Klimallco®
climate experience

Water Cooled Water Chillers

Cooling capacity LKWC-B : 127,87 - 1565,78 kW
Cooling capacity LKWC-C : 127,22 - 1425,60 kW

LKCW

LKWC-B R407c
LKWC-C R134a

Twin Screw Compressors

Klimallco sa Air Treatment Experts

Indoor Installation

2019

Contents

1. General Description

Water Cooled Water Chillers

The KLIMALLCO LKWC series are packaged water cooled water chillers for cooling applications and indoor installation. They are available in 16 models.

These series are ideal in combination with KLIMALLCO cooling towers, fan coil or Water to Water Chillers for air conditioning office buildings, hotels, hospitals shopping centers, restaurants, etc., or for supplying chilled water for industrial or MARINE applications.

Description

Optimized design for R407c and R134a refrigerant.

Casing: Steel

Compressor: Twin Screw Semi Hermetic.

Condenser: Shell and tube type (outside tube condenser)

Chilled 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 manometers.
- High pressure relieve valve on compressor discharge and condenser.
- 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 LKWC series water cooled water chillers consists of 18 models covering capacities from 122 up to 1565 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 R407c or R134a refrigerants that is chlorine-free and has zero ozone depletion potential. LKWC units are therefore ideal for installation in commercial, industrial and marine applications due to their dependability, selected materials and low operating sound levels.

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 R407c or 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.
- •High temperature sensor for induction motor windings (PT-1000).
- •Low oil level safety switch.
- •Refrigerant gas suction filter- accessible.
- • Discharge valves.
- •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.

Condenser

A highly efficient horizontal shell and tubes heat exchanger, where refrigerant condensates in shell and water heat in tubes. The tubes have external fins for enchanced thermal transfer coefficient between refrigerant and water. The water end cover are removable for easier tubes cleaning and the tubes can be mechanically cleaned. In marine type the tubes are manufactured from alloy of copper-nickel (90% Cu - 10% Ni) in order to avoid the corrosion which is caused by marine water.

Evaporator

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.

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 outlet.
- Superheat temperature.

Controlled fault parameters:

- Low suction pressure per refrigerant circuit.
- High discharge pressure - temperature per refrigerant circuit.
- Oil low level.
- Compressor 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 microprocesor. 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 and condenser.
- 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 optional accessories:

- R407a refrigerant for special applications of low tempeature under 0°C.
- Condenser made of Cu -Ni (90%-10%) for marine applications.
- Glycol application for chilled water temperature down to -15°C
- Continous linear 3-way valve of condensing water.
- A-meter, V-meter.
- Antifreeze heater at the evaporetor.
- Electrical board ventilation fan.
- Heat recovery exchanger.
- Other custom built options upon request.

3.1 Technical Specifications

LKWC-B

Type	LKWC-B	130	160	200	250	320	370	500	590
Nominal cooling capacity[1]	kw	**127,87**	**159,19**	**191,81**	**255,74**	**318,38**	**370,87**	**492,91**	**583,63**
	RT	36	45	54	73	90	105	140	166
	Btu/h	435.927	542.700	653.891	871.855	1.085.400	1.264.336	1.680.382	1.989.655
Construction	Material/Color	Steel							
Compressor		Twin Screw							
Quantity		1		2					
Capacity steps		Stepless 25-100 %							
Absorbed power	kw	30,7	37,4	46,8	61,4	74,8	85,8	113,8	126,8
Nominal operating current	A	52,0	63,0	78,6	104,0	126,0	145,6	189,6	212,8
Maximum operating current	A	87,0	112,0	130,0	174,0	224,0	244,0	326,0	366,0
Evaporator		Shell and tube							
Quantity		1							
Water content	lit	57,0	62,0	111,0	109,0	102,0	151,0	137,0	234,0
Max. Operating pressure	Water side bar	16							
	Refrigerant side bar	29							
Connections		DN 100	DN 100	DN 125	DN 125	DN 125	DN 150	DN 150	DN 200
Nominal water flow	lit/h	21,994	27,381	32,991	43,988	54,762	63,790	84,781	100,385
Water pressure drop	kpa	10,3	17,2	12,6	23,0	48,7	33,7	47,0	38,6
Condenser		Shell and tube (Outside tube condenser)							
Quantity		1		2					
Water content	lit	28	33	34	54	66	66	102	112
Max. Operating pressure	Water side bar	16							
	Refrigerant side bar	30							
Connections (per condenser)		DN 80	DN 80	2 1/2"	DN 80	DN 80	DN 80	DN 100	DN 100
Nominal water flow (total)	lit/h	27,712	34,500	41,569	55,425	69,000	80,375	106,824	126,485
Water pressure drop	kpa	15,1	16,2	20,0	15,1	16,2	21,2	16,3	18,5
Electrical characteristics		400V/3Ph/50Hz							
Total absorbed power	kw	30,7	37,4	46,8	61,4	74,8	85,8	113,8	126,8
Nominal operating current	A	52,0	63,0	78,6	104,0	126,0	145,6	189,6	212,8
Maximum operating current	A	87,0	112,0	130,0	174,0	224,0	244,0	326,0	366,0
Compressor carter resistance power	W	150	150	300	300	300	300	300	300
Voltage operating limits	V	360-440V							
Refrigerant circuit									
Number of circuits		1		2					
Expansion device		electronic expansion valve							
Refrigerant type		R407c							
Noise level @ 5m	dbA	60	64	62	63	67	67	68	69
Dimensions	Width mm	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Length mm	3.500	3.700	3.700	3.700	3.700	3.700	3.700	3.700
	Height mm	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
Shipping weight	kg	1.263	1.393	1.657	1.786	2.321	2.521	3.032	3.300
Operational weight	kg	1.348	1.488	1.802	1.949	2.489	2.738	3.271	3.646

R407c

LKWC-B

ı ŘŐŇ	LKWC-B	640	680	740	950	1100	1200	1400	1550
ı ŎÖ ÒŌMÕŃŎŎÒŌŊ ŃMŐMŃÒŘ[1]	kw	**635,04**	**673,92**	**736,99**	**941,33**	**1099,44**	**1210,25**	**1425,82**	**1565,78**
	RT	180	191	209	267	312	344	405	445
	Btu/h	2.164.909	2.297.455	2.512.473	3.209.073	3.748.091	4.125.845	4.860.736	5.337.900
Construction	Material/Color	Steel							
Compressor		Twin Screw							
Quantity		2							
Capacity steps		Stepless 12,5-100 %							
Absorbed power	kw	139,4	148,0	161,8	205,4	241,2	266,2	310,4	340,8
Nominal operating current	A	231,8	249,2	268,8	336,4	398,6	436,4	506,4	554,4
Maximum operating current	A	392,0	418,0	458,0	588,0	638,0	738,0	860,0	946,0
Evaporator		Shell and tube							
Quantity		1							
Water content	lit	234,0	221,0	241,0	374,0	460,0	313,0	348,0	338,0
Max. Operating pressure	Water side bar	16							
	Refrigerant side bar	29							
Connections		DN 200	DN 200	DN 200	DN 200	DN 200	DN 200	DN 200	DN 200
Nominal water flow	lit/h	109,227	115,914	126,763	161,908	189,104	208,163	245,240	269,315
Water pressure drop	kpa	45,5	40,4	48,2	29,0	47,8	48,0	55,0	66,0
Condenser		Shell and tube (Outside tube condenser)							
Quantity		2							
Water content	lit	112	121	149	184	198	276	378	378
Max. Operating pressure	Water side bar	16,0							
	Refrigerant side bar	30,0							
Connections		DN 100	DN 100	DN 125	DN 125	DN 125	DN 150	DN 150	DN 150
Nominal water flow	lit/h	137,626	146,052	159,721	204,005	238,271	262,285	309,003	339,337
Water pressure drop	kpa	22,5	21,5	18,3	19,2	22,8	18,1	16,6	19,7
Electrical characteristics		400V/3Ph/50Hz							
Total absorbed power	kw	139,4	148,0	161,8	205,4	241,2	266,2	310,4	340,8
Nominal operating current	A	231,8	249,2	268,8	336,4	398,6	436,4	506,4	554,4
Maximum operating current	A	392,0	418,0	458,0	588,0	638,0	738,0	860,0	946,0
Compressor carter resistance power	W	300	300	300	300	300	300	300	300
Voltage operating limits	V	360-440V							
Refrigerant circuit									
Number of circuits		2							
Expansion device		electronic expansion valve							
Refrigerant type		R407c							
Noise level @ 5m	dbA	69	69	71	73	75	76	76	76
Dimensions	Width mm	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Length mm	3.700	3.700	4.400	4.400	4.400	4.400	4.400	4.400
	Height mm	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
Shipping weight	kg	3.400	3.684	3.880	4.594	5.007	5.165	5.878	6.080
Operational weight	kg	3.746	4.026	4.270	5.152	5.665	5.754	6.604	6.796

Notes

Nominal conditions are as follows
- entering/leaving condensing water temperature 30/35°C.
- entering/leaving chilled water temperature 12/7°C.
- 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.

3.2 Capacity Tables LKWC-B

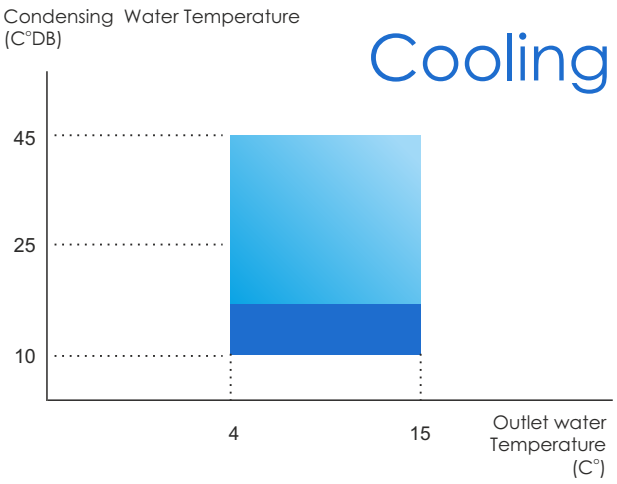
Cooling capacity table for LKWC-B

TYPE	Leaving condenser water temperature °C																
		25			30			35			40			45		
	water outlet °C	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
130	5	138,6	24,9	40,4	128,8	27,4	44,5	117,9	30,1	48,9	111,2	32,5	52,9	104,9	35,0	56,9
	7	149,6	25,3	41,0	139,3	27,6	44,9	**127,9**	**30,7**	**52,0**	120,2	33,2	53,9	112,5	35,9	58,3
	10	167,3	26,0	42,2	156,0	28,6	46,4	141,9	31,9	52,3	130,4	33,8	54,9	121,5	36,5	59,3
160	5	172,6	30,3	49,2	160,3	33,4	54,2	146,8	36,7	59,5	138,5	39,6	64,4	130,5	42,7	69,3
	7	186,3	30,8	50,0	173,4	33,7	54,7	**159,2**	**37,4**	**63,0**	149,6	40,4	65,6	140,1	43,8	71,1
	10	208,2	31,6	51,4	194,2	34,8	56,5	176,7	38,9	63,8	162,4	41,1	66,8	151,2	44,5	72,3
200	5	207,9	37,9	61,6	193,2	41,7	67,8	176,8	45,9	74,5	166,9	49,6	80,6	157,3	53,4	86,7
	7	224,4	38,5	62,6	208,9	42,1	68,4	**191,8**	**46,8**	**78,6**	180,3	50,5	82,1	168,8	54,8	88,9
	10	250,9	39,6	64,3	234,0	43,5	70,7	212,9	48,7	79,8	195,6	51,5	83,6	182,2	55,7	90,5
250	5	277,2	49,7	80,8	257,5	54,8	89,0	235,8	60,2	97,7	222,5	65,1	105,7	209,7	70,1	113,8
	7	299,2	50,5	82,1	278,5	55,3	89,8	**255,7**	**61,4**	**104,0**	240,4	66,3	107,7	225,1	71,8	116,7
	10	334,5	51,9	84,4	312,0	57,1	92,8	283,9	63,9	104,7	260,9	67,5	109,7	243,0	73,1	118,7
320	5	345,1	60,6	98,4	320,6	66,7	108,4	293,5	73,3	119,1	277,0	79,3	128,8	261,1	85,3	138,6
	7	372,5	61,6	100,0	346,7	67,3	109,4	**318,4**	**74,8**	**126,0**	299,3	80,8	131,2	280,2	87,5	142,2
	10	416,4	63,3	102,8	388,4	69,6	113,0	353,4	77,8	127,5	324,7	82,3	133,7	302,5	89,0	144,6
370	5	402,0	69,5	112,9	373,5	76,5	124,3	341,9	84,1	136,6	322,7	90,9	147,7	304,1	97,9	159,0
	7	433,9	70,6	114,7	403,9	77,2	125,4	**370,9**	**85,8**	**145,6**	348,6	92,7	150,5	326,4	100,4	163,1
	10	485,1	72,6	117,9	452,5	79,8	129,6	411,7	89,2	146,3	378,3	94,4	153,3	352,3	102,1	165,9
500	5	534,3	92,2	149,7	496,4	101,5	164,9	454,5	111,5	181,2	428,8	120,6	196,0	404,2	129,8	210,9
	7	576,7	93,7	152,1	536,8	102,4	166,4	**492,9**	**113,8**	**189,6**	463,3	122,9	199,6	433,8	133,1	216,3
	10	644,7	96,3	156,4	601,4	105,8	171,9	547,1	118,4	194,0	502,8	125,2	203,3	468,3	135,4	220,0
590	5	632,7	102,7	166,8	587,7	113,1	183,7	538,1	124,3	201,9	507,8	134,4	218,3	478,6	144,7	235,0
	7	682,8	104,4	169,5	635,6	114,1	185,4	**583,6**	**126,8**	**212,8**	548,6	136,9	222,5	513,6	148,4	241,0
	10	763,4	107,3	174,3	712,0	117,9	191,6	647,8	131,9	216,2	595,3	139,5	226,6	554,4	150,9	245,1
640	5	688,4	112,9	183,4	639,5	124,3	202,0	585,5	136,6	221,9	552,5	147,8	240,0	520,7	159,1	258,4
	7	743,0	114,7	186,4	691,6	125,5	203,8	**635,0**	**139,4**	**231,8**	596,9	150,6	244,6	558,8	163,1	264,9
	10	830,6	117,9	191,6	774,7	129,6	210,6	704,9	145,0	237,7	647,7	153,3	249,1	603,3	165,9	269,5
680	5	730,5	119,9	194,7	678,6	132,0	214,5	621,4	145,0	235,6	586,3	156,9	254,8	552,6	168,9	274,3
	7	788,5	121,8	197,9	733,9	133,2	216,4	**673,9**	**148,0**	**249,2**	633,5	159,8	259,6	593,0	173,2	281,3
	10	881,5	125,2	203,4	822,2	137,6	223,6	748,1	153,9	252,3	687,4	162,8	264,5	640,2	176,1	286,1
740	5	798,9	131,1	212,9	742,1	144,3	234,4	679,5	158,6	257,6	641,2	171,5	278,6	604,3	184,6	299,9
	7	862,3	133,2	216,3	802,6	145,6	236,5	**737,0**	**161,8**	**268,8**	692,8	174,7	283,9	648,6	189,3	307,5
	10	964,0	136,9	222,4	899,1	150,5	244,4	818,1	168,3	275,9	751,7	178,0	289,1	700,1	192,5	312,8
950	5	1020,4	166,4	270,3	947,9	183,2	297,6	867,9	201,3	327,0	819,0	217,7	353,7	771,9	234,4	380,7
	7	1101,4	169,0	274,6	1025,1	184,9	300,3	**941,3**	**205,4**	**336,4**	884,9	221,8	360,4	828,4	240,3	390,4
	10	1231,3	173,8	282,3	1148,4	191,0	310,3	1044,9	213,6	350,2	960,2	225,9	367,0	894,3	244,4	397,1
1100	5	1191,8	195,4	317,4	1107,1	215,2	349,5	1013,7	236,4	384,0	956,5	255,7	415,3	901,5	275,2	447,1
	7	1286,3	198,5	322,5	1197,3	217,1	352,6	**1099,4**	**241,2**	**398,6**	1033,5	260,5	423,2	967,5	282,2	458,4
	10	1438,1	204,1	331,5	1341,3	224,3	364,4	1220,4	250,8	411,2	1121,4	265,3	431,0	1044,5	287,0	466,3
1200	5	1311,9	215,6	350,3	1218,7	237,5	385,7	1115,9	260,9	423,8	1052,9	282,2	458,4	992,4	303,7	493,4
	7	1416,0	219,1	355,9	1318,0	239,6	389,2	**1210,3**	**266,2**	**436,4**	1137,6	287,5	467,0	1065,0	311,5	505,9
	10	1583,0	225,2	365,8	1476,5	247,6	402,2	1343,4	276,8	453,8	1234,5	292,8	475,7	1149,7	316,8	514,6
1400	5	1545,6	251,4	408,4	1435,8	276,9	449,8	1314,6	304,2	494,1	1240,5	329,0	534,5	1169,2	354,2	575,3
	7	1668,2	255,5	415,0	1552,7	279,4	453,8	**1425,8**	**310,4**	**506,4**	1340,3	335,2	544,6	1254,7	363,2	589,9
	10	1865,0	262,6	426,6	1739,5	288,7	468,9	1582,7	322,8	529,2	1454,3	341,4	554,6	1354,5	369,4	600,0
1550	5	1697,3	276,0	448,4	1576,7	304,0	493,8	1443,6	334,0	542,5	1362,2	361,2	586,8	1283,9	388,9	631,7
	7	1832,0	280,5	455,6	1705,1	306,7	498,2	**1565,8**	**340,8**	**554,4**	1471,8	368,1	597,9	1377,9	398,7	647,7
	10	2048,0	288,3	468,4	1910,3	316,9	514,9	1738,0	354,4	581,0	1597,1	374,9	609,0	1487,5	405,6	658,8

Notes

Bold values show nominal cooling capacities.
Absorbed power and current refers to the compressor.
Above figures are valid for water Δt = 5°C.

3.3 Operation Range LKWC-B



Notes

Standard version

Version with 3-way valve 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.

3.4 Sound Data LKWC-B

Type		dB(A)	63	125	250	500	1000	2000	4000	8000
130	Power	85	63	65	72	69	71	74	70	57
	Pressure @1 m	74	52	54	61	58	60	63	59	46
	Pressure @10 m	54	32	34	41	38	40	43	39	26
160	Power	89	67	69	76	73	76	78	74	60
	Pressure @1 m	78	56	58	65	62	65	67	63	49
	Pressure @10 m	58	36	38	45	42	45	47	43	29
200	Power	87	66	68	74	72	74	76	72	59
	Pressure @1 m	76	55	57	63	61	63	65	61	48
	Pressure @10 m	56	35	37	43	41	43	45	41	28
250	Power	88	66	68	75	72	74	77	73	60
	Pressure @1 m	77	55	57	64	61	63	66	62	49
	Pressure @10 m	57	35	37	44	41	43	46	42	29
320	Power	92	70	72	79	76	79	81	77	63
	Pressure @1 m	81	59	61	68	65	68	70	66	52
	Pressure @10 m	61	39	41	48	45	48	50	46	32
370	Power	92	70	72	80	79	79	81	77	63
	Pressure @1 m	81	59	61	69	68	68	70	66	52
	Pressure @10 m	61	39	41	49	48	48	50	46	32
500	Power	93	71	73	80	77	80	82	68	64
	Pressure @1 m	82	60	62	69	66	69	71	57	53
	Pressure @10 m	62	40	42	49	46	49	51	37	33
590	Power	94	71	73	81	78	80	83	78	64
	Pressure @1 m	83	60	62	70	67	69	72	67	53
	Pressure @10 m	63	40	42	50	47	49	52	47	33

Type		dB(A)	63	125	250	500	1000	2000	4000	8000
640	Power	94	72	74	81	78	81	83	79	64
	Pressure @1 m	83	61	63	70	67	70	72	68	53
	Pressure @10 m	63	41	43	50	47	50	52	48	33
680	Power	94	72	74	81	79	81	83	79	64
	Pressure @1 m	83	61	63	70	68	70	72	68	53
	Pressure @10 m	63	41	43	50	48	50	52	48	33
740	Power	96	73	75	83	79	82	84	80	65
	Pressure @1 m	85	62	64	72	68	71	73	69	54
	Pressure @10 m	65	42	44	52	48	51	53	49	34
950	Power	98	75	77	85	82	85	87	83	67
	Pressure @1 m	87	64	66	74	71	74	76	72	56
	Pressure @10 m	67	44	46	54	51	54	56	52	36
1100	Power	100	77	79	87	84	87	89	85	69
	Pressure @1 m	89	66	68	76	73	76	78	74	58
	Pressure @10 m	69	46	48	56	53	56	58	54	38
1200	Power	101	77	79	88	84	87	90	85	69
	Pressure @1 m	90	66	68	77	73	76	79	74	58
	Pressure @10 m	70	46	48	57	53	56	59	54	38
1400	Power	101	78	80	88	85	87	90	85	69
	Pressure @1 m	90	67	69	77	74	76	79	74	58
	Pressure @10 m	70	47	49	57	54	56	59	54	38
1550	Power	101	78	80	88	85	87	90	85	69
	Pressure @1 m	90	67	69	77	74	76	79	74	58
	Pressure @10 m	70	47	49	57	54	56	59	54	38

4.1 Technical Specifications

LKWC

Type		LKWC-C	131	161	181	251	311	401	501	621
Nominal cooling capacity[1]		kw	**127,22**	**154,98**	**172,58**	**254,45**	**309,96**	**397,87**	**495,50**	**621,65**
		RT	36	44	49	72	88	113	141	177
		Btu/h	433.718	528.341	588.355	867.436	1.056.682	1.356.382	1.689.218	2.119.255
Construction	Material/Color		Steel							
Compressor			Twin Screw							
Quantity			1		2					
Capacity steps			Stepless 25-100 %							
Absorbed power		kw	27,2	32,6	38,6	54,4	65,2	82,0	101,2	127,4
Nominal operating current		A	45,0	54,3	63,8	90,0	108,5	135,1	162,9	208,0
Maximum operating current		A	98,0	117,0	140,0	196,0	234,0	294,0	370,0	472,0
Evaporator			Shell and tube							
Quantity			1							
Water content		lit	41,0	53,0	53,0	95,0	89,0	128,0	263,0	250,0
Max. Operating pressure	Water side	bar	16							
	Refrigerant side	bar	29							
Connections			DN 80	DN 80	DN 80	DN 100	DN 100	DN 125	DN 150	DN 150
Nominal water flow		lit/h	21,883	26,657	29,684	43,765	53,313	68,434	85,227	106,923
Water pressure drop		kpa	53,6	47,2	58,5	81,0	88,3	69,4	57,3	77,5
Condenser			Shell and tube (Outside tube condenser)							
Quantity			1		2					
Water content		lit	17	21	22	34	42	56	77	84
Max. Operating pressure	Water side	bar	16							
	Refrigerant side	bar	30							
Connections (per condenser)			2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	DN 80	DN 80	DN 80
Nominal water flow (total)		lit/h	27,572	33,587	37,402	55,144	67,175	86,227	107,386	134,724
Water pressure drop		kpa	32,9	34,2	32,9	32,9	34,2	33,3	28,3	37,4
Electrical characteristics			400V/3Ph/50Hz							
Total absorbed power		kw	27,2	32,6	38,6	54,4	65,2	82,0	101,2	127,4
Nominal operating current		A	45,0	54,3	63,8	90,0	108,5	135,1	162,9	208,0
Maximum operating current		A	98,0	117,0	140,0	196,0	234,0	294,0	370,0	472,0
Compressor carter resistance power		W	150	150	300	300	300	300	300	300
Voltage operating limits		V	360-440V							
Refrigerant circuit										
Number of circuits			1		2					
Expansion device			electronic expansion valve							
Refrigerant type			R134a							
Noise level @ 5m		dbA	64	65	63	67	68	69	71	73
Dimensions	Width	mm	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Length	mm	3.500	3.500	3.500	3.500	3.500	3.500	3.500	4.400
	Height	mm	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
Shipping weight		kg	1.331	1.486	1.564	1.947	2.527	2.826	3.119	3.547
Operational weight		kg	1.389	1.560	1.639	2.076	2.658	3.010	3.459	3.881

LKWC-C

Type	LKWC-C	681	751	841	1001	1101	1151	1301	1451
Nominal cooling capacity[1]	kw	**676,08**	**740,45**	**839,59**	**973,30**	**1079,57**	**1125,58**	**1265,54**	**1425,60**
	RT	192	210	239	277	307	320	360	405
	Btu/h	2.304.818	2.524.255	2.862.245	3.318.055	3.680.345	3.837.191	4.314.355	4.860.000
Construction	Material/Color	Steel							
Compressor		Twin Screw							
Quantity		2							
Capacity steps		Stepless 12,5-100 %							
Absorbed power	kw	140,0	151,2	167,6	193,2	214,4	223,6	249,0	281,4
Nominal operating current	A	225,8	240,7	267,1	307,5	342,0	355,5	395,6	443,5
Maximum operating current	A	516,0	554,0	602,0	694,0	768,0	802,0	930,0	960,0
Evaporator		Shell and tube							
Quantity		1							
Water content	lit	229,0	285,0	353,0	353,0	401,0	487,0	487,0	574,0
Max. Operating pressure	Water side bar	16							
	Refrigerant side bar	29							
Connections		DN 150	DN 200	DN 200	DN 200	DN 200	DN 200	DN 200	DN 200
Nominal water flow	lit/h	116,286	127,357	144,410	167,407	185,686	193,599	217,674	245,203
Water pressure drop	kpa	72,2	59,5	52,8	70,3	85,0	77,0	95,8	82,0
Condenser		Shell and tube (Outside tube condenser)							
Quantity		2							
Water content	lit	102	102	112	149	166	166	184	198
Max. Operating pressure	Water side bar	16							
	Refrigerant side bar	30							
Connections		DN 100	DN 100	DN 100	DN 125	DN 125	DN 125	DN 125	DN 125
Nominal water flow	lit/h	146,520	160,470	181,956	210,933	233,964	243,935	274,269	308,956
Water pressure drop	kpa	29,0	34,3	36,4	30,4	29,7	32,1	33,4	36,5
Electrical characteristics		400V/3Ph/50Hz							
Total absorbed power	kw	140,0	151,2	167,6	193,2	214,4	223,6	249,0	281,4
Nominal operating current	A	225,8	240,7	267,1	307,5	342,0	355,5	395,6	443,5
Maximum operating current	A	516,0	554,0	602,0	694,0	768,0	802,0	930,0	960,0
Compressor carter resistance power	W	300	300	300	300	300	300	300	300
Voltage operating limits	V	360-440V							
Refrigerant circuit									
Number of circuits		2							
Expansion device		electronic expansion valve							
Refrigerant type		R134a							
Noise level @ 5m	dbA	74	75	76	76	76	77	77	79
Dimensions	Width mm	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	Length mm	4.400	4.400	4.400	4.400	4.400	4.400	4.400	4.400
	Height mm	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
Shipping weight	kg	3.777	4.222	4.650	5.098	5.416	5.616	5.724	6.702
Operational weight	kg	4.108	4.609	5.115	5.600	5.983	6.269	6.395	7.474

NOTES

Nominal conditions are as follows
- entering/leaving condensing water temperature 30/35°C
- entering/leaving chilled water temperature 12/7°C
- 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.

4.2 Capacity Tables LKWC-C

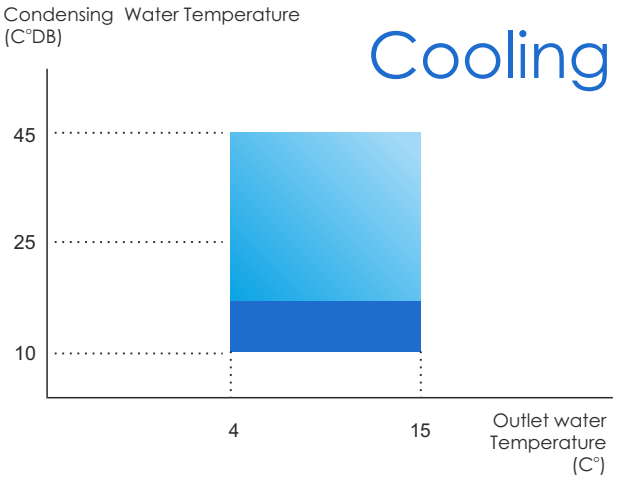
Cooling capacity table for LKWC-C

TYPE	Leaving condenser water temperature °C															
		25			30			35			40			45		
	R MNØ outlet °C	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
131	5	137,9	22,0	35,8	128,1	24,3	39,4	117,3	26,7	43,3	110,7	28,8	46,8	104,3	31,0	50,4
	7	148,8	22,4	36,4	138,5	24,5	39,8	**127,2**	**27,2**	**45,0**	119,6	29,4	47,7	112,0	31,8	51,7
	10	166,4	23,0	37,4	155,2	25,3	41,1	141,2	28,3	46,4	129,8	29,9	48,6	120,9	32,4	52,6
161	5	168,0	26,4	42,9	156,1	29,1	47,2	142,9	31,9	51,9	134,8	34,6	56,1	127,1	37,2	60,4
	7	181,3	26,8	43,6	168,8	29,3	47,7	**155,0**	**32,6**	**54,3**	145,7	35,2	57,2	136,4	38,1	62,0
	10	202,7	27,6	44,8	189,1	30,3	49,2	172,0	33,9	55,6	158,1	35,9	58,3	147,2	38,8	63,0
181	5	187,1	31,3	50,8	173,8	34,4	55,9	159,1	37,8	61,4	150,1	40,9	66,5	141,5	44,0	71,5
	7	201,9	31,8	51,6	187,9	34,7	56,4	**172,6**	**38,6**	**63,8**	162,2	41,7	67,7	151,9	45,2	73,4
	10	225,7	32,7	53,0	210,5	35,9	58,3	191,6	40,1	65,8	176,0	42,5	69,0	164,0	45,9	74,6
251	5	275,8	44,1	71,6	256,2	48,5	78,8	234,6	53,3	86,6	221,4	57,7	93,7	208,6	62,1	100,8
	7	297,7	44,8	72,7	277,1	49,0	79,5	**254,5**	**54,4**	**90,0**	239,2	58,8	95,4	223,9	63,6	103,4
	10	332,8	46,0	74,8	310,4	50,6	82,2	282,4	56,6	92,7	259,5	59,8	97,2	241,7	64,7	105,2
311	5	336,0	52,8	85,8	312,1	58,2	94,5	285,8	63,9	103,8	269,7	69,1	112,3	254,2	74,4	120,8
	7	362,7	53,7	87,2	337,5	58,7	95,3	**310,0**	**65,2**	**108,5**	291,4	70,4	114,4	272,8	76,3	123,9
	10	405,4	55,2	89,6	378,2	60,6	98,5	344,1	67,8	111,2	316,2	71,7	116,5	294,5	77,6	126,0
401	5	431,3	66,4	107,9	400,7	73,1	118,8	366,8	80,4	130,5	346,1	86,9	141,2	326,3	93,6	152,0
	7	465,5	67,5	109,6	433,3	73,8	119,9	**397,9**	**82,0**	**135,1**	374,0	88,6	143,9	350,1	95,9	155,8
	10	520,4	69,4	112,7	485,4	76,3	123,9	441,6	85,3	139,8	405,8	90,2	146,5	378,0	97,6	158,5
501	5	537,1	82,0	133,2	499,0	90,3	146,6	456,9	99,2	161,1	431,1	107,3	174,3	406,3	115,5	187,6
	7	579,7	83,3	135,3	539,6	91,1	148,0	**495,5**	**101,2**	**162,9**	465,8	109,3	177,5	436,0	118,4	192,3
	10	648,1	85,6	139,1	604,5	94,1	152,9	550,0	105,2	172,5	505,4	111,3	180,8	470,7	120,4	195,6
621	5	673,9	103,2	167,6	626,0	113,6	184,6	573,2	124,9	202,8	540,8	135,0	219,4	509,8	145,4	236,1
	7	727,3	104,9	170,3	677,0	114,7	186,3	**621,7**	**127,4**	**208,0**	584,4	137,6	223,5	547,1	149,1	242,1
	10	813,1	107,8	175,1	758,4	118,5	192,5	690,0	132,5	217,2	634,1	140,1	227,6	590,6	151,6	246,3
681	5	732,9	113,4	184,2	680,8	124,9	202,9	623,3	137,2	222,9	588,2	148,4	241,1	554,4	159,7	259,5
	7	791,0	115,2	187,2	736,3	126,0	204,7	**676,1**	**140,0**	**225,8**	635,5	151,2	245,6	595,0	163,8	266,1
	10	884,3	118,4	192,4	824,8	130,2	211,5	750,4	145,6	238,7	689,6	154,0	250,2	642,3	166,6	270,6
751	5	802,6	122,5	198,9	745,6	134,9	219,1	682,7	148,2	240,7	644,2	160,3	260,4	607,2	172,5	280,2
	7	866,3	124,4	202,1	806,4	136,1	221,1	**740,5**	**151,2**	**240,7**	696,0	163,3	265,3	651,6	176,9	287,4
	10	968,5	127,9	207,8	903,3	140,6	228,4	821,9	157,2	257,8	755,3	166,3	270,2	703,4	179,9	292,3
841	5	910,1	135,8	220,5	845,5	149,5	242,9	774,1	164,2	266,8	730,4	177,7	288,6	688,5	191,2	310,6
	7	982,3	137,9	224,1	914,3	150,8	245,0	**839,6**	**167,6**	**267,1**	789,2	181,0	294,0	738,8	196,1	318,5
	10	1098,2	141,8	230,3	1024,3	155,9	253,2	931,9	174,3	285,7	856,4	184,4	299,5	797,6	199,4	324,0
1001	5	1055,1	156,5	254,2	980,1	172,3	279,9	897,4	189,3	307,6	846,8	204,8	332,7	798,1	220,4	358,1
	7	1138,8	159,0	258,3	1059,9	173,9	282,5	**973,3**	**193,2**	**307,5**	914,9	208,7	338,9	856,5	226,0	367,2
	10	1273,1	163,4	265,5	1187,4	179,7	291,9	1080,4	200,9	329,4	992,8	212,5	345,2	924,6	229,9	373,5
1101	5	1170,3	173,7	282,1	1087,1	191,2	310,7	995,4	210,1	341,3	939,2	227,3	369,2	885,2	244,6	397,4
	7	1263,1	176,5	286,6	1175,7	193,0	313,5	**1079,6**	**214,4**	**342,0**	1014,8	231,6	376,1	950,0	250,8	407,5
	10	1412,1	181,4	294,6	1317,1	199,4	323,9	1198,3	223,0	365,5	1101,2	235,8	383,1	1025,6	255,1	414,5
1151	5	1220,1	181,1	294,2	1133,5	199,5	324,0	1037,8	219,1	356,0	979,3	237,0	385,0	923,0	255,1	414,4
	7	1316,9	184,0	298,9	1225,8	201,2	326,9	**1125,6**	**223,6**	**355,5**	1058,0	241,5	392,3	990,5	261,6	425,0
	10	1472,3	189,2	307,3	1373,2	207,9	337,8	1249,4	232,5	381,2	1148,1	246,0	399,5	1069,3	266,1	432,2
1301	5	1371,8	201,7	327,6	1274,4	222,1	360,8	1166,8	244,0	396,4	1101,0	263,9	428,8	1037,7	284,1	461,5
	7	1480,7	204,9	332,9	1378,2	224,1	364,0	**1265,5**	**249,0**	**395,6**	1189,6	268,9	436,8	1113,7	291,3	473,2
	10	1655,3	210,7	342,2	1544,0	231,6	376,2	1404,7	259,0	424,5	1290,9	273,9	444,9	1202,3	296,3	481,3
1451	5	1545,4	227,9	370,3	1435,6	251,0	407,7	1314,4	275,8	448,0	1240,3	298,3	484,5	1169,0	321,1	521,6
	7	1668,0	231,6	376,2	1552,5	253,3	411,4	**1425,6**	**281,4**	**443,5**	1340,1	303,9	493,7	1254,5	329,2	534,8
	10	1864,7	238,1	386,7	1739,2	261,7	425,1	1582,4	292,7	479,8	1454,1	309,5	502,8	1354,3	334,9	544,0

NOTES

Bold values show nominal cooling capacities.
Absorbed power and current refers to the compressor.
Above figures are valid for water Δt = 5°C.

4.3 Operation Range LKWC-C



Notes

Standard version

Version with 3-way valve 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.

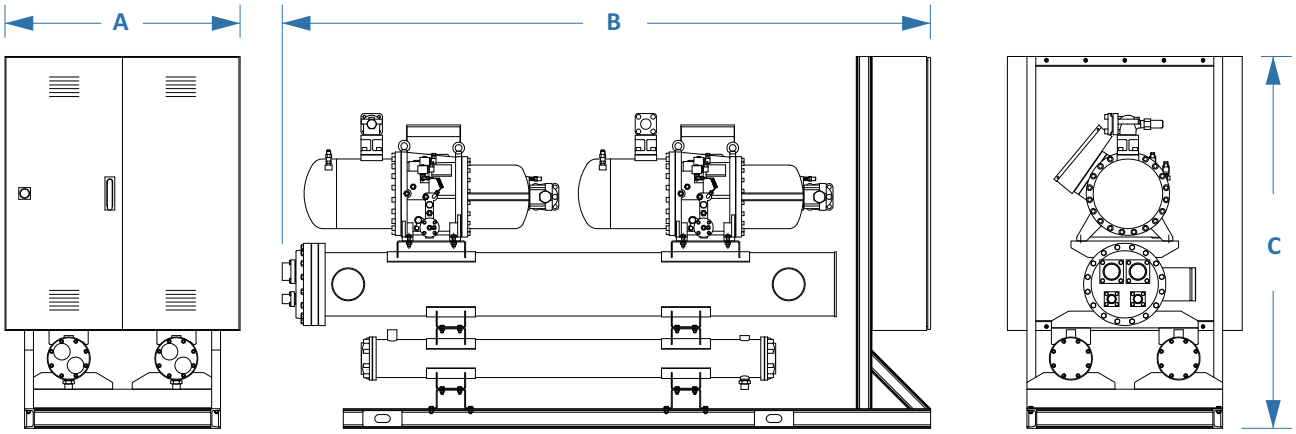
4.4 Sound Data LKWC-C

ÇšŕŠ		dB(A)	63	125	250	500	1000	2000	4000	8000
131	Power	89	67	69	77	74	76	78	74	60
	Pressure @1 m	78	56	58	66	63	65	67	63	49
	Pressure @10 m	58	36	38	46	43	45	47	43	29
161	Power	90	68	70	77	74	76	79	75	60
	Pressure @1 m	79	57	59	66	63	65	68	64	49
	Pressure @10 m	59	37	39	46	43	45	48	44	29
181	Power	88	66	68	75	72	74	77	73	60
	Pressure @1 m	77	55	57	64	61	63	66	62	49
	Pressure @10 m	57	35	37	44	41	43	46	42	29
251	Power	92	70	72	80	77	79	81	77	63
	Pressure @1 m	81	59	61	69	66	68	70	66	52
	Pressure @10 m	61	39	41	49	46	48	50	46	32
311	Power	93	71	73	80	77	79	83	68	63
	Pressure @1 m	82	60	62	69	66	68	72	57	52
	Pressure @10 m	62	40	42	49	46	48	52	37	32
401	Power	94	71	73	81	78	80	83	78	64
	Pressure @1 m	83	60	62	70	67	69	72	67	53
	Pressure @10 m	63	40	42	50	47	49	52	47	33
501	Power	96	73	75	83	79	82	84	80	65
	Pressure @1 m	85	62	64	72	68	71	73	69	54
	Pressure @10 m	65	42	44	52	48	51	53	49	34
621	Power	98	65	77	85	82	85	87	83	67
	Pressure @1 m	87	54	66	74	71	74	76	72	56
	Pressure @10 m	67	34	46	54	51	54	56	52	36

Type		dB(A)	63	125	250	500	1000	2000	4000
681	Power	99	76	78	86	83	85	88	84
	Pressure @1 m	88	65	67	75	72	74	77	73
	Pressure @10 m	68	45	47	55	52	54	57	53
751	Power	100	77	79	87	84	87	89	85
	Pressure @1 m	89	66	68	76	73	76	78	74
	Pressure @10 m	69	46	48	56	53	56	58	54
841	Power	101	77	79	88	84	87	90	85
	Pressure @1 m	90	66	68	77	73	76	79	74
	Pressure @10 m	70	46	48	57	53	56	59	54
1001	Power	101	78	80	88	85	87	90	85
	Pressure @1 m	90	67	69	77	74	76	79	74
	Pressure @10 m	70	47	49	57	54	56	59	54
1101	Power	101	78	80	88	85	87	90	85
	Pressure @1 m	90	67	69	77	74	76	79	74
	Pressure @10 m	70	47	49	57	54	56	59	54
1151	Power	102	78	80	88	85	88	90	86
	Pressure @1 m	91	67	69	77	74	77	79	75
	Pressure @10 m	71	47	49	57	54	57	59	55
1301	Power	102	79	81	89	86	88	91	86
	Pressure @1 m	91	68	70	78	75	77	80	75
	Pressure @10 m	71	48	50	58	55	57	60	55
1451	Power	104	80	82	91	74	90	93	88
	Pressure @1 m	93	69	71	80	63	79	82	77
	Pressure @10 m	73	49	51	60	43	59	62	57

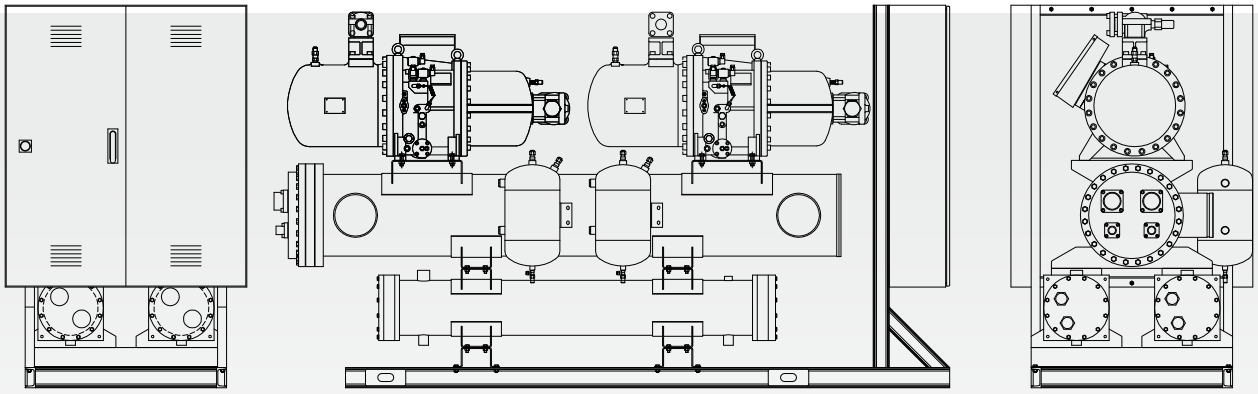
5. DRAWINGS LKWC (B, C)

4.1 Standard type



Dimensions	Μοντέλο	130	160	200	250	320	370	500	590	640	680	740	950	1100	1200	1400	1550
	A	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200	1.200
	B	3.500	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	3.700	4.400	4.400	4.400	4.400	4.400	4.400
	C	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900

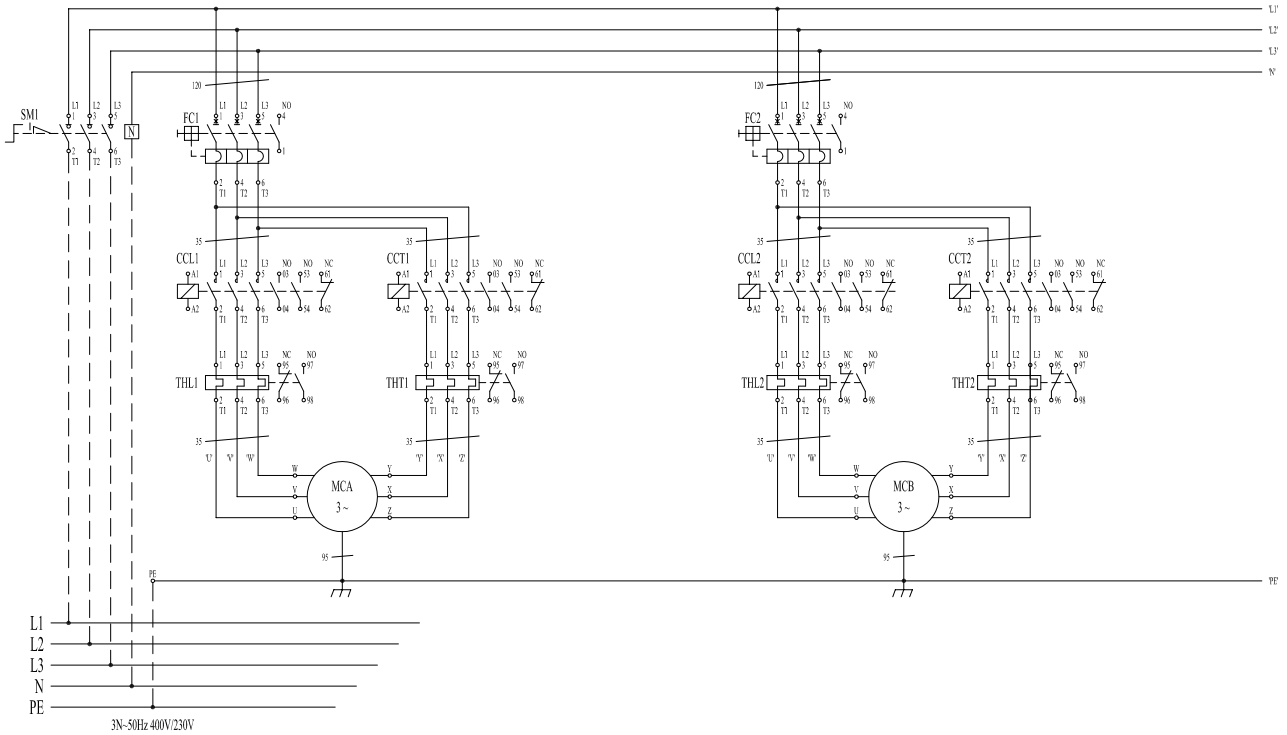
4.2 Marine type



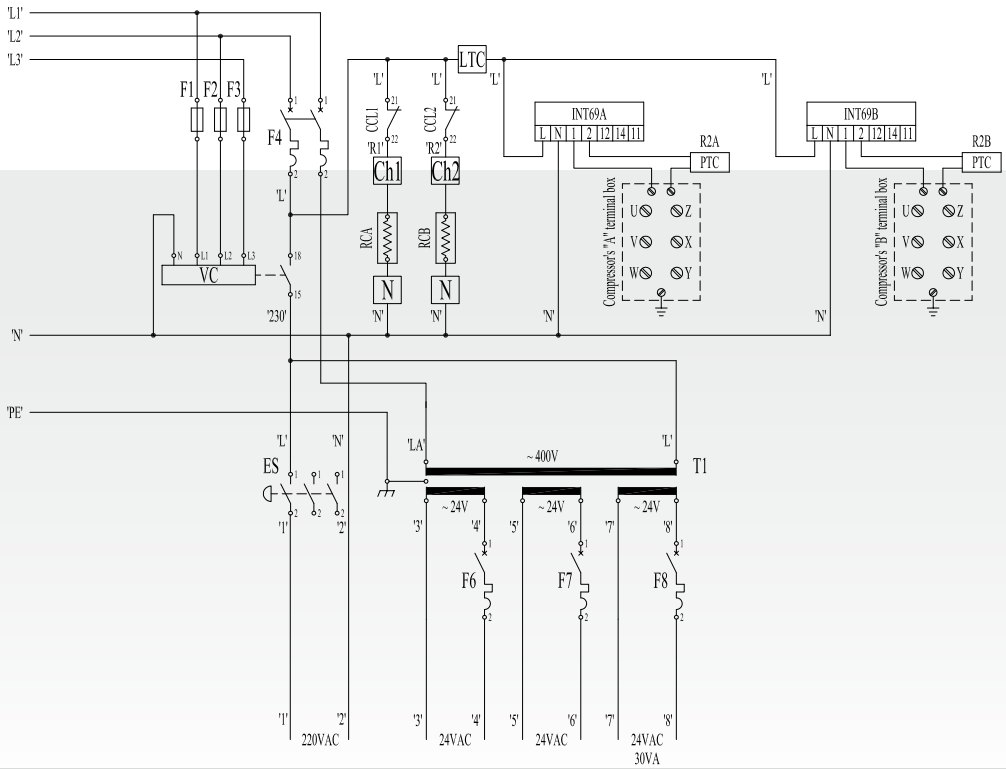
* For dimensions please, contact Klimallco's Technical Department

6. Wiring Diagrams

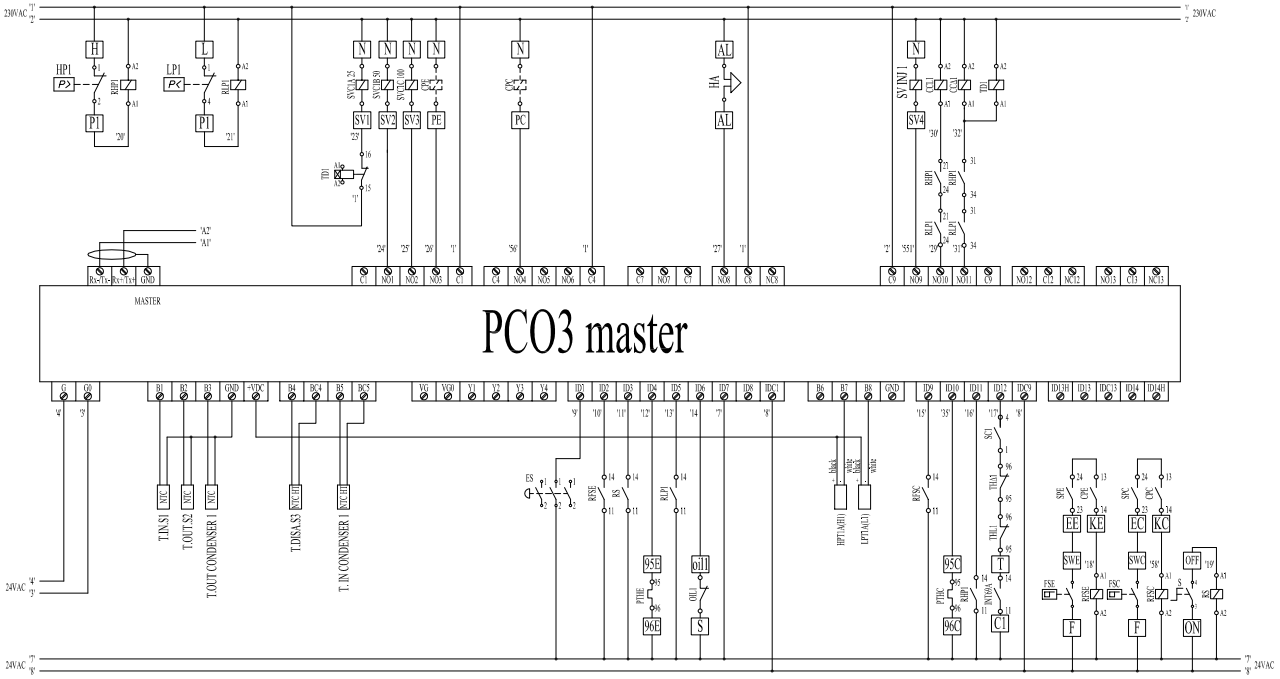
6.1 Compressor connection diagram



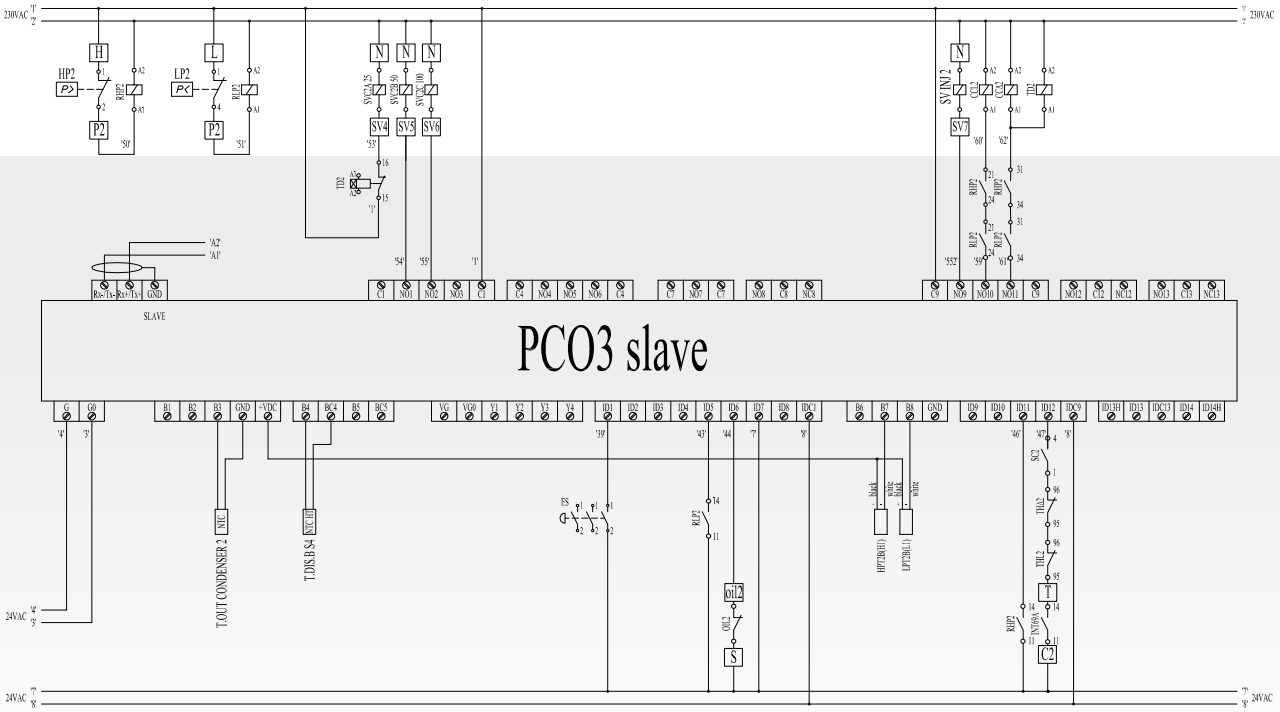
6.2 Electrical diagram at axilliary circuit



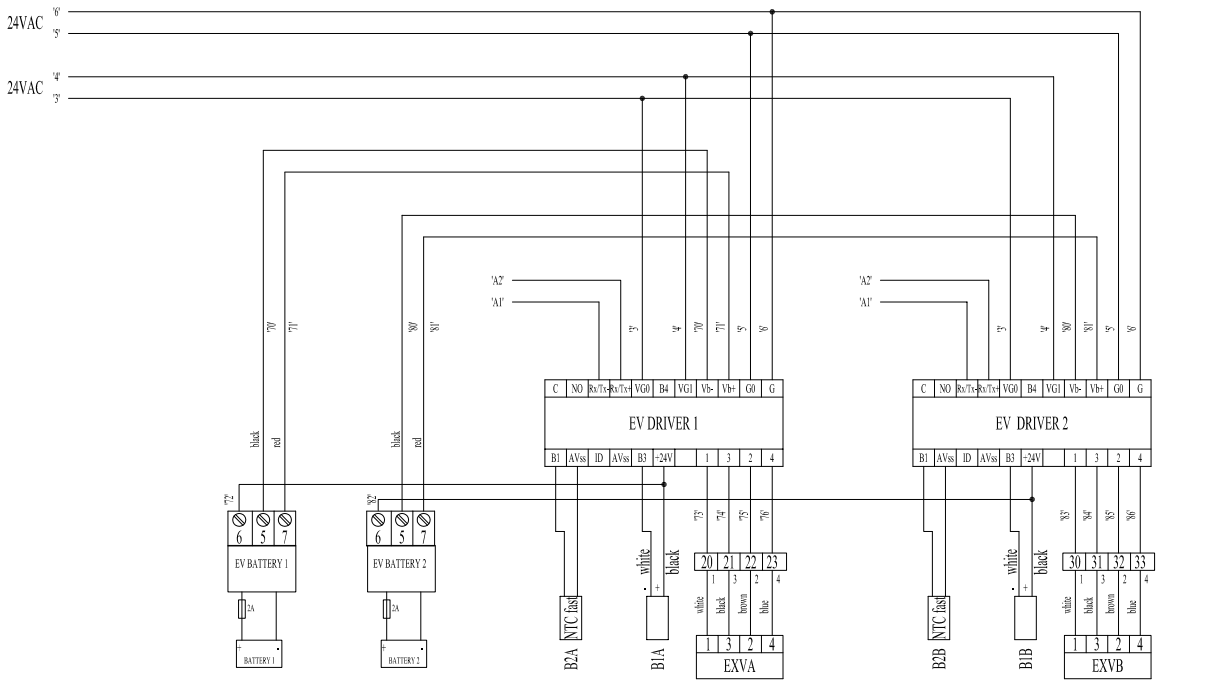
6.3 Control circuit diagram (MASTER)



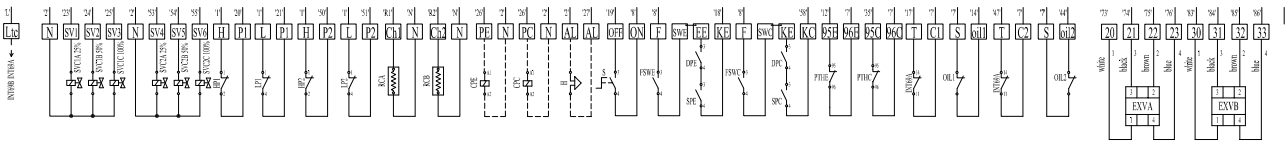
6.4 Control circuit diagram (SLAVE)



6.5 Control circuit diagram of electrical expansion valve



6.6 Cable terminals



6.7 Legend

MI	Main switch
SC	Compressor's circuit breaker
DC_L	Compressor's line contactor (Y-Δ)
DC_Δ	Compressor's delta contactor (Y-Δ)
FC_	Compressor's thermal overload relay (Y-Δ)
CCL1	Compressor's star contactor (PW)
THL1	Compressor's thermal overload relay (PW)
MC	Compressor's motor
SP	Pump's thermal magnetic circuit breaker
CP	Pump's contactor
F_	Fuse

VC	3 phase control
RC_	Compressor's crankcase heater
INT69_	Compressor's motor protection device
R2_	Compressor's discharge sensor
T1,T2,T3	Transformer 230VAC / 24VAC
ES	Emergency stop
HP_	High pressure switch
LP_	Low pressure switch
RHP_	High pressure switch miniature relay
RLP_	Low pressure switch miniature relay

SVC_A	Compressor's solenoid valve (25%)
TD	Timer of compressor's solenoid valve (25%)
SVC_B	Compressor's solenoid valve (50%)
SVC_C	Compressor's solenoid valve (100%)
H_	Siren
T.IN(1)	Water inlet temperature NTC probe
T.OUT(3)	Water outlet temperature NTC probe
T.DIS.A(5)	Discharge temperature NTC probe
RFSW	Flow switch interface relay
OIL_	Oil level switch

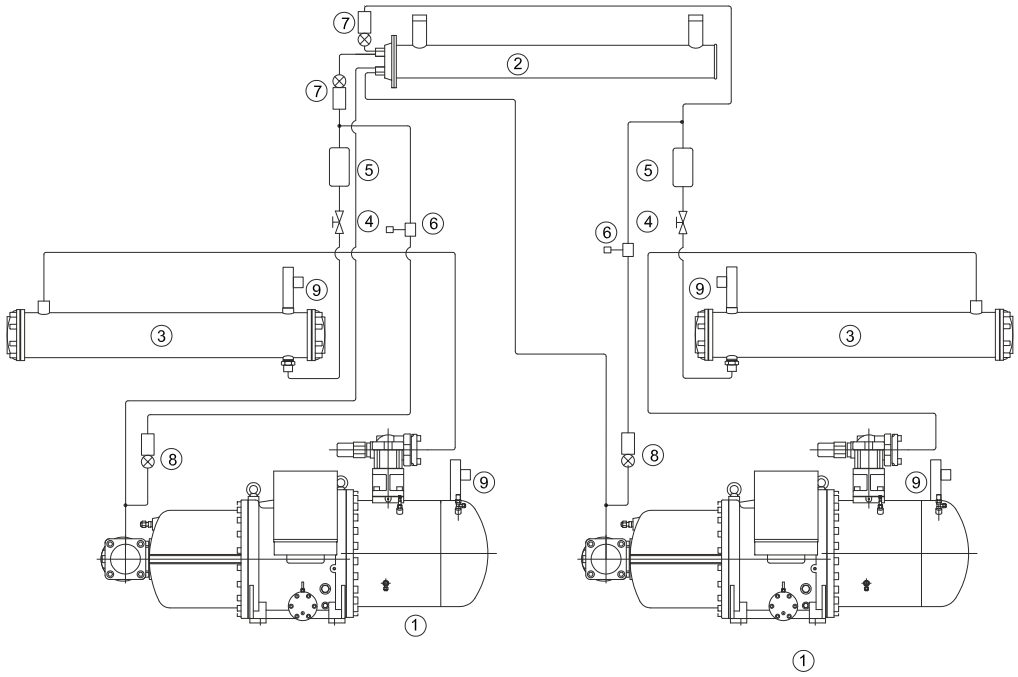
HPT_	High pressure transducer
LPT_	Low pressure transducer
FS_	Flow switch
S_	On-Off switch
RS_	On-Off switch interface relay
EXV_	Electronic refrigerant expansion valve
B1_	Low pressure transducer
B2_	Suction temperature NTC probe

Connections

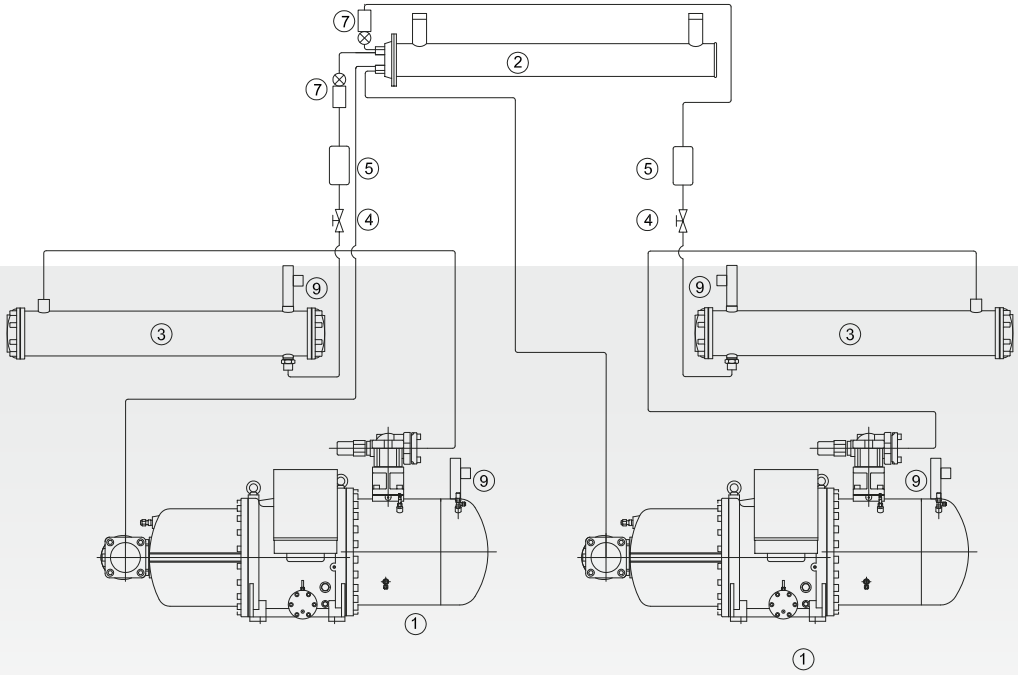
1-2	Remote on-off
5-6	Pump contact (no) - Circuit braker contact (n.o)
7-8	Pump thermal protection

7. Refrigerant Circuit

7.1 LKWC-B



7.2 LKWC-C



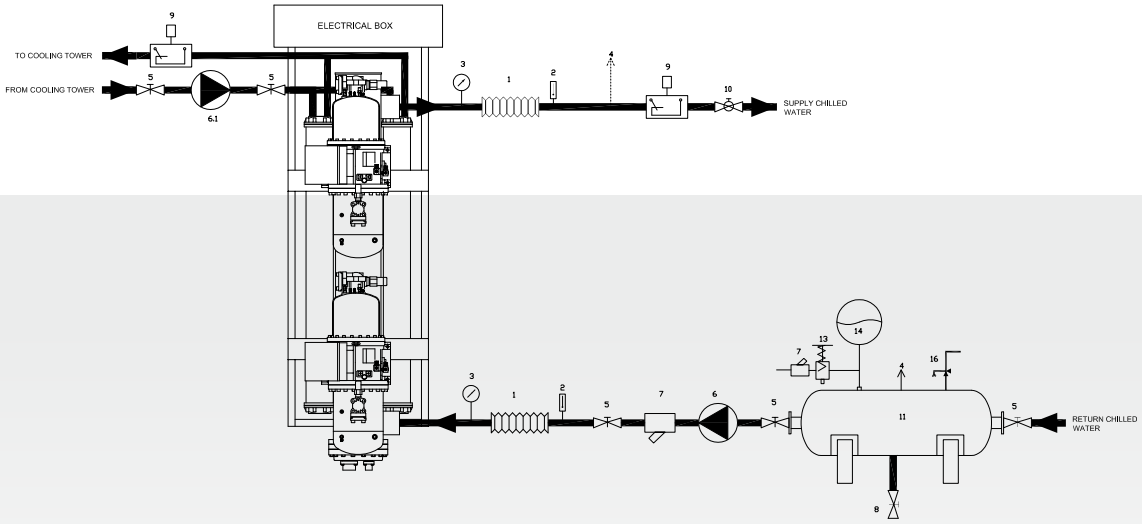
NOTES

1. Compressors.
2. Shell and tube evaporator.
3. Shell and tube Condenser.
4. Shut off valve.
5. Filter dryer.
6. Solelenoid valve.
7. Expansion device (electronic expansion valve).
8. Liquid expansion valve.
9. Relief valve.

7.3 Recommendations concerning the hydraulic circuit

- All field connections must be carried out by a licensed technician and must comply with the applicable local and national codes.
- Evaporator water connections should be made in accordance with the unit outlook respecting the water inlet – and outlets.
- Install a flow switch or water differential pressostat (standard component) in the water outlet piping (evaporator and condenser) to prevent the unit from operating at a water flow, which is too low. A terminal is provided in the switch box for the electrical connection of the flow switch in the control circuit.
- To avoid errosion, it is recommended to install a filter in the water inlet pipe.
- It is essential to install a thermometer in the water inlet/ outlet pipe to check temperatures.
- Provide heat insulation with suitable vapour barrier around the chilled water piping to prevent condensation and capacity loss.Provide drain connections at all low points of the system to permit complete drainage for maintenance and/ or shutdown.
- Air vents should be provided at all high points in the system located where they are easily accessible for servicing. The water inlet pipe is specially designed to obtain a complete air purge of the evaporator.
- Provide flexible connection pipes at the inlet and outlet of the evaporator, to prevent tubes vibration.
- Install an expansion tank on the suction side of the water pump so that the water pressure on the pump suction shall be positive.
- The frequent evacuation of the water system should be avoided.
- To avoid frequent on/off operation of the compressor, a minimum water volume is required in the system (table 7.4). To assure proper operation of the unit, the water flow through the evaporator must be within the specified limits in (table 7.4). The water quality should be in accordance with the specifications in the table 7.4, to ensure the longest life span and optimum operation.

LKWC



NOTES

1. Flexible.
2. Thermometer.
3. Manometer.
4. Air vent.
5. Shut off valve.
6. Pump (primary circuit).
6.1 Pump (secondary circuit).
7. Water filter.
8. Drainage.
9. Flow switch (optional).
10. Balancing valve.
11. Buffer tank.
12. Electric resistance.
13. Automatic make up water valve.
14. Expansion membrane.
15. Check valve.
16. Safety valve.

7.4 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.

Evaporator

R407c	Minimum water volume (l)	Minimum water flow(l/h)	Nominal water flow (l/h)	Maximum water flow (l/h)
LKWC-B 130	919	15396	21994	26833
LKWC-B 160	1144	19167	27381	33405
LKWC-B 200	689	23094	32991	40249
LKWC-B 250	919	30799	43998	53678
LKWC-B 320	1144	38333	54762	66810
LKWC-B 370	1333	44653	63790	77824
LKWC-B 500	1772	59347	84781	103433
LKWC-B 590	2098	70270	100385	122470
LKWC-B 640	2283	76459	109227	133257
LKWC-B 680	2422	81140	115914	141415
LKWC-B 740	2649	88734	126763	154651
LKWC-B 950	3384	113336	161908	197528
LKWC-B 1100	3952	132373	189104	230707
LKWC-B 1200	4350	145714	208163	253959
LKWC-B 1400	5125	171668	245240	299193
LKWC-B 1550	5628	188521	269315	328564

R134a	Minimum water volume (l)	Minimum water flow (l/h)	Nominal water flow (l/h)	Maximum water flow (l/h)
LKWC-C 131	915	15318	21883	26697
LKWC-C 161	1114	18660	26657	32522
LKWC-C 181	620	20779	29684	36214
LKWC-C 251	915	30636	43765	53393
LKWC-C 311	1114	37319	53313	65042
LKWC-C 401	1430	47904	68434	83489
LKWC-C 501	1781	59659	85227	103977
LKWC-C 621	2234	74846	106923	130446
LKWC-C 681	2430	81400	116286	141869
LKWC-C 751	2662	89150	127357	155376
LKWC-C 841	3018	101087	144410	176180
LKWC-C 1001	3498	117185	167407	204237
LKWC-C 1101	3880	129980	185686	226537
LKWC-C 1151	4046	135519	193599	236191
LKWC-C 1301	4549	152372	217674	265562
LKWC-C 1451	5124	171642	245203	299148

7.4 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.

Condencer

w IJ	aẹẹTĻ ö¯Жųŧ Õö į Ë	Nominal water flow (l/h)	Maximum water flow (l/h)
LKWC-B 130	24941	27712	55425
LKWC-B 160	31050	34500	69000
LKWC-B 200	37412	41569	83137
LKWC-B 250	49894	55437	110875
LKWC-B 320	62100	69000	138000
LKWC-B 370	72338	80375	160751
LKWC-B 500	96142	106824	213648
LKWC-B 590	113837	126485	252970
LKWC-B 640	123863	137626	275252
LKWC-B 680	131446	146052	292103
LKWC-B 740	143749	159721	319443
LKWC-B 950	183604	204004	408008
LKWC-B 1100	214444	238271	476542
LKWC-B 1200	236057	262285	524571
LKWC-B 1400	278102	309002	618005
LKWC-B 1550	305403	339337	678674

R134a	Minimum water flow (l/h)	Nominal water flow (l/h)	Maximum water flow (l/h)
LKWC-C 131	24815	27573	55145
LKWC-C 161	30229	33588	67176
LKWC-C 181	33662	37402	74804
LKWC-C 251	49630	55144	110288
LKWC-C 311	60457	67174	134349
LKWC-C 401	77604	86227	172454
LKWC-C 501	96647	107386	214772
LKWC-C 621	121251	134723	269446
LKWC-C 681	131868	146520	293041
LKWC-C 751	144423	160470	320940
LKWC-C 841	163761	181957	363913
LKWC-C 1001	189840	210933	421866
LKWC-C 1101	210568	233964	467929
LKWC-C 1151	219541	243935	487869
LKWC-C 1301	246842	274269	548538
LKWC-C 1451	278060	308956	617912

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

Items	Evaporator water		Heated water		Tendency if out of criteria
	Circulating water 20°C	Supply water	Circulating water 20°C-60°C	Supply water	
Items to be controlled:					
PH AT 25°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	below 30	below 30	below 30	below 30	corrosion + scale
Chloride ion (mg Cl-/l)	below 50	below 200	below 30	below 30	corrosion
Sulfate ion (mg SO 2/4/l	below 50	below 50	below 30	below 30	corrosion
M-alkalinity (ph 4.8) (mg SO3/l)	below 50	below 50	below 50	below 50	scale
Total hardness (mg CaCO3/l)	below 70	below 70	below 70	below 70	scale
Calcium hardness (mg CaCO3/l)	below 50	below 50	below 50	below 50	scale
Silica ion (mg SiO2/l	below 30	below 30	below 30	below 30	scale
Items to be referred to:					
Iron (mg Fe/l)	below 1.0	below 0.3	below 1.0	below 0.3	corrosion + scale
Copper (mg Cu/l)	below 1.0	below 0.1	below 1.0	below 1.0	corrosion
Sulfide ion (mg S2-/l)	Not detectable	Not detectable	Not detectable	Not detectable	corrosion
Amonium ion (mg NH+4/l	below 0.3	below 0.1	below 0.1	below 0.1	corrosion
Remaining chloride (mg Cl/l)	below 0.25	below 0.3	below 0.1	below 0.3	corrosion
Free carbide (mg SO2/l)	below 0.4	below 4.0	below 0.4	below 4.0	corrosion
Stability index	-	-	-	-	corrosion + scale

Notes

The above tables are purely indicative and non-binding

7.5 Operating pressure of the refrigerant circuit

R407C	FŎŎŎŎŊÖŎŇŇ (region)	Minimum (cond.water inlet temp. 20°C) (leaving water temp 6°C)	Nominal (cond.water inlet temp. 30°C) (leaving water temp 7°C)	Maximum (cond.water inlet temp. 40°C) (leaving water temp 15°C)
	low pressure	3,5-4,0 bar	4,0-5,0 bar	5,5-6,0 bar
	high pressure	11,5-12,5 bar	15,5-16,5 bar	19,5-20,5 bar

R134a	FŎŎŎŎŊÖŎŇŇ (region)	Minimum (cond.water inlet temp. 20°C) (leaving water temp 6°C)	Nominal (cond.water inlet temp. 30°C) (leaving water temp 7°C)	Maximum (cond.water inlet temp. 40°C) (leaving water temp 15°C)
	low pressure	1,7-2,0 bar	2,0-2,3 bar	2,5-3,0 bar
	high pressure	6,5-7,5 bar	8,6-9,3 bar	13,5-14,5 bar

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.

Klimallco®
climate experience

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

LKWC

klimallco sa Air Treatment Experts

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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