Klimallco®
climate experience

Air Cooled Water Chillers

Cooling capacity : 137 - 1050 kW

R134a

LKAC

LKAC-ELN

Twin Screw Compressors

Extra Low Noise

Outdoor Installation

klimallco sa Air Treatment Experts

2019

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1. General Description

Air Cooled Water Chillers

LKAC-ELN

The Klimallco LKAC-ELN extra low noise, large series are packaged air cooled water chillers for cooling applications and outdoor installation. They are available in 13 models with nominal capacities ranging from 137 to 1.050 kW.

These series are ideal in combination with Klimallco fan coil or air handling units for air conditioning office buildings, hotels, hospitals shopping centers, restaurants, etc., or for supplying chilled water for industrial applications.

Silent version complete with sound proofed compressors covering and reduced speed fans.

Optimized design for R134a refrigerant.

Casing: Galvanized steel plate with polyesteric coating.

Assembly: Fully bolted/welding free.

Compressor: Twin Screw Semi Hermetic.

Air heat exchanger: Cross fin coil Internally grooved copper tubes and louvered aluminium fins. Direct drive propeler .

Fan: Low rpm, quiet operation.

Water heat exchanger: Shell and tube type.

Safety and functional devices:

- High/low pressure switch.
- Phase sequence - phase failure - reverse phase and voltage monitoring device.
- Evaporator low temperature protection.
- Electronic microprocessor control with digital display.
- Differential water pressure switch.
- High and low pressure transmitters.
- High pressure relieve valve on compressor discharge.
- Constant compressor current monitoring control.
- Liquid injection cooling system to ensure the appropriate gas discharge temperature.
- Electronic expansion valve, ensuring constant suction gas superheat, at all operating conditions.
- Stepless compressor control, continuously regulating output capacity from 25% to 100%, in acoordance with load demand.

2. Technical Description

General

The LKAC-ELN extra low noise series air-cooled water chillers consists of 13 models covering capacities from 137 up to 1.050 kW. It is the end result of a thorough study, and accurate design by experienced Klimallco research and development teams, to develop a large size chiller series with compact shape, high performance, and reliability of the highest quality standards. This series meets the highest levels of aesthetic and technical requirements using the latest technological innovations, including environmentally friendly R134a refrigerant that is chlorine-free and has zero ozone depletion potential. LKAC units are therefore ideal for installation in commercial and industrial applications due to their dependability, selected materials and low operating sound levels.

Casing

All units use metal parts fabricated from heavy gauge galvanized steel sheets, formed to ensure maximum rigidity that guarantees and preserves the units operation during the years. After fabrication these are degreased, phosphatised, and electro statically powder coated with an epoxy-polyester RAL 7042 coating of a thickness 60-70 μ. This fully automatic process ensures superior corrosion resistance against the most aggressive ambient conditions. The treatment can successfully withstand a salt spray test of 500 hours, according to ASTM B-117. All components are assembled together using bolts thus avoiding the need for welding which may harm the galvanization of the steel, and ensures that the whole assembly can fully withstand adverse weather conditions.

The compact footprint of the unit arises from detailed study and design by our engineering teams and results in a machine, which fits easily in restricted areas and is simple and easy to install and maintain, and has been designed with special fittings for easy transport and lifting.

Removable side panels are used to permit access only to authorized personnel to internal components of the unit for inspection and maintenance. Electrical and electronic equipment and components for proper unit operation are located in a weather proof (IP 55) electrical panel with access only via a special key.

Compressor

The product is equipped with 2 semi-hermetic, accessible, screw type compressors and 2 independent refrigerant circuits. All screw compressors are designed for use with R134a refrigerant.The compression of the refrigerant is succeeded via twin screw shafts. The first one is directly driven by the motor and the second one is driven by the first. As a result the refrigerant gets through the screws and compressed.The compressors consist of twin screws moving in opposite directions, specially made out of steel and are installed in a separate compartment from the electric motor. The original seating design of the twin screws in 11-B type ball bearings, constantly varying performance through an axial shaft that ensures not only long life but also high performance. Movement to the screws is transmitted direct connection through the induction motor. The 3 phase 2 pole induction motor is suitable for a 400V-50Hz network and does not require any heat dissipation as it is cooled by the refrigerant medium itself. The windings design does not require any additional external cooling. A reduced starting current startup configuration ensures minimum startup current. The compressors are equipped with continuous (stepless) capacity control system. In continuous (stepless) capacity control system, a normally open solenoid valve and a normally closed solenoid valve are equipped to the inlet and outlet of the piston cylinder respectively. These two solenoid valves are controlled by the chiller micro controller, refrigeration capacity control can be modulated at anywhere within 25%-100%. The compressor is equipped with a special oil-separator ensuring the minimum possible lubricant circulation in the refrigerant circuit. Fitting lubrication is accomplished with effusion created by the pressure differential during normal operation, without the use of an additional mechanical pump. Compressors have been equipped with crankcase electrical heater for the oil, glass observation window for the oil level, an oil filter, with a designated cleaning/charging port, constant oil level control, and are internally protected by special thermistors against potential overheating or electrical spikes. Externally the compressor is equipped with a watertight IP-55 protected electrical panel, bearing all the necessary connections for operation and control. Inside the electrical panel an installed microprocessor controls all the safety and operation features of the compressor.

In order to ensure correct operation, the compressor also features:

- High temperature sensor for the refrigerant medium (PT-100).
- High temperature sensor for induction motor windings (PT-100).
- Low oil level safety switch.
- Refrigerant gas suction filter- accessible.
- Discharge valve.
- Check valve in discharge line.
- Pressure safety setup ensuring the highly pressurized refrigerant gas is within safety limits.
- Additional cooling through the suction chamber via a thermo expansion valve when necessary, through refrigerant liquid spray ensuring temperatures are kept within designated limits.
- Special rubber pads to absorb noise from the unit's operation.

Air heat exchanger

All unit air heat exchangers are manufactured from high quality inner grooved copper tubes according to ASTM B-280, having an outside diameter of 9,52 mm (3/8"). The fins are manufactured from aluminium and form the secondary extended heat transfer surface. The fins are continuous across the heat exchanger and are fabricated in high precision dedicated press lines. The fin surface is waffle formed, so as to increase the fin rigidity, and have special louvers that help increase heat transfer. The combination of internally grooved Copper-tubing and louvered fins has resulted in a heat transfer performance 30% superior to that of a conventional coil for this particular application. The assembly of the finned pack is achieved by mechanical expansion of the tubes in such a way as to form a perfect mechanical bond with the fins. For this purpose, the fin holes have a peripheral extrusion (collar) of adjustable height. This extrusion serves to define the distance between fins (and consequently the total heat transfer surface) and to ensure perfect contact of the fins to the tubes. Alternative fin materials are available upon request such as epoxy – coated aluminium or copper for applications in especially aggressive environments. The condensers are V-shaped paired in order to exploit all available space.Upon completion of the manufacturing procedure all coils are pressure tested at 30 bars for leaks.

Water heat exchanger

All units are equipped with a Shell and Tube water –direct expansion type evaporator that has two separate cooling circuits, one for each independent refrigerant circuit. The casing is of steel and the internal tubes are of copper. There is an air vent valve, drain valve, differential water pressure switch, probes for water temperature sensors, and the whole heat exchanger is wrapped in a heavy insulation material appropriate for external installation.

Air heat exchanger fans

Condenser fans are of the axial type directly transmitting motion to the blades, suitable for outdoor installation and pair mounted in-between the W-shaped condenser coils. The 3-phase motors are of closed type, low RPM (680rpm), 8-poles F insulation type and IP-55 protected. Axial seating is suitable for vertical operation, also included is internal thermal protection for the windings. Due to the special aerodynamic design of the blades and inlet cones as well as the perfect static and dynamic balancing, their operation is completely vibration-free. The fan-motor assembly has a protective grid against accidental contact with moving parts, which is designed according to ISO regulations. Fan motors are aerodynamically shaped so as not to interfere with the airflow, and have permanently lubricated bearings that do not require service. Upon request also available is an electrical set-up that controls the fan rpm through a microprocessor depending on the condensation temperature or pressure. Through this set-up the operational pressures of the device depend on the external condition thus increasing energy efficiency. Also this way of controlling the fans ensures machine performance under extreme cooling conditions, maximum performance, minimum absorbed current and noise confinement.

Microprocessor controller

All units are equipped with an electronic programmable control system. This allows complete management of all the functions of the unit and ensures protection of all vital parts. It also has a full self-diagnostics function as to prevent the stop of the machine by alarm. If it can't avert the cut off of the compressor, it has a diagnostics function, permitting easy and straightforward understanding of all the possible failures and malfunctions of the unit. All functions and indicators appear on the LCD screen. Over 150 programmable parameters offer complete unit management.

Critical parameters that require control are:

- Start-up/shut down time of compressor.
- Time delay.
- Protection against multiple start-up.
- Water pump time delay in reference to unit operation.
- Inlet/outlet water temperature.
- Evaporator and Condenser temperature.
- Discharge temperature.
- Suction temperature.
- Continuous sophisticated compressor capacity control using multiple parameters.
- High discharge pressure.
- Low suction pressure.
- Water temperature adjustment in the inlet side during summer operation.
- Superheat temperature.
- Controlled fault parameters:
- Low suction pressure per refrigerant circuit.
- High discharge pressure - temperature per refrigerant circuit.
- Oil low level.
- Compressor overload.
- Fan motor overload.
- Water pump overload.
- Differential water pressure switch.
- Error reading in water outlet low temperature.
- Compressor operating hour reading.
- In addition the control also shall include :
- Self diagnostic error of all electronic control sensors.
- Connection to building management system (BMS) by means of a Modbus or Metasys Protocol through RS485 serial gate.
- Remote on/ off switch.
- Remote alarm indication capability.
- History of operation points and fault codes.
- Password access code.

Refrigerant circuit

Each refrigerant circuit consists of the following:

- Electronic expansion valve with constant step control in order to maintain constantly the appropriate superheat of the refrigerant. The valve moves electromechanically controlled by the unit microprocessor. The valve is supplied with low voltage current that in addition is protected against sudden power shutdown. When the valve is in off position, it maintains a tight normally closed state not allowing refrigerant flow thus not needing supplimental electromagnetic valve at the liquid line.
- Filter drier.
- Shut off valves to allow easy replace of the filter core without loss of refrigerant.
- Liquid injection valve.
- Shut-off valves to allow servicing of the compressors.
- Solenoid valve in liquid injection line.
- Sight glass for checking the liquid lines.
- Pressure relief valve on compressor discharge.
- High and low pressure gauges for each refrigerant circuit, easily viewed.
- Service valves.

Optional accessories

- Microprocessor controller options:
- BMS module interface kit for Bacnet, Trend, LonWorks, connection.
- BMS interface kit for Modbus connection.
- Connection via internet using a device converting the Carel protocol to 10Mb/s TCP/IP ethernet protocol.
- Communication card through RS232 / RS485 serial ports.
- Possibility to send and receive messages using a GSM modem.
- Extention memory card for up to five thousand messages.
- Extention memory card 1& 2 MB.
- Microprocessor parameter reprogramming card.
- Other unit accessories/option:.
- Condenser fins made of copper or prepainted aluminum, and Blygold treatment for corrosion protection.
- Glycol application for chilled water temperature down to -15°C
- Continous linear fan speed regulation.
- A-meter, V-meter.
- Antifreeze heater at the evaporator.
- Electrical board ventilation fan.
- Heat recovery exchanger.
- Axial fans with EC motors.
- Other custom built options upon request.

3. Technical Description

1.1 LKAC 040-315-ELN

Ĭ ŔŐŇ	LKAC-ELN	040	055	075	090	105	120	130
Nominal Cooling capacity	kw	**137**	**182**	**253**	**308**	**356**	**395**	**431**
	RT	39	52	72	87	101	112	122
	Btu/h	468.709	619.036	862.255	1.049.455	1.213.964	1.347.273	1.468.527
EER		2,64	2,84	2,67	2,79	2,84	2,93	2,87
ESEER		3,51	3,79	3,55	3,72	3,77	3,90	3,83
IPLV		11,93	12,88	12,08	12,66	12,83	13,25	13,01
Kw/RT		1,33	1,24	1,32	1,26	1,24	1,20	1,23
Construction	Material/Color	Galvanised steel / Light grey-beige (RAL 7042)						
Compressor		Twin screw						
Quantity		2						
Capacity Steps		Stepless down to 12,5%-100%						
Absorbed power	kw	48,4	60,4	87,6	103,0	118,4	127,8	142,8
Nominal Operating Current	A	79,2	99,8	143,4	169,0	193,8	207,8	229,0
Maximum Operating Current	A	140,0	184,0	234,0	294,0	338,0	370,0	410,0
Condenser		High capacity cross finned coil with internally grooved tubes and louver fins						
Evaporator		Shell and tube						
Quantity		1						
Water Content	lit	94,0	88,0	133,0	125,0	222,0	206,0	206,0
I L·RBŌŎŇØL·CEÖŅ ŎØŇØØP ØŇ	Water side bar	10						
	Refrigerant side bar	30						
Connections		DN 125	DN 125	DN 150	DN 150	DN 200	DN 200	DN 200
Nominal Water Supply	lit/h	23,6	31,2	43,5	52,9	61,2	68,0	74,1
Water Pressure Drop	kpa	20,9	36,1	38,0	39,0	21,9	32,3	39,0
Minimum System Water Content	lit	508	671	934	1137	1315	1460	1591
Fans								
Quantity		4	4	8	8	8	8	8
Speed	rpm	680						
Total Air Flow	m3/h	50.000	52.000	96.000	96.000	112.000	112.000	120.000
Absorbed power	kw	3,6	3,6	7,2	7,2	7,2	7,2	7,2
Nominal Operating Current	A	8,8	8,8	17,6	17,6	17,6	17,6	17,6
Maximum Operating Current	A	9,6	9,6	19,2	19,2	19,2	19,2	19,2
Electrical characteristics		400V/3Ph/50Hz						
Total Absorbed Power	kw	52,0	64,0	94,8	110,2	125,6	135,0	150,0
Nominal Operating Current	A	88,0	108,6	161,0	186,6	211,4	225,4	246,6
Maximum Operating Current	A	149,6	193,6	253,2	313,2	357,2	389,2	429,2
Compressor carter resistance power	W	2x300	2x300	2x300	2x300	2x300	2x300	2x300
Power cables cross section per phase	mm^2	120	150	185	240	240	2x120	2x185
Fuses	A	3x200	3x250	3x400	3x400	3x400	3x400	3x500
Voltage operating limits	V	360-440V						
Refrigerant circuit								
Number of circuits		2						
Expansion device		Electronic expansion valves						
Refrigerant type		R134a						
Sound pressure level at 5m	db(A)	60	61	62	63	63	64	65
Dimensions	Width mm	2.200	2.200	2.200	2.200	2.200	2.200	2.200
	Length mm	3.225	3.225	6.125	6.125	6.125	6.125	6.125
	Height mm	2.300	2.300	2.300	2.300	2.300	2.300	2.300
Shiping weight	kg	2.400	2.700	3.700	3.850	3.950	4.200	4.500

Type	LKAC - ELN		155	170	195	225	270	315
Nominal Cooling capacity		KW	**528**	**579**	**656**	**752**	**897**	**1050**
		RT	150	164	186	214	255	298
		Btu/h	1.801.091	1.972.691	2.235.784	2.565.102	3.058.364	3.578.114
EER			2,86	2,91	2,98	2,93	2,98	3,08
ESEER			3,80	3,74	3,84	3,75	3,83	3,97
IPLV			12,92	12,73	13,05	12,74	13,02	13,51
Kw/RT			1,23	1,21	1,18	1,20	1,18	1,14
Construction	Material/Color		Galvanised steel / Light grey-beige (RAL 7042)					
Compressor			Twin srew					
Quantity			2					
Capacity Steps			Stepless down to 12,5%-100%					
Absorbed power		kw	174,2	188,0	209,6	240,2	285,0	324,8
Nominal Operating Current		A	279,2	301,4	336,6	381,8	453,6	515,8
Maximum Operating Current		A	516,0	554,0	602,0	694,0	802,0	930,0
Condenser			High capacity cross finned coil with internally grooved tubes and louver fins					
Evaporator			Shell and tubes					
Quantity			1					
Water Content		lit	185,0	225,0	310,0	378,0	348,0	337,0
Max. operating pressure	Water side bar		10					
	Refrigerant side bar		30					
Connections			DN 200	DN 200	DN 200	DN 200	DN 200	DN 200
Nominal Water Supply		lit/h	90,9	99,5	112,8	129,4	154,3	180,5
Water Pressure Drop		kpa	39,9	35,2	30,4	39,9	36,1	43,7
Minimum System Water Content		lit	1951	2137	2422	2779	3313	3876
Fans								
Quantity			12	12	12	18	18	18
Speed		rpm	680					
Total Air Flow		m3/h	168.000	168.000	180.000	216.000	252.000	228.000
Absorbed power		kw	10,8	10,8	10,8	16,2	16,2	16,2
Nominal Operating Current		A	26,4	26,4	26,4	39,6	39,6	39,6
Maximum Operating Current		A	28,8	28,8	28,8	43,2	43,2	43,2
Electrical characteristics			400V/3Ph/50Hz					
Total Absorbed Power		kw	185,0	198,8	220,4	256,4	301,2	341,0
Nominal Operating Current		A	305,6	327,8	363,0	421,4	493,2	555,4
Maximum Operating Current		A	544,8	582,8	630,8	737,2	845,2	973,2
Compressor carter resistance power		W	2x300	2x300	2x300	2x300	2x300	2x300
Power cables cross section per phase		mm^2	2x185	2x240	2x300	3x185	3x240	3x240
Fuses		A	3x600	3x600	3x700	3x800	3x900	3x1000
Voltage operating limits		V	360-440V					
Refrigerant circuit								
Number of circuits			2					
Expansion device			Electronic expansion valves					
Refrigerant type			R134a					
Sound pressure level at 5m		db(A)	66	66	67	68	68	70
Dimensions	Width	mm	2.200	2.200	2.200	2.200	2.200	2.200
	Length	mm	9.025	9.025	9.025	10.675	10.675	10.675
	Height	mm	2.450	2.450	2.450	2.450	2.450	2.450
Shiping weight		kg	7.500	7.700	7.900	9.300	9.500	9.700

Nominal conditions are as follows :

1. Entering/leaving chilled water temperature 12/7°C, ambient 35°CDB (cooling)
2. Electrical installation specifications are purely indicative and non-binding, all connections to the system andthe electrical installation must be in full accordance with all applicable national and local codes.

4. Cooling Capacity

2.1 LKAC 040-315-ELN

İ ŘŐÑ	Water outlet °C	Ambient Temperature °C																	
		25			30			35			40			45			50		
		Cooling capacity kW	Absorbed power kW	Current A	Cooling capacity kW	Absorbed power kW	Current A	Cooling capacity kW	Absorbed power kW	Current A	Cooling capacity kW	Absorbed power kW	Current A	Cooling capacity kW	Absorbed power kW	Current A	Cooling capacity kW	Absorbed power kW	Current A
[Y! / ھی	ي	ĈDĆÆĖ	37,3	63,0	140,8	41,3	68,7	126,3	48,0	78,6	117,1	52,3	85,4	104,6	58,4	95,2	99,3	60,9	99,5
	ﯾ	ĈĎĊÆĈ	37,7	63,4	152,9	41,7	69,1	**137,5**	**48,4**	**79,2**	128,0	52,8	86,1	114,8	58,9	95,9	109,3	61,4	100,3
	ﻬو	ĈĐÇÆĈ	38,1	64,0	172,9	42,2	69,8	156,0	49,0	80,0	145,7	53,4	87,0	131,7	59,6	97,0	125,7	62,2	101,5
LKAC -055	ي	ĈEĐÆĎ	46,7	79,5	186,1	51,7	86,7	166,8	60,0	99,2	154,7	65,4	107,8	138,2	73,0	120,1	131,2	76,2	125,5
	ﯾ	ČĈDÆÇ	47,0	79,9	202,0	52,0	87,1	**181,6**	**60,4**	**99,8**	169,0	65,9	108,5	151,7	73,5	120,9	144,3	76,7	126,4
	ﻬو	ČÇĊÆĆ	47,6	80,6	228,2	52,7	88,0	205,9	61,2	100,8	192,3	66,7	109,6	173,8	74,4	122,3	165,9	77,7	127,8
LKAC -075	ي	ČĐĎÆÇ	67,7	113,9	258,9	74,9	124,3	232,1	87,0	142,2	215,3	94,9	154,5	192,3	105,8	172,2	182,5	110,5	179,9
	ﯾ	ĊĆĆÆĈ	68,2	114,8	281,3	75,5	125,2	**252,9**	**87,6**	**143,4**	235,4	95,5	155,9	211,2	106,5	173,7	201,1	111,2	181,6
	ﻬو	ĊĊĐÆĖ	68,9	115,8	317,6	76,3	126,4	286,6	88,6	144,8	267,7	96,6	157,5	241,9	107,7	175,6	231,0	112,4	183,7
LKAC -090	ي	ĊĊĎÆĎ	79,3	134,3	315,3	87,9	146,4	282,7	102,0	167,6	262,2	111,2	182,1	234,2	124,0	202,9	222,3	129,5	212,1
	ﯾ	ĊĎDÆČ	80,2	135,3	342,4	88,8	147,5	**307,8**	**103,0**	**169,0**	286,5	112,3	183,7	257,1	125,3	204,7	244,7	130,8	214,0
	ﻬو	ÇĈĈÆĎ	81,0	136,6	386,6	89,7	149,0	348,8	104,2	170,8	325,8	113,6	185,8	294,4	126,7	207,2	281,1	132,2	216,6
LKAC -105	ي	ĊĐEÆĈ	91,3	154,2	364,5	101,1	168,1	326,8	117,4	192,4	303,1	128,0	209,0	270,7	142,7	232,9	256,9	149,1	243,5
	ﯾ	ÇČČÆÇ	92,1	155,2	396,1	102,0	169,2	**356,1**	**118,4**	**193,8**	331,4	129,1	210,6	297,4	144,0	234,7	283,1	150,3	245,4
	ﻬو	ÇĐĎÆČ	93,1	156,6	447,2	103,2	170,9	403,5	119,8	195,8	376,8	130,6	213,0	340,6	145,6	237,5	325,2	152,0	248,3
[Y! / ﻬوو	ي	ÇĊĈÆ	98,5	165,2	404,7	109,0	180,2	362,8	126,6	206,2	336,5	138,1	224,0	300,5	153,9	249,6	285,2	160,7	260,9
	ﯾ	ÇĎEÆĈ	99,5	166,4	439,8	110,1	181,4	**395,4**	**127,8**	**207,8**	368,0	139,4	225,8	330,2	155,4	251,7	314,3	162,2	263,1
	ﻬو	DČĐÆĐ	100,4	167,9	496,3	111,3	183,2	447,8	129,2	210,0	418,2	140,8	228,4	378,0	157,1	254,7	360,9	164,0	266,3
LKAC -130	ي	ÇĐĆÆĐ	110,1	181,4	441,1	122,0	197,8	395,4	141,6	226,4	366,8	154,4	245,9	327,6	172,2	274,1	310,9	179,8	286,5
	ﯾ	DĈĈÆĆ	111,1	183,4	479,2	123,1	199,9	**430,8**	**142,8**	**229,0**	400,9	155,7	248,9	359,8	173,7	277,4	342,4	181,3	290,0
	ﻬو	DĐĎÆĈ	112,3	185,2	541,0	124,4	202,1	488,2	144,4	231,6	455,9	157,4	251,9	412,0	175,5	280,9	393,4	183,3	293,7
LKAC -155	ي	DĐĐÆĎ	134,4	222,0	541,1	148,8	242,0	485,1	172,8	277,0	449,9	188,5	300,9	401,8	210,1	335,4	381,4	219,4	350,5
	ﯾ	ĎČĎÆĐ	135,6	223,6	587,7	150,1	243,7	**528,3**	**174,2**	**279,2**	491,7	190,0	303,5	441,3	211,9	338,2	420,0	221,1	353,6
	ﻬو	ĐĆĎÆĐ	137,0	225,8	663,4	151,8	246,4	598,6	176,2	282,4	559,1	192,1	307,2	505,3	214,2	342,5	482,4	223,6	358,2
LKAC -170	ي	ĎĊČÆĐ	145,0	239,6	592,6	160,5	261,3	531,2	186,4	299,0	492,8	203,3	324,8	440,1	226,6	362,0	417,7	236,7	378,3
	ﯾ	ĎĐĎÆĐ	146,3	241,3	643,7	162,0	263,1	**578,7**	**188,0**	**301,4**	538,6	205,0	327,6	483,3	228,6	365,1	460,0	238,7	381,7
	ﻬو	ĐĐÇÆĆ	147,9	243,8	726,8	163,8	266,0	655,8	190,2	304,8	612,5	207,3	331,5	553,5	231,2	369,7	528,5	241,4	386,6
LKAC -195	ي	ĐĈĎÆ	161,6	267,5	671,6	179,0	291,7	602,1	207,8	333,8	558,5	226,6	362,6	498,8	252,7	404,1	473,4	263,8	422,4
	ﯾ	ĐĐĐÆĆ	163,1	269,5	729,5	180,6	293,9	**655,8**	**209,6**	**336,6**	610,4	228,6	365,8	547,8	254,9	407,7	521,3	266,1	426,2
	ﻬو	ĐĐĐÆĈ	164,8	272,2	823,6	182,6	297,0	743,2	212,0	340,4	694,1	231,1	370,3	627,3	257,7	412,9	598,9	269,0	431,7
LKAC -225	ي	ĐČČÆÇ	185,3	303,5	770,5	205,2	331,0	690,7	238,2	378,8	640,7	259,8	411,5	572,2	289,6	458,6	543,1	302,4	479,3
	ﯾ	ĐEČÆĎ	186,9	305,7	837,0	207,0	333,3	**752,4**	**240,2**	**381,8**	700,3	261,9	415,0	628,4	292,1	462,4	598,1	304,9	483,5
	ﻬو	ĈĆĆĎÆČ	188,9	308,9	944,9	209,3	337,0	852,6	243,0	386,2	796,2	264,9	420,1	719,6	295,4	468,4	687,0	308,4	489,8
LKAC -270	ي	EĐĆÆĐ	219,8	360,6	918,8	243,4	393,2	823,6	282,6	450,0	764,0	308,2	488,8	682,3	343,6	544,8	647,6	358,8	569,4
	ﯾ	ĈĆĎÇÆĖ	221,8	363,2	997,9	245,6	396,0	**897,1**	**285,0**	**453,6**	835,0	310,8	493,0	749,3	346,6	549,4	713,2	361,8	574,4
	ﻬو	ĈĈEEÆĐ	224,2	366,6	1126,7	248,4	400,0	1016,6	288,4	458,4	949,4	314,4	498,6	858,1	350,6	556,0	819,2	366,0	581,4
LKAC -315	ي	ĈĈÇĐÆĐ	250,4	410,0	1075,0	277,3	447,0	963,7	322,0	511,6	893,9	351,2	555,7	798,3	391,5	619,4	757,8	408,8	647,3
	ﯾ	ĈČÇDÆĈ	252,8	412,8	1167,5	279,9	450,1	**1049,6**	**324,8**	**515,6**	976,9	354,2	560,4	876,6	395,0	624,5	834,4	412,3	652,9
	ﻬو	ĈÇĆĊÆĐ	255,5	417,1	1318,2	283,0	455,1	1189,4	328,6	521,6	1110,8	358,2	567,3	1003,9	399,5	632,7	958,5	417,0	661,6

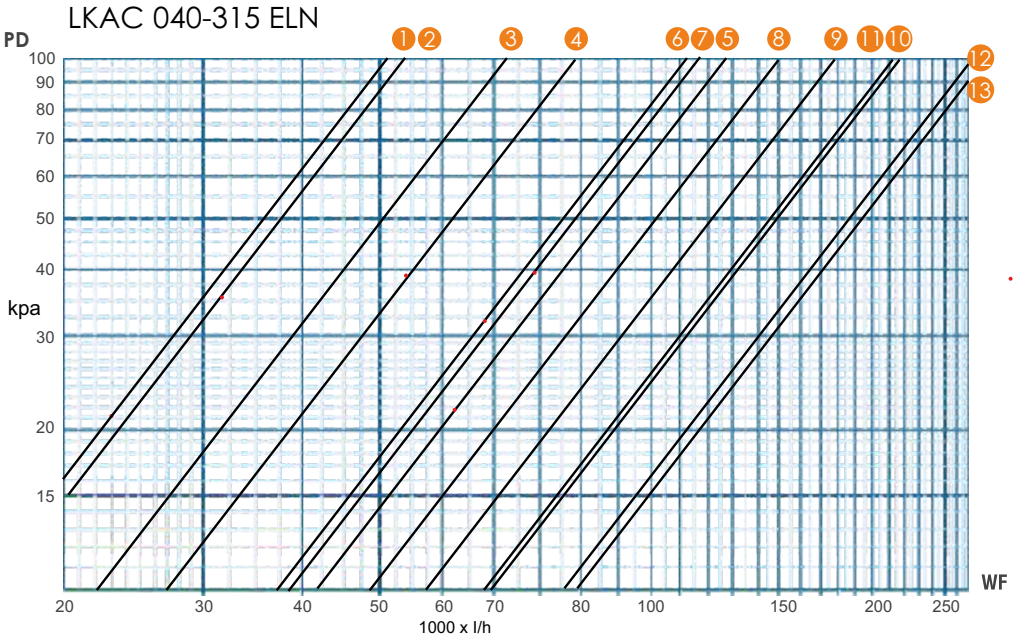
Notes

Bold values show nominal cooling capacities.

Absorbed power and current refers to the compressor.

Above figures are valid for water Δt = 5°C.

5. Water Pressure Drop



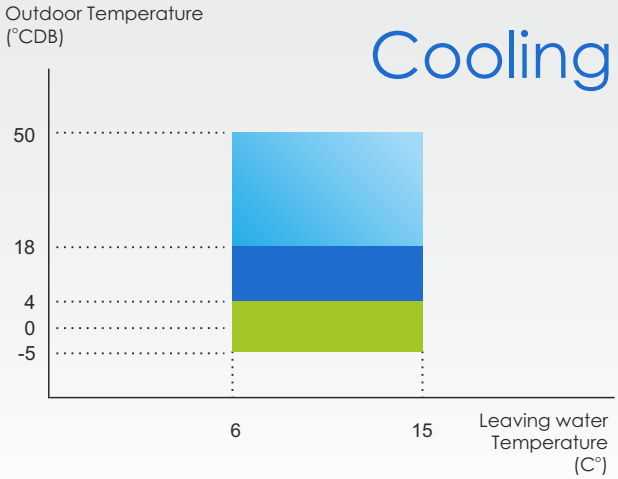
Notes

PD: Pressure Drop
WF: Water Flow
1. LKAC 040
2. LKAC 055
3. LKAC 075
4. LKAC 090
5. LKAC 105
6. LKAC 120
7. LKAC 130
8. LKAC 155
9. LKAC 170
10. LKAC 195
11. LKAC 225
12. LKAC 270
13. LKAC 315

1000 x l/h

% Dsgxkdmd F kxbnkax unkt l d	Unit	10	20	30	40
Freezing point	°C	-4	-9	-15	-23
Output duty	KW	0,99	0,98	0,97	0,96
Input power	KW	0,99	0,98	0,98	0,97
Equivelant Flow rate	L/H	1,02	1,04	1,08	1,13
Equivelant pressure drop	kPa	1,06	1,12	1,18	1,25

6. Operation Range



Notes

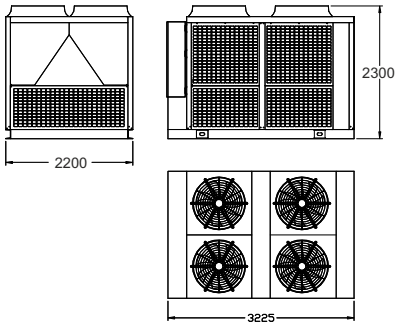
Protect the water circuit against freezing
After Request
Required continuous linear fan speed regulation control.

The accompanying operating limits are for general guidance only. It may be possible for certain units to operate outside the confines of the graph.Please contact Klimallco if further clarification is required.

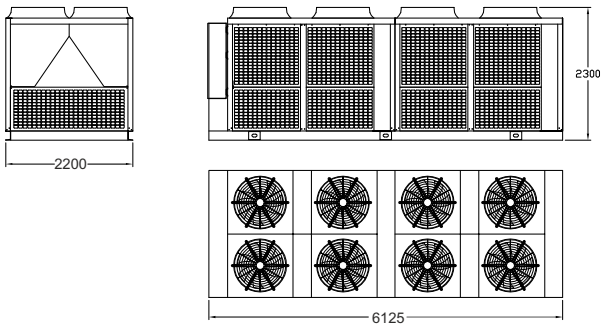
For operation with leaving water temperature below 6°C it is required to confirm with Klimallco at the time of order and the addition of glycol into the system.

7. Outlook Drawings

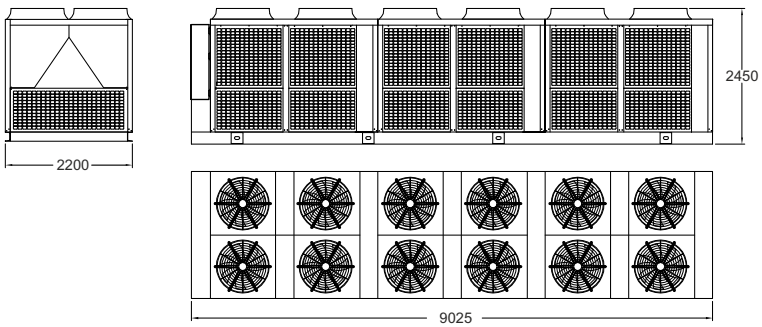
1.1 LKAC 040-055 ELN



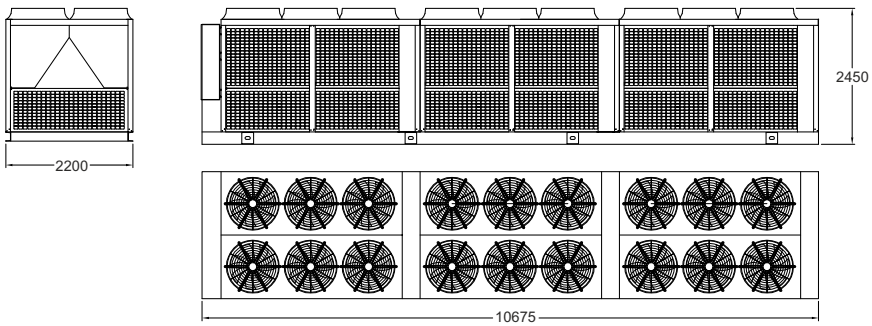
1.1 LKAC 075-130 ELN



1.1 LKAC 115-195 ELN



1.1 LKAC 225-315 ELN



8. Installation

4.1 Selection of location

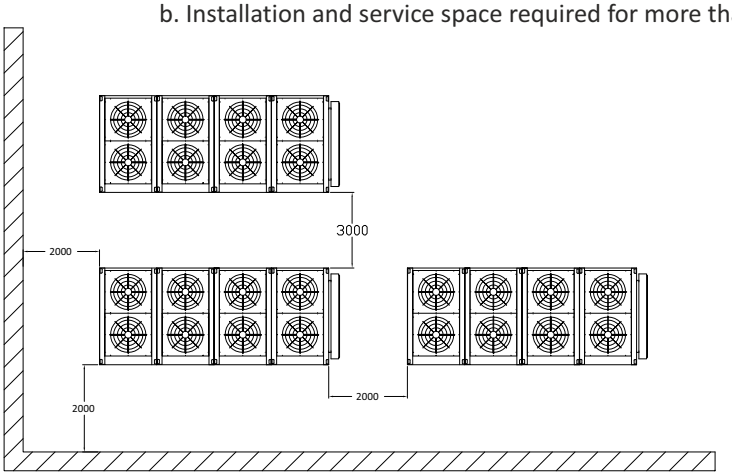
Installation and Service space

The LKAC-ELN unit should be installed in a location that meets the following requirements:

1. The foundation is strong enough to support the weight of the unit, and the floor is flat to prevent vibration and noise generation.
2. The space around the unit is adequate for servicing and the minimum space air inlet and air outlet is available. If several units are being installed side by side in parallel, the minimum service space between them must be taken into account.
3. There is no danger of fire due to leakage of inflammable gas.
4. Ensure that water cannot cause any damage to the surroundings in case it drips out of the unit.
5. Make sure that the air inlet and outlet of the unit are not positioned towards the main wind direction. Frontal wind shall disturb the operation of the unit. If necessary, use a windscreen to block the wind.
6. In heavy snowfall areas, select an installation site where snow shall not affect operation of the unit.
7. Make sure that the unit can be fixed directly on concrete. In order to avoid the transmission of vibration from the operating unit to its carrying structure, the use of antivibration material to install under the supports of the unit is recommended. It is suggested to install a rubber pad between the points of support and the base of the unit, or spring antivibration mounts under each point of support of the unit.

a. Installation and service space required for single chiller.

b. Installation and service space required for more than one chiller.



11.4 Watercharge, flow and quality

To ensure 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 tables.

R134a	Minimum Water Volume (l)	Minimum Water Flow (l/h)	Nominal Water Flow (l/h)	Maximum Water Flow (l/h)
LKAC-040ELN	547	16.520	23.600	28.792
LKAC-055ELN	722	21.840	31.200	38.064
LKAC-075ELN	984	30.450	43.500	53.070
LKAC-090ELN	1263	37.030	52.900	64.538
LKAC-105ELN	1446	42.840	61.200	74.664
LKAC-120ELN	1572	47.600	68.000	82.960
LKAC-130ELN	1731	51.870	74.100	90.402
LKAC-155ELN	2079	63.630	90.900	110.898
LKAC-170ELN	2350	69.650	99.500	121.390
LKAC-195ELN	2665	78.960	112.800	137.616
LKAC-225ELN	3089	90.580	129.400	157.868
LKAC-270ELN	3572	108.010	154.300	188.246
LKAC-315ELN	4016	126.350	180.500	220.210

Be sure the water quality is in accordance with the specifications below.

Items	Evaporator Water		Heated Water		Tendency if out of critiria
	Circulating Water 20°C	Supply Water	Circulating Water 20-60°C	Supply Water	
Items to be controlled					
PH at 20°C	6.8 - 8.0	6.8 - 8.0	7.0 - 8.0	7.0 - 8.0	corrosion + scale
Electrical Conduct (mS/m) at 25°C	bellow 30	bellow 30	bellow 30	bellow 30	corrosion + scale
Chloride Ion (mg Cl/l)	bellow 50	bellow 200	bellow 30	bellow 30	corrosion
Sulfate Ion (mg So 2/4/l)	bellow 50	bellow 50	bellow 30	bellow 30	corrosion
M-alkalinity (ph 4.8) (mgSO3/l)	bellow 50	bellow 50	bellow 50	bellow 50	corrosion
Total Hardness (CaCo3/l)	bellow 70	bellow 70	bellow 70	bellow 70	corrosion
Total Hardness (mg CaCO3/l)	bellow 50	bellow 50	bellow 50	bellow 50	corrosion
Silica Ion (mg Sio2/l)	bellow 30	bellow 30	bellow 30	bellow 30	corrosion
Items to be refered to :					
Iron (mg Fe/l)	bellow 1.0	bellow 0.3	bellow 1.0	bellow 0.3	corrosion + scale
Copper (mg Cu/l)	bellow 1.0	bellow 0.1	bellow 1.0	bellow 0.1	corrosion
Sulfide Ion (mg S2/l)	Not detectable	Not detectable	Not detectable	Not detectable	corrosion
Amonium Ion (mg NH4/l)	bellow 0.3	bellow 0.1	bellow 0.1	bellow 0.1	corrosion
Remaining Chloride (mg Cl/l)	bellow 0.25	bellow 0.3	bellow 0.1	bellow 0.3	corrosion
Free Carbide(mg SO2/l)	bellow 0.4	bellow 4.0	bellow 0.4	bellow 4.0	corrosion
Stability Index	-	-	-	-	corrosion + scale

Notes

The above tables are purely indicative and non-binding

Operating pressure of the refrigerant circuit

It is important to check the high and low pressure of the refrigerant circuit to ensure the proper operation of the unit and to guarantee that the rated output shall be obtained.

Attention:

The pressures measured shall vary between a maximum and minimum value, depending on the water and ambient temperatures at the moment of measurement.

R 134a	F ÖÖŒŒDNÖ ÖÑÑ (Region)	Minimum (outdoor temp. 15°CDB) (leaving water temp 6°C)	Nominal (outdoor temp. 35°CDB) (leaving water temp, 7°C)	Maximum (outdoor temp. 38°CDB) (leaving water temp, 25°C)
	Low pressure	1,7-2,0 bar	2,0-2,3 bar	2,5-3,0 bar
	High pressure	8,0-10 bar	11-13 bar	14-16 bar

Klimallco®
climate experience

CE KLIMALLCO's units comply with the European regulations, that guarantee the safety of the product.

LKAC-ELN

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klimallco sa Air Treatment Experts

CERTIFIED LR ISO 9001 · ISO 14001

KLIMALLCO's quality management system is certified according to **ISO 9001:2015** and **ISO 14001:2015** for:
Design, manufacturing and trading of air conditioning equipment.

Technical Data
2019