Databook

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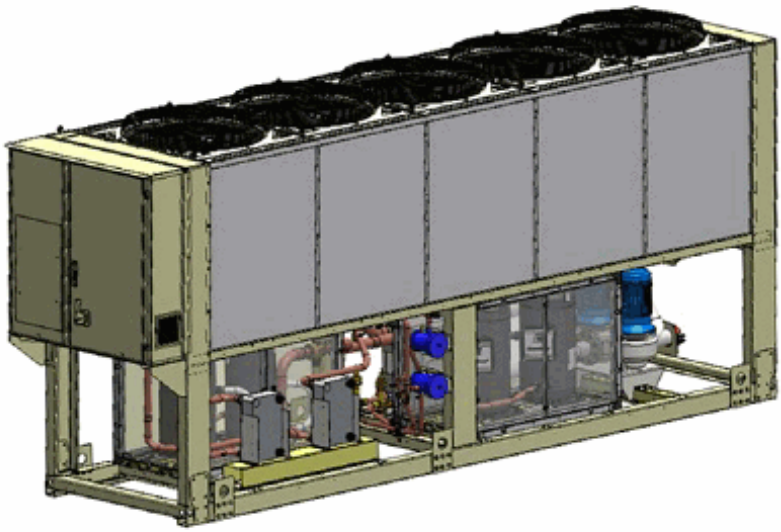
EWAQ~E-	R3.4

Air cooled scroll chillers

ECOLOGICAL
HFC
410A
REFRIGERANT

EWAQ~E-

XS (High Efficiency - Standard Noise) - Cooling Capacity from 178 to 336 kW
XL (High Efficiency - Low Noise) - Cooling Capacity from 178 to 336 kW
XR (High Efficiency - Reduced Noise) - Cooling Capacity from 173 to 323 kW



CE

DAIKIN

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 scroll compressors, large condenser coil surface area for maximum heat transfer and low discharge pressure, advanced technology condenser fans and a 'plate to plate' 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 truly independent refrigerant circuits, in order to assure maximum safety for any maintenance, whether planned or not. They are equipped with hermetic orbiting scroll compressor complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature, a proactive control logic and are full factory-run-tested to optimized trouble-free operation.

Superior control logic The new MicroTech III controller provides an easy to use control environmental. The control logic is designed to provide maximum efficiency, to continue operation in unusual operating conditions and to provide a history of unit operation. One of the greatest benefits is the easy interface with LonWorks, Bacnet, Ethernet TCP/IP or Modbus communications.

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 one version:

HIGH EFFICIENCY
6 sizes to cover a range 178 up to 336 kW with an EER up to 3.11 and an ESEER up to 4.31 (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 705 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 The compressor is hermetic orbiting scroll compressor complete with motor over-temperature and over-current devices. An oil heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops. The compressors are connected in Tandem or Trio on a single refrigerating circuit and are fitted on rubber antivibration mounts and complete with oil charge.

Refrigerant Units have been optimized to operates with R-410A, refrigerant with zero ODP (Ozone Depletion Potential). R-410A has been the logical choice for our multiple scroll chiller because today it is one of the most promising refrigerants in terms of efficiency, stability and environmental impact. R-410A offers a small swept volume, a good heat exchange capacity and leads to reduced component sizes of items such as heat exchangers and tubing.

Evaporator (Plate Heat Exchanger) The unit is equipped with a direct expansion plate to plate type evaporator. This heat exchanger is made of stainless steel brazed plates and is covered with a 20mm closed cell insulation material. The exchanger is equipped with an electric heater for protection against freezing down to –28°C and evaporator water connections are provided with victaulic kit (as standard). The evaporator is manufactured in accordance to PED approval. Flow switch on evaporator standard factory mounted. Water filter is standard.

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 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 internally protected from overtemperature 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 1 refrigerant circuit that includes:
- Compressors
- Refrigerant
- Evaporator
- Air Cooled Condenser
- Electronic expansion valve
- Liquid line shut off valve
- Sight glass with moisture indicator
- Filter drier
- Charging valves
- High pressure switch
- High pressure transducers
- Low pressure transducers
- 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, correct phase sequence (option), 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 refrigerant circuit 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 superheat for each circuit.
- Leaving water evaporator temperature regulation.
- Compressor and evaporator pumps hours counter.
- Display of Status Safety Devices.
- Number of starts and compressor working hours.
- Optimized management of circuit load.
- Fan management according to condensing pressure.
- Re-start in case of power failure (automatic / manual).
- 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).
- High motor winding temperature.
- Low pressure ratio.
- No pressure change at start.

System security The following securities are available.
- 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)

Direct on line starter (DOL)

Double setpoint - Dual leaving water temperature setpoints.

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.

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

Electronic expansion valve

Ambient outside temperature sensor and setpoint reset

General fault contactor

Hour run meter

Main switch interlock door

Water filter - The water filter removes impurities from water by means of a fine physical barrier.

Options (on request)

MECHANICAL

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).

Axial fans (250 Pa lift)

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.

Discharge line shut-off valve - Installed on the discharge port of the compressor to facilitate maintenance operation.

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.

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

ELECTRICAL / CONTROL

Compressor thermal overload relays - Safety electronic devices that, added to the standard protection devices, protect compressor motors against overload and current unbalance.

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

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.

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.

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.

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

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.

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.

External tank without cabinet (500 L)

External tank without cabinet (1000 L)

External tank with cabinet (500 L)

External tank with cabinet (1000 L)

OTHER

Container Kit

Witness test

Acoustic test

Machine type

EWA	= Air cooled chiller cooling 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

X	= Standard Efficiency
	= High Efficiency

Sound level

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

EWAQ E-XS

MODEL		180	200	230	260	320	340		
Capacity - Cooling (1)	kW	178	201	227	264	316	336		
Capacity control - Type	---	Step	Step	Step	Step	Step	Step		
Capacity control - Minimum capacity	%	50.0	43.0	50.0	33.0	27.0	33.0		
Unit power input - Cooling (1)	kW	57.4	64.6	73.0	85.1	102	108		
EER (1)	---	3.10	3.10	3.11	3.10	3.10	3.10		
ESEER	---	4.14	4.24	4.03	4.31	4.30	4.27		
IPLV	---	4.49	4.64	4.50	4.73	4.66	4.54		
CASING									
Colour (2)	---	IW	IW	IW	IW	IW	IW		
Material (2)	---	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS		
DIMENSIONS									
Height	mm	2271	2271	2271	2271	2271	2271		
Width	mm	1224	1224	1224	1224	1224	1224		
Length	mm	4413	4413	5313	5313	6213	6213		
WEIGHT									
Unit Weight	kg	1722	1807	1871	2173	2304	2492		
Operating Weight	kg	1734	1819	1885	2188	2318	2507		
WATER HEAT EXCHANGER									
Type (3)	---	PHE	PHE	PHE	PHE	PHE	PHE		
Water Volume	l	12	12	14	14	14	14		
Nominal water flow rate - Cooling	l/s	8.5	9.6	10.8	12.6	15.1	16.0		
Nominal Water pressure drop - Cooling	kPa	27	34	35	47	47	54		
Insulation material (4)		CC	CC	CC	CC	CC	CC		
AIR HEAT EXCHANGER									
Type (5)	---	HFP	HFP	HFP	HFP	HFP	HFP		
FAN									
Type (6)	---	DPT	DPT	DPT	DPT	DPT	DPT		
Drive (7)	---	DOL	DOL	DOL	DOL	DOL	DOL		
Diameter	mm	800	800	800	800	800	800		
Nominal air flow	l/s	21845	21148	26874	25884	32953	32065		
Quantity	No.	4	4	5	5	6	6		
Speed	rpm	900	900	900	900	900	900		
Motor input	kW	7.0	7.0	8.8	8.8	10.5	10.5		
COMPRESSOR									
Type	---	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll		
Oil charge	l	13	13	13	19	19	19		
Quantity	No.	2	2	2	3	3	3		
SOUND LEVEL									
Sound Power - Cooling	dB(A)	93	94	96	95	96	97		
Sound Pressure - Cooling (8)	dB(A)	75	76	76	76	77	77		
REFRIGERANT CIRCUIT									
Refrigerant type	---	R410A	R410A	R410A	R410A	R410A	R410A		
Refrigerant charge	kg	15	18	16	21	21	26		
N. of circuits	No.	1	1	1	1	1	1		
PIPING CONNECTIONS									
Evaporator water inlet/outlet		3"	3"	3"	3"	3"	3"		

Fluid: Water
(1) 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;
(2) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; (3) PHE: Plate Heat Exchanger --- S&T: Single Pass Shell & Tube
(4) CC: Closed Cell; (5) HFP: High efficiency fin and tube type with integral subcooler
(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.

EWAQ E-XL

MODEL		180	200	230	260	320	340		
Capacity - Cooling (1)	kW	178	201	227	264	316	336		
Capacity control - Type	---	Step	Step	Step	Step	Step	Step		
Capacity control - Minimum capacity	%	50.0	43.0	50.0	33.0	27.0	33.0		
Unit power input - Cooling (1)	kW	57.4	64.6	73.0	85.1	102	108		
EER (1)	---	3.10	3.10	3.11	3.10	3.10	3.10		
ESEER	---	4.14	4.24	4.03	4.31	4.30	4.27		
IPLV	---	4.49	4.64	4.50	4.73	4.66	4.54		
CASING									
Colour (2)	---	IW	IW	IW	IW	IW	IW		
Material (2)	---	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS		
DIMENSIONS									
Height	mm	2271	2271	2271	2271	2271	2271		
Width	mm	1224	1224	1224	1224	1224	1224		
Length	mm	4413	4413	5313	5313	6213	6213		
WEIGHT									
Unit Weight	kg	1876	1965	2032	2370	2507	2705		
Operating Weight	kg	1889	1978	2047	2385	2522	2719		
WATER HEAT EXCHANGER									
Type (3)	---	PHE	PHE	PHE	PHE	PHE	PHE		
Water Volume	l	12	12	14	14	14	14		
Nominal water flow rate - Cooling	l/s	8.5	9.6	10.8	12.6	15.1	16.0		
Nominal Water pressure drop - Cooling	kPa	27	34	35	47	47	54		
Insulation material (4)		CC	CC	CC	CC	CC	CC		
AIR HEAT EXCHANGER									
Type (5)	---	HFP	HFP	HFP	HFP	HFP	HFP		
FAN									
Type (6)	---	DPT	DPT	DPT	DPT	DPT	DPT		
Drive (7)	---	DOL	DOL	DOL	DOL	DOL	DOL		
Diameter	mm	800	800	800	800	800	800		
Nominal air flow	l/s	21845	21148	26874	25884	32953	32065		
Quantity	No.	4	4	5	5	6	6		
Speed	rpm	900	900	900	900	900	900		
Motor input	kW	7.0	7.0	8.8	8.8	10.5	10.5		
COMPRESSOR									
Type	---	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll		
Oil charge	l	13	13	13	19	19	19		
Quantity	No.	2	2	2	3	3	3		
SOUND LEVEL									
Sound Power - Cooling	dB(A)	91	92	93	92	93	94		
Sound Pressure - Cooling (8)	dB(A)	73	73	73	73	74	74		
REFRIGERANT CIRCUIT									
Refrigerant type	---	R410A	R410A	R410A	R410A	R410A	R410A		
Refrigerant charge	kg	15	18	16	21	21	26		
N. of circuits	No.	1	1	1	1	1	1		
PIPING CONNECTIONS									
Evaporator water inlet/outlet		3"	3"	3"	3"	3"	3"		

Fluid: Water
(1) 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;
(2) IW: Ivory White; GPSS: Galvanized and Painted Steel Sheet; (3) PHE: Plate Heat Exchanger --- S&T: Single Pass Shell & Tube
(4) CC: Closed Cell; (5) HFP: High efficiency fin and tube type with integral subcooler
(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.

EWAQ E-XR

MODEL		170	190	220	260	300	320		
Capacity - Cooling (1)	kW	173	194	220	255	303	323		
Capacity control - Type	---	Step	Step	Step	Step	Step	Step		
Capacity control - Minimum capacity	%	50.0	43.0	50.0	33.0	27.0	33.0		
Unit power input - Cooling (1)	kW	56.0	63.7	71.0	84.5	101	108		
EER (1)	---	3.09	3.04	3.09	3.01	3.00	2.99		
ESEER	---	4.59	4.69	4.46	4.79	4.76	4.68		
IPLV	---	5.09	4.99	4.87	4.93	4.96	5.02		
CASING									
Colour (2)	---	IW	IW	IW	IW	IW	IW		
Material (2)	---	GPSS	GPSS	GPSS	GPSS	GPSS	GPSS		
DIMENSIONS									
Height	mm	2271	2271	2271	2271	2271	2271		
Width	mm	1224	1224	1224	1224	1224	1224		
Length	mm	4413	4413	5313	5313	6213	6213		
WEIGHT									
Unit Weight	kg	1970	2064	2134	2489	2632	2840		
Operating Weight	kg	1982	2076	2148	2503	2647	2855		
WATER HEAT EXCHANGER									
Type (3)	---	PHE	PHE	PHE	PHE	PHE	PHE		
Water Volume	l	12	12	14	14	14	14		
Nominal water flow rate - Cooling	l/s	8.2	9.2	10.5	12.1	14.5	15.4		
Nominal Water pressure drop - Cooling	kPa	26	32	33	44	43	50		
Insulation material (4)		CC	CC	CC	CC	CC	CC		
AIR HEAT EXCHANGER									
Type (5)	---	HFP	HFP	HFP	HFP	HFP	HFP		
FAN									
Type (6)	---	DPT	DPT	DPT	DPT	DPT	DPT		
Drive (7)	---	DOL	DOL	DOL	DOL	DOL	DOL		
Diameter	mm	800	800	800	800	800	800		
Nominal air flow	l/s	16743	16285	20618	20056	25243	24604		
Quantity	No.	4	4	5	5	6	6		
Speed	rpm	705	705	705	705	705	705		
Motor input	kW	3.0	3.0	3.8	3.8	4.5	4.5		
COMPRESSOR									
Type	---	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll		
Oil charge	l	13	13	13	19	19	19		
Quantity	No.	2	2	2	3	3	3		
SOUND LEVEL									
Sound Power - Cooling	dB(A)	85	86	87	86	88	89		
Sound Pressure - Cooling (8)	dB(A)	66	67	68	67	68	69		
REFRIGERANT CIRCUIT									
Refrigerant type	---	R410A	R410A	R410A	R410A	R410A	R410A		
Refrigerant charge	kg	15	18	16	21	21	26		
N. of circuits	No.	1	1	1	1	1	1		
PIPING CONNECTIONS									
Evaporator water inlet/outlet		3"	3"	3"	3"	3"	3"		

Fluid: Water
(1) 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;
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(6) DPT: Direct Propeller Type; (7) DOL: Direct On Line - VFD: Inverter - BRS: Brushless
(8) The values are according to ISO 3744 and are referred to: evaporator 12/7°C, ambient 35°C, full load operation.

EWAQ E-XS

MODEL		180	200	230	260	320	340		
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3		
Frequency	Hz	50	50	50	50	50	50		
Voltage	V	400	400	400	400	400	400		
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%		
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%		
UNIT									
Maximum starting current	A	384	482	500	447	563	577		
Nominal running current cooling	A	103	115	129	151	179	190		
Mximum running current	A	133	147	165	195	227	241		
Maximum current for wires sizing	A	146	162	181	215	250	265		
FANS									
Nominal running current cooling	A	16	16	20	20	24	24		
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3		
Voltage	V	400	400	400	400	400	400		
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%		
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%		
Maximum running current	A	117	131	145	175	203	217		
Starting method	---	DOL	DOL	DOL	DOL	DOL	DOL		

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 other compressors at maximum load + fans current at maximum load
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.

EWAQ E-XL

MODEL		180	200	230	260	320	340		
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3		
Frequency	Hz	50	50	50	50	50	50		
Voltage	V	400	400	400	400	400	400		
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%		
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%		
UNIT									
Maximum starting current	A	384	482	500	447	563	577		
Nominal running current cooling	A	103	115	129	151	179	190		
Mximum running current	A	133	147	165	195	227	241		
Maximum current for wires sizing	A	146	162	181	215	250	265		
FANS									
Nominal running current cooling	A	16	16	20	20	24	24		
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3		
Voltage	V	400	400	400	400	400	400		
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%		
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%		
Maximum running current	A	117	131	145	175	203	217		
Starting method	---	DOL	DOL	DOL	DOL	DOL	DOL		

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 other compressors at maximum load + fans current at maximum load
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.

EWAQ E-XR

MODEL		170	190	220	260	300	320		
POWER SUPPLY									
Phases	Nr	3	3	3	3	3	3		
Frequency	Hz	50	50	50	50	50	50		
Voltage	V	400	400	400	400	400	400		
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%		
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%		
UNIT									
Maximum starting current	A	379	477	493	440	554	568		
Nominal running current cooling	A	101	113	127	151	179	189		
Mximum running current	A	127	141	158	188	219	233		
Maximum current for wires sizing	A	140	155	174	207	241	256		
FANS									
Nominal running current cooling	A	10	10	13	13	16	16		
COMPRESSORS									
Phases	Nr	3	3	3	3	3	3		
Voltage	V	400	400	400	400	400	400		
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%	-10%		
Voltage tolerance Maximum	%	+10%	+10%	+10%	+10%	+10%	+10%		
Maximum running current	A	117	131	145	175	203	217		
Starting method	---	DOL	DOL	DOL	DOL	DOL	DOL		

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 other compressors at maximum load + fans current at maximum load
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.

EWAQ E-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)
180	79.8	73.2	72.9	69.9	70.9	68.1	60.5	48.9	74.9	93.5
200	80.7	74.1	73.8	70.8	71.8	69.0	61.4	49.8	75.7	94.3
230	81.3	74.7	74.4	71.4	72.4	69.6	62.0	50.4	76.4	95.5
260	80.5	73.9	73.6	70.6	71.6	68.8	61.2	49.6	75.5	94.7
320	81.5	74.9	74.6	71.6	72.6	69.8	62.2	50.6	76.5	96.3
340	81.9	75.3	75.0	72.0	73.0	70.2	62.6	51.0	77.0	96.8

EWAQ E-XL

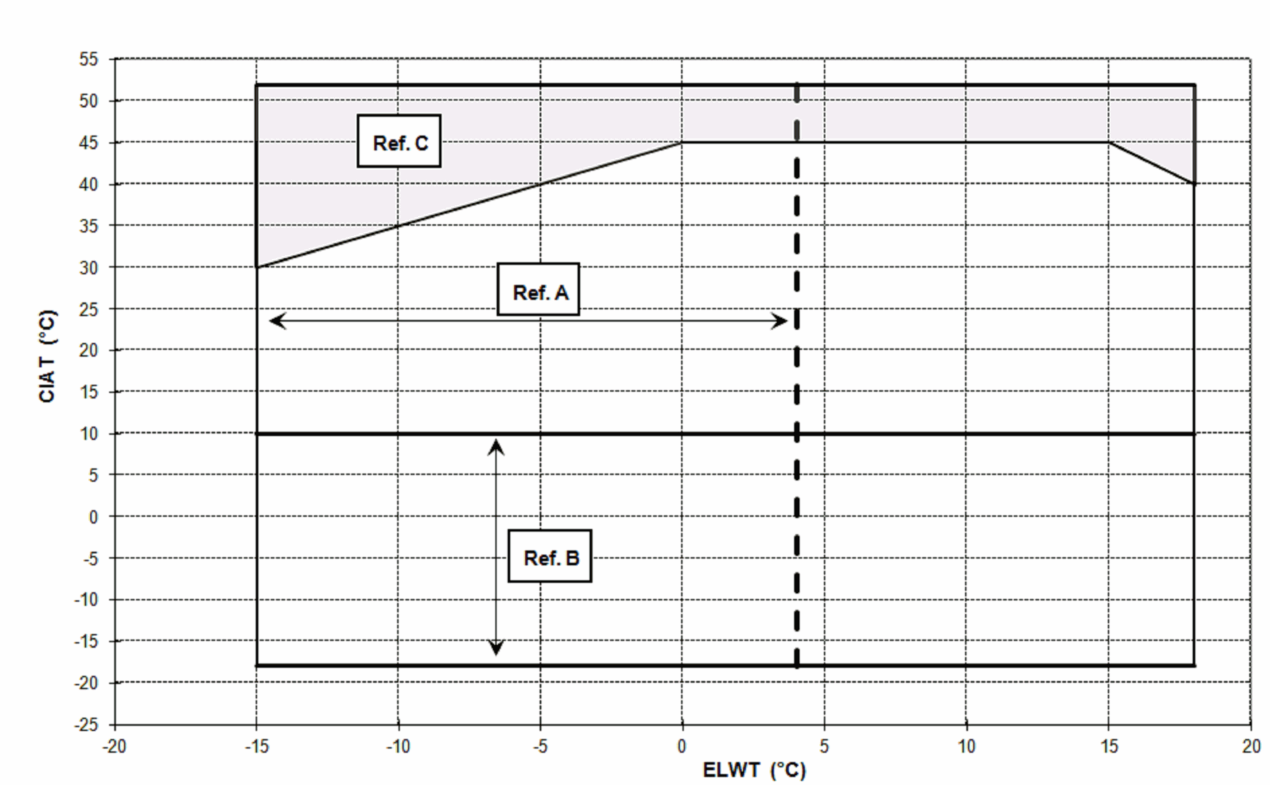
	Sound pressure level at 1 m from the unit (rif. 2 x 10-5 Pa)								Power
MODEL	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB(A)	dB(A)
180	77.7	71.1	70.8	67.8	68.8	66.0	58.4	46.8	72.7	91.4
200	77.9	71.3	71.0	68.0	69.0	66.2	58.6	47.0	73.0	91.6
230	78.4	71.8	71.5	68.5	69.5	66.7	59.1	47.5	73.5	92.6
260	78.2	71.6	71.3	68.3	69.3	66.5	58.9	47.3	73.2	92.4
320	78.6	72.0	71.7	68.7	69.7	66.9	59.3	47.7	73.6	93.4
340	78.7	72.1	71.8	68.8	69.8	67.0	59.4	47.8	73.8	93.6

EWAQ E-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)
170	70.9	64.3	64.0	61.0	62.0	59.2	51.6	40.0	65.9	84.6
190	72.2	65.6	65.3	62.3	63.3	60.5	52.9	41.3	67.2	85.8
220	72.9	66.3	66.0	63.0	64.0	61.2	53.6	42.0	68.0	87.1
260	71.7	65.1	64.8	61.8	62.8	60.0	52.4	40.8	66.7	85.9
300	73.1	66.5	66.2	63.2	64.2	61.4	53.8	42.2	68.1	87.9
320	73.7	67.1	66.8	63.8	64.8	62.0	54.4	42.8	68.7	88.5

Fluid: Water
Note: The values are according to ISO 3744 and are referred to: evaporator 12/7° C, air ambient 35°C, full load operation

Operating Limits



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

Ref.:
A = Operation with Glycol (below 4°C Evap LWT)
B = Fan speed modulation or Speedtroll required (below 10°C Condens. Air Temp.)
C = In this area units can work at partial load

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, as 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) = (12.153 x DT(°C) - 22.168) x P(kW)

For 3 compressors unit
M (liters) = (1.7321 x DT(°C) + 2.7749) 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.

EWAQ E-XS

			180						200					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	188	178	168	158	151	144	212	201	190	177	170	162
	PI	kW	48	52	56.6	61.8	65.3	69	54.5	58.8	63.7	69.4	73.2	77.3
	qw	l/s	8.9	8.5	8.0	7.5	7.2	6.8	10.1	9.6	9.0	8.5	8.1	7.7
	dpw	kPa	30	27	24	21	20	18	38	34	31	27	24	22
7	CC	kW	199	189	178	167	160	152	224	213	201	188	180	171
	PI	kW	48.8	52.8	57.4	62.7	66.2	69.9	55.3	59.7	64.6	70.3	74.1	78.2
	qw	l/s	9.5	9.0	8.5	8.0	7.6	7.3	10.7	10.1	9.6	9.0	8.6	8.2
	dpw	kPa	34	31	27	24	22	20	43	38	34	30	27	25
9	CC	kW	210	199	188	176	169	161	237	225	212	198	190	181
	PI	kW	49.6	53.7	58.3	63.6	67.1	70.8	56.2	60.6	65.6	71.3	75	79.1
	qw	l/s	10.0	9.5	9.0	8.4	8.1	7.7	11.3	10.7	10.1	9.5	9.1	8.6
	dpw	kPa	38	34	31	27	25	22	48	43	38	34	31	28
11	CC	kW	222	210	199	186	178	170	249	237	223	209	200	191
	PI	kW	50.5	54.6	59.3	64.6	68.1	71.8	57.2	61.6	66.6	72.2	76	80.1
	qw	l/s	10.6	10.1	9.5	8.9	8.5	8.1	11.9	11.3	10.7	10.0	9.6	9.1
	dpw	kPa	42	38	34	30	27	25	53	48	43	37	34	31
13	CC	kW	234	222	209	196	187	179	263	249	235	220	211	201
	PI	kW	51.4	55.5	60.2	65.6	69.1	72.9	58.1	62.6	67.6	73.3	77.1	81.2
	qw	l/s	11.2	10.6	10.0	9.4	9.0	8.5	12.6	11.9	11.3	10.5	10.1	9.6
	dpw	kPa	47	42	38	33	30	28	59	53	47	41	38	34
15	CC	kW	246	233	220	206	197	188	276	262	247	232	222	211
	PI	kW	52.3	56.5	61.3	66.7	70.2	74.1	59.1	63.6	68.6	74.4	78.1	82.2
	qw	l/s	11.8	11.2	10.5	9.9	9.4	9.0	13.2	12.6	11.8	11.1	10.6	10.1
	dpw	kPa	52	47	42	37	34	31	65	59	52	46	42	38

			230						260					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	240	228	215	201	192	183	278	264	249	234	224	213
	PI	kW	62.3	66.8	72	78.1	82.1	86.6	70.7	76.9	83.9	91.8	97.1	103
	qw	l/s	11.4	10.8	10.2	9.6	9.1	8.7	13.2	12.6	11.9	11.1	10.7	10.1
	dpw	kPa	39	35	32	28	25	23	52	47	42	37	34	30
7	CC	kW	253	241	227	212	203	193	294	279	264	247	236	225
	PI	kW	63.2	67.8	73	79	83.1	87.5	71.9	78.1	85.1	93.1	98.4	104
	qw	l/s	12.1	11.5	10.8	10.1	9.7	9.2	14.0	13.3	12.6	11.8	11.3	10.7
	dpw	kPa	44	40	35	31	28	26	58	52	47	41	38	34
9	CC	kW	268	254	240	224	215	204	310	295	278	261	250	238
	PI	kW	64.2	68.8	74	80	84	88.4	73.1	79.3	86.4	94.5	99.8	106
	qw	l/s	12.8	12.1	11.4	10.7	10.2	9.8	14.8	14.1	13.3	12.5	11.9	11.4
	dpw	kPa	49	44	39	35	32	29	65	59	52	46	42	38
11	CC	kW	282	268	253	237	226	216	327	311	293	275	263	251
	PI	kW	65.2	69.8	75	81	85	89.4	74.4	80.7	87.8	95.9	101	107
	qw	l/s	13.5	12.8	12.1	11.3	10.8	10.3	15.6	14.8	14.0	13.1	12.6	12.0
	dpw	kPa	55	49	44	39	35	32	72	65	58	51	47	42
13	CC	kW	297	282	266	249	239	228	344	327	309	289	277	264
	PI	kW	66.1	70.8	76	82	86	90.4	75.7	82.1	89.3	97.5	103	109
	qw	l/s	14.2	13.5	12.7	11.9	11.4	10.9	16.4	15.6	14.8	13.8	13.2	12.6
	dpw	kPa	61	55	49	43	39	36	80	72	64	56	52	47
15	CC	kW	312	297	280	262	251	240	361	343	324	304	291	277
	PI	kW	67.1	71.8	77.1	83.1	87	91.3	77.1	83.6	90.9	99.1	105	110
	qw	l/s	15.0	14.2	13.4	12.6	12.0	11.5	17.3	16.4	15.5	14.5	13.9	13.3
	dpw	kPa	67	61	54	47	44	40	88	80	71	62	57	52

EWAQ E-XS

			320						340					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	334	317	299	280	267	254	355	337	318	297	284	271
	PI	kW	85.9	92.6	100	109	115	122	91.7	98.7	107	116	122	129
	qw	l/s	15.9	15.1	14.3	13.3	12.7	12.1	16.9	16.1	15.2	14.2	13.5	12.9
	dpw	kPa	52	47	42	37	33	30	60	54	48	42	39	35
7	CC	kW	353	335	316	295	282	269	375	356	336	314	300	286
	PI	kW	87.2	94	102	111	117	123	93.1	100	108	117	124	130
	qw	l/s	16.8	16.0	15.1	14.1	13.5	12.8	17.9	17.0	16.0	15.0	14.3	13.6
	dpw	kPa	58	53	47	41	37	34	67	61	54	47	43	39
9	CC	kW	372	353	333	312	298	284	395	375	354	331	317	302
	PI	kW	88.7	95.5	103	112	118	125	94.6	102	110	119	125	132
	qw	l/s	17.8	16.9	15.9	14.9	14.2	13.6	18.9	17.9	16.9	15.8	15.1	14.4
	dpw	kPa	65	59	52	46	42	38	75	67	60	53	48	44
11	CC	kW	392	372	351	328	314	299	416	395	373	349	334	318
	PI	kW	90.1	97	105	114	120	126	96.1	103	111	121	127	133
	qw	l/s	18.7	17.8	16.8	15.7	15.0	14.3	19.9	18.9	17.8	16.7	16.0	15.2
	dpw	kPa	72	65	58	51	47	42	83	75	67	58	54	49
13	CC	kW	412	391	369	345	331	315	437	415	392	367	352	335
	PI	kW	91.6	98.5	106	115	121	128	97.6	105	113	122	128	135
	qw	l/s	19.7	18.7	17.7	16.5	15.8	15.1	20.9	19.9	18.8	17.6	16.8	16.0
	dpw	kPa	80	72	64	56	52	47	92	83	74	65	59	54
15	CC	kW	432	411	388	363	347	331	458	436	412	386	369	352
	PI	kW	93.1	100	108	117	123	129	99	106	114	124	130	136
	qw	l/s	20.7	19.7	18.6	17.4	16.6	15.8	21.9	20.9	19.7	18.5	17.7	16.9
	dpw	kPa	88	80	71	62	57	52	101	91	82	72	66	60

Fluid: Water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop
** For working condition where dpw value is "Italic-Red Color" please contac factory*

EWAQ E-XL

			180						200					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	188	178	168	158	151	144	212	201	190	177	170	162
	PI	kW	48	52	56.6	61.8	65.3	69	54.5	58.8	63.7	69.4	73.2	77.3
	qw	l/s	8.9	8.5	8.0	7.5	7.2	6.8	10.1	9.6	9.0	8.5	8.1	7.7
	dpw	kPa	30	27	24	21	20	18	38	34	31	27	24	22
7	CC	kW	199	189	178	167	160	152	224	213	201	188	180	171
	PI	kW	48.8	52.8	57.4	62.7	66.2	69.9	55.3	59.7	64.6	70.3	74.1	78.2
	qw	l/s	9.5	9.0	8.5	8.0	7.6	7.3	10.7	10.1	9.6	9.0	8.6	8.2
	dpw	kPa	34	31	27	24	22	20	43	38	34	30	27	25
9	CC	kW	210	199	188	176	169	161	237	225	212	198	190	181
	PI	kW	49.6	53.7	58.3	63.6	67.1	70.8	56.2	60.6	65.6	71.3	75	79.1
	qw	l/s	10.0	9.5	9.0	8.4	8.1	7.7	11.3	10.7	10.1	9.5	9.1	8.6
	dpw	kPa	38	34	31	27	25	22	48	43	38	34	31	28
11	CC	kW	222	210	199	186	178	170	249	237	223	209	200	191
	PI	kW	50.5	54.6	59.3	64.6	68.1	71.8	57.2	61.6	66.6	72.2	76	80.1
	qw	l/s	10.6	10.1	9.5	8.9	8.5	8.1	11.9	11.3	10.7	10.0	9.6	9.1
	dpw	kPa	42	38	34	30	27	25	53	48	43	37	34	31
13	CC	kW	234	222	209	196	187	179	263	249	235	220	211	201
	PI	kW	51.4	55.5	60.2	65.6	69.1	72.9	58.1	62.6	67.6	73.3	77.1	81.2
	qw	l/s	11.2	10.6	10.0	9.4	9.0	8.5	12.6	11.9	11.3	10.5	10.1	9.6
	dpw	kPa	47	42	38	33	30	28	59	53	47	41	38	34
15	CC	kW	246	233	220	206	197	188	276	262	247	232	222	211
	PI	kW	52.3	56.5	61.3	66.7	70.2	74.1	59.1	63.6	68.6	74.4	78.1	82.2
	qw	l/s	11.8	11.2	10.5	9.9	9.4	9.0	13.2	12.6	11.8	11.1	10.6	10.1
	dpw	kPa	52	47	42	37	34	31	65	59	52	46	42	38

			230						260					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	240	228	215	201	192	183	278	264	249	234	224	213
	PI	kW	62.3	66.8	72	78.1	82.1	86.6	70.7	76.9	83.9	91.8	97.1	103
	qw	l/s	11.4	10.8	10.2	9.6	9.1	8.7	13.2	12.6	11.9	11.1	10.7	10.1
	dpw	kPa	39	35	32	28	25	23	52	47	42	37	34	30
7	CC	kW	253	241	227	212	203	193	294	279	264	247	236	225
	PI	kW	63.2	67.8	73	79	83.1	87.5	71.9	78.1	85.1	93.1	98.4	104
	qw	l/s	12.1	11.5	10.8	10.1	9.7	9.2	14.0	13.3	12.6	11.8	11.3	10.7
	dpw	kPa	44	40	35	31	28	26	58	52	47	41	38	34
9	CC	kW	268	254	240	224	215	204	310	295	278	261	250	238
	PI	kW	64.2	68.8	74	80	84	88.4	73.1	79.3	86.4	94.5	99.8	106
	qw	l/s	12.8	12.1	11.4	10.7	10.2	9.8	14.8	14.1	13.3	12.5	11.9	11.4
	dpw	kPa	49	44	39	35	32	29	65	59	52	46	42	38
11	CC	kW	282	268	253	237	226	216	327	311	293	275	263	251
	PI	kW	65.2	69.8	75	81	85	89.4	74.4	80.7	87.8	95.9	101	107
	qw	l/s	13.5	12.8	12.1	11.3	10.8	10.3	15.6	14.8	14.0	13.1	12.6	12.0
	dpw	kPa	55	49	44	39	35	32	72	65	58	51	47	42
13	CC	kW	297	282	266	249	239	228	344	327	309	289	277	264
	PI	kW	66.1	70.8	76	82	86	90.4	75.7	82.1	89.3	97.5	103	109
	qw	l/s	14.2	13.5	12.7	11.9	11.4	10.9	16.4	15.6	14.8	13.8	13.2	12.6
	dpw	kPa	61	55	49	43	39	36	80	72	64	56	52	47
15	CC	kW	312	297	280	262	251	240	361	343	324	304	291	277
	PI	kW	67.1	71.8	77.1	83.1	87	91.3	77.1	83.6	90.9	99.1	105	110
	qw	l/s	15.0	14.2	13.4	12.6	12.0	11.5	17.3	16.4	15.5	14.5	13.9	13.3
	dpw	kPa	67	61	54	47	44	40	88	80	71	62	57	52

EWAQ E-XL

			320						340					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	334	317	299	280	267	254	355	337	318	297	284	271
	PI	kW	85.9	92.6	100	109	115	122	91.7	98.7	107	116	122	129
	qw	l/s	15.9	15.1	14.3	13.3	12.7	12.1	16.9	16.1	15.2	14.2	13.5	12.9
	dpw	kPa	52	47	42	37	33	30	60	54	48	42	39	35
7	CC	kW	353	335	316	295	282	269	375	356	336	314	300	286
	PI	kW	87.2	94	102	111	117	123	93.1	100	108	117	124	130
	qw	l/s	16.8	16.0	15.1	14.1	13.5	12.8	17.9	17.0	16.0	15.0	14.3	13.6
	dpw	kPa	58	53	47	41	37	34	67	61	54	47	43	39
9	CC	kW	372	353	333	312	298	284	395	375	354	331	317	302
	PI	kW	88.7	95.5	103	112	118	125	94.6	102	110	119	125	132
	qw	l/s	17.8	16.9	15.9	14.9	14.2	13.6	18.9	17.9	16.9	15.8	15.1	14.4
	dpw	kPa	65	59	52	46	42	38	75	67	60	53	48	44
11	CC	kW	392	372	351	328	314	299	416	395	373	349	334	318
	PI	kW	90.1	97	105	114	120	126	96.1	103	111	121	127	133
	qw	l/s	18.7	17.8	16.8	15.7	15.0	14.3	19.9	18.9	17.8	16.7	16.0	15.2
	dpw	kPa	72	65	58	51	47	42	83	75	67	58	54	49
13	CC	kW	412	391	369	345	331	315	437	415	392	367	352	335
	PI	kW	91.6	98.5	106	115	121	128	97.6	105	113	122	128	135
	qw	l/s	19.7	18.7	17.7	16.5	15.8	15.1	20.9	19.9	18.8	17.6	16.8	16.0
	dpw	kPa	80	72	64	56	52	47	92	83	74	65	59	54
15	CC	kW	432	411	388	363	347	331	458	436	412	386	369	352
	PI	kW	93.1	100	108	117	123	129	99	106	114	124	130	136
	qw	l/s	20.7	19.7	18.6	17.4	16.6	15.8	21.9	20.9	19.7	18.5	17.7	16.9
	dpw	kPa	88	80	71	62	57	52	101	91	82	72	66	60

Fluid: Water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop
** For working condition where dpw value is "Italic-Red Color" please contac factory*

EWAQ E-XR

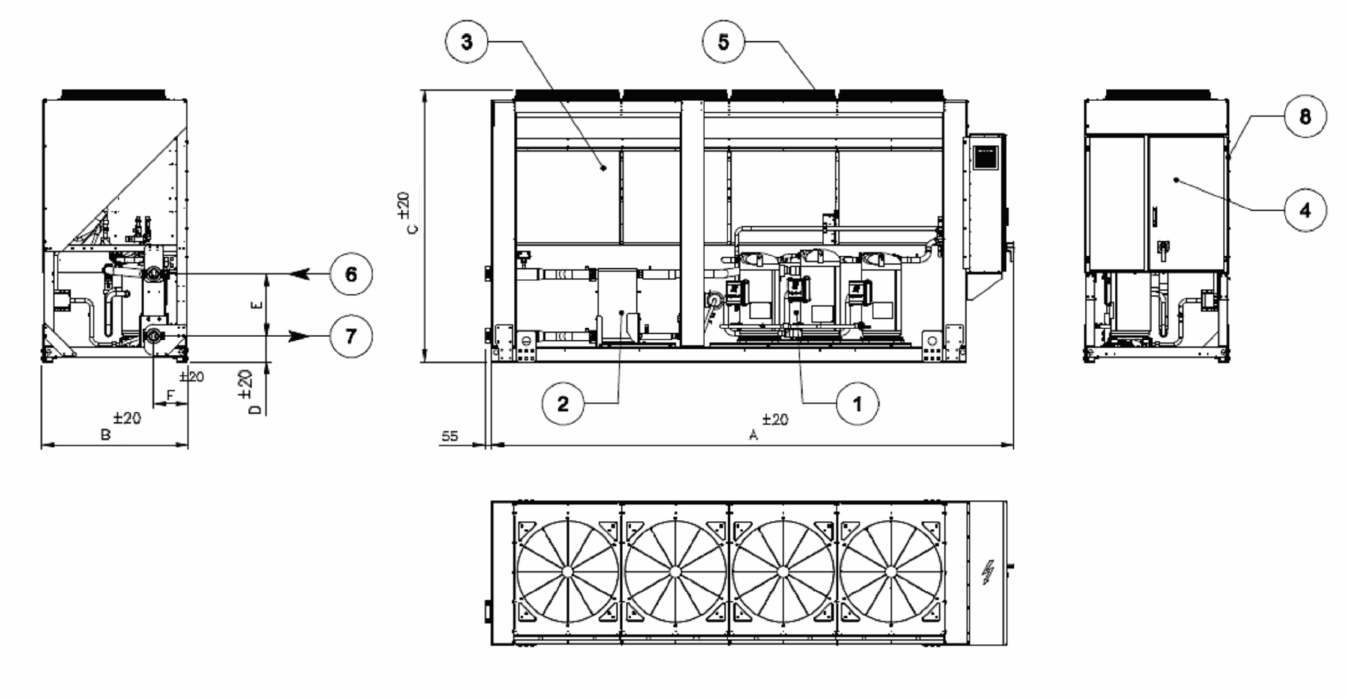
			170						190					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	183	174	163	152	145	138	206	195	183	171	163	155
	PI	kW	46	50.2	55	60.5	64.1	68	52.8	57.4	62.6	68.6	72.7	77
	qw	l/s	8.7	8.3	7.8	7.3	6.9	6.6	9.8	9.3	8.7	8.1	7.8	7.4
	dpw	kPa	29	26	23	20	18	16	36	32	29	25	23	20
7	CC	kW	194	183	173	161	154	146	217	206	194	180	172	163
	PI	kW	46.8	51.1	56	61.5	65.1	69	53.8	58.4	63.7	69.7	73.7	78
	qw	l/s	9.2	8.8	8.2	7.7	7.3	7.0	10.4	9.8	9.2	8.6	8.2	7.8
	dpw	kPa	32	29	26	22	20	18	40	36	32	28	25	23
9	CC	kW	204	194	182	170	162	154	229	217	204	190	181	172
	PI	kW	47.8	52.1	57	62.5	66.2	70.1	54.9	59.5	64.8	70.8	74.8	79.2
	qw	l/s	9.8	9.2	8.7	8.1	7.7	7.4	10.9	10.4	9.7	9.1	8.7	8.2
	dpw	kPa	36	32	29	25	23	20	45	40	35	31	28	25
11	CC	kW	215	204	192	179	171	162	241	229	215	200	191	181
	PI	kW	48.8	53.1	58	63.6	67.3	71.2	55.9	60.6	65.9	72	76	80.3
	qw	l/s	10.3	9.7	9.2	8.6	8.2	7.8	11.5	10.9	10.3	9.6	9.1	8.7
	dpw	kPa	40	36	32	28	25	23	50	45	39	34	31	28
13	CC	kW	227	214	202	188	180	102	254	240	226	210	201	126
	PI	kW	49.8	54.2	59.2	64.8	68.5	32.4	57	61.8	67.1	73.2	77.2	40.9
	qw	l/s	10.8	10.3	9.7	9.0	8.6	4.9	12.1	11.5	10.8	10.1	9.6	6.0
	dpw	kPa	44	40	35	31	28	9	55	49	44	38	34	14
15	CC	kW	238	225	212	197	188	108	267	252	237	221	211	133
	PI	kW	50.9	55.4	60.4	66.1	69.8	32.9	58.2	63	68.3	74.4	78.4	41.3
	qw	l/s	11.4	10.8	10.1	9.5	9.0	5.2	12.8	12.1	11.4	10.6	10.1	6.4
	dpw	kPa	49	44	39	34	31	10	61	54	48	42	38	15

			220						260					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	234	221	208	194	185	175	270	256	241	225	214	203
	PI	kW	59.6	64.4	69.9	76.3	80.6	85.3	69.1	75.6	83	91.4	97	103
	qw	l/s	11.1	10.5	9.9	9.2	8.8	8.4	12.9	12.2	11.5	10.7	10.2	9.7
	dpw	kPa	37	33	30	26	23	21	49	44	39	34	31	28
7	CC	kW	247	233	220	205	195	185	285	270	255	237	226	215
	PI	kW	60.6	65.5	71	77.4	81.7	86.3	70.4	77	84.5	92.9	98.5	105
	qw	l/s	11.8	11.1	10.5	9.8	9.3	8.8	13.6	12.9	12.1	11.3	10.8	10.3
	dpw	kPa	42	37	33	29	26	24	55	49	44	38	35	31
9	CC	kW	260	246	231	216	206	196	301	285	268	250	239	226
	PI	kW	61.7	66.6	72.2	78.5	82.8	87.4	71.8	78.5	86	94.5	100	106
	qw	l/s	12.4	11.8	11.1	10.3	9.8	9.3	14.4	13.6	12.8	11.9	11.4	10.8
	dpw	kPa	46	42	37	32	29	26	61	55	48	42	38	35
11	CC	kW	274	259	244	227	217	206	316	300	282	263	251	181
	PI	kW	62.8	67.7	73.3	79.7	83.9	88.5	73.3	80	87.6	96.2	102	66
	qw	l/s	13.1	12.4	11.7	10.9	10.4	9.9	15.1	14.3	13.5	12.6	12.0	8.6
	dpw	kPa	52	46	41	36	32	29	68	61	54	47	43	22
13	CC	kW	288	273	256	239	228	217	332	315	296	276	264	190
	PI	kW	64	68.9	74.5	80.8	85	89.6	74.9	81.7	89.4	98	104	66.9
	qw	l/s	13.8	13.0	12.3	11.4	10.9	10.4	15.9	15.1	14.2	13.2	12.6	9.1
	dpw	kPa	57	51	45	39	36	32	75	67	59	52	47	25
15	CC	kW	302	286	269	251	240	138	349	330	311	290	276	201
	PI	kW	65.1	70	75.6	82	86.2	41	76.5	83.4	91.2	100	106	68
	qw	l/s	14.5	13.7	12.9	12.0	11.5	6.6	16.7	15.8	14.9	13.9	13.2	9.6
	dpw	kPa	63	57	50	44	40	13	82	74	65	57	52	27

EWAQ E-XR

			300						320					
Twout		**Ta**	**25**	**30**	**35**	**40**	**43**	**46**	**25**	**30**	**35**	**40**	**43**	**46**
5	CC	kW	324	306	288	268	255	242	344	326	306	285	272	258
	PI	kW	83.9	91.2	99.4	109	115	122	89.9	97.4	106	116	123	130
	qw	l/s	15.4	14.6	13.7	12.8	12.2	11.5	16.4	15.5	14.6	13.6	12.9	12.3
	dpw	kPa	49	44	39	34	30	27	57	51	45	39	35	32
7	CC	kW	341	323	303	282	269	255	363	343	323	300	286	272
	PI	kW	85.6	92.8	101	111	117	124	91.6	99.1	108	118	124	132
	qw	l/s	16.3	15.4	14.5	13.5	12.8	12.2	17.3	16.4	15.4	14.3	13.7	13.0
	dpw	kPa	55	49	43	37	34	31	63	56	50	43	39	35
9	CC	kW	359	340	320	297	283	198	382	361	340	316	302	286
	PI	kW	87.2	94.5	103	112	119	73.8	93.3	101	110	119	126	133
	qw	l/s	17.2	16.2	15.3	14.2	13.5	9.4	18.2	17.3	16.2	15.1	14.4	13.7
	dpw	kPa	61	54	48	42	38	18	70	63	55	48	44	39
11	CC	kW	378	358	336	313	298	209	401	380	357	333	317	229
	PI	kW	88.9	96.3	105	114	121	74.7	95	103	111	121	128	82.8
	qw	l/s	18.1	17.1	16.1	15.0	14.3	10.0	19.2	18.2	17.1	15.9	15.2	10.9
	dpw	kPa	67	60	53	46	42	21	77	69	61	53	48	25
13	CC	kW	397	375	353	328	313	221	421	399	375	350	334	242
	PI	kW	90.7	98.1	107	116	122	75.6	96.7	104	113	123	130	83.7
	qw	l/s	19.0	18.0	16.9	15.7	15.0	10.6	20.1	19.1	17.9	16.7	16.0	11.6
	dpw	kPa	74	66	59	51	46	23	85	76	68	59	53	28
15	CC	kW	416	394	370	344	328	233	441	418	393	367	350	255
	PI	kW	92.4	99.9	108	118	124	76.6	98.5	106	115	125	131	84.6
	qw	l/s	19.9	18.8	17.7	16.5	15.7	11.1	21.1	20.0	18.8	17.6	16.8	12.2
	dpw	kPa	82	73	65	56	51	26	94	84	74	65	59	31

Fluid: Water
Ta: Condenser inlet air temperature; Twout: Evaporator leaving water temperature (Δt 5°C)
CC: Cooling capacity; PI: Power input; qw: Fluid flow rate; dpw: Fluid pressure drop
** For working condition where dpw value is "Italic-Red Color" please contac factory*



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
EWAQ180E-XS	4413	1224	2271	212	519	286					
EWAQ200E-XS	4413	1224	2271	212	519	286					
EWAQ230E-XS	5313	1224	2271	212	519	286					
EWAQ260E-XS	5313	1224	2271	212	519	286					
EWAQ320E-XS	6213	1224	2271	212	519	286					
EWAQ340E-XS	6213	1224	2271	212	519	286					
EWAQ180E-XL	4413	1224	2271	212	519	286					
EWAQ200E-XL	4413	1224	2271	212	519	286					
EWAQ230E-XL	5313	1224	2271	212	519	286					
EWAQ260E-XL	5313	1224	2271	212	519	286					
EWAQ320E-XL	6213	1224	2271	212	519	286					
EWAQ340E-XL	6213	1224	2271	212	519	286					
EWAQ170E-XR	4413	1224	2271	212	519	286					
EWAQ190E-XR	4413	1224	2271	212	519	286					
EWAQ220E-XR	5313	1224	2271	212	519	286					
EWAQ260E-XR	5313	1224	2271	212	519	286					
EWAQ300E-XR	6213	1224	2271	212	519	286					
EWAQ320E-XR	6213	1224	2271	212	519	286					

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.

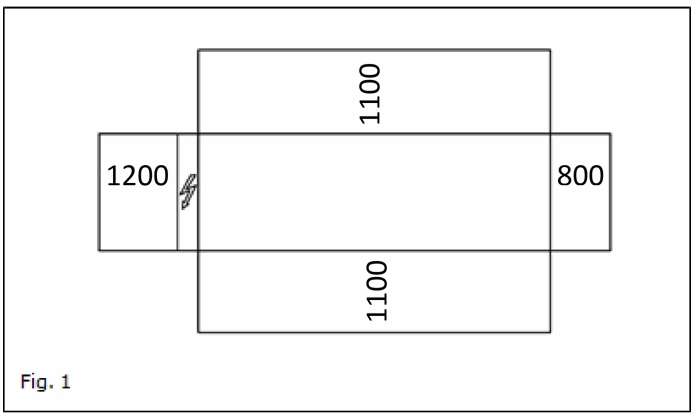


Fig. 1

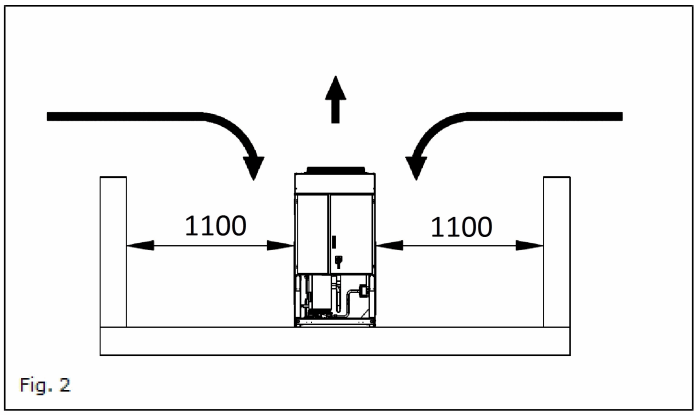


Fig. 2

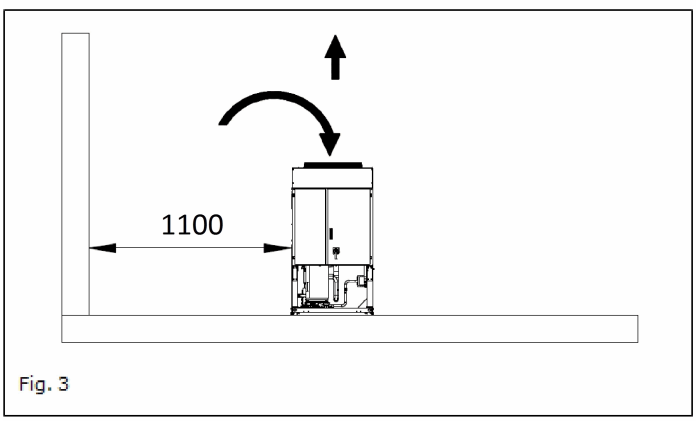


Fig. 3

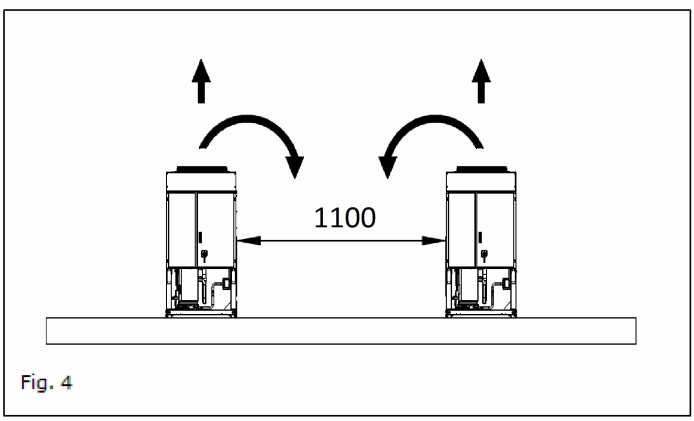


Fig. 4

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:	+42°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 410A 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: one refrigerant circuit, two or three hermetic type rotary scroll compressors (depending on the size), electronic expansion device (EEXV), refrigerant direct expansion plate to plate heat exchanger, air-cooled condenser section, R-410A refrigerant, motor starting components, 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

Evaporator (PHE) The units shall be equipped with a direct expansion plate to plate type evaporator.
- The evaporator will be made of of stainless steel brazed plates and 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 1 refrigerant circuit.
- 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.
- Flow switch will be standard factory mounted.
- Water filter will be standard.

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 an internally protection from overtemperature.

Refrigerant circuit The unit shall have one refrigerant circuit.
• The circuit shall include as standard: electronic expansion device piloted by unit's microprocessor control, liquid line shut-off valve, sight glass with moisture indicator, replaceable filter drier, charging valves, high pressure switch, high and low pressure transducers 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 unit 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 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.

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 maximise 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.

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

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