MITSUBISHI ELECTRIC

e-series

Air Cooled Modular Chiller

Our commitment to quality, service, research and development has helped us gain a leading position in today's marketplace in heating, cooling and air conditioning for the home or office.

#**works**for**me**

Contents

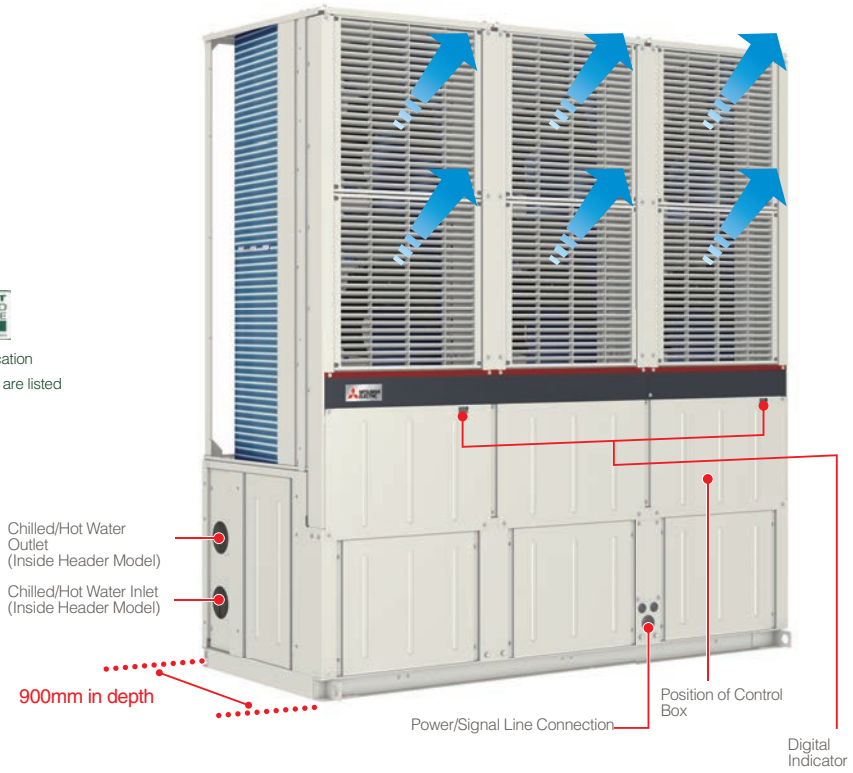
90kW Line up

EAHV-P900YA(-N)
EACV-P900YA(-N)

Eurovent Certified

Mitsubishi Electric participants in the Eurovent Certification Programme for the chilling units. The certified models are listed in the Directory of Certified Products.

(Only EAHV-P900YA(-N), EACV-P900YA (N))



90kW Module

	Standard	Inside Header
Heat Pump	EAHV-P900YA (-BS)	EAHV-P900YA-N (-BS)
Cooling Only	EACV-P900YA (-BS)	EACV-P900YA-N (-BS)
Units	**Capacity**	
6 Units	540kW	540kW
5 Units	450kW	450kW
4 Units	360kW	360kW
3 Units	270kW	270kW
2 Units	180kW	180kW
1 Unit	90kW	90kW

* (-N) indicates model with built-in header.

*1 Up to 24 units (4 groups x 6 units) can be connected to 1 identical water system.

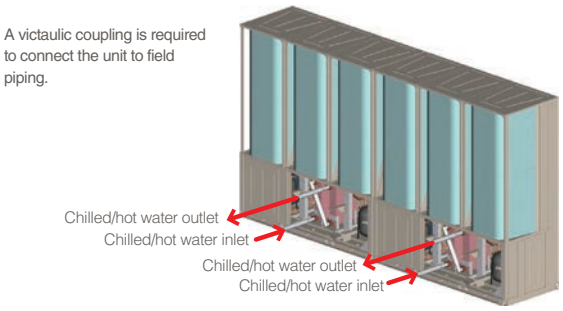
Configuration

Mitsubishi Electric's Inside Header Incorporates Field Water Pipe Header into Unit.

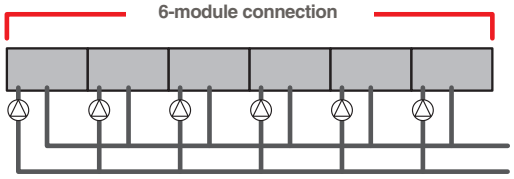
The field water pipe header section that is usually required to connect between modules is now available as a manufacturer option (hereinafter referred to as the "inside header"), which can be incorporated into the unit at the factory before shipment (a supplied connection kit is used for the connection to field piping).

Standard Pipe Specification

The figure shows a 180kW unit in which two 90kW modules are connected.



Field water pipe header connection image *1
(In the case of installing one pump per module)



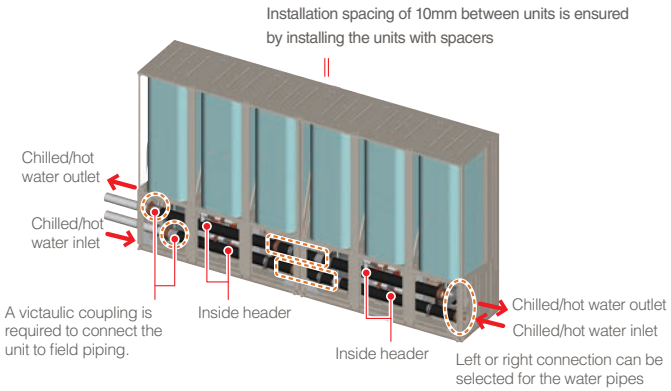
Number of pumps: 6
Pipes connected at the site: 12 points

*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 help prevent the entry of foreign substances, such as dirt and sand particles into the plate heat exchanger.

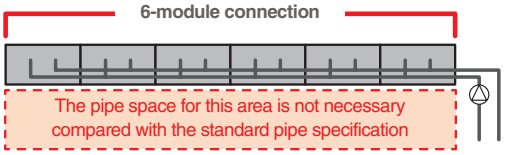
Inside Header Specification

Left or right connection can be selected for the water pipes

The figure shows a 180kW unit in which two 90kW modules are connected.



Field water pipe header connection image *1
(In the case of installing one pump)

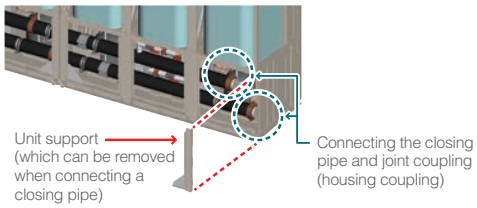


Number of pumps: 1
Pipes connected at the site: 2 points (10 internal connection points)

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

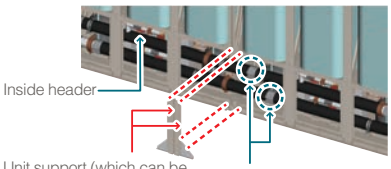
Connecting Pipe End [Connection to Field Piping]

Connecting Pipe End



Connecting Joint Pipe

Connecting the joint coupling (housing coupling)



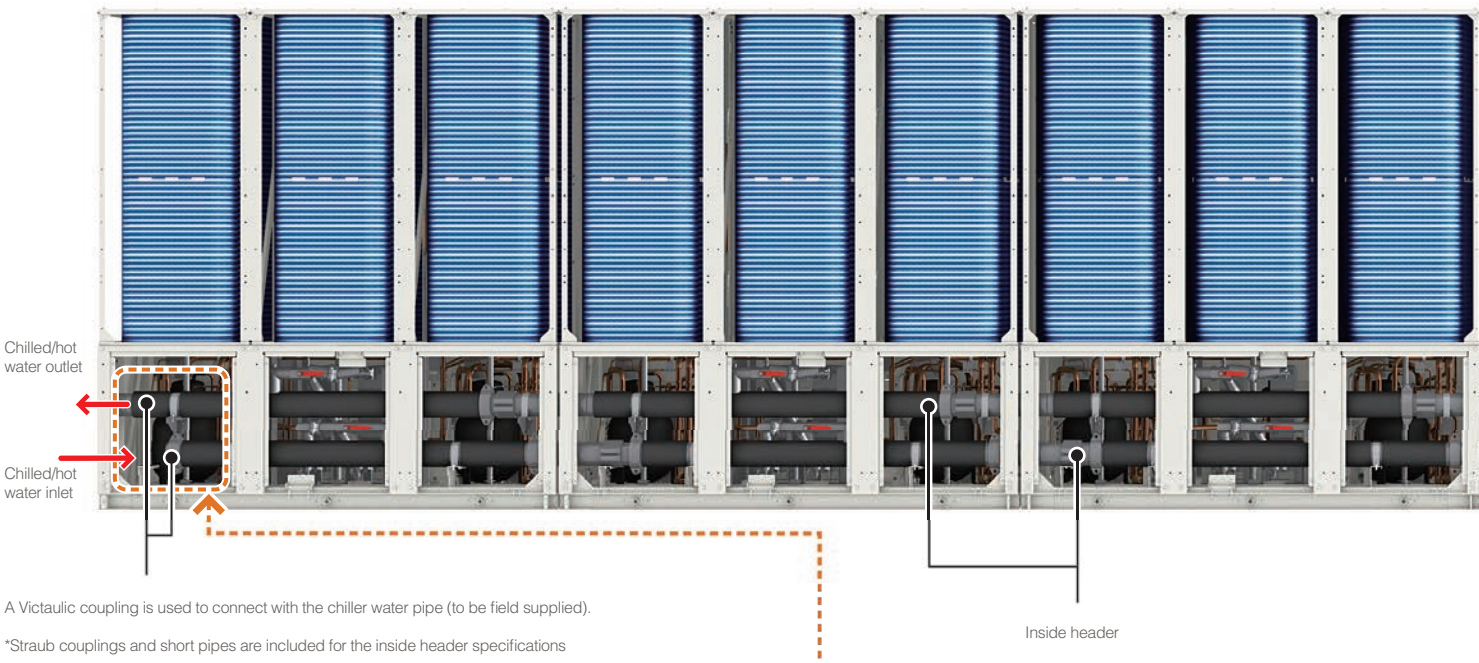
The clearance between the inside header and the joint pipe is approximately 10 mm. (The joint pipe can be positioned within the clearance range of 5 to 25 mm)

Inside Header

"-N" model only.

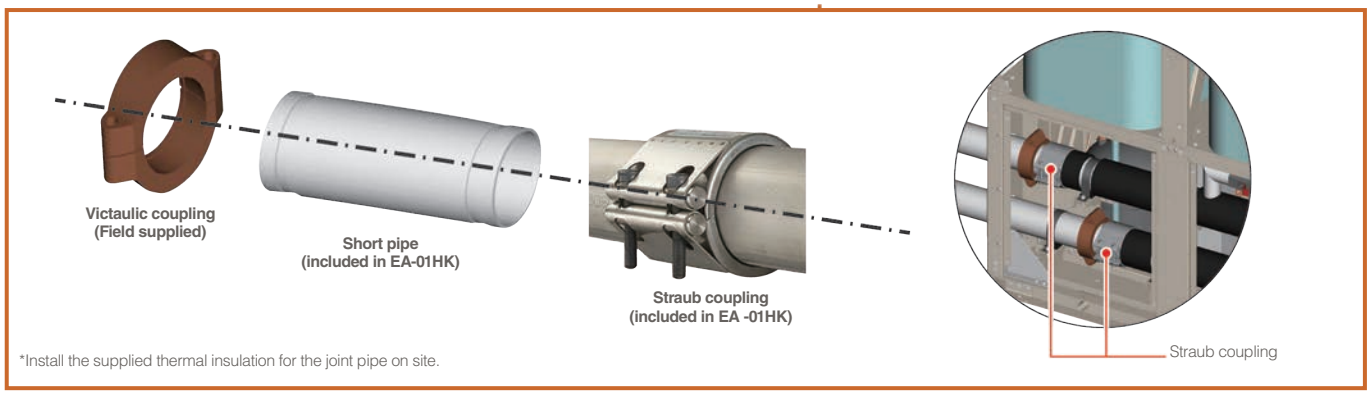
About Pipe Connection Kit

This figure shows 540kW (EAHV-900A-Nx6) as an example.

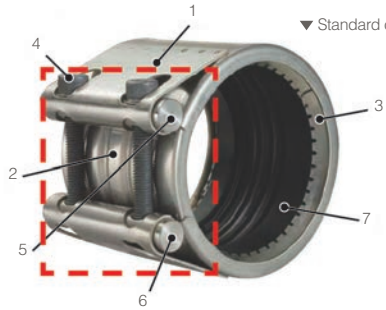


A Victaulic coupling is used to connect with the chiller water pipe (to be field supplied).

*Straub couplings and short pipes are included for the inside header specifications

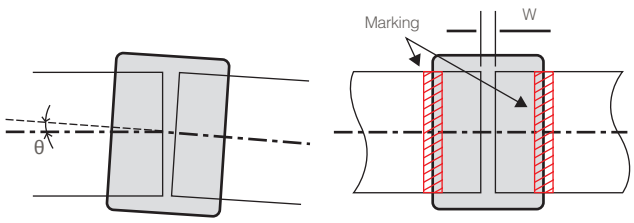


*Install the supplied thermal insulation for the joint pipe on site.



▼ Standard coupling

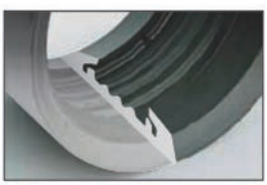
No.	Part name	Material
1	Casing	SUS 304
2	Sliding Plate	SUS 301 or 304
3	Grip Ring	SUS 301
4	Tightening Bolt	SUS XM7
5	Rod Washer	SUS 304
6	Rod Nut	SUS 304
7	Rubber Sleeve	EPDM



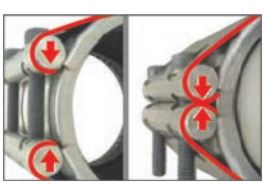
Allowable clearance and tilt range

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

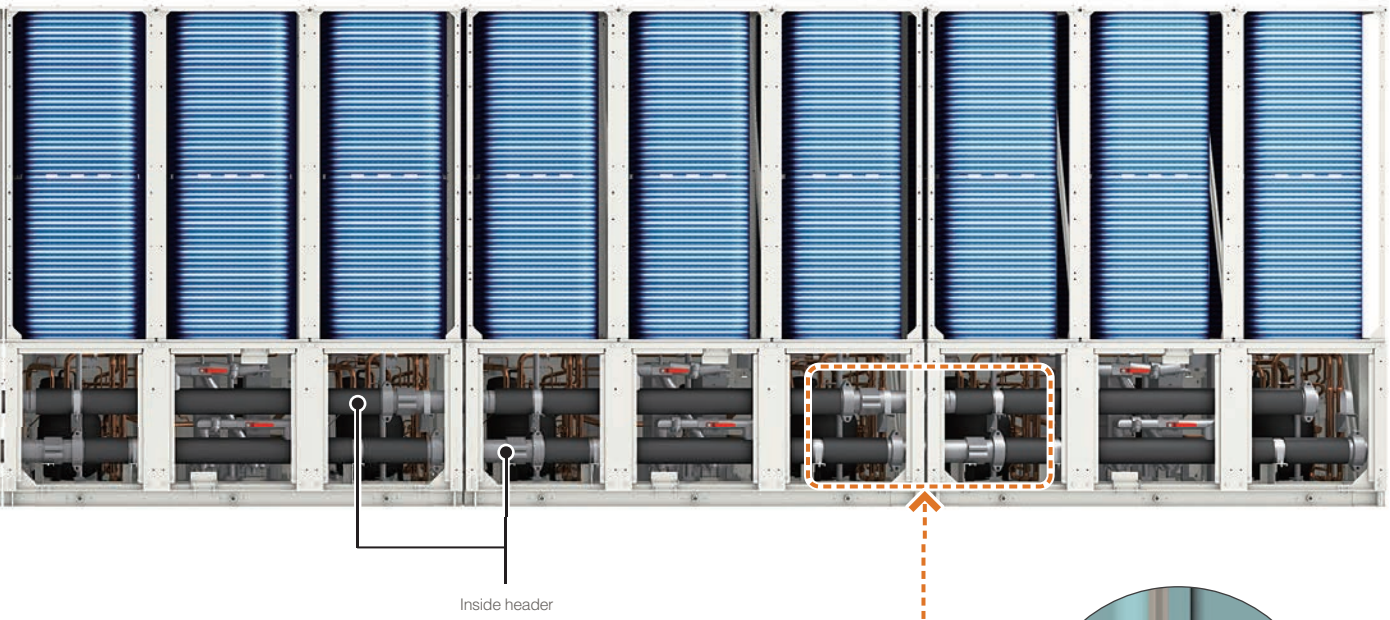
Allowable pipe tilt angle [θ]=±2°

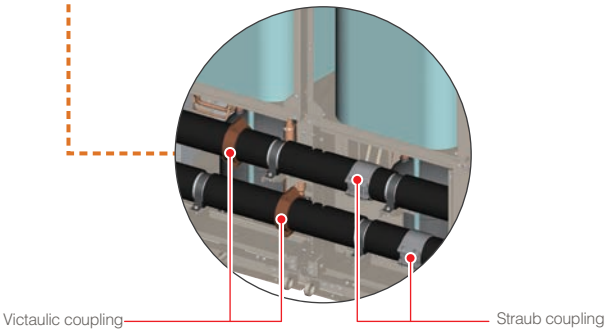


The sealed rubber has a lip structure for improved seal. Adjust the position of the Straub coupling so the marking on both sides can be seen.

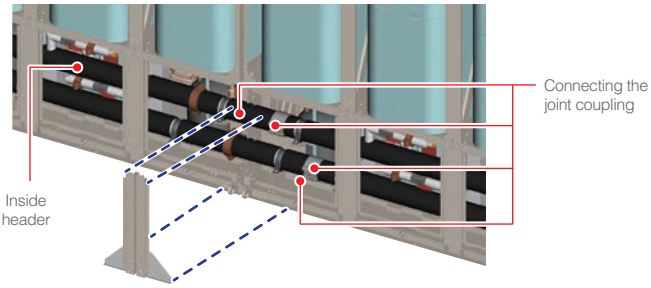


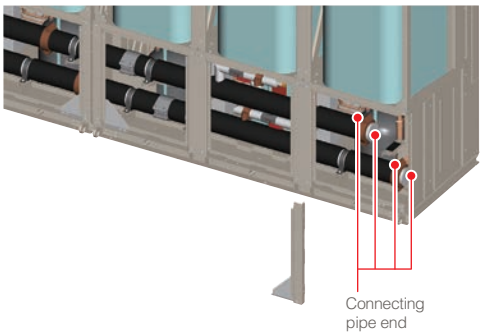
Just tighten the bolt until the casting fits against (comes into contact with) the metal.





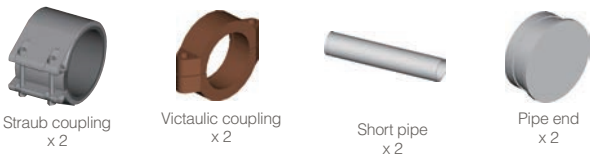
Connecting Pipe End (Carried out on site)



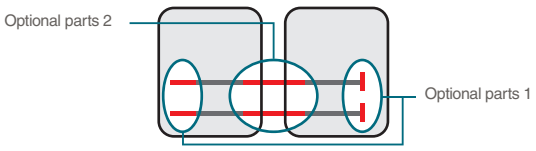


Capacity	Module (Inside Header)	Optional Parts 1 EA-01HK (model)	Optional Parts 2 EA-02HK (model)
90 kW	1	1	0
180kW (90kW x2)	2	1	1
270kW (90kW x3)	3	1	2
360kW (90kW x4)	4	1	3
450kW (90kW x5)	5	1	4
540kW (90kW x6)	6	1	5

Optional parts 1 (Piping Kit) EA-01HK



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



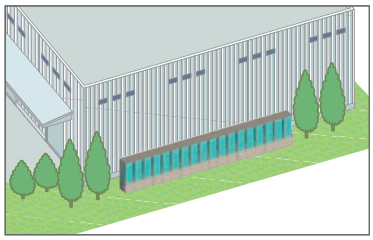
The Victaulic coupling and Straub coupling mentioned in the explanation are product names.

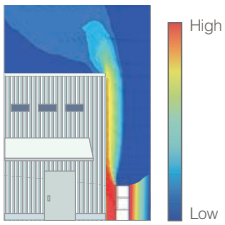
Sophisticated Design & Small Footprint Installation

Single-row Installation

- Flexible installation, such as along the outer wall or in a narrow space of a building.
- The figure shows the discharge air directed upward toward the wall (a diagonal discharge air guide is equipped as standard). Directing the discharge air upward toward the wall is effective in helping prevent short cycling.

Example of installation along the outer wall of the building





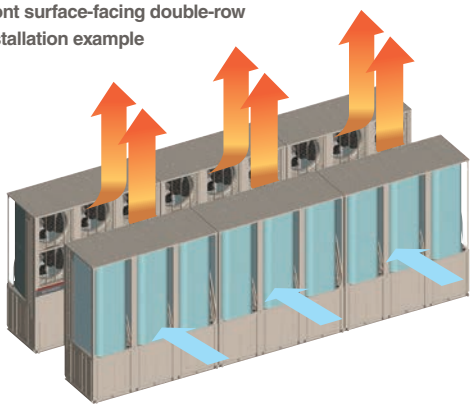
Airflow analysis
(Temperature distribution)

*For details on installation, refer to the installation manual

Double-row Installation

- Double-row installation in which the units' discharge air is directed toward each other is possible (a diagonal discharge air guide is equipped as standard).
- Rear surface-facing double-row installation in which the units' air intake surfaces are directed toward each other is also possible.
  * The image figure shows an example of installation using the inside header specification.

Front surface-facing double-row installation example

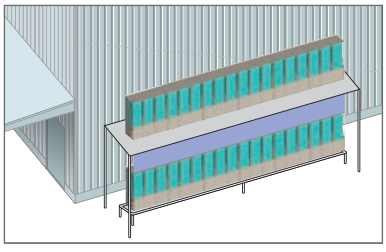


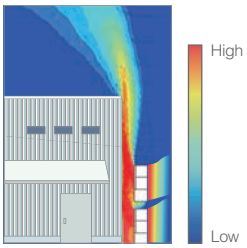
*For details on installation, refer to the installation manual

Single-row Double-stack Installation

The side-flow feature allows for a single-row double-stack installation by using a frame for the units installed in a row. Additional units can be installed above the existing units. If you plan to add units in the future, it is recommended to make a plan with consideration given to double-stack installation after the second phase of installation.

Single-row double-stack installation example



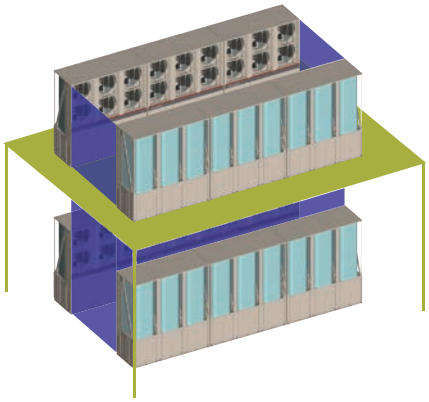


Airflow analysis
(Temperature distribution)

- The figure shows an example of using the inside header specifications

Double-row Double-stack Installation

A double-row, double-stack installation is possible by using a frame for the units installed in two rows. If you plan to add units in the future, it is recommended to make a plan with consideration given to double-stack installation.



- The figure shows an example of using the inside header specifications

Features & Parts

High Efficiency Inverter Compressor

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

Two-stage Cooling Circuit

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

Front Service

The control box is arranged at the front. In addition, the front panel has been divided into 6 parts to reduce the weight.

U-shaped High Performance Compact Air Heat Exchanger

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

Fans are Placed at Even Intervals

The use of side flow has reduced the distance between each fan and heat exchanger and ensured the distance between them is identical to help air to be distributed uniformly across the heat exchanger. Thus, the performance of the heat exchanger is maximised.

Fan Inverter Control

Chiller fans are also equipped with an inverter to save energy.

Digital Indicator (Inside the Board)

Displays the high pressure, low pressure, error code, etc.

Power Cable Port

The power cable can be connected from below the front panel of the module.

Air Blower Air Guide is Fitted as Standard

Mitsubishi Electric's unique diagonally upward blowing structure, assists in achieving small footprint installations.

Brine Compatible*

Use of brine allows for supply of water as low as -10°C, suitable for use with process application cooling.

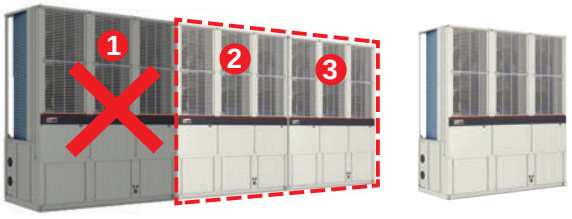
*Restrictions apply.

Connect up to Six Units

Backup

The combination control of modules helps to reduce the capacity of backup chillers and initial cost.

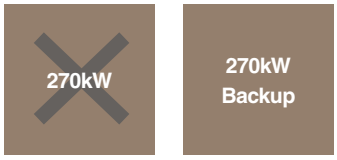
Modular Chiller



90kW x 3 = 270kW

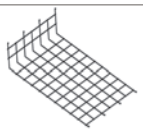
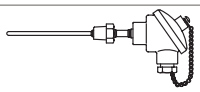
90kW for Backup

Non-Modular Chiller

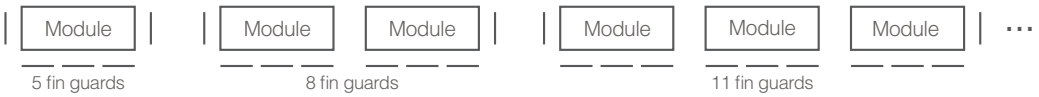


With our modular chiller system, even if one module goes down, operation can be continued by the backup module and the remaining modules. This reduces additional backup.

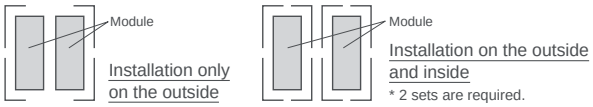
Optional Parts

Description	Image	P900	Remarks
Piping Kit		EA-01HK	For Inside Header Type
Connection Piping Kit		EA-02HK	For Inside Header Type
Fin Guard		EA-130FG	For Standard Pipe Type, Inside Header Type *1
		-	For Standard Pipe type, inside Header type *2
Representative-water temperature sensor		TW-TH16-E	For Standard Pipe Type, Inside Header Type
Y Type Strainer 50A		YS-50A	For Standard Pipe Type

*1 Only one piece of fin guard is included. The necessary quantity is as follows.



*2 One set contains 4 fin guards. Please refer to the following installation examples.



Controller Functions

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	O
Cooling/Heating Switch	O
FAN operation switch for snowfall	O
Target outlet temperature setting	O
Scheduled operation	O
Individual error display	O
Outlet water temperature setting of 5°C or below (Brine)	O

O Standard Feature ✕ Feature Not Included

Energy Saving Performance

High EER, High COP

Achieved **EER 3.30** and **COP 3.50.***

* EER shows the value at an outdoor air temperature of 35°C and chilled water inlet/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.

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

High ESEER

ESEER 5.66.*

* ESEER shows the value at an outdoor air temperature of 35°C and chilled water inlet/outlet temperatures of 12°C/7°C, respectively.

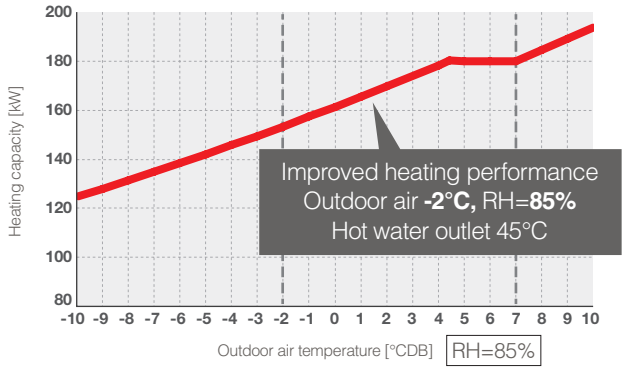
Pump input is not included.

- Achieved the same ESEER from 90 to 540kW.

Improved Heating Performance

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

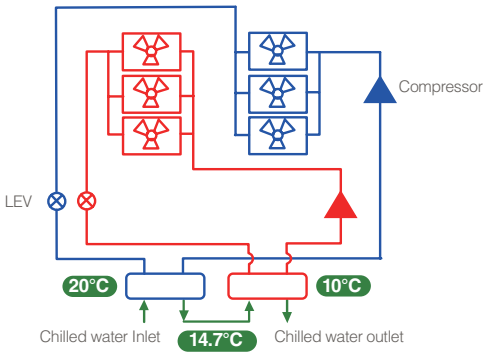
e-Series (EAHV-P900YA x 3)

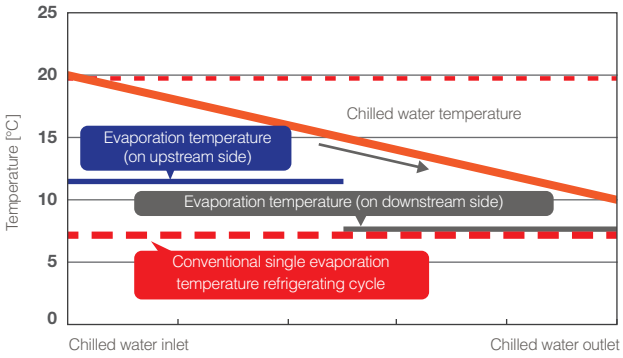


Large Temperature Difference Operation Significantly Increases Efficiency

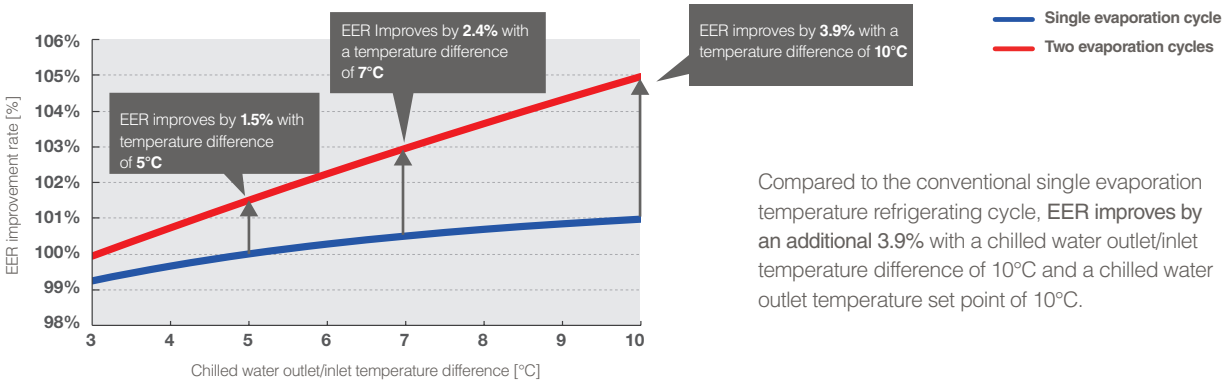
Two Evaporation Temperature Refrigerating Cycles

Two evaporators are connected in series to keep the evaporation temperature on the upstream side of chilled water high.





Chilled water outlet 10°C



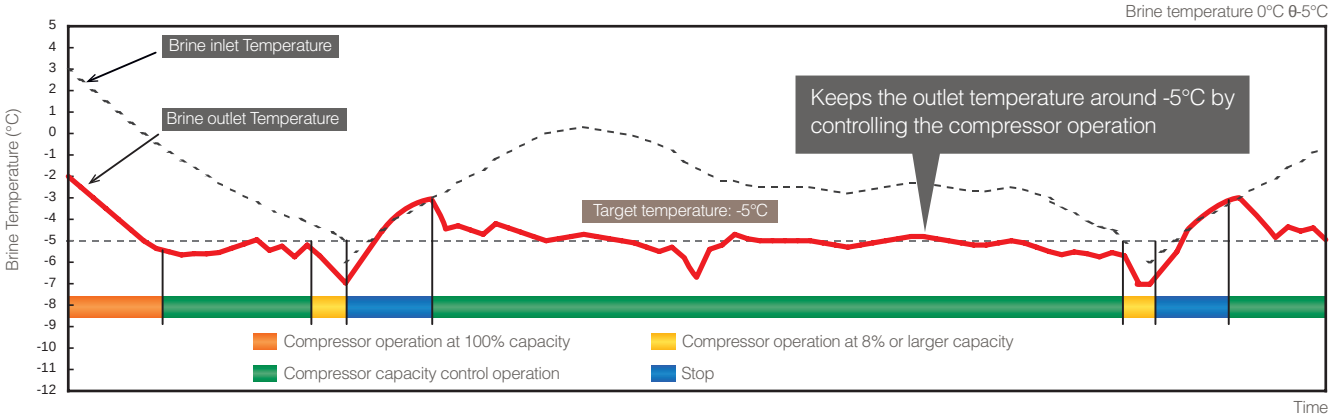
Compared to the conventional single evaporation temperature refrigerating cycle, EER improves by an additional 3.9% with a chilled water outlet/inlet temperature difference of 10°C and a chilled water outlet temperature set point of 10°C.

Brine Compatible

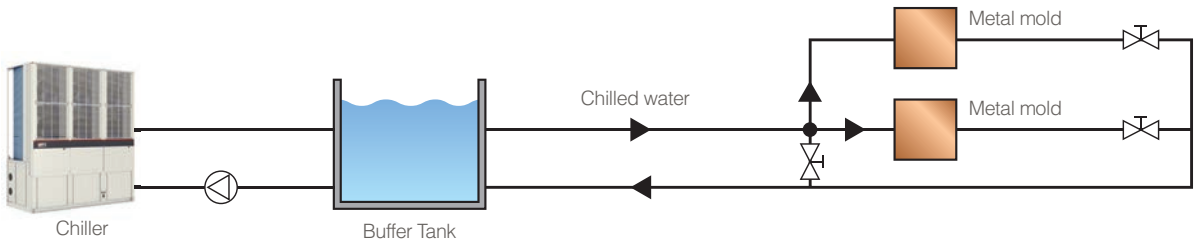
The EACV-P900YA(-N) model is suitable for versatile use, including process cooling.

The EACV-P900YA(-N) model supports a wider outlet water temperature setting range (between 5°C and -10°C) and is suitable for a variety of applications. The use of inverter controlled fans and compressors enable precise control of outlet water temperature, which is essential in process cooling. This model is also suitable for most types of process cooling applications, including food processing, machine cooling, medical imaging equipment etc.

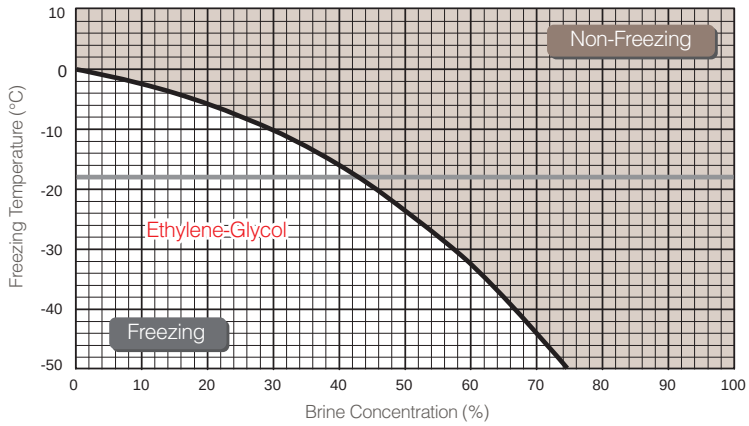
Inverter controlled fan and compressor enables precise control of outlet temperatures on air-cooled unit.



Application Examples



Manufacturing Industries	Food Industries	Medical Industries
This model helps boost productivity by ensuring stable temperature control.	Food processing, breweries and seafood storage.	For cooling MRI and CT equipment



Note:
The graph was referred from chemical company data.
Freezing temperature condition will be slightly different based on each supplier.
Please confirm detailed data from the chemical supplier.
It is recommended to set the brine concentration to a percentage that will keep the freezing temperature at -16°C or less.

What is Brine?

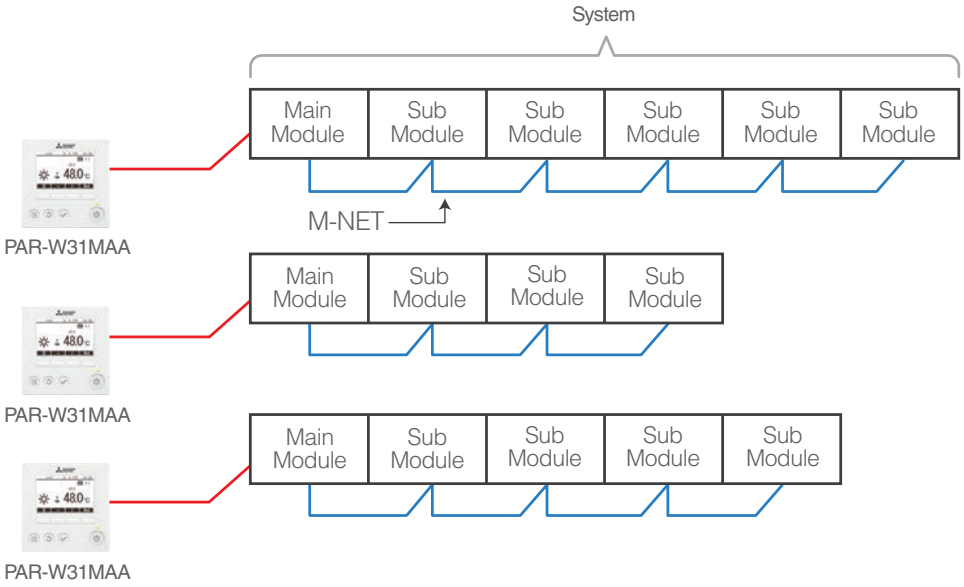
Brine is a mixture of water and an antifreeze solution that brings the freezing point down to help prevent freezing at subzero temperatures. The freezing point depends on the percentage of antifreeze, whose main component is ethylene glycol. This model is available with the outlet water temperature setting range down to -10°C.

Easy System Control

Remote Control Connection Image

*Up to 6 modules and one system can be connected for each remote controller.

*Simultaneous Control.

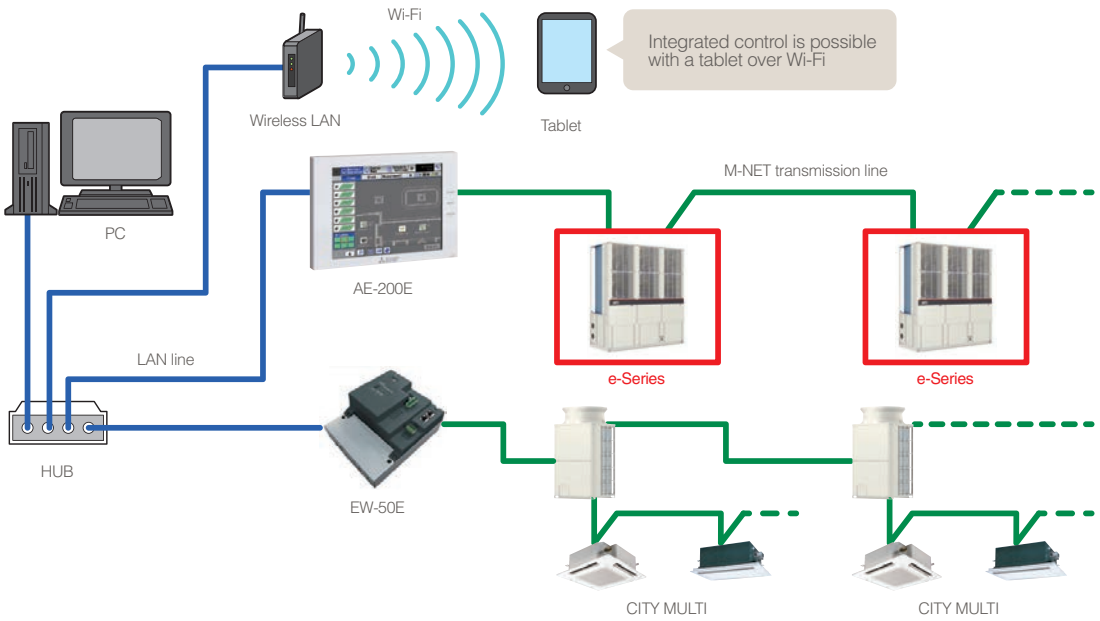


Demand Control

Forced capacity control by an external input to the unit (non-voltage normally open), is an inbuilt feature.
Heating demand is possible in addition to the cooling demand.

System Configuration

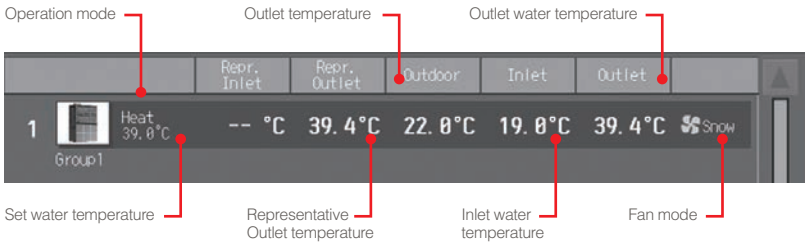
- The maximum of three EW-50E or AE-50E units can be connected to AE-200E.
- When connecting only e-Series, up to 24 units can be connected to each AE-200E, AE-50E, and EW-50E (M-NET connection).



Operation and 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.

LCD Touch Panel (monitoring window)



Web Browser (monitoring window)

Operable from a PC or tablet connected to the same network

AE-200E

Featuring 10.4-inch color LCD backlit touch panel, is able to accommodate e-Series*. Operable from the LCD touch panel, flexible programmed operation, total control of CITY MULTI, and connectable to a web browser.

*The outlet water temperature of 5°C or below cannot be set on the AE-200E/A.

SPECIFICATIONS (Cooling only Model)

Model				EACV-P900YA(-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
Water	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
	Pump Input Is Not Included — ESEER			5.66	-
	Certified Value By Eurovent — EER		*3	3.08	3.76
	Certified Value By Eurovent — ESEER		*3 *4	4.71	-
	ESEER (Includes Pump Input Based on EN14511)		*3 *5	5.46	-
	IPLV	*6	kW/kW	6.34	-
	Water Flow Rate		m^3/h	15.5	10.8
Heating Capacity			kW	56.73	39.34
Brine (Ethylene Glycol 35wt%) *7 *8	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	*1	kPa	135	65
	Brine(Ethylene Glycol 35wt%)	*7 *8	kPa	106	50
Temp Range	Chilled Water	*10	°C	Outlet Water 5~25	
	Brine (Ethylene Glycol 35wt%)	*8 *11	°C	Outlet Brine -10~25	
	Outdoor	*10 *11	°C	-15~43	
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	50A (2B) Housing Type Joint	
	Outlet		mm	50A (2B) Housing Type Joint	
Diameter of Water Pipe (Inside Header Piping)	Inlet		mm	100A (4B) Housing Type Joint	
	Outlet		mm	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	957	
	Inside Header Piping		kg	992	
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		L/s	1283 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	
Refrigerant	Type			R410a	
	Factory Charged — Weight	*9	kg	12	
	Maximum Additional Charge — Weight		kg	26	
	Total Charge — Weight		kg	38	

Note:

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB outlet water temp 7°C inlet water temp 12°C.

*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.

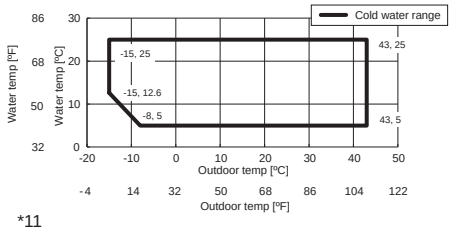
*6 Calculations according to standard performances (in accordance with AHRI 550-590).

*7 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB outlet brine temp -5°C inlet brine temp 0°C.

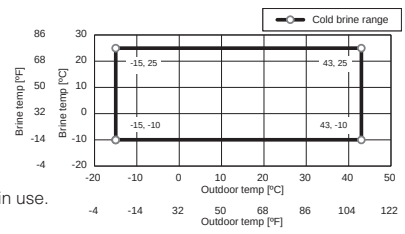
*8 Set the dipswitch SW3-6 on both main and sub modules to ON.

*9 Amount of factory-charged refrigerant is 6 (kg)x 2. Please add additional refrigerant on site.

*10



*11



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

*Don't use steel material for water piping.
*Ensure water circulation at all times, or pull the circulation water out completely when not in use.
*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.

SPECIFICATIONS (Heat Pump Model)

Model					EAHV-P900YA(-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
Water		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 *5	4.71	-
		ESEER (Includes Pump Input Based on EN14511)		*4 *6	5.46	-
		IPLV	*7	kW/kW	6.34	-
		Water Flow Rate		m^3/h	15.5	10.8
Heating Capacity			*2	kW	90.00	63.00
		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
		Water Flow Rate		m^3/h	15.5	10.8
Maximum Current Input				A	61	
Water Pressure Drop			*1	kPa	135	65
Temp Range		Cooling		°C	Outlet Water 5~25	
		Heating		°C	Outlet Water 30~55	
		Outdoor	*9	°C	-15~43	
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	50A (2B) Housing Type Joint	
		Outlet		mm	50A (2B) Housing Type Joint	
Diameter of Water Pipe (Inside Header Piping)		Inlet		mm	100A (4B) Housing Type Joint	
		Outlet		mm	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	987	
		Inside Header Piping		kg	1022	
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		L/s	1283 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	
Refrigerant	Type				R410a	
	Factory Charged	Weight	*8	kg	12	
	Maximum Additional Charge	Weight		kg	26	
	Total Charge	Weight		kg	38	

Note:

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB outlet water temp 7°C inlet water temp 12°C.

*2 Under normal cooling conditions at outdoor temp 7°CDB/6°CWB outlet water temp 45°C inlet water temp 40°C.

*3 Pump input is not included.

*4 Pump is not included in e-series.

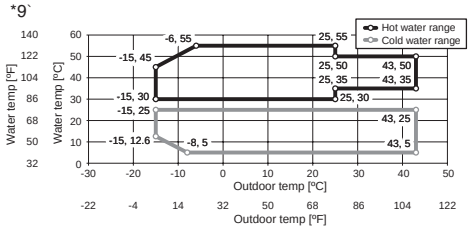
*5 EN14511 standard (2013) formula is applied to figure out this value in case of variable flow rate operation (flow rate varies per heat load).
Pump input is included in cooling capacity for EER calculation. Condition of water inlet and outlet is fixed at inlet 12°C and outlet 7°C.

*6 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.

*7 Calculations according to standard performances (in accordance with AHRI 550-590).

*8 Amount of factory-charged refrigerant is 6 (kg)×2. Please add additional refrigerant on site.

*9`



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

*Don't use steel material for water piping.
*Ensure water circulation at all times, or pull the circulation water out completely when not in use.
*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.

150kW/180kW Line up

EAHV-P1500YBL EAHV-P1800YBL
EACV-P1500YBL EACV-P1800YBL

	150kW Module	180kW Module	150kW Module	180kW Module
				
Heat Pump	EAHV-P1500YBL(-BS)	EAHV-P1800YBL(-BS)	EAHV-P1500YBL-N(-BS)	EAHV-P1800YBL-N(-BS)
Cooling Only	EACV-P1500YBL(-BS)	EACV-P1800YBL(-BS)	EACV-P1500YBL-N(-BS)	EACV-P1800YBL-N(-BS)
Units	Capacity *2			
6 Units	900kW	1080kW	900kW	1080kW
5 Units	750kW	900kW	750kW	900kW
4 Units	600kW	720kW	600kW	720kW
3 Units	450kW	540kW	450kW	540kW
2 Units	300kW	360kW	300kW	360kW
1 Unit	150kW	180kW	150kW	180kW

* (-N) indicates model with built-in header.
*1 Up to 24 units (4 groups x 6 units) can be connected to 1 identical water system.

Energy Saving Performance

The rated and seasonal energy efficiency ratios have been increased to achieve high energy saving performance.

Rated Efficiency

The use of the high-efficiency inverter compressors achieves high energy saving performance.
The 150kW model has cooling EER and heating COP rating corresponding to energy saving class A.

*1 Under normal cooling conditions at outdoor temp 35°DB/24°WB outlet water temp 7°C inlet water temp 12°C.
Pump input is included in cooling capacity and power input based on EN14511.
*2 Under normal heating conditions at outdoor temp 7°DB/6°WB outlet water temp 45°C inlet water temp 40°C.
Pump input is included in heating capacity and power input based on EN14511.

Seasonal Efficiency

The use of the high-efficiency inverter compressors promote optimum operation according to the operation load.
The compressors can operate efficiently even during night-time and intermediate seasons with low load,
thereby saving energy throughout the year.

*1 Compliant with EN14511

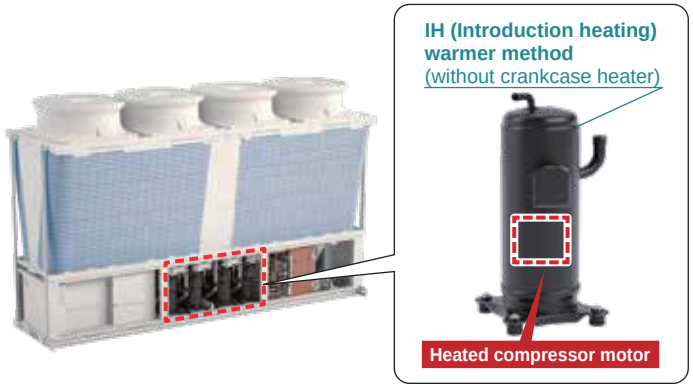
Key Components Save Energy

By controlling the frequency of the inverter compressors, the rated efficiency and the seasonal efficiency are higher.
This achieves optimum energy saving according to the operation load.

Equipped with high-efficiency inverter compressors

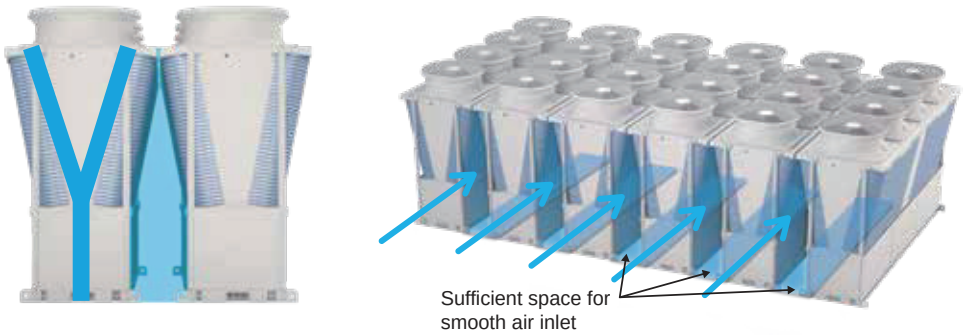
Each unit is equipped with four high-efficiency inverter compressors, developed by Mitsubishi Electric. The four compressors operate as two pairs. The inverters observe the load and control the compressors so that they can optimally operate together.

The compressors use the IH warmer method. Heat is generated by the magnetic material characteristics of the motor core unit to help prevent liquid refrigerant from remaining in the compressor when the unit stops. This reduces standby power compared to the crankcase heater method when the unit is stopped.



Use of Y-shape structure for effective operation

When the modules are connected, the intake air passages from the floor and sides contribute to effective operation.



High Functionality

The Capacity of one system can be increased to up to 1080kW by combining modules.

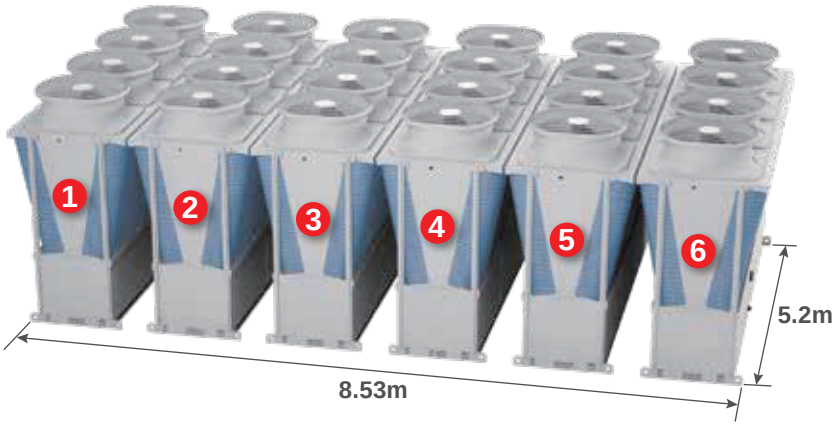
Large-capacity 150kW and 180kW units are available. Even a 1080kW system using six 180kW units can be installed in a floor area of 8.53 m × 5.2 m including the service space. The 150kW model has cooling EER and heating COP rating corresponding to energy saving class A.

* Only modules with the same capacity can be combined.

150kW	
Heat Pump	EAHV-P1500YBL(-N)
Cooling Only	EACV-P1500YBL(-N)

180kW	
Heat Pump	EAHV-P1800YBL(-N)
Cooling Only	EACV-P1800YBL(-N)

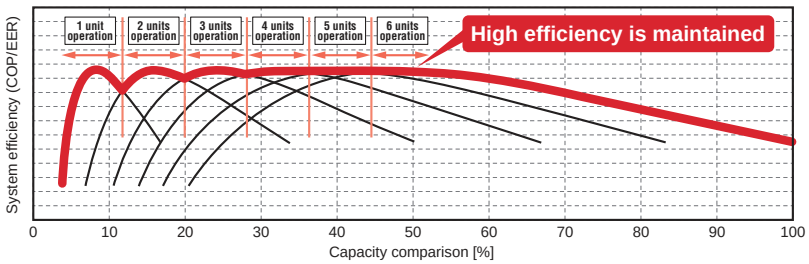
* (-N) indicates an inside header model.



Optimum frequency control for further energy saving

When multiple units are connected, the frequency of each compressor is controlled during operation to increase the efficiency of each unit, achieving high energy saving performance. This control can be implemented by simply connecting to our M-NET, without needing additional controls.

* The following is an example of operation.



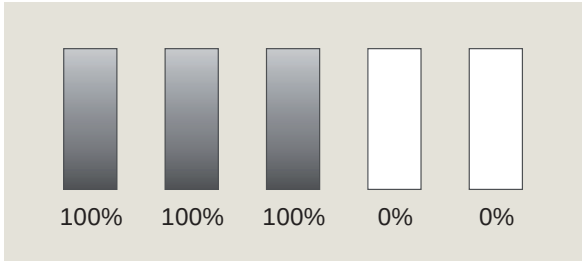
Optimum Frequency Control

The system will automatically select the best operation frequency between all available modules to achieve the required load at the highest efficiency.

When the Overall System Load is 60%

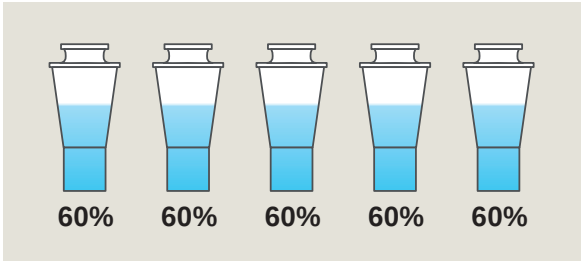
Without Optimum Frequency Control

* The following is an example of operation.



With non-inverter compressors, it is only possible to turn the unit on or off, and the compressor frequency cannot be adjusted according to the required capacity.

With Optimum Frequency Control

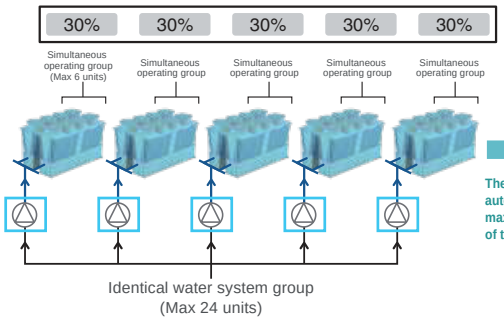


Our modules are equipped with inverter compressors, so the system can be operated in frequency ranges in which the efficiency of each unit is high. Optimum frequency control of each unit increases the efficiency of the whole system.

When the Overall System Load is 30%

Without Optimum Frequency Control

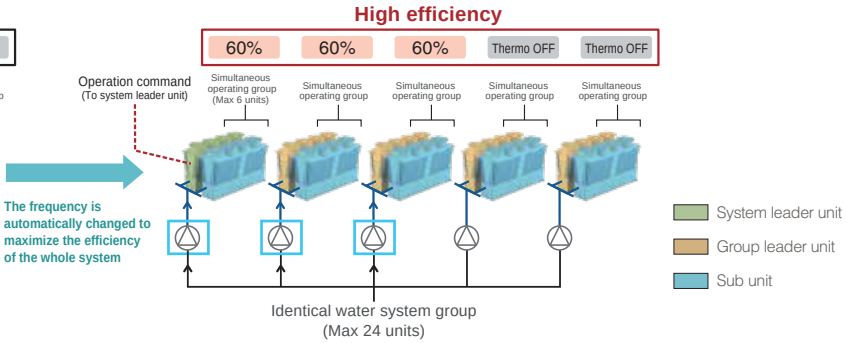
*The following is an example of operation.



Since the compressors of all groups are running at inefficient frequencies, the efficiency of the whole system is lower.

In addition, all the pumps are operating with the units, lowering the system efficiency further.

With Optimum Frequency Control



The load of identical water system groups is observed, and the frequency of each group can be controlled to increase the efficiency. As shown in the above image, when the overall system load is 30%, three groups are operated at 60%, at which the efficiency of each group is high, and the remaining groups are set to the thermo OFF state.

Then, the output of the pumps connected to the remaining group can be decreased, and the efficiency of the whole system can be increased. This control is completed by connecting to M-NET. There is no need to provide additonal controls.

Operation of Optimum Frequency Control

A) One system master unit is specified to control the modules in the system.

B) The board of the system master unit collects the operating frequency of each module.

C) The board of the system master unit calculates the number of running units with which the system can be operated at high efficiency.

D) The system master unit transmits the start or stop command to each group master unit.

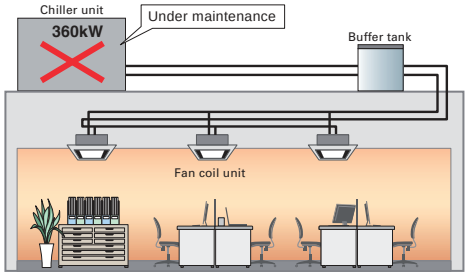
E) Each sub unit starts or stops according to the operation of the group master unit.

Backup

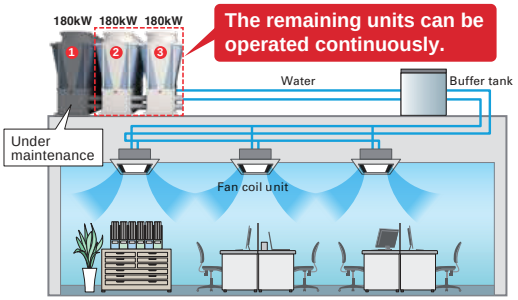
When a non-modular chiller is used as the main 360kW unit, it is required to prepare the same capacity as a backup. When Mitsubishi Electric modular chillers are used, two units can be used even if one unit goes down, and the operation can be continued normally. It helps to compress the capacity of backup.

The following is an example of operation.

Non-Modular Chiller



Modular Chiller

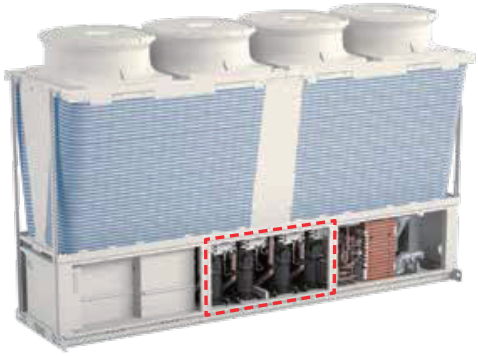


Emergency Operation Mode

Single Unit

The unit contains four compressors developed by Mitsubishi Electric.

The four compressors operate as two pairs. If something is wrong with one of the two pairs, the other pair (2 compressors) can temporarily continue to operate.



Multiple Units

If one of the units goes down, the remaining units can continue to operate. Each unit has a function for independently controlling the outlet water temperature. Even if the main unit goes down, operation can be continued.

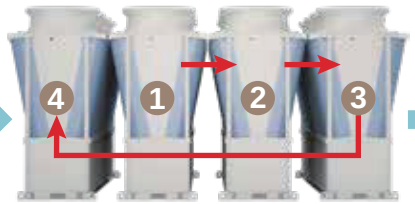
* Units that have been stopped by thermo OFF before the main unit goes down are kept in the thermo OFF mode.

Rotation Operation

When multiple modules are installed, the operating time of each module in the same system can be equalised according to the load of the whole system.

First Start

Second Start



Third Start

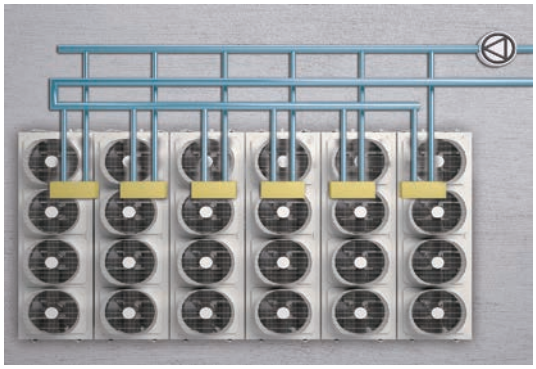
Space Saving

Selectable Piping System

Standard piping and built-in header types are available. The optimum type can be selected according to the design and construction needs of the building.

Standard Piping Type

Type without built-in pump or header.

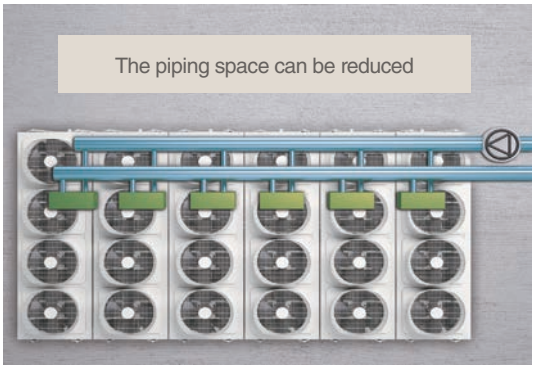


Advantages

The flexibility of design is high, and it is possible to select the most suitable number of pumps and water circuit for the on-site system.

Built-In Header Type (models with "-N" in the name only)

Type with built-in header piping for connection between modules.



Advantages

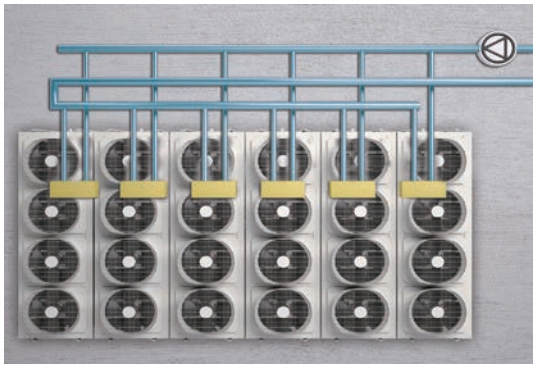
The piping space and number of connections are reduced, helping simple construction and short construction times.

* It is not possible to build both the pump and the header in each module.

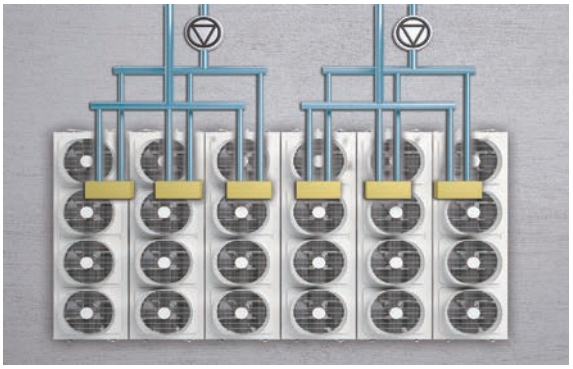
Standard Piping Type

The flexibility of design is high, and the system can be designed according to the on-site system and load pattern. Up to 24 units (4 groups × 6 units) can be connected to one system. The number of pumps and the piping structure can be designed according to project requirements.

System with 6 Chillers and One Pump



System with 6 Chillers and Two Pumps

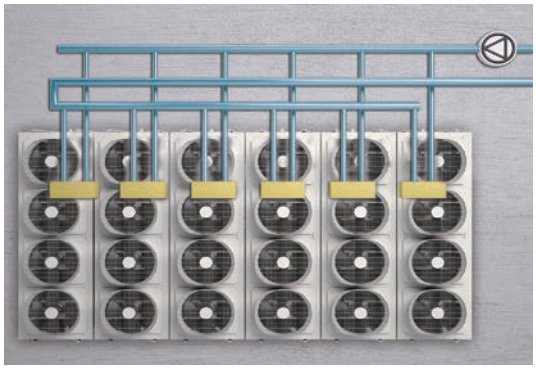


Built-In Header Type

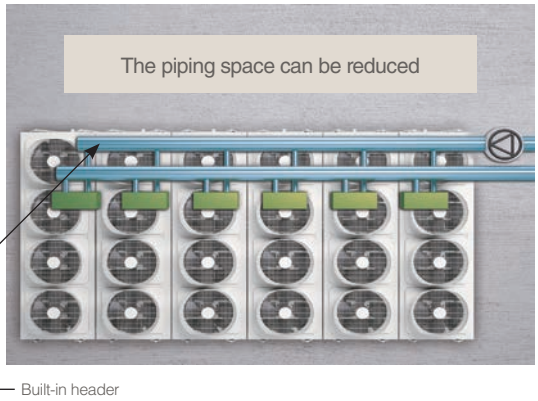
The piping to connect to other units is built into each unit. The number of piping connections is reduced (saving construction work and reducing the construction time), and the installation space can be also reduced.

Space Saving | Construction Saving

Standard Piping Construction

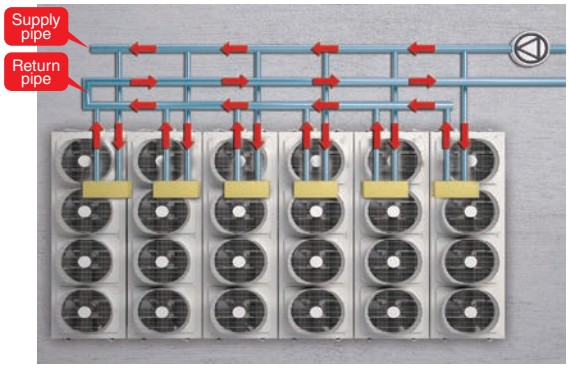


Built-In Header Type



Space for return piping is not required

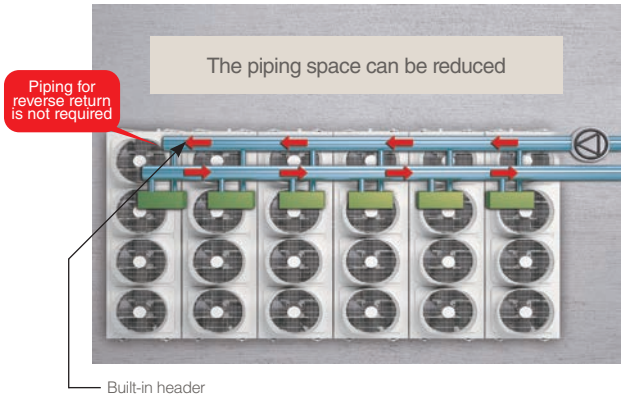
Standard Piping Construction



With standard piping construction, the customer must determine and design the return piping.

The supply pipe and return pipe of each module must have the same overall length and piping resistance to keep a balanced flow rate between modules. Therefore, piping space and equipment costs are increased.

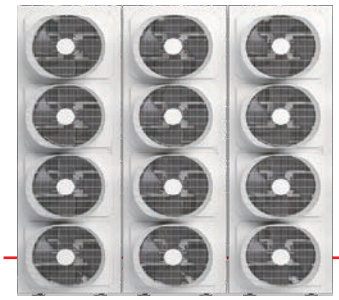
Built-In Header Type (models with "-N" in the name only)



For the built-in header type, the size of the piping from the pump is increased, so that water pressure to the modules can be maintained regardless of the distance from the pump. Reverse return piping is not necessary. The piping space and equipment costs are reduced, because the modules are supplied with built-in piping.

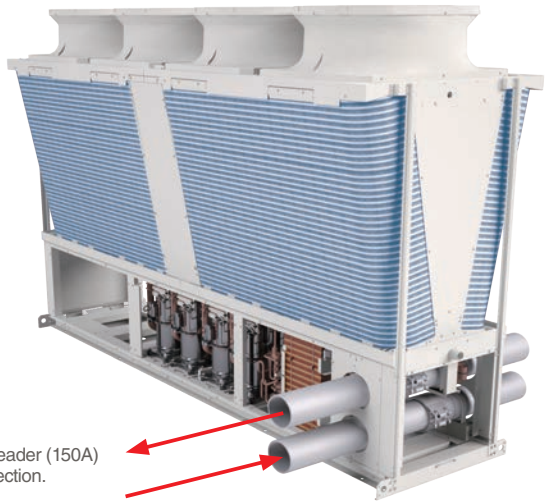
Details of Built-In Header Type Modules

Up to six units with built-in headers can be connected. (Piping size: 150A). When 6 units or less are connected, flow adjustment and reverse return piping for each unit are unnecessary.



Built-in header (150A) outlet direction.

The direction can be selected.



Built-in header (150A) outlet direction.

Built-in header (150A) outlet direction.

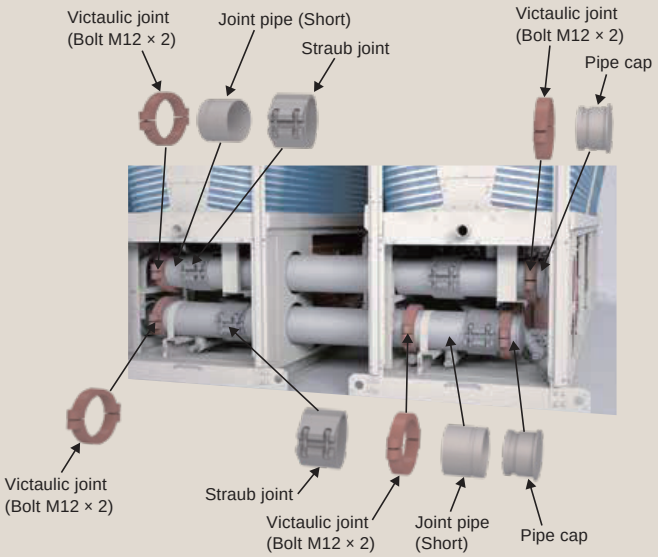
The direction can be selected.

Example of construction for built-in header type modules.

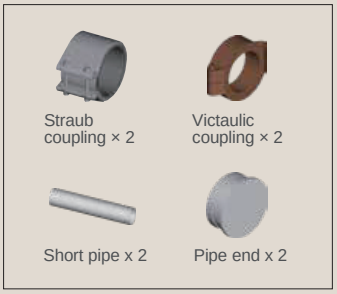
* Heat insulation of the connection piping between units must be applied on site.

Procedure for Installing the Connection Kit

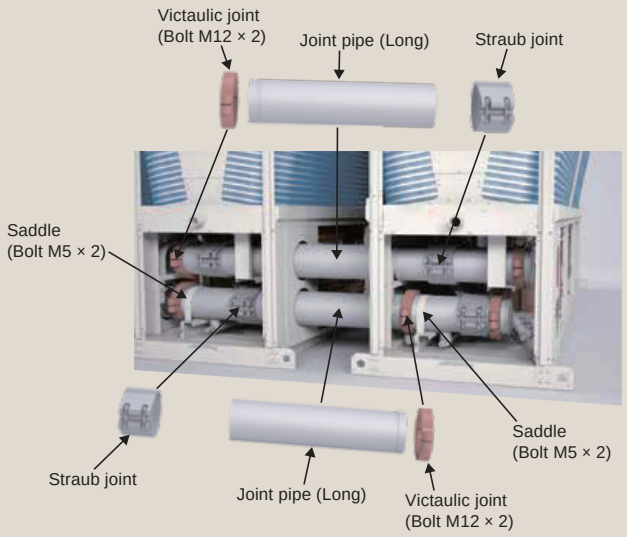
Installation of End Connection Kit (DT-01HK)



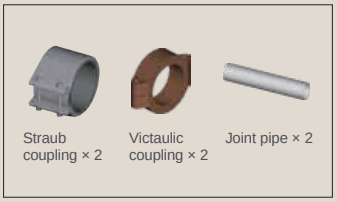
Optional parts① (Piping Kit)
DT-01HK

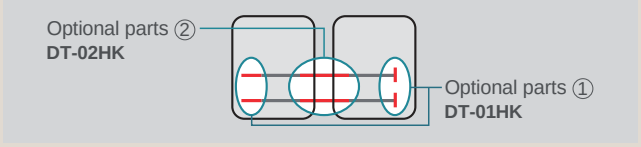


Installation of Connection Kit (DT-02HK)



Optional parts② (Connection Piping Kit)
DT-02HK

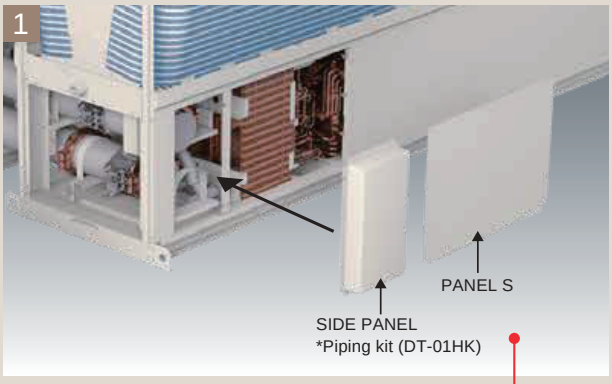




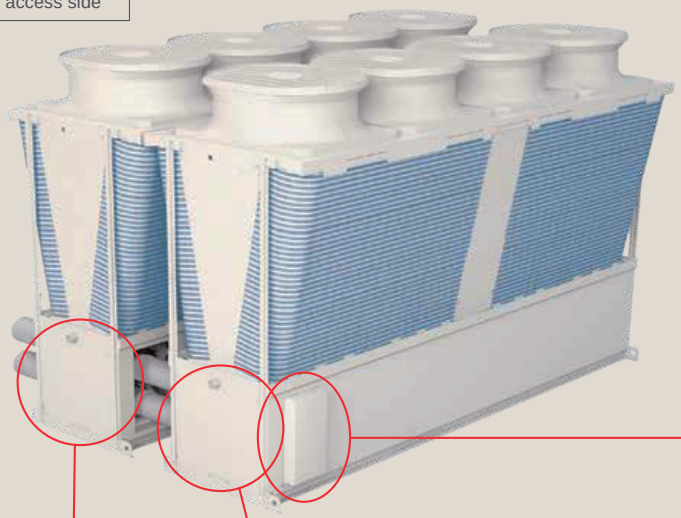
Installation of Panels

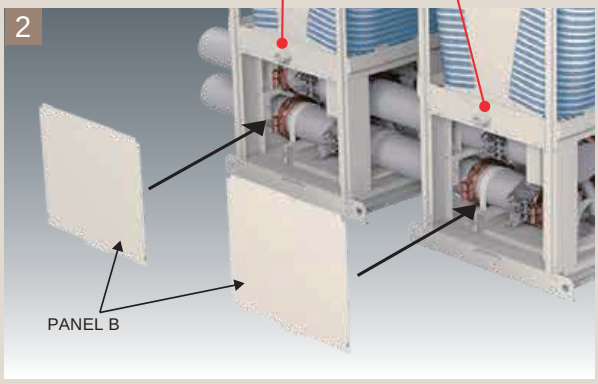
1 Install the panels on the end unit.
* Note: Install panel S and then the closing panel.

2 Install panel B.



Seen from the opposite side of the maintenance access side





Control Information

Remote Controller

You can perform basic operations, such as start/stop, mode switching, water temperature setting and schedule setting, by connecting a remote controller.

Major Functions	
Operation/Setting	ON/OFF
	Cooling/Heating/HeatingECO/Anti-freeze
	Snow/regular
	Demand
	Scheduled operation (daily/weekly)
Display	Operation mode
	Current water temperature
	Error code
Control Function (Function of Chiller Body)	Control of number of units
	Control to help prevent simultaneous defrosting

External Signal Input

Basic operations, such as start/stop, mode switching and water temperature setting, can be performed by inputting external signals directly to the chiller.

Major Functions	
Input	ON/OFF
	Cooling/Heating
	Snow/regular
	Demand
	Target water temperature
Display	Operation mode
	Under operation
	Under defrosting
	Error
Control Function (Function of Chiller Body)	Control of number of units
	Control to help prevent simultaneous defrosting

SPECIFICATIONS (Cooling only Model)

Model				EACV-P1500YBL(-N)(-BS)	EACV-P1800YBL(-N)(-BS)
Power Source				3-Phase 4-Wire 380-400-415V 50/60Hz	
Cooling Capacity *1			kW	150.00	180.00
			kcal/h	129,000	154,800
	Power Input		kW	45.10	59.01
	EER			3.33	3.05
	IPLV		*5	6.55	6.33
	Water Flow Rate		m^3/h	25.8	31.0
Cooling Capacity (EN14511) *2			kW	148.58	177.76
			kcal/h	127,779	152,874
	Power Input	*2	kW	46.52	61.25
	EER			3.19	2.90
	Eurovent Efficiency Class			A	B
	ESEER		*6	4.74	4.45
	SEER			4.62	4.58
	Water Flow Rate		m^3/h	25.8	31.0
Current Input	Cooling Current 380-400-415V	*1	A	77 - 73 - 70	
	Maximum Current		A	111	
Water Pressure Drop *1			kPa	114	164
Temp Range	Cooling	*7	°C	Outlet Water 5~30	
	Outdoor		°C	-15~43 *6	
Circulating Water Volume Range			m^3/h	12.9~34.0	
Sound Pressure Level (Measured In Anechoic Room) at 1m		*1	dB (A)	66	68
Sound Power Level (Measured In Anechoic Room)		*1	dB (A)	84	86
Diameter of Water Pipe (Standard Piping)	Inlet		mm	65A Housing Type Joint	
	Outlet		mm	65A Housing Type Joint	
Diameter of Water Pipe (Inside Header Piping)	Inlet		mm	150A Housing Type Joint	
	Outlet		mm	150A Housing Type Joint	
External Finish				Polyester Powder Coating Steel Plate	
External Dimension HxWxD			mm	2350 X 3400 X 1080	
Net Weight	Standard Piping		kg	1240	
	Inside Header Piping		kg	1256	
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			4	
	Motor Output		kW	11.7 X 4	
	Lubricant			MEL32	
Fan	Air Flow Rate		m^3/min	265 X 4	
			L/s	4417 X 4	
	Type, Quantity			Propeller Fan X 4	
	Starting Method			Inverter	
	Motor Output		kW	0.94 X 4	
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	
Refrigerant *3	Type		*4	R410a / 2088	
	Factory Charged	Weight	*3 kg	12.0	
	Maximum Additional Charge	Weight	kg	48.0	
	Total Charge	Weight	kg	60.0	
		Control		LEV	

Note:

*1 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB outlet water temp 7°C inlet water temp 12°C. Pump input is not included.

*2 Under normal cooling conditions at outdoor temp 35°CDB/24°CWB outlet water temp 7°C inlet water temp 12°C. Pump input is included in cooling capacity and power input based on EN14511.

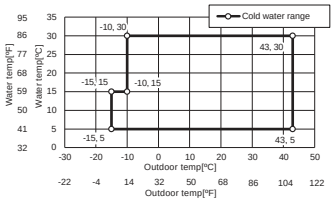
*3 Amount of factory-charged refrigerant is 3(kg) x 4. Please add additional refrigerant at the field.

*4 These values are based on Regulation(EU) No.517 / 2014.

*5 IPLV is calculated in accordance with AHRI 550-590.

*6 ESEER is calculated in accordance with EUROVENT conditions.

*7



EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

Unit Converter

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

*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.
*This model doesn't equip with a pump.

SPECIFICATIONS (Heatpump Model)

Model					EAHV-P1500YBL(-N)(-BS)	EAHV-P1800YBL(-N)(-BS)
Power Source					3-Phase 4-Wire 380-400-415V 50/60Hz	
Cooling Capacity *1				kW	150.00	180.00
				kcal/h	129,000	154,800
		Power Input		kW	45.10	59.01
		EER			3.33	3.05
		IPLV		*7	6.55	6.33
		Water Flow Rate		m^3/h	25.8	31.0
Cooling Capacity (EN14511) *2				Kw	148.58	177.76
				kcal/h	127,779	152,874
		Power Input		kW	46.52	61.25
		EER			3.19	2.90
		Eurovent Efficiency Class			A	B
		ESEER		*8	4.74	4.45
		SEER			4.62	4.58
		Water Flow Rate		m^3/h	25.8	31.0
Heating Capacity *3				Kw	150.00	180.00
				kcal/h	129,000	154,800
		Power Input		kW	44.59	55.68
		Cop			3.36	3.23
		Water Flow Rate			25.8	31.0
Heating Capacity (EN14511) *4				kW	151.42	182.24
				kcal/h	130,221	156,726
		Power Input		kW	46.01	57.92
		Cop			3.29	3.15
		Eurovent Efficiency Class			A	B
		Scop (Reversible) Low/Medium			3.24 / 2.85	
		Water Flow Rate		m^3/h	25.8	31.0
Current Input		Cooling Current 380-400-415V	*1	A	77- 73 - 70	
		Heating Current 380-400-415V	*3	A	76 - 72 - 69	
		Maximum Current		A	111	
Water Pressure Drop *1				kPa	114	164
Temp Range		Cooling	*9	°C	Outlet Water 5~30	
		Heating	*9	°C	Outlet Water 30~55	
		Outdoor	*9	°C	-15~43	
Circulating Water Volume Range				m^3/h	12.9~34.0	
Sound Pressure Level (Measured In Anechoic Room) at 1m			*1	dB (A)	66	68
Sound Power Level (Measured In Anechoic Room)			*1	dB (A)	84	86
Diameter of Water Pipe (Standard Piping)		Inlet		mm	65A Housing Type Joint	
		Outlet		mm	65A Housing Type Joint	
Diameter of Water Pipe (Inside Header Piping)		Inlet		mm	150A Housing Type Joint	
		Outlet		mm	150A Housing Type Joint	
External Finish					Polyester Powder Coating Steel Plate	
External Dimension HxWxD				mm	2350 X 3400 X 1080	
Net Weight		Standard Piping		kg	1310	
		Inside Header Piping		kg	1326	
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			4	
		Motor Output		kW	11.7 X 4	
		Lubricant			MEL32	
Fan		Air Flow Rate		m^3/min	265 X 4	
				L/s	4417 X 4	
		Type, Quantity			Propeller Fan X 4	
		Starting Method			Inverter	
		Motor Output		kW	0.92 X 4	
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	
Refrigerant *3	Type			*6	R410a	
	Factory Charged	Weight	*5	kg	12.0	
	Maximum Additional Charge	Weight		kg	48.0	
	Total Charge	Weight		kg	60.0	
		Control			LEV	

Note:
*1 Under normal cooling conditions at outdoor temp 35°DB/24°WB outlet water temp 7°C inlet water temp 12°C.
Pump input is not included in cooling capacity and power input.
*2 Under normal cooling conditions at outdoor temp 35°DB/24°WB outlet water temp 7°C inlet water temp 12°C.
Pump input is included in cooling capacity and power input based on EN14511.
*3 Under normal heating conditions at outdoor temp 7°DB/6°WB outlet water temp 45°C inlet water temp 40°C.
Pump input is not included in heating capacity and power input.
*4 Under normal heating conditions at outdoor temp 7°DB/6°WB outlet water temp 45°C inlet water temp 40°C.
Pump input is included in heating capacity and power input based on EN14511.
*5 Amount of factory-charged refrigerant is 3(kg) x 4. Please add additional refrigerant at the field.
*6 These values are based on Regulation(EU) No.517 / 2014.
*7 IPLV is calculated in accordance with AHRI 550-590.
*8 ESEER is calculated in accordance with EUROVENT conditions.

NOTES

NOTES

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