

LGK

Air cooled water chiller and heat pumps



R134a



LGK water chillers and heat pumps are efficient, low-noise products designed for large applications.

They are suitable for generating chilled water at temperatures in the region of 7°C, commonly used in applications with fan coils and/or air handling units.

The use of semi hermetic screw compressors results in high efficiencies and low noise levels, making suitable for use in most applications.

Differing versions and a wide range of accessories, enable the optimal solution to be selected.

VERSIONS

- **LGK**, cooling only version, available in 11 different sizes.
- **LGK-HP**, reversible heat pump version, available in 11 different sizes.
- **LGK-FC**, free-cooling version, available in 11 different sizes.

ACCESSORI

- **A1ZZ**: Hydraulic kit with: pump, expansion valve, safety valve, flow switch, insulated tank
- **A2ZZ**: Hydraulic kit as A1ZZ with twin pumps
- **DCCF**: Low ambient condensing pressure control
- **FAMM**: Condensing coil protection mesh with metallic filter
- **INSE**: Serial interface card RS485
- **KAVG**: Rubber anti-vibration mountings
- **KAVM**: Spring anti-vibration mountings
- **LS00**: Low noise version
- **MAML**: Refrigerant circuit pressure gauges
- **MVCS**: Compressors suction manual valves
- **PCRL**: Remote control panel
- **RAES**: Antifreeze kit
- **RAEV**: Evaporator antifreeze heater
- **RP00**: Partial heat recovery
- **VSLI**: Liquid line solenoid valve

Versions LGK ÷ LGK/HP		1901	2301	2701	3202	3602
Cooling capacity ⁽¹⁾	kW	164,0	210,0	240,0	289,4	328,3
Compressors input power ⁽¹⁾	kW	54,9	65,6	77,2	96,2	107,1
Water flow ⁽¹⁾	m³/h	28,3	36,2	41,3	49,5	57,2
Heating capacity ⁽²⁾	kW	144,0	180,0	218,0	245,0	287,0
Compressors input power ⁽²⁾	kW	50,3	59,9	66,7	89,2	99,3
Water flow ⁽²⁾	m³/h	24,6	31,1	38,9	42,8	51,1
Power supply	V/Ph/Hz	400V / 3Ph / 50Hz				
Peak current	A	363,9	335,2	335,2	423,8	517,4
Max input current	A	144,9	173,2	199,2	261,8	298,4
Compressors / n° / circuits		Screw / 1 / 1			Screw / 2 / 2	
Capacity steps	n°	3	3	3	6	6
Fans	n° x kW	3 x 2	4 x 2	4 x 2	6 x 2	6 x 2
Airflow	m³/h	49500	66000	66000	99000	99000
Sound power level ⁽³⁾	dB(A)	88	91	91	93	93
Sound pressure level ⁽⁴⁾	dB(A)	60	63	63	65	65
Water pump input power	kW	3	4	4	5,5	7,5
Water tank volume	l	670	670	670	670	670

Versions LGK ÷ LGK/HP		4502	5202	6402	7202	8202	9002
Cooling capacity ⁽¹⁾	kW	420,0	479,0	620,7	719,5	820,1	874,7
Compressors input power ⁽¹⁾	kW	131,3	153,1	194,6	231,8	233,6	245,7
Water flow ⁽¹⁾	m³/h	72,1	81,9	106,3	126,3	142,5	151,9
Heating capacity ⁽²⁾	kW	360,0	436,0	561,0	656,0	740,0	790,0
Compressors input power ⁽²⁾	kW	121,2	136,6	168,4	198,9	225,4	241,2
Water flow ⁽²⁾	m³/h	63,3	77,5	97,3	58,5	65,9	70,1
Power supply	V/Ph/Hz	400V / 3Ph / 50Hz					
Peak current	A	508,4	543	640,6	685,6	808,2	921,8
Max input current	A	346,4	407	507,6	571,6	650,2	688,8
Compressors / n° / circuits		Screw / 2 / 2					
Capacity steps	n°	6	6	6	6	6	6
Fans	n° x kW	8 x 2	10 x 2	12 x 2	12 x 2	14 x 2	16 x 2
Airflow	m³/h	132000	165000	198000	198000	231000	260000
Sound power level ⁽³⁾	dB(A)	94	94	97	98	99	100
Sound pressure level ⁽⁴⁾	dB(A)	66	66	69	70	71	72
Water pump input power	kW	7,5	7,5	11	11	15	15
Water tank volume	l	1000	1000	1000	1000	1000	1000

⁽¹⁾ Cooling: ambient air temperature 35°C, evaporator water temperature in/out 12/7 °C.

⁽²⁾ Heating: condenser water temperature in/out 40/45 °C, ambient air temperature 7°C DB, 6°C WB.

⁽³⁾ Sound power level in accordance with ISO 9614.

⁽⁴⁾ Sound pressure level at 10 mt from the unit in free field conditions direction factor Q = 2 in accordance with ISO 9614.

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Versions LGK/FC		1901	2301	2701	3202	3602
Cooling capacity ⁽¹⁾	kW	162,1	207,6	238,3	285,1	328,0
Compressors input power ⁽¹⁾	kW	54,8	65,3	77,0	95,8	106,6
Water flow ⁽¹⁾	m ³ /h	29,5	37,8	42,2	52,9	60,0
Free cooling capacity ⁽⁵⁾	kW	130,4	159,2	165,3	235,7	303,3
Compressors input power ⁽⁵⁾	kW	6	8	8	12	12
Water flow ⁽⁵⁾	m ³ /h	29,5	37,8	42,2	52,9	60,0
Power supply	V/PhHz	400V / 3Ph / 50Hz				
Peak current	A	363,9	335,2	335,2	423,8	517,4
Max input current	A	144,9	173,2	199,2	261,8	298,4
Compressors / n° / circuits		Screw / 1 / 1			Screw / 2 / 2	
Capacity steps	n°	3	3	3	6	6
Fans	n°x kW	3 x 2	4 x 2	4 x 2	6 x 2	6 x 2
Airflow	m ³ /h	49500	66000	66000	99000	99000
Sound power level ⁽³⁾	dB(A)	88	91	91	93	93
Sound pressure level ⁽⁴⁾	dB(A)	60	63	63	65	65
Water pump input power	kW	3	4	4	5,5	7,5
Water tank volume	l	670	670	670	670	670

Versions LGK/FC		4502	5202	6402	7202	8202	9002
Cooling capacity ⁽¹⁾	kW	411,9	474,0	613,8	719,8	819,7	865,5
Compressors input power ⁽¹⁾	kW	131,3	151,9	193,7	230,7	232,6	244,6
Water flow ⁽¹⁾	m ³ /h	74,8	86,0	113,5	132,4	149,7	158,0
Free cooling capacity ⁽⁵⁾	kW	319,5	359,4	451,2	466,2	537,6	589,3
Compressors input power ⁽⁵⁾	kW	16	20	24	24	28	32
Water flow ⁽⁵⁾	m ³ /h	74,8	86,0	113,5	132,4	149,7	158,0
Power supply	V/PhHz	400V / 3Ph / 50Hz					
Peak current	A	508,4	543	640,6	685,6	808,2	921,8
Max input current	A	346,4	407	507,6	571,6	650,2	688,8
Compressors / n° / circuits		Screw / 2 / 2					
Capacity steps	n°	6	6	6	6	6	6
Fans	n°x kW	8 x 2	10 x 2	12 x 2	12 x 2	14 x 2	16 x 2
Airflow	m ³ /h	132000	165000	198000	198000	231000	260000
Sound power level ⁽³⁾	dB(A)	94	94	97	98	99	100
Sound pressure level ⁽⁴⁾	dB(A)	66	66	69	70	71	72
Water pump input power	kW	7,5	7,5	11	11	15	15
Water tank volume	l	1000	1000	1000	1000	1000	1000

⁽¹⁾ Cooling: ambient air temperature 35°C, evaporator water temperature in/out 12/7 °C glycol 20%.

⁽³⁾ Sound power level in accordance with ISO 9614.

⁽⁴⁾ Sound pressure level at 10 mt from the unit in free field conditions direction factor Q = 2 in accordance with ISO 9614.

⁽⁵⁾ Free Cooling: ambient air temperature 2°C, water inlet temperature 15°C, glycol 20%, nominal waterflow, compressors switched off.

FRAME

All LGK units are made from hot-galvanised sheet steel, painted with polyurethane powder enamel and stoved at 180°C to provide maximum protection against corrosion. The frame is self-supporting with removable panels. All screws and rivets used are made from stainless steel. The standard colour of the units is RAL 9018.

REFRIGERANT CIRCUIT

The refrigerant utilised is R134a. The refrigerant circuit is assembled using internationally recognised brand name components with all brazing and welding being performed in accordance with ISO 97/23. Each refrigerant circuit is totally independent from the other. Failure of one circuit does not influence the other circuit. The refrigerant circuit includes: sight glass, filter drier, reversing valve (for heat pump version only), one way valve (for heat pump version only), liquid receiver (for heat pump version only), Schraeder valves for maintenance and control and pressure safety device (for compliance with PED regulations).

Also available is an electronic expansion valve with electronic control which optimises the efficiency in part load conditions (option).

COMPRESSORS

The compressors are screw type, Star-Delta starting, double rotor with crankcase heater and thermal overload protection by a klixon embedded in the motor winding. They are mounted in a separate compartment within the casing in order to isolate them from the condenser air stream. The crankcase heater is always energised when the compressor is in stand-by. Each compressor is provided, as standard, with 3 capacity steps. Access to the compressor compartment is by removal of a front panel and, because they are isolated from the main airstream, maintenance of the compressors is possible whilst the unit is operating.

CONDENSERS

The condenser is made from 3/8" copper pipes and 0,1mm thick aluminium fins with the tubes being mechanically expanded into the aluminium fins in order to maximise heat transfer. Furthermore, the condenser design guarantees a low air side pressure drop thus enabling the use of low rotation

speed (and hence low noise emission) fans. The condensers can be protected by a metallic filter that is available as an accessory.

FANS

The fans are direct drive axial type with aluminium aerofoil blades, are statically and dynamically balanced and are supplied complete with a safety fan guard complying with the requirements of EN 60335. They are fixed to the unit frame via rubber anti-vibration mountings. The electric motors used are 6 pole (about 900 rpm). The motors are fitted with integrated thermal overload protection and have a moisture protection rating of IP 54.

EVAPORATORS

From size 1601 to 4502 they are AISI 316 stainless steel braze-welded plate type; from size 5202 to 9002 they are shell in tube type. Each evaporator is factory insulated with flexible close cell material and can be equipped with an antifreeze heater (optional). As standard, each evaporator is provided with a temperature sensor for antifreeze protection.

MICROPROCESSORS

All LGK units are supplied as standard with microprocessor controls. The microprocessor controls the following functions: control of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence, alarm reset, volt free contact for remote general alarm, alarms and operation LED's. If required (available as an option), the microprocessor can be configured in order for it to connect to a site BMS system thus enabling remote control and management. The Hidros technical department can discuss and evaluate, in conjunction with the customer, solutions using MODBUS protocols.

ELECTRIC ENCLOSURE

The enclosure is manufactured in order to comply with the requirements of the electromagnetic compatibility standards CEE 73/23 and 89/336. Access to the enclosure is achieved by removing the front panel of the unit. All LGK units have fitted as standard, a sequence relay that disables the power supply in the event that the phase sequence is incorrect. The following com-

ponents are supplied as standard on all units: main switch, thermal overloads (protection of pumps and fans), compressor fuses, control circuit automatic breakers, compressor contactors, fan contactors and pump contactors. The terminal board has volt free contacts for remote ON-OFF, Summer/Winter change over (heat pumps only) and general alarm.

CONTROL AND PROTECTION DEVICES

All units are supplied with the following control and protection devices: Return water temperature sensor installed on the return water line from the building (12°C), antifreeze protection sensor installed on the outlet water temperature (7°C), high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, fans thermal overload protection and flow switch.

HEAT PUMP VERSIONS (HP)

The heat pump versions are provided with a 4 way reversing valve and are designed to produce hot water up to a temperature of 48°C. They are always supplied with a liquid receiver and a second thermostatic valve in order to optimize the efficiency of the refrigerant cycle in heating and in cooling. The microprocessor controls defrost automatically (when operating in low ambient conditions) and also the summer/winter change over.

FREE COOLING VERSION FC-FC100%

If there is a requirement for the chiller to operate all year round it is possible to generate the chilled water by free cooling. The free cooling version has an extra coil through which the system water is passed if the ambient temperature is low enough to remove energy from it. This is especially useful with modern, low energy cooling systems such as high temperature fan coils, chilled beams or ceilings. If the return water temperature is, for example, 16°C, and the flow required is 12°C then it can be seen that if the ambient is below 16°C some of

the cooling can be performed by free cooling. If the ambient is below 12°C most, if not all, of the cooling can be provided by free cooling. This process makes substantial energy savings and results in correctly designed water systems being among the most energy efficient available.

Free Cooling is available in 2 different versions:

FC; Standard Free Cooling capacity;
FC100; Enhanced Free Cooling capacity that is capable of providing 100% of the chiller capacity at low ambient conditions;
Free Cooling versions comprise the following components:

Thermal exchange coil:

An air to water heat exchanger manufactured from copper tubes with aluminium fins. It is supplied with shut-off valves.

Microprocessor control:

The "heart" of the system; By measurement of all the critical parameters, the controller ensures that the unit operates at maximum efficiency under all conditions.

3 way valve:

This is an ON/OFF 3 way valve which either passes the water into the free cooling coil or sends it directly to the plate exchanger.

Low ambient pressure control:

Control of the condensing pressure of the refrigerant circuit in low external conditions is provided by this device. If free cooling is in operation, the fans must run at full speed for maximum effect. If there is insufficient duty from free cooling then the chiller circuit must also run but with the fans at full speed. This is likely to result in a low condensing pressure as the exchanger capacity is too large.

The control therefore consists of several solenoid valves than can partialise the condenser coil into 1/3rd, 2/3rd's or full coil. This enables the heat transfer surface area to be reduced thereby maintaining the correct condensing pressure.



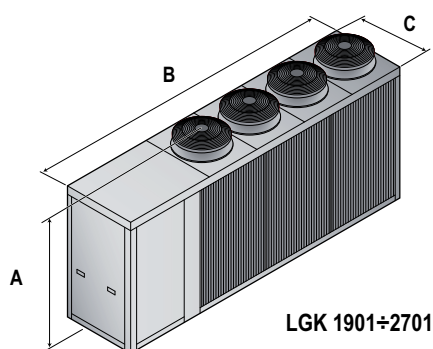
Axial fans with aerofoil blades

A2ZZ Hydraulic kit



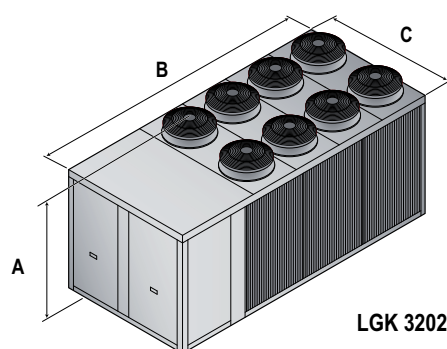
	Code	Version LGK	Version LGK/HP	Version LGK/FC
Main switch	–	●	●	●
Flow switch	–	●	●	●
LS low noise version	LS00	○	○	○
Partial heat recovery	RP00	○	○	○
Hydraulic kit A1ZZ with tank and one pump.	A1ZZ	○	○	○
Hydraulic kit A1NT with one pump without tank.	A1NT	○	○	○
Hydraulic kit A2ZZ with tank and two pump.	A2ZZ	○	○	○
Hydraulic kit A0NP without tank and pump.	A0NP	○	○	○
Low ambient condensing pressure control	DCCF	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○
Spring anti-vibration mountings	KAVM	○	○	○
Evaporator antifreeze heater	RAEV	○	–	–
Antifreeze kit (only for A versions)	RAES	○	○	○
Refrigerant circuit pressure gauges	MAML	○	○	○
Electronic expansion valve	–	○	○	○
Liquid line solenoid valve	VSLI	○	●	○
Compressors suction manual valves	MVCS	○	○	○
Condensing coil protection mesh with metallic filter	FAMM	○	○	○
Remote control panel	PCRL	○	○	○
Serial interface card RS485	INSE	○	○	○

● Standard, ○ Optional, – Not available.



LGK 1901÷2701

Mod.	A (mm)	B (mm)	C (mm)	Kg
1901/1901A	2262	4708	1105	1850/2150
2301/2301A	2262	4708	1105	2290/2590
2701/2701A	2262	4708	1105	2680/2980



LGK 3202÷9002

Mod.	A (mm)	B (mm)	C (mm)	Kg
3202/3202A	2350	4708	2200	4100/4770
3602/3602A	2350	4708	2200	4500/5240
4502/4502A	2350	5200	2200	4800/5590
5202/5202A	2350	6200	2200	5600/6510
6402/6402A	2350	7200	2200	6200/7200
7202/7202A	2350	7200	2200	6400/7440
8202/8202A	2350	9300	2200	8570/9970
9002/9002A	2350	9800	2200	10200/11800