

LSA

Air to water chillers and heat pumps



R410A

Active



The LSA water chiller and heat pump range has been designed for small and medium residential and commercial applications.

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

LSA water chillers have high operating efficiencies and are quiet in operation.

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

VERSIONS

- LSA, cooling only versions, available in 10 different sizes.
- LSA/HP, reversible heat pump versions, available in 10 different sizes.
- LSA/CN condensing unit versions, available in 10 different sizes.

ACCESSORIES

- A1NT: Hydraulic kit with: pump, expansion valve, safety valve, flow switch
- A1ZZ: Hydraulic kit with: pump, expansion valve, safety valve, flow switch, insulated tank
- BRCA: Condensate discharge drip tray with antifreeze heater. (only versions HP)
- DCCF: Low ambient condensing pressure control
- FAMM: Coil protection mesh with metallic filter
- KAVG: Rubber anti-vibration mountings
- KAVM: Spring anti-vibration mountings
- LS00: Low noise version
- MAML: Refrigerant circuit pressure gauges.
- PCRL: Remote control panel
- RAEV: Evaporator antifreeze heater (basic version only)
- RP00: Partial heat recovery

Model LSA ÷ LSA/HP		06	08	10	14	16
Cooling capacity (EN14511) ⁽¹⁾	kW	5,7	7,5	8,5	14,0	15,5
Total input power (EN14511) ⁽¹⁾	kW	1,9	2,5	2,8	4,7	5,7
E.E.R. ⁽¹⁾	W/W	3,0	3,0	3,0	2,9	2,7
Cooling capacity (EN14511) ⁽²⁾	kW	7,6	9,9	11,2	18,6	20,3
Total input power (EN14511) ⁽²⁾	kW	2,0	2,7	3,0	4,8	6,2
E.E.R. ⁽³⁾	W/W	3,8	3,7	3,7	3,9	3,3
Heating capacity (EN14511) ⁽⁴⁾	kW	5,9	7,7	9,2	14,9	17,2
Total input power (EN14511) ⁽⁴⁾	kW	1,5	2,0	2,3	3,9	4,3
C.O.P ⁽⁴⁾	W/W	3,9	3,9	4,0	3,8	4,0
Heating capacity (EN14511) ⁽⁵⁾	kW	5,8	7,6	9,0	14,5	16,9
Total input power (EN14511) ⁽⁵⁾	kW	1,9	2,4	2,8	4,8	5,3
C.O.P ⁽⁵⁾	W/W	3,1	3,2	3,2	3,0	3,2
Power supply	V/Ph/Hz	230/1/50			400/3+N/50	
Peak current	A	60,6	68	99	66	77
Max input current	A	13,4	18,1	23	13,3	17
Air flow	m³/h	2.800	3.350	3.150	7.200	7.000
Fans	n°/kW	1 x 0,12	1 x 0,2	1 x 0,2	2 x 0,2	2 x 0,2
Compressors	n°/tipo	1/Rotary			1/Scroll	
Sound power level ⁽⁶⁾	dB (A)	68	68	68	69	69
Sound pressure level ⁽⁷⁾	dB (A)	40	40	40	41	41
Water pump input power	kW	0,2	0,2	0,2	0,5	0,5
Pump available static pressure ⁽¹⁾	kPa	56,7	56,5	45,9	109,3	109,3
Water tank volume	l	40	40	40	40	60

Model LSA/CN		06	08	10	14	16
Cooling capacity ⁽¹⁾	kW	5,8	7,6	9,0	14,8	16,6
Compressors input power ⁽¹⁾	kW	1,9	2,5	2,8	4,7	5,7
Power supply	V/Ph/Hz	230/1/50			400/3+N/50	
Peak current	A	60,6	68,0	99,0	66,0	77,0
Max input current	A	13,4	18,1	23,0	13,3	17,0
Airflow	m³/h	2.800	3.350	3.150	7.200	7.000
Fans	n°/kW	1 x 0,12	1 x 0,2	1 x 0,2	2 x 0,2	2 x 0,2
Compressors	n°/tipo	1/Rotary			1/Scroll	
Sound power level ⁽³⁾	dB (A)	68	68	68	69	69
Sound pression level ⁽⁴⁾	dB (A)	40	40	40	41	41

⁽¹⁾ Cooling: ambient temperature 35°C; water temperature 12/7°C.

⁽²⁾ Cooling: ambient temperature 35°C; water temperature 23/18°C.

⁽³⁾ Heating: ambient temperature 7°C (DB), 6°C (WB); water temperature 30/35°C.

⁽⁴⁾ Heating: ambient temperature 7°C (DB), 6°C (WB); water temperature 40/45°C.

⁽⁵⁾ Sound power level in accordance with ISO 9614.

⁽⁶⁾ Sound pressure level at 10m from the unit in free field conditions direction factor Q = 2. in accordance with ISO 9614.

⁽⁷⁾ Cooling: ambient temperature 35°C; evaporating temperature 5°C.

LSA

LSA

Model LSA ÷ LSA/HP		21	26	31	36	41
Cooling capacity (EN14511) ⁽¹⁾	kW	20,5	26,6	30,0	33,0	39,0
Total input power (EN14511) ⁽¹⁾	kW	6,8	8,8	10,5	11,8	13,8
E.E.R. ⁽¹⁾	W/W	3,0	3,0	2,9	2,8	2,8
Cooling capacity (EN14511) ⁽²⁾	kW	26,7	34,6	38,8	42,4	50,5
Total input power (EN14511) ⁽²⁾	kW	7,5	10,2	11,4	12,9	15,2
E.E.R. ⁽³⁾	W/W	3,6	3,4	3,4	3,3	3,3
Heating capacity (EN14511) ⁽⁴⁾	kW	22,0	29,5	33,5	36,5	44,4
Total input power (EN14511) ⁽⁴⁾	kW	5,2	6,8	8,2	9,0	10,7
C.O.P. ⁽⁴⁾	W/W	4,3	4,3	4,1	4,1	4,2
Heating capacity (EN14511) ⁽⁵⁾	kW	21,6	28,7	32,5	35,6	43,1
Total input power (EN14511) ⁽⁵⁾	kW	6,4	9,1	10,0	11,0	12,8
C.O.P. ⁽⁵⁾	W/W	3,4	3,2	3,3	3,2	3,4
Power supply	V/Ph/Hz	400/3+N/50				
Peak current	A	96,8	119,8	120,6	142,6	176,6
Max input current	A	17,8	23,8	27,6	33,6	36,6
Air flow	m³/h	8.500	8.500	10.800	10.800	10.800
Fans	n°/kW	2 x 0,2	2 x 0,2	2 x 0,5	2 x 0,5	2 x 0,5
Compressors	n°/tipo	1/Scroll				
Sound power level ⁽⁶⁾	dB (A)	74	74	79	79	79
Sound pressure level ⁽⁷⁾	dB (A)	46	46	51	51	51
Water pump input power	kW	0,6	0,6	0,9	0,9	1,3
Pump available static pressure ⁽¹⁾	kPa	136,8	79,2	96,4	41,2	170,1
Water tank volume	l	60	60	180	180	180

Model LSA/CN		21	26	31	36	41
Cooling capacity ⁽¹⁾	kW	21,5	29,2	32,6	36,3	44,4
Compressors input power ⁽¹⁾	kW	6,9	9,0	10,7	12,2	14,0
Power supply	V/Ph/Hz	400/3+N/50				
Peak current	A	96,8	119,8	120,6	142,6	176,6
Max input current	A	17,8	23,8	27,6	33,6	36,6
Airflow	m³/h	8.500	8.500	10.800	10.800	10.800
Fans	n°/kW	2 x 0,2	2 x 0,2	2 x 0,5	2 x 0,5	2 x 0,5
Compressors	n°/tipo	1/Scroll				
Sound power level ⁽³⁾	dB (A)	74	74	79	79	79
Sound pressure level ⁽⁴⁾	dB (A)	46	46	51	51	51

⁽¹⁾ Cooling: ambient temperature 35°C; water temperature 12/7°C.

⁽²⁾ Cooling: ambient temperature 35°C; water temperature 23/18°C.

⁽³⁾ Heating: ambient temperature 7°C (DB), 6°C (WB); water temperature 30/35°C.

⁽⁴⁾ Heating: ambient temperature 7°C (DB), 6°C (WB); water temperature 40/45°C.

⁽⁵⁾ Sound power level in accordance with ISO 9614.

⁽⁶⁾ Sound pressure level at 10m from the unit in free field conditions direction factor Q = 2. in accordance with ISO 9614.

⁽⁷⁾ Cooling: ambient temperature 35°C; evaporating temperature 5°C.

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FRAME

All LSA 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 R410A. The refrigerant circuit is assembled using internationally recognised brand name components with all brazing and welding being performed in accordance with ISO 97/23. 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).

COMPRESSOR

For models 06 & 08, rotary type compressors are used. For all other models the compressors are of the scroll type. All compressors are fitted with a crankcase heater and each compressor has a klixon embedded in the motor winding for thermal overload protection. 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 standby. 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.

CONDENSORS

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 are 6 pole type rotating at approximately 900 rpm. The motors are fitted with integrated thermal overload protection and have a moisture protection rating of IP 54.

EVAPORATORS

The evaporator is a braze welded, plate type heat exchanger, manufactured from AISI 316 stainless steel. Utilisation of this type of exchanger results in a massive reduction of the refrigerant charge of the unit compared to a traditional shell-in-tube evaporator. A further advantage is a reduction in the overall dimensions of the unit. The evaporators are factory insulated with flexible close cell material and can be fitted with an antifreeze heater (accessory). Each evaporator is fitted with a temperature sensor on the discharge water side for antifreeze protection.

MICROPROCESSOR

All LSA units are supplied with microprocessor controls loaded with ACTIVE auto-adaptive strategy. 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 Hydros technical department can discuss and evaluate, in conjunction with the customer, solutions using MODBUS protocols. The autoadaptive control system ACTIVE is an advanced strategy that continuously monitors the temperature of the inlet and outlet water thereby determining the variation of the building thermal load. By then adjusting the outlet water temperature set point the compressor start/stop cycle can be accurately controlled thus optimizing the heat

pump efficiency and maximizing the operational life of the units component's. Use of ACTIVE auto-adaptive Control enables the minimum water content to be reduced from the traditional 12-15 l/kw to 5 l/kw. A further benefit of the reduced water requirement is that LSA units can be used in installations without a buffer tank thereby reducing the space requirements, thermal losses and costs.

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. The following components 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. For all three phase units, a sequence relay that disables the power supply in the event that the phase sequence is incorrect (scroll compressors can be damaged if they rotate in the wrong direction), is fitted as standard.

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, antifreeze protection sensor installed on the outlet water temperature 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 VERSION (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.

CONDENSING UNITS REFRIGERANT CONNECTIONS (LSA/CN)

Condensing unit (CN) versions must be connected to the indoor unit by refrigerant lines. The condensing units are supplied without refrigerant charge but with a holding charge of nitrogen.

Piping layout and max distance between the sections.

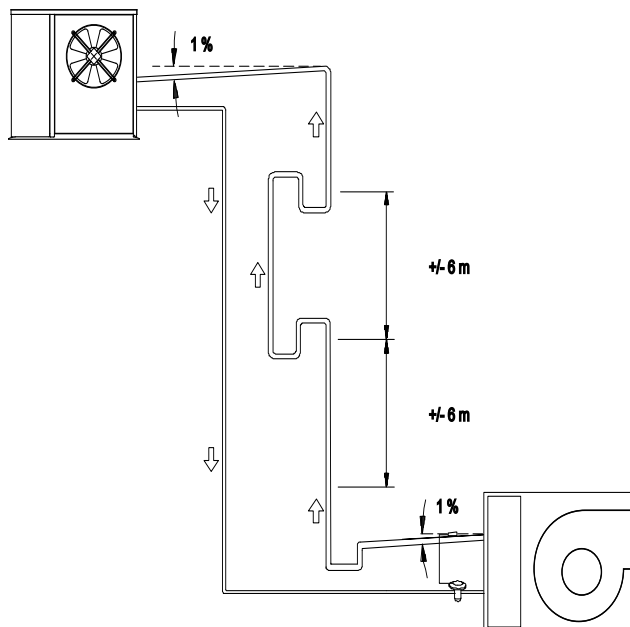
On split-system applications, the piping layout is determined by the location of the indoor and outdoor units and by the building structure. Pipe runs should be minimised in order to reduce the pressure drops in the refrigerant circuit and the refrigerant charge required. The maximum allowable pipe length is 30 meters. Should your requirements exceed the limits described above, please contact our application engineers who will be delighted to assist.

Condensing unit installed at a higher level than the evaporation section

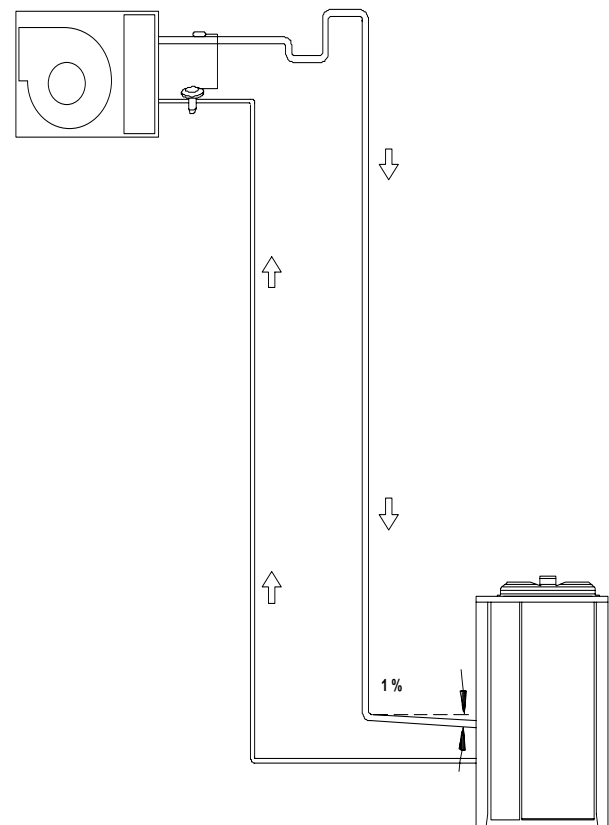
On the rising vertical pipes, oil traps should be fitted every 6 metres to ensure that the oil does not run back to the compressor by gravity and that it continues to circulate in the correct direction. On horizontal suction pipelines a minimum of 1% slope in the direction of flow should be provided in order to ensure the oil flow back to the compressor. Required pipeline diameters for various unit sizes and pipe run lengths can be found in the following tables.

Condensing unit installed at a lower level than the evaporation section

Install a liquid trap on the suction line at the evaporator outlet and at the same height in order that liquid refrigerant, when the system is off, will not fall back to the compressor. Locate this trap down-stream from the bulb of the thermostatic valve to ensure that when the compressor is restarted, the rapid evaporation of the refrigerant liquid fluid in the trap will not affect the bulb of the thermostatic valve. On horizontal suction pipelines a minimum of 1% slope in the direction of flow should be provided in order to ensure the oil flow back to the compressor.



Condensing unit higher than the remote evaporator



Condensing unit lower than the remote evaporator

Refrigerant line diameters for "CN" versions						
Max Distance (m)	10		20		30	
Mod.	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)
06	16	10	16	10	16	10
08	16	10	16	10	16	12
10	16	10	18	10	18	12
14	18	12	22	12	22	12
16	18	12	22	12	22	16
21	22	16	28	16	28	16
26	28	16	28	16	28	16
31	28	18	28	18	28	18
36	28	18	28	18	35	18
41	28	18	35	18	35	18

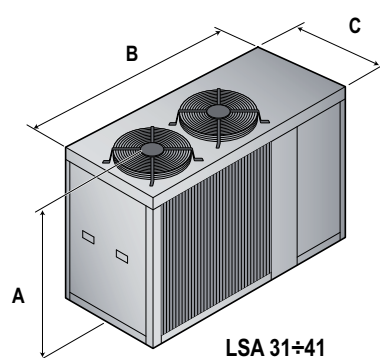
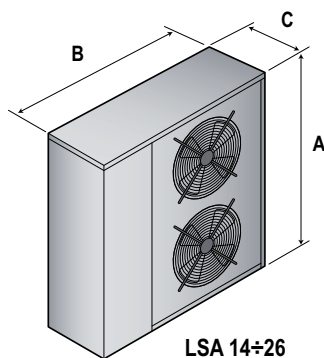
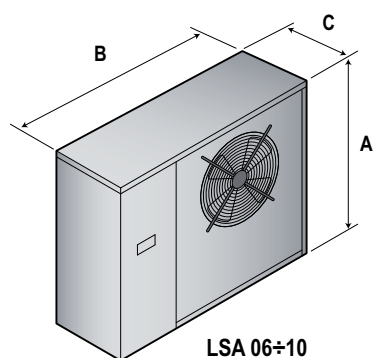
Refrigerant charge for liquid line			
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m
8 (mm)	28	16 (mm)	143
10 (mm)	46	18 (mm)	186
12 (mm)	73	22 (mm)	215

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

LSA

Version LSA ÷ LSA/HP	Code	06	08	10	14	16	21	26	31	36	41
Main switch	—	—	—	—	●	●	●	●	●	●	●
Flow switch	—	●	●	●	●	●	●	●	●	●	●
Microprocessor control	—	●	●	●	●	●	●	●	●	●	●
General alarm digital output	—	●	●	●	●	●	●	●	●	●	●
Remote on/off digital input	—	●	●	●	●	●	●	●	●	●	●
LS low noise version	LS00	○	○	○	○	○	○	○	○	○	○
Low ambient condensing pressure control	DCCF	○	○	○	○	○	○	○	○	○	○
Partial heat recovery	RP00	—	—	—	○	○	○	○	○	○	○
Rubber anti-vibration mounts	KAVG	○	○	○	○	○	○	○	○	○	○
Spring anti-vibration mounts	KAVM	○	○	○	○	○	○	○	○	○	○
Electronic soft starter	DSSE	○	○	○	○	○	○	○	○	○	○
Evaporator antifreeze heater (basic version only)	RAEV	○	○	○	○	○	○	○	○	○	○
Antifreeze Kit (only for A version)	RAES	○	○	○	○	○	○	○	○	○	○
Refrigerant circuit pressure gauges	MAML	○	○	○	○	○	○	○	○	○	○
Condensate discharge drip tray with antifreeze heater (Only for versions HP)	BRCA	○	○	○	○	○	○	○	○	○	○
Hydraulic kit pump + tank (A1ZZ)	A1ZZ	○	○	○	○	○	○	○	○	○	○
Hydraulic kit pump no tank (A1NT)	A1NT	○	○	○	○	○	○	○	○	○	○
Coils protection mesh with metallic filter	FAMM	○	○	○	○	○	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○	○	○	○	○	○

● Standard, ○ Optional, — Not available.



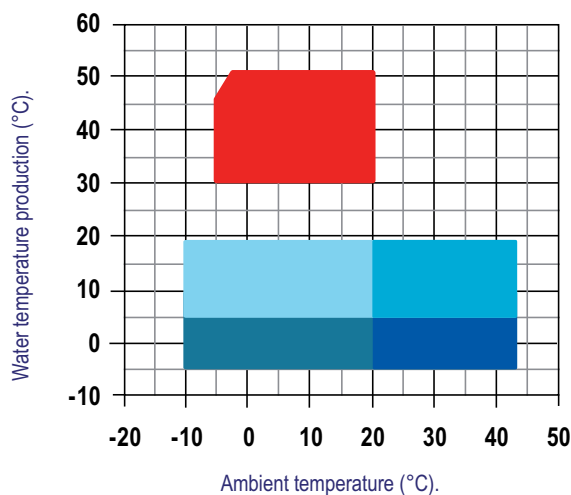
Mod.	A (mm)	B (mm)	C (mm)	Kg
06/06A1	989	1103	380	95/148
08/08A1	989	1103	380	104/163
10/10A1	989	1103	380	118/179
14/14A1	1324	1203	423	127/207
16/16A1	1324	1203	423	133/212

Mod.	A (mm)	B (mm)	C (mm)	Kg
21/21A1	1423	1453	473	188/267
26/26A1	1423	1453	473	209/286
31/31A1	1406	1870	850	330/440
36/36A1	1406	1870	850	345/495
41/41A1	1406	1870	850	360/520

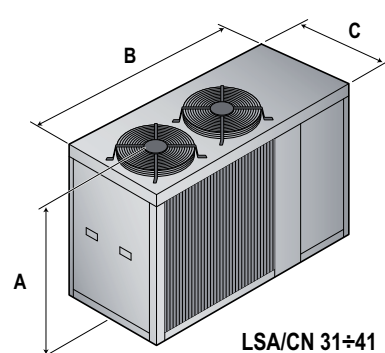
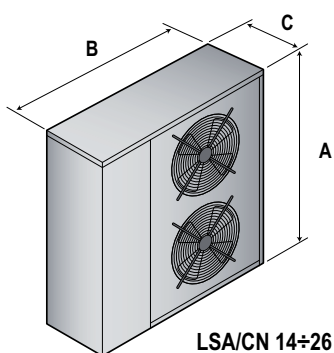
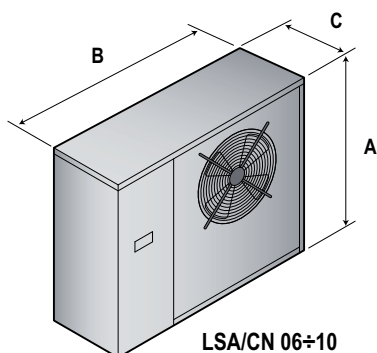
Version LSA/CN	Code	06	08	10	14	16	21	26	31	36	41
Main switch	—	—	—	●	●	●	●	●	●	●	●
Microprocessor control	—	●	●	●	●	●	●	●	●	●	●
Liquid line solenoid valve	—	●	●	●	●	●	●	●	●	●	●
Rubber anti-vibration mountings	KAVG	○	○	○	○	○	○	○	○	○	○
Spring anti-vibration mountings	KAVM	○	○	○	○	○	○	○	○	○	○
Protection mesh with metallic filter	FAMM	○	○	○	○	○	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○	○	○	○	○	○
Expansion valve for CN versions	VTER	○	○	○	○	○	○	○	○	○	○
Low ambient condensing pressure control	DCCF	○	○	○	○	○	○	○	○	○	○

● Standard, ○ Optional, — Not available.

OPERATION LIMITS



- Heating mode
- Cooling mode with cond. press. contr.
- Cooling mode without cond. press. contr.
- Cooling mode with cond. press. contr. and glycol
- Cooling mode without cond. press. contr. and glycol



Mod.	A (mm)	B (mm)	C (mm)	Kg
06	989	1103	380	90
08	989	1103	380	94
10	989	1103	380	108
14	1324	1203	423	115
16	1324	1203	423	120

Mod.	A (mm)	B (mm)	C (mm)	Kg
21	1423	1453	473	172
26	1423	1453	473	193
31	1406	1870	850	310
36	1406	1870	850	325
41	1406	1870	850	340