

Water Cooled Scroll Chillers Hydrocube



EWLQ~KC

Water to water chiller
Nominal capacity range: 14 - 64 kW
Best performances at full load and part loads
Designed for wide application range and compact footprint

Performance according to EN14511-3 (2018)



Features and benefits

Daikin water -cooled chiller with hermetic scroll compressor and R-410A refrigerant The Hydrocube range is designed to optimize the energy efficiency, to bring down the operating costs and to reduce its environmental impact. It features high efficiency scroll compressors and plate to plate evaporator heat exchanger with reduced pressure drops and low refrigerant charge.

Flexibility The Hydrocube water cooled series meets all the possible request in terms of plant needs for comfort and process applications. The units are available for chilled.

Wide capacity range The water cooled series covers a wide range of cooling capacities from 14kW up to 64 kW.

Wide operating range The extended operating range allows the unit to work in a wide range of cooling and heating operating temperatures (up to 60°C condensing temperature). Suitable to brine operation down to -10°C evaporator leaving water temperature (brine option provided as standard).

Additional information related to F-GAS Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16th April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006

General Characteristics

General construction Compact, modular design water-cooled chiller for indoor installation with IP22 electrical panel. Manufactured according to the ISO9001 quality standard. The EWLQ -KCW1N range has been designed for both air conditioning and process cooling applications.

Casing / colour The unit casing is made of powder coated galvanised steel plate. Fully factory assembled on a base frame. External case colour ivory is white ($\pm$ RAL7044) / Munsell code 5Y7.5/1

Number of cooling circuits Sizes 014 -033 are single circuit, sizes 049 -064 are twin circuit.

Material Name	Installation	Single Module				
		14	25	33	49	64
EWLQ014KCW1N	Unit + Control factory mounted	1				
EWLQ025KCW1N			1			
EWLQ033KCW1N				1		
EWLQ049KCW1N					1	
EWLQ064KCW1N						1

Compressor The units are equipped with one R-410A optimised fully hermetically sealed Daikin scroll type compressor per refrigerant circuit. As a design requirement, this compressor characteristically offers extremely smooth performance, efficiency and operational reliability. Each compressor is mounted in the unit with vibration isolation and fitted with a compressor motor overcurrent protection.

Evaporator R-410A optimised counter flow plate heat exchanger made of stainless steel plates brazed gastight with copper, for water and glycol mixtures. A special refrigerant distribution system has been incorporated into the plate duct to optimize the heat transmission surface. As well as an additional increase in efficiency, this is also responsible for stable control behaviour in the heat exchanger. The plate heat exchanger is heat insulated to ensure it is diffusion-proof to prevent any heat loss. Flow switch and water filter are supplied as standard. The water pressure may not exceed the maximum permissible operating pressure of 10bar.

Piping Consists of copper pipes with all the necessary cooling fittings.

Safety and control devices Each refrigerant circuit is fitted with the following safety devices: High-pressure switch, low-pressure transducer, hot gas temperature sensor, overload relay. Each refrigerant circuit is fitted with the following control devices: Electronic temperature monitoring, thermal expansion valve, frost protection.

Switching and control device In addition to the fully automated -Chiller digital controller, the control cabinet is in accordance with the valid EN directives (CE) and contains all the required switching and control components such as: Main switch, 220 VAC/24 VDC power supply, control fuses, relay and auxiliary relay, sensors. The electronics have an automatic restart after power failure and have the following digital inputs and outputs hard -wired to terminals:

Digital inputs:

- Remote on/off
- Evaporator flow switch (shipped loose)
- External alarm input

Digital outputs:

- 2x evaporator pump contacts
- General alarm contact
- General operation contact

Analog outputs:

- Evaporator three-way valve or evaporator water pump speed

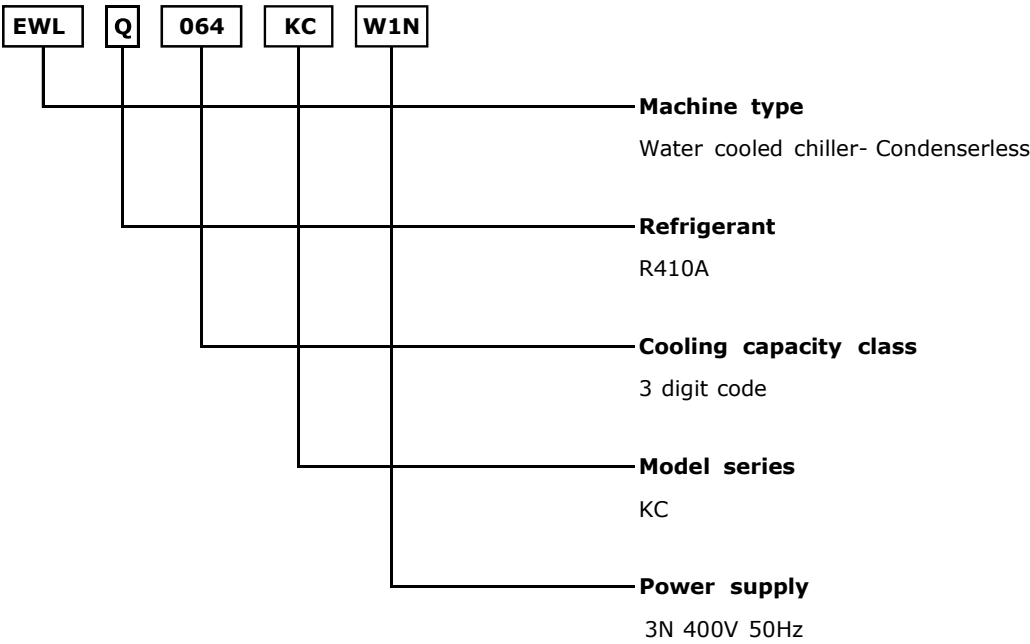
Chiller digital controller The EWLQ -KCW1N units are fitted with a digital controller which allows the user to configure, operate and service the unit in a user-friendly manner. The -Chiller digital controller consists of a numerical display, 4 control keys, 8 digits display with 18 status icons.

The following functions are supported by the electronics, among the others:

- Allocation of the setpoint and the desired switching hysteresis
- Cold water leaving controller (cooling mode)
- Allocation of pump lead times / overrun times
- Allocation of service intervals
- Displaying the current operating parameters such as water temperature and refrigerant pressure
- Recording operating hours (compressor / pump)
- Fault code
- Password protection

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Nomenclature



Accessories

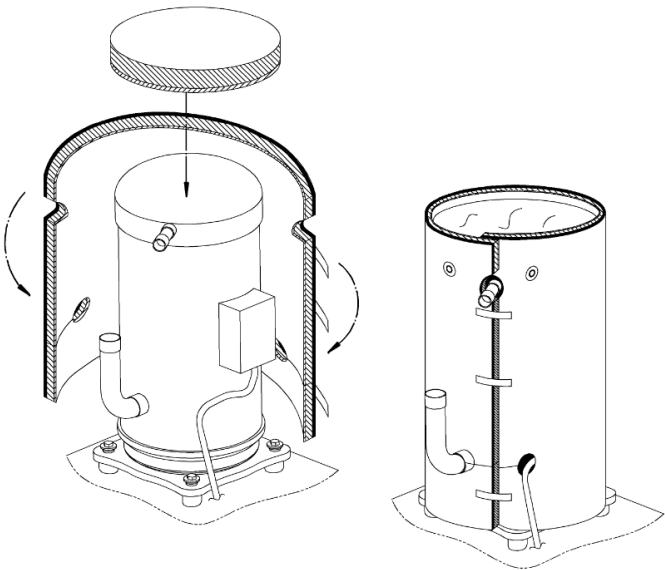
Available kits (shipped loose):

EKRSCWI - Temperature sensor water in

EKRSTMS - Temperature sensor for master/slave configuration

EKLS2 - Low noise kit 22/28/35/45/55/65 Hp-units

Compressor jacket shipped loose. It should be mounted on site around the compressors. The accessory is able to reduce the sound power by 4 db.



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EKRSCBMS – Connectivity Card

In case the BMS communication is needed, with Modbus or BACnet protocol, the connectivity card is delivered with the unit. Through a dedicated App, available for iOS and Android, it is possible to scan the QRCode and the activation key and generate the controller license file for activating the corresponding communication protocol.



	M/S - Master (T6)	M/S - Slave (T1)	Modbus RTU (T1)	Modbus TCP-IP	Bacnet MSTP (T1)	Bacnet TCP-IP	Modem
M/S - Master (T6)		Not compatible	Compatible	Compatible	Compatible	Compatible	Compatible
M/S - Slave (T1)			Not compatible	Not compatible	Not compatible	Compatible	Compatible
Modbus RTU (T1)				Compatible	Not compatible	Compatible	Compatible
Modbus TCP-IP					Compatible	Compatible	Not compatible
Bacnet MSTP (T1)						Not compatible	Compatible
Bacnet TCP-IP							Not compatible
Modem							

EKRSCSMP - Daikin on site modem with antenna (Accessory)

Connecting the unit to Daikin on Site will be possible through a dedicated modem that can be ordered from Factory as an accessory. It will allow remote monitoring and system optimization with Daikin proprietary cloud platform:

- Predictive maintenance to prevent breakdowns.
- Visualize energy consumption to reduce energy costs.
- Monitor and control your building no matter where you are via the Daikin Cloud Service.
- Remote diagnostic support to increase your system lifetime.
- Manage Multiple sites.

In case of mono circuit units (014, 025, 033) modem installation has to be done in a switch box provided by the customer and externally with respect to the electrical panel.

For dual units (049 and 064) the modem kit can be installed inside the unit electrical panel.

EKRSCPCS - Local/remote display external HMI

Local/remote user interface for standard commissioning and service activities. This accessory allows the standard activities being close to the unit for a maximum distance of 3 m.

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MODEL		EWLQ014K CW1N	EWLQ025K CW1N	EWLQ033K CW1N	EWLQ049K CW1N	EWLQ064K CW1N
COOLING PERFORMANCE ⁽¹⁾						
Capacity - Cooling	kW	12.09	19.87	28.9	39.35	57.84
Capacity control - Type		On/Off	On/Off	On/Off	On/Off	On/Off
Capacity control - Minimum capacity	%	100	100	100	50	50
Unit power input - Cooling	kW	3.74	6.11	8.43	12.03	16.41
EER		3.237	3.254	3.429	3.270	3.524
CASING						
Colour *		IW	IW	IW	IW	IW
Material *		GPSS	GPSS	GPSS	GPSS	GPSS
DIMENSIONS ⁽²⁾						
Height	mm	600	600	600	600	600
Width	mm	600	600	600	600	600
Length	mm	600	600	600	1200	1200
WEIGHT ⁽²⁾						
Unit Weight	kg	62	124	130	238	249
Operating Weight	kg	70	129	135	247	258
HEAT EXCHANGER - EVAPORATOR						
Type *		Brazed plate	Brazed plate	Brazed plate	Brazed plate	Brazed plate
Fluid		Water	Water	Water	Water	Water
Fouling Factor	m ² °C/W	0	0	0	0	0
Water Volume	l	1.47	1.96	2.74	4.47	5.88
Water temperature in	°C	12	12	12	12	12
Water temperature out	°C	7	7	7	7	7
Water flow rate	l/s	0.576	0.947	1.378	1.876	2.757
Water pressure drop ⁽³⁾	kPa	9.71	16.4	21.6	20.5	34.8
Insulation material *		CC	CC	CC	CC	CC
COMPRESSOR						
Type		Scroll	Scroll	Scroll	Scroll	Scroll
Oil charge	l	1.50	3.00	3.00	6.00	6.00
Quantity	No.	1	1	1	2	2
SOUND LEVEL ⁽⁴⁾						
Sound Power - Cooling	dB(A)	69	69	76	72	79
Sound Pressure level@1m distance - Cooling	dB(A)	55.2	55.2	62.1	57.6	64.6
REFRIGERANT CIRCUIT						
Refrigerant type		R410A	R410A	R410A	R410A	R410A
Refrigerant charge	kg	-	-	-	-	-
N. of circuits	No.	1	1	1	2	2
PIPING CONNECTIONS						
Evaporator water inlet/outlet	mm	G1"	G1"	G1"	G1" 1/2	G1" 1/2

Note

(1) Cooling performances as per EN14511-3:2018 (evaporator 12.0/7.0°C, condensing temperature 45.0°C; operating fluid=Water, fouling factor=0 m²°C/W, unit at full load). The minimum capacity indicated is referred to unit operating at standard Eurovent conditions.

(2) Dimensions and weights are for indication only and not considered binding. Before designing the installation, consult the official drawings available from the factory at request.

(3) The values refer to the pressure drops in the evaporator only.

(4) Sound power level are measured in accordance with ISO 9614 and Eurovent 8/1 for Eurovent certified units. The certification refers only to the overall sound power level; the sound pressure is calculated from the sound power level and are for information only and not considered binding.

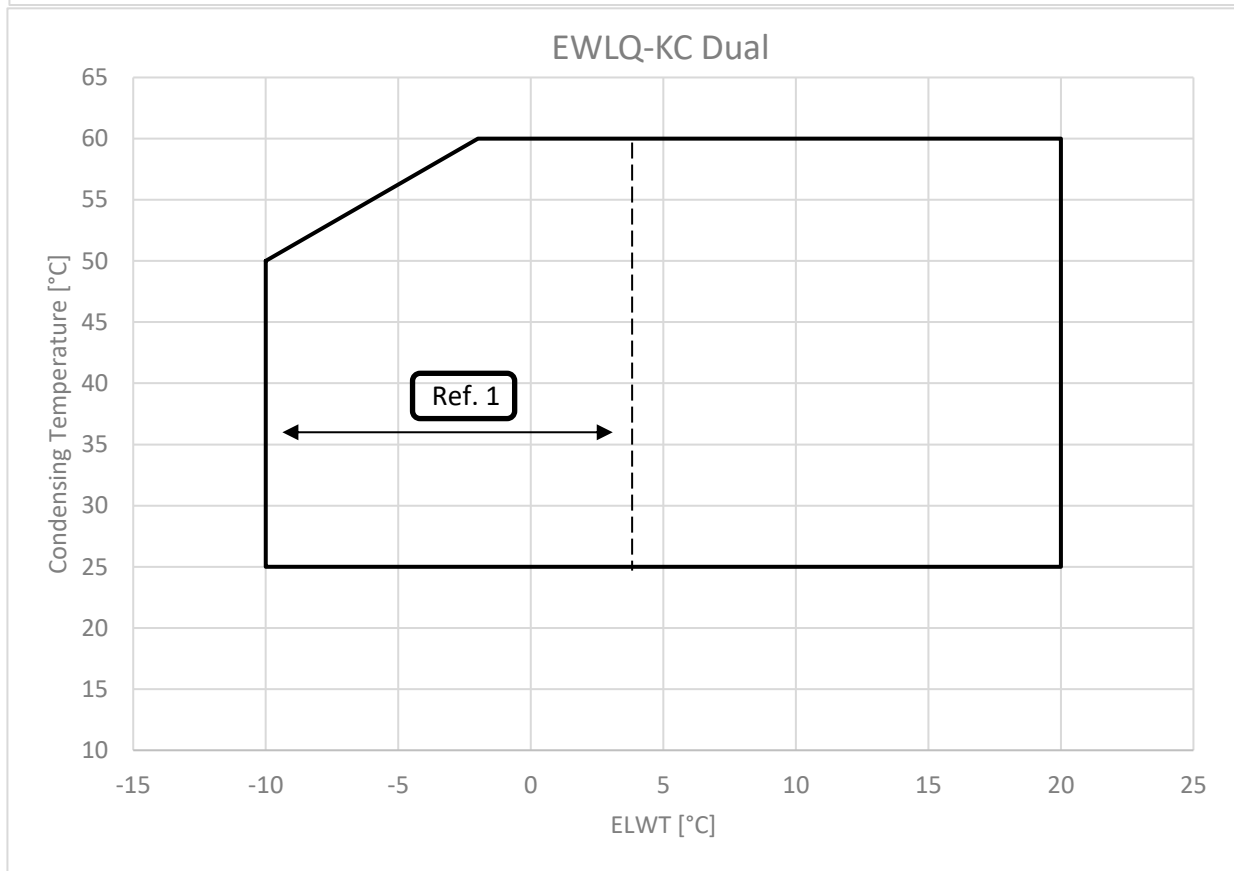
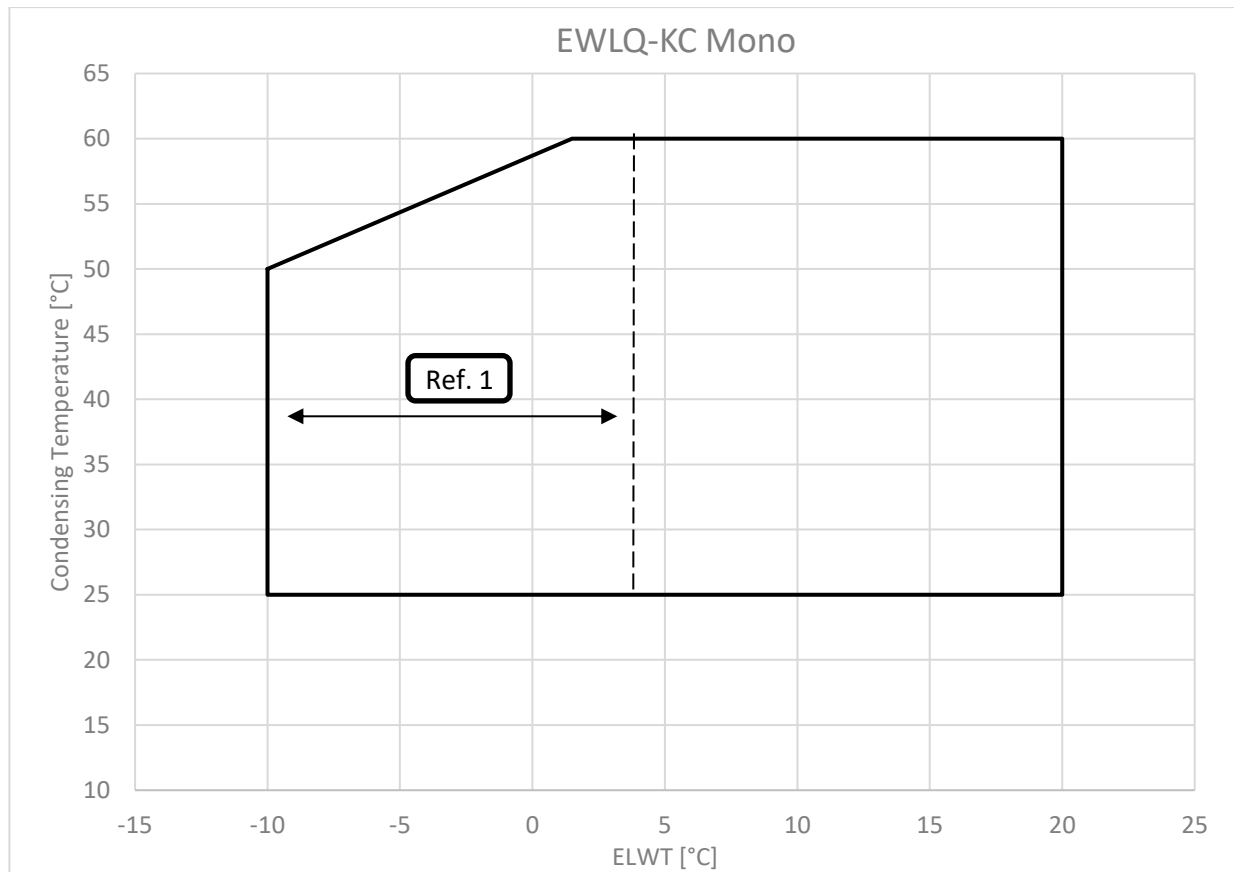
All the data are referred to standard unit without options and are subject to change without notice.

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MODEL		EWLQ014K CW1N	EWLQ025K CW1N	EWLQ033K CW1N	EWLQ049K CW1N	EWLQ064K CW1N
POWER SUPPLY						
Phases	No.	3N	3N	3N	3N	3N
Frequency	Hz	50	50	50	50	50
Voltage	V	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	10%	10%	10%	10%	10%
UNIT						
Maximum inrush current	A	57.4	109.3	124.3	124.8	143.6
Nominal running current cooling	A	6.57	10.5	14.1	20.9	28.1
Maximum running current	A	9.16	15.5	19.3	31	38.7
Maximum current for wires sizing	A	10.2	17.2	21.5	34.5	43
COMPRESSORS						
Phases	No.	3N	3N	3N	3N	3N
Voltage	V	400	400	400	400	400
Voltage tolerance Minimum	%	-10%	-10%	-10%	-10%	-10%
Voltage tolerance Maximum	%	10%	10%	10%	10%	10%
Maximum running current	A	0	0	0	0	0
Starting method		DOL	DOL	DOL	DOL	DOL

Allowed voltage tolerance $\pm 10\%$. Voltage unbalance between phases must be within $\pm 3\%$. Nominal running current in cooling is referred to the following conditions: evaporator $12/7^{\circ}\text{C}$; condensing temperature 45°C . Maximum running current is based on max compressor absorbed current in its envelope. Maximum current for wires sizing is based on minimum allowed voltage. Maximum current for wires sizing: compressors full load ampere $\times 1,1$. The data are referred to the standard unit without options. All data are subject to change without notice. Please refer to unit nameplate data.

Operating Limits



Legend :

ELWT Evaporator leaving water temperature

Ref 1 Glycol required for operation below +4°C ELWT

Water flow and quality

Water quality limits

DAE Water quality requirements	BPHE
Ph (25 °C)	7.5 – 9.0
Electrical conductivity [$\mu\text{S}/\text{cm}$] (25°C)	< 500
Chloride ion [$\text{mg Cl}^- / \text{l}$]	< 70
Sulphate ion [$\text{mg SO}_4^{2-} / \text{l}$]	< 100
Alkalinity [$\text{mg CaCO}_3 / \text{l}$]	< 200
Total Hardness [$\text{mg CaCO}_3 / \text{l}$]	75 ÷ 150
Iron [$\text{mg Fe} / \text{l}$]	< 0.2
Ammonium ion [$\text{mg NH}_4^+ / \text{l}$]	< 0.5
Silica [$\text{mg SiO}_2 / \text{l}$]	-
Chlorine molecular ($\text{mg Cl}_2/\text{l}$)	< 0.5

Glycol freezing point

The table below contains glycol freezing points for different glycol concentrations.

Type	Concentration (%)	0	10	20	30	40
Ethylene glycol	Freezing point	0	-4	-9	-16	-23
	Minimum LWE	5	2	0	-5	-11
Propylene glycol	Freezing point	0	-3	-7	-13	-22
	Minimum LWE	5	3	-2	-4	-10

Water flow and plant water content limits

To assure proper operation of the unit a minimum water volume is required in the system and the water flow must be within the operation range as specified in the table below.

	Minimum water volume (l)	Minimum water flow	Maximum water flow
EWQ014	62	31 l/min	75 l/min
EWQ025	134	53 l/min	123 l/min
EWQ033	155	76 l/min	186 l/min
EWQ049	205	101 l/min	247 l/min
EWQ064	311	152 l/min	373 l/min

LEGEND

1	Compressor	D1	Compressor-Condenser
2	Condenser (BPHE)	L1-1	Condenser-Therm.Exp. Valve
3	Drier filter	L1-2	Therm.Exp Valve-Evaporator
4	Thermostatic expansion valve	S1	Evaporator-Compressor
5	Evaporator (BPHE)	S1-1	Evaporator-Accumulator
6	Ball valve (optional)	S1-2	Accumulator-Compressor
7	Air purge valve (optional)	W1/W3	Water inlet assembly (optional)
8	Water filter (optional)	W2/W4	Water outlet assembly (optional)
9	Accumulator	E1/E2	Equalizer pipe
10	Discharge stop valve	TT	Temperature sensor
11	Sight glass	PT	Pressure transducer (6,5 barg)
12	Liquid solenoid valve	PZH	High pressure switch (40,7 barg)
13	Liquid stop valve	FS	Flow switch

Technical specifications

General The unit will be designed and manufactured in accordance with the following European directives:

DIRECTIVE 2014/35/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery, and amending Directive 95/16/EC.

DIRECTIVE 2014/68/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment.

DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products.

And to the following harmonized standards/specifications (used in part or whole as described in the technical construction file):

EN 60204-1:2006 A1:2009 Safety of machinery

EN 60335 -2-40 Household and similar electrical appliances - Safety: Particular requirements for electrical heat pumps, air conditioners and dehumidifier

EN 378-1:2016, EN 378-2:2016, EN 378-4:2016 Safety and environmental requirements; design, construction, testing, marking and documentation

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:

- evaporator leaving fluid temperature between °C and°C

Refrigerant Only R-410A can be used.

Performance The unit shall supply the following performances:

Number.....unit(s)

Cooling capacity for single unit.....kW

Power input for single chiller in cooling mode.....kW

Evaporator heat exchanger entering water temperature in cooling mode.....°C

Evaporator heat exchanger leaving water temperature in cooling mode.....°C

Evaporator heat exchanger water flow l/s

Operating voltage range should be 400V ±10%, 3N ph, 50Hz.

Unit description The unit shall include as standard: one or two independent refrigerant circuit per module, each of them equipped with an hermetic type rotary scroll compressors, thermal expansion device, refrigerant direct expansion plate to plate heat exchangers, 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 epoxy paint.

Sound level and vibrations Sound pressure level at 1 meter distance in free field, hemispheric conditions, shall not exceeddB(A). The sound pressure levels must be rated in accordance to ISO 3744

Dimensions Unit dimensions shall not exceed following indications:

Unit length.....mm

Unit width..... mm

Unit height.....mm

Compressors The units shall be equipped with:

High performance hermetic scroll compressors optimized to work with R-410A, with reduced vibration and sound emissions.

• High efficiency values shall be guaranteed by:

- High volumetric efficiency in the whole range of application, through the continuous contact between the fixed and the orbiting scroll deleting the dead space and the re-expansion of the refrigerant gas;
- Low pressure drops due to the absence of inlet and discharge valves and to the uniform compression cycle;
- Reduction of the heat exchange between the gas during suction and discharge due to the separation of gas flows;

- The reduced noise shall be obtained by:
 - The absence of the inlet and discharge valves
 - The uniform compression cycles
 - The absence of pistons which ensures reduced vibration and pulsation of the refrigerant
- The engine shall be cooled by the suction refrigerant fluid.
- Shall be present a thermal protection for the three phases complete with sensors on the stator windings to avoid overheating caused by lack of phase, insufficient cooling, mechanical locks, power supply out of tolerance;
- The compressors shall be one on each independent refrigerating circuit.
- The compressors shall be fitted on rubber antivibration mounts.
- The compressors shall be provided complete with oil charge.

Evaporator (PHE) The units shall be equipped with a direct expansion plate to plate type evaporator. The evaporator will be made of stainless steel brazed plates closed cell with thermal insulation material.

- The evaporator will have 1 or 2 refrigerant circuit.
- The evaporator will be manufactured in accordance to PED approval.
- Flow switch must be installed on plant.
- Water filter must be installed on plant.

Refrigerant circuit The unit shall have one or two refrigerant circuits per module according to the capacity.

- The circuits shall include as standard the following safety devices: High and low pressure switch, hot gas temperature monitoring, overload relay.

Electrical control panel Power and control Power and control sections shall be located into the main electrical panel. The power section shall include Main switch, auxiliary and control cut-outs, transformers, control fuses, relay and auxiliary relay, sensors, - Chiller digital controller. The main panel doors shall be interlocked to the main switch to guarantee safe operations when the doors are open.

Controller Units controllers shall fit a digital controller which allows the user to configure, operate and service the unit in a user-friendly manner. The -Chiller digital controller shall consist of a numerical display, 4 control keys and 4 LEDs.

The following functions shall be supported:

- Allocation of the setpoint and the desired switching hysteresis
- Cold water return controller (cooling mode)
- Hot water return controller (heating mode)
- Allocation of pump lead times / overrun times
- Allocation of service intervals
- Displaying the current operating parameters such as flow and return temperatures
- Recording operating hours (compressor / pump)
- Fault code query
- Password protection

High level communication As an option, the chiller can be fitted with an interface for integrating it into a Modbus Building Management System (BMS)

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