

WVK

Water to water chillers and heat pumps



R407C



WVK 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 offers high efficiencies and low noise levels, making these units suitable for use in most applications.

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

VERSIONS

- WVK, cooling only version, available in 14 different sizes.
- WVK/HP, reversible heat pump, version available in 14 different sizes.
- WVK/EV, condenserless units, version available in 14 different sizes.

ACCESSORIES

- A1NT: Hydraulic kit with: pump, expansion valve, safety valve, flow switch
- INSE: Scheda interfaccia seriale RS485
- KAVG: Rubber anti-vibration mountings
- KAVM: Spring anti-vibration mountings
- LS01: Low noise version
- MAML: Refrigerant circuit pressure gauges
- MVCS: Compressors suction manual valves
- PCRL: Remote control panel
- V2M0: Source 4÷20 mA modulating valve
- VPSF: Pressostatic valve kit for cooling versions
- VSLI: Liquid line solenoid valve

Version WVK ÷ WVK/HP		2301	2701	3201	3601	4001	3202
Cooling capacity ⁽¹⁾	kW	240,7	279,9	344,9	386,1	424,1	338,7
Compressors input power ⁽¹⁾	kW	71,7	74	87	96,3	106,3	89
Heating capacity ⁽²⁾	kW	310,1	373,6	443,8	494,7	555,9	425,5
Compressors input power ⁽²⁾	kW	74,7	89,9	105,8	126,4	138,5	112
User water flow ⁽²⁾	m ³ /h	54	65,1	77,3	86,2	96,8	74,1
Source water flow ⁽²⁾	m ³ /h	40,5	48,8	58,1	63,4	71,8	53,9
Power supply	V/Ph/Hz	400V - 3 - 50 Hz					
Peak current	A	497,6	320,6	356,6	376,6	455,6	406,6
Maximum input current	A	170,6	198,6	227,6	247,6	272,6	250,6
Compressors		Screw Semi-hermetic					
Compressors	n°	1	1	1	1	1	2
Sound power level (LS) ⁽³⁾	dB(A)	79	80	81	81	82	80
Sound pressure level (LS) ⁽⁴⁾	dB(A)	51	52	53	53	54	52

Version WVK ÷ WVK/HP		3602	4502	5202	6402	7202	8202	9002	9502
Cooling capacity ⁽¹⁾	kW	391,8	481,6	579,9	691	772,2	848,5	934,9	998,2
Compressors input power ⁽¹⁾	kW	101,8	123	148	174	192,7	212,5	234,2	250
Heating capacity ⁽²⁾	kW	507	620,3	747,1	887,5	989,5	1111,9	1225,2	1308
Compressors input power ⁽²⁾	kW	133,6	159,4	180	211,5	252,8	256,6	301,7	302
User water flow ⁽²⁾	m ³ /h	88,3	108	129,5	152,6	170,2	191,2	210,7	224,9
Source water flow ⁽²⁾	m ³ /h	64,2	79,3	97,6	116,2	126,8	147,2	158,8	173,2
Power supply	V/Ph/Hz	400V - 3 - 50 Hz							
Peak current	A	493,6	665,6	516,6	581,6	621,6	725,6	845,6	931,6
Maximum input current	A	282,6	338,6	394,6	452,6	492,6	542,6	602,6	670,6
Compressors		Screw Semi-hermetic							
Compressors	n°	2	2	2	2	2	2	2	2
Sound power level (LS) ⁽³⁾	dB(A)	81	82	83	84	84	85	86	86
Sound pressure level (LS) ⁽⁴⁾	dB(A)	53	54	55	56	56	57	58	58

⁽¹⁾ Cooling: evaporator water temperature in/out 12/7°C, condenser water temperature 30/35°C. Without pressostatic valve.

⁽²⁾ Heating: condenser water temperature in/out 40/45°C; evaporator water temperature in/out 15/10°C. Without pressostatic valve.

⁽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.

WVK

Version WVK/EV		2301	2701	3201	3601	4001	3202
Cooling capacity ⁽⁵⁾	kW	207,8	250,0	298,0	332,7	374,1	292,0
Compressors input power ⁽⁵⁾	kW	73,3	88,3	103,8	115,0	126,2	106,2
Power supply	V/Phz			400V - 3 - 50 Hz			
Peak current	A	497,6	320,6	356,6	376,6	455,6	406
Max input current	A	170,6	198,6	227,6	247,6	272,6	250,6
Compressors		Screw Semi-hermetic					
Compressors	n°	1	1	1	1	1	2
Sound power level (LS)	dB(A)	79	80	81	81	82	80
Sound pressure level (LS)	dB(A)	51	52	53	53	54	52

Version WVK/EV		3602	4502	5202	6402	7202	8202	9002	9502
Cooling capacity ⁽⁵⁾	kW	337,6	415,0	500,0	595,6	665,4	748,2	824,5	880,3
Compressors input power ⁽⁵⁾	kW	121,5	146,7	176,6	207,7	230,0	252,2	278,2	297,0
Power supply	V/Phz				400V - 3 - 50 Hz				
Peak current	A	493,6	665,6	516,6	581,6	621,6	752,6	745,6	931,6
Max input current	A	282,6	338,6	394,6	452,6	492,6	542,6	602,6	670,6
Compressors		Screw Semi-hermetic							
Compressors	n°	2	2	2	2	2	2	2	2
Sound power level (LS)	dB(A)	81	82	83	84	84	85	86	86
Sound pressure level (LS)	dB(A)	53	54	55	56	56	57	58	58

⁽⁵⁾ Cooling: evaporator water temperature in/out 12/7°C; Condensing temperature 50°C.

⁽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.

FRAME

All WVK 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 R407C. 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. 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 is through the front and side panels.

CONDENSERS

The source heat exchangers are braze welded, plate type heat exchangers, manufactured from AISI 316 stainless steel. From size 1601 to size 4001 and from size 6402 to 9002 they are single circuit ; From size

3202 to size 5202 they are double circuit "cross flow" type. The use of these heat exchangers allows a massive reduction of the refrigerant charge of the unit compared to the traditional shell-in-tube type and increases the efficiency of the refrigerant cycle in partial loads.

EVAPORATORS

The user heat exchangers are made braze welded, plate type heat exchangers, manufactured from AISI 316 stainless steel. From size 1601 to size 4001 and from size 6402 to 9002 they are single circuit ; From size 3202 to size 5202 they are double circuit "cross flow" type. All units are supplied with sub-cooler to enhance the performance of the refrigerant cycle. The user heat exchangers are factory insulated with flexible close cell material. They are all provided with a temperature sensor for antifreeze protection. All WDR 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.

ELECTRICS 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 (screw 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 R407C 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. The microprocessor controls defrost automatically (when operating in low ambient conditions) and also the summer/winter change over.

PARTIAL HEAT RECOVERY RP

This version is supplied with an auxiliary heat exchanger fitted in series with the unit condenser thereby enabling it to produce hot water when the unit is operating in cooling mode.

CONDENSERLESS UNITS REFRIGERANT CONNECTIONS

Condensing unit (WVK/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 Table II.

Condensing unit installed at a lower level than the evaporation section

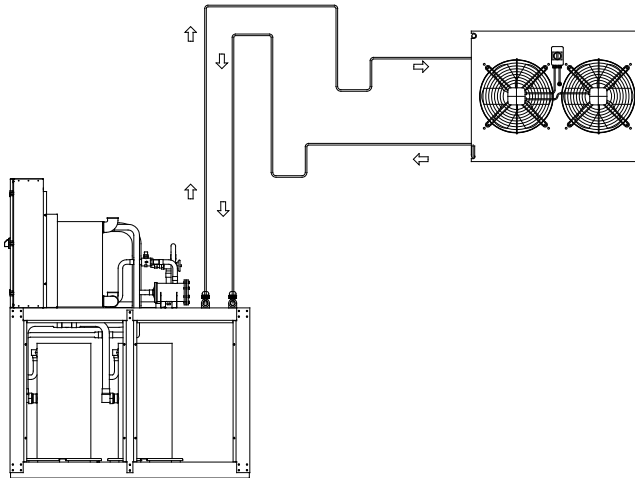
Install a liquid trap on the suction line at the evaporator outlet and at the same height in order that liquid refrigerant, when the system is off, will not fall back to the compressor. Locate this trap down-stream from the bulb of the thermostatic valve to ensure that when the compressor is restarted,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

tion 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.

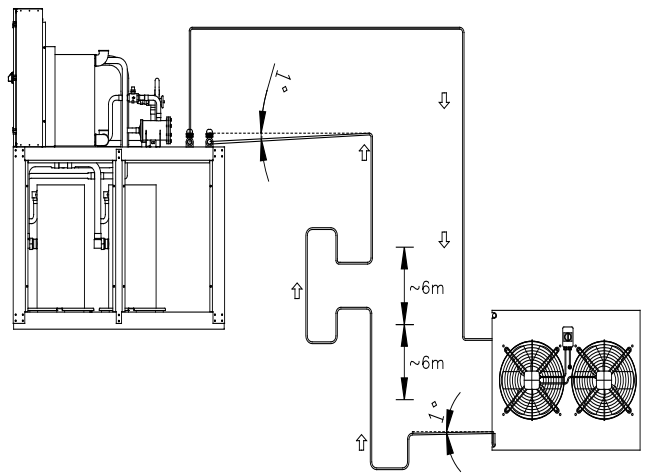
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WVK/EV lower than the remote condenser



WVK/EV higher than the remote condenser



Refrigerant line diameters for WVK/EV versions

Distance (m)	10		20		30		
	Mod.	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)	Gas (mm)	Liquid (mm)
2301		42	35	54	35	54	35
2701		54	35	54	42	54	42
3201		54	42	54	42	54	42
3601		54	42	54	42	54	42
4001		54	42	64	42	64	54
3202		42x2	28x2	42x2	28x2	42x2	35x2
3602		42x2	28x2	42x2	35x2	42x2	35x2
4502		42x2	35x2	54x2	35x2	54x2	35x2
5202		54x2	35x2	54x2	42x2	54x2	42x2
6402		54x2	42x2	54x2	42x2	54x2	42x2
7202		54x2	42x2	54x2	42x2	54x2	42x2
8202		54x2	42x2	64x2	42x2	64x2	54x2
9002		64x2	42x2	64x2	54x2	64x2	54x2
9502		64x2	42x2	64x2	54x2	64x2	54x2

Refrigerant charge for liquid line

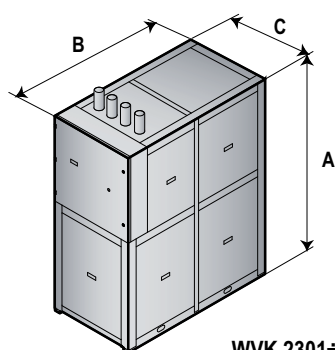
Liquid line diameter	Refrigerant charge g/m	Liquid line diameter	Refrigerant charge g/m
28 (mm)	570	42 (mm)	1270
35 (mm)	860	54 (mm)	2170

Cooling capacity correction factors

Mod.	Refr. Line 0 mt.	Refr. Line = 10 mt.	Refr. Line 20 mt.	Refr. Line 30 mt.
WVK/EV	1	0,98	0,96	0,95

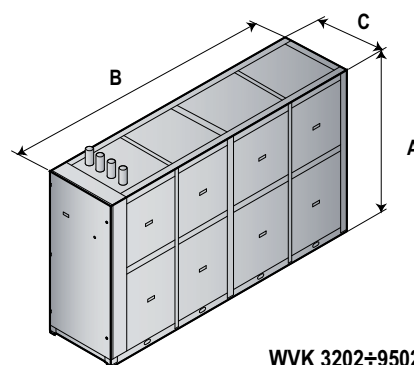
Version WVK ÷ WVK/HP ÷ WVK /EV	Code	2301-2701	3201-4001	3202-5202	6402-9502
Main switch	-	●	●	●	●
Flow switch	-	●	●	●	●
LS low noise version	LS01	○	○	○	○
Hydraulic kit A1NT with one pump without tank	A1NT	○	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○	○
Spring anti-vibration mountings	KAVM	○	○	○	○
Liquid line solenoid valve	VSLI	○	○	○	○
Refrigerant circuit pressure gauges	MAML	○	○	○	○
Compressors suction manual valves	MVCS	○	○	○	○
Remote control panel	PCRL	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○
Source 4÷20 mA modulating valve	V2M0	○	○	○	○
Pressostatic valve kit (only cooling version)	VPSF	○	○	○	○

● Standard, ○ Optional, – Not available.



WVK 2301÷4001

Mod.	A (mm)	B (mm)	C (mm)	Kg
2301	1855	2480	800	1190
2701	1855	2480	800	1290
3201	1855	2480	800	1370
3601	1855	2480	800	1480
4001	1855	2480	800	1620



WVK 3202÷9502

Mod.	A (mm)	B (mm)	C (mm)	Kg
3202	1855	2960	800	1750
3602	1855	2960	800	1840
4502	1855	4600	800	2320
5202	1855	4600	800	2490
6402	1855	4600	800	2600
7202	1855	4600	800	2750
8202	1855	4600	800	2830
9002	1855	4600	800	2900
9502	1855	4600	800	3190