	2285	2285	2285	2285	2285	2285	2285	2285
Length	mm	9885	9885	12085	12985	13885	14785	14785	14785
WEIGHT									
Unit Weight	kg	8900	8900	11570	11900	12260	12600	12600	12600
Operating Weight	kg	9890	9890	12430	12760	13140	13470	13470	13470
WATER HEAT EXCHANGER									
Type **	---	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
Water Volume	l	979	979	850	850	871	850	850	850
Nominal water flow rate - Cooling	l/s	68,4	73,8	77,0	81,2	85,2	89,5	91,5	94,1
Nominal Water pressure drop - Cooling***	kPa	79	86	63	70	69	76	40	42
Insulation material **		CC	CC	CC	CC	CC	CC	CC	CC
AIR HEAT EXCHANGER									
Type **	---	HFP	HFP	HFP	HFP	HFP	HFP	HFP	HFP
FAN									
Type **	---	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Drive **	---	DOL	DOL	DOL	DOL	DOL	DOL	DOL	DOL
Diameter	mm	850	850	850	850	850	850	850	850
Nominal air flow	l/s	123993	123993	148792	161191	173591	185990	185990	185990
Quantity	No.	20	20	24	26	28	30	30	30
Speed	rpm	900	900	900	900	900	900	900	900
Motor input	kW	44,0	44,0	52,8	57,2	61,6	66,0	66,0	66,0
COMPRESSOR									
Type	---	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw
Oil charge	l	50	50	75	75	75	75	75	75
Quantity	No.	2	2	3	3	3	3	3	3
SOUND LEVEL****									
Sound Power - Cooling	dB(A)	103	103	103	104	104	104	104	104
Sound Pressure - Cooling	dB(A)	80	80	81	81	81	81	81	81
REFRIGERANT CIRCUIT									
Refrigerant type	---	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	250	270	312	327	340	360	360	360
N. of circuits	No.	2	2	3	3	3	3	3	3
PIPING CONNECTIONS									
Evaporator water inlet/outlet		273 mm	273 mm	273 mm	273 mm	273 mm	273 mm	273 mm	273 mm

** Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;*

*** IW: Ivory White - GPSS: Galvanized and Painted Steel Sheet - PHE: Plate Heat Exchanger - S&T: Single Pass Shell & Tube.*

***CC: Closed Cell - HFP: High efficiency fin and tube type - DPT: Direct Propeller Type - DOL: Direct On Line - VFD: Inverter - BRS: Brushless.*

**** If red contact factory. **** Details on measurement metods in the Sound Data section*

Unit performances are referred to ideal running conditions that are reproducible in laboratory test environment in accordance to recognized industry standards (i.e. EN14511). Weights and dimensions are indicative –For specific values refer to certified drawing issued by factory.

Data are referred to unit with standard options only. For specific information about additional options refer to databook specific section.

EWAD C-XS

MODEL		C22							
Capacity - Cooling *	kW	2029							
Capacity control - Type	---	Stepless							
Capacity control - Minimum capacity	%	7,0							
Unit power input - Cooling *	kW	666							
EER *	---	3,05							
ESEER	---	4,02							
IPLV	---	4,47							
CASING									
Colour **	---	IW							
Material **	---	GPSS							
DIMENSIONS									
Height	mm	2540							
Width	mm	2285							
Length	mm	14785							
WEIGHT									
Unit Weight	kg	12600							
Operating Weight	kg	13470							
WATER HEAT EXCHANGER									
Type **	---	S&T							
Water Volume	l	850							
Nominal water flow rate - Cooling	l/s	96,8							
Nominal Water pressure drop - Cooling***	kPa	44							
Insulation material **		CC							
AIR HEAT EXCHANGER									
Type **	---	HFP							
FAN									
Type **	---	DPT							
Drive **	---	DOL							
Diameter	mm	800							
Nominal air flow	l/s	185990							
Quantity	No.	30							
Speed	rpm	900							
Motor input	kW	66,0							
COMPRESSOR									
Type	---	Asymm Single Screw							
Oil charge	l	75							
Quantity	No.	3							
SOUND LEVEL****									
Sound Power - Cooling	dB(A)	104							
Sound Pressure - Cooling	dB(A)	81							
REFRIGERANT CIRCUIT									
Refrigerant type	---	R134a							
Refrigerant charge	kg	375							
N. of circuits	No.	3							
PIPING CONNECTIONS									
Evaporator water inlet/outlet		273 mm							

** Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;*
*** IW: Ivory White - GPSS: Galvanized and Painted Steel Sheet - PHE: Plate Heat Exchanger - S&T: Single Pass Shell & Tube.*
***CC: Closed Cell - HFP: High efficiency fin and tube type - DPT: Direct Propeller Type - DOL: Direct On Line - VFD: Inverter - BRS: Brushless.*
**** If red contact factory. **** Details on measurement metods in the Sound Data section*
Unit performances are referred to ideal running conditions that are reproducible in laboratory test environment in accordance to recognized industry standards (i.e. EN14511). Weights and dimensions are indicative –For specific values refer to certified drawing issued by factory.
Data are referred to unit with standard options only. For specific information about additional options refer to databook specific section.

EWAD C-PS

MODEL		820	890	980	C11	C12	C13	C14	C15
Capacity - Cooling *	kW	826	896	983	1083	1168	1291	1402	1488
Capacity control - Type	---	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless	Stepless
Capacity control - Minimum capacity	%	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
Unit power input - Cooling *	kW	230	252	276	304	332	365	398	425
EER *	---	3,60	3,56	3,56	3,56	3,52	3,53	3,52	3,51
ESEER	---	4,44	4,51	4,43	4,52	4,38	4,46	4,31	4,33
IPLV	---	4,78	4,67	4,79	4,69	4,73	4,68	4,73	4,73
CASING									
Colour **	---	IW	IW	IW	IW	IW	IW	IW	IW
Material **	---	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS									
Height	mm	2540	2540	2540	2540	2540	2540	2540	2540
Width	mm	2285	2285	2285	2285	2285	2285	2285	2285
Length	mm	8985	8985	8985	9885	9885	11185	12085	12085
WEIGHT									
Unit Weight	kg	7530	7530	7660	8290	8550	9390	9730	9730
Operating Weight	kg	8130	8130	8700	9330	9590	10380	10720	10720
WATER HEAT EXCHANGER									
Type **	---	S&T	S&T	S&T	S&T	S&T	S&T	S&T	S&T
Water Volume	l	599	599	1043	1027	1027	995	979	979
Nominal water flow rate - Cooling	l/s	39,4	42,8	46,9	51,7	55,7	61,6	66,9	71,0
Nominal Water pressure drop - Cooling***	kPa	58	67	31	62	71	61	71	82
Insulation material **		CC	CC	CC	CC	CC	CC	CC	CC
AIR HEAT EXCHANGER									
Type **	---	HFP	HFP	HFP	HFP	HFP	HFP	HFP	HFP
FAN									
Type **	---	DPT	DPT	DPT	DPT	DPT	DPT	DPT	DPT
Drive **	---	DOL	DOL	DOL	DOL	DOL	DOL	DOL	DOL
Diameter	mm	850	850	850	850	850	850	850	850
Nominal air flow	l/s	111594	111594	111594	123993	123993	136393	148792	148792
Quantity	No.	18	18	18	20	20	22	24	24
Speed	rpm	900	900	900	900	900	900	900	900
Motor input	kW	39,6	39,6	39,6	44,0	44,0	48,4	52,8	52,8
COMPRESSOR									
Type	---	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw	Asymm Single Screw
Oil charge	l	38	38	38	44	50	50	50	50
Quantity	No.	2	2	2	2	2	2	2	2
SOUND LEVEL****									
Sound Power - Cooling	dB(A)	101	101	101	102	102	103	103	103
Sound Pressure - Cooling	dB(A)	80	80	80	80	81	80	81	81
REFRIGERANT CIRCUIT									
Refrigerant type	---	R134a	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Refrigerant charge	kg	204	204	204	230	252	275	280	280
N. of circuits	No.	2	2	2	2	2	2	2	2
PIPING CONNECTIONS									
Evaporator water inlet/outlet		219.1 mm	219.1 mm	273 mm	273 mm	273 mm	273 mm	273 mm	273 mm

** Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;*

*** IW: Ivory White - GPSS: Galvanized and Painted Steel Sheet - PHE: Plate Heat Exchanger - S&T: Single Pass Shell & Tube.*

***CC: Closed Cell - HFP: High efficiency fin and tube type - DPT: Direct Propeller Type - DOL: Direct On Line - VFD: Inverter - BRS: Brushless.*

**** If red contact factory. **** Details on measurement metods in the Sound Data section*

Unit performances are referred to ideal running conditions that are reproducible in laboratory test environment in accordance to recognized industry standards (i.e. EN14511). Weights and dimensions are indicative –For specific values refer to certified drawing issued by factory.

Data are referred to unit with standard options only. For specific information about additional options refer to databook specific section.

EWAD C-PS

MODEL		C16							
Capacity - Cooling *	kW	1578							
Capacity control - Type	---	Stepless							
Capacity control - Minimum capacity	%	12,5							
Unit power input - Cooling *	kW	452							
EER *	---	3,49							
ESEER	---	4,31							
IPLV	---	4,71							
CASING									
Colour **	---	IW							
Material **	---	GPSS							
DIMENSIONS									
Height	mm	2540							
Width	mm	2285							
Length	mm	12085							
WEIGHT									
Unit Weight	kg	9730							
Operating Weight	kg	10720							
WATER HEAT EXCHANGER									
Type **	---	S&T							
Water Volume	l	979							
Nominal water flow rate - Cooling	l/s	75,3							
Nominal Water pressure drop - Cooling***	kPa	90							
Insulation material **		CC							
AIR HEAT EXCHANGER									
Type **	---	HFP							
FAN									
Type **	---	DPT							
Drive **	---	DOL							
Diameter	mm	850							
Nominal air flow	l/s	148792							
Quantity	No.	24							
Speed	rpm	900							
Motor input	kW	52,8							
COMPRESSOR									
Type	---	Asymm Single Screw							
Oil charge	l	50							
Quantity	No.	2							
SOUND LEVEL****									
Sound Power - Cooling	dB(A)	104							
Sound Pressure - Cooling	dB(A)	81							
REFRIGERANT CIRCUIT									
Refrigerant type	---	R134a							
Refrigerant charge	kg	322							
N. of circuits	No.	2							
PIPING CONNECTIONS									
Evaporator water inlet/outlet		273 mm							

** Cooling capacity, unit power input in cooling and EER are based on the following conditions: evaporator 12,0/7,0°C; ambient 35,0°C, unit at full load operation;*
*** IW: Ivory White - GPSS: Galvanized and Painted Steel Sheet - PHE: Plate Heat Exchanger - S&T: Single Pass Shell & Tube.*
***CC: Closed Cell - HFP: High efficiency fin and tube type - DPT: Direct Propeller Type - DOL: Direct On Line - VFD: Inverter - BRS: Brushless.*
**** If red contact factory. **** Details on measurement metods in the Sound Data section*
Unit performances are referred to ideal running conditions that are reproducible in laboratory test environment in accordance to recognized industry standards (i.e. EN14511). Weights and dimensions are indicative –For specific values refer to certified drawing issued by factory.
Data are referred to unit with standard options only. For specific information about additional options refer to databook specific section.

EWAD C-XS

MODEL		760	830	890	990	C10	C11	C12	C13
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3	3	3
Frequency	Hz	50	50	50	50	50	50	50	50
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
UNIT									
Maximum starting current	A	626	666	666	802	849	911	911	911
Nominal running current cooling	A	394	432	470	519	565	619	676	693
Maximum running current	A	526	580	623	693	752	837	901	901
Maximum current for wires sizing	A	572	630	678	753	818	910	981	981
FANS									
Nominal running current cooling	A	64	74	74	85	85	106	106	106
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3	3	3
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
Maximum running current	A	231 231	231 274	274 274	274 333	333 333	333 398	398 398	398 398
Starting method	---	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ
Compressor starting current	A	410 410	410 410	410 410	410 540	540 540	540 540	540 540	540 540

EWAD C-XS

MODEL		H14	H15	C16	C17	C18	C19	C20	C21
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3	3	3
Frequency	Hz	50	50	50	50	50	50	50	50
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
UNIT									
Maximum starting current	A	1055	1098	1158	1220	1282	1282	1427	1469
Nominal running current cooling	A	736	779	843	895	946	998	1030	1068
Maximum running current	A	955	1008	1127	1202	1277	1352	1405	1458
Maximum current for wires sizing	A	1039	1098	1227	1309	1390	1471	1530	1588
FANS									
Nominal running current cooling	A	106	106	127	138	148	159	159	159
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3	3	3
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
Maximum running current	A	398 451	451 451	333 333 333	333 333 398	398 398 333	398 398 398	398 398 451	451 451 398
Starting method	---	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ
Compressor starting current	A	540 684	684 684	540 540 540	540 540 540	540 540 540	540 540 540	540 540 684	684 684 540

EWAD C-XS

MODEL		C22							
POWER SUPPLY									
Phases	Nr	3							
Frequency	Hz	50							
Voltage	V	400							
Voltage tolerance Minimum	%	-10%							
Voltage tolerance Maximum	%	+10%							
UNIT									
Maximum starting current	A	1512							
Nominal running current cooling	A	1107							
Maximum running current	A	1512							
Maximum current for wires sizing	A	1647							
FANS									
Nominal running current cooling	A	159							
COMPRESSORS									
Phases	Nr	3							
Voltage	V	400							
Voltage tolerance Minimum	%	-10%							
Voltage tolerance Maximum	%	+10%							
Maximum running current	A	451 451 451							
Starting method	---	Y-Δ							
Compressor starting current	A	684 684 684							

Fluid: Water
Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
Nominal current in cooling mode is referred to the following conditions: evaporator 12/7°C; ambient 35°C; compressors + fans current.
Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
Maximum unit current for wires sizing is based on minimum allowed voltage
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.
Electrical data are subject to modification without notice. Please refer to unit nameplate data

EWAD C-PS

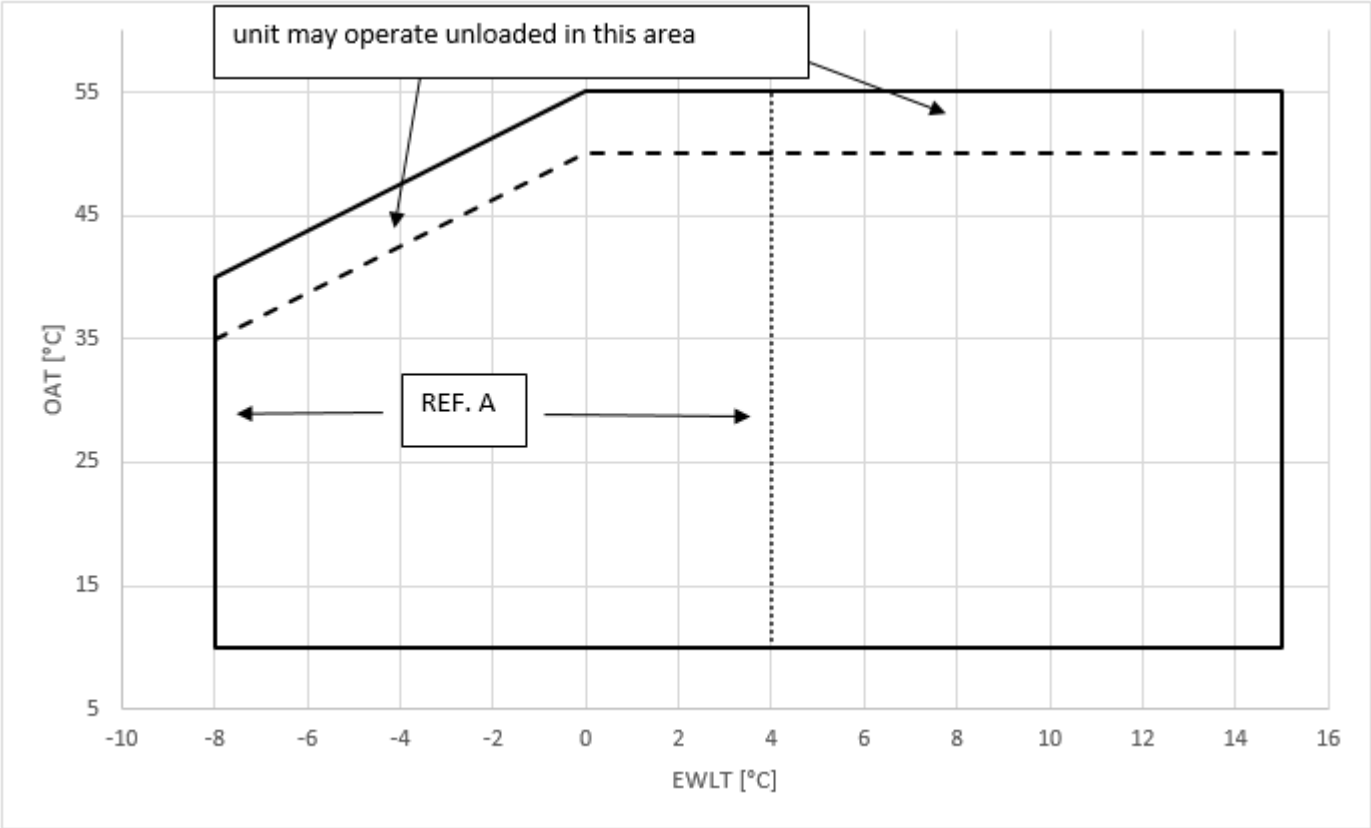
MODEL		820	890	980	C11	C12	C13	C14	C15
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3	3	3
Frequency	Hz	50	50	50	50	50	50	50	50
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
UNIT									
Maximum starting current	A	642	677	677	715	860	922	922	1066
Nominal running current cooling	A	403	440	479	527	569	629	687	725
Maximum running current	A	557	601	644	696	773	848	923	976
Maximum current for wires sizing	A	604	651	699	755	839	921	1002	1061
FANS									
Nominal running current cooling	A	95	95	95	106	106	117	127	127
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3	3	3
Voltage	V	400	400	400	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%	+10%	+10%
Maximum running current	A	231 231	231 274	274 274	274 316	333 333	333 398	398 398	398 451
Starting method	---	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ	Y-Δ
Compressor starting current	A	410 410	410 410	410 410	410 540	540 540	540 540	540 540	540 684

EWAD C-PS

MODEL		C16
POWER SUPPLY		
Phases	Nr	3
Frequency	Hz	50
Voltage	V	400
Voltage tolerance Minimum	%	-10%
Voltage tolerance Maximum	%	+10%
UNIT		
Maximum starting current	A	1109
Nominal running current cooling	A	764
Maximum running current	A	1029
Maximum current for wires sizing	A	1119
FANS		
Nominal running current cooling	A	127
COMPRESSORS		
Phases	Nr	3
Voltage	V	400
Voltage tolerance Minimum	%	-10%
Voltage tolerance Maximum	%	+10%
Maximum running current	A	451 451
Starting method	---	Y-Δ
Compressor starting current	A	684 684

Fluid: Water
Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.
Maximum starting current: starting current of biggest compressor + current of the compressor at 75% maximum load + fans current for the circuit at 75%.
Nominal current in cooling mode is referred to the following conditions: evaporator 12/7°C; ambient 35°C; compressors + fans current.
Maximum running current is based on max compressor absorbed current in its envelope and max fans absorbed current
Maximum unit current for wires sizing is based on minimum allowed voltage
Maximum current for wires sizing: (compressors full load ampere + fans current) x 1,1.
Electrical data are subject to modification without notice. Please refer to unit nameplate data

Operating Limits



Note

The above graphic represents a guideline about the operating limits of the range. Please refer to Chiller Selection Software (CSS) for real operating limits working conditions for each size.

Legend:

ELWT = Evaporator Leaving Water Temperature (°C)
CIAT = Condenser Inlet Air Temperature (°C)

Ref.:

A = Operation with Glycol (below 4°C Evap LWT)

Table 1 - Water heat exchanger - Minimum and maximum water Δt

A - Δt	**°C**	**8**
B - Δt	**°C**	**4**

Legend:

A = Max evaporator water Δt
B = Min evaporator water Δt

Table 2 - Water heat exchanger - Fouling factors

A	B	C	D
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Legend:
A = Fouling factors (m2 °C / kW)
B = Cooling capacity correction factor
C = Power input correction factor
D = EER correction factor

Table 3 - Air heat exchanger - Altitude correction factors

A	0	300	600	900	1200	1500	1800
B	1013	977	942	908	875	843	812
C	1.000	0.993	0.986	0.979	0.973	0.967	0.960
D	1.000	1.005	1.009	1.015	1.021	1.026	1.031

Legend:
A = Elevation above sea level (m)
B = Barometric pressure (mbar)
C = Cooling capacity correction factor
D = Power input correction factor

- Maximum operating altitude is 2000 m above sea level
- Contact factory in case the unit has to be installed at altitudes between 1000 and 2000 m above sea level

Table 4 - Minimum glycol percentage for low air ambient temperature

AAT (2)	-3	-8	-15	-20
A (1)	10%	20%	30%	40%
AAT (2)	-3	-7	-12	-20
B (1)	10%	20%	30%	40%

Legend:

AAT = Air Ambient Temperature (°C) (2)
A = Ethylene glycol (%) (1)
B = Propylene glycol (%) (1)

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

(2) Air ambient temperature do exceed the operating limits of the unit, a protection of water circuit may be needed in winter season at non-working conditions.

Table 5.1 - Available fan static pressure correction factors

A	0	10	20	30	40	50	60	70	80	90	100
B	1.000	0.998	0.996	0.995	0.993	0.992	0.991	0.989	0.986	0.985	0.982
C	1.000	1.004	1.009	1.012	1.018	1.021	1.024	1.027	1.034	1.039	1.045
D	1.0	-0.3	-0.5	-0.7	-1.0	-1.1	-1.3	-1.6	-1.8	2.1	-2.4

The above data are referred to:
- Fan 800 mm diameter
- Fan speed 890 rpm or 900 rpm

Legend:
A = External Static Pressure (Pa)
B = Cooling Capacity (kW) Correction factor
C = Compressor Power Input (kW) Correction factor
D = Reduction of Maximum Condenser Inlet Air Temperature (°C)

Table 5.2 - Available fan static pressure correction factors

A	0	10	20	30	40	50	60	70
B	1.000	0.996	0.991	0.985	0.978	0.970	0.954	0.927
C	1.000	1.005	1.012	1.020	1.028	1.039	1.058	1.092
D	1.0	-0.3	-0.7	-1.1	-1.6	-2.2	-3.3	-5.1

The above data are referred to:
- Fan 800 mm diameter
- Fan speed 700 rpm or 705 rpm

Legend:
A = External Static Pressure (Pa)
B = Cooling Capacity (kW) Correction factor
C = Compressor Power Input (kW) Correction factor
D = Reduction of Maximum Condenser Inlet Air Temperature (°C)

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, have 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 with a certain approximation using this simplified formula:

For 2 compressors unit
M (liters) = (0.1595 x NT(°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.

Water charge, flow and quality

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	[mgCl^{2-}/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	Sulfate ion	[mgSO^{2-}_4/l]	Below 200	Below 50	Below 50	Below 200	Below 50	Below 50	Below 50	Below 30	Below 30	Corrosion
	M-alkalinity (pH4.8)	[mg$CaCO_3$/l]	Below 100	Below 50	Below 50	Below 100	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Total hardness	[mg$CaCO_3$/l]	Below 200	Below 70	Below 70	Below 200	Below 70	Below 70	Below 70	Below 70	Below 70	Scale
	Calcium harness	[mg$CaCO_3$/l]	Below 150	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Below 50	Scale
	Silca ion	[mgSiO_2/l]	Below 50	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Below 30	Scale
	Oxygen	(mg 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	[mgS^{2-}/l]	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Not detectable	Corrosion
	Ammonium ion	[mgNH^+_4/l]	Below 1.0	Below 0.1	Below 1.0	Below 1.0	Below 0.1	Below 0.3	Below 0.1	Below 0.1	Below 0.1	Corrosion
	Remaining chloride	[mgCL/l]	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.3	Below 0.25	Below 0.3	Below 0.1	Below 0.3	Corrosion
	Free carbide	[mgCO_2/l]	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 4.0	Below 0.4	Below 4.0	Below 0.4	Below 4.0	Corrosion
	Stability index		6.0 ~ 7.0	---	---	---	---	---	---	---	---	Corrosion + Scale

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.

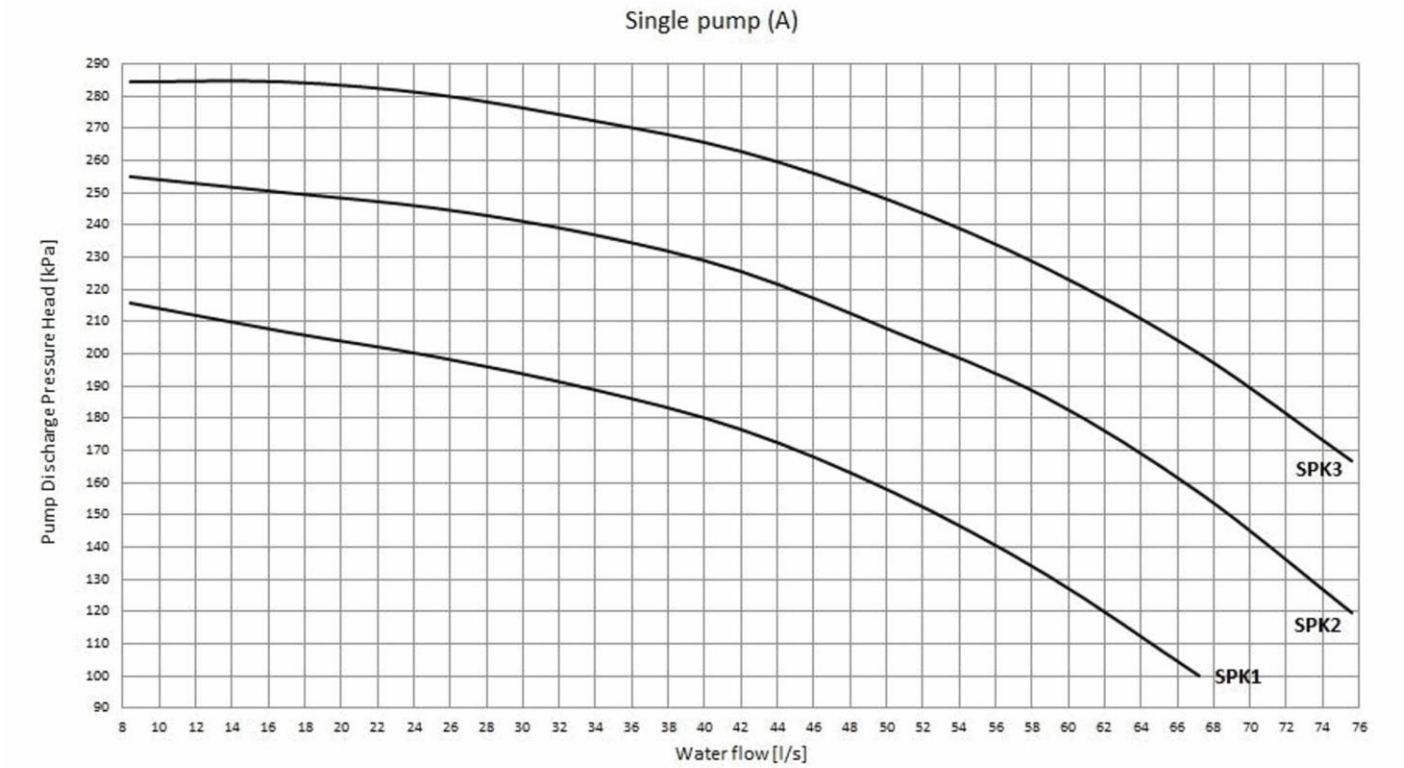
5 The above mentioned items are representable items in corrosion and scale cases.

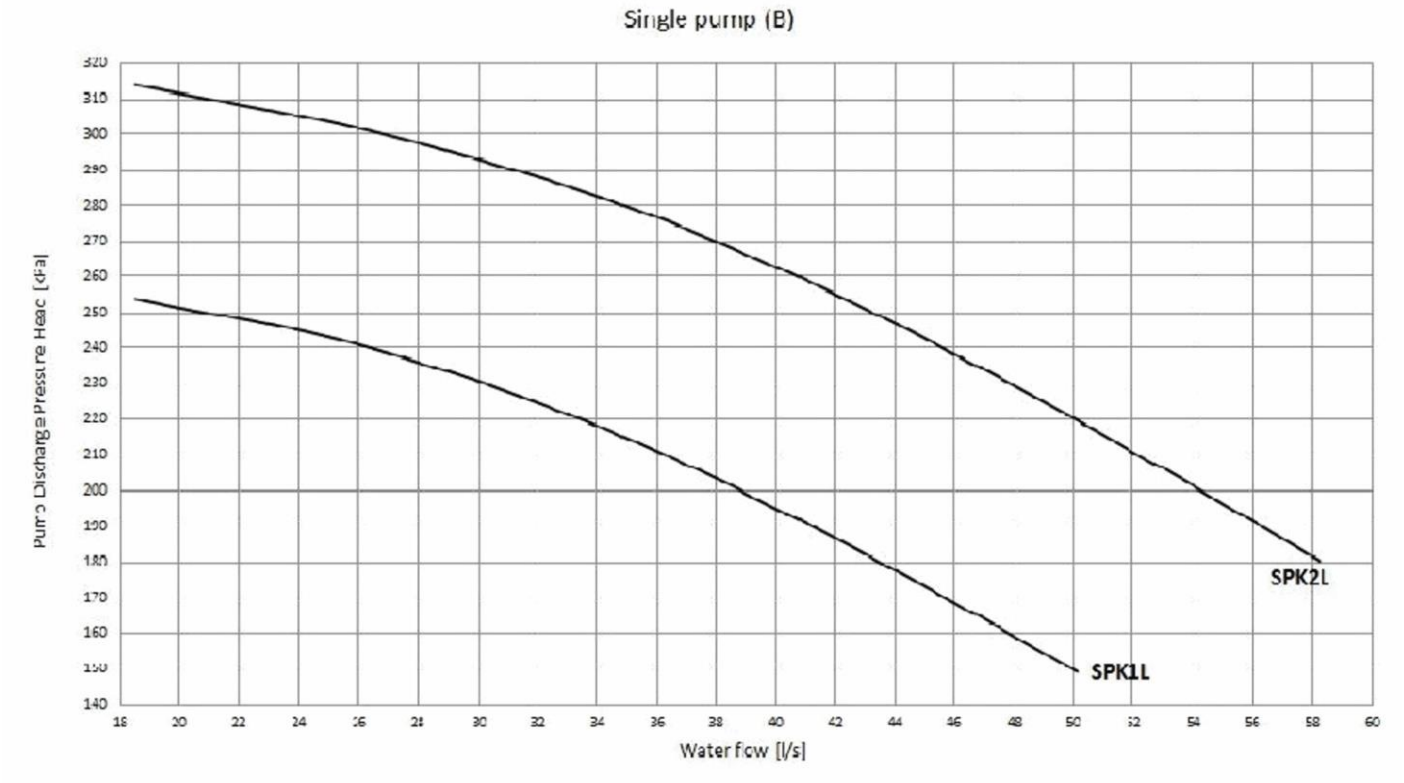
6 The limits above have to be considered as a general prescription and con not totallu assure the absence of corrossion and erosion.
Some particular combinations of elements or the presence of components not listed in the table or factors not considered may trigger corrosion phenomena.

Water Pump Kit

Single Pump (2 poles)

Discharge head





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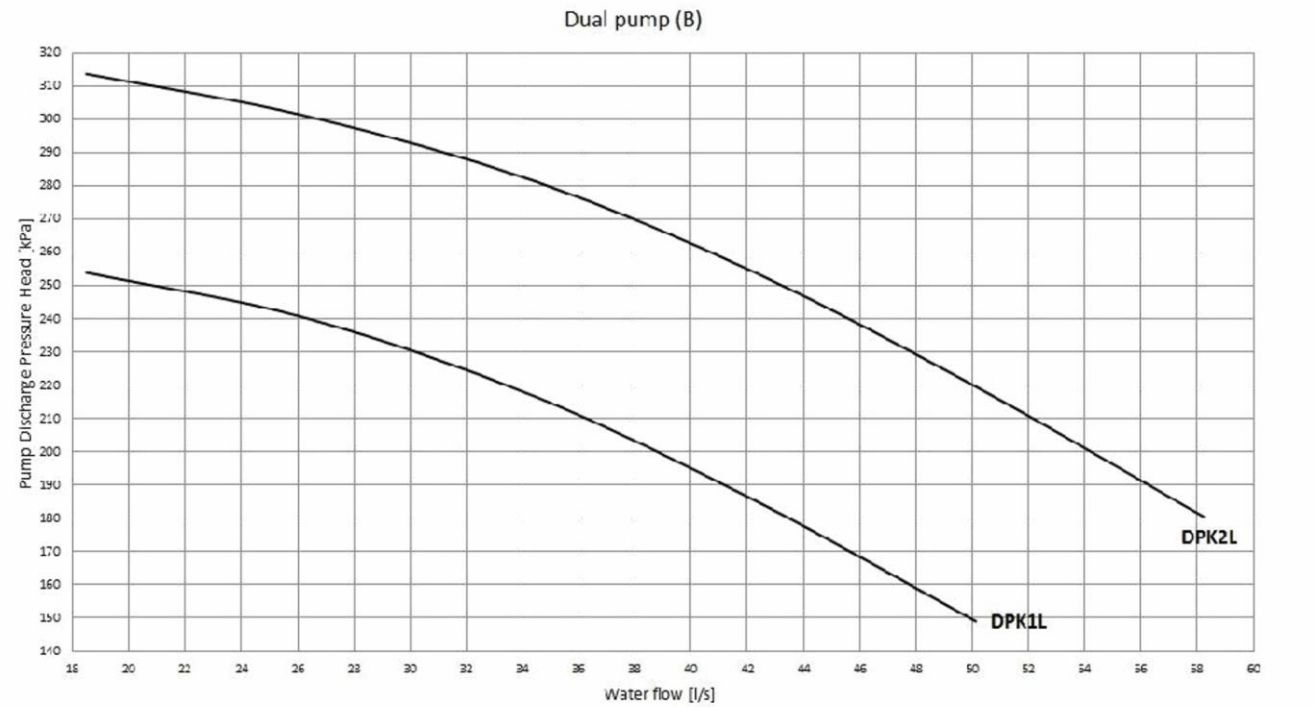
Twin Pump (2 poles)

Discharge head



Note

- the above curves are referred to the discharge head of the pump only, not including pressure drops in the unit
- when using mixture of water and glycol please contact the factory as above specification can change

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Water Pump Kit - Combination Matrix

EWAD-C			Single pump					Dual pump					
			SPK1L	SPK2L	SPK1	SPK2	SPK3	DPK1L	DPK2L	DPK1	DPK2	DPK3	DPK4
EWAD650C-SS	EWAD650C-SL	EWAD620C-SR	x	x				x	x				
EWAD740C-SS	EWAD740C-SL	EWAD720C-SR	x	x				x	x				
EWAD830C-SS	EWAD830C-SL	EWAD790C-SR	x	x				x	x				
EWAD910C-SS	EWAD910C-SL	EWAD880C-SR	x	x				x	x				
EWAD970C-SS	EWAD970C-SL	EWAD920C-SR	x	x				x	x				
EWADC11C-SS	EWADC11C-SL	EWADC10C-SR	x	x				x	x				
EWADC12C-SS	EWADC12C-SL	EWADC11C-SR			x	x	x				x	x	x
EWADC13C-SS	EWADC13C-SL	EWADC12C-SR			x	x	x				x	x	x
EWADH14C-SS	EWADH14C-SL	EWADH14C-SR				x	x				x	x	x
EWAD760C-XS	EWAD760C-XL	EWAD740C-XR	x	x				x	x				
EWAD830C-XS	EWAD830C-XL	EWAD810C-XR	x	x				x	x				
EWAD890C-XS	EWAD890C-XL	EWAD870C-XR	x	x				x	x				
EWAD990C-XS	EWAD990C-XL	EWAD970C-XR			x	x	x			x	x	x	x
EWADC10C-XS	EWADC10C-XL	EWADC10C-XR			x	x	x			x	x	x	x
EWADC11C-XS	EWADC11C-XL	EWADC11C-XR			x	x	x			x	x	x	x
EWADC12C-XS	EWADC12C-XL	EWADC12C-XR			x	x	x			x	x	x	x
EWADC13C-XS	EWADC13C-XL	EWADC13C-XR				x	x				x	x	x
EWADH14C-XS	EWADH14C-XL	EWADH14C-XR				x	x				x	x	x
EWADH15C-XS	EWADH15C-XL	EWADH15C-XR				x	x					x	x
EWAD820C-PS	EWAD820C-PL	EWAD810C-PR			x	x	x			x	x	x	x
EWAD890C-PS	EWAD890C-PL	EWAD880C-PR			x	x	x			x	x	x	x
EWAD980C-PS	EWAD980C-PL	EWAD960C-PR			x	x	x			x	x	x	x
EWADC11C-PS	EWADC11C-PL	EWADC10C-PR			x	x	x			x	x	x	x
EWADC12C-PS	EWADC12C-PL	EWADC11C-PR			x	x	x				x	x	x
EWADC13C-PS	EWADC13C-PL	EWADC13C-PR			x	x	x				x	x	x
EWADC14C-PS	EWADC14C-PL	EWADC14C-PR				x	x				x	x	x
EWADC15C-PS	EWADC15C-PL	EWADC15C-PR				x	x					x	x
EWADC16C-PS	EWADC16C-PL	EWADC16C-PR			n.a	n.a	n.a			n.a	n.a	n.a	n.a
NOTE: Pumps not available for 3 circuits units. Contact factory for evaluating special solution.													

EWAD-CZ			Single pump					Dual pump					
			SPK1L	SPK2L	SPK1	SPK2	SPK3	DPK1L	DPK2L	DPK1	DPK2	DPK3	DPK4
EWAD740CZXS	EWAD740CZXL	EWAD700CZXR	x	x				x	x				
EWAD830CZXS	EWAD830CZXL	EWAD790CZXR	x	x				x	x				
EWAD900CZXS	EWAD900CZXL	EWAD850CZXR	x	x				x	x				
EWADC10CZXS	EWADC10CZXL	EWAD980CZXR			x	x	x			x	x	x	x
EWADC11CZXS	EWADC11CZXL	EWADC10CZXR			x	x	x			x	x	x	x
EWADC12CZXS	EWADC12CZXL	EWADC11CZXR			x	x	x				x	x	x
EWADC13CZXS	EWADC13CZXL	EWADC12CZXR			x	x	x				x	x	x
EWADC14CZXS	EWADC14CZXL	EWADC13CZXR				x	x				x	x	x
EWADC15CZXS	EWADC15CZXL	EWADC14CZXR					x					x	x
NOTE: Pumps not available for 3 circuits units. Contact factory for evaluating special solution.													

Legend:
SP = Single Pump; DP = Double Pump

Water Pump Kit - Technical Information

		Pump Motor Power[kW]	Pumo Motor Current[A]	Power Supply[V-ph-Hz]	PN	Motor Protection	Insulation[Class]	Working Temperature[°C]
single pump	SPK1L	11,0	20,2	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK2L	15,0	26,2	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK1	11,0	20,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK2	15,0	26,8	400V-3ph-50hz	16	IP55	class F	-20 +140
	SPK3	18,5	31,8	400V-3ph-50hz	16	IP55	class F	-20 +140
dual pump	DPK1L	11,0	20,2	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK2L	15,0	26,2	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK1	11,0	20,5	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK2	15,0	26,8	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK3	18,,5	31,8	400V-3ph-50hz	16	IP55	class F	-20 +140
	DPK4	22,0	38,0	400V-3ph-50hz	16	IP55	class F	-20 +140

Legend:
SP = Single Pump; DP = Double Pump
A = Pump Motor Power; B = Pump Motor Current; C = Power Supply; D = PN; E = Motor Protection; F = Insulation (Class); G = Working temperature

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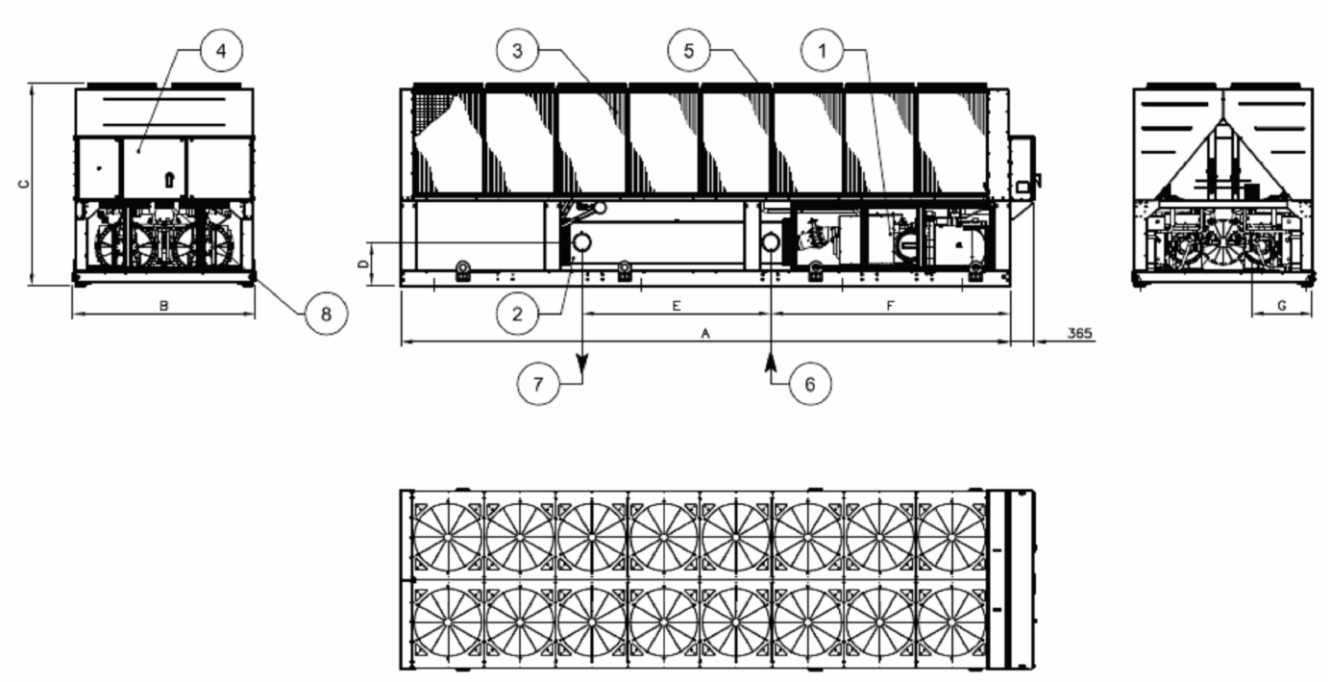
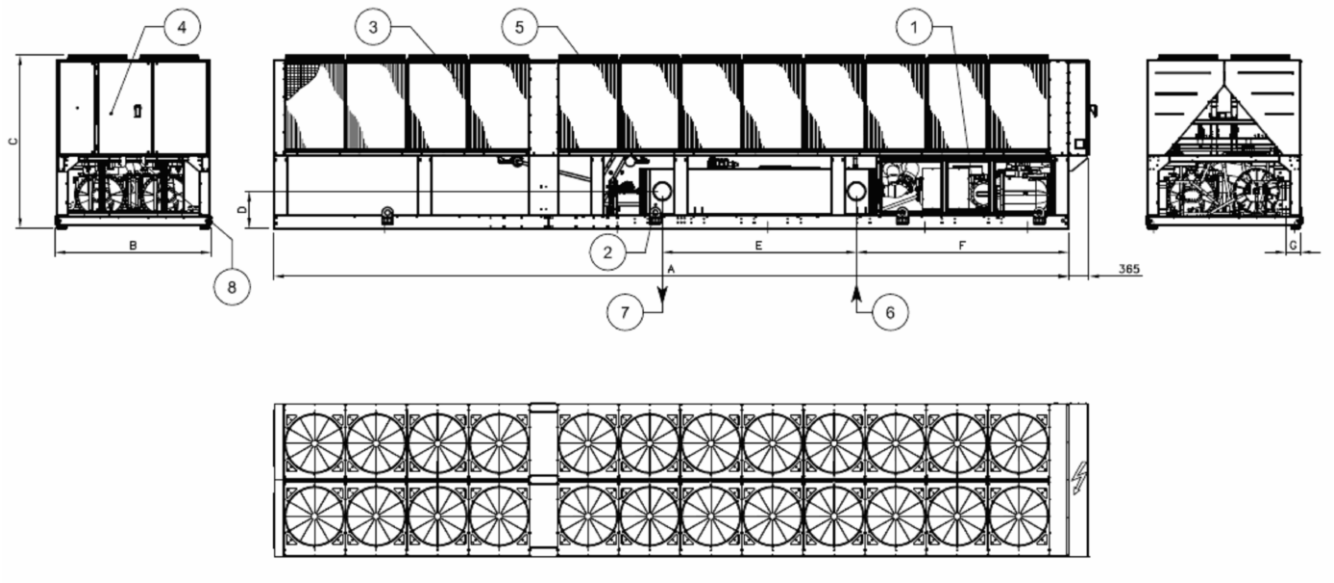


LEGEND

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 panel connection

	A	B	C	D	E	F	G	H	I	L	M
EWAD760C-XS	6285	2285	2540	470	2412	435	810				
EWAD830C-XS	7185	2285	2540	1370	2412	435	810				
EWAD890C-XS	7185	2285	2540	1370	2412	435	810				
EWAD990C-XS	8085	2285	2540	2270	2360	540	760				
EWADC10C-XS	8085	2285	2540	2270	2360	540	760				
EWADC11C-XS	9885	2285	2540	4070	2360	540	760				
EWADC12C-XS	9885	2285	2540	4070	2360	540	760				
EWADC13C-XS	9885	2285	2540	4070	2360	540	760				
EWADH14C-XS	9885	2285	2285	2920	3440	540	685				
EWADH15C-XS	9885	2285	2285	2920	3440	540	685				
EWAD820C-PS	8985	2285	2540	2020	3510	540	760				
EWAD890C-PS	8985	2285	2540	2020	3510	540	760				
EWAD980C-PS	8985	2285	2540	2020	3440	540	685				
EWADC11C-PS	9885	2285	2540	2920	3440	540	685				
EWADC12C-PS	9885	2285	2540	2920	3440	540	685				
EWADC13C-PS	11185	2285	2540	4205	3440	540	685				
EWADC14C-PS	12085	2285	2540	5105	3440	540	685				
EWADC15C-PS	12085	2285	2285	5130	3440	540	685				
EWADC16C-PS	12085	2285	2285	5130	3440	540	685				



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 panel connection

	A	B	C	D	E	F	G	H	I	L	M
EWADC16C-XS	12085	2285	2540	5680	2840	540	210				
EWADC17C-XS	12985	2285	2540	6580	2840	540	210				
EWADC18C-XS	13885	2285	2540	7480	2840	540	210				
EWADC19C-XS	14785	2285	2540	8380	2840	540	210				
EWADC20C-XS	14785	2285	2540	8380	2840	540	210				
EWADC21C-XS	14785	2285	2540	8380	2840	540	210				
EWADC22C-XS	14785	2285	2540	8380	2840	540	210				

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 follow the minimum recommended clearance requirements shown in 'Fig.2'. In the event the obstacles are higher than the units, the minimum recommended clearance requirements are shown in '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 a minimum distance from one another as shown in '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.

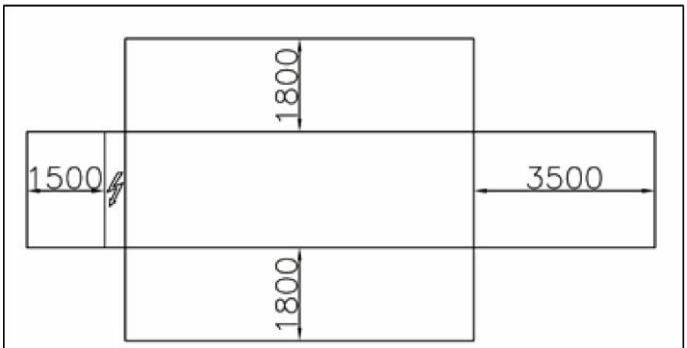


Fig. 1

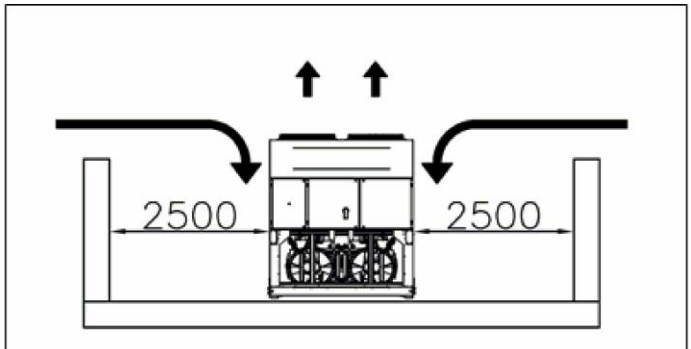


Fig. 2

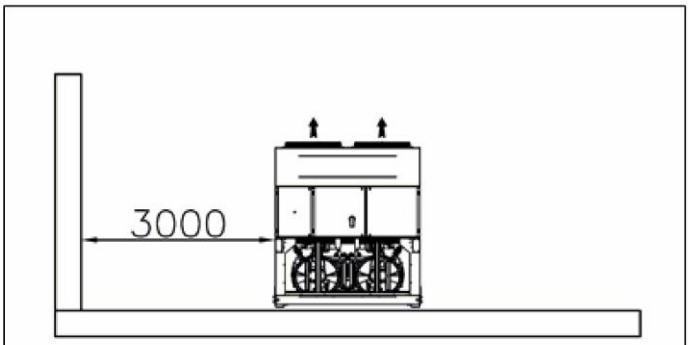


Fig. 3

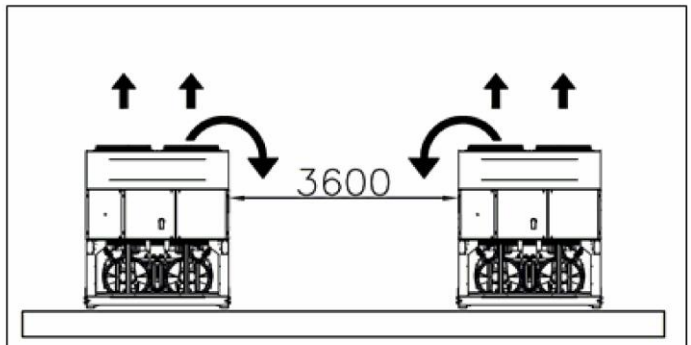


Fig. 4

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

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 HFC 134a can be used.

Performance Chiller shall supply the following performances:
- Number of chiller(s) : ..... unit(s)
- Cooling capacity for single chiller : ..... kW
- Power input for single chiller in cooling mode : ..... kW
- 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.

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.
- Water filter not available.

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 aluminum 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.

Condensation control The units will be provided with an automatic control for condensing pressure which ensures the working at low external temperatures down to - …… °C, to maintain condensing pressure.

- The compressor automatically unloads when abnormal high condensing pressure is detected. This to prevent the shutdown of the refrigerant circuit (shutdown of the unit) due to a high-pressure fault.

Low sound unit configurations (on request) The 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 aluminum 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.

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 against possible accidental contact with live parts.
- The main panel shall be fitted with a main switch interlocked door that shuts off power supply when opening.
- 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 maximize chiller energy efficiency and reliability.
- The controller will be able to protect critical components based on external signals 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 Controller shall be garantee following minimu functions:

- 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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