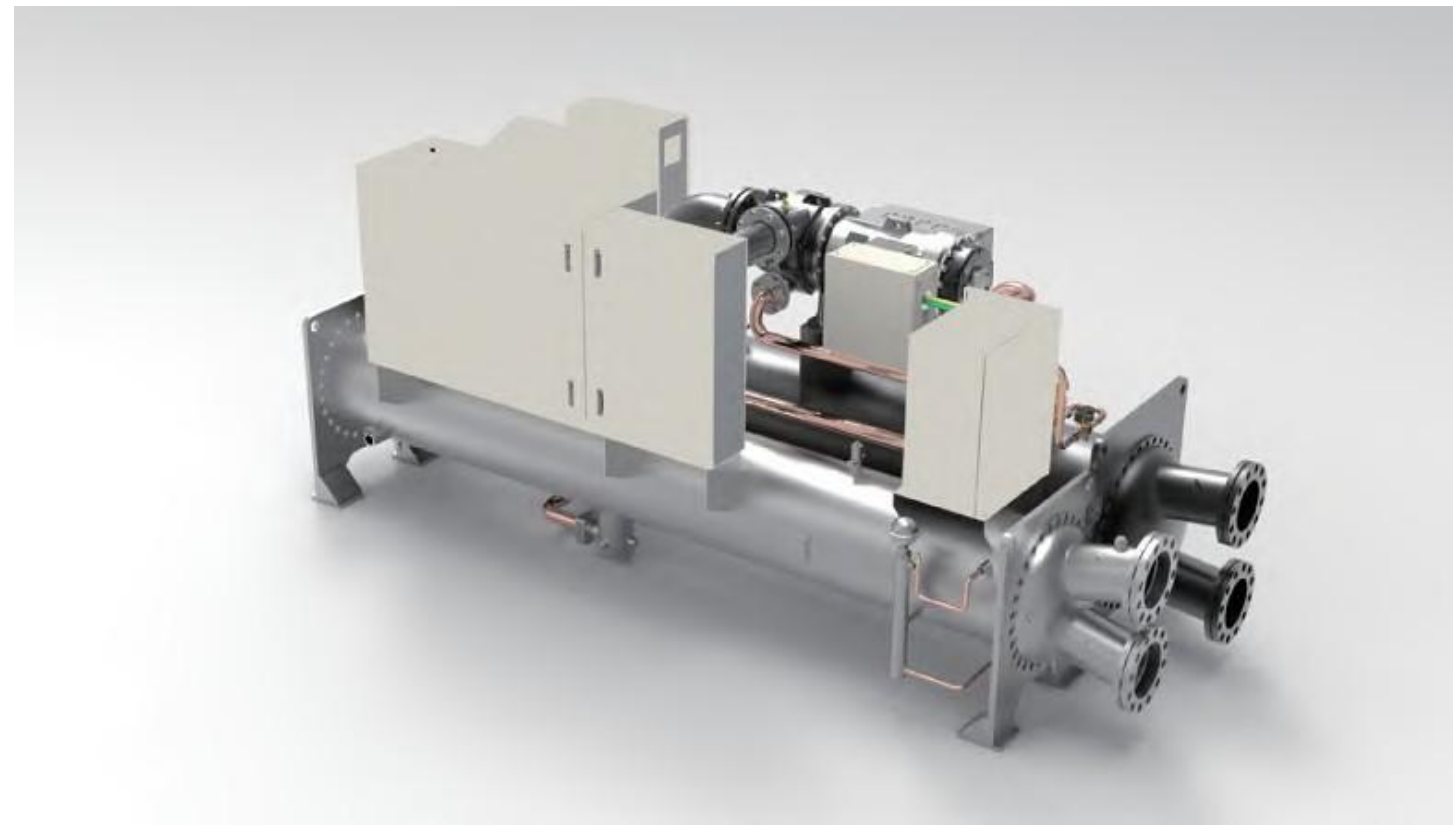




Commercial Air Conditioners

# Magnetic Bearing Oil-free Centrifugal Chiller



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## >> Features

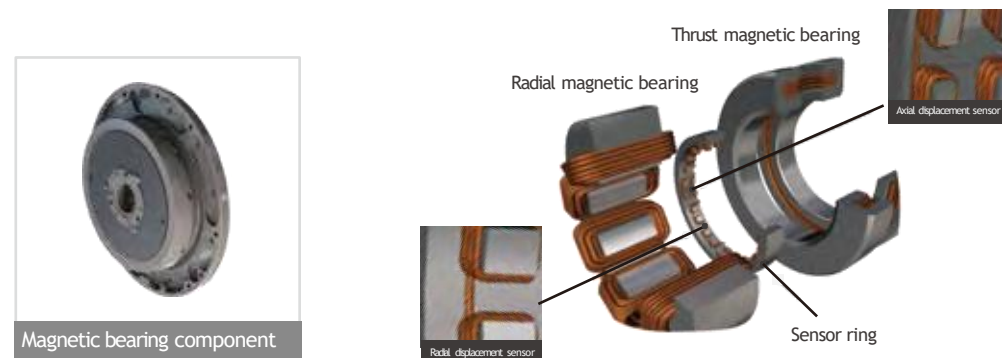
### Oil-free and High Efficiency

Aerodynamic design, making full-load operation more efficient; the magnetic bearing avoids friction, making partial load more efficient and providing the maximum IPLV.

#### Magnetic bearing technology

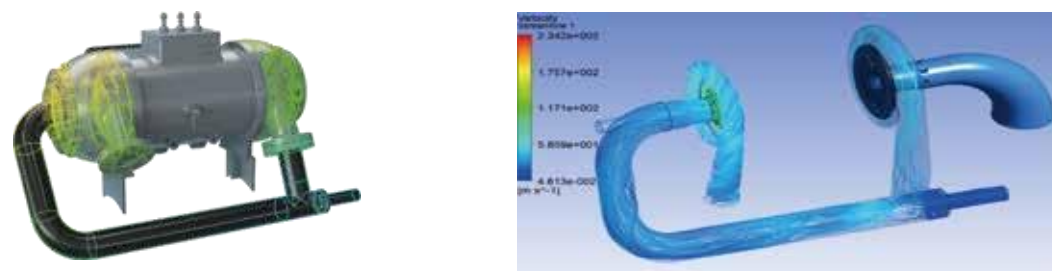
Industrial-level magnetic bearing assembly including the radial magnetic bearing, thrust magnetic bearing and position sensor, featuring low power consumption, high bearing capacity and high reliability.

- ❖ Power consumption less than 0.4kW, only 2% to 10% of that of conventional oil bearings.
- ❖ Breaks through the upper speed limits of conventional oil bearings, significantly reducing power consumption of the bearing at high speed: the higher the speed, the more energy efficient the magnetic bearing is compared to the oil bearing.



#### Aerodynamic technology

- ❖ Aerodynamic design optimizes the overall flow field efficiency and improves the compressor's isentropic efficiency.
- ❖ Back-to-back two-stage compression structure balances the thrust forces for longer life span and improves efficiency.
- ❖ Enclosed impeller design, reduced leakage and improved efficiency.
- ❖ 6% higher efficiency than single-stage compression.



Back-to-back two-stage compression flow field analysis

#### Permanent magnet synchronous motor technology

- ❖ Motor efficiency exceeds 96% in the full operating range, with the highest efficiency of up to 97%.
- ❖ The space vector pulse width modulation (SVPWM) technology is used for speed regulation and driving. Accurate and efficient operation is achieved according to changes in the operating conditions. The startup current is small, the operating current is low, the operating electricity charge and distribution cost of the whole life cycle are low.

#### Full falling film evaporation technology

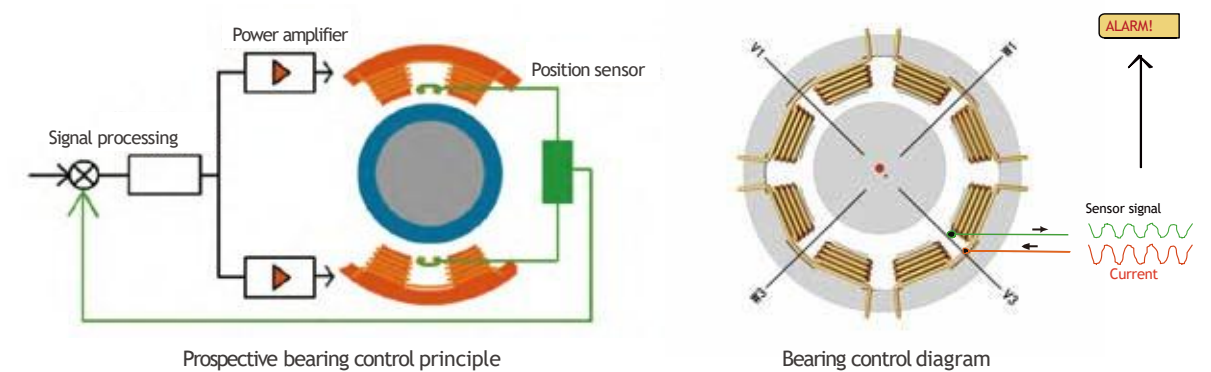
First created the full falling film evaporator and adopted spray technology to achieve film evaporation on the surface of the heat exchange tube, greatly increasing overall heat transfer efficiency and reducing refrigerant charge.

### Stable and Reliable

Dual protection of self-generation control mode + spare bearing, ensuring safe operation under multiple harsh conditions.

#### Bearing control technology

- ❖ The bearing control system adopts prospective vibration compensation technology, which detects and controls the position at a high frequency to effectively reduce the impact of vibration on the rotating shaft by the amount of imbalance.
- ❖ 20 kHz dynamic position scanning and adjustment and position control precision at the  $\mu\text{m}$  level ensure the accuracy of the shaft levitation position.

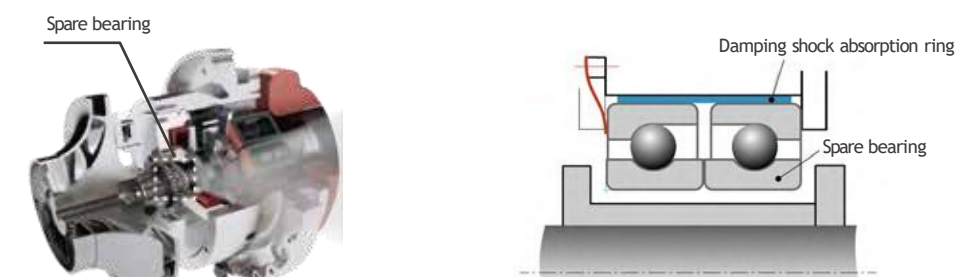


#### Self-generation control technology

- ❖ Our self-developed VFD control + permanent magnet motor technology can automatically switch the motor to the generator mode in the event of unexpected power failure to ensure the stability of the bus voltage and the 40-750 V wide voltage adaptability of the bearing is combined to ensure the power supply safety of the magnetic bearing.
- ❖ The self-generating mode guarantees continuous power supply of above 15 Hz to the unit's magnetic bearing, ensuring the bearing remains levitating.

#### Long-life spare bearing

The spare bearing employs a set of high-strength rolling bearings and a damping shock absorption ring to effectively stop the rotor shaft during high-speed rotation if a magnetic bearing controller failure occurs, avoiding wear between the magnetic bearing, sensor and rotor and resulting in damage to the compressor.



# Eco-Friendly

Back-to-back two-stage compression + noise reduction structure, minimizing the operating noise to 70 dB(A); full falling film evaporation technology reduces the refrigerant charge amount and better protects the environment.

Multi-technology joint adjustment widens the unit operation range while ensuring optimal efficiency; the cooling load of a single compressor can be as low as 10%.

With reference to AHRI standard 575-2017, sound pressure ratings are as low as 70 dB(A)

- ❖ No physical contact between moving metal parts, very quiet and low vibration levels.
- ❖ The back-to-back impeller + external pipe-type reflux device structure of the compressor reduces the pneumatic noise of refrigerant while flowing.

## LEED

R134a refrigerant has zero ozone depletion potential and has no elimination cycle for now. Full falling film technology reduces refrigerant charge which enables to qualify for maximum leadership in Energy and Environmental Design®(LEED) points for Enhanced Refrigerant Management. And with the chiller's high efficiency, you can also earn additional points for credits from Optimized Energy Performance (EAc1).



## Joint regulation of multiple technologies

- ❖ Magnetic bearing centrifugal chiller adopts the inverter and Inlet Guide Vane (IGV) to jointly regulate the cooling capacity. In extreme operating conditions, the guide vane opening starts to be reduced when the load becomes 50%.
- ❖ When the load is above 15% under normal operating conditions, the load is regulated solely by changing the speed, thus avoiding the additional flow loss caused by reduced opening of the IGV.



Inlet guide vane (IGV)

# Cost-saving

Oil-free throughout its entire life cycle, avoiding efficiency attenuation caused by oil film and saving more electricity; the maintenance costs are further reduced because it is not necessary to replace the lubricating oil and filter.

No friction between moving metal parts, better part-load performance and efficient operation under all operating conditions. No oil system, no oil system fault and no need for regular maintenance.

## >> Specifications Overview

Model	SFWW	170EV	200EV	230EV	250EV	270EV	300EV	350EV	
Cooling capacity	RT	170	200	230	250	270	300	350	
	kW	597.7	703.2	808.7	879.0	949.3	1055	1231	
	10 <sup>4</sup> kcal/h	51.41	60.48	69.55	75.60	81.65	90.72	105.8	
Power input	kW	93.43	107.7	122.3	134.3	143.7	161.0	189.8	
COP	W/W	6.398	6.532	6.610	6.547	6.606	6.551	6.485	
IPLV	W/W	10.20	10.56	11.11	11.36	11.79	10.69	11.24	
Motor configuration power	kW	150.0	150.0	150.0	150.0	150.0	280.0	280.0	
Rated current	A	152.6	175.9	199.0	219.3	234.8	263.0	310.0	
Max. operating current	A	167.9	193.5	218.9	241.2	258.3	289.3	341.0	
Evaporator	Water flow	m <sup>3</sup> /h	97.35	108.6	124.9	135.8	146.7	163.0	190.1
	Pressure drop	kPa	31.4	41.9	46.6	54.0	47.0	46.3	46.5
	Water pipe connection	mm	DN150	DN150	DN150	DN150	DN150	DN200	DN200
Condenser	Water flow	m <sup>3</sup> /h	114.7	135.1	155.0	168.8	182.6	202.5	236.6
	Pressure drop	kPa	26.8	35.8	38.0	44.3	38.6	45.7	49.4
	Water pipe connection	mm	DN150	DN150	DN150	DN150	DN150	DN200	DN200
Unit dimensions	Length	mm	3500	3500	3500	3500	3500	4150	4150
	Width	mm	1400	1400	1400	1400	1400	1650	1650
	Height	mm	1800	1800	1800	1800	1800	1850	1850
Shipping weight	kg	3110	3110	3225	3225	3350	4970	5100	
Running weight	kg	3660	3660	3735	3735	3940	5520	5705	

Model	SFWW	380EV	400EV	420EV	450EV	500EV	550EV	600EV	
Cooling capacity	RT	380	400	420	450	500	550	600	
	kW	1336	1406	1477	1582	1758	1934	2110	
	10 <sup>4</sup> kcal/h	114.9	121.0	127.0	136.1	151.3	166.4	181.6	
Power input	kW	203.4	216.2	227.9	233.6	260.3	287.2	318.7	
COP	W/W	6.568	6.506	6.481	6.774	6.753	6.733	6.620	
IPLV	W/W	11.29	11.43	11.47	11.35	11.66	11.99	12.01	
Motor configuration power	kW	280.0	280.0	280.0	400.0	400.0	400.0	400.0	
Rated current	A	332.4	353.2	372.2	381.6	425.3	469.2	520.6	
Max. operating current	A	365.6	388.5	409.4	419.8	467.8	516.1	572.7	
Evaporator	Water flow	m <sup>3</sup> /h	206.4	217.3	228.2	244.4	271.6	298.8	325.9
	Pressure drop	kPa	49.0	47.1	47.4	50.3	52.6	54.6	49.9
	Water pipe connection	mm	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Condenser	Water flow	m <sup>3</sup> /h	256.7	270.2	284.0	302.8	336.7	370.6	405.8
	Pressure drop	kPa	54.1	50.1	53.2	58.6	60.5	57.2	59.7
	Water pipe connection	mm	DN200	DN200	DN200	DN250	DN250	DN250	DN250
Unit dimensions	Length	mm	4150	4150	4150	4700	4700	4700	4700
	Width	mm	1650	1850	1850	2050	2050	2050	2050
	Height	mm	1850	1950	1950	2450	2450	2450	2450
Shipping weight	kg	5140	5980	6030	7670	7800	7980	8170	
Running weight	kg	5765	6735	6800	8630	8830	9090	9360	

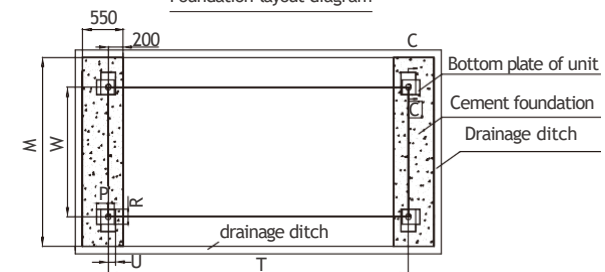
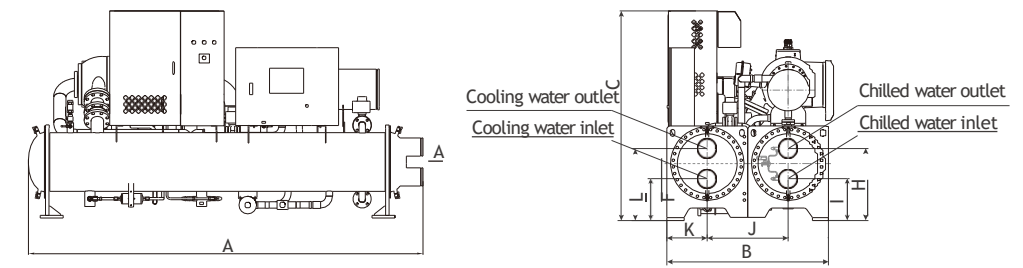
Note:  
 Evaporator conditions: water inlet=54°F (12.22°C), water outlet=44°F (6.67°C), fouling factor=0.00010h-ft<sup>2</sup>-°F/Btu (0.0176m<sup>2</sup>. °C/kW);  
 Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft<sup>2</sup>-°F/Btu (0.0440m<sup>2</sup>. °C/kW).

## >> Dimensions

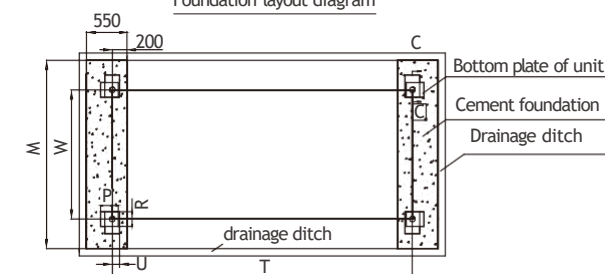
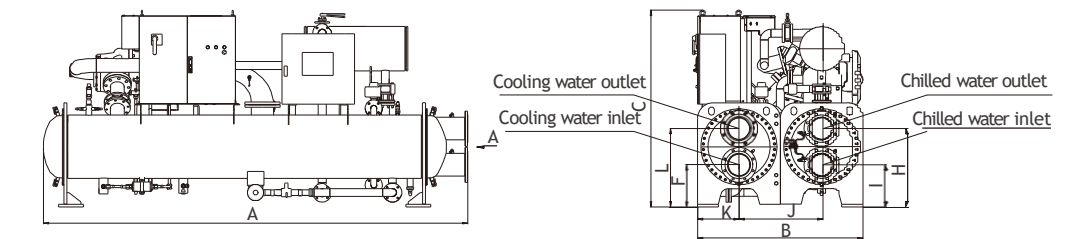
Model	SFWW	650EVD	700EVD	750EVD	800EVD	850EVD	900EVD	950EVD	1000EVD	
Cooling capacity	RT	650	700	750	800	850	900	950	1000	
	kW	2285	2461	2637	2813	2989	3164	3340	3516	
	10 <sup>4</sup> kcal/h	196.6	211.7	226.8	241.9	257.0	272.3	287.4	302.6	
Power input	kW	339.3	370.2	390.4	421.3	461.6	460.7	487.5	515.7	
COP	W/W	6.736	6.649	6.754	6.676	6.475	6.868	6.851	6.818	
IPLV	W/W	11.46	11.68	11.78	11.93	11.91	11.81	11.84	11.95	
Motor configuration power	kW	560.0	560.0	560.0	560.0	560.0	800.0	800.0	800.0	
Rated current	A	554.3	604.7	637.9	688.3	754.1	752.7	796.5	842.5	
Max. operating current	A	609.7	665.2	701.7	757.1	829.5	828.0	876.2	926.8	
Evaporator	Water flow	m <sup>3</sup> /h	353.1	380.3	407.4	434.6	461.7	488.9	516.1	543.2
	Pressure drop	kPa	67.3	67.6	67.5	66.5	66.7	56.1	55.2	54.5
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Condenser	Water flow	m <sup>3</sup> /h	438.9	473.0	506.7	540.3	575.2	605.8	639.6	673.7
	Pressure drop	kPa	65.4	66.0	66.1	66.0	67.5	72.2	72.2	72.3
	Water pipe connection	mm	DN300	DN300	DN300	DN300	DN300	DN300	DN300	DN300
Unit dimensions	Length	mm	5050	5050	5050	5050	4750	4750	4750	
	Width	mm	2000	2000	2000	2000	2950	2950	2950	
	Height	mm	2200	2200	2200	2200	2650	2650	2650	
Shipping weight	kg	10820	12050	12170	12320	12430	11990	12140	12300	
Running weight	kg	12030	13330	13520	13752	13925	13720	13950	14180	

Model	SFWW	1100EVD	1200EVD	1300EVT	1400EVT	1500EVT	1600EVT	1700EVT	1800EVT	
Cooling capacity	RT	1100	1200	1300	1400	1500	1600	1700	1800	
	kW	3868	4219	4571	4922	5274	5626	5977	6329	
	10 <sup>4</sup> kcal/h	332.9	363.1	393.4	423.6	453.9	484.2	514.4	544.7	
Power input	kW	578.2	636.6	706.2	713.0	770.0	832.3	899.9	945.9	
COP	W/W	6.689	6.628	6.914	6.904	6.849	6.759	6.642	6.628	
IPLV	W/W	12.11	12.08	12.08	12.10	12.09	12.03	12.00	12.05	
Motor configuration power	kW	800.0	800.0	1200.0	1200.0	1200.0	1200.0	1200.0	1200.0	
Rated current	A	944.6	1040	1080	1164.8	1258	1359.8	1470.2	1560	
Max. operating current	A	1039.1	1144.0	1188.0	1281.3	1383.8	1495.8	1617.2	1716.0	
Evaporator	Water flow	m <sup>3</sup> /h	597.5	651.9	706.2	760.5	814.8	869.1	923.5	977.8
	Pressure drop	kPa	55.3	55.3	64.4	64.4	65.2	65.2	64.4	65.1
	Water pipe connection	mm	DN300	DN300	DN400	DN400	DN400	DN400	DN400	DN400
Condenser	Water flow	m <sup>3</sup> /h	741.5	812.7	877.0	943.1	1012.0	1079.0	1149.0	1223.0
	Pressure drop	kPa	72.6	72.7	63.2	63.3	64.1	64.3	64.6	64.5
	Water pipe connection	mm	DN300	DN300	DN400	DN400	DN400	DN400	DN400	DN400
Unit dimensions	Length	mm	4750	4750	5290	5290	5290	5290	5290	
	Width	mm	2950	2950	3300	3300	3300	3300	3300	
	Height	mm	2650	2650	3050	3050	3050	3050	3050	
Shipping weight	kg	12590	12890	19670	19990	20410	20830	21040	21360	
Running weight	kg	14610	15040	24660	25120	25730	26350	26660	27120	

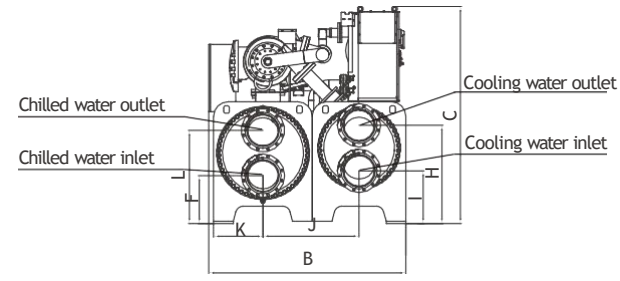
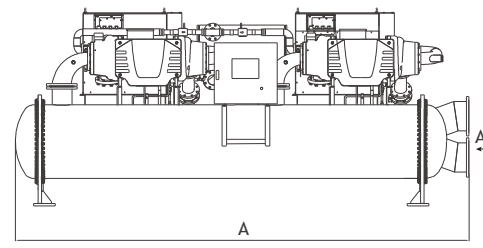
Note:  
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 Condenser conditions: water inlet=85°F (29.44°C), water outlet=94.3°F (34.61°C), fouling factor=0.00025h-ft<sup>2</sup>-°F/Btu (0.0440m<sup>2</sup>·°C/kW).



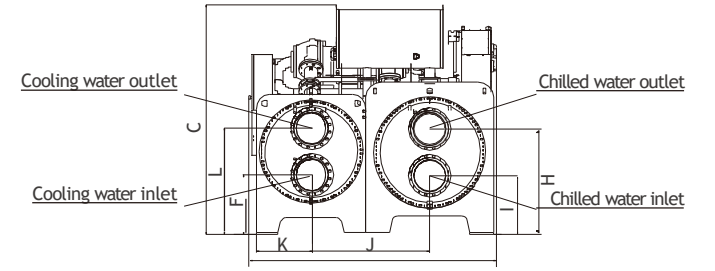
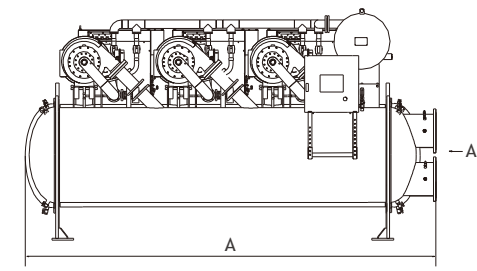
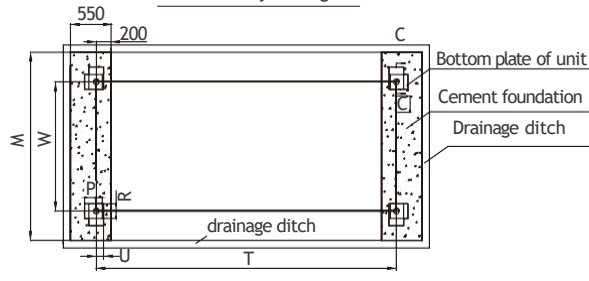
Model	Dimensions			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SFWW170-270EV	3500	1400	1800	1750	1250	200	150	100	2820	360	620	350	360	620	700	DN150	DN150



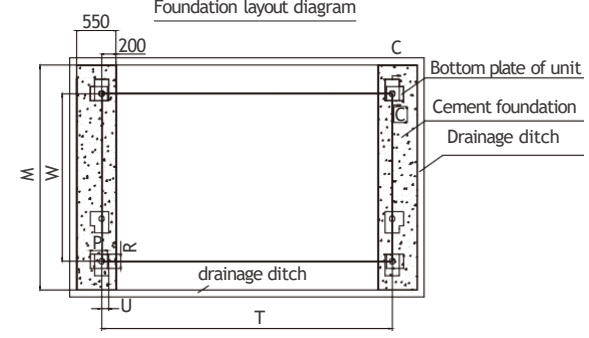
Model	Dimensions			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SFWW300EV	4150	1650	1850	2000	1400	240	200	100	3280	405	755	400	405	755	800	DN200	DN200
SFWW350EV																	
SFWW380EV																	
SFWW400EV	4150	1850	1950	2200	1600	240	200	100	3280	445	815	450	445	815	900	DN200	DN200
SFWW420EV																	
SFWW450EV																	
SFWW500EV	4700	2050	2450	2550	1750	240	200	100	3780	570	1015	475	510	980	975	DN250	DN250
SFWW550EV																	
SFWW600EV																	



Foundation layout diagram

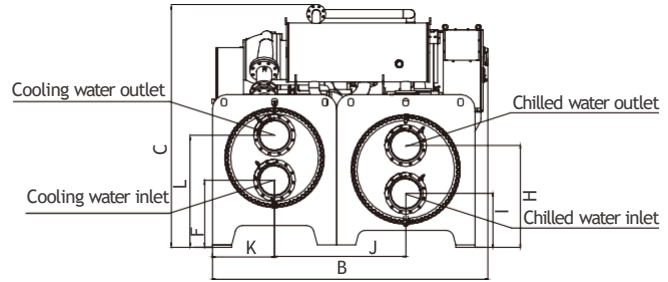
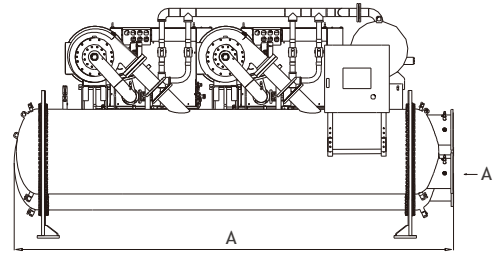


Foundation layout diagram

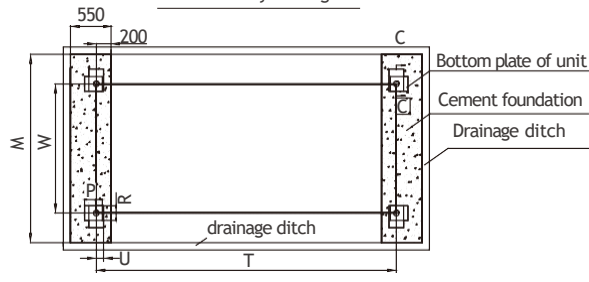


Model	Dimensions			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SFWW650EVD	5050	2000	2200	2550	1750	240	200	100	4080	485	945	500	535	995	975	DN300	DN300
SFWW700EVD																	
SFWW750EVD																	
SFWW800EVD																	
SFWW850EVD																	

Model	Dimensions			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SFWW1300EVT	5290	3300	3050	3450	2850	240	200	100	4040	790	1410	735	780	1400	1575	DN400	DN400
SFWW1400EVT																	
SFWW1500EVT																	
SFWW1600EVT																	
SFWW1700EVT																	
SFWW1800EVT																	



Foundation layout diagram



Model	Dimensions			Support						Pipe locate position						Evaporator pipe diameter	Condenser pipe diameter
	Length (A)	Width (B)	Height (C)	M	W	P	R	U	T	F	L	K	I	H	J		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SFWW900EVD	4750	2950	2650	3150	2550	240	200	100	3780	700	1170	650	563	1063	1375	DN300	DN300
SFWW950EVD																	
SFWW1000EVD																	
SFWW1100EVD																	
SFWW1200EVD																	