



Mammoth®
The Leader In Custom HVAC & Energy Saving



Modular Air Cooled Chiller (Heat Pump) Thunder Series (50HZ)

Standard Type: 63KW-1008KW

Low Temperature Type: (-25°C) 60KW-944KW



ISO9001 ISO14001 OHSAS18001

Head Office: 11/F, HuaHong Business Center, No.5 388 Daduhe Road, Shanghai, China. Tel: 020-51097778
Manufacturing Base: No.818, South Lingfeng Road, Economic and Technical Development Zone, Anji County, Zhejiang Province.
Tel: 0572-5867396

www.mammothchina.com

Mammoth dedicates to continuous improvement of products and unit parameters are subject to change without notice.

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Mammoth

Mammoth (Shanghai) Air Conditioning Ltd.



Since 1988, Mammoth has been providing energy saving products to projects in China. In 2002, Mammoth invested US\$ 10 million to establish its manufacturing facility in Anji, China's #1 Ecological County, and its national sales headquarter in Shanghai to provide custom engineered air conditioning systems for projects in China and abroad.



Mammoth produces air conditioning equipment that leverages energy saving and innovative technologies. Our products include, but not limited to, geothermal & water source heat pumps, air & water cooled commercial air conditioning units, fan coils, AHU, VAV box, screw chillers, and energy recovery units.



Mammoth has been recognized as a leader in providing custom designed Total Energy Solution HVAC Systems. Our solutions can fit any design applications from WSHP systems to geothermal systems, from hybrid systems to various energy saving systems. Based on the needs of our customers, our recommendations help our customers assess the economic benefits of Mammoth solutions over alternative systems.



Mammoth has also brought its innovative design concepts to the industry. We have printed numerous technical design manuals and books to facilitate engineers in the design of Renewable Energy HVAC Systems. Together with industry associations and the commercial section of the US Embassy and Consulate General Offices, we have frequently conducted technical seminars in major cities in China and abroad. We have supplied our solutions to projects that amount to over 20 million sq. m., and have been continuously recognized as the leader in Renewable Energy products in China.



Since 1935, Mammoth has been producing and installing air conditioning units with the most innovative technologies. Our solutions are found in some of the world's most important buildings for its unparalleled flexibility and efficiency. When performance and energy efficiency are important factors to a project, our products are often chosen as the final solution.

Modular Design

This unit series has three basic modules, MAC0220, MAC0330 and MAC0440, with this modular design, the unit is operated in steps according to the change of load, which is beneficial to reduce the impact on the grid when the unit starts.

Ultra Low Noise

Utilizes hermetic scroll compressor and low noise fan to reduce operating noise level.

Excellent Performance

Utilizes high efficiency R410A compressor with inner grooved copper tubing and efficient heat exchange hydrophilic corrugated aluminum fins with blue foil anti-corrosion protection to achieve excellent performance. Utilizes EVI compressor for low temperature application to provide heating at -25C ambient temperature with two stage compression.

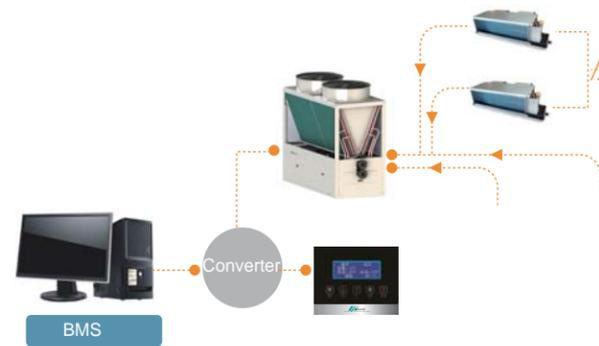


Easy Installation

Unit is designed for user's easy installation. Refrigerant systems are consealed after manufacturing, no need to connect any copper tubing at site, and unit has been fully charged with refrigerant. Water inlet and outlet are provided for connections with terminal units. The unit can be started after the system is connected, powered, flushed and filled with water.

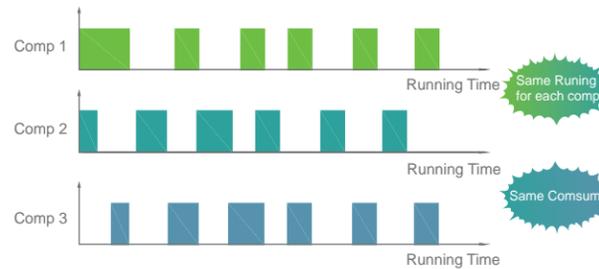
Easy Control

Unit can be controlled by built-in controller or via central group controller and is compatible with BMS.



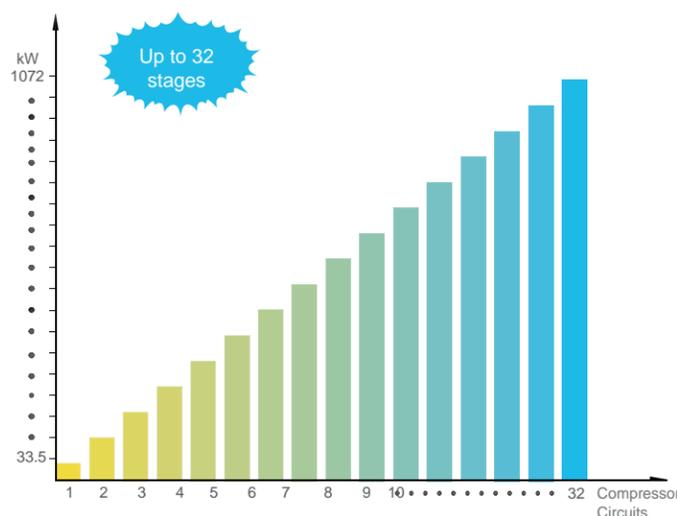
Intelligent Control

Unit will adjust automatically the running time of each compressor to maintain same running time to extend life expectancy of compressors.



Energy Saving

Up to 32 stages energy capacity control, automatically adjust the operation stage to satisfy load requirement. Capacity range: 33.5-1072kW

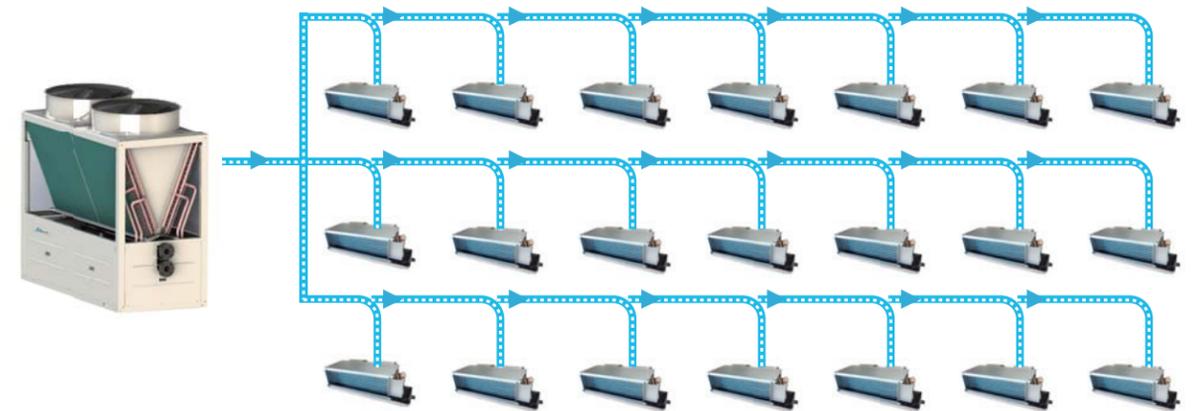


Safety Operation Controls

Evaporator is shell and tube type instead of plate type heat exchanger to avoid freezing damage. Each system has its own high and low pressure safety device; and anti-freezing protection in cooling mode to prevent unit from damage of heat exchange coil in case of low water temperature. Anti-freezing protection is available during heating mode to prevent unit from damage in case of low outdoor temperature (require to be powered on in heating mode in winter time).

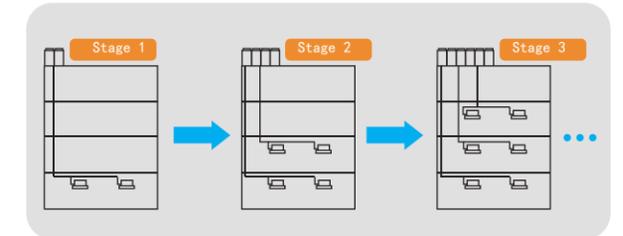
Flexible Configuration for Indoor Terminal Units

Terminal indoor units can be cassette type FCU, consealed FCU, ultra thin FCU and fresh air unit etc.



Retrofit Application

Units can be purchased and installed in different stages to reduce one time investment cost.



Controller Introduction

There are modular control and alarm display function.

Controller is installed inside the control cabinet, easy to access by removing the access panel.

Control system is capable to realize below functions automatically:

- a. compressor start delay
- b. heat pump auto-defrosting
- c. anti-freezing for low water temp in cooling
- d. anti-freezing in winter heating
- e. system high & low pressure protection
- f. compressor & fan overload protection
- g. water flow switch

Control functions available via thermostat.

When there is alarm, controller will display its error code, it should be solved by professional service personnel. Shift main unit ON/OFF control to indoor motorized valve ON/OFF control, indoor remote control can be realized for whole system. Unit is shut off in winter, anti-freezing function shall be activated to prevent unit heat exchanger and water pipes from freezing damage due to low ambient air temperature.

Unit pressure switch, flow switch and overflow protector settings have been done at the factory, do not try to adjust it. The factory is not responsible for any damage due to adjustment by the end user.



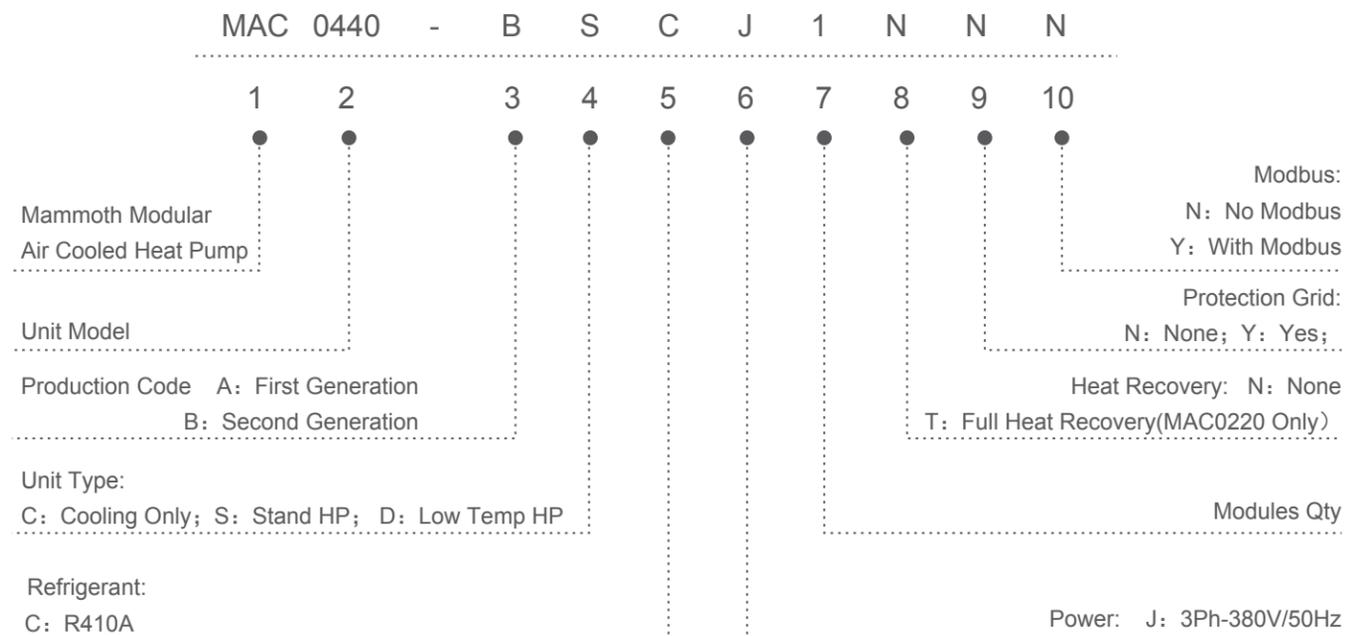
Application Range

Item	Unit	Parameter
Load	Chilled Leaving °C	5-18
	Hot Water Leaving °C	30-55
Ambient	Cooling (dry) °C	21~43
	Heating (dry) °C	-10-21
	Low Temp Heating (dry) °C	-25~21
Water Flow	m³/h	Rated±15%
Voltage	V	Rated±5%
3 Ph balance	/	±2%
Frequency Range	/	Rated±2%

Notes:

1. Operation outside the range may cause damage to the unit;
2. Unit is not applicable to chemical or corrosive environment, as well as corrosive media.
3. Please contact Mammoth sales personnel if there is any special application requirement;

Nomenclature



Modular Air Cooled Heat Pump (Chiller) Standard Technical Data

Item	Model	MAC0220	MAC0330	MAC0440
Nominal Cooling	kW	63	94	126
Nominal Heating	kW	68	102	136
Cooling Compressor Power	kW	20.1	30.6	39.3
Heating Compressor Power	kW	20.4	31.1	39.7
Compressor	Type	Scroll		
	Qty	2	3	4
Cooling with Heat Recovery (Optional)	Capacity	81	\	\
	Power	18.6	\	\
Recovery (Optional)	Water Produced	1.74	\	\
	Pipe Size	R2"	\	\
R410A Charge	kg	13	18.6	22
Starting Current	A	120	144	168
Maximum Current	A	48	72	105
Power Supply	3ph-380V/50Hz			
Control Method	Micro-processor			
Safety Protections	High & low pressure, water lose delay, anti-freezing, motor overload, overheat and phase protection			
Compressor Type	Hemetic Scroll			
Air Side Heat Exchanger	High Efficiency Copper and Fin			
Blower	Type	Axial		
	Qty	2	2	2
	Power	2×0.75	2×0.90	2×1.80
Water Side HE	Type	Shell and Tube		
	Pressure	≤1.0		
Water Flow	m³/h	11.5	17.2	23.0
Pressure Drop	kPa	45	60	65
Entering / Leaving Pipe Size	DN50			
Noise	dB(A)	68	70	72
Dimensions (L×W×H)	mm	2130×1000×2010		
Unit Weight	kg	625	810	950
Operating Weight	kg	660	860	1000

Notes:

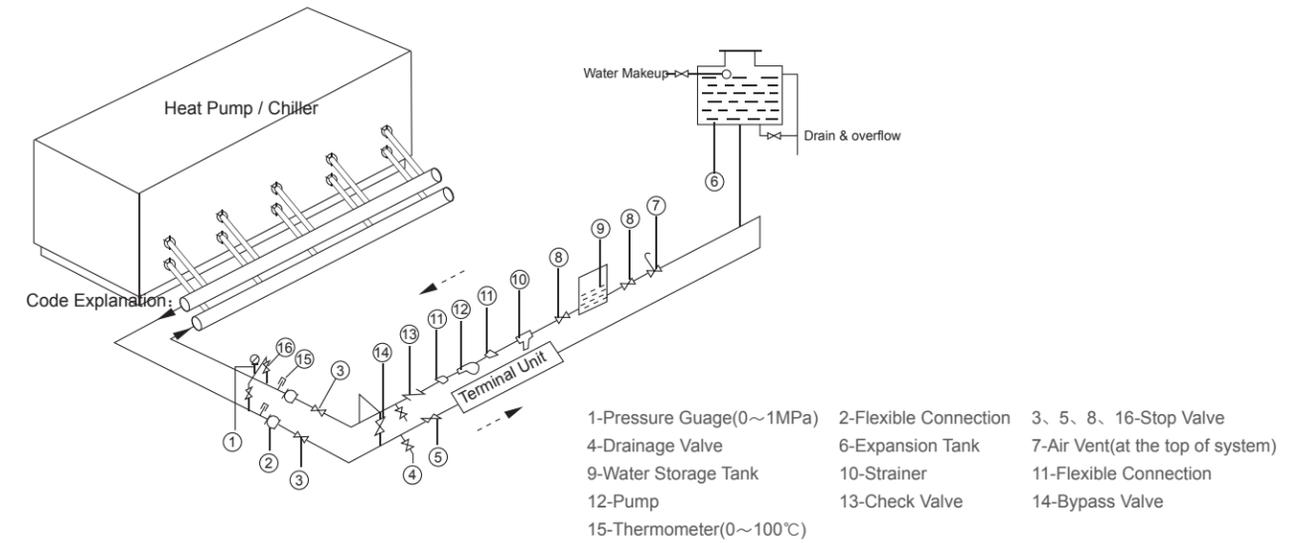
1. Nominal cooling: water flow 0.172m³/ (h.kW), leaving water 7°C, ambient air 35°C;
2. Nominal heating: water flow is the same as cooling, leaving water 45°C, ambient air (dry bulb) 7°C, (wet bulb) 6°C;
3. Cooling with heat recovery: hot water initial temperature is 15°C, and heated in cycles to 55°C, AC water flow is the same as cooling, and leaving water is 7°C;
4. All basic modules above can be designed in modular form up to maximum 8 modules;
5. MAC0220 is capable to provide full heat recovery, this function is not available with other modules;
6. Due to continuous product improvement, Mammoth reserves the right to change above parameters without further notice;

Modular Air Cooled Heat Pump (Chiller) Low Temperature Technical Data

Item	Model	MAC0220	MAC0330	MAC0440
Nominal Cooling	kW	60	90	118
Nominal Heating	kW	45	66	90
Practical Heating	kW	64	98	128
Cooling Power	kW	19.8	30.2	39.6
Compressor Heating Power	kW	16.5	24.0	32
Practical Heating Power	kW	18.7	28.0	37.4
Compressor	Type	EVI Scroll		
	Qty	2	3	4
Heat	Heating	79	\	\
	Power	18.4	\	\
Recovery (Optional)	Water Produced	1.70	\	\
	Water Connection	R2"	\	\
R410A Charge	kg	13	19.5	26
Starting Current	A	126	146	166
Maximum Current	A	48	70	96
Power Supply	3ph-380V/50Hz			
Control Method	Micro-processor			
Safety Protections	High & low pressure, water lose delay, anti-freezing, motor overload, overheat and phase protection			
Compressor Type	Hemetic Scroll			
Air Side Heat Exchanger	High Efficiency Copper and Fin			
Blower	Type	Axial		
	Qty	2	2	2
	Power	2×0.75	2×0.90	2×1.80
Water Side HE	Type	Shell and Tube		
	Pressure	Mpa ≤1.0		
Water Flow	m3/h	10.3	15.5	20.3
Pressure Drop	kPa	44	58	64
Entering / Leaving Pipe Size	DN50			
Noise	dB(A)	68	70	72
Dimensions (L×W×H)	mm	2230×1000×2010		
Unit Weight	kg	640	825	975
Operating Weight	kg	675	875	1025

Notes:

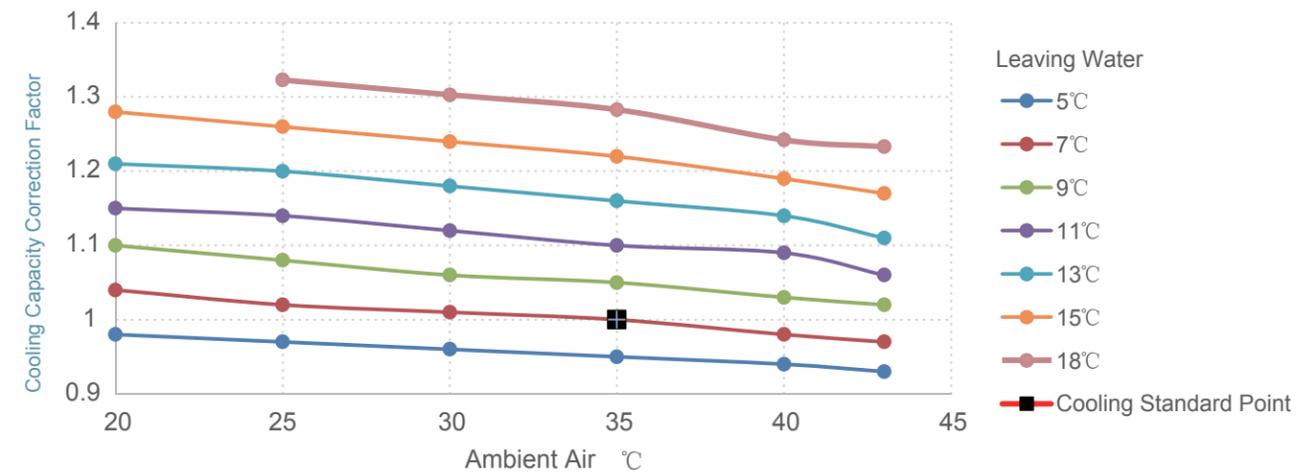
- Nominal cooling: water flow 0.172m³/ (h.kW), leaving water 7°C, ambient air 35°C;
- Nominal heating: water flow is the same as cooling, leaving water 41°C, ambient air (dry bulb) -12°C, (wet bulb) -14°C;
- Actual heating: water flow is the same as cooling, leaving water 45°C, ambient air (dry bulb) 7°C, (wet bulb) 6°C;
- Cooling with heat recovery: hot water initial temperature is 15°C, and heated in cycles to 55°C, AC water flow is the same as cooling, and leaving water is 7°C;
- All basic modules above can be designed in modular form up to maximum 8 modules;
- MAC0220 is capable to provide full heat recovery, this function is not available with other modules;
- Due to continuous product improvement, Mammoth reserves the right to change above parameters without further notice;



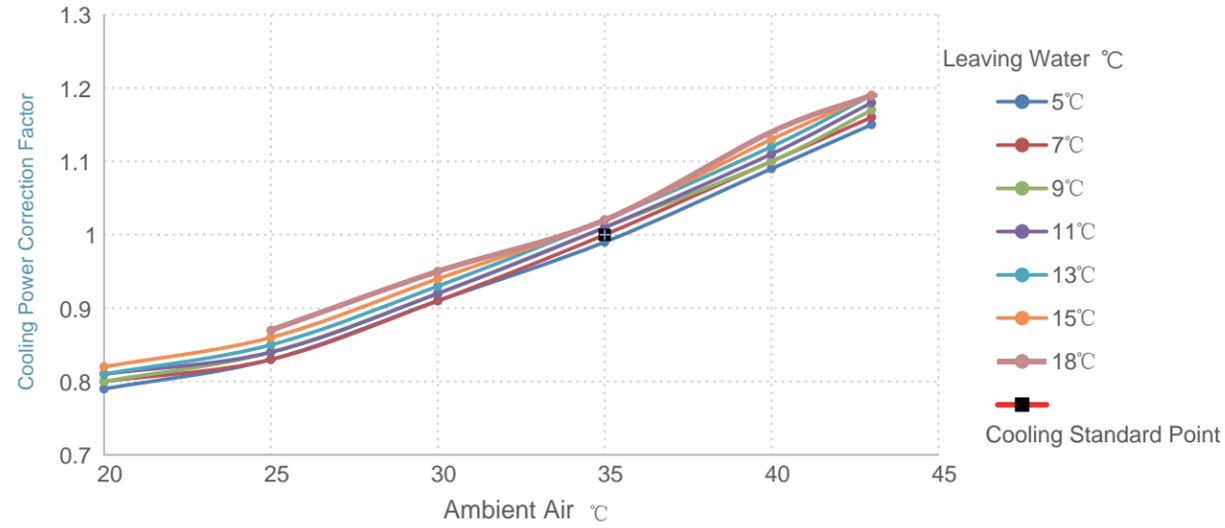
Commissioning system water circulation, turn off all valves, turn on 14. After pump running for a long while, clean water strainer. Confirm there is no foreign objects inside water system, then turn on 3, turn off 14.

Performance Curve

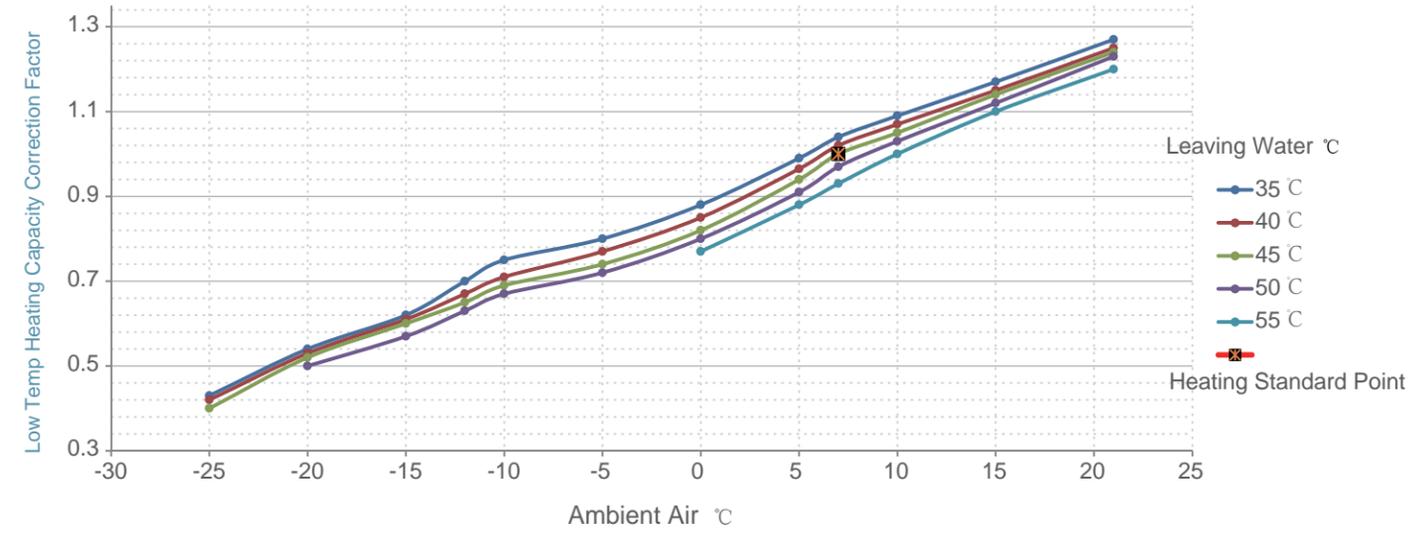
Cooling Capacity Correction Factor



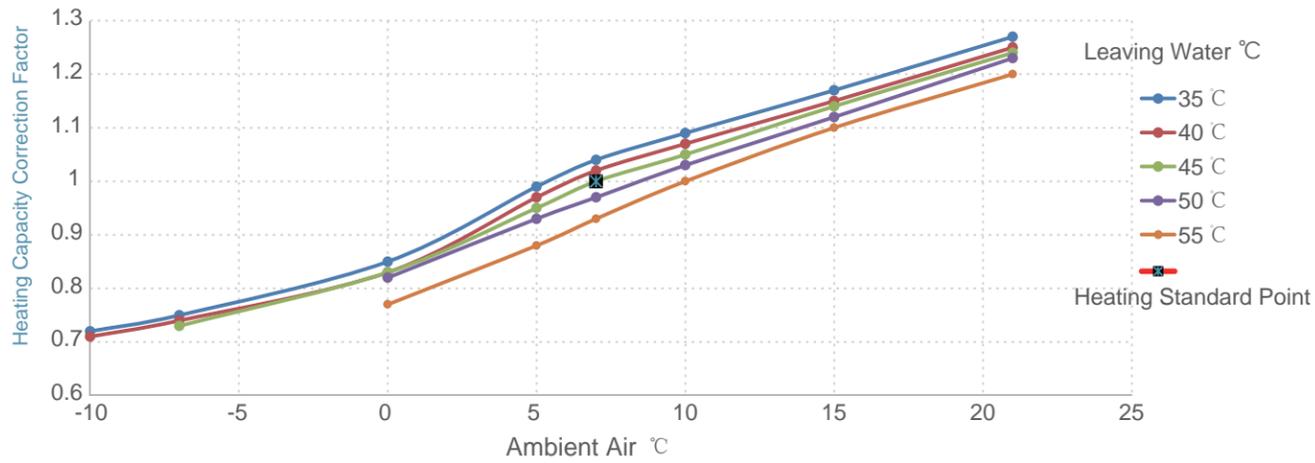
Cooling Power Correction Factor



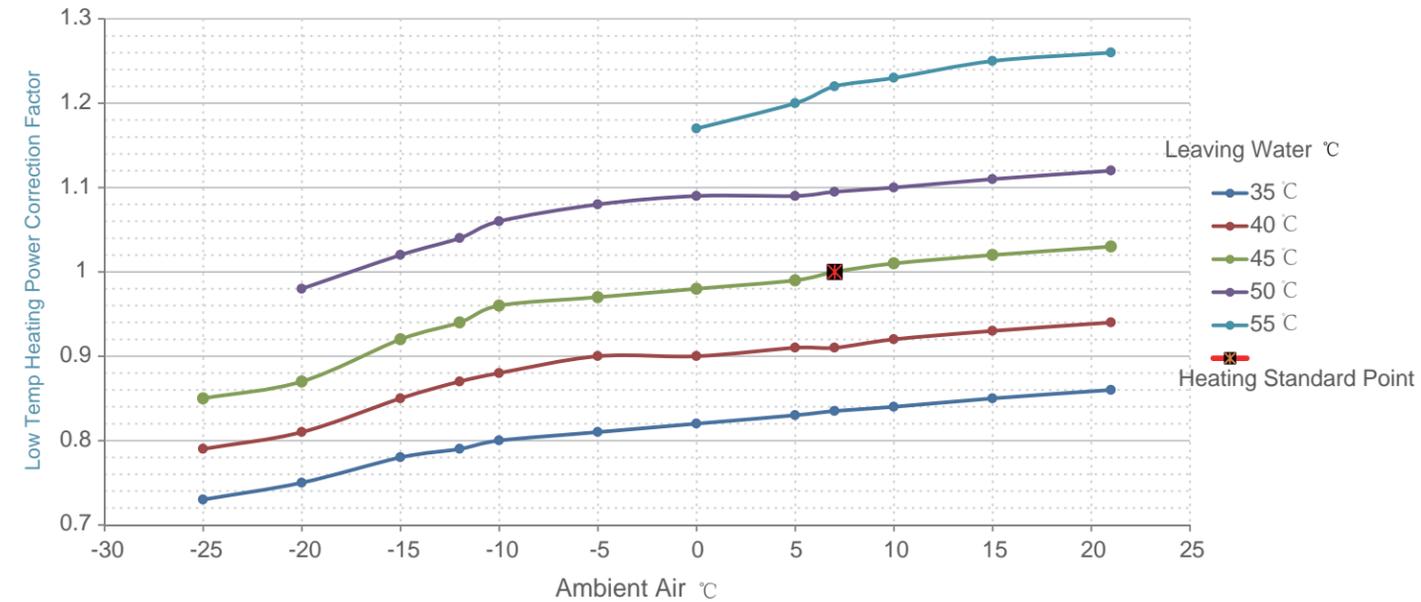
Low Temperature Heating Capacity Correction Factor



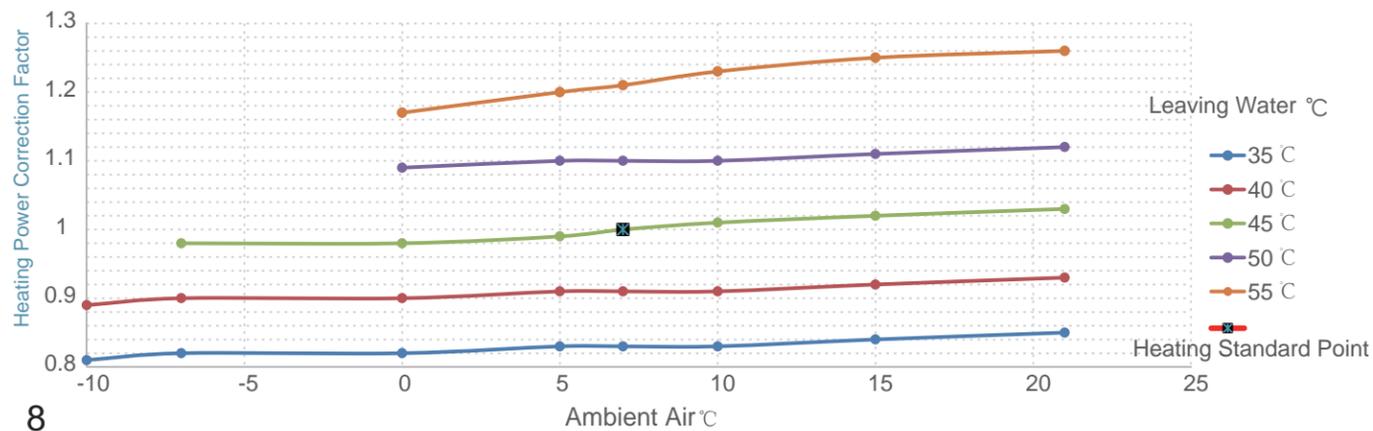
Standard Heating Capacity Correction Factor



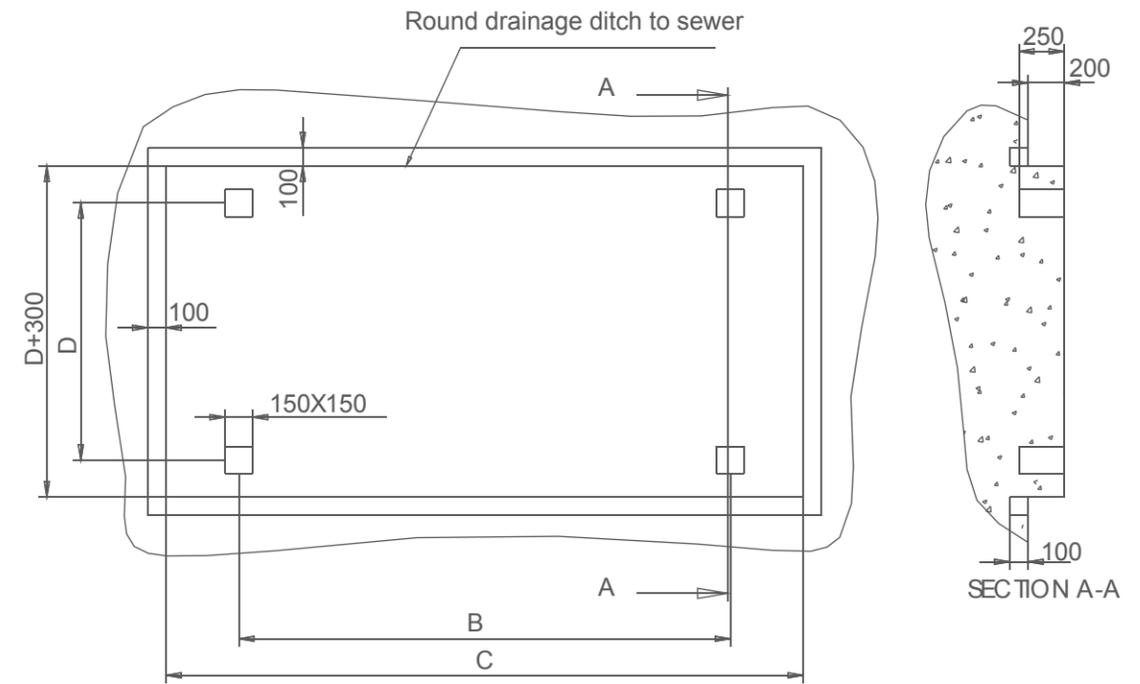
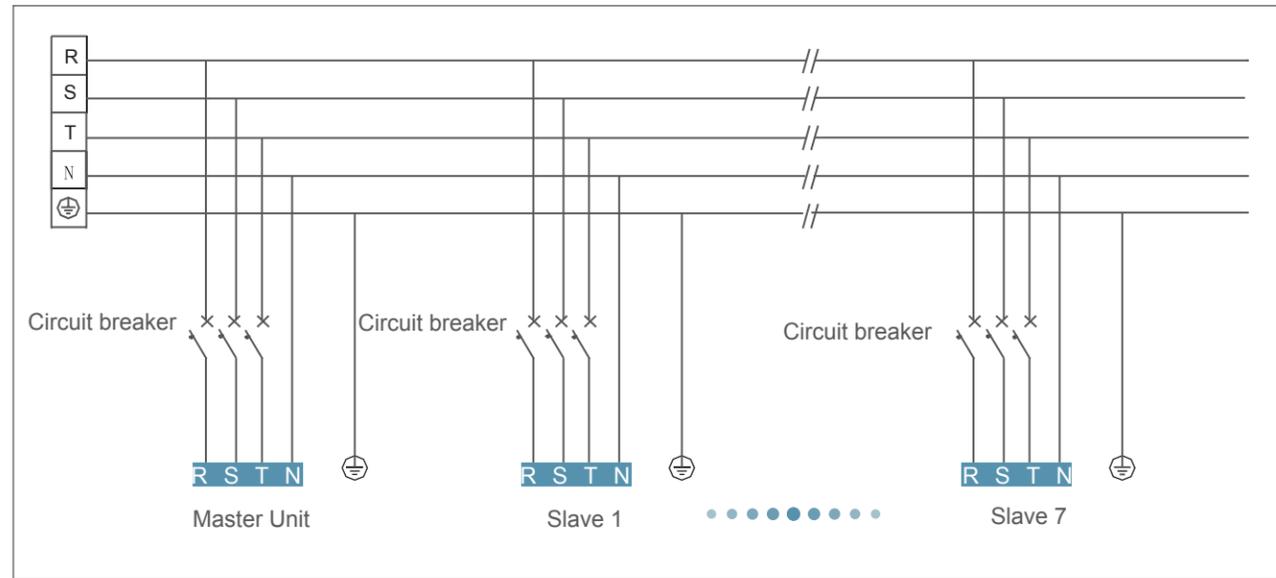
Low Temperature Heating Power Correction Factor



Standard Heating Power Correction Factor



In the above Low temperature heating correction curve: Standard reference point 1.0 is based on 7°C (dry bulb) ambient air, and 45°C load leaving water.



Single Module Footprint

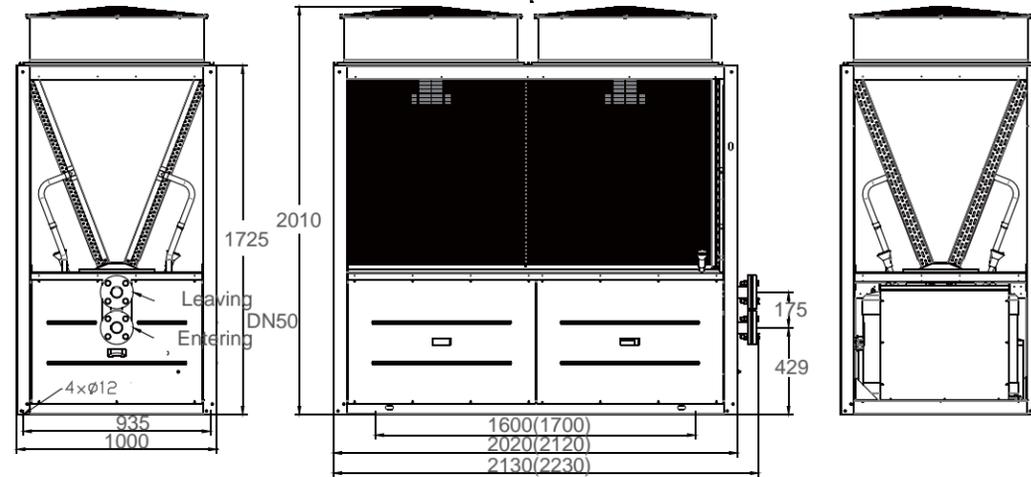
Unit power lines diameter selection

Model	Copper Core (mm ²)		
	Wiring Length ≤ 20m		
	Phase Line Diameter	Neutral Line Diameter	Ground Line
MAC0220	16	2.5	16
MAC0330	25	2.5	16
MAC0440	35	2.5	16

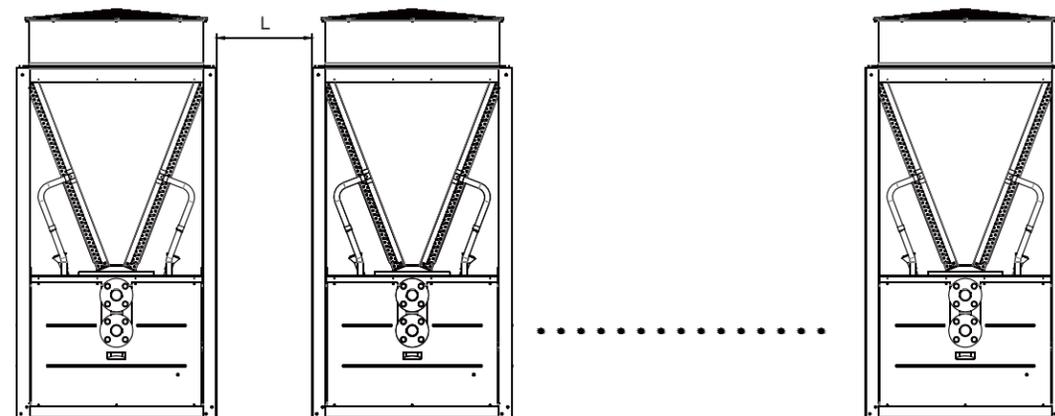
Standard / Low Temperature

	MAC0220	MAC0330	MAC0440
B		1600/1700	
C		2020/2120	
D		935/935	

1. 150X150 Square hole for M12 bolt Embedded;
2. Proper vibration isolators should be used under the unit during installation;
3. 100x100 ditch above is for water drainage;
4. The base is made from concrete structure.



Single module dimensions (data inside brackets are for low temperature module)



Multiple Modules Installation Spacing

Notes:

1. All modules can be designed in modular form up to maximum 8 modules, please refer to catalogue parameters for selection;
2. Spacing "L" between modules can be determined by user according to site condition, suggest to keep 300~500mm service clearance or more.



Seeking Increasing Perfection, Product R&D, Professional Air Conditioner, Customization

The strength of Mammoth in research and development always takes the lead in the industry. It has several R&D centers in the world with experienced engineering specialists and first-class R&D experimental equipments, which enables custom air-conditioning products for global users in different applications within the shortest time. The reliability, practicality and economical efficiency are assessed by professional laboratory to ensure zero-defect products. Seeking increasing perfection has always been the mission of Mammoth.

Efficient and Strict Management with Products Adapting to the Market

Mammoth adopts the most advanced DFT management system and integrates market prediction, individual needs, product research, purchasing, production, testing, logistics and service into the system, thus realizing custom professional and energy-saving air-conditioning products for global users. The factories start from every detail and give enough thought to economical efficiency while offering high-quality products and have won recognition from global users. Strict and efficient quality management certification system is well reflected in the products from Mammoth's companies worldwide.



Wholehearted Individuation Serves to Your Engineering Scheme

"Wholehearted individuation serves to your engineering scheme" is our service concept, 24-hour hotline, free consultation, independent filing in customer center, regular return visit, quality tracking, efficient and quick-response service network, perfect local-based service. We are seeking for 100% satisfaction degree.

