SIMULTANEOUS HEAT/COOL HEAT PUMP

AIR

4-pipe Air Source Heat Pump Unit

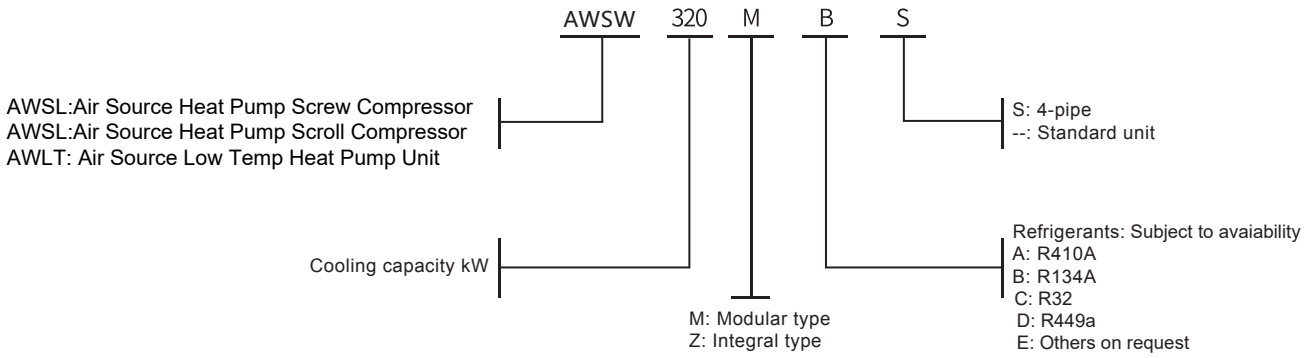
65kW~1350kW



Description

4-pipe air source heat pump units has been developed with many years of technilogical development, the advantages of the all-in-one units installed in a 4-pipe system: maximum comfort, self-adaptability simultaneous hot and cold water production, unbeatable energy and system efficiency, system simplification.
4-pipe air source heat pump units are widely used in hospitals, hotels, modern mixed-use buildings, large business centers, process industries etc.

Product nomenclature



Operating range

	Water inlet temperature °C		Ambient temperature °C	
	Minimum temperature	Maximum temperature	Minimum temperature	Maximum temperature
	Cooling			
Evaporator side	5°C	15°C	-	-
Condenser side	-	-	-10°C	46°C
	Heating			
Condenser side	26°C	55°C (60°C option)	-	-
Evaporator side	-	-	-10°C	20°C
	100% heat recovery			
Evaporator side	26°C	55°C (60°C option)	-	-
Heat recovery side	30°C	45°C	-10°C	46°C



Multifunction

4-pipe air source heat pump unit

Cooling
Heating
Cooling and heating

- High efficiency scroll compressors, R410a/R32/R449a
- Semi-hermetic screw compressors, R134a/R449a
- Suitable for air-conditioning in buildings that require separate areas to be heated and cooled at the same time and process engineering applications.
- Combined with PLC smart control, manages the overall capacity
- Simplified system: plant areas are reduced, hydronic circuits are simplified, maintenance is reduced by half
- Single unit maximum capacity 520kw (scroll type)


Refrigerant benchmark

SCROLL

Refrigerant	GWP*	Flammability**
R410A	2088	NON flammable
R32	675	MILDLY flammable
R454B	466	MILDLY flammable
R452B	698	MILDLY flammable

SCREW

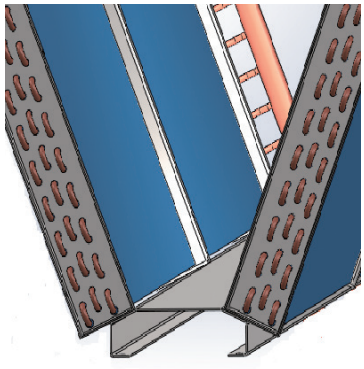
Refrigerant	GWP*	Flammability**
R134a	1430	NON flammable
R513A	631	NON flammable
1234ze	7	MILDLY flammable
1234yf	4	MILDLY flammable

*IPCC AR4 **ASHRAE 34 - ISO 817



Characteristic

Cooling in low ambient temperature: detects the suction and discharge pressures of compressors, adopting step-less inverter fans, to achieve the cooling in -10°C ambient temperature.



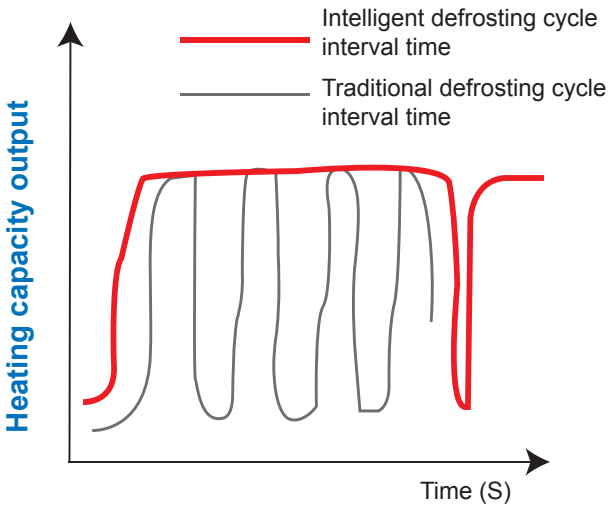
20% -100% step-less regulation of hot water flow rate.

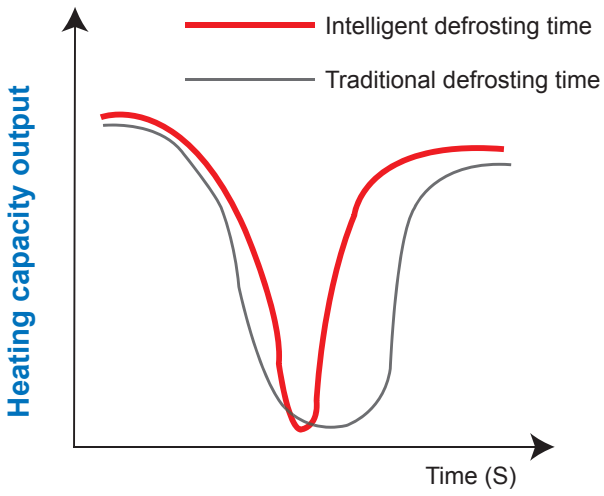
PLC smart control technology, cascade energy regulation method, automatic detection of operating status, achieving energy-saving operation.

No drain pan design ensures smooth drainage of condensed water from the coils during heating, which prevents water from freezing and improves the heating capacity and stability of the unit.

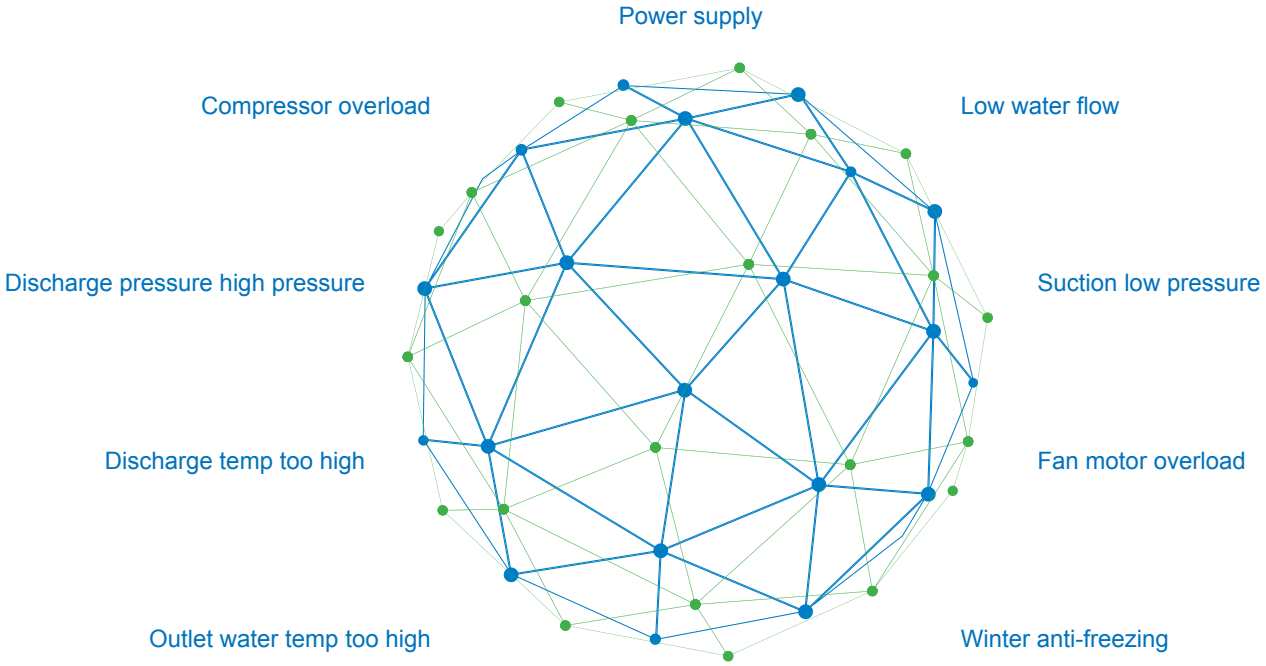
High-precision pressure and temperature sensors can accurately sense the changes in system pressure and temperature in evaporator and intelligently initiates a defrost cycle.

Heating in low ambient temperature: enhanced vapor injection and high-temperature liquid control technology achieves heating operation at ultra-low temperature at -30°C.



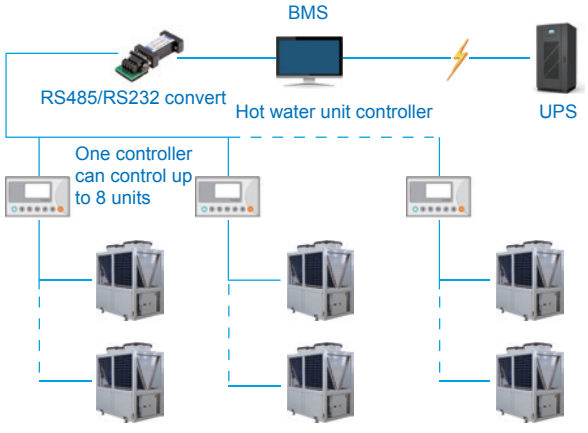


Multi-protection



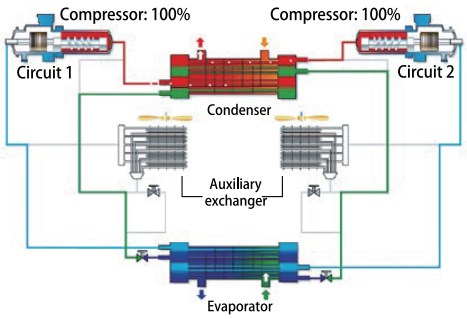
Intelligent control system

Optional RS485 communication port makes it easy to download the latest unit control program, increased storage capacity and sensitive control response.
Energy regulation advantage: adopting fuzzy interval control, ensuring smooth operation of the unit and high energy conversion efficiency.
Capacity adjustment loading and unloading function: Through capacity adjustment time, the unit is controlled to gradually load and unload when the load changes instantaneously, avoiding frequent startup and shutdown, and ensuring more stable unit operation.
Auto Time Clock Function: achieving automatic operation throughout the year.

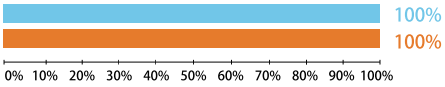




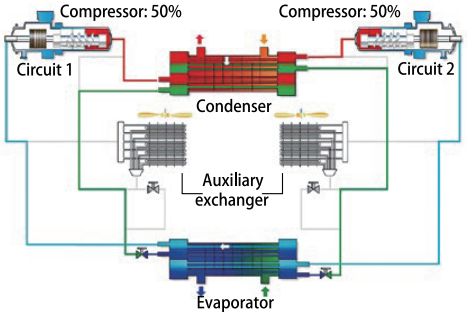
Intelligent control system



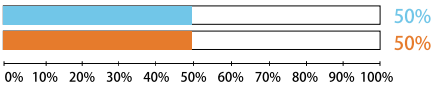
100% cold side / 100% hot side



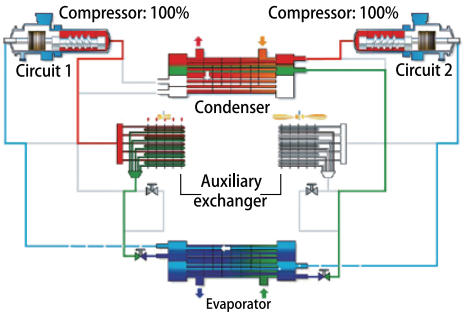
The two circuits operate at maximum power, evaporating in the cold-side exchanger and condensing in the hot-side one.
The source-side heat exchanger (air coil or water exchanger, depending on the type of unit) is not used, which means that in these conditions there is no energy waste.



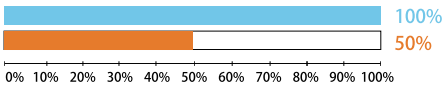
50% cold side / 50% hot side



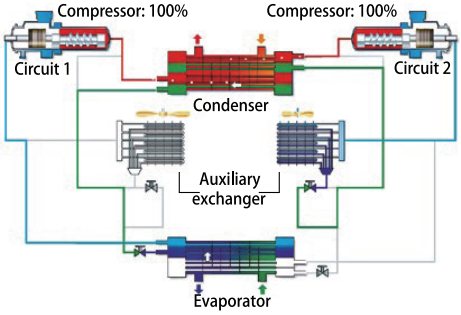
Also in this situation the unit operates like a water-water unit, as all the evaporating and condensing energy is used for the system.
Since the system only requires 50% of the total energy, each circuit operates in partial load conditions. In this particular state, the exchangers are oversized, thus achieving an even higher efficiency.



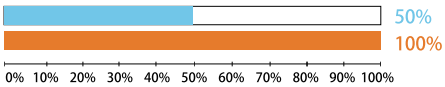
100% cold side / 50% hot side



Both the circuits operate to produce the amount of energy necessary for the cooling of the plant, evaporating all the refrigerant in the cold-side heat exchanger. While one circuit carries out the condensation on the hot-side heat exchanger, thus supplying the total energy necessary to heat the building, the other circuit exchanges the remaining heating energy in the external environment by using the auxiliary source-side heat exchanger (air coil or water exchanger, depending on the type of unit).



50% cold side / 100% hot side



Just like the previous case, in this state both circuits operate differently, to supply the system with the correct amount of required energy.
The unit uses two sources to produce the requested hot water ow: in fact, one circuit evaporates the refrigerant in the cold-side heat exchanger, thus producing the cold water demand, while the other circuit uses the auxiliary source-side heat exchanger. In this way both circuits move energy through the hot-side heat exchanger, fulfilling the request for hot water flow.

Technical data - scroll type

AWSL-MAS			65	90	130	260	390	520
Cooling	Cooling capacity	kW	65	90	130	260	390	520
	Power input	kW	20.8	28.2	46.4	92.8	185.6	185.6
	Evaporator water flow	m^3/h	11	15.5	22	45	67	88
	Evaporator water pressure drop	kPa	43	45	48	48	48	48
Heating	Heating capacity	kW	68	95	140	280	420	560
	Power input	kW	20.2	27	47	94	141	188
	Hot water flow	m^3/h	11.7	17.9	24	48	72	96
	Hot water pressure drop	kPa	44	46	49	49	50	0
Cooling+heating	Cooling capacity	kW	63.7	88.2	127.4	254.9	382.3	509.8
	Power input	kW	21.22	29.2	47.34	94.69	142.02	189.36
	Evaporator water flow	m^3/h	11	15	22	44	66	88
	Evaporator water pressure drop	kPa	43	45	48	48	48	48
	Heat recovery capacity	kW	84.9	117	174.8	349.6	524.4	699.2
	Heat recovery water flow	m^3/h	14.6	20	30	60	90	120
	Heat recovery water pressure drop	kPa	44	46	49	49	50	50
Compressor type			Scroll					
Compressor Qty.			2	2	2	4	6	8
Circuits			2	2	2	4	6	8
Fan								
Fan Qty.			2	2	2	4	6	8
Air flow rate		m^3/h	3.6	5.3	6	6	6	6
Motor power		kW	0.75	1.1	1.5	1.5	1.5	1.5
Refrigerant			R410A					
Charge amount		kg	2×10	2×12	2×16	4×16	6×16	8×16
Dimension								
Length		mm	2060	2260	2260	2430	3610	4862
Width		mm	1100	1250	1250	2260	2260	2260
Height		mm	2013	2375	2375	2494	2494	2494
Operating weight		kg	780	1060	1260	2520	3780	5040

Note:

* Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.

** Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.

*** Plant (side) cooling exchanger water (in/out) 12°C/7°C; Plant (side) heat exchanger water (in/out) 40°C/45°C.

**** Cooling condition operating range: ambient temperature -10°C ~ +46°C.



Technical data - screw type

AWSW-ZBS			300	350	420	510	580	650	730	860	980	1120	1250	1350
Cooling	Cooling capacity	kW	305	352	425	510	578	645	725	860	980	1116	1248	1348
	Power input	kW	89	102	119.4	143.1	162.5	180.5	202.8	240.3	275	311.1	350	377.8
	Evaporator water flow	m^3/h	52.46	61.9	73.9	88.5	100.6	111.8	125.6	148.8	170.3	192.6	216.7	233.9
	Evaporator water pressure drop	kPa	32	33.1	38.1	43.5	36.7	42.1	43.5	35.8	34.9	35.9	34.3	37.8
Heating	Heating capacity	kW	316	368	442.9	528	600	667	750	890	1017	1153	1296	1400
	Power input	kW	86	96.3	115.1	137.7	156.5	173.8	195.2	231.4	264.8	299.6	337.1	369
	Hot water flow	m^3/h	54	63	76	91	103	115	129	153	175	198	223	240
	Hot water pressure drop	kPa	34	36	42.3	48.1	42.2	47.6	49.5	37.4	38	40.1	39.1	42.3
Cooling + heating	Cooling capacity	kW	306.5	353.7	427.1	512.5	580.9	648.2	728.6	864.3	984.9	1121.6	1254.2	1354.7
	Power input	kW	87.2	99.96	117.01	140.2	159.2	176.9	198.7	235.5	269.5	304.8	343	370.2
	Evaporator water flow	m^3/h	52	60	73.4	88	100	111	125	148	170	193	216	233
	Evaporator water pressure drop	kPa	31	31.7	37.2	41.6	35.7	41.1	42.2	35.5	34.6	35.2	33.1	37
	Heat recovery capacity	kW	392	450.8	541.2	648	736	818	920	1090	1250	1420	1590	1710
	Heat recovery water flow	m^3/h	67	77	93	111	126	140	158	187	215	244	273	294
	Heat recovery water pressure drop	kPa	50	52.4	60.4	68.4	58.3	67.3	69.1	57.2	55.8	57.3	54.2	61.1
Compressor type			Semi-hermetic screw											
Compressor Qty.			2	2	2	2	2	2	2	2	2	2	2	2
Circuits			2	2	2	2	2	2	2	2	2	2	2	2
Fan														
Fan Qty.			6	6	8	8	10	10	12	14	16	18	20	20
Air flow rate		m^3/s	33	40.5	44	54	67.5	67.5	81	94.5	108	121.5	135	135
Motor power		kW	1.5	2.2	1.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Refrigerant			R134a											
Charge amount		kg	107	122	138	164	172	193	258	280	302	308	362	375
Refrigerant oil		kg	28	30	30	44	44	38	38	60	60	60	60	64
Dimension														
Length		mm	3910	3910	5162	5162	6342	6342	7522	8774	9954	11134	12386	12386
Width		mm	2360	2360	2360	2360	2360	2360	2360	2360	2360	2360	2360	2360
Height		mm	2710	2710	2710	2710	2710	2710	2710	2710	2710	2710	2710	2710
Operating weight		kg	4690	5140	5410	6850	7290	7800	8490	9800	10380	12430	13450	13770

Note:

* Plant (side) cooling exchanger water (in/out) 12°C/7°C; Source (side) heat exchanger air (in) 35°C.

** Plant (side) heat exchanger water (in/out) 40°C/45°C; Source (side) heat exchanger air (in) 7°C - 87% R.H.

*** Plant (side) cooling exchanger water (in/out) 12°C/7°C; Plant (side) heat exchanger water (in/out) 40°C/45°C.

**** Cooling condition operating range: ambient temperature -10°C ~ +46°C.

Correction factor (cooling in summer)

		Unit water outlet temp (°C)											
		5		7		9		11		13		15	
		Cooling capacity	Power input	Cooling capacity	Power input	Cooling capacity	Power input	Cooling capacity	Power input	Cooling capacity	Power input	Cooling capacity	Power input
Air inlet temp (°C)	20	1.039	0.705	1.107	0.722	1.173	0.744	1.241	0.761	1.31	0.778	1.378	0.795
	22	1.026	0.733	1.094	0.75	1.161	0.773	1.229	0.79	1.296	0.813	1.364	0.83
	24	1.014	0.761	1.08	0.784	1.147	0.807	1.214	0.824	1.282	0.847	1.348	0.864
	26	1.008	0.778	1.067	0.818	1.133	0.841	1.2	0.864	1.266	0.881	1.333	0.903
	28	0.989	0.83	1.053	0.852	1.119	0.875	1.184	0.898	1.249	0.92	1.316	0.943
	30	0.975	0.869	1.039	0.892	1.104	0.915	1.167	0.938	1.234	0.96	1.299	0.983
	32	0.96	0.909	1.025	0.932	1.087	0.96	1.152	0.983	1.215	1.006	1.28	1.028
	35	0.938	0.972	1	1	1.062	1.028	1.125	1.051	1.187	1.074	1.251	1.102
	38	0.915	1.04	0.975	1.068	1.036	1.097	1.096	1.125	1.158	1.153	1.22	1.176
	40	0.899	1.091	0.958	1.119	1.017	1.148	1.077	1.176	1.136	1.205	1.197	1.227
	42	0.882	1.142	0.94	1.17	0.998	1.199	1.057	1.233	1.116	1.256	1.173	1.284
	44	0.865	1.193	0.923	1.227	0.98	1.256	1.036	1.284	1.093	1.318	1.15	1.341
	46	0.847	1.25	0.904	1.284	0.969	1.284	1.025	1.318	1.087	1.33	1.127	1.398

Note:

* Based on 100% of cooling output / input with chilled water outlet / inlet 7/12 °C & ambient temp at 35 °C

** Other working conditions refer to standard cooling capacity / input x coefficiency

Correction factor (heating in winter)

		Unit water outlet temp (°C)											
		35		38		40		45		48		50		55	
		Heating capacity	Power input	Heating capacity	Power input	Heating capacity	Power input	Heating capacity	Power input	Heating capacity	Power input	Heating capacity	Power input	Heating capacity	Power input
Air inlet temp (°C)	-10	0.647	0.716	0.646	0.761	0.646	0.795	0.645	0.881	0.645	0.943	0.641	0.983		
	-8	0.678	0.722	0.677	0.773	0.676	0.801	0.676	0.892	0.675	0.955	0.675	1		
	-6	0.713	0.733	0.713	0.778	0.712	0.813	0.711	0.909	0.711	0.972	0.711	1.011		
	-4	0.75	0.744	0.749	0.79	0.749	0.824	0.748	0.92	0.748	0.983	0.747	1.028	0.746	1.136
	-2	0.79	0.75	0.789	0.801	0.789	0.835	0.788	0.932	0.787	1	0.787	1.045	0.784	1.153
	0	0.833	0.761	0.832	0.813	0.831	0.84	0.831	0.949	0.83	1.017	0.83	1.063	0.825	1.176
	2	0.877	0.773	0.876	0.824	0.875	0.864	0.875	0.966	0.874	1.028	0.874	1.08	0.87	1.193
	5	0.951	0.79	0.95	0.841	0.949	0.881	0.948	0.989	0.948	1.057	0.948	1.102	0.943	1.222
	7	1.002	0.801	1.001	0.858	1.001	0.898	1	1	1	1.074	0.999	1.125	0.995	1.244
	10	1.086	0.824	1.085	0.881	1.085	0.92	1.084	1.028	1.08	1.09	1.079	1.148	1.074	1.273
	12	1.145	0.835	1.142	0.892	1.139	0.932	1.136	1.045	1.135	1.119	1.135	1.17	1.127	1.29
	14	1.20	0.852	1.203	0.909	1.2	0.949	1.195	1.063	1.192	1.136	1.191	1.188	1.183	1.313
	16	1.272	0.869	1.266	0.926	1.263	0.966	1.256	1.08	1.253	1.153	1.25	1.205	1.241	1.335
	18	1.338	0.886	1.332	0.943	1.328	0.983	1.319	1.097	1.315	1.17	1.312	1.227	1.3	1.358

Note:

* Based on 100% of heating output / input with hot water inlet / outlet 40/45 °C & air inlet temp 7 °C, humidity 85%

** Other working conditions refer to standard heating capacity / input x coefficiency

Correction factor (cooling + heat recovery)

		Unit water outlet temp (°C)																	
		30			35			40			45			50			55		
		Cooling capacity	Power input	Heat recovery capacity	Cooling capacity	Power input	Heat recovery capacity	Cooling capacity	Power input	Heat recovery capacity	Cooling capacity	Power input	Heat recovery capacity	Cooling capacity	Power input	Heat recovery capacity	Cooling capacity	Power input	Heat recovery capacity
Evaporator water outlet temp (°C)	5	0.976	0.714	0.969	1.006	0.791	0.96	0.972	0.885	0.952	0.936	0.984	0.944	0.895	1.104	0.938	0.857	1.22	0.932
	6	1.074	0.72	0.999	1.041	0.797	0.989	1.006	0.89	0.98	0.967	0.995	0.973	0.926	1.11	0.965	0.889	1.231	0.959
	7	1.11	0.725	1.027	1.075	0.808	1.017	1.039	0.896	1.009	1	1	1	0.959	1.121	0.991	0.918	1.236	0.988
	8	1.144	0.731	1.057	1.111	0.813	1.047	1.074	0.907	1.037	1.035	1.011	1.027	0.991	1.132	1.019	0.95	1.247	1.011
	10	1.215	0.747	1.115	1.181	0.824	1.104	1.143	0.918	1.094	1.1	1.027	1.083	1.055	1.148	1.073	1.011	1.264	1.064
	12	1.287	0.758	1.173	1.251	0.835	1.162	1.212	0.934	1.151	1.168	1.038	1.14	1.121	1.159	1.127	1.074	1.28	1.116
	15	1.396	0.769	1.262	1.358	0.852	1.25	1.317	0.951	1.237	1.27	1.06	1.224	1.218	1.181	1.209	1.168	1.302	1.196

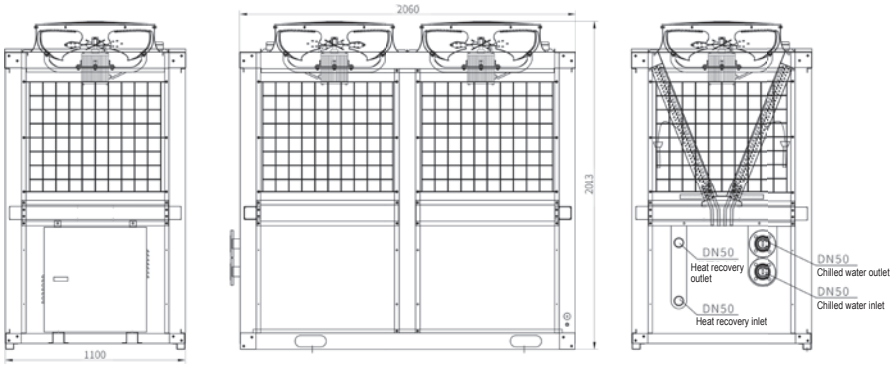
Note:

* Based on 100% of cooling output / input / heat recovery capacity with hot water inlet / outlet 40/45 °C & chilled water inlet / outlet 12/7 °C

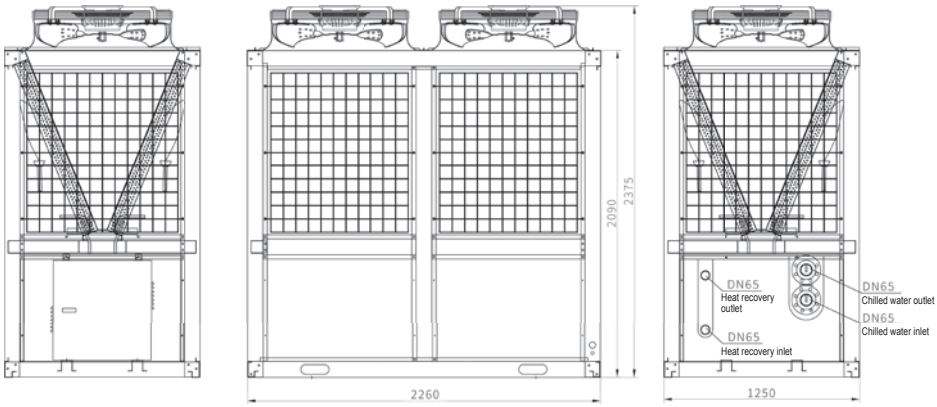
** Other working conditions refer to standard cooling capacity / input x coefficiency

Unit dimension

AWSL65MAS



AWSL130/190MAS



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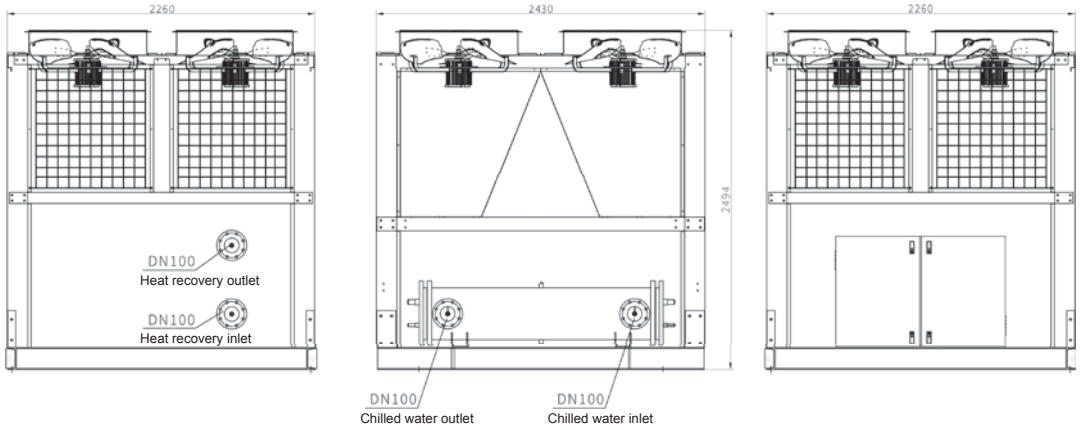

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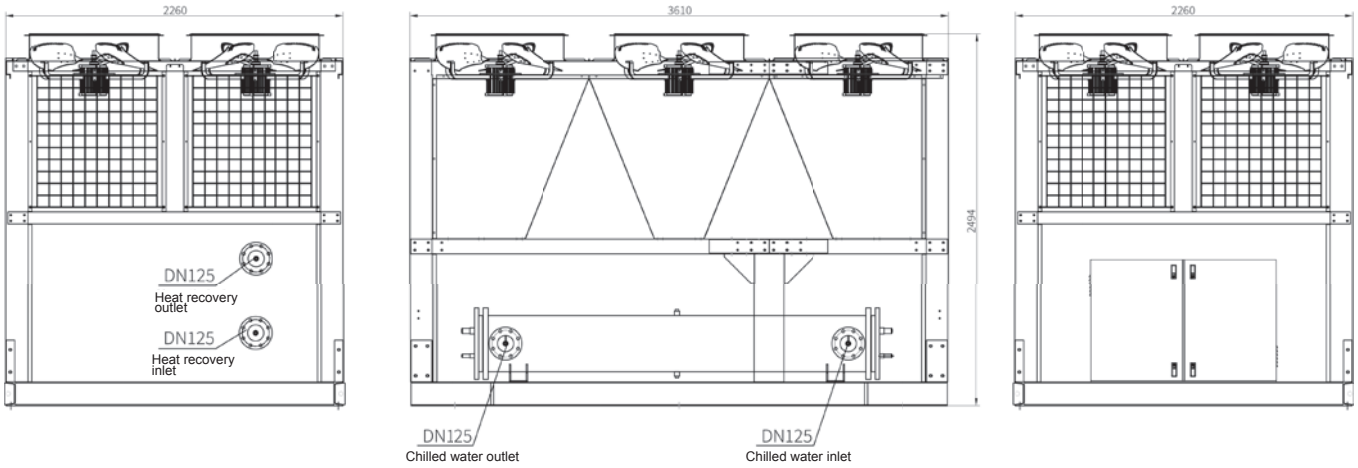

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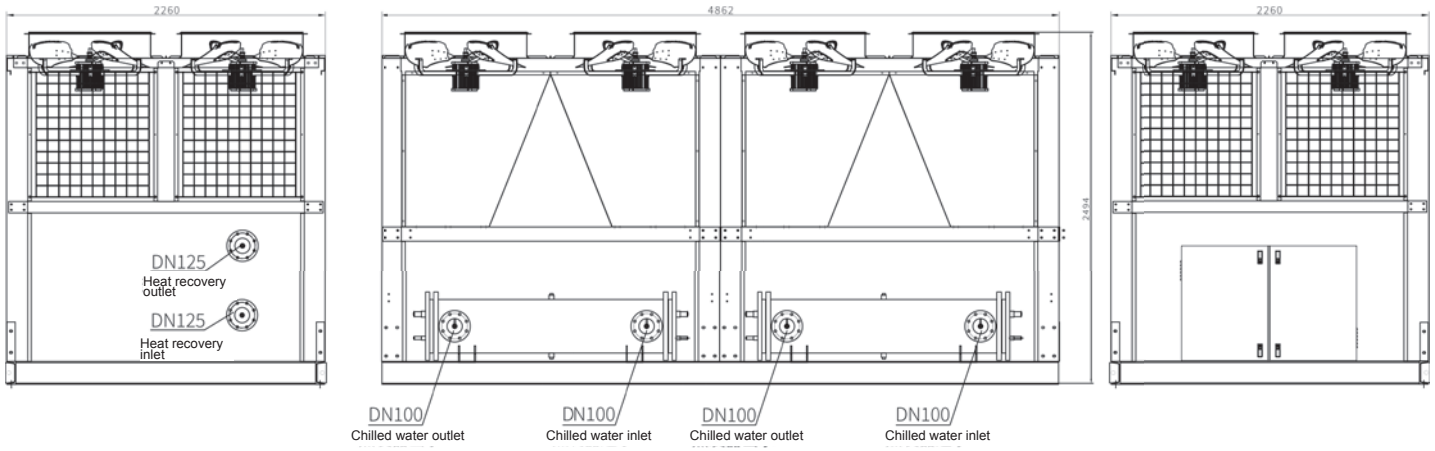
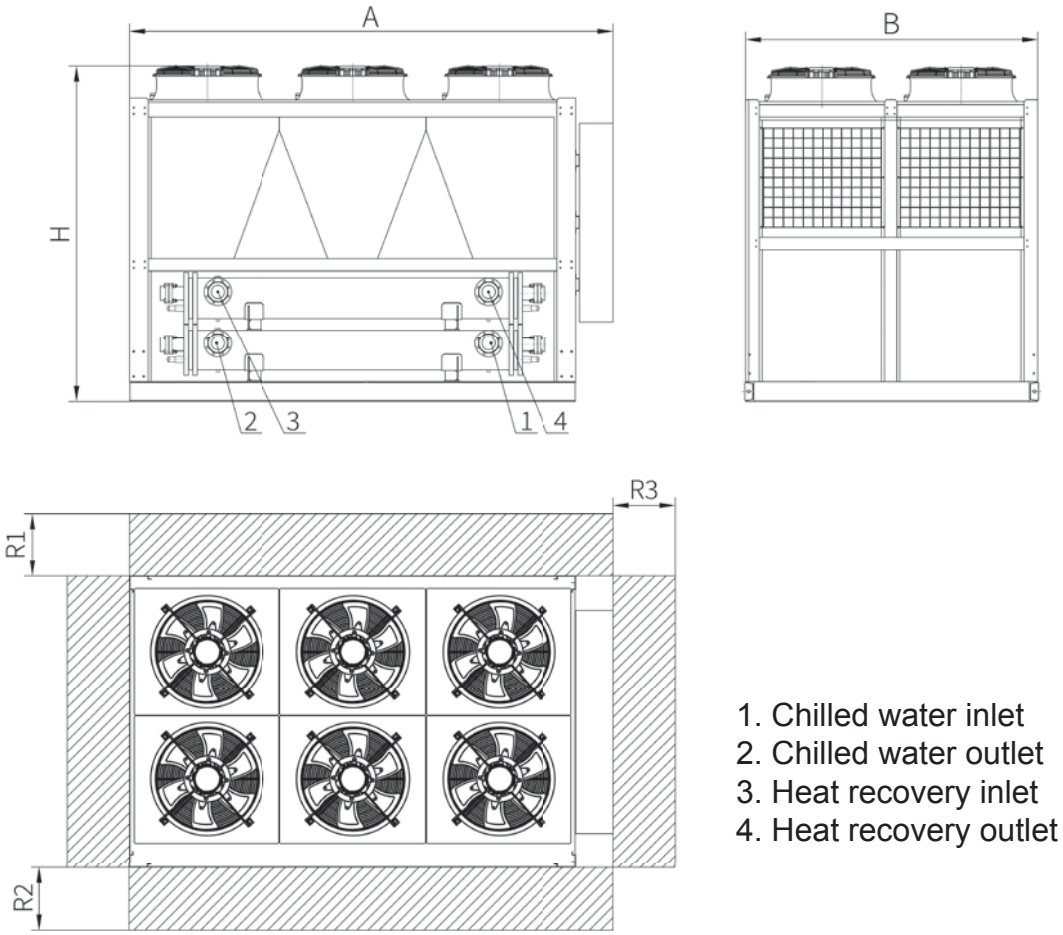


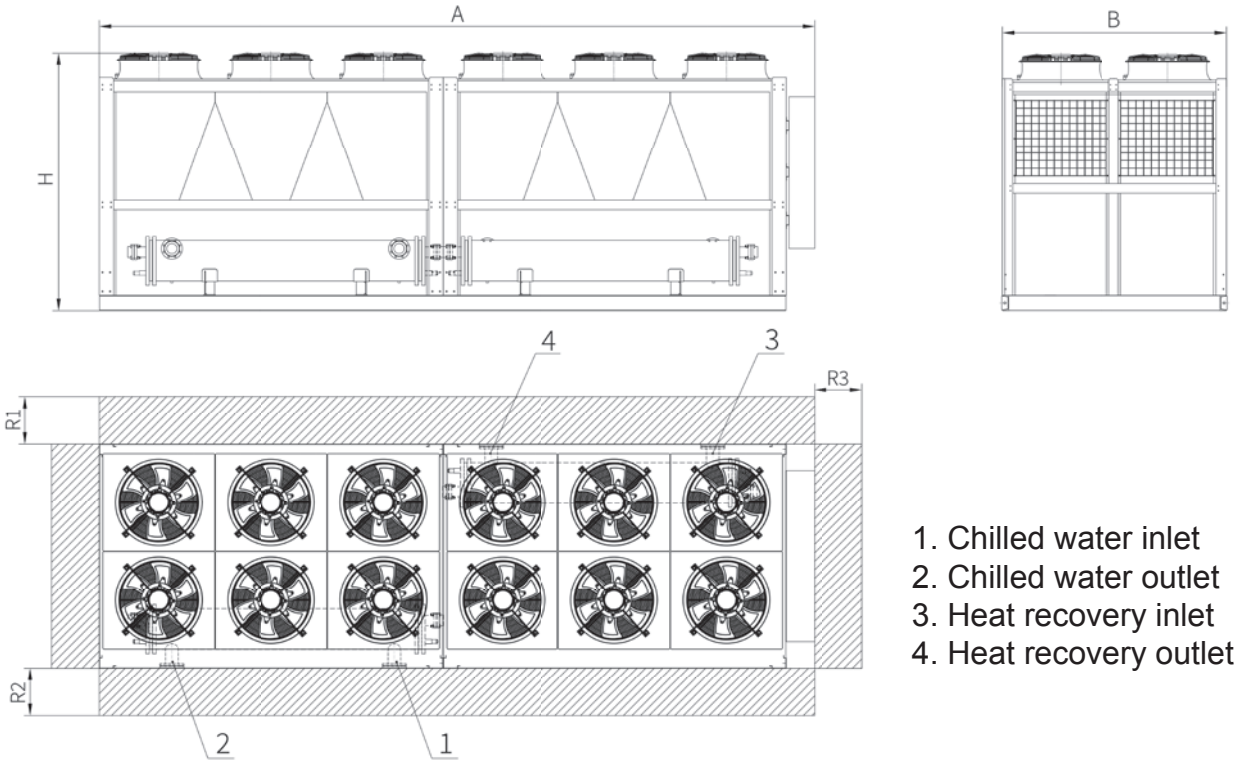
AWSW300~510ZBS



1. Chilled water inlet
2. Chilled water outlet
3. Heat recovery inlet
4. Heat recovery outlet

Model	Dimension			Maintenance spacing				Evaporator connection		Hot water connection	
AWSW-ZBS	A(mm)	B(mm)	H(mm)	Rl(mm)	R2(mm)	R3(mm)	R4(mm)	Type	DN	Type	DN
300	3910	2360	2710	2000	2000	1800	1500	Flange	100	Flange	100
350	3910	2360	2710	2000	2000	1800	1500	Flange	100	Flange	100
420	5162	2360	2710	2000	2000	1800	1500	Flange	100	Flange	100
510	5162	2360	2710	2000	2000	1800	1500	Flange	125	Flange	125

AWSW580~1350ZBS



1. Chilled water inlet
2. Chilled water outlet
3. Heat recovery inlet
4. Heat recovery outlet

Model	Dimension			Maintenance spacing				Evaporator connection		Hot water connection	
AWSW-ZBS	A(mm)	B(mm)	H(mm)	Rl(mm)	R2(mm)	R3(mm)	R4(mm)	Type	DN	Type	DN
580	6342	2360	2710	2000	2000	1800	1500	Flange	125	Flange	125
650	6342	2360	2710	2000	2000	1800	1500	Flange	125	Flange	125
730	7522	2360	2710	2000	2000	1800	1500	Flange	125	Flange	125
860	8774	2360	2710	2000	2000	1800	1500	Flange	150	Flange	150
980	9954	2360	2710	2000	2000	1800	1500	Flange	150	Flange	150
1120	11134	2360	2710	2000	2000	1800	1500	Flange	150	Flange	150
1250	12386	2360	2710	2000	2000	1800	1500	Flange	200	Flange	200
1350	12386	2360	2710	2000	2000	1800	1500	Flange	200	Flange	200