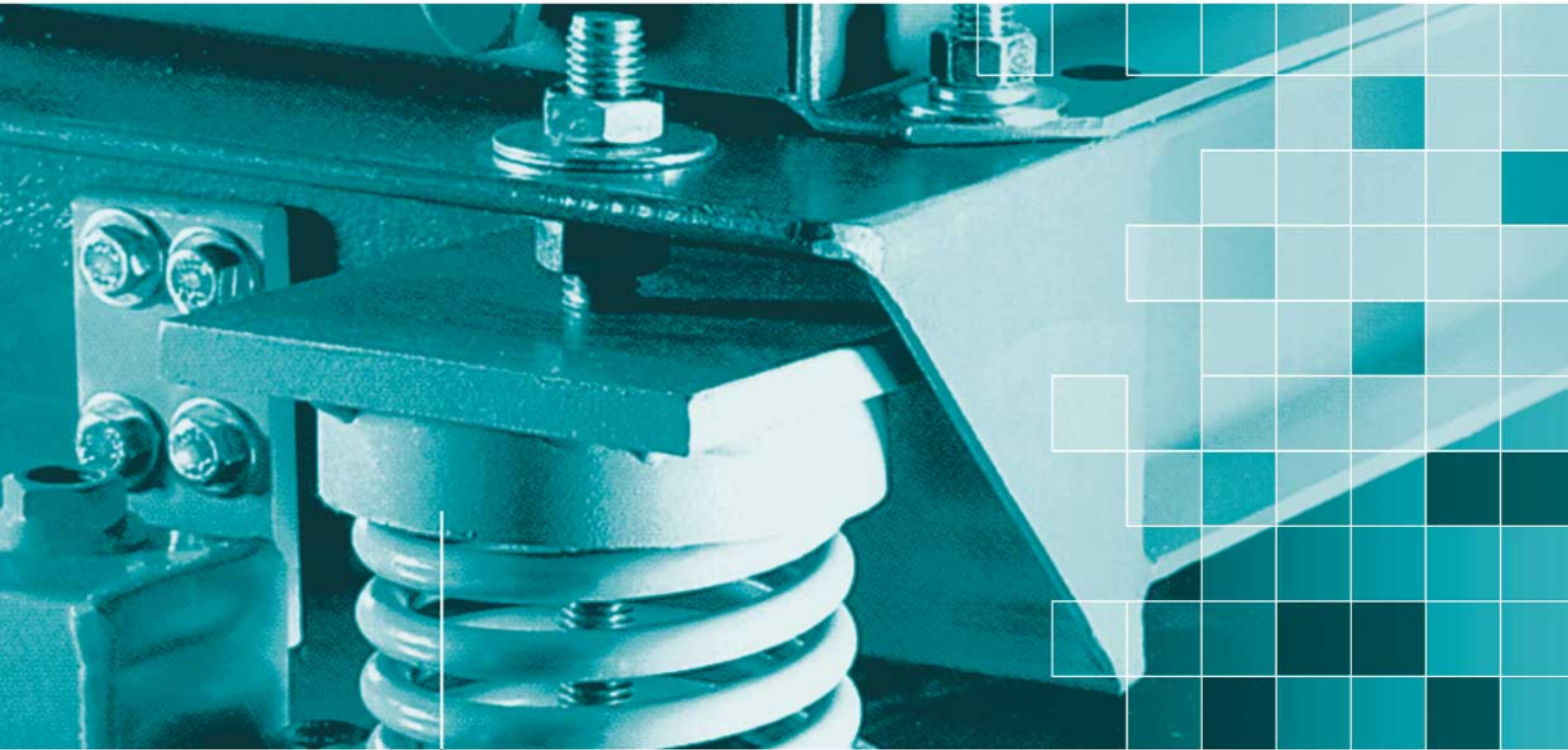




**Mammoth®**  
The Leader In Custom HVAC & Energy Saving



## **Water-cooled Screw Chiller**

128kW-1,914kW(R407C, 50Hz)



Mammoth (Shanghai) Air Conditioning Ltd.

Mammoth

Mammoth MSW series water cooled chiller has wide range of application, not only work as traditional A/C but also offer water, ice storage and domestic hot water etc. for industrial use. Standard unit's cooling capacity range is from 128KW to 1914KW, divided into ten models.

## Superior Quality Compressor

Mammoth chiller uses semi-hermetic screw compressor, with no bearing leakage. Twin screw gas discharge and the new developed Y type moulding, optimized circumferential speed and advanced tooth design lead to higher compressing efficiency.

Motor and compressor housing are coupling forged with high precision. Double wall pressure compensated rotator shell has the extremely strength, and there is no expansion even in high pressure condition and unit noise is reduced at the same time.

Imported fluoride-resistant motor has high efficiency and good reliability. Twin screw heat can stand wear and tear. Using tongue shape round seal to isolate the bearing cavity to get a lower axial cavity pressure. Motor thermal protection PTC will keep its safety operation.

The oil line design, inner patented three grades oil separator, and the long life expectancy with  $\mu\text{m}$  grade precise filter. Hermetic low pressure bearing cavity improves lubrication, the de-pressurized bearing room, ensures minimum refrigerant mixed in oil, the oil's viscosity will be higher. Compared with normal design, the oil's viscosity will be improved nearly up to 1 time.

Oil is supplied by pressure difference, and it is not necessary to design additional complicated oil system, like oil cooler and oil pump etc. Compressor is direct driven by motor with less moving components reduces wear and tear, and gains high mechanical efficiency. Optional stepless slide valve control with Vi compensation.

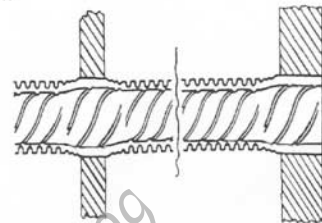


## High Efficiency & Energy Saving

Nowadays, the production of water cooled chiller put more attention on lower initial investment rather than lower operation cost, which lead to the descending of heat exchanger performance and declining of COP.

However, Mammoth has its own solution for those wasted energy. Mammoth has focused on energy saving at the very start, keep good performance on every detail. Mammoth MSW chillers are rated in accordance with USA ARI.

The condenser and evaporator of this series are shell and tube type with new high efficiency structure. The heat exchanger adopts the most advanced high efficient copper beams, its special geometrical characteristics enhance vaporizing core for core boiling of outside pipe, strengthen fluid turbulence and postpone water side dust deposit; reinforced heat transfer of inner and outer wall makes the transfer efficiency increased 30% compared with previous design.



Inner groove of evaporator and condenser tube upgrades the transferring efficiency, as well as the evaporating temperature and then improves the unit COP.

The minimum refrigerant flow rate passed on evaporator is 6m/s, which ensures oil self-flow with the refrigerant back to compressor without any compulsive oil return facility, it prevents compressor damage caused by lack oil.

The design, production and inspection of every vessel reach the standard/rules of GB150 «Steel Pressure Vessels», GB151 «Tubular heat exchanger», JB/T4750-2003 «Pressure vessels for refrigeration equipment» and Supervision Regulations On Technology For Stationary Pressure Vessel, safety and reliable work.

## Part Load Performance

Compressor is mostly working under part-load condition, unit should work in high efficiency not only in fully but also in part-load condition. It is normal that operation cost has 10%~20% variation due to the partial load under same condition.

The operation energy consumption in part-load condition is vital to unit running cost, and in ARI550 it is measured by Integrated Part Load Value (IPLV) and Application Part Load Value (APLV). IPLV and APLV provided a standard measurement of part-load operation, so partial load should be defined as normal application rather than special situation.





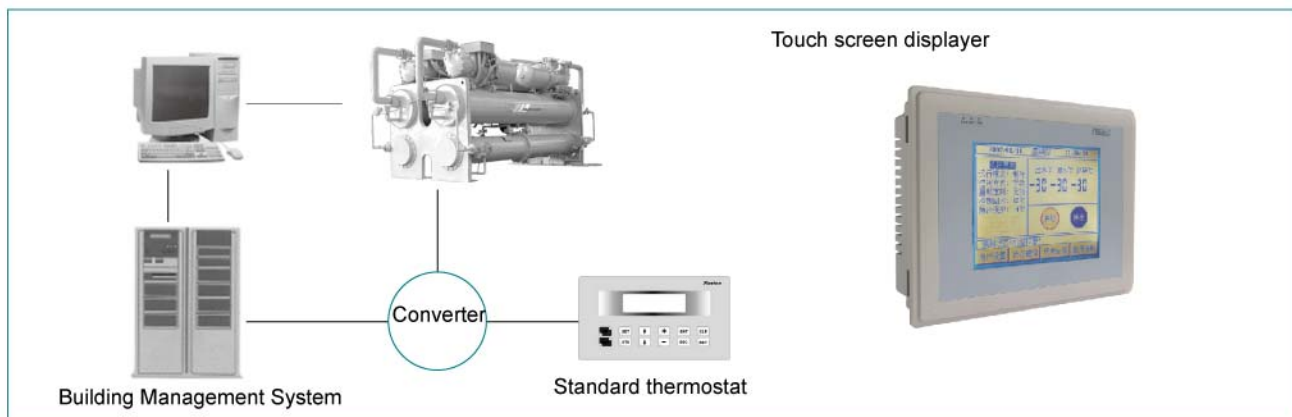
Mammoth screw chiller has been fully considered the economic operation in part-load condition. Utilization of electronic expansion valve improves unit efficiency. Electronic expansion valve has the technology of PID, which cut down the working cost. The valves integrated with expansion valve motor, ceramic valve plate and valve port wears resistance, has high reliability and long life expectancy. A linear change of water flow, continuously cooling capacity adjustment, make no fluid strike to compressor in cooling circuit. In part-load condition, Electronic expansion valve can create higher accuracy of adjustment, then improves part-load efficiency, and the operation efficiency upgrades 15% compared with thermal expansion valve units, and more accurately controls on chilled water temperature.

Electronic expansion valve	Thermal expansion valve
Valve degree controlled by stepping motor, it's instantaneity	Valve degree controlled by physical balance.
Several seconds cost from full close to full open , prompt reaction, closing and opening and speed are manual settable.	Can not be fully closed, jaw-opening only adjusted by physical balance.
Make accurate adjustment in partial load or condition changed.	Small adjustable range, best performance only in standard condition.

## Automatic Control

Electrical control system uses first class electrical components, and there are many automatic protection functions; unit is monitored and managed by microprocessor, and can be linked with water pump & cooling tower, and also can be central controlled through communication port, with the compatibilities of Building Automation System(BAS). English display, optional can display many working datas, which can fully indicate unit operation status. Optional touch screen displayer.

Compressor working status	Chilled water pump working status	Inlet/outlet water temperature of Chilled water pump	Condenser water pump working status
Inlet/outlet water temperature of condenser water	Working time	Error check etc.	
Accurate control、multiple protections and alarm function assure unit's safety and efficient working, avoid unit damage caused by severe environment or misoperation.			
Permanent power lost memory	Intelligent control of compressor working time under part-load condition	Interlock of pump and blower	
Insufficient chilled water flow	Insufficient condenser water flow	External long distance control switch	
Overload of chilled water pump	Overload of condenser water pump	High pressure	
Low pressure	Compressor overload	Phase protection	
Three phase unbalance protection			
Too high condenser leaving water pump	Too low leaving water temperature	Communication error	



## Easy Installation

Each unit has been fully tested before leaving factory, filled with oil and refrigerant. All protection switches have fully set in factory, and just connect power supply and water pipes at site only.

## Widespread Application

Mammoth MSW series are suitable for office building, hotel, restaurant and hospital etc., and offering higher than 5°C chilled water

If in low temperature mode (optional), the unit can be used for freezing processing, chemical industry and ice storage. Add antifreeze into water system to get -10°C ~ 5°C chilled water.

In heat recovery mode (optional), it is free to supply domestic water in cooling mode; the domestic hot water temperature ranges from 45°C ~ 65°C according to different refrigerant. The design of heat exchangers separated condenser water and domestic water, which ensures no water mixture pollution.

If the use marine water as condenser water is the sea water, Cupronickel heat exchanger is a good solution on anticorrosion.

## Model Nomenclature

MSW	060
1	2

1.MSW: Mammoth water cooled screw chiller

2.Unit No.

## Performance Data 1 R407C

Item	Model	MSW040	MSW050	MSW060	MSW080	MSW100	MSW120	MSW140	MSW180
Cooling	Cooling Capacity kW	128	157	210	270	379	430	484	560
	Cooling Power Input kW	27	34	45	57	80	91	102	118
	Chilled Water Flow m <sup>3</sup> /h	22	27	36	46	65	74	83	96
	Evaporator Pressure Drop kPa	53	55	59	60	61	62	63	63
	Condenser Water Flow m <sup>3</sup> /h	27	33	44	56	79	90	101	117
	Condenser Pressure Drop kPa	40	40	43	44	45	47	48	48
Total heat recovery heat exchanger (optional)	Heat Recover Capacity kW	137	171	240	273	377	492	553	640
	Water Flow m <sup>3</sup> /h	24	29	41	47	65	85	95	110
	Water Pressure Drop kPa	40	40	43	44	45	46	48	48
	Water Fitting mm	DN80		DN100		DN125		DN150	
Partial heat recovery heat exchanger (optional)	Heat Recover Capacity kW	19	24	32	41	57	65	73	84
	Water Flow m <sup>3</sup> /h	3	4	5	7	10	11	12	14
	Water Pressure Drop kPa	23	24	25	26	28	29	31	31
	Water Fitting mm	DN50							DN65
Compressor	Type	Semi-Hermetic Screw							
	Capacity Range %	25~100							
	Power	415V/3N~/50Hz							
	Number	1							
	Start Method	Y-Δ							
	Full Load Amps A	51	63	82	104	143	161	180	206
	Start Current A	circuit 1(Y/Δ) 132/397 163/490 206/617 206/617 232/696 256/768 285/856 416/1248 circuit 2(Y/Δ) / / / / / / / / circuit 3(Y/Δ) / / / / / / / /							
Running Control		Digital control, Micro computer control							
Protection		HP/LP, Anti-freeze, Flow etc							
Chilled water pipe size mm		DN80		DN100		DN125		DN150	
Chilled water pipe size mm		DN80		DN100		DN125		DN150	
R407C Charge Kg		25	30	45	50	65	85	95	115
Refrigerant oil charge L		15	15	19	19	26	26	26	28
Dimension	Length mm	3300	3300	3300	3300	3300	3300	3300	3300
	Width mm	1200	1200	1200	1250	1300	1300	1300	1300
	Height mm	1750	1750	1800	1850	1950	2050	2050	2050
Net Weight kg		1160	1360	1550	1650	2150	2370	2430	2900
Operating Weight kg		1360	1580	1790	1910	2450	2700	2790	3300

### NOTES:

1. Standard design pressure for water system is 1.0Mpa.
2. Under standard cooling operating condition, Condenser water inlet/outlet temp is 30/35℃, Chilled water inlet/outlet temp is 12/7℃.
3. Under heat recovery operating condition, evaporation inlet water temp is 12℃, domestic hot water inlet/outlet is 40℃/45℃, Partial heat recovery domestic hot water inlet/outlet is 40℃/45℃.
4. Mammoth is committed to a policy of continuous product improvements, and reserves the right to revise specification and design without further notice.



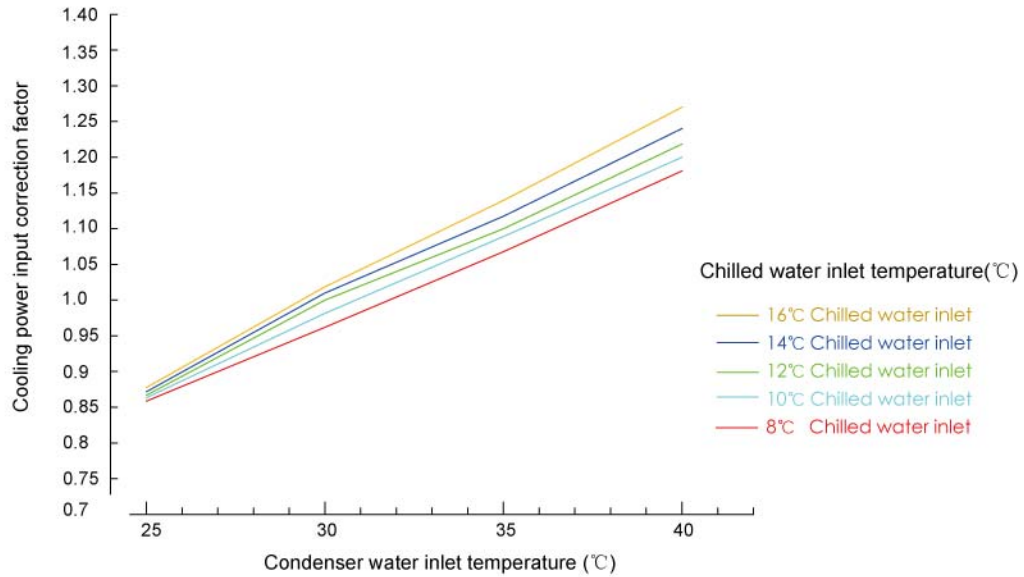
## Performance Data 2 R407C

Item		Model		MSW210	MSW260	MSW280	MSW320	MSW395	MSW420	MSW460	MSW550	MSW710
Cooling	Cooling Capacity kW	638	733	823	968	1120	1276	1466	1646	1914		
	Cooling Power Input kW	134	153	171	204	236	268	306	342	402		
	Chilled Water Flow m³/h	110	126	142	166	193	219	252	283	329		
	Evaporator Pressure Drop kPa	64	65	66	67	67	70	73	74	76		
	Condenser Water FLOW m³/h	133	152	171	202	233	266	305	342	398		
	Condenser Pressure Drop kPa	49	51	53	55	56	57	59	61	64		
Total heat recovery heat exchanger (optional)	Heat Recoever Capacity kW	729	837	938	1106	1280	1458	1674	1876	2187		
	Water Flow m³/h	125	144	161	190	220	251	288	323	376		
	Water Pressure Drop kPa	49	50	52	54	56	56	58	60	63		
	Water Fitting mm	DN150		DN200	DN200		DN200		DN250	DN250		
Partial heat recovery heat exchanger (optional)		DN150		DN200	2"DN125		2"DN150		2"DN200	3"DN150		
	Heat Recover Capacity kW	96	110	123	145	168	191	220	247	287		
	Water Flow m³/h	16	19	21	25	29	33	38	42	49		
	Water Pressure Drop kPa	35	38	39	40	41	42	43	45	45		
Compressor	Water Fitting mm	DN65			2"DN65		2"DN80			3"DN80		
	Type	Semi-Hermeic Screw										
	Capacity Range %	25~100				12.5~100					8.3~100	
	Power	415V/3N ~/50Hz										
	Number	1				2					3	
	Start Method	Y-Δ										
	Full Load Amps A	233	265	295	360	412	466	530	590	699		
	Start Current A	circuit 1(Y/Δ)	512/1535	571/1712	571/1712	285/856	416/1248	512/1535	571/1712	571/1712	512/1535	
		circuit 2(Y/Δ)	/	/	/	285/856	416/1248	512/1535	571/1712	571/1712	512/1535	
circuit 3(Y/Δ)		/	/	/	/	/	/	/	/	512/1535		
Running Control		Digital control, Micro computer control										
Protection		HP/LP、Anti-freeze、Flow etc										
Chilled Water Pipe Size mm		DN150		DN200	DN200		DN200		DN250	DN250		
Condenser Water Pipe Size mm		DN150		DN200	2"DN125		2"DN150		2"DN200	3"DN150		
R407cCharge kg		130	145	170	190	230	260	295	345	390		
Refrigeration oil charge L		28	38	38	2*26	2*28	2*28	2*38	2*38	3*28		
Dimension	Length mm	3350	3350	3600	4400	5150	5150	5300	5300	5600		
	Width mm	1350	1400	1500	1650	1700	1750	1800	1800	2450		
	Height mm	2100	2150	2150	2350	2400	2450	2450	2450	2500		
Net Weight kg		3190	3450	3850	4800	5850	6110	7050	8400	8650		
Operating Weight kg		3730	4050	4270	5600	6730	7030	8000	9500	9850		

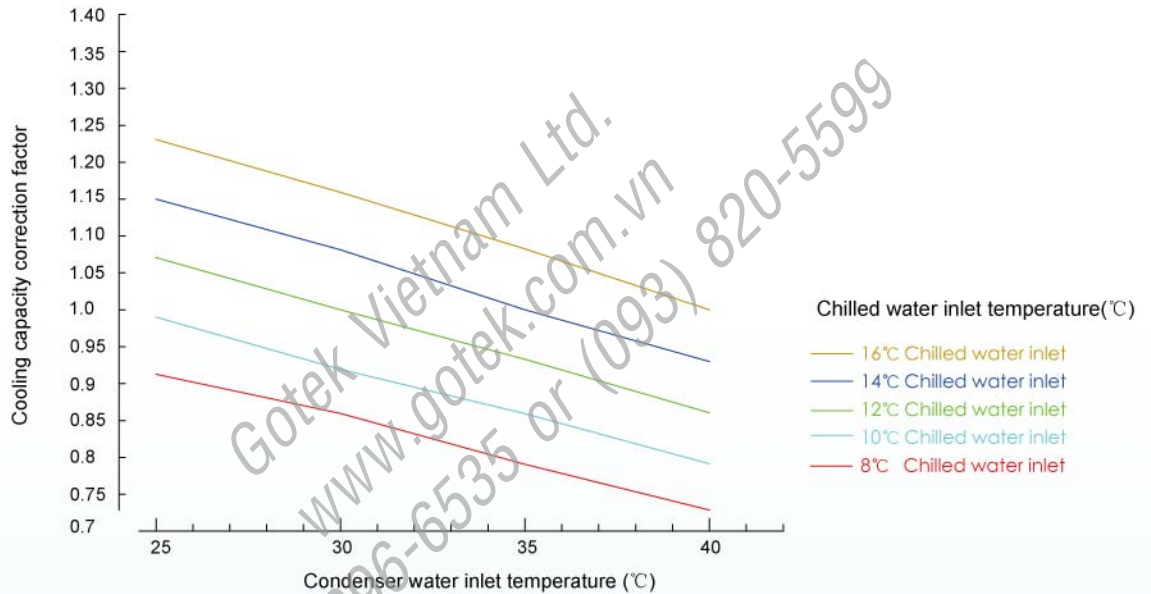
### NOTES:

1. Standard design pressure for water syetem is 1.0Mpa.
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4. Mammoth is committed to a policy of continuous product improvements, and reserves the right to revise specification and design without further notice.

## MSW water cooled screw chiller working condition rectified correction curve.



Note: The cooling power factor is 1 in cooling mode of normal working condition.



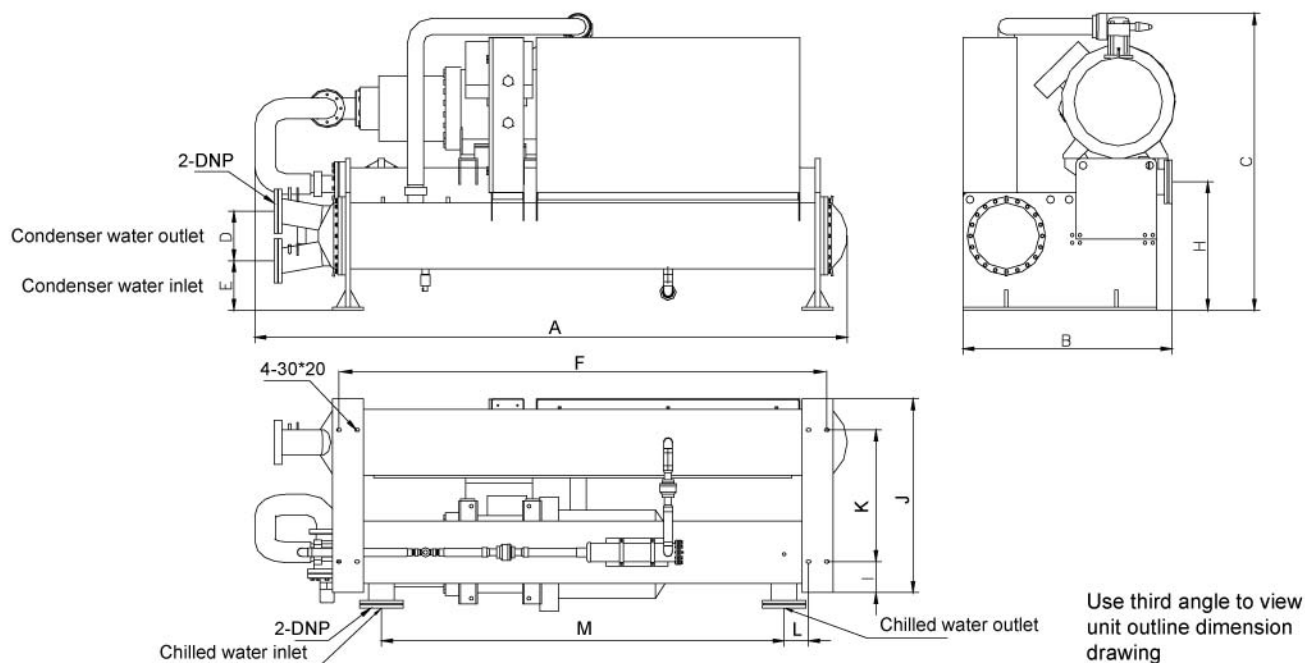
Note: The cooling capacity correction factor is 1 in cooling mode of standard working condition.

Note: 1. The data is for reference only, the real performance will be slightly different if compressor or working condition changed.

2. The data is obtained from actual compressor type.

3. The correction data can not be out of compressor operation range

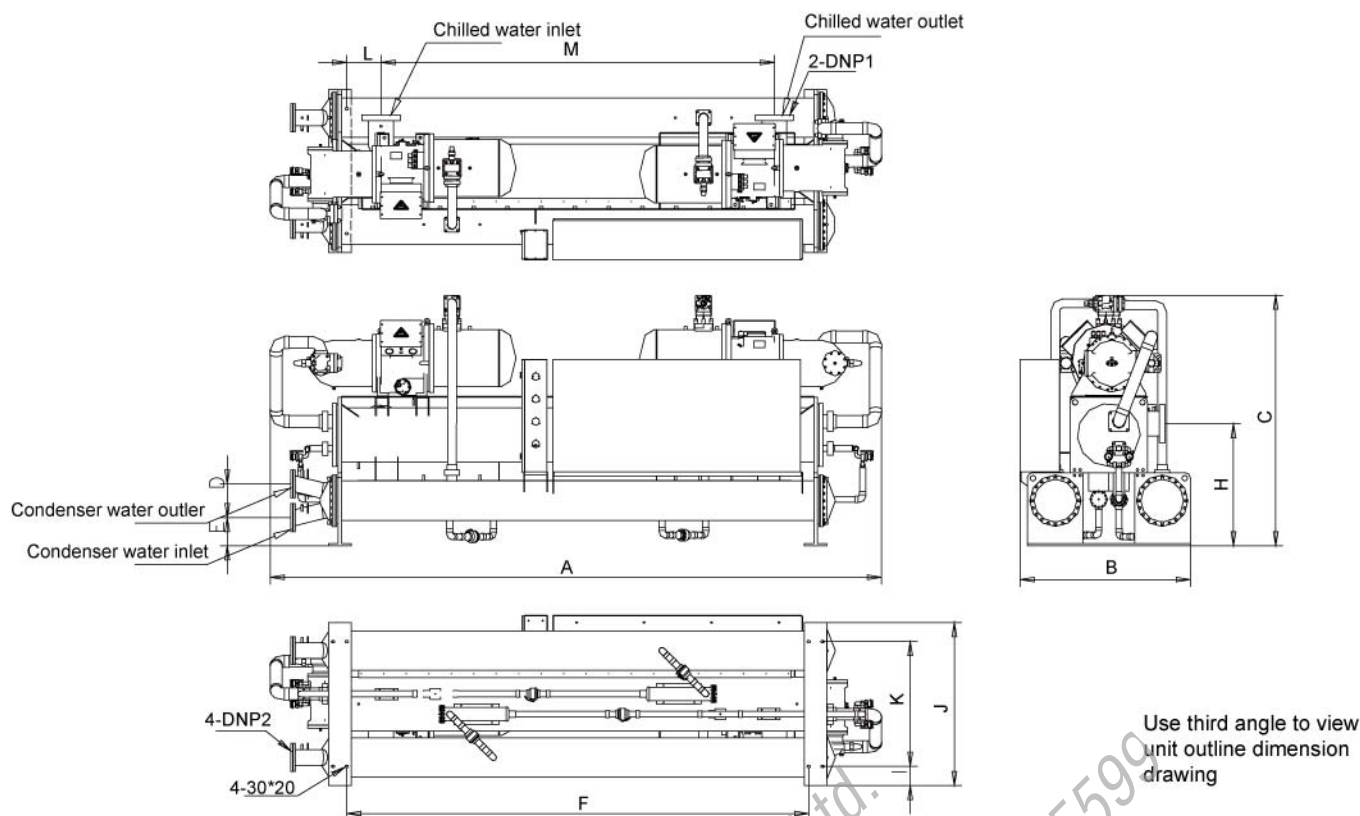
## Unit outline dimension drawing MSW065~240



Model	Dimension	A	B	C	D	E	F	H	I	J	K	L	M	P
MSW065		3300	1200	1800	230	255	2557	700	220	1140	800	85	2150	100
MSW075		3300	1250	1850	250	245	2557	715	220	1140	800	85	2150	100
MSW085		3300	1300	1900	270	260	2557	790	170	1140	800	85	2150	100
MSW095		3300	1300	1950	300	260	2557	790	170	1140	800	85	2150	125
MSW120		3300	1300	2050	300	270	2557	800	170	1140	800	85	2150	125
MSW140		3300	1300	2050	300	270	2557	900	170	1140	800	85	2150	125
MSW165		3300	1300	2050	300	270	2557	900	170	1140	800	85	2150	150
MSW175		3350	1350	2100	300	270	2557	950	170	1140	800	85	2150	150
MSW210		3350	1350	2100	320	300	2557	950	170	1140	800	85	2150	150
MSW240		3600	1500	2150	320	320	2557	960	170	1140	800	85	2150	200



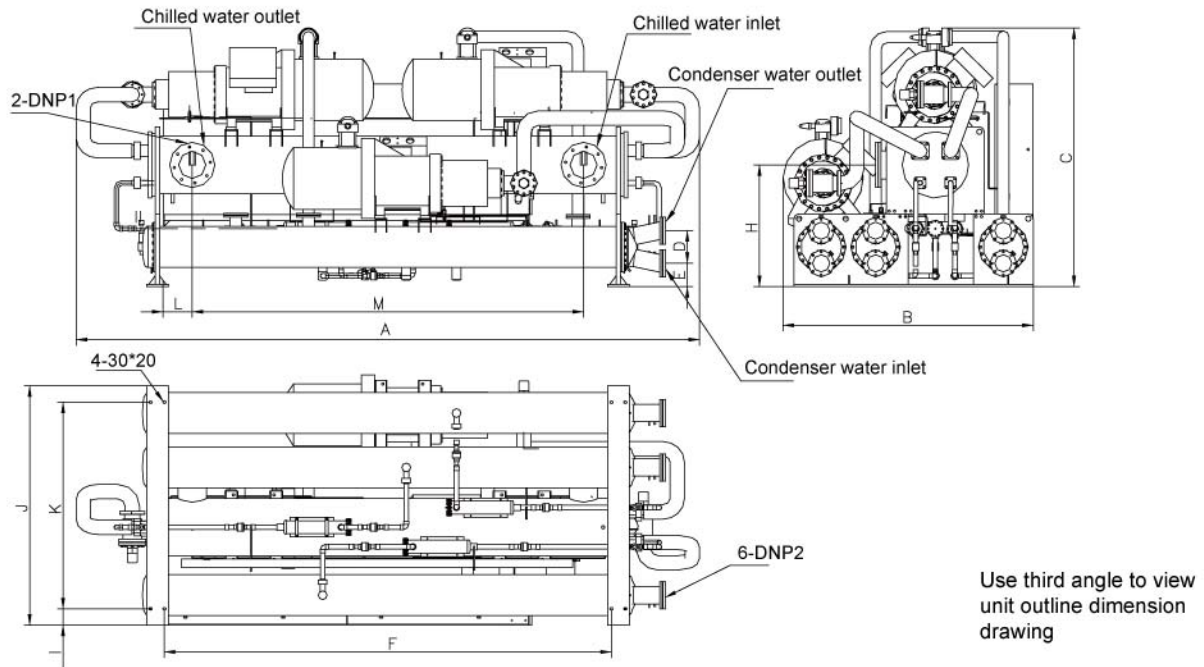
## Unit outline dimension drawing MSW295~550



Use third angle to view  
unit outline dimension  
drawing

Dimension Model	A	B	C	D	E	F	H	I	J	K	L	M	P1 (load side)	P2 (Cooling side)
MSW295	4400	1650	2350	300	280	2640	1200	150	1540	1250	120	2400	200	2*125
MSW395	5150	1700	2400	300	250	3640	1150	110	1470	1250	120	3400	200	2*125
MSW420	5150	1750	2450	320	250	3640	1150	110	1470	1250	120	3400	200	2*150
MSW460	5300	1800	2450	320	250	3640	1150	110	1470	1250	120	3400	200	2*150
MSW550	5300	2200	2500	320	250	3640	1150	110	1470	1250	120	3400	250	2*200

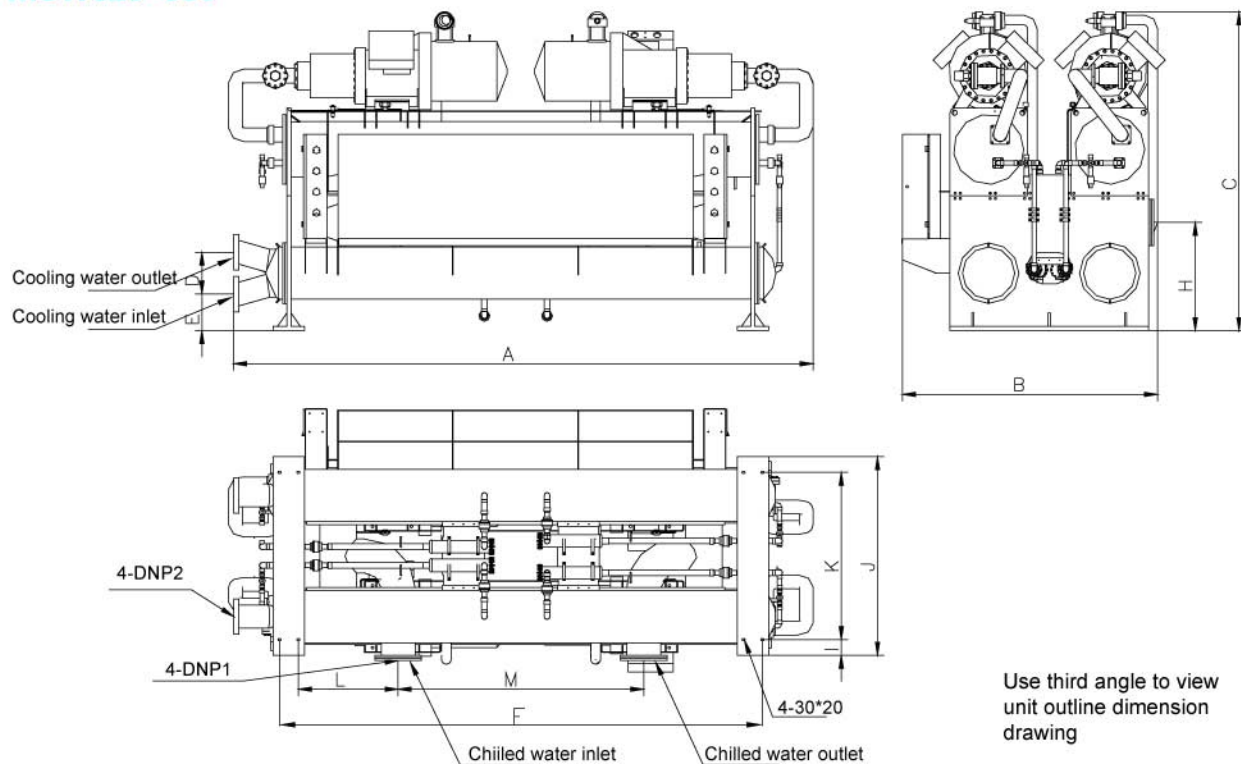
## Unit outline dimension drawing MSW710~760



Dimension Model	A	B	C	D	E	F	H	I	J	K	L	M	P1(load side)	P2(Cooling side)
MSW710	5600	2450	2550	310	215	4012	1200	150	2200	1900	170	3650	250	3*150
MSW760	5600	2450	2550	320	205	4012	1250	150	2300	2000	180	3650	250	3*150

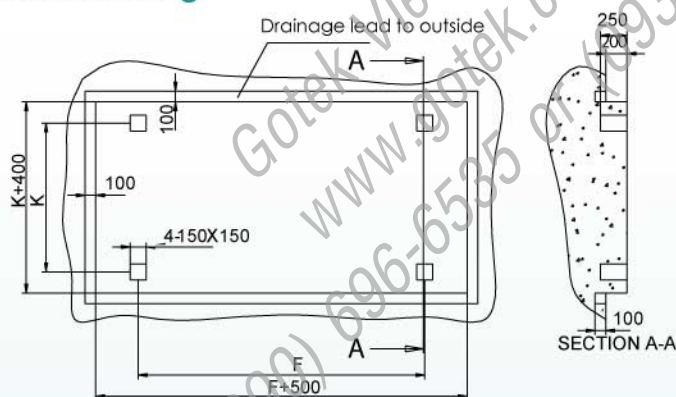


## Unit outline dimension drawing MSW820~960



Dimension Model	A	B	C	D	E	F	H	I	J	K	L	M	P1 (load side)	P2 (Cooling side)
MSW820	5700	2550	3100	400	350	4490	1035	150	1900	1600	845	2405	300	2*250
MSW860	5850	2600	3100	400	350	4490	1035	150	1900	1600	845	2405	300	2*250
MSW960	5850	2600	3100	400	350	4490	1035	150	1900	1600	845	2405	300	2*250

## Installation base drawing



### Notes

- 1.Mammoth recommend M16 embedded bolt
- 2.Relevant rubber gasket fixed for shock absorbing.(300\*200\*10)

## Model Nomenclature

$\frac{B}{1} \frac{D}{2} \frac{F}{3}$

- 1: Refrigerant: C-R22, A-R134a ,B-R407C
- 2: Unit No
- 3: F: Full heat recovery R: Partial heat recovery L: Low temperature ice storage  
N: Cupronickel heat exchanger, omit if unavailable.



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**ISO9001 ISO14001 OHSAS18001**

Due to continuous product improvements, we reserve the right to change design and specifications without notice.

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