

Water-Source, Water-to-Air Heat Pump



Why choose a water-source heat pump?

A heat pump transfers energy from one source to another using electricity to drive the transfer. Using this technology in occupied spaces provides energy savings. Heat-pump energy transfer commonly uses air or water. Water provides an efficient energy-transfer path and, because of its high thermal conductivity, allows a more efficient and compact unit than an air-source system. The lower condensing temperature supports lower energy consumption.

Main heat-pump components

- Condenser (plate heat exchanger)
- Evaporator (air-cooled)
- Compressor (rotary/scroll)
- Expansion valve (bi-flow)
- Refrigerant: R410A

WSHP system operation

Water-cooled system operating principle

Modern buildings may require simultaneous heating and cooling in different zones throughout the year. Highly insulated business centres, shopping centres, hospitals, hotels and similar buildings may have this demand because of insulation and changing internal heat loads.

The water-source heat-pump loop is closed. The circulating water is intended to remain within 15-30°C throughout the year; this interval may vary by $\pm 3^{\circ}\text{C}$ with local climatic conditions. Water temperature is controlled using a three-way valve and the return-water temperature is monitored. The cooling tower starts above 30°C; the boiler starts below 15°C. Between 15°C and 30°C, neither is required and heat is recovered within the system.

Simultaneous heating and cooling: tower/boiler-supported systems

The boiler and cooling tower are off while WSHP units operate in heating and cooling modes. Simultaneous demands enable heat recovery between units, supporting energy savings and efficient operation. The loop operates in the 15-30°C balance interval. The principal source-side components are a cooling tower and boiler; water-to-air heat pumps serve the building/load side. A smaller tower and boiler arrangement than a conventional system is sufficient.

Shopping centres and shell-and-core commercial buildings are preferred applications. Inter-unit heat recovery during simultaneous heating and cooling supports efficiency and low energy consumption.

Main applications

- Shopping and mixed-use centres
- Shell-and-core buildings, offices and commercial buildings
- Factories and administrative buildings

WSHP applications and equipment views



Equipment controller



WSHP application illustration and equipment views.

WSHP model data - 1/2

Model	Fan	AP-WSHP-TT-6	AP-WSHP-TT-8	AP-WSHP-TT-10	AP-WSHP-TT-12	AP-WSHP-TT-16	AP-WSHP-TT-24	AP-WSHP-TT-32
Unit airflow	m³/h - High m³/h - Medium m³/h - Low	1.000 930 875	1.320 1.180 1.025	1.800 1.680 1.545	2.350 2.100 1.925	2.850 2.600 2.520	4.700 4.200 3.850	5.700 5.200 5.400
External pressure loss	Pa - High Pa - Medium Pa - Low	150 120 100	150 120 100	150 120 100	150 120 100	150 120 100	150 120 100	150 120 100
Fan speed	Steps	3	3	3	3	3	3	3
Maximum fresh-air ratio (%)		25	25	25	25	25	25	25
T_d (°C-RH)	T_m (°C-RH)	COOLING CAPACITY (kW)						
34 - % 50	27 - % 50	5,76	8,00	10,00	11,8	15,45	23,60	30,90
Operating water temperature	°C	30 - 35	30 - 35	30 - 35	30 - 35	30 - 35	30 - 35	30 - 35
T_d (°C-RH)	T_m (°C-RH)	HEATING CAPACITY (kW)						
7 - % 80	22 - % 50	7,10	9,30	11,28	13,70	19,08	27,40	38,16
Operating water temperature	°C	20	20	20	20	20	20	20
Fan motor power	kW	0,15	0,15	0,42	0,25	0,37	0,50	0,74
Compressor power	kW	1,58	2,66	3,16	3,43	3,83	6,86	7,66
Compressor type / quantity	Rotary	1	1	1	1	1	2	2
Installed unit power	kW	1,85	2,93	3,70	4,00	4,35	8,00	8,70

WSHP model data - 2/2

Model	Fan	AP-WSHP-TT-6	AP-WSHP-TT-8	AP-WSHP-TT-10	AP-WSHP-TT-12	AP-WSHP-TT-16	AP-WSHP-TT-24	AP-WSHP-TT-32
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A
Filter type / class	Cassette	G2 - Pol	G2 - Pol	G2 - Pol	G2 - Pol	G2 - Pol	G2 - Pol	G2 - Pol
Operating water flow	L/s	0,30	0,40	0,60	0,60	0,8	1,2	1,6
Operating water pressure loss	kPa	41,5	36,3	29,7	29,3	56,1	36,1	51,2
Water connection diameter	Inch	3/4 "	3/4 "	3/4 "	1 "	1 "	1 1/4 "	1 1/4 "
Operating voltage	Volt	230 - 1 P - 50 Hz	230 - 1 P - 50 Hz	230 - 1 P - 50 Hz	230 - 1 P - 50 Hz	230 - 1 P - 50 Hz	380 - 3 P - 50 Hz	380 - 3 P - 50 Hz
Applicable fuse	Amp - time-delay	6 A.	8 A.	12 A.	16 A.	20 A.	16 A.	16 A.
Unit width	W - mm	730	730	730	730	730	950	1000
Unit height	H - mm	520	570	570	570	570	570	570
Unit length	L - mm	1070	1320	1370	1420	1520	1520	1520
Air-duct connection dimensions (mm)	Air intake inlet	466*367	686*417	716*417	766*417	866*417	866*417	866*417
	Air discharge	230*210	230*210	300*260	265*290	300*260	650*290	700*260