

HOT WATER HEAT PUMP

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CAHV-P500YB-HPB

Mitsubishi Electric - A Leading Manufacturer of Hot Water Heat Pumps

Mitsubishi Electric has been designing and manufacturing commercial hot water heat pumps since 1970.

We were one of the first manufacturers in Japan to utilize heat pump technology to provide hot water, and also the first manufacturer to develop R407C products, which can supply hot water up to 70°C, high enough to eliminate legionella bacteria.

We quickly rose to the forefront of the hot water supply industry in Japan.

Our products are mainly used in commercial applications, such as hotels, hospitals, and nursing homes, where they are providing highly reliable performance.

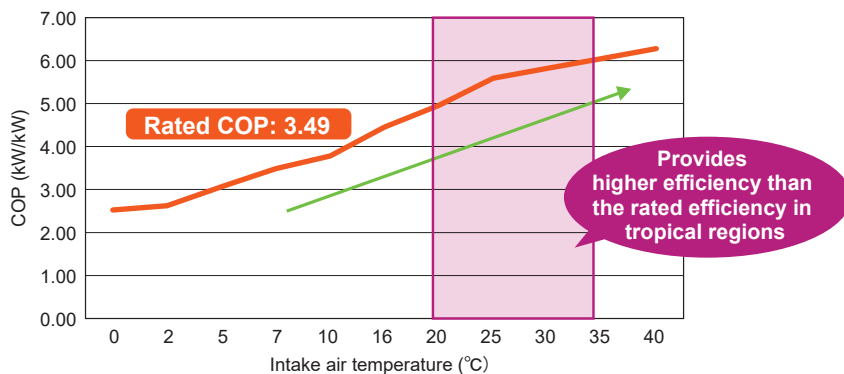
From this position as a leading manufacturer in the hot water supply industry, we are proud to introduce our highly efficient hot water heat pump system.

**Rated
COP
3.49^{*1}**

A "Flash Injection Circuit" is incorporated in our hot water heat pump. Through utilizing this advanced "Flash Injection Circuit" and high-efficiency compressor, the hot water heat pump is able to achieve high efficiency in tropical climate in Asia.

^{*1} Efficiency priority mode: Outdoor temp. 7°CDB/6°CWB, Outlet water temp. 45°C

Changes in COP at high outside temperature



^{*}Efficiency priority mode: Outlet water temp. 45°C

Built-in inverter-driven scroll compressor

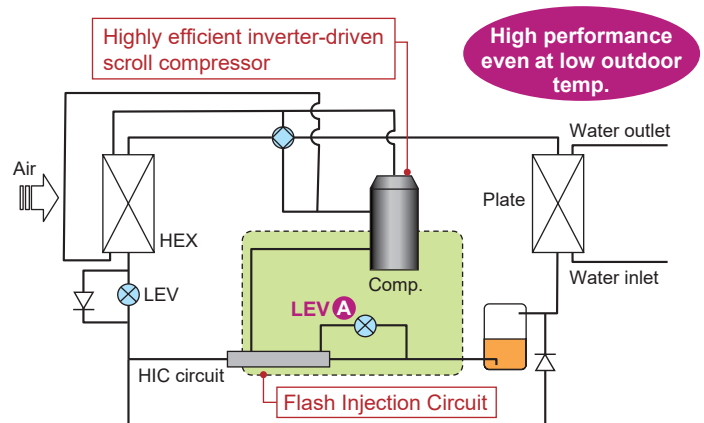


Highly efficient

Highly efficient operation made possible by load-optimized inverter-controlled compressor frequency.

Flash Injection Circuit

Liquid refrigerant, whose pressure is reduced by the linear expansion valve (LEV[Ⓐ]), exchanges heat in the HIC circuit and become gas-liquid two-phase refrigerant. This two-phase refrigerant flows into the injection port in the compressor for controlling the increase of the discharge temperature. Therefore the optimal amount of refrigerant can be provided to the system via the compressor, which makes it possible to provide hot water of 70 °C.



^{*}One unit has two same circuits. (One circuit is shown above.)

**Supplies
hot water
up to 70°C**

This heat-pump unit supplies hot water up to 70°C, which prevents the occurrence of Legionnaire in hot water tank without the need for an electric heater.

^{*}Depending on the outside temperature, hot water temperature may not always reach 70°C.

Case Study

The previous oil boiler, which was installed for more than ten years, malfunctioned frequently. When we built a new annex in 2005, we decided to renew the system. We initially thought about a gas system; however, considering safety and reliability, we decided to install an electric system. We have now been using the Mitsubishi Electric hot water heat pump for more than five years. No malfunction has occurred, and we are satisfied with its safety.



Owner's Voice

Application : Nursing home
Country : Japan
Installed : June, 2005
System : Hot water heat pump 20HP x 1

*Our previous model sold in Japan.



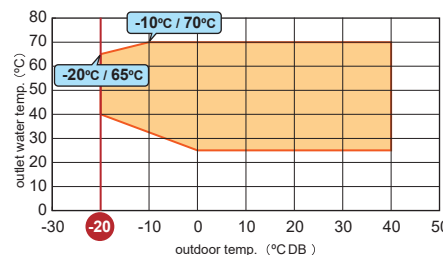
Operable
even at
-20~40°C

The hot water heat pump can be operated at outdoor temp. between -20°C and 40°C.

It delivers precise comfort through all season.

Maximum heating capacity of 75 kW (hot water temperature at 35°C and outdoor temperature at 25°C)

Range of operation temperature and outlet water temperature



If operated at the temperature above 40°C, the operation of the unit may become unstable.

*Operable in the temperature range shown in orange.

Backup function Rotation function

The hot water heat pump ensures an exceptionally high level of reliability through a backup function.*² If either of the compressors malfunction, the other compressor maintains operation to avoid a complete stop of the system.

A rotation function is also available. When two or more units are in the system, the unit runs alternately, ensuring an optimum product lifecycle for both component units.

*² If the main circuit board malfunctions, the backup function and rotation function are not available.
 Capacity drops by 50%.

Backup function



Rotation function



Units run alternately



Wide variety of external input/output

Various system configurations are available.

- Two external output for backup heater
- Analog input to control capacity
- Defrost signal

* Refer to the Data Book for other functions.

60 Pa
External
static pressure

Fan speed can be changed considering ducting on the outdoor unit. Either "60 Pa" or "0 Pa" can be selected.

* The factory setting is "0 Pa."

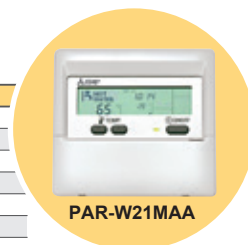
Other features

The system is equipped with "**Capacity Priority Mode**" and "**COP Priority Mode**."*
 Operation modes are changeable to suit clients' needs.

*Factory default setting: COP Priority Mode

The hot water heat pump has been awarded the Promotion Award of the Heat Pump and Thermal Storage Technology Center of Japan in the 2011 Electric Load Leveling Equipment and Systems.

Specifications



Up to 16 units can be controlled with one remote controller.

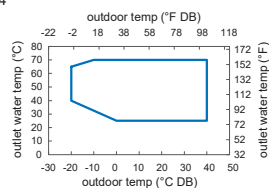
Model			CAHV-P500YB-HPB
Power Source			3-phase 4-wire 380-400-415V 50/60Hz
Capacity *1		kW	45.0
		kcal/h	38,700
		BTU/h	153,540
	Power input	kW	12.9
	Current input	A	21.8-20.7-19.9
Capacity *2	COP (kW/kW)		3.49
		kW	45.0
		kcal/h	38,700
		BTU/h	153,540
	Power input	kW	25.6
Capacity *3	Current input	A	43.2-41.0-39.5
	COP (kW/kW)		1.76
	Maximum current input	A	57.8-54.9-52.9
	Water pressure drop *1		12.9kPa (1.87psi)
	Temp range	Outlet water temp *4	
Outdoor temp *4		D.B	77~158°F
			-20~40°C
			-4~104°F
Circulating water volume range			7.5 m³/h-15.0m³/h
Sound Pressure level (measured in anechoic room) *1		dB (A)	59
Sound Pressure level (measured in anechoic room) *3		dB (A)	63
Diameter of water pipe	Inlet	mm (in.)	38.1 (Rc 1 1/2") screw
	Outlet	mm (in.)	38.1 (Rc 1 1/2") screw
External finish			Acrylic painted steel plate <MUNSELL 5Y 8/1 or similar>
External dimension H × W × D		mm in.	1,710 (without legs 1,650) × 1,978 × 759
Net weight		kg (lbs)	67.3 (without legs 65.0) × 77.9 × 29.9
Accessories			511 (1127)
Design Pressure	R407C	MPa	Y strainer Rc 1 1/2
	Water	MPa	3.85
Drawing	Wiring		1.0
	External		KC94R746
Heat exchanger	Water side		KC94R745
	Air side		stainless steal plate and copper brazing
Compressor	Type		Plate fin and copper tube
	Maker		Inverter scroll hermetic compressor
	Starting method		MITSUBISHI ELECTRIC CORPORATION
	Motor output	kW	Inverter
	Case heater	kW	7.5 × 2
	Lubricant		0.045 × 2
FAN	Air flow rate	m³/min	MEL32
		L/s	185 × 2
		cfm	3,083 × 2
	External static press *5		6,532 × 2
	Type × Quantity		0Pa, 60Pa (0mmH2O/6.1mmH2O)
	Control, Driving mechanism		Propeller fan × 2
	Motor output	kW	Inverter-control, Direct-driven by motor
HIC circuit (HIC:Heat inter-Changer)			Copper pipe
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 3.85MPa (643psi)
	Inverter circuit		Over-heat protection, Over current protection
	Compressor		Over-heat protection
	Fan motor		Thermal switch
Defrosting method			Auto-defrost mode (Reversed refrigerant circle)
Control			LEV and HIC circuit
Type			R407C
Original charged	Weight	kg	11.0

*1 Under Normal heating conditions at outdoor temp, 7°C DB/6°C WB(44.6°F DB/42.8°F WB) outlet water temp 45°C(113°F), inlet water temp 40°C(104°F)

*2 Under Heating conditions at outdoor temp, 7°C DB/6°C WB(44.6°F DB/42.8°F WB), outlet water temp 70°C (158°F)

*3 Under Heating conditions at outdoor temp, 7°C DB/6°C WB(44.6°F DB/42.8°F WB) when this unit is set to capacity priority mode by non-voltage B contact

*4



Outdoor temp -20°C DB/ Outlet water temp 40~65°C
(Outdoor temp -4°F DB/ Outlet water temp 104°F~149°F)
Outdoor temp -10°C DB/ Outlet water temp 33°C~70°C
(Outdoor temp 14°F DB/ Outlet water temp 91°F~158°F)
Outdoor temp 0°C DB/ Outlet water temp 25°C~70°C
(Outdoor temp 32°F DB/ Outlet water temp 77°F~158°F)

*5 Dip SW on the unit control board need to be changed.

* Due to continuing improvement, the above specifications may be subject to change without notice.

* Please don't use the steel material for the water piping material.

* Please always make water circulate or pull out the circulation water completely when not using it.

* Please do not use groundwater and well water.

* Install the unit in an environment where the wet bulb temp will not exceed 32°C (89.6°F).

* The water circuit must use the closed circuit.

* There is possibility that the unit may abnormally stop when it operates outside its operating range. Provide backup (ex. boiler start with Error display output signal (blue CN511 1-3)) for abnormal stop.

* The capacity is tested based on EN14511-3.

Unit converter
kcal/h =kW × 860
BTU/h =kW × 3,412
cfm =m³/min × 35.31
lbs =kg/0.4536

<External input/output from the unit>

*The unit can be operated and the operation status can be monitored with external input/output terminals.

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