P900

R410A | e-series

HIGH ENERGY SAVING PERFORMANCE BY THE USE OF INVERTER COMPRESSORS

BEST IN CLASS EFFICIENCY FOR ENERGY SAVING PERFORMANCE

ENERGY-SAVING TECHNOLOGY

UP TO 6 MODULES CAN BE CONNECTED

COMBINATION CONTROL FUNCTION

High energy saving performance by the use of inverter compressors

Each module is provided with two high-efficiency inverter scroll compressors developed by Mitsubishi Electric and can operate optimally according to the load. This improves the high energy saving performance.

Best in class efficiency for energy saving performance

High EER, High COP

- The air suction area is expanded to maximize the performance of the air heat exchanger.
- Two independent refrigerant circuits are provided in the module to cool and heat water in two stages in series to improve EER and COP.

EER 3.30	COP 3.50

*EER shows the value at an outdoor air temperature of 35°C and cool waterinlet/outlet temperatures of 12°C/7°C, respectively. COP shows the value at an outdoor air temperature of 7°C and hot water inlet/outlet temperatures of 40°C/45°C, respectively. Pump input is not included.

High SEER

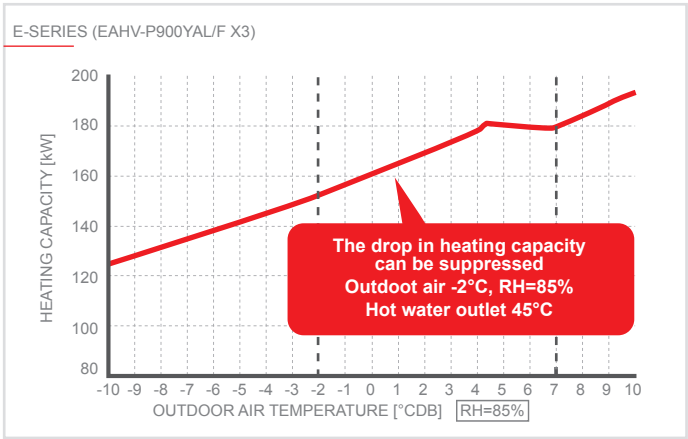
- Achieved the same SEER from 30 to 180 HP.

SEER 4.48

* SEER shows the value at an outdoor air temperature of 35°C and cool water inlet/outlet temperatures of 12°C/7°C, respectively. Pump input is included based on EN14511.

Suppression of heating capacity drop at low outside temperatures

- A heat pump technology captures heat from the outdoor air. The heating performance decrease which occurs with a decrease in outdoor air temperature has been made up for by installing a larger number of units. This disadvantage has been eliminated with the e-series by increasing the heating performance in the low outdoor air temperature range. This allows the user to reduce the required number of units.



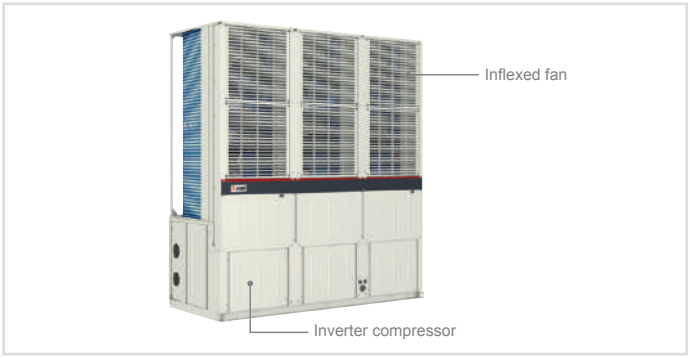
Energy-saving technology

High Efficiency Inverter Compressor

DC inverter scroll compressor is incorporated. Two compressors each are incorporated to increase efficiency.

Two refrigerating cycles

A configuration of two independent refrigerant circuits and the series connection of water-side heat exchangers increase the performance (two-stage cooling).

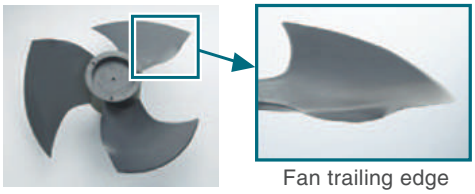


U-shaped High Performance Compact Air Heat Exchanger

U-shaped air heat exchangers are used. Installing them in a row makes the system thinner.
Weather resistant coating is provided for the heat transfer plate fin as standard.

Inflexed Fan

Adoption of a fan with improved ventilation characteristics and a newly designed trailing edge that suppresses wind turbulence raises fan operation efficiency.

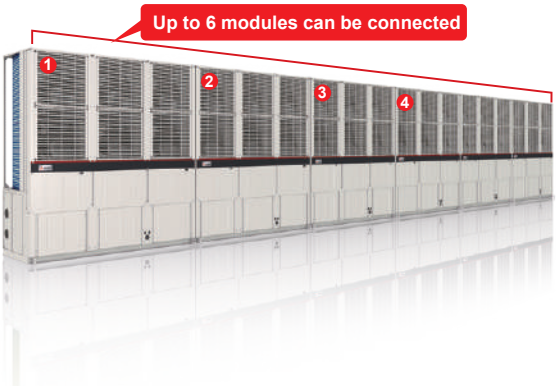


Fan Inverter Control

Air blower fans are also equipped with an inverter to save energy.

Up to 6 modules can be connected

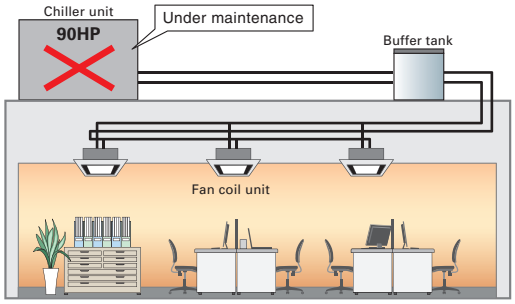
The total capacity can be increased to up to 30HP × 6 modules = 180HP. Because modules can be installed horizontally in a row. Installation in narrow places such as along building walls is possible.



Combination control function

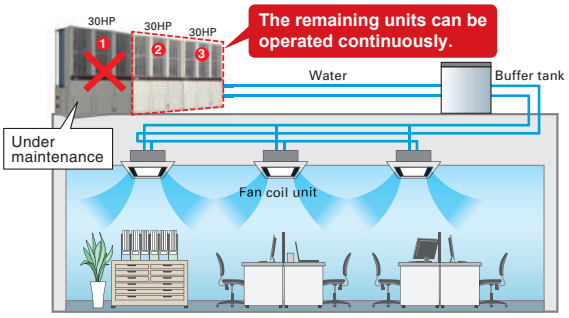
The flexible backup operation among the combined modules enables the continuous operation, even when one module is stopped due to maintenance.

Non-modular chiller



Since the chiller unit can not operate during maintenance, the timing of maintenance is limited.

Mitsubishi Electric modular chiller



With our module chiller system, even if one module is stopped, the remaining modules back the continuous operation up.

* When performing maintenance, please confirm that the remaining modules meet the required capacity for the indoor side.

Small footprint installation

Since this module has a compact and thin body, it is suitable for installation along the exterior walls of buildings or in narrow spaces, and it is possible to install the modules on each floor.

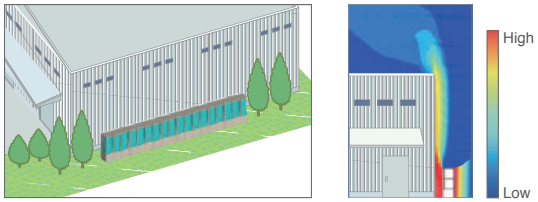
Installation example

Installable in limited space, such as along the outer wall or in the corner of a factory, or in a narrow space of a building. The compact and thin design allows for the consideration of installation on each floor of a building, as is the case with industrial air conditioners. (If the inside header specification is selected).

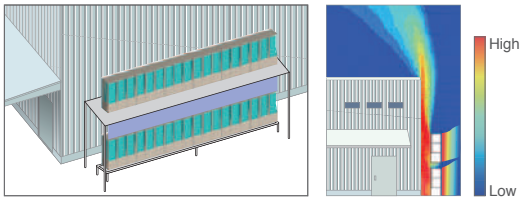
The figure shows the air blowing surface directed toward the wall (a diagonal blowing air guide is equipped as standard). Directing the air blowing surface toward the wall is effective in preventing short cycling.

The modules can be installed in two rows or in one row on each of two stages using a frame. They can be installed flexibly according to the installation space.

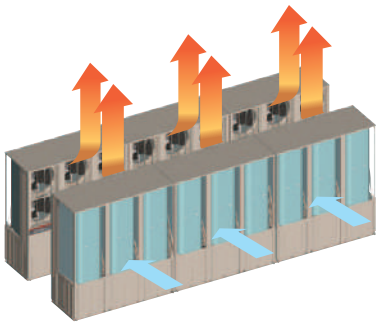
EXAMPLE OF INSTALLATION ALONG THE OUTER WALL OF A FACTORY

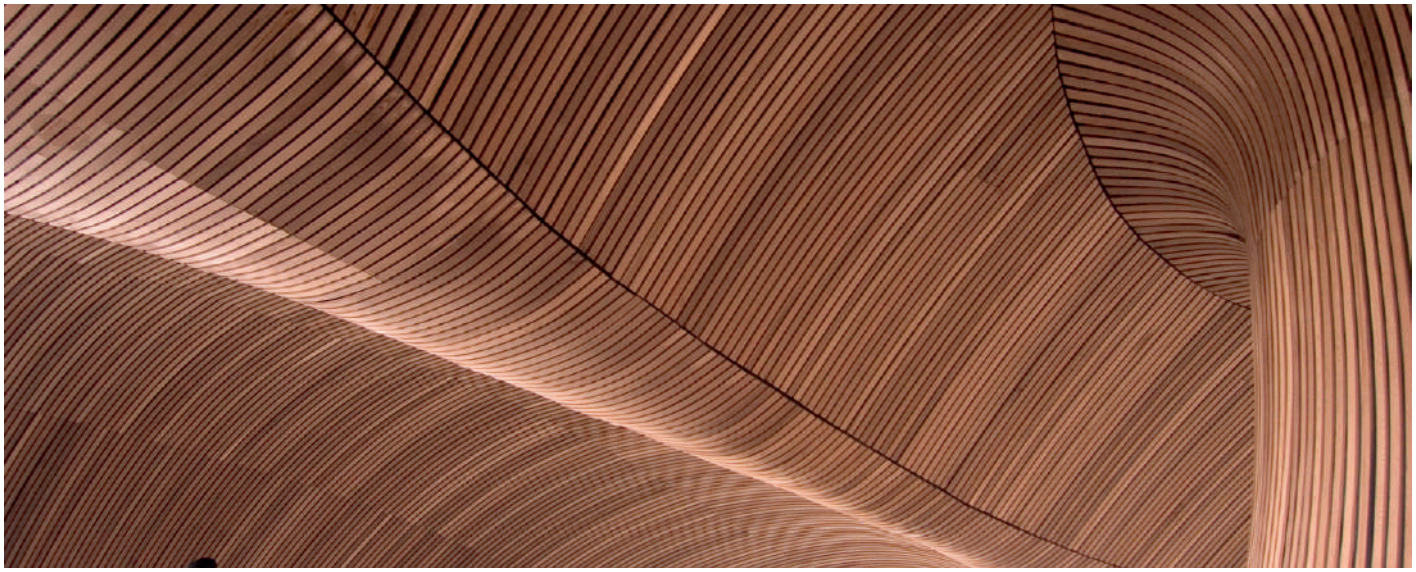


FRONT SURFACE-FACING DOUBLE-ROW INSTALLATION EXAMPLE



SINGLE-ROW DOUBLE-STACK INSTALLATION EXAMPLE





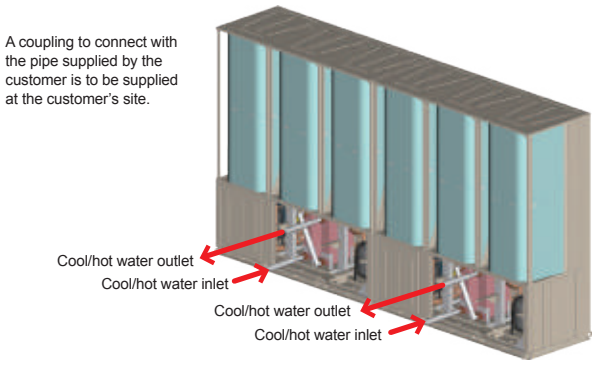
Inside Header

Mitsubishi Electric's Unique Inside Header Incorporates Field Water Pipe Header into Module

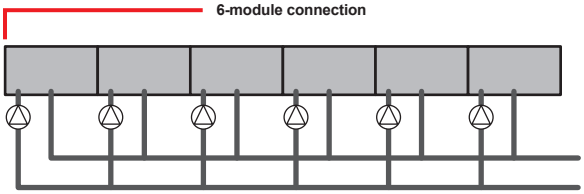
- The field water pipe header section that is usually required to connect the module to the field water pipe is now available as a manufacturer option (hereinafter referred to as the "inside header") which can be incorporated into the module at the factory before shipment (a supplied connection kit is used for the connection work at the customer's site).
- This allows for incorporating the field water pipe header section into the module.
- In addition, the field connection work of the inside header is very simple. Significant simplification of the water pipe connection compared to the previous one has reduced the installation time.

Standard Pipe Specification

THE FIGURE SHOWS A 60 HP UNIT IN WHICH TWO 30 HP MODULES ARE CONNECTED



FIELD WATER PIPE HEADER CONNECTION IMAGE *1
(in the case of installing one pump for each module)



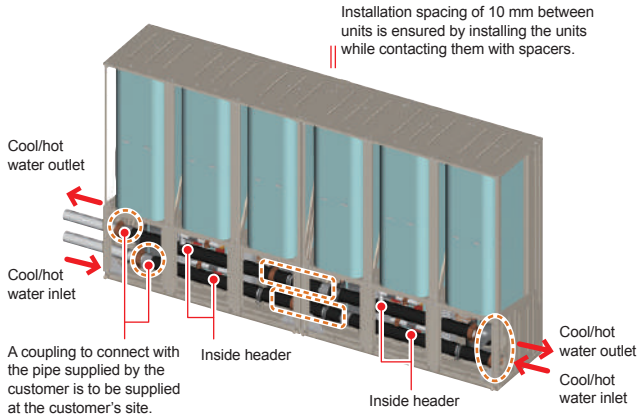
- Number of pumps: 6
- Pipes connected at the site: 12 points

*1 Be sure to install a strainer (optional parts: YS-50A) near the chiller on the inlet side of the cool/hot water pipe to prevent the entry of foreign substances such as dirt and sand particles to the plate heat exchanger

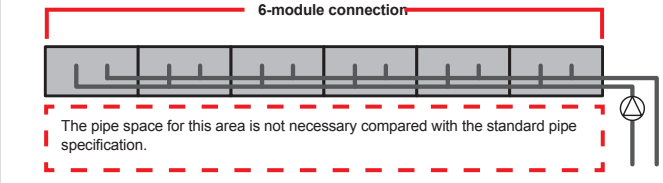
Inside Header Specification

(Left or right connection can be selected for the water pipes)

THE FIGURE SHOWS A 60 HP UNIT IN WHICH TWO 30 HP MODULES ARE CONNECTED



FIELD WATER PIPE HEADER CONNECTION IMAGE *1
(in the case of installing one pump for the system)

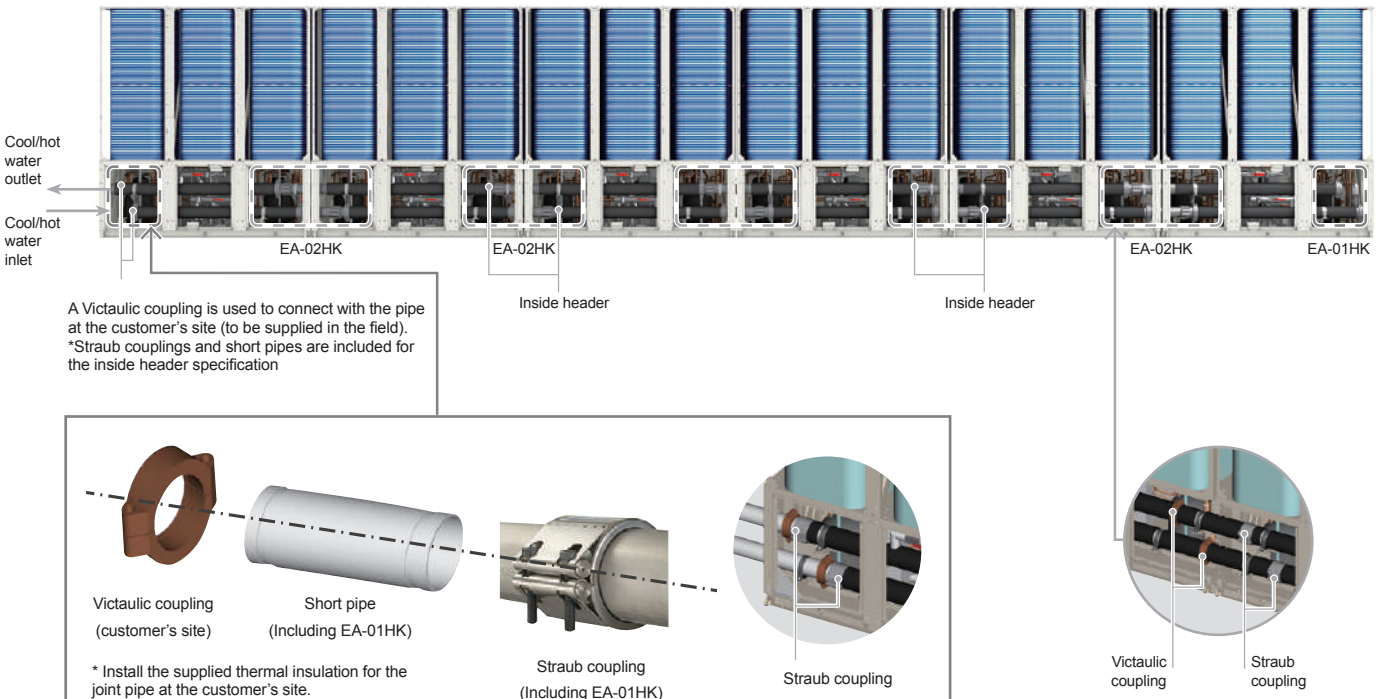


- Number of pumps: 1
- Pipes connected at the site: 2 points (10 internal connection points)

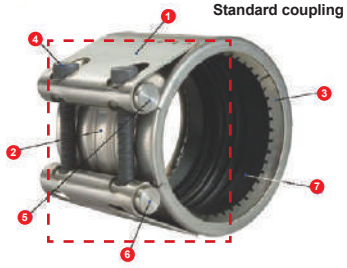
*1 Be sure to install a strainer near the chiller on the inlet side of the cool/hot water pipe to prevent the entry of foreign substances such as dirt and sand particles to the plate heat exchanger.

About Pipe Connection Kit

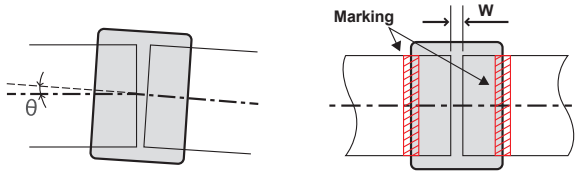
THIS FIGURE SHOWS 540 HP (EAHV-P900YAL/F-N×6) AS AN EXAMPLE.



STRUCTURE



No.	Part name	Material
1	Casing	SUS 304
2	Sliding plate	SUS 301 or 304
3	Grip ring	SUS 301
4	Tightening bolt	SUS XM7
5	Rod washer	SUS 304
6	Rod nut	SUS 304
7	Rubber sleeve	EPDM

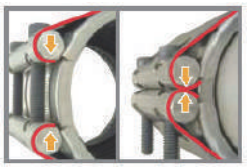


Allowable clearance and tilt range

Allowable pipe clearance value [W]=0 to 25 mm

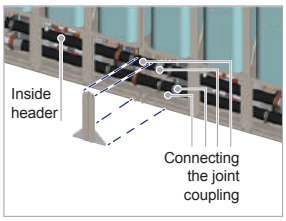
Allowable pipe tilt angle [θ]=±2°

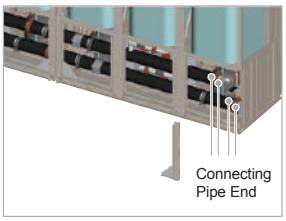
The sealed rubber has a lip structure to improve the water-stopping performance. Adjust the position of the Straub coupling so the marking on both sides can be seen.



Just tighten the bolt until the casing fits against (comes into contact with) the metal. Anyone can connect the pipes evenly and securely, regardless of their skills and the type of the pipe used.

CONNECTING PIPE END
(Connection at Customer's Site)



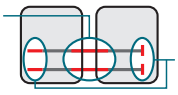


Capacity	Module (Inside header)	Optional parts -1- EA-01HK (model)	Optional parts -2- EA-02HK (model)
30 HP	1	1	0
60 HP (30 HP×2)	2	1	1
90 HP (30 HP×3)	3	1	2
120 HP (30 HP×4)	4	1	3
150 HP (30 HP×5)	5	1	4
180 HP (30 HP×6)	6	1	5

Optional parts -1- (Piping Kit) EA-01HK

Optional parts -2- (Connection Piping Kit) EA-02HK

Optional parts -2-



Optional parts -1-

The Victaulic coupling and Straub coupling mentioned in the explanation are product names.

Control technology

- Up to 6 modules and one unit can be connected for each remote control.
- Simultaneous control

Unit Remote Control

PAR-W31MAA

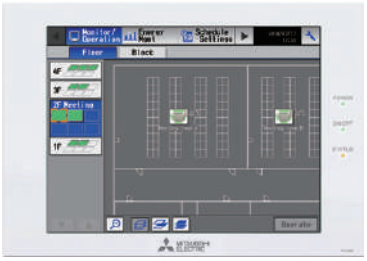
Control	Simultaneous control
Number of modules that can be connected	6
Number of units that can be connected	1
Number of supported water lines	1
ON/OFF	●
Cooling/heating switch	●
FAN operation switch for snowfall	●
Target outlet temperature setting	●
Scheduled operation	●
Individual error display	●
Outlet water temperature setting of 5°C or below (Brine)	●

Centralized controller*

When connected to the AE-200E/A centralized controller or the EW-50A/E expansion controller, up to 6 e-series modules can be connected to 1 group for centralized monitoring and management.
Combined management of CITY MULTI is also possible.

* Centralized monitoring and management are possible only for M-NET-connected e-series units.

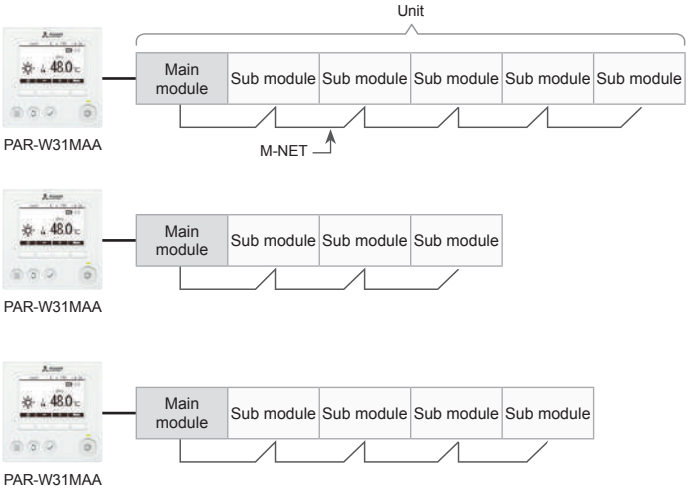
AE-200E/A



Monitoring on LCD touch panel and web browser

Monitoring of the operating condition—including the water temperature—of e-series units are possible from the LCD screen of the AE-200E/A or from a Web browser. Combined management of CITY MULTI is also possible.

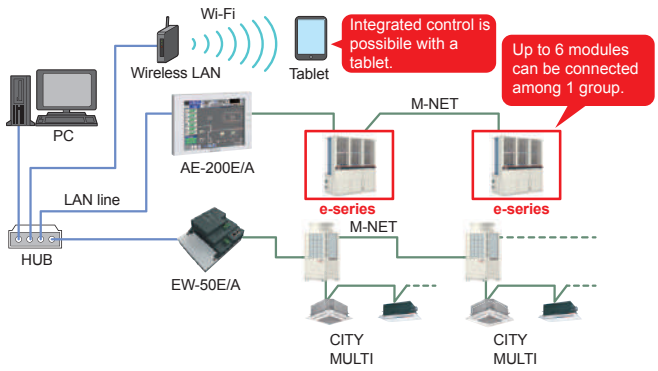
System configuration



Demand control

Forced capacity control up to the demand upper limit by an external input to the unit (non-voltage normal open). Heating demand is possible in addition to the cooling demand.

SYSTEM CONFIGURATION AE-200E/A



Technical specifications COOLING ONLY MODEL

MODEL			SET	EACV-P900YAL(-N)(-BS) EACV-P900YAF(-N)(-BS)	
Power source				3-phase 4-wire 380-400-415V 50/60Hz	
Capacity change mode				Capacity priority	COP priority
Cooling capacity *1 Water			kW	90.00	63.00
			kcal/h	77,400	54,180
			BTU/h	307,080	214,956
	Power input *2		kW	27.27	16.27
	Current input 380-400-415V		A	46.0 - 43.7 - 42.2	27.5 - 26.1 - 25.2
	Pump input is not included	EER		3.30	3.87
		ESEER		5.66	-
	Certified value by EUROVENT	EER *3		3.08	3.76
		ESEER *3 *4		4.71	-
	ESEER (Includes pump input based on EN14511) *3 *5			5.46	-
	SEER (Includes pump input based on EN14511) *3			4.88	-
	IPLV *6		kW/kW	6.34	-
	Water flow rate		m^3/h	15.5	10.8
Cooling capacity *7 *8 Brine(ethylene glycol 35wt%)			kW	56.73	39.34
			kcal/h	48,788	33,832
			BTU/h	193,563	134,228
	Power input *2		kW	25.98	15.78
	Current input 380-400-415V		A	43.9 - 41.7 - 40.2	26.7 - 25.4 - 24.4
	EER(Pump input is not included)			2.18	2.49
	EER(Includes pump input based on EN14511) *3			2.10	2.42
	Brine flow rate		m^3/h	11.5	8.0
Maximum current input			A	61	
Water pressure drop	Water *9		kPa	135	65
	Brine(ethylene glycol 35wt%) *8 *10		kPa	106	50
Temp range	Cooling		°C	Outlet water 5~25 *11	
	Water		°F	Outlet water 41~77 *11	
	Cooling		°C	Outlet brine -10~25 *8 *12	
	Brine(ethylene glycol 35wt%)		°F	Outlet brine 14~77 *8 *12	
	Outdoor		°C	-15~43 *11 *12	
			°F	5~109.4 *11 *12	
Circulating water volume range			m^3/h	7.7~25.8	
Sound pressure level (measured in anechoic room) at 1m *1			dB (A)	65	63
Sound power level (measured in anechoic room) *1			dB (A)	77	75
Diameter of water pipe (Standard piping)	Inlet		mm (in)	50A (2B) housing type joint	
	Outlet		mm (in)	50A (2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet		mm (in)	100A (4B) housing type joint	
	Outlet		mm (in)	100A (4B) housing type joint	
External finish				Polyester powder coating steel plate	
External dimension HxWxD			mm	2450 x 2250 x 900	
Net weight	Standard piping		kg (lbs)	957 (2110)	
	Inside header piping		kg (lbs)	992 (2187)	
Design pressure	R410A		MPa	4.15	
	Water		MPa	1.0	
Heat exchanger	Water side			Stainless steel plate and copper brazing	
	Air side			Plate fin and copper tube	
Compressor	Type			Inverter scroll hermetic compressor	
	Maker			MITSUBISHI ELECTRIC CORPORATION	
	Starting method			Inverter	
	Quantity			2	
	Motor output		kW	11.7 x 2	
	Case heater		kW	0.045 x 2	
	Lubricant			MEL32	
Fan	Air flow rate		m^3/min	77 x 6	
			L/s	1283 x 6	
			cfm	2719 x 6	
	Type, Quantity			Propeller fan x 6	
	Starting method			Inverter	
	Motor output		kW	0.19 x 6	
Protection	High pressure protection			High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit			Over-heat protection, Over current protection	
	Compressor			Over-heat protection	

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F).
*2 Pump input is not included.
*3 Pump is not included in e-series.
*4 EN14511 standard (2013) formula is applied to figure out this value in case of fixed flow rate operation (flow rate is fixed at any heat load)
Pump input is included in cooling capacity for EER calculation. Condition of water inlet and outlet is fixed at inlet 12°C and outlet 7°C.
*5 EN14511 standard (2013) formula is applied to figure out this value in case of variable flow rate operation (flow rate varies per heat load).
Pump input is included in cooling capacity for EER calculation. Condition of water temperature : inlet water temperature varies due to fixed water flow rate and outlet is fixed at outlet 7°C.
*6 Calculations according to standard performances (in accordance with AHRI 550-590).
*7 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet brine temp -5°C (23.0°F) inlet brine temp 0°C (32.0°F).
*8 Set the dipswitch SW3-6 on both main and sub modules to ON.
*9 Under normal cooling conditions capacity 90kW, water flow rate 15.5m3/h
*10 Under normal cooling conditions capacity 56.73kW, brine flow rate 11.5m3/h
*Please don't use the steel material for the water piping.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water in direct.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.

Technical specifications HEATPUMP MODEL

MODEL			SET	EAHV-P900YAL(-N)(-BS) EAHV-P900YAF(-N)(-BS)	
Power source				3-phase 4-wire 380-400-415V 50/60Hz	
Capacity change mode				Capacity priority	COP priority
Cooling capacity *1			kW	90.00	63.00
			kcal/h	77,400	54,180
			BTU/h	307,080	214,956
	Power input *3		kW	27.27	16.27
	Current input 380-400-415V		A	46.0 - 43.7 - 42.2	27.5 - 26.1 - 25.2
	Pump input is not included	EER		3.30	3.87
		ESEER		5.66	-
	Certified value by EUROVENT	EER *4		2.94	3.76
		ESEER *4 *6		4.71	-
	ESEER (Includes pump input based on EN14511) *4 *7			5.46	-
	SEER (Includes pump input based on EN14511) *4			4.88	-
	IPLV *8		kW/kW	6.34	-
	Water flow rate		m^3/h	15.5	10.8
Heating capacity *2			kW	90.00	63.00
			kcal/h	77,400	54,180
			BTU/h	307,080	214,956
	Power input *3		kW	25.71	16.96
	Current input 380-400-415V		A	43.4 - 41.2 - 39.7	28.6 - 27.2 - 26.2
	COP (Pump input is not included)			3.50	3.71
	COP (Includes pump input based on EN14511) *4			3.25	3.61
	SCOP (Reversible) Low/Medium (Includes pump input based on EN14511) *4			3.66/2.89	-
	Seasonal space heating energy efficiency class for medium-temperature application			A+	-
	Seasonal space heating energy efficiency class for low-temperature application			A+	-
	Water flow rate		m^3/h	15.5	10.8
Maximum current input			A	61	
Water pressure drop *5			kPa	135	65
Temp range	Cooling		°C	Outlet water 5~25 *9	
			°F	Outlet water 41~77 *9	
	Heating		°C	Outlet water 30~55 *9	
			°F	Outlet water 86~131 *9	
	Outdoor		°C	-15~43 *9	
			°F	5~109.4 *9	
Circulating water volume range			m^3/h	7.7~25.8	
Sound pressure level (measured in anechoic room) at 1m *1			dB (A)	65	63
Sound power level (measured in anechoic room) *1			dB (A)	77	75
Diameter of water pipe (Standard piping)	Inlet		mm (in)	50A (2B) housing type joint	
	Outlet		mm (in)	50A (2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet		mm (in)	100A (4B) housing type joint	
	Outlet		mm (in)	100A (4B) housing type joint	
External finish				Polyester powder coating steel plate	
External dimension HxWxD			mm	2450 x 2250 x 900	
Net weight	Standard piping		kg (lbs)	987 (2176)	
	Inside header piping		kg (lbs)	1022 (2253)	
Design pressure	R410A		MPa	4.15	
	Water		MPa	1.0	
Heat exchanger	Water side			Stainless steel plate and copper brazing	
	Air side			Plate fin and copper tube	
Compressor	Type			Inverter scroll hermetic compressor	
	Maker			MITSUBISHI ELECTRIC CORPORATION	
	Starting method			Inverter	
	Quantity			2	
	Motor output		kW	11.7 x 2	
	Case heater		kW	0.045 x 2	
	Lubricant			MEL32	
Fan	Air flow rate		m^3/min	77 x 6	
			L/s	1283 x 6	
			cfm	2719 x 6	
	Type, Quantity			Propeller fan x 6	
	Starting method			Inverter	
	Motor output		kW	0.19 x 6	
Protection	High pressure protection			High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit			Over-heat protection, Over current protection	
	Compressor			Over-heat protection	

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB (95°FDB/75.2°FWB) outlet water temp 7°C (44.6°F) inlet water temp 12°C (53.6°F).
*2 Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).
*3 Pump input is not included.
*4 Pump is not included in e-series.
*5 Under normal cooling or heating conditions capacity 90kW, water flow rate 15.5m3/h
*6 EN14511 standard (2013) formula is applied to figure out this value in case of fixed flow rate operation (flow rate is fixed at any heat load)
Pump input is included in cooling capacity for EER calculation. Condition of water inlet and outlet is fixed at inlet 12°C and outlet 7°C.
*7 EN14511 standard (2013) formula is applied to figure out this value in case of variable flow rate operation (flow rate varies per heat load). Pump input is included in cooling capacity for EER calculation.
Condition of water temperature : inlet water temperature varies due to fixed water flow rate and outlet is fixed at outlet 7°C.
*8 Calculations according to standard performances (in accordance with AHRI 550-590).
*Please don't use the steel material for the water piping.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water in direct.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.

Technical specifications HEATING ONLY MODEL

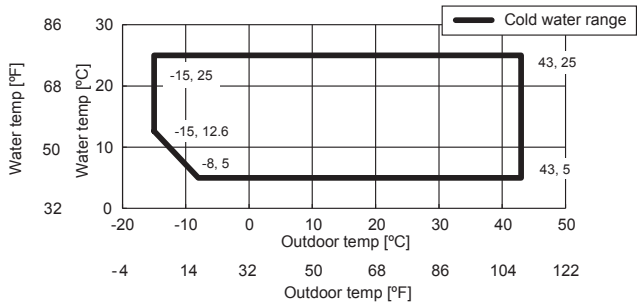
MODEL		SET	EAHV-P900YAL-H(-N)(-BS) EAHV-P900YAF-H(-N)(-BS)	
Power source			3-phase 4-wire 380-400-415V 50/60Hz	
Capacity change mode			Capacity priority	COP priority
Heating capacity *1		kW	90.00	63.00
		kcal/h	77,400	54,180
		BTU/h	307,080	214,956
	Power input *2	kW	25.71	16.96
	Current input 380-400-415V	A	43.4 - 41.2 - 39.7	28.6 - 27.2 - 26.2
	COP (Pump input is not included)		3.50	3.71
	COP (Includes pump input based on EN14511) *3		3.25	3.61
	SCOP (Reversible) Low/Medium (Includes pump input based on EN14511) *4		3.56/2.83	-
	Seasonal space heating energy efficiency class for medium-temperature application		A+	-
	Seasonal space heating energy efficiency class for low-temperature application		A+	-
	Water flow rate	m^3/h	15.5	10.8
Maximum current input		A	61	
Water pressure drop *5		kPa	135	65
Temp range	Heating	°C	Outlet water 30~55 *6	
		°F	Outlet water 86~131 *6	
	Outdoor	°C	-15~43 *6	
		°F	5~109.4 *6	
Circulating water volume range		m^3/h	7.7~25.8	
Sound pressure level (measured in anechoic room) at 1m *4		dB (A)	65	63
Sound power level (measured in anechoic room) *4		dB (A)	77	75
Diameter of water pipe (Standard piping)	Inlet	mm (in)	50A (2B) housing type joint	
	Outlet	mm (in)	50A (2B) housing type joint	
Diameter of water pipe (Inside header piping)	Inlet	mm (in)	100A (4B) housing type joint	
	Outlet	mm (in)	100A (4B) housing type joint	
External finish			Polyester powder coating steel plate	
External dimension HxWxD		mm	2450 x 2250 x 900	
Net weight	Standard piping	kg (lbs)	987 (2176)	
	Inside header piping	kg (lbs)	1022 (2253)	
Design pressure	R410A	MPa	4.15	
	Water	MPa	1.0	
Heat exchanger	Water side		Stainless steel plate and copper brazing	
	Air side		Plate fin and copper tube	
Compressor	Type		Inverter scroll hermetic compressor	
	Maker		MITSUBISHI ELECTRIC CORPORATION	
	Starting method		Inverter	
	Quantity		2	
	Motor output	kW	11.7 x 2	
	Case heater	kW	0.045 x 2	
	Lubricant		MEL32	
Fan	Air flow rate	m^3/min	77 x 6	
		L/s	1283 x 6	
		cfm	2719 x 6	
	Type, Quantity		Propeller fan x 6	
	Starting method		Inverter	
	Motor output	kW	0.19 x 6	
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 4.15MPa (601psi)	
	Inverter circuit		Over-heat protection, Over current protection	
	Compressor		Over-heat protection	

*1 Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).
*2 Pump input is not included.
*3 Pump is not included in e-series.
*4 Under normal heating conditions at outdoor temp 7°CDB/6°CWB (44.6°FDB/42.8°FWB) outlet water temp 45°C (113°F) inlet water temp 40°C (104°F).
*5 Under normal heating conditions capacity 90kW, water flow rate 15.5m3/h
*Please don't use the steel material for the water piping material.
*Please always make water circulate, or pull the circulation water out completely when not in use.
*Please do not use groundwater or well water in direct.
*The water circuit must be closed circuit.
*Due to continuous improvement, the above specifications may be subject to change without notice.

Operating limits

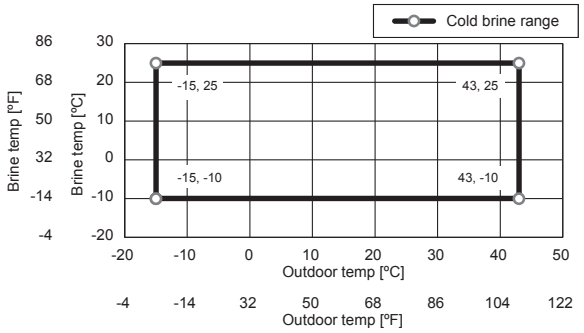
COOLING ONLY

*11

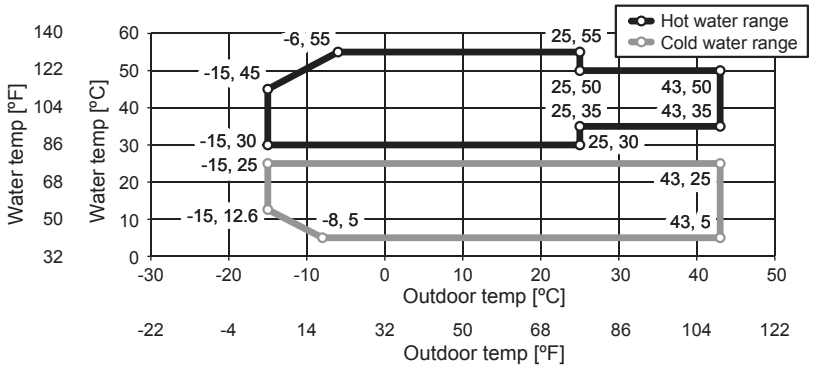


COOLING ONLY - BRINE MODE

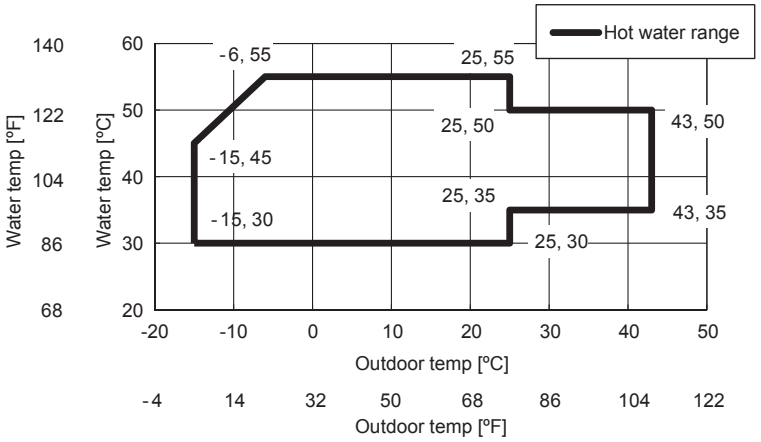
*12



REVERSIBLE HEAT PUMP



HEATING ONLY



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