



## Three In One Water Source Heat Pump

**7.1kW - 46.2kW (50Hz)**

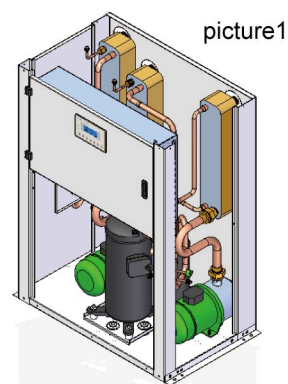
**(R410A)**



Mammoth

## Mammoth “ Three In One Water Source Heat Pump ” Unit Introduction

- 8 unit sizes from 7.1 to 46.2 kW
- Produces hot water for space heating, chilled water for air conditioning and domestic hot water
- Can be applied to boiler/tower or ground-coupled (geothermal) loops
- Can be connected to air handlers, fan coil units or radiant floor heating system
- Five modes of operating cooling, heating, heat recovery, domestic hot water, heating with domestic hot water(priority is domestic hot water)
- For floor-mounted installations



### Standard Rating Data

#### Water loop condition

Unit Size	Voltage	Flow(Source) m3/h	Cooling Load			Heating Load			Domestic Hot Water	
			Flow(Load) m3/h	KW	EER	Flow(Load) m3/h	KW	COP	Flow(Load) m3/h	Hot water Volume L/h
024	L	1.53	1.22	7.1	4	1.22	10.3	4.6	1.53	160
036	J	2.41	1.92	11.2	4.2	1.92	17.5	4.9	2.41	265
052	J	3.15	2.54	14.8	4.1	2.54	22.6	4.9	3.15	350
072	J	3.81	3.10	18.0	4.4	3.1	24.8	4.9	3.81	380
086	J	5.23	4.22	24.6	4.2	4.22	35.3	4.8	5.23	530
100	J	6.2	4.98	29.0	4.0	4.98	41.5	4.7	6.20	575
120	J	7.33	5.92	34.5	4.2	5.92	51.3	4.8	7.33	780
142	J	9.8	7.92	46.2	4.3	7.92	65.5	4.8	9.80	1000

Rated per GB/T19409-2003

Cooling capacity is based on 12/7 °C entering/leaving( load )water and 30 °C/35 °C entering/leaving (source )water.

Heating capacity is based on 40 °C entering (load )water and 20 °C entering (source) water.

Domestic hot water capacity is based on 15 °C entering (source) water and 15 °C/55 °C (cyclic heating) entering/leaving domestic hot water.

#### Low temperature condition

Unit Size	Voltage	Flow(Source) m3/h	Cooling Load			Heating Load			Domestic Hot Water	
			Flow(Load) m3/h	KW	EER	Flow(Load) m3/h	KW	COP	Flow(Load) m3/h	Hot water Volume L/h
024	L	1.59	1.30	7.57	4.6	1.30	7.8	3.5	1.59	160
036	J	2.58	2.10	12.2	4.5	2.10	13.2	3.6	2.58	265
052	J	3.20	2.64	15.4	4.7	2.64	16.9	3.6	3.20	350
072	J	3.84	3.19	18.6	5.1	3.19	19.2	3.8	3.84	380
086	J	5.42	4.50	26.2	4.9	4.50	26.8	3.6	5.42	530
100	J	6.27	5.15	30.0	4.6	5.15	31.5	3.5	6.27	575
120	J	7.52	6.26	36.5	5.0	6.26	38.4	3.6	7.52	780
142	J	9.84	8.15	47.5	4.8	8.15	48.3	3.5	9.84	1000

Cooling capacity is based on 12/7 °C entering/leaving load water and 25 °C/30 °C entering/leaving source water.

Heating capacity is based on 40 °C entering load water and 10 °C entering source water.

Domestic hot water capacity based on 15 °C entering source water and 15 °C/55 °C (cyclic heating) entering/leaving domestic hot water.

## Pump Head

Item \ Size		024	036	052	072	086	100	120	142
Load water pump	Pump Head m	21	26	23	27	24	28	30	26
	Power input KW	0.55	0.55	0.55	0.55	0.55	0.75	1.1	1.1
Source water pump	Pump Head m	5-8	5-8	5-8	5-8	10-15	10-15	10-15	10-15
	Power input KW	0.37	0.55	0.55	0.55	0.75	1.1	1.1	1.1
Domestic hot water pump(optional)	Pump Head m	26	22	26	25	29	28	25	30
	Power input KW	0.21	0.21	0.21	0.21	0.37	0.37	0.37	0.37

## Model Nomenclature

MSR    –    L    024    WHE  
1                    2                    3                    4

- 1 Mammoth WSHP
- 2 Voltage  
L= 220V~50Hz  
J= 380V/3N~50Hz
- 3 Unit Size  
kW Cooling  
024= 7.1  
036= 11.2  
052= 14.8  
072= 18  
086= 24.6  
100= 29  
120= 34.5  
142= 46.2
- 4 Unit Type  
WHE=Three In One WSHP water loop condition  
WLE=Three In One WSHP low temperature condition



## Unit Feature

Mammoth Three-in-one 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 Three-in-one units in 8 sizes from 7 to 46 kW with two configurations; The 024 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. It use R410A refrigerant and is enviromental friendly.

## Total heat recovery

During cooling mode, the unit produce 7 °C 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/m<sup>3</sup> density, skin-coated fiberglass. The entire bottom 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, 3 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**

Pump can be linked to work. (the control system can integrate three pump connections)

- **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**

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

- **Others:**

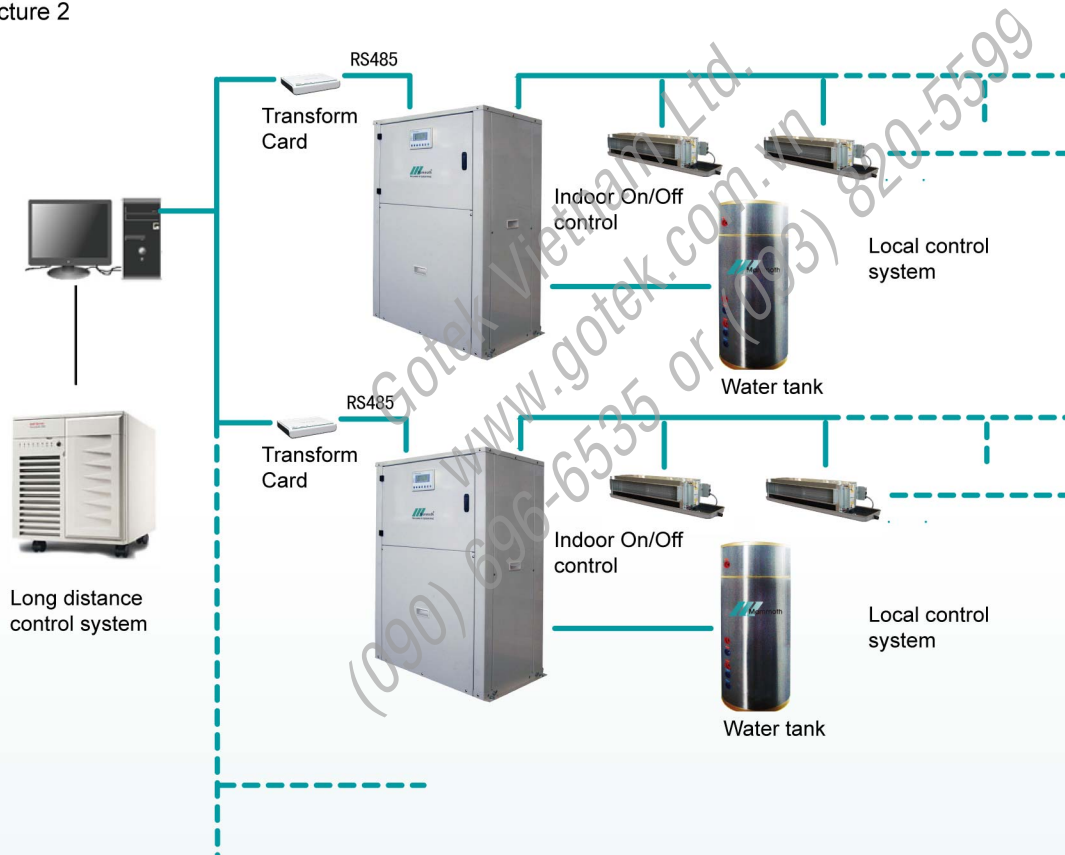
Antifreezing protection; LCD error code display; Timer-power-on/off etc .

### 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

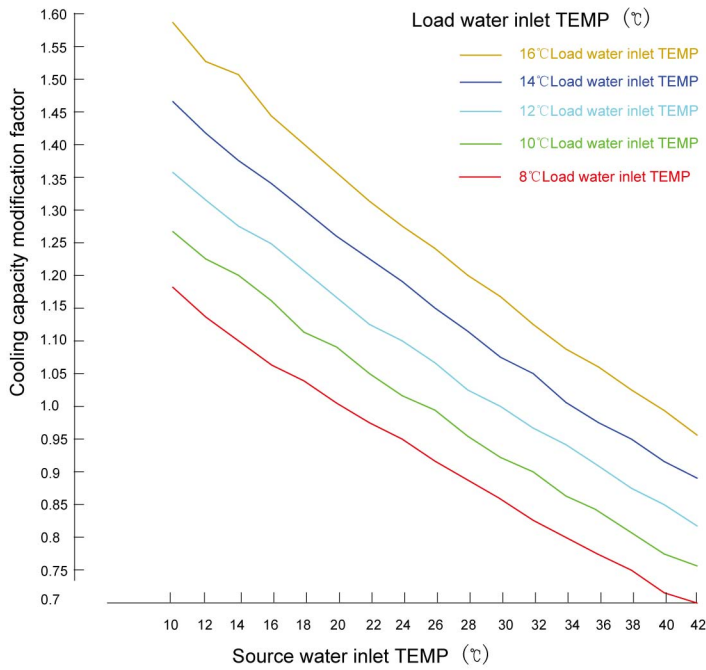


Picture 2

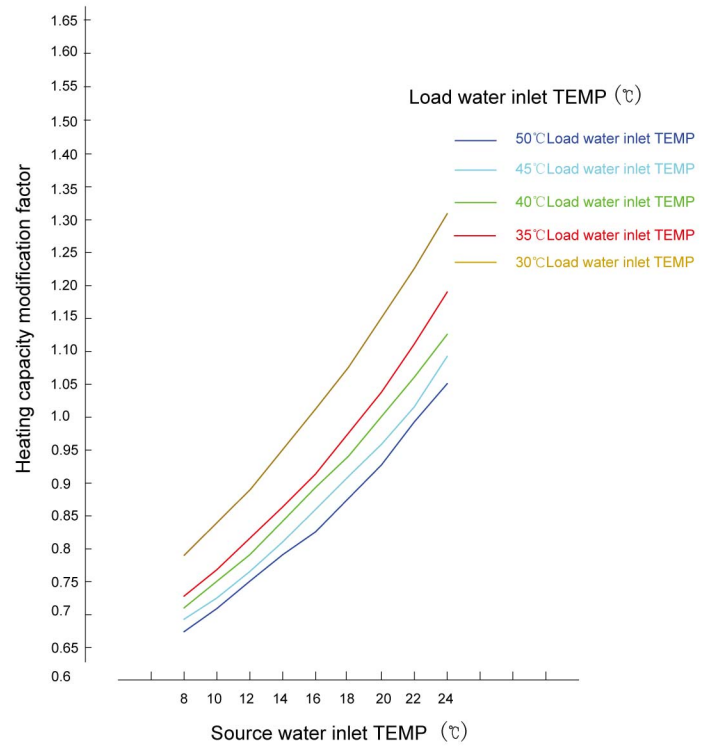


## Performance Curve

### Water loop capacity modification factor

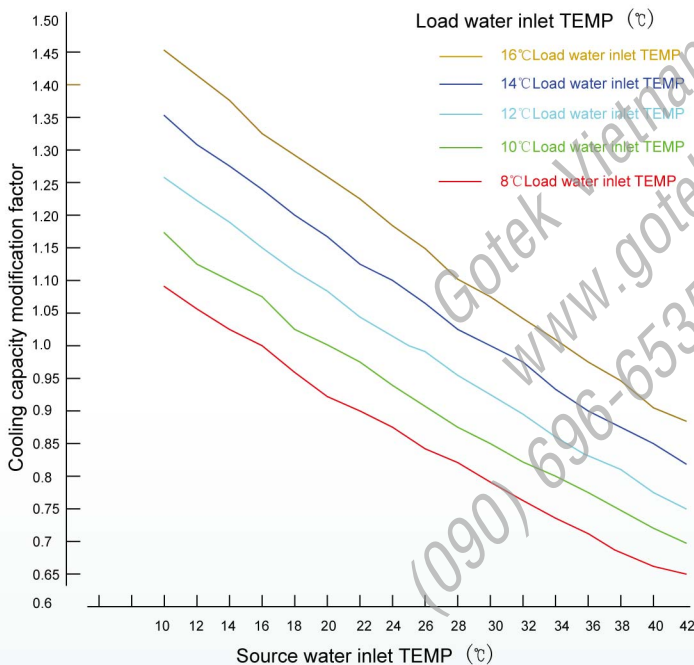


NOTE: In this chart the cooling capacity modification factor under standard water loop condition is 1

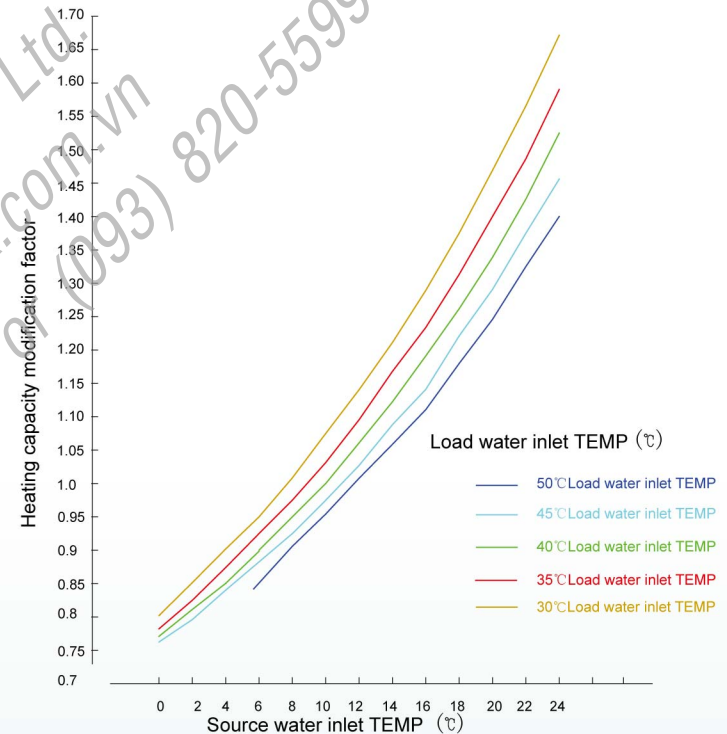


NOTE: In this chart the heating capacity modification factor under standard water loop condition is 1

### Ground source capacity modification factor



NOTE: In this chart the cooling capacity modification factor under standard ground source condition is 1



NOTE: 1. In this chart the heating capacity modification factor under standard ground source condition is 1  
2. When the load water outlet TEMP is over 55°C, the source water outlet TEMP should not below 2°C

## Capacity Correction Factors

METHANOL (by Volume)	10%	20%	30%	40%	50%
Cooling	0.9980	0.9965	0.9949	0.9932	0.9915
Heating	0.9950	0.9898	0.9846	0.9794	0.9742

ETHANOL GLYCOL (by Volume)	10%	20%	30%	40%	50%
Cooling	0.9955	0.9912	0.9870	0.9830	0.9790
Heating	0.9925	0.9848	0.9770	0.9690	0.9610

PROPYLENE GLYCOL (by Volume)	10%	20%	30%	40%	50%
Cooling	0.9934	0.9869	0.9804	0.9739	0.9681
Heating	0.9863	0.9732	0.9603	0.9477	0.9350

## Application Limits

	Water loop condition			Low temperature source condition		
Load water outlet TEMP	Cooling	Heating	Domestic hot water	Cooling	Heating	Domestic hot water
	3~20 °C	~50 °C	~55 °C	3~20 °C	~50 °C	~55 °C
Source water inlet TEMP	13~43 °C	10~32 °C	10~32 °C	13~43 °C	-4~32 °C	7~32 °C

NOTE: 1. When the source water temperature is too low (Ground loop), please add antifreeze to the source water system.  
 2. It is not recommended to operate under 10-15 °C source water temperature. If the source water temperature is below 15 °C, please reduce the source water flow to make sure the leaving source water temperature is higher than 25 °C.

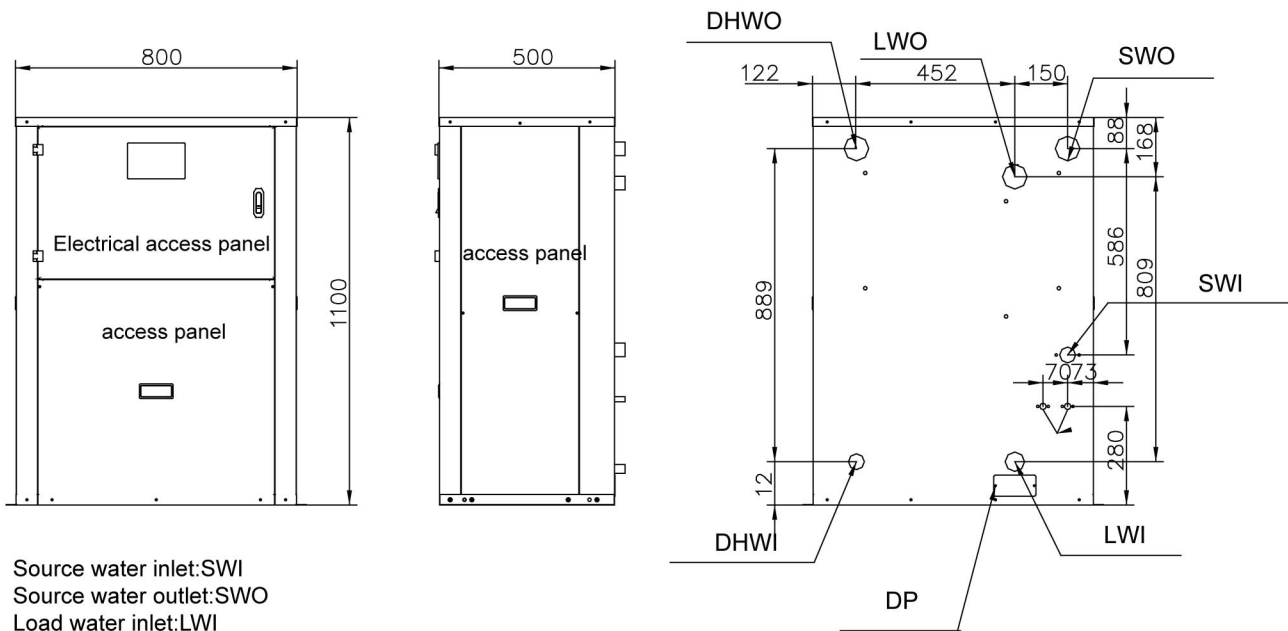
## Electrical Data

Model	Voltage	Compressor		Operating Current (A)	Min/Max Voltage(V)	Max. Breaker(A)
		RLA (A)	LRA (A)			
L024WH(L)E	220V~/50HZ	11.5	63	11.5	197/253	25A
J036WH(L) E	380V/3N~/50HZ	6.8	37	6.8	342/420	15A
J052WH(L) E	380V/3N~/50HZ	8.5	47	8.5	342/420	25A
J072WH(L) E	380V/3N~/50HZ	9.6	53	9.6	342/420	25A
J086WH(L) E	380V/3N~/50HZ	13.9	45	13.9	342/420	50A
J100WH(L) E	380V/3N~/50HZ	15.6	50	15.6	342/420	62A
J120WH(L) E	380V/3N~/50HZ	19.8	65	19.8	342/420	62A
J142WH(L) E	380V/3N~/50HZ	26	85	26	342/420	62A



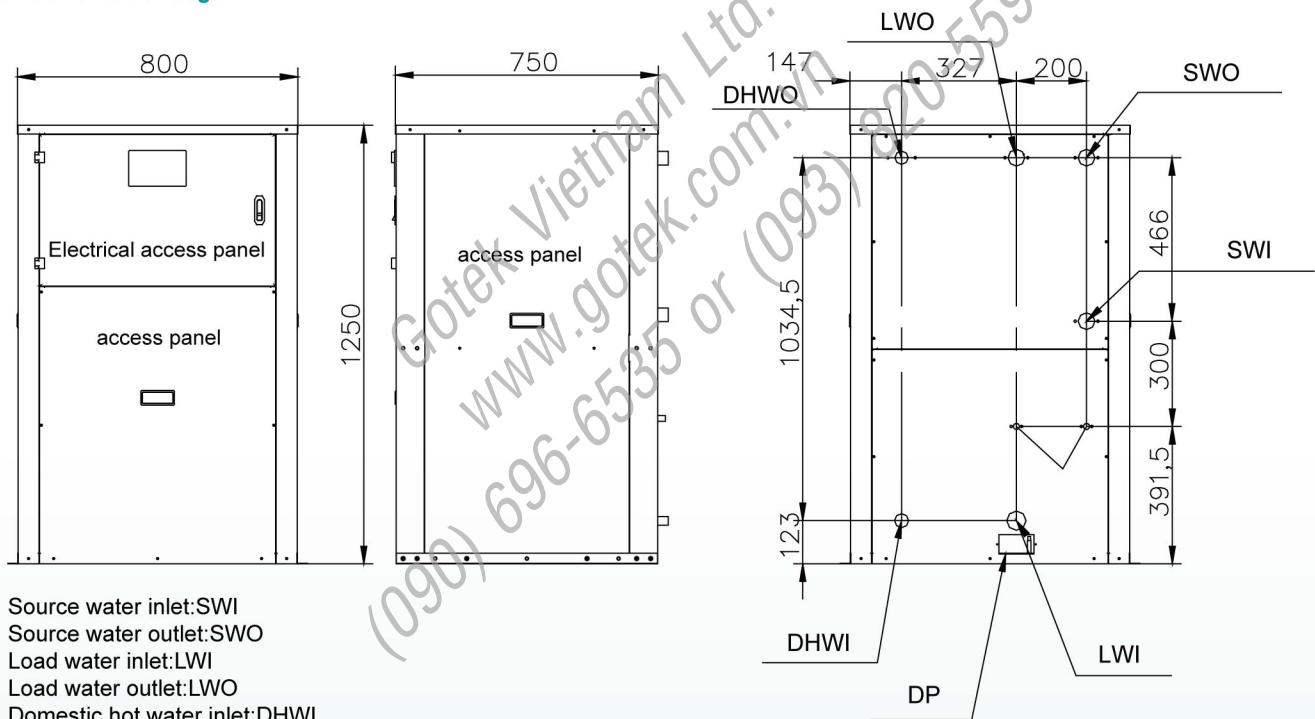
## Dimensional Data

### Unit Size 024 through 072



Source water inlet:SWI  
Source water outlet:SWO  
Load water inlet:LWI  
Load water outlet:LWO  
Domestic hot water inlet:DHWI  
Domestic hot water outlet:DHWO  
Drain pipe:DP

### Unit Size 086 through 142



Source water inlet:SWI  
Source water outlet:SWO  
Load water inlet:LWI  
Load water outlet:LWO  
Domestic hot water inlet:DHWI  
Domestic hot water outlet:DHWO  
Drain pipe:DP



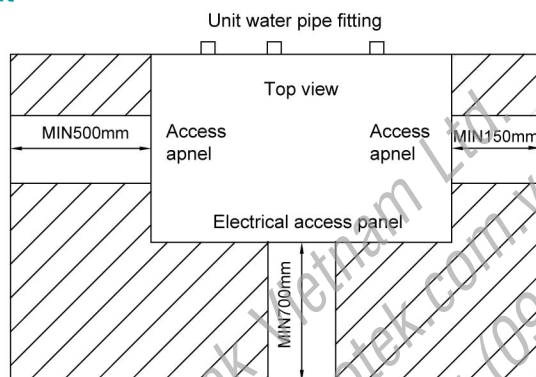
## Physical Data

Unit Size	Number of Refrigerant Circuits	Refrigerant Charge R410A (kg)	Net Weight (kg)	Gross Weight (kg)	Package Dimensions (mm)
024	1	0.90	130	160	950*610*1300
036	1	1.40	142	172	950*610*1300
052	1	1.85	150	180	950*610*1300
072	1	2.00	160	190	950*610*1300
086	2	2*1.60	270	306	950*860*1430
100	2	2*1.80	285	321	950*860*1430
120	2	2*2.00	297	333	950*860*1430
142	2	2*2.70	330	366	950*860*1430

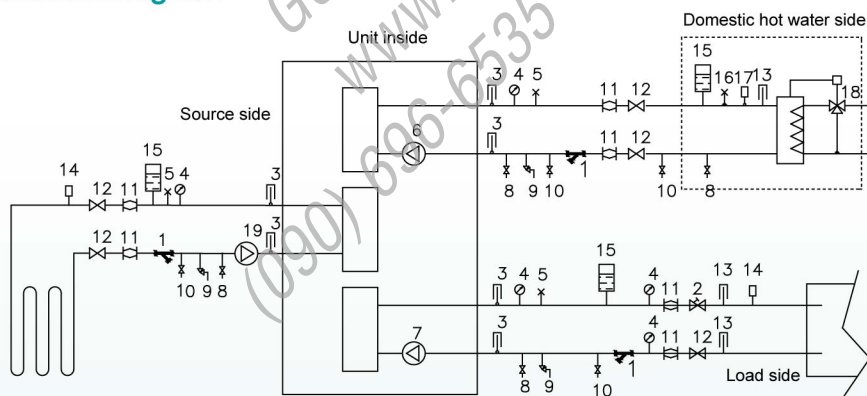
## Fitting Sizes

Item \ Size		024	036	052	072	086	100	120	142
Load water	Inlet inch	Rp 1	Rp 1	Rp 1	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4	Rp 1-1/2	Rp 1-1/2
	Outlet inch	R 1	R 1	R 1	R 1-1/4	R 1-1/4	R 1-1/4	R 1-1/4	R 1-1/4
Source water	Inlet inch	Rp 1	Rp 1	Rp 1	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4
	Outlet inch	Rp 1	Rp 1	Rp 1	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4	Rp 1-1/4
Domestic hot water	Inlet inch	R 3/4	R 3/4	R 3/4	R 3/4	Rp 1	Rp 1	Rp 1	Rp 1
	Outlet inch	R 3/4	R 3/4	R 3/4	R 3/4	R 1	R 1	R 1	R 1

## Installation Space Limit



## System Application Diagram



1. Filter 2. Adjustable valve 3. Temperature gauge 4. Pressure gauge 5. Air vent 6. Hot waster pump 7. A/C pump 8. Drainage pipe 9. Safty valve 10. Drainage pipe 11. Flexible pipe 12. Stop valve 13. Thermometer 14. Water flow switch 15. Expansion tank 16. Automatic air vent 17. Temperature adjustor 18. Water mixing valve 19. Source side pump



**ISO9001**

**ISO14001**

**OHSAS18001**

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