LSK

Air to water chillers and heat pumps





The LSK water chillers range have been designed for small and medium residential and commercial applications.

The LSK water chillers are suitable for water outlet temperatures at 7°C, commonly used in combinations with fan coils or/ and air handling units.

The LSK water chillers provide high efficiencies and quiet operation in any application.

The different versions allow the user to select the most suitable solution thanks to a wide range of accessories.

VERSIONS

- LSK, cooling only versions, available in 11 different sizes.
- LSK/HP, reversible heat pump versions, available in 11 different sizes.
- LSK/CN condensing unit versions, available in 11 different sizes.

ACCESSORIES

- LS low noise version.
- Hydraulic kit A1ZZ with: pump, expansion valve, safety valve, flow switch, insulated tank.
- Partial heat recovery.
- Low ambient condensing pressure control.
- Spring or Rubber vibrations dampers.
 - Evaporator antifreeze heater (basic versions only).
- Manometers.
- Condensing coil protection mesh with metallic filter.
- Remote control panel.
- Condensate discharge drip tray with antifreeze heater (HP version only).
- Hydraulic kit A1NT with: pump, expansion valve, safety valve, flow switch.

LSK

Model LSK ÷ LSK/HP		04	05	07	09	13				
Cooling capacity ⁽¹⁾	kW	4,0	5,2	7,3	8,4	12,9				
Compressors input power (1)	kW	1,3	1,5	2,6	2,9	4,2				
Water flow ⁽¹⁾	m³/h	0,7	0,9	1,2	1,5	2,2				
Heating capacity ⁽²⁾	kW	3,7	4,8	7,2	8,4	12,6				
Compressors input power (2)	kW	1,4	1,7	2,5	3,0	4,2				
Water flow ⁽²⁾	m³/h	0,6	0,8	1,3	1,5	2,2				
Power supply	V/Ph/Hz		230/1/50							
Nominal input current	А	6,8	9,4	12,3	15,5	13,7				
Peak current	Α	34,5	42,0	68,0	75,0	70,7				
Max input current	А	9,0	11,5	14,5	17,5	16,7				
Airflow	m³/h	3000	3000	3000	3000	5400				
Fans	n°	1	1	1	1	2				
Compressors	n°/tipo		1/R	otary		1/Scroll				
Sound power level ⁽³⁾	dB (A)	68	68	68	68	69				
Sound pressure level (4)	dB (A)	40	40	40	40	41				
Water pump	kW	0,13	0,13	0,2	0,2	0,3				
Pump available static pressure	kPa	58	53	47	39	80				
Water tank	1	40	40	40	40	60				

Model LSK ÷ LSK/HP		15	20	25	30	35	40		
Cooling capacity ⁽¹⁾	kW	15,1	18,3	23,3	27,5	32,5	40,2		
Compressors input power (1)	kW	5,2	6,5	7,7	8,5	11,4	13,9		
Water flow (1)	m³/h	2,6	3,1	4,0	4,6	5,5	7,0		
Heating capacity ⁽²⁾	kW	15,0	19,1	23,7	27,4	33,5	41,3		
Compressors input power (2)	kW	4,9	6,4	7,6	8,7	10,9	13,2		
Water flow (2)	m³/h	2,7	3,4	4,2	4,8	6,0	7,2		
Power supply	V/Ph/Hz	400/3+N/50							
Nominal input current	А	14,7	19,5	21,6	20,0	24,0	29,0		
Peak current	А	78,7	105,0	129,0	137,0	177,0	208,0		
Max input current	А	16,7	21,1	24,0	26,4	30,4	36,3		
Airflow	m³/h	5400	8000	8000	10800	10800	10600		
Fans	n°	2	2	2	2	2	2		
Compressors	n°/tipo			1/S	croll				
Sound power level (3)	dB (A)	69	74	74	79	79	79		
Sound pressure level (4)	dB (A)	41	46	46	51	51	51		
Water pump	kW	0,45	0,45	0,45	0,55	0,55	0,9		
Pump available static pressure	kPa	66	119	83	131	123	103		
Water tank	1	60	60	60	180	180	180		

⁽¹⁾ Cooling: Ambient air temperature 35°C; evaporator water temperature in/out 12/7°C.
⁽²⁾ Heating: Ambient air temperature 7°C; condenser water temperature in/out 40/45°C.
⁽³⁾ Sound power level according to ISO 3746.
⁽⁴⁾ Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

LSK

Model LSK/CN		04	05	07	09	13
Cooling capacity ⁽¹⁾	kW	4,5	5,4	8,0	10	14,6
Compressors input power ⁽¹⁾	kW	1,3	1,5	2,5	2,6	4,2
Power supply	V/Ph/Hz		230/1/50		400/3+N/50	
Nominal input current	А	6,2	8,8	11,3	14,5	11,4
Peak current	А	33,9	10,9	13,5	16,5	14,4
Max input current	А	8,4	10,9	13,5	16,5	14,4
Airflow	m³/h	3.000	3.000	3.000	3.000	5.400
Fans	n°	1	1	1	1	2
Compressors	n°/tipo		1/Re	otary		1/Scroll
Sound power level ⁽³⁾	dB (A)	68	68	68	68	69
Sound pression level (4)	dB (A)	40	40	40	40	41

Model LSKCN	15	20	25	30	35	40					
Cooling capacity (1)	kW	16,8	19,2	26,3	30,6	35,1	44,3				
Compressors (1)	kW	5,2	6,4	7,7	8,5	11,4	13,9				
Power supply	V/Ph/Hz	400/3+N/50									
Nominal input current	А	11,9	16,7	18,8	17,2	21,2	26,2				
Peak current	А	75,9	102,2	126,2	134,2	174,2	205,2				
Max input current	А	15,9	18,3	21,2	23,6	27,6	33,5				
Airflow	m³/h	5.400	8.000	8.000	10.800	10.800	10.600				
Fans	n°	2	2	2	2	2	2				
Compressors	n°/tipo			1/So	croll						
Sound power level (3)	dB (A)	69	74	74	79	79	79				
Sound pressure level (4)	dB (A)	41	46	46	51	51	51				

⁽¹⁾ Cooling: ambient air temperature 35°C; evaporation temperature 5°C.
⁽³⁾ Sound power level according to ISO 3746.
⁽⁴⁾ Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2 according to ISO 3746.

LSK FRAME

All LSK units are made from hot-galvanised thick sheet metal, painted with polyurethane powder enamel at 180°C to ensure the best resistance against the atmospheric agents. The frame is self-supporting with removable panels. All screws and rivets for outdoor installations are in stainless steel. The colour of the units is RAL 9018.

REFRIGERANT CIRCUIT

The refrigerant gas used in these units is R407C. The refrigerant circuit is made by using international primary brands components and according to ISO 97/23 concerning welding procedures. The refrigerant circuit includes: sight glass, filter drier, thermal expansion valve with external equalizer, reverse cycle valve (for heat pump version only), one way valve (for heat pump version only), liquid receiver (for heat pump version only), Schrader valves form maintenance and control, pressure safety device (according to PED regulation).

COMPRESSORS

The compressors are scroll type (rotative type for sizes 04,05,07 only), with crankcase heater and thermal overload protection by a klixon embedded in the motor winding. They are mounted in a separate chamber in order to be separated from the air stream. The crankcase heater, when present, is always powered when the compressor is in stand-by. The inspection is possible through the frontal panel of the unit that allows the maintenance of the compressors even if the unit is working.

CONDENSERS

The condensers are made of copper pipes and aluminium fins. The diameter of the copper pipes is 3/8" and the thickness of the aluminium fins is 0,1 mm. The tubes are mechanically expanded into the aluminium fins to improve the heat exchange factor. The geometry of these condensers guarantees a low air side pressure drop and then the use of low rotation (and low noise emission) fans. The condensers can be protected by a metallic filter to be installed on request.

FANS

The fans are axial type with aluminium aerofoil blades. They are statically and dynamically balanced and supplied complete of the safety fan guard according to EN 60335. They are mounted on the unit frame by interposition of rubber vibration dampers. The electric motors are all at 6 poles (about 900 rpm). The motors are directly driven with an integrated thermal overload protection. The protection class of the motors is IP 54.

EVAPORATORS

The evaporators are made of AISI 316 stainless steel braze-welded plates type. The use of this kind of evaporators allows a massive reduction of the refrigerant charge of the unit compared to the traditional shellin-tube evaporators and also a reduction of the overall dimensions of the unit. The evaporators are factory insulated with flexible close cell material and can be equipped with antifreeze heater (optional). Each evaporator is provided with a temperature sensor as antifreeze protection.

MICROPROCESSOR

All LSK units are supplied standard with microprocessor controls. The microprocessor controls the following functions: regulation of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence, alarm reset, potential free contact for remote general alarm, alarms and operation leds. Upon request any microprocessor can be connected to a BMS system for the remote control and management. The technical department is available to study, together with the customer, different solutions using MO-DBUS; LONWORKS; BACNET or TREND protocols.

ELECTRIC BOX

The electric box is made according to electromagnetic compatibility norms CEE 73/23 and 89/336. The accessibility to the board is possible after removing the front panel of the unit. The protection degree is IP55. In all LSK units are installed, standard, the compressors sequence relay (three phase versions only) which disables the operation of the compressor in case the power supply phase sequence is not the correct one (scroll compressors in fact, can be damaged if they rotate reverse wise). The following components are also standard installed: main switch, magnetic-thermal switches (as a protection of pumps and fans), compressors fuses, control circuit automatic breakers, compressor contactors, fan contactors, pump contactors. The terminal board is supplied with voltage 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 plant (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, flow switch.

HEAT PUMP VERSION HP

The heat pump versions are provided with a 4 way reverse cycle valve and are suitable to produce hot water up to a temperature of 45-48°C. They are always supplied with liquid receiver and a second thermostatic valve to optimize the efficiency of the refrigerant cycle in heating and in cooling. The microprocessor is set for automatic defrost (in case of operation in severe ambient conditions) and for summer/winter change over.

LSK

CONDENSING UNITS REFRIGERANT CONNECTIONS

Condensing unit (CN versions) must be connected to the indoor unit by refrigerant lines. The condensing units are supplied without refrigerant charge and filled with nytrogen.

Piping layout and max distance between the sections.

On split-system applications, piping layout is determined by sections location and building structure. Piping should be as shorter as possible in order to reduce pressure drops in refrigerant circuit and the refrigerant charge in the system. Maximum admitted pipe length is 30 meters.

Our technicians are available to study other kinds of applications which don't respect the limits reported above.

Condensing unit installed at a higher level than the evaporation section:

On the rising vertical pipes, oil traps should be fitted every 6 metres to allow oil circulation to the compressor;

On horizontal suction pipelines a minimum 1% slope should be allowed in order to let the oil easily come back to compressor. Pipelines diameter can be read in Table II depending on the unit size and the length of refrigerant pipelines.

Condensing unit installed at a lower level than the evaporation section:

Install a liquid trap on suction line at the evaporator outlet whit the same height of the evaporator so that liquid refrigerant, when the system is not running, will not fall into the compressor;

Install a collection pit immediately downstream from the bulb of the thermostatic valve so that liquid refrigerant, when the system is not running, can be collected by this pit. In this way, when the compressor is turned on, the rapid evaporation of the coolant fluid in the pit, will not affect the bulb of the thermostatic valve;

On horizontal suction pipelines a minimum 1% slope should be allowed in order to let the oil easily come back to thecompressor.



Condensing unit higher than the remote evaporator

Condensing unit lower than the remote evaporator

LSK

Refrigerant line diameters for "CN" versions											
Max Distance (m)	1	0	2	20	30						
Mod.	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)					
04	16	8	18	10							
05	16	10	18	10							
07	18	10	22	12							
09	22	12	22	12	22	12					
13	28	12	28	16	28	16					
15	28	16	28	16	28	16					
20	28	16	28	16	35	16					
25	28	16	35	16	35	18					
30	35	16	35	18	35	18					
35	35	18	42	18	42	22					
40	42	18	42	22	42	22					

Refrigerant charge for liquid line											
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m								
8 (mm)	30	16 (mm)	165								
10 (mm)	55	18 (mm)	215								
12 (mm)	85	22 (mm)	335								

Cooling capacity correction factors											
Mod. Refr. line 0 (m) Refr. line 10 (m) Refr. line 20 (m) Refr. line 30 (r											
LSK/CN	1	0,98	0,96	0,95							

LSK

Version LSK ÷ LSK/HP	Code	04	05	07	09	13	15	20	25	30	35	40
Main switch	-	-	-	-	_	•	•	•	•	•	•	•
Flow switch	-	•	•	•	•	•	•	•	•	•	•	•
Microprocessor control	-	•	•	•	•	•	•	•	٠	٠	•	•
General alarm digital output	-	•	•	•	•	•	•	•	•	•	•	•
Remote on/off digital input	-	•	•	•	•	•	•	•	٠	٠	•	•
LS low noise version	LS00	0	0	0	0	0	0	0	0	0	0	0
Low ambient condensing pressure control	DCCF	0	0	0	0	0	0	0	0	0	0	0
Partial heat recovery	RP00	-	-	-	-	0	0	0	0	0	0	0
Rubber vibration dampers	KAVG	0	0	0	0	0	0	0	0	0	0	0
Spring vibration dampers	KAVM	0	0	0	0	0	0	0	0	0	0	0
Electronic soft starter	DSSE	0	0	0	0	0	0	0	0	0	0	0
Evaporator antifreeze heater (basic version only)	RAEV	0	0	0	0	0	0	0	0	0	0	0
Antifreeze Kit (only for A version)	RAES	0	0	0	0	0	0	0	0	0	0	0
Manometers	MAML	0	0	0	0	0	0	0	0	0	0	0
Condensate discharge drip tray with antifreeze heater	BRCA	0	0	0	0	0	0	0	0	0	0	0
Hydraulic kit pump + tank (A1ZZ)	A1ZZ	0	0	0	0	0	0	0	0	0	0	0
Hydraulic kit pump no tank(A1NT)	A1NT	0	0	0	0	0	0	0	0	0	0	0
Coils protection mesh with metallic filter	FAMM	0	0	0	0	0	0	0	0	0	0	0
Remote control panel	PCRL	0	0	0	0	0	0	0	0	0	0	0
Serial interface card RS485	INSE	0	0	0	0	0	0	0	0	0	0	0

• Standard, O Optional, - Not available.



LSK

Version LSN/CN	Code	04	05	07	09	13	15	20	25	30	35	40
Main switch	-	-	-	-	-	•	٠	•	٠	•	•	٠
Microprocessor control	-	•	•	•	•	•	•	•	•	•	•	•
Liquid line solenoid valve	-	•	٠	٠	•	•	٠	•	٠	٠	٠	٠
Rubber vibration dampers	KAVG	0	0	0	0	0	0	0	0	0	0	0
Spring vibration dampers	KAVM	0	0	0	0	0	0	0	0	0	0	0
Protection mesh with metallic filter	FAMM	0	0	0	0	0	0	0	0	0	0	0
Serial interface card RS485	INSE	0	0	0	0	0	0	0	0	0	0	0
Remote control panel	PCRL	0	0	0	0	0	0	0	0	0	0	0
Expansion valve for CN versions	VTER	0	0	0	0	0	0	0	0	0	0	0
Low ambient condensing pressure control	DCCF	0	0	0	0	0	0	0	0	0	0	0

• Standard, O Optional, - Not available.

