Mammoth
The Leader In Custom HVAC & Energy Saving

Water Source Heat Pump

Water to Water Standard & Heat Recovery E Series

11.3kW - 45.2kW (50Hz)

(R410A)

Mammoth (Shanghai) Air Conditioning Ltd.

ISO9001 ISO14001 OHSAS18001

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

Mammoth®
The Leader In Custom HVAC & Energy Saving

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.

Unit Features

Mammoth water to water units are designed to supply hot and/or chilled water to terminal unit such as air handling units, fan coils, and radiant floor heating systems It also can supply free domestic hot water.This applies to water loop system(boiler /cooling tower) or geothermal system.
Mammoth produces water to water units in 9 sizes from 11.3 to 42.1 kW with two configurations; The 036 through 072 models incorporate a single circuit refrigeration design, while 086 through 142 models incorporate dual circuit design. Each unit is fully test run in factory before shipping.

Green

Water Source Heat Pump is flexible for installation in boiler/cooling tower applications as well as ground-source (geothermal) applications with underground water or sewage water and soil as the heat source. Utilization of environmentally friendly refrigerant R410A does not deplete the earth's ozone layer.

Total Heat Recovery

During cooling mode, the unit produce 7℃ chilled water for load side and also produces free domestic hot water with heat recovery.

Construction

The cabinet is constructed of G-60 galvanization steel.Cabinet insulation is 15 mm thick, 48 kg/m3 density, skin-coated fiberglass. The entirebottom panel is insulated with the same material to prevent condensation and reduce noise transmission
Four access panels for the compressor, pump and control box sections allow service to all major components. See Picture 1.

Refrigerant System

The refrigeration system for each circuit consists of a hermetic compressor, braze-plate type water-to-refrigerant heat exchangers, thermal expansion valve, access valves, reversing valve and safety controls. The compressor is mounted on special designed mounting channel and neoprene isolators. This dual isolation ensures minimal noise transmission and quiet operation. Each refrigerant circuit has high and low side access valves for servicing. Use stainless steel brazed-plate heat exchanger with high efficiency and anticorrosive characteristics.

Electrical and Control Box

The control box houses all the electrical components with its own access panel. Controls include a transformer, printed-circuit board, compressor contactor, relays etc.

The control system completes with a microprocessor-based unit controller with the following features:

• Five operation modes

Cooling, heating, heat recovery, domestic hot water, heating with domestic hot water (with domestic hot water as priority)

• Water temperature Indication

The inlet and outlet water temperature are indicated on the thermostat. (load water， source water , domestic hot water)

• Pump connection

Maximum 3 pumps (source, load and hot water) can be linked to work with unit controller.

• Safety lockout

Safety lockout prevents compressor operation if any of the safety switches trip: high pressure switch, low pressure switch, water flow switch. The unit can be reset from the wall thermostat or from the main unit disconnect.

• Low pressure switch bypass

Low pressure switch will bypass the low pressure input signal for 120 seconds each time the compressor starts, to eliminate nuisance trip and to allow the suction pressure to build up at startup.

• BMS communication

Utilize RS485 communication port to connect with BMS, see Picture 2

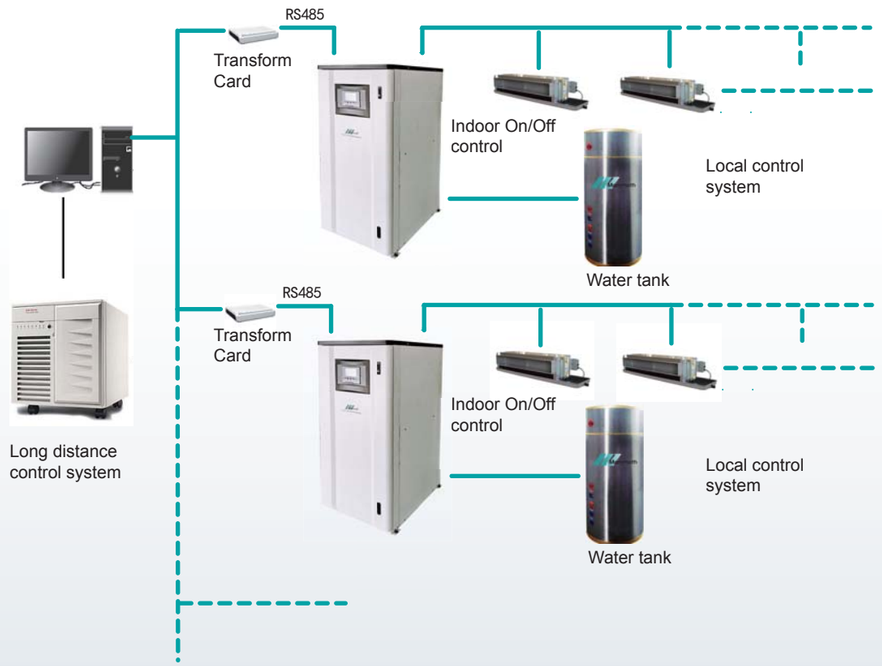
• Others:

Antifreezing protection; LCD error code display; Timer-power-on/off etc .

Other Design Features Include

- Scroll or rotary compressor(s)
- Expansion valve(s)
- High and low refrigerant pressure safety switches
- Threaded water connections for source side
- Threaded water connections for domestic hot water
- Threaded water connections for load side
- Insulated water and refrigerant piping

Picture 2



Water Loop (3 in 1)

Item \ Model		MSR-J036	MSR-J052	MSR-J072	MSR-J086	MSR-J100	MSR-J120	MSR-J142
Cooling Capacity kW		11.3	14.5	17.6	22.1	29.1	33.1	43.5
Heating Capacity kW		15.5	19	23.7	30	38.1	43.8	58.8
Cooling Power kW		2.3	3.0	3.7	4.6	6.1	7.2	9.3
Heating Power kW		2.9	3.6	4.5	5.7	7.4	8.7	11.3
Power Supply		380V/3N~/50Hz						
Cooling Current A		5.8	6.1	7.3	9.2	11.9	13.3	18.7
Heating Current A		6.4	7.1	8.2	11.0	14.0	16.2	21.9
Compressor Type		High Efficiency Rotary						
Compressor Qty		1	1	1	1	2	2	2
Refrigerant		R410A						
Load Water Flow m3/h		1.9	2.5	3.0	3.8	5.0	5.7	7.5
Load Pressure Drop kPa		48	53	55	59	65	67	68
Source Water Flow m3/h		2.4	3.0	3.7	4.6	6.1	6.9	9.1
Source Pressure Drop kPa		52	55	58	59	68	69	69
Source Connection Fitting Size (Without Pump) in		R 1-1/4						
Load Connection Fitting Size (Without Pump) in		R 1-1/4						
Domestic Hot Water	Hot Water Capacity L/h	245	305	380	450	305	380	450
	Hot Water Flow m3/h	2.2	2.7	3.4	4.1	2.7	3.4	4.1
	Connection Fitting Size in	R 1						
Hot Water Pump (Standard)	Head m	5~8	5~8	5~8	5~8	10~15	10~15	10~15
	Power kW	0.21	0.21	0.21	0.21	0.37	0.37	0.37
	Connection Fitting Size (with hot water pump)	R 1						
Load Water Pump (Standard)	Head m	26	24	27	24	28	30	27
	Power kW	0.55	0.55	0.55	0.55	0.75	1.1	1.1
	Connection Fitting Size (with load water pump)	Rp 1		Rp 1 1/4			Rp 1 1/2	
Source Water Pump (Optional)	Head m	29	27	25	27	28	27	25
	Power kW	0.55	0.55	0.55	0.75	1.1	1.1	1.1
	Connection Fitting Size (with source water pump)	Rp 1 1/4				Rp 1 1/2		
Weight Net/Gross kg		175/200	180/205	185/210	190/215	245/280	265/300	285/320
Dimensions (LxWxH) mm		675*580*1350				675*880*1350		

Notes:
1. Standard unit water side design pressure is 1.0MPa, please contact Mammoth if any other request on pressure.
2. Cooling capacities are based on 7C leaving load water and 30c entering source water; Heating capacities are based on 45C leaving load water and 20C entering source water; Hot water capacities are based on 15C entering source water, and hot water circular heating from 10C to 55C;
3. Unit water connection fittings explanation: R means conical external thread; Rp means cylindrical internal thread. If unit is selected with internal installed pump, water connection fittings shall refer to information with pump in above table.
4. Parameters above are subjected to change without notice due to continuous product improvement.

Ground Loop (3 in 1)

Item \ Model		MSR-J036	MSR-J052	MSR-J072	MSR-J086	MSR-J100	MSR-J120	MSR-J142
Cooling Capacity kW		12.2	15	18.1	23	30.1	34.6	45.2
Heating Capacity kW		12.7	15.6	18.9	24.3	31.3	36.7	47.3
Cooling Power kW		2.1	2.7	3.3	4.2	5.6	6.5	8.4
Heating Power kW		2.8	3.6	4.5	5.6	7.4	8.7	11.2
Power Supply		380V/3N~/50Hz						
Cooling Current A		5.7	6.0	6.5	8.7	11.0	12.2	17.4
Heating Current A		6.3	7.1	8.1	10.8	14.0	16.2	21.9
Compressor Type		High Efficiency Rotary						
Compressor Qty		1	1	1	1	2	2	2
Refrigerant		R410A						
Load Water Flow m3/h		2.1	2.6	3.1	4.0	5.2	6.0	7.8
Load Pressure Drop kPa		48	53	55	59	65	67	68
Source Water Flow m3/h		2.5	3.0	3.7	4.7	6.1	7.1	9.2
Source Pressure Drop kPa		52	55	58	59	68	69	69
Source Connection Fitting Size (Without Pump) in		R 1-1/4						
Load Connection Fitting Size (Without Pump) in		R 1-1/4						
Domestic Hot Water	Hot Water Capacity L/h	245	305	380	450	305	380	450
	Hot Water Flow m3/h	2.2	2.7	3.4	4.1	2.7	3.4	4.1
	Connection Fitting Size in	R 1						
Hot Water Pump (Standard)	Head m	5~8	5~8	5~8	5~8	10~15	10~15	10~15
	Power kW	0.21	0.21	0.21	0.21	0.37	0.37	0.37
	Connection Fitting Size (with hot water pump)	R 1						
Load Water Pump (Standard)	Head m	26	24	27	24	28	30	27
	Power kW	0.55	0.55	0.55	0.55	0.75	1.1	1.1
	Connection Fitting Size (with load water pump)	Rp 1		Rp 1 1/4			Rp 1 1/2	
Source Water Pump (Optional)	Head m	29	27	25	27	28	27	25
	Power kW	0.55	0.55	0.55	0.75	1.1	1.1	1.1
	Connection Fitting Size (with source water pump)	Rp 1 1/4				Rp 1 1/2		
Weight Net/Gross kg		175/200	180/205	185/210	190/215	245/280	265/300	285/320
Dimensions (LxWxH) mm		675*580*1350				675*880*1350		

Notes:
1. Standard unit water side design pressure is 1.0MPa, please contact Mammoth if any other request on pressure.
2. Cooling capacities are based on 7C leaving load water and 25C entering source water; Heating capacities are based on 45C leaving load water and 10C entering source water; Hot water capacities are based on 15C entering source water, and hot water circular heating from 10C to 55C; Put antifreeze for the case of source leaving water will be lower than 2C.
3. Please contact Mammoth if the water storage tank used is designed with internal installed heat exchange coil.
4. Unit water connection fittings explanation: R means conical external thread; Rp means cylindrical internal thread. If unit is selected with internal installed pump, water connection fittings shall refer to information with pump in above table.
5. Parameters above are subjected to change without notice due to continuous product improvement.

Water Loop (Standard Heat Pump)

Item \ Model		MSR-J036	MSR-J052	MSR-J072	MSR-J086	MSR-J100	MSR-J120	MSR-J142
Cooling Capacity kW		11.3	14.5	17.6	22.1	29.1	33.1	43.5
Heating Capacity kW		15.5	19	23.7	30	38.1	43.8	58.8
Cooling Power kW		2.3	3.0	3.7	4.7	6.1	7.2	9.3
Heating Power kW		2.9	3.6	4.5	5.7	7.4	8.7	11.3
Power Supply		380V/3N~/50Hz						
Cooling Current A		5.8	6.1	7.3	9.2	11.9	13.3	18.7
Heating Current A		6.4	7.1	8.2	11.0	14.0	16.2	21.9
Compressor Type		High Efficiency Rotary						
Compressor Qty		1	1	1	1	2	2	2
Refrigerant		R410A						
Load Water Flow m3/h		1.9	2.5	3.0	3.8	5.0	5.7	7.5
Load Pressure Drop kPa		48	53	55	59	65	67	68
Source Water Flow m3/h		2.4	3.0	3.7	4.6	6.1	6.9	9.1
Source Pressure Drop kPa		52	55	58	59	68	69	69
Source Connection Fitting Size (Without Pump) in		R 1-1/4						
Load Connection Fitting Size (Without Pump) in		R 1-1/4						
Load Water Pump (Standard)	Head m	26	24	27	24	28	30	27
	Power kW	0.55	0.55	0.55	0.55	0.75	1.1	1.1
	Connection Fitting Size (with load water pump)	Rp 1		Rp 1 1/4			Rp 1 1/2	
Source Water Pump (Optional)	Head m	29	27	25	27	28	27	25
	Power kW	0.55	0.55	0.55	0.75	1.1	1.1	1.1
	Connection Fitting Size (with source water pump)	Rp 1 1/4				Rp 1 1/2		
Weight Net/Gross kg		161/186	165/190	169/194	172/197	225/260	243/278	260/295
Dimensions (LxWxH) mm		675*580*1350				675*880*1350		

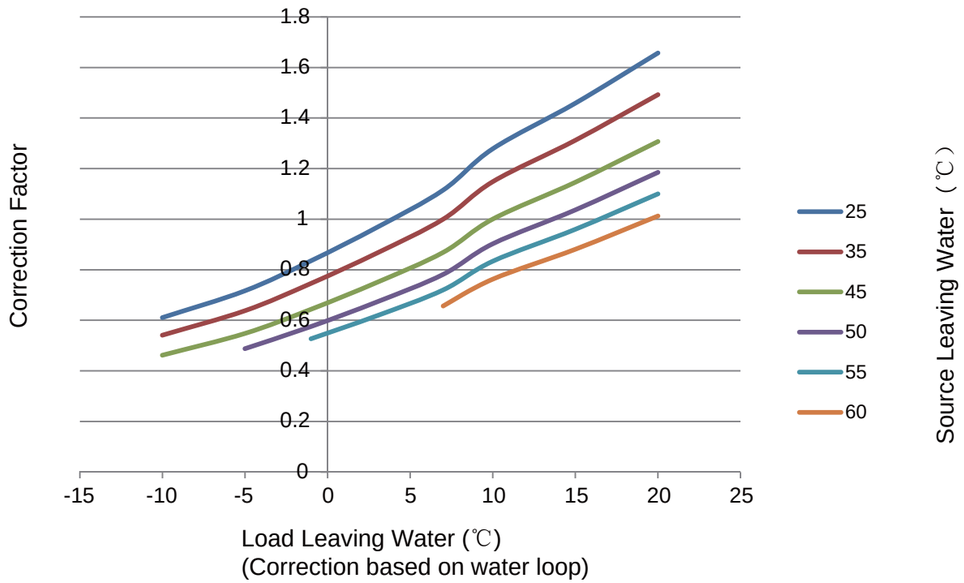
Notes:
1. Standard unit water side design pressure is 1.0MPa, please contact Mammoth if any other request on pressure.
2. Cooling capacities are based on 7C leaving load water and 30c entering source water; Heating capacities are based on 45C leaving load water and 20C entering source water; Hot water capacities are based on 15C entering source water, and hot water circular heating from 10C to 55C.
3. Unit water connection fittings explanation: R means conical external thread; Rp means cylindrical internal thread. If unit is selected with internal installed pump, water connection fittings shall refer to information with pump in above table.
4. Parameters above are subjected to change without notice due to continuous product improvement.

Ground Loop (Standard Heat Pump)

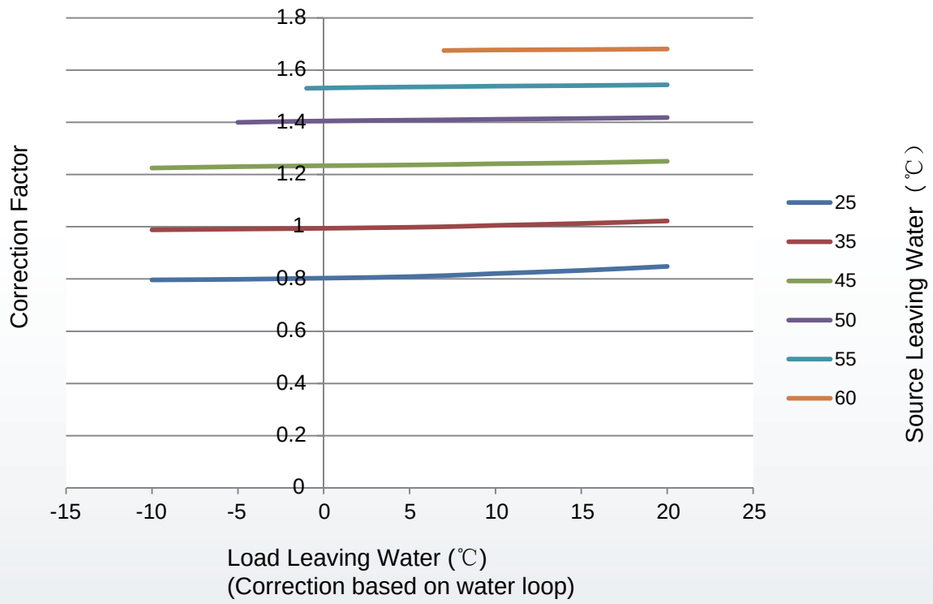
Item \ Model		MSR-J036	MSR-J052	MSR-J072	MSR-J086	MSR-J100	MSR-J120	MSR-J142
Cooling Capacity kW		12.2	15	18.1	23	30.1	34.6	45.2
Heating Capacity kW		12.7	15.6	18.9	24.3	31.3	36.7	47.3
Cooling Power kW		2.1	2.7	3.3	4.2	5.6	6.5	8.4
Heating Power kW		2.8	3.6	4.5	5.6	7.4	8.7	11.2
Power Supply		380V/3N~/50Hz						
Cooling Current A		5.7	6.0	6.5	8.7	11.0	12.2	17.4
Heating Current A		6.3	7.1	8.1	10.8	14.0	16.2	21.9
Compressor Type		High Efficiency Rotary						
Compressor Qty		1	1	1	1	2	2	2
Refrigerant		R410A						
Load Water Flow m3/h		2.1	2.6	3.1	4.0	5.2	6.0	7.8
Load Pressure Drop kPa		48	53	55	59	65	67	68
Source Water Flow m3/h		2.5	3.0	3.7	4.7	6.1	7.1	9.2
Source Pressure Drop kPa		52	55	58	59	68	69	69
Source Connection Fitting Size (Without Pump) in		R 1-1/4						
Load Connection Fitting Size (Without Pump) in		R 1-1/4						
Load Water Pump (Standard)	Head m	26	24	27	24	28	30	27
	Power kW	0.55	0.55	0.55	0.55	0.75	1.1	1.1
	Connection Fitting Size (with load water pump)	Rp 1		Rp 1 1/4			Rp 1 1/2	
Source Water Pump (Optional)	Head m	29	27	25	27	28	27	25
	Power kW	0.55	0.55	0.55	0.75	1.1	1.1	1.1
	Connection Fitting Size (with source water pump)	Rp 1 1/4				Rp 1 1/2		
Weight Net/Gross kg		161/186	165/190	169/194	172/197	225/260	243/278	260/295
Dimensions (LxWxH) mm		675*580*1350				675*880*1350		

Notes:
1. Standard unit water side design pressure is 1.0MPa, please contact Mammoth if any other request on pressure.
2. Cooling capacities are based on 7C leaving load water and 25C entering source water; Heating capacities are based on 45C leaving load water and 10C entering source water; Put antifreeze for the case of source leaving water will be lower than 2C.
3. Unit water connection fittings explanation: R means conical external thread; Rp means cylindrical internal thread. If unit is selected with internal installed pump, water connection fittings shall refer to information with pump in above table.
4. Parameters above are subjected to change without notice due to continuous product improvement.

Cooling Capacity Correction Curve

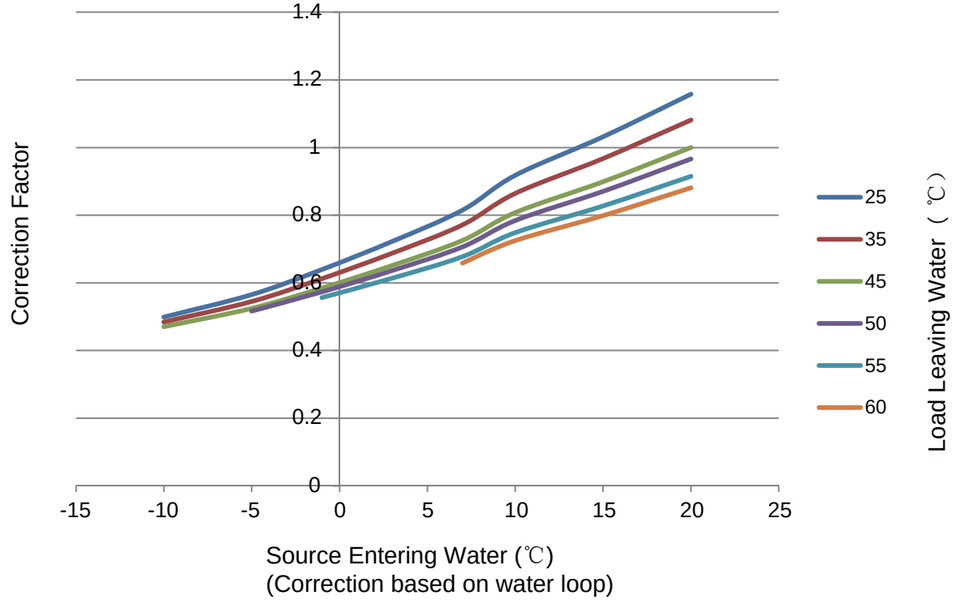


Cooling Power Correction Curve

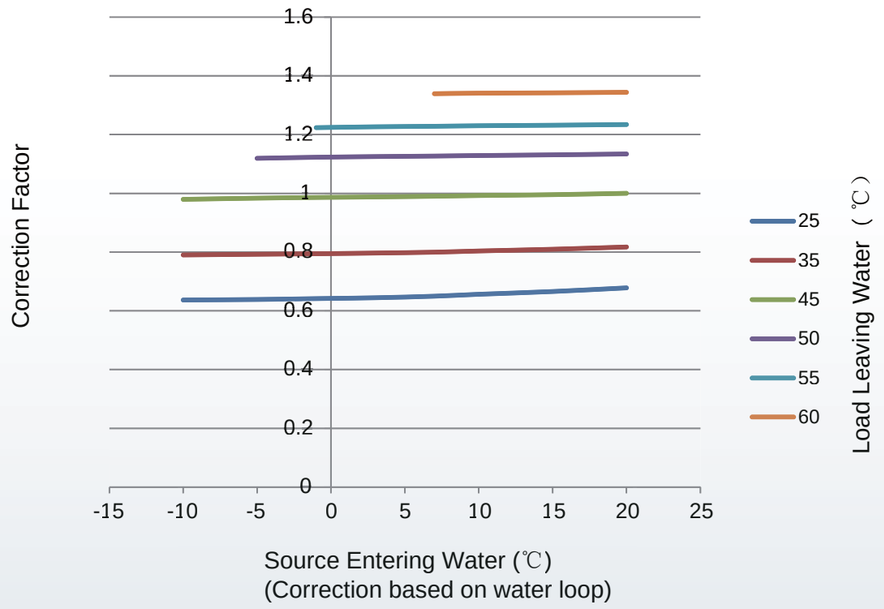


Notes:
1. In cooling capacity correction curve, the basic point 1 is based on 12C/7C evaporator inlet / outlet water and 30C/35C condenser inlet / outlet water;
2. In heating capacity correction curve, he basic point 1 is based on 20C evaporator inlet water and 45C condenser outlet water, with the same water flow as cooling.

Heating Capacity Correction Curve



Heating Power Correction Curve



Capacity Correction Factors

ETHANOL GLYCOL (by Volume)	5%	10%	15%	20%	25%	30%	35%	40%
Cooling	0.985	0.965	0.945	0.924	0.903	0.881	0.859	0.837
Heating	0.978	0.957	0.934	0.912	0.895	0.871	0.843	0.822

Application Limits

	Water Loop / Ground Loop Working Condition		
	Cooling	Heating	Domestic hot water
Load water outlet TEMP	3~20	35~60	35~60
Source water inlet TEMP	20-50	-10~40	-10~40

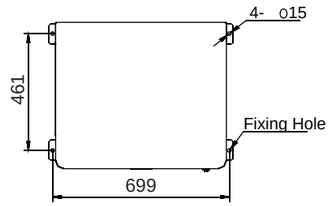
Notes:

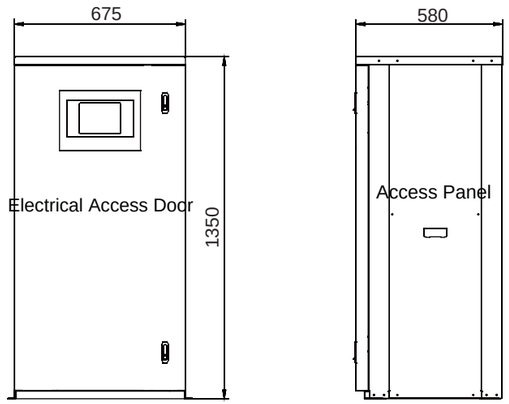
1. During cooling operation and when source entering water is lower 20C, install water flow bypass valve to reduce water flow, to keep leaving water is higher than 25C.
2. When the leaving source water is lower than 2C, put antifreeze into source water system to avoid unit from freezing damage.
3. During heating operation and when load leaving water is higher than 55C, the source side entering water must not be lower than 7C at rated water flow ;
4. If unit is installed outdoor, electrical heater accessory must be used to avoid unit from freezing damage.
5. All above limits are based on unit rated water flow.

Electrical Data

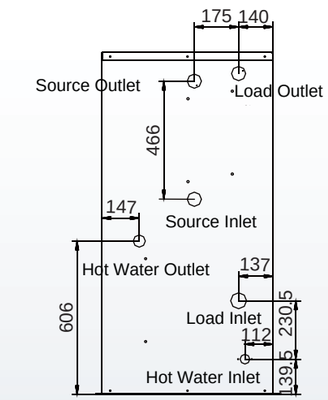
Model	Voltage	Compressor		Operating Current	Min/Max	Max.
		RLA(A)	LRA (A)	(A)	Valtage(V)	Breaker(A)
MSR-J036	380V/3N~/50HZ	7.25	49	7.25	342/420	25A
MSR-J052	380V/3N~/50HZ	7.5	69	7.5	342/420	25A
MSR-J072	380V/3N~/50HZ	9.5	65	9.5	342/420	25A
MSR-J086	380V/3N~/50HZ	11.5	83	11.5	342/420	25A
MSR-J100	380V/3N~/50HZ	7.5	69	15	342/420	62A
MSR-J120	380V/3N~/50HZ	8.7	65	17.4	342/420	62A
MSR-J142	380V/3N~/50HZ	11.5	83	23	342/420	62A

J036 ~086 Dimensions

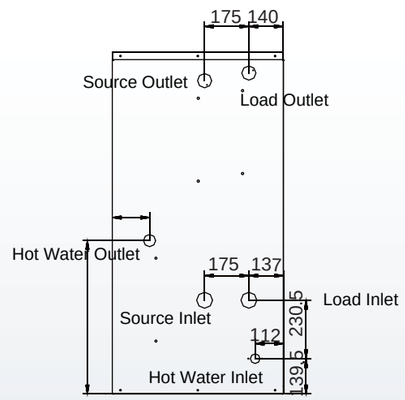




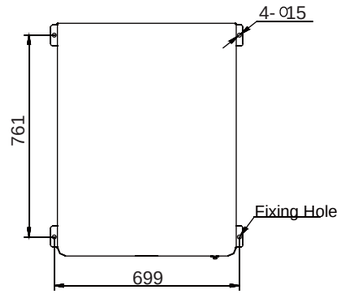
With two internal installed pumps
(Load & hot water pump)

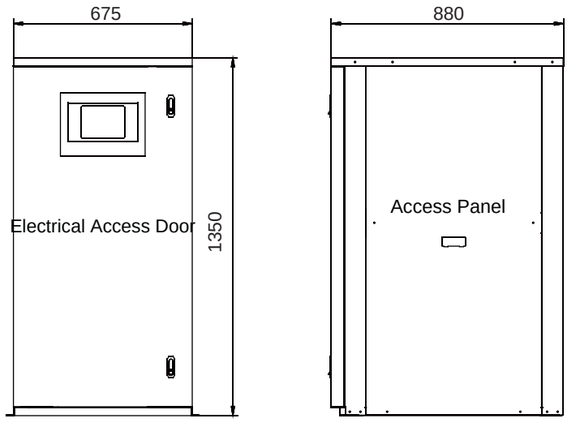


With three internal installed pumps

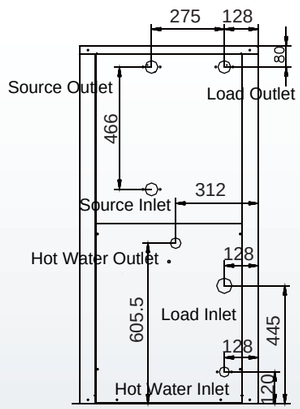


J100~J142 Dimensions

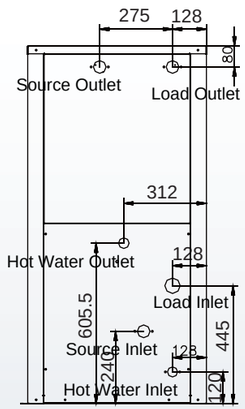




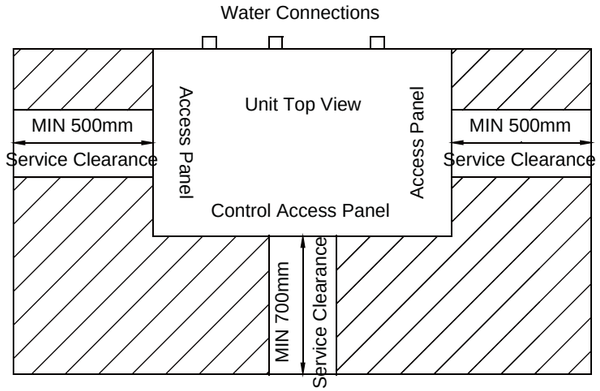
With two internal installed pumps
(Load & hot water pump)



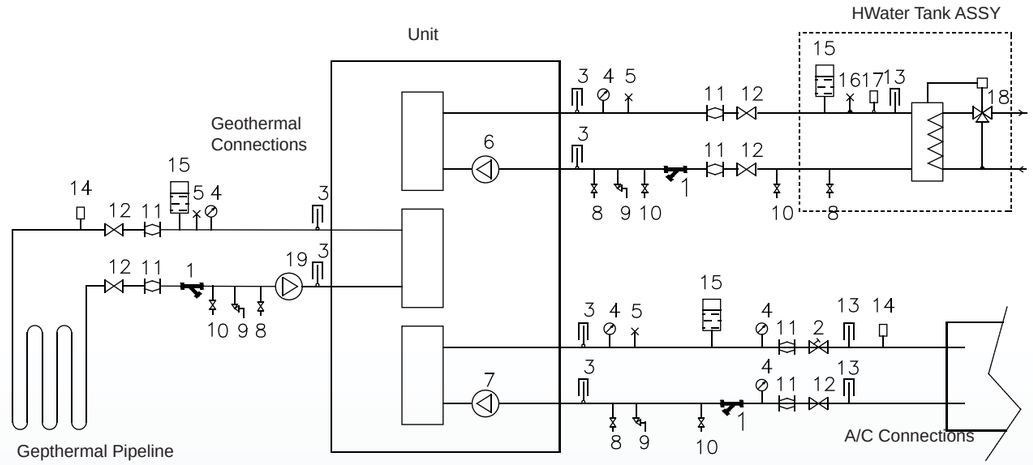
With three internal installed pumps



Service Clearance



Water System Diagram



1. Strainer 2. Adjust Valve 3. Temperature Sensor 4. Pressure Gage 5.Manual Vent Valve 6. Hot Water Pump 7.A/C Pump
8.Drainage Pipe 9. Safety Valve 10.Drainage Pipe
11.Soft Connection 12.Access Valve 13.Thermometer 14. Water Flow Switch 15.Expansion Tank 16.Auto Air Vent Valve
17. Temperature Controller 18.Mixer 19.Source Water Pump

Note: The diagram above is for reference only, please consider site condition, all system part beside unit are provided by others.