

## WSA

Water to water chillers and heat pumps



R410A

Active



WSA water chillers have been designed for small and medium residential and commercial applications.

They are designed to operate with water outlet temperatures of 7°C, commonly used in combinations with fan coils or/ and air handling units.

The units are designed for indoor installation and have low noise levels in operation.

Due to the compact dimensions, the versatility in installation and a wide range of accessories, the WRK series are ideal for most applications.

### VERSIONS

- WSA, cooling only version, available in 10 different sizes.
- WSA/HP, reversible heat pump version, available in 10 different sizes.
- WSA/EV, condenserless version, available in 10 different sizes.

### ACCESSORIES

- DSSE: Soft starter elettronico
- INSE: Serial interface card RS 485
- KAVG: Rubber anti-vibration mountings
- KAVM: Spring anti-vibration mountings
- LS00: Low noise version
- MAML: Refrigerant circuit pressure gauges
- PCRL: Remote control panel
- RP00: Partial heat recovery
- V2M0: Source 4÷20 mA modulating valve
- VPSF: Pressostatic valve kit (only cooling version)

Model WSA		06	08	10	14	16	21	26	31	36	41
Cooling capacity (EN14511) <sup>(1)</sup>	kW	5,9	7,5	9,0	14,9	17,4	22,0	30,3	34,3	38,2	45,0
Input power (EN14511) <sup>(1)</sup>	kW	1,5	1,8	2,2	3,6	4,2	5,1	6,9	7,8	8,7	10,2
EER (EN14511) <sup>(1)</sup>	w/w	3,9	4,2	4,1	4,1	4,1	4,3	4,4	4,4	4,4	4,4
Cooling capacity (EN14511) <sup>(2)</sup>	kW	8,1	10,2	12,2	20,4	23,5	29,5	40,3	45,5	50,7	60,3
Input power (EN14511) <sup>(2)</sup>	kW	1,4	1,8	2,2	3,5	4,3	5,4	7,1	8,0	9,1	10,4
EER (EN14511) <sup>(2)</sup>	w/w	5,8	5,7	5,5	5,8	5,5	5,5	5,7	5,7	5,6	5,8
Heating capacity (EN14511) <sup>(3)</sup>	kW	7,0	8,8	10,6	17,2	20,3	25,3	34,3	42,6	47,9	52,7
Input power (EN14511) <sup>(3)</sup>	kW	1,5	1,8	2,2	3,6	4,2	5,1	6,9	7,9	8,8	10,3
COP (EN14511) <sup>(3)</sup>	w/w	4,7	4,9	4,8	4,8	4,8	5,0	5,0	5,4	5,4	5,1
Heating capacity (EN14511) <sup>(4)</sup>	kW	6,7	8,4	10,2	16,5	19,5	24,4	32,7	40,7	45,8	50,5
Input power (EN14511) <sup>(4)</sup>	kW	1,9	2,3	2,8	4,5	5,2	6,3	8,6	9,9	10,9	12,5
COP (EN14511) <sup>(4)</sup>	w/w	3,5	3,6	3,6	3,7	3,8	3,9	3,8	4,1	4,2	4,0
Power supply	V/Ph/Hz	230/1/50			400/3+N/50				400/3/50		
Peak current	A	60	67	98	64	75	95	118	118	140	174
Maximum input current	A	12,8	17,1	22	11,3	15	16	22	25	31	34
Compressors / Circuits	n°	1/1	1/1	1/1	1/1	1/1	1/1	2/1	1/1	1/1	1/1
Sound power <sup>(5)</sup>	dB(A)	51	52	52	54	54	60	60	62	64	64
Sound pressure <sup>(6)</sup>	dB(A)	43	44	44	46	46	52	52	54	56	56

<sup>(1)</sup> Cooling: Evaporator water temperature in/out 12/7°C  
condenser water temperature in/out 30/35°C. Without pressostatic valve.

<sup>(2)</sup> Cooling: Evaporator water temperature in/out 23/18°C  
condenser water temperature in/out 30/35°C. Without pressostatic valve.

<sup>(3)</sup> Heating: condenser water temperature in/out 30/35°C; evaporator water temperature in/out 10/7°C.

<sup>(4)</sup> Heating: condenser water temperature in/out 40/45°C; evaporator water temperature in/out 10/7°C.  
<sup>(6)</sup> Sound pressure level at 1 mt from the unit in free field conditions direction factor Q = 2 in accordance with ISO 9614.

Versions WSA/EV		06	08	10	14	16	21	26	31	36	41
Cooling capacity <sup>(5)</sup>	kW	5,1	6,5	7,9	13,1	15,3	19,5	26,6	30,0	33,7	39,8
Compressor input power <sup>(5)</sup>	kW	1,9	2,4	2,9	4,6	5,3	6,4	8,9	10,2	11,1	12,7
Water flow <sup>(5)</sup>	m³/h	0,9	1,1	1,4	2,2	2,6	3,3	4,6	5,1	5,8	6,8
Peak current	A	60	67	98	64	75	95	118	118	140	174
Max input current	A	12,8	17,1	22	11,3	15	16	22	25	31	34
Power supply	V/Ph/Hz	230/1/50			400/3+N/50				400/3/50		
Compressors / Circuits	n°	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Sound power level <sup>(3)</sup>	dB(A)	51	52	52	54	54	60	690	62	64	64
Sound pressure level <sup>(4)</sup>	dB(A)	43	44	44	46	46	52	52	54	56	56

<sup>(5)</sup> For EV version: condensing temperature 50 °C, water temperature in/out 12/7 °C.

<sup>(3)</sup> Sound power level in accordance with ISO 9614. (LS versions).

<sup>(4)</sup> Sound pressure level at 1 mt from the unit in free field conditions direction factor Q = 2 in accordance with ISO 9614 (LS versions)

## WSA

### FRAME

All WSA units are made from hot-galvanized 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:

high 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).

### COMPRESSORS

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 within the casing. The crankcase heater is always energised when the compressor is in stand-by. Access to the compressors is by removal of a front panel and maintenance of the compressors is possible whilst the unit is operating.

### CONDENSERS AND EVAPORATORS

The evaporators and the condensers are braze welded, plate type heat exchangers, 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 the traditional shell-in-tube type. 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). In the heat pump version, the condensers are factory insulated with flexible close cell material and can be equipped with an antifreeze heater (accessory). Each evaporator

is fitted with a temperature sensor on the discharge water side for antifreeze protection.

### MICROPROCESSOR

All WSA 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 Hidros 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 WSA 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 (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.

### CONDENSERLESS VERSIONS EV

This version includes a microprocessor control to manage both the compressor timings and alarms. It is designed to operate with refrigerant R410A but is supplied with a holding charge of nitrogen.

### 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 50°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.

## CONDENSERLESS UNITS REFRIGERANT CONNECTIONS

Condensing unit (WSA/EV) 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

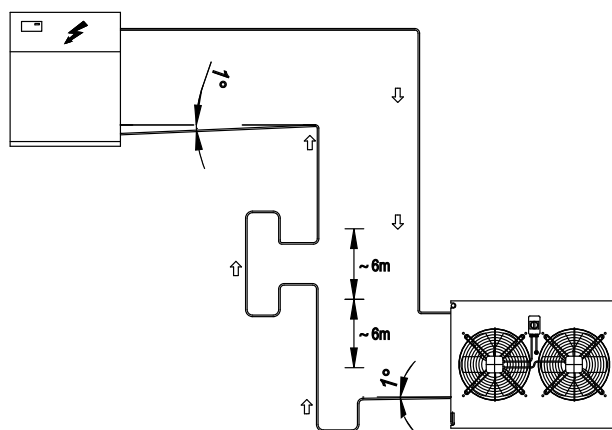
On the rising vertical pipes, oil traps should be fitted every 6 metres to ensure that the oil does not run back to the compressor by gravity and that it continues to circulate in the correct direction. On horizontal suction pipelines a minimum of 1% slope in the direction of flow should be provided 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 table.

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

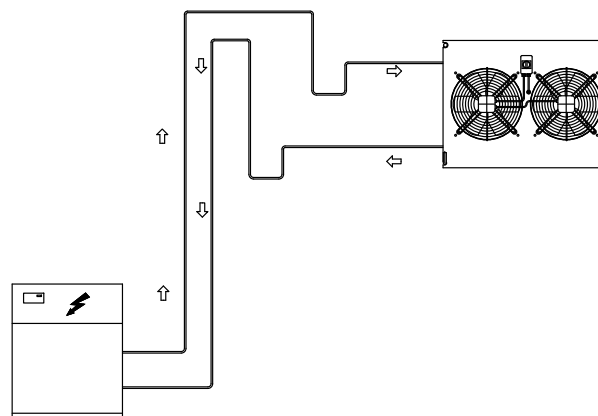
Install a liquid trap on the suction line at the evaporator outlet and at the same height in order that liquid refrigerant, when

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.

The refrigerant line diameters are determined from the selected unit size and the distance between the indoor and the outdoor unit. The table below provides the recommended sizes for various combinations.



WSA/EV higher than the remote condenser



WSA/EV lower than the remote condenser

## WSA

WSA

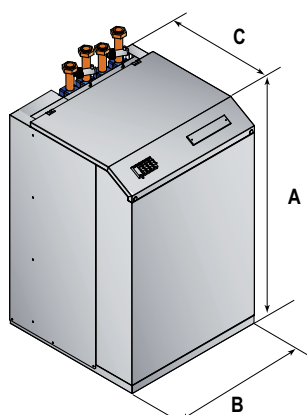
Refrigerant line diameters for "EV" versions						
Distance (m)	10		20		30	
Mod.	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)
06	10	10	12	10	12	10
08	12	10	12	10	12	10
10	12	10	12	10	16	12
14	16	12	16	12	16	16
16	16	12	16	16	16	16
21	16	16	18	16	18	16
26	18	16	18	16	22	16
31	18	18	22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

Refrigerant charge for liquid line			
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m
10	50	12	80
16	160	18	200

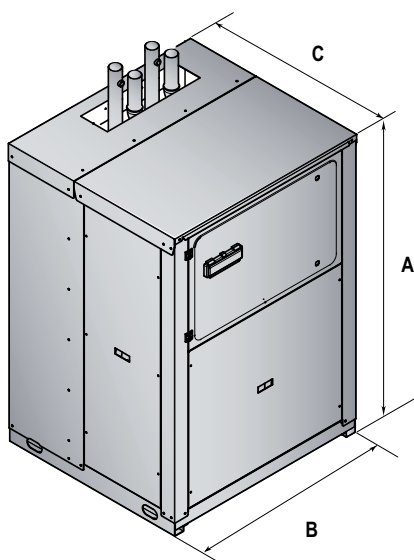
Cooling capacity correction factors				
Mod.	Refr. Line 0 mt.	Refr. Line = 10 mt.	Refr. Line 20 mt.	Refr. Line 30 mt.
WSA/EV	1	0,98	0,96	0,95

Model WSA ÷ WSA/EV ÷ WSK/HP	Code	06	08	10	14	16	21	26	31	36	41
Main switch	-	-	-	-	●	●	●	●	●	●	●
Flow switch	-	●	●	●	●	●	●	●	●	●	●
Microprocessor control	-	●	●	●	●	●	●	●	●	●	●
LS low noise basic version	LS01	○	○	○	○	○	○	○	○	○	○
Partial heat recovery	RP00	-	-	-	○	○	○	○	○	○	○
Spring anti-vibration mountings	KAVM	○	○	○	○	○	○	○	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○	○	○	○	○	○	○	○
Refrigerant circuit pressure gauges	MAML	○	○	○	○	○	○	○	○	○	○
Pressostatic valve kit (only cooling version)	VPSF	○	○	○	○	○	○	○	○	○	○
V2M0: Source 4÷20 mA modulating valve	V2M0	○	○	○	○	○	○	○	○	○	○
Electronic soft starter	DSSE	○	○	○	○	○	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○	○	○	○	○	○

● Standard, ○ Optional, – Not available.



WSA 06 ÷ 21



WSA 31 ÷ 41

Mod.	A (mm)	B (mm)	C (mm)	Kg
06	900	600	600	100
08	900	600	600	100
10	900	600	600	100
14	1255	600	600	120
16	1255	600	600	120
21	1255	600	600	130
26	1270	850	765	165
31	1270	850	765	175
36	1270	850	765	185
41	1270	850	765	185