

HOT WATER HEAT PUMP

DATA BOOK

MODEL

QAHV-N560YA-HPB(-BS)

HOT WATER HEAT PUMP

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1. Product Specifications

1-1. Specifications

Model		QAHV-N560YA-HPB	
Power Source		3-phase 4-wire 380-400-415V 50Hz	
Capacity *1		kW	40
		kcal/h	34400
		Btu/h	136480
	Power input	kW	10.31
	Current input	A	17.8-16.9-16.3
COP(kW/kW)			3.88
Capacity *2		kW	40
		kcal/h	34400
		Btu/h	136480
	Power input	kW	10.97
	Current input	A	20.0-19.0-18.3
COP(kW/kW)			3.65
Capacity *3		kW	40
		kcal/h	34400
		Btu/h	136480
	Power input	kW	11.6
	Current input	A	20.4-19.4-18.7
COP(kW/kW)			3.44
Maximum current input *4		A	28.8-27.4-26.4
Allowable external pump head			77kPa
Temperature range *5	Outlet water temp		55~90°C 131~194°F
	Outdoor temp	D.B.	-25~43°C -13~109.4°F
Sound Pressure level (measured 1m below the unit in an anechoic room) *1		dB(A)	56
Water pipe diameter and type	Inlet	mm(in.)	19.05(Rc 3/4"), screw pipe
	Outlet	mm(in.)	19.05(Rc 3/4"), screw pipe
External finish		Acrylic painted steel plate <MUNSELL 5Y 8/1 or similar>	
External dimension H x W x D		mm	1837(1777 not including legs) x 1220 x 760
		in.	72.3(69.9 not including legs) x 48.0
Net weight		kg(lbs)	400(882)
Design Pressure	R744	MPa	14
	Water	MPa	1.0
Heat exchanger	Water-side		Copper tube coil
	Air-side		Plate fin and copper tube
Compressor	Type		Inverter scroll hermetic compressor
	Maker		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Motor output	kW	11.0
	Case heater	kW	0.045
	Lubricant		PAG
FAN	Air flow rate	m ³ /min	220
		L/s	3666
		cfm	7768
	Type x Quantity		Propeller fan
	Control, Driving mechanism		Inverter-control, Direct-driven by motor
	Motor output	kW	0.92
HIC (HIC: Heat inter-changer) circuit		Copper pipe	
Protection	High pressure protection		High pres.Sensor & High pres.Switch at 14MPa(643psi)
	Inverter circuit		Overheat and overcurrent protection
	Compressor		Overheat protection
	Fan motor		Thermal switch
Defrosting method		Auto-defrost mode (Hot gas)	
Refrigerant	Type x original charge		6.5
	Flow and temperature control		LEV

Notes:	Unit converter
*1.Under Normal heating conditions at the outdoor temp, 16°CDB/12°CWB(60.8°FDB/53.6°FWB), the outlet water temperature 65°C(149°F), and the inlet water temperature 17°C(62.6°F)	kcal/h =kW x 860
*2.Under Normal heating conditions at the outdoor temp, 7°CDB/6°CWB(44.6°FDB/42.8°FWB), the outlet water temperature 65°C(149°F), and the inlet water temperature 9°C(48.2°F)	BTU/h =kW x 3,412
*3.Under Normal heating conditions at the outdoor temp, 7°CDB/6°CWB(44.6°FDB/42.8°FWB), the outlet water temperature 65°C(149°F), and the inlet water temperature 15°C(59.0°F)	cfm =m ³ /min x 35.31
*4.Under Normal heating conditions at the outdoor temp, 7°CDB/6°CWB(44.6°FDB/42.8°FWB), when the unit is set to the " Capacity Priority " mode through the dry NC-contact.	lbs =kg/0.4536
*5.Please refer to 2-1-3. Operation temperature range.	
*Due to continuing improvements, specifications may be subject to change without notice	
*Do not use steel pipes as water pipes.	
*Keep the water circulated at all times. Blow the water out of the pipes if the unit will not be used for an extended period time.	
*Do not use ground water or well water	
*Do not install the unit in an environment where the wet bulb temperature exceeds 32°C	
*The water circuit must use the closed circuit	
*There is a 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.	

1-2. External Dimensions

Unit: mm

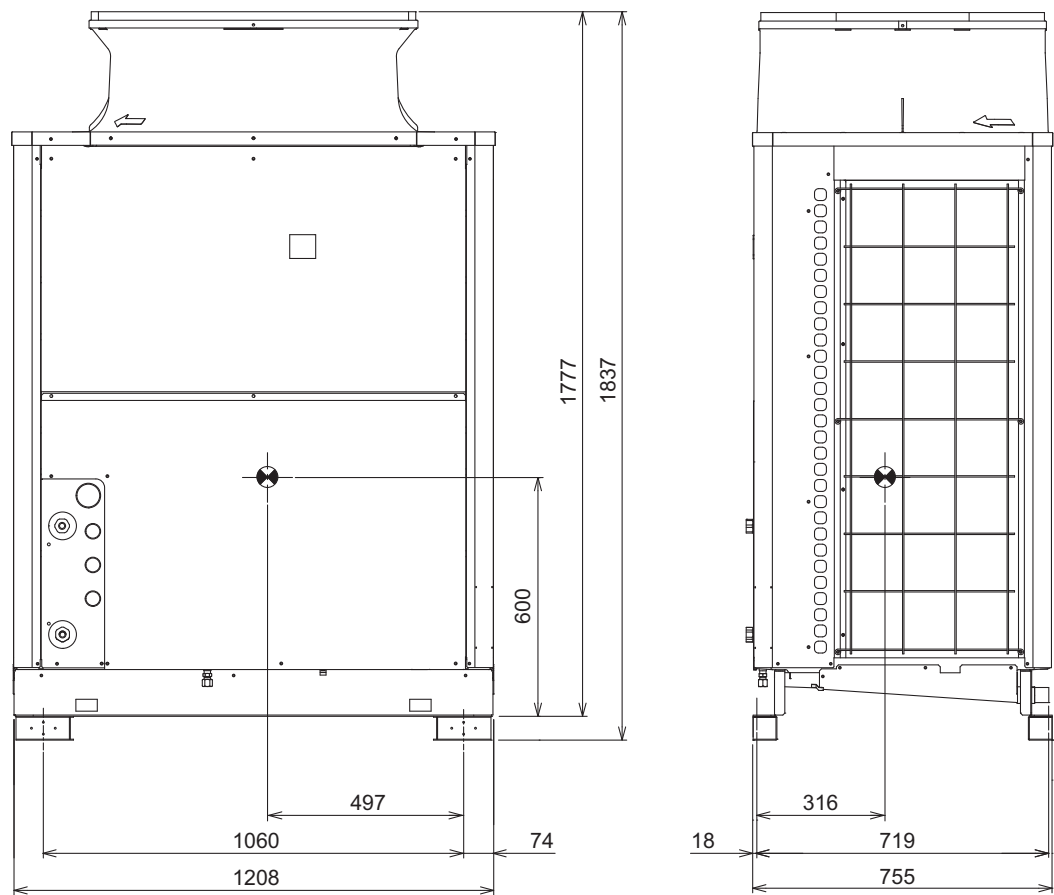


1. Product Specifications

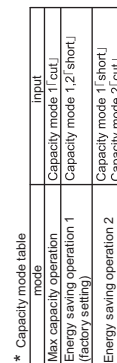
1-3. Center of Gravity

QAHV-N560YA-HPB(-BS)

Unit: mm



QAHV-N560YA-HPB(-BS)



1. Product Specifications

Note

1. The broken lines indicate the optional parts, field-supplied parts, and field work.
2. Dashed lines indicate sub box
3. Faston terminals have a locking function.
Press the tab in the middle of the terminals to remove them.
Check that the terminals are securely locked in place after insertion.
4. The symbols of the field connection by cutting the short circuit wire
○: Terminal block ×: Connection by cutting the short circuit wire
5. The method of input signal of operation can choose one of optional remote controller or no-voltage input.
6. Leave a space of at least 5 cm between the low voltage external wiring (no-voltage contact input and remote controller wiring) and wiring of 100V or greater. Do not place them in the same conduit tube or cable as this will damage the circuit board.
7. When cable is used for the control cable wiring, use a separate cable for the following wiring.
Using the same cable may cause malfunctions and damage to the unit.
(a) Optional remote controller wiring
(b) No-voltage contact input wiring
(c) No-voltage contact output wiring
(d) Remote water temperature setting
8. Use a contact that takes 12VDC 1mA for no-voltage contact input.
9. Need to select either Water temperature setting input signal.
Set the SW421 as shown in the table below.

	SW421-1	SW421-2
4~20mA	ON	ON
0~10V	OFF	OFF
1~5V	OFF	ON
2~10V	OFF	OFF

10. Use a 4-20mA signal output device with insulation.
Feeding 30mA or more current may damage the circuit board.
11. For prevention of damage of the pump, SWS2 is set in "A" (factory setting).
Change the slide switch SWS2 [B(automatic)] in Test Run.

Symbol explanation

Symbol	explanation
CT12	
CT22	Ac current sensor
CT3	
C100	Capacitor (Electrolysis)
DCL	DC reactor
F01	
F02	
F03	
F04	Fuse
F06	
F07	
F121	
H1	Crankcase heater (for heating the compressor)
H2	Electric heater (Antifreeze)
LEV1	Electronic expansion valve (Main circuit)
LEV3	Electronic expansion valve (Injection)
M	Fan motor
MP1	Pump motor
MS	Compressor motor
MVW1	Water flow control valve
PSH1	High pressure sensor
PSL1	Low pressure sensor
R11	Resistance (for Water flow rate sensor 2)
R12	Resistance (for Water flow rate sensor 3)
R1	
R5	Electrical resistance
SV1	Solenoid valve (Defrost)1
SV2	Solenoid valve (Defrost)2
SV3	Solenoid valve (Defrost)3
SV4	Solenoid valve (Defrost)4
SV5	Solenoid valve (Injection circuit)
S1	Water flow rate sensor
THHS	IGBT temperature
TH1~5,9,11,12,14	Thermistor
Z21	Function setting connector
63H1	High pressure switch
72C	Electromagnetic relay (Inverter main circuit)
*TH15~19	
*S2,3	Thermistor
<ELB1>	Water flow rate sensor Earth leakage breaker

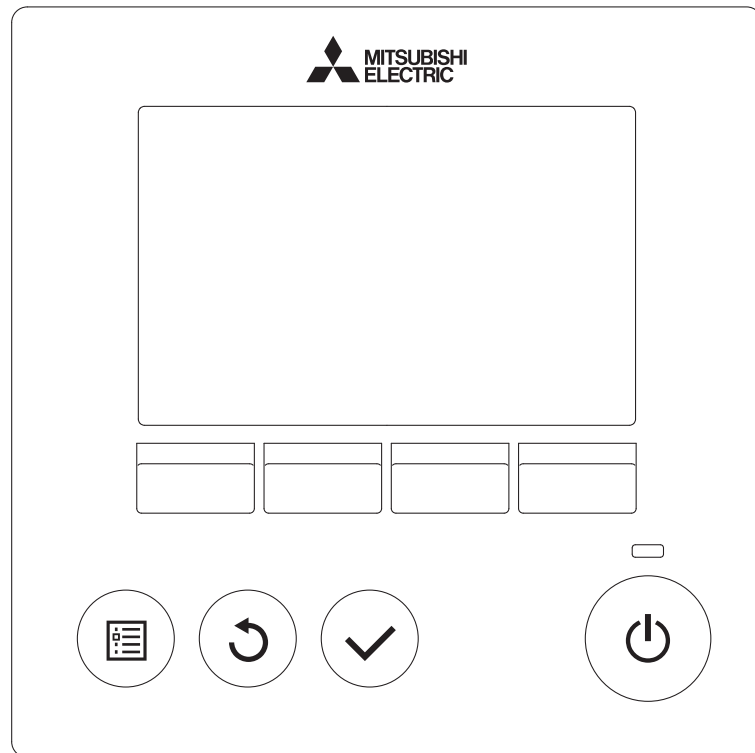
* of symbol item is the optional parts, <> is field-supplied parts.

1. Product Specifications

1-5. Optional parts

1-5-1. Remote controller PAR-W31MAA

Refer to 6-1. PAR-W31MAA specifications.



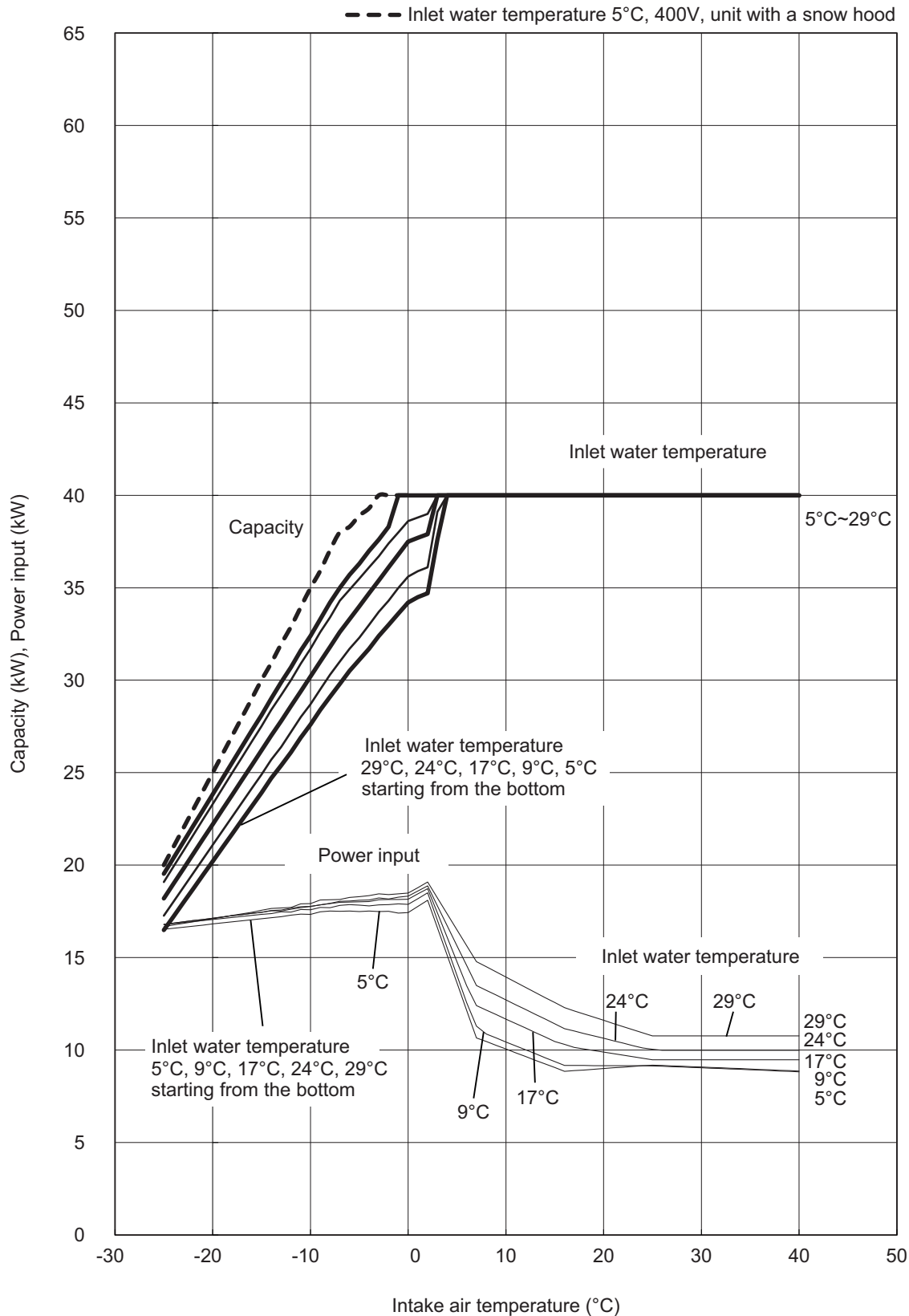
2. Product Data

2-1. Capacity tables

2-1-1. Correction by temperature

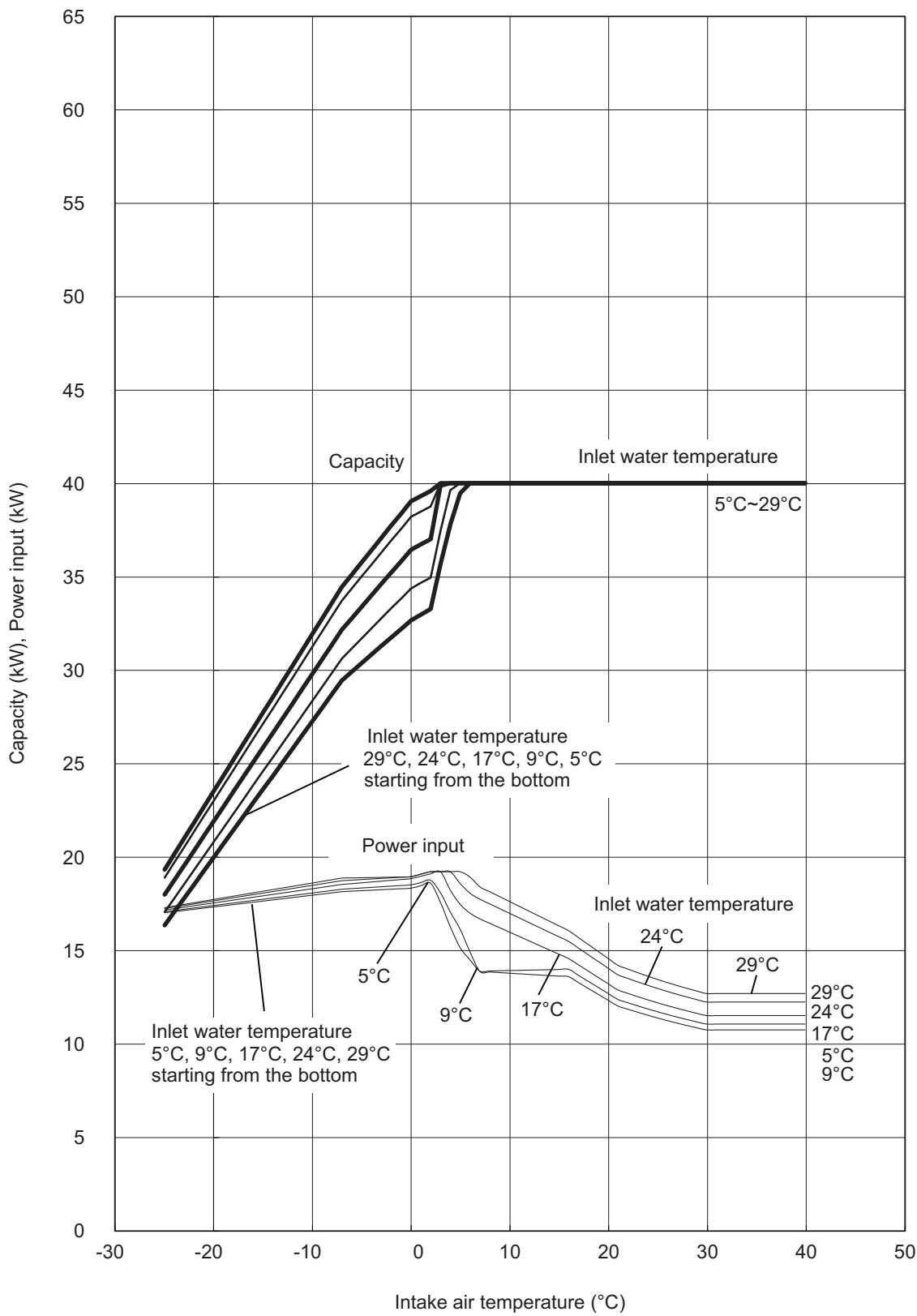
Outlet water temperature 60~70°C
Energy saving operation 1 mode

QAHV-N560YA-HPB(-BS)



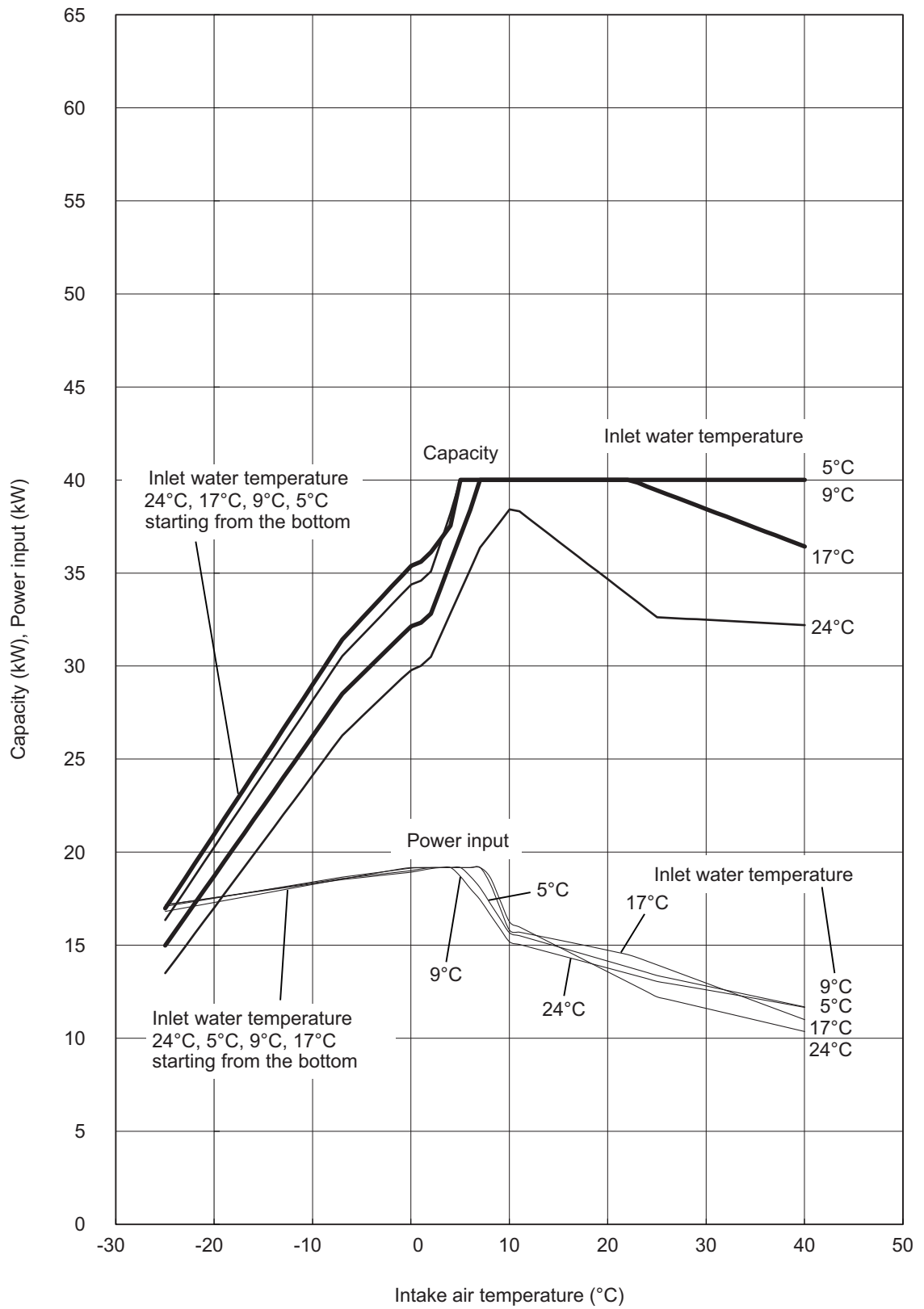
2. Product Data

Outlet water temperature 80°C
Energy saving operation 1 mode



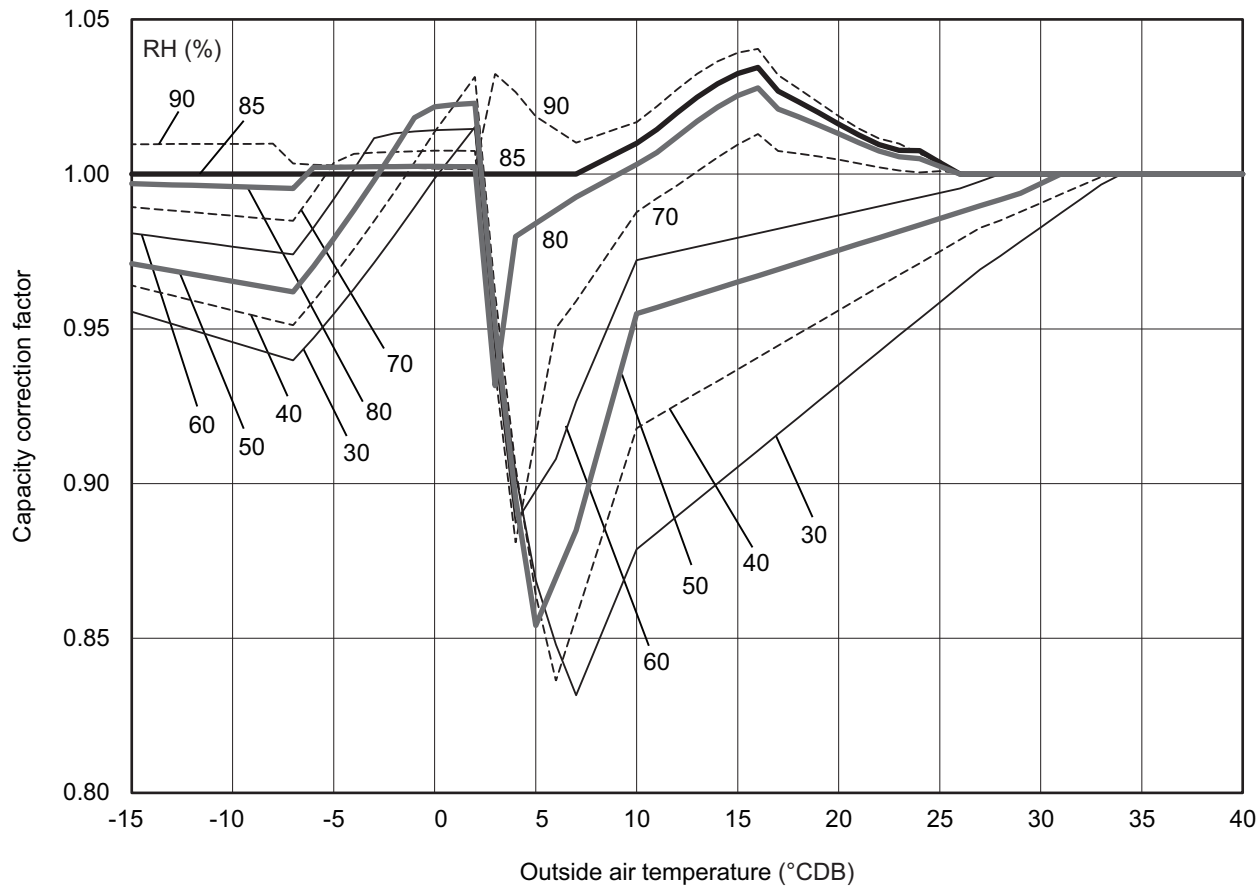
2. Product Data

Outlet water temperature 90°C
Energy saving operation 1 mode



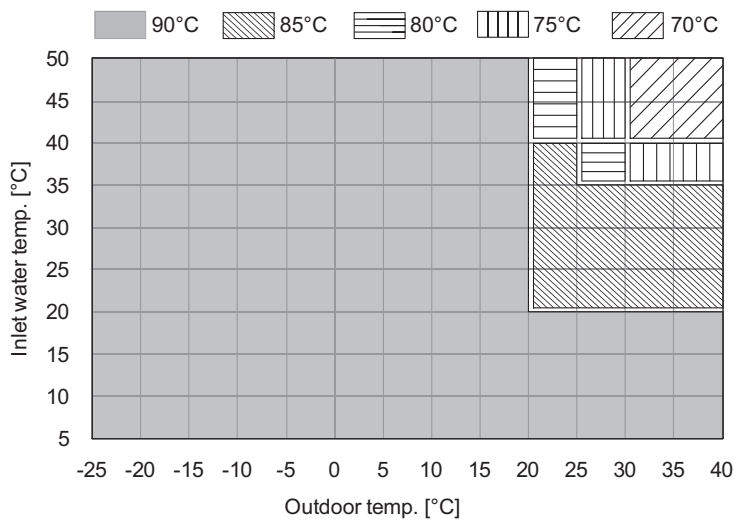
2. Product Data

2-1-2. Correction by relative humidity



2-1-3. Operation temperature range

Upper limit value of water temperature

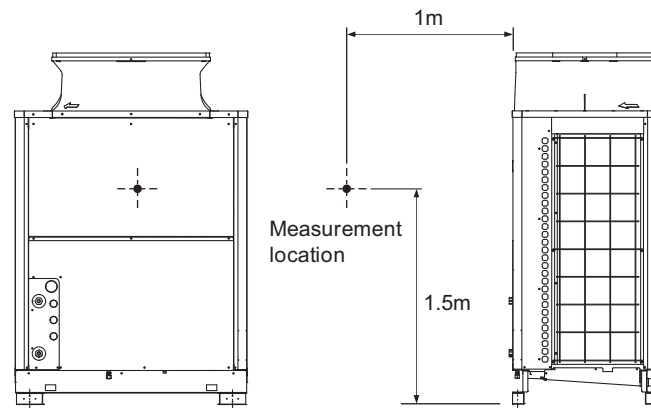


2. Product Data

2-2. Sound pressure levels

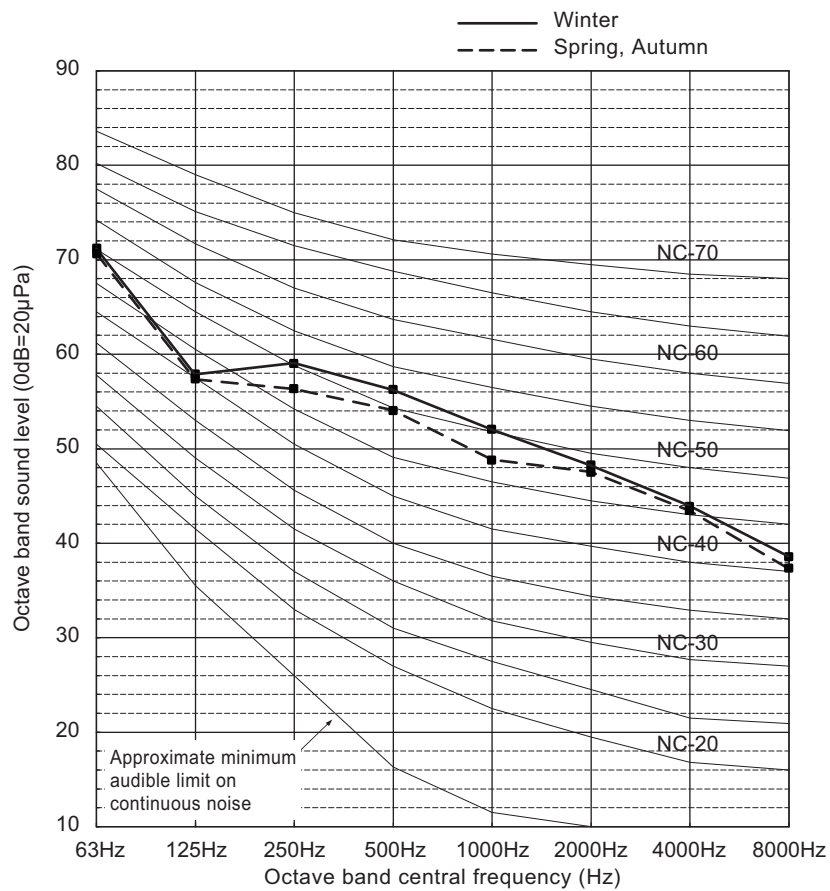
Measurement condition

QAHV-N560YA-HPB(-BS)



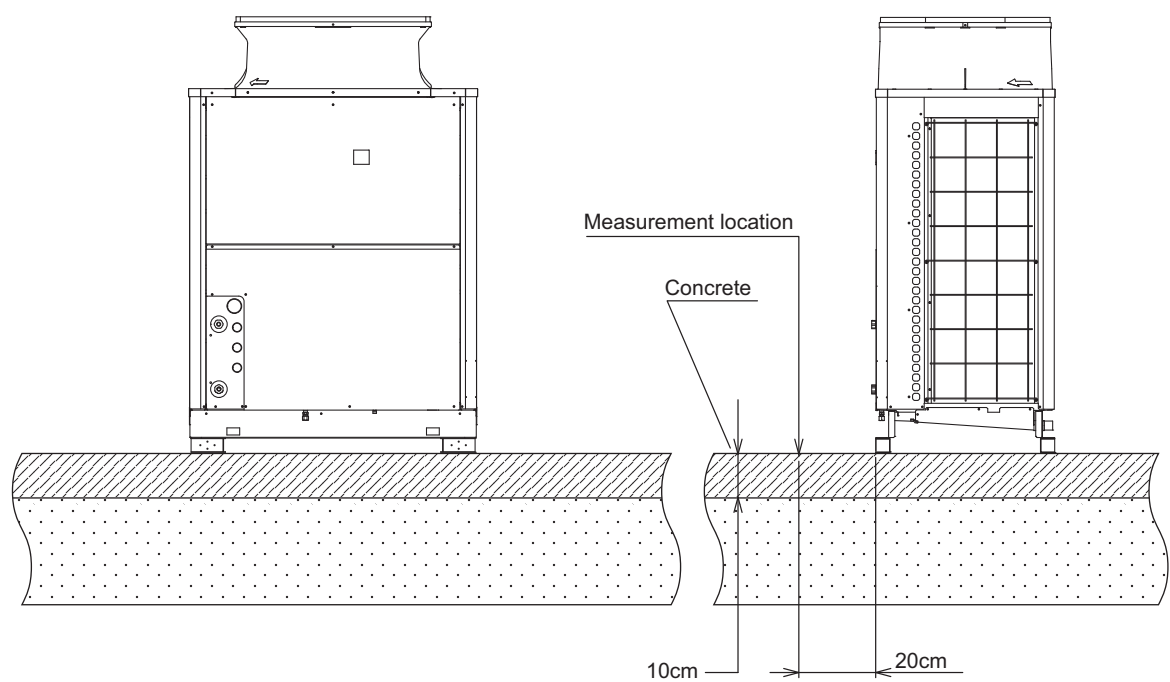
Sound Pressure Level: 56.0 / 58.0 dB (Spring, Autumn/Winter)

Operation condition... Spring, Autumn: Outdoor temp.: 16°CDB/12°CWB, Inlet water temp.: 17°C, Outlet water temp.: 65°C
Winter: Outdoor temp.: 7°CDB/6°CWB, Inlet water temp.: 9°C, Outlet water temp.: 65°C



2. Product Data

2-3. Vibration levels



Model	Vibration Levels [dB]
QAHV-N560YA-HPB(-BS)	47 or less

3. Installation

3-1. Selecting the Installation Site

3-1-1. Installation Conditions

Select the installation site in consultation with the client.

Select a site to install the outdoor unit that meets the following conditions:

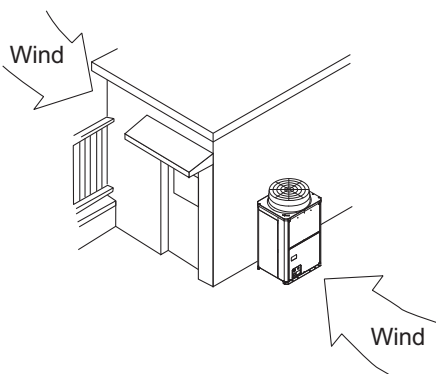
- ♦The unit will not be subject to heat from other heat sources.
- ♦The noise from the unit will not be a problem.
- ♦The unit will not be exposed to strong winds.
- ♦Water from the unit can be drained properly.
- ♦The space requirements as shown in 3-1. Selecting the Installation Site.

1. Protection against winds

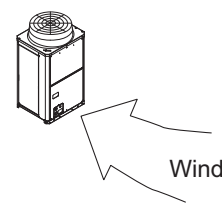
Using the figures at right as a reference, provide adequate protection against winds. A unit installed alone is vulnerable to strong winds.

Select the installation site carefully to minimize the effect of winds.

When installing a unit in a place where the wind always blows from the same direction, install the unit so that the outlet faces away from the direction of the wind.



- Install the outdoor unit in a place where it is not exposed to direct wind, such as behind a building.



- Install the outdoor unit so that the outlet/inlet faces away from the wind.

2. Cold Climate Installation

Observe the following when installing the units in areas where snow or strong winds prevail.

- ♦Avoid direct exposure to rain, winds, and snow.
- ♦Icicles that may form under the foundation can fall and inflict personal injury or property damage. Select the installation site carefully to reduce these risks, especially when installing the unit on a roof.
- ♦If the units are installed in the direct line of rain, winds, or snow, install the optional snow hood (on both the discharge and suction ducts). Use a snow net or snow fence as necessary to protect the unit.
- ♦Install the unit on a base approximately twice as high as the expected snowfall.
- ♦If the unit is continuously operated for a long time with the outside air temperature below the freezing point, install a heater at the base of the unit to prevent the water from freezing at the unit bottom.
- ♦When using the unit in an outdoor temperature of -15°C or below, install a drain pan (with heater whose capacity is 320 W or more) at the bottom surface of the unit.

3. Installation

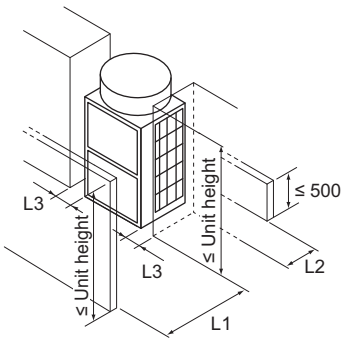
3-1-2. Installation Space Requirements

Provide sufficient space around the unit for effective operation, efficient air movement, and ease of access for maintenance.

1. Single unit installation

(1) When all walls are within their height limits*.

[mm]

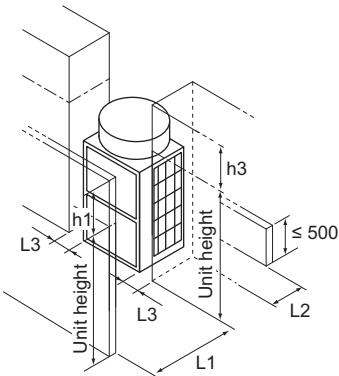


* Height limit	
Front/Right/Left	Same height or lower than the overall height of the unit
Rear	500 mm or lower from the unit bottom

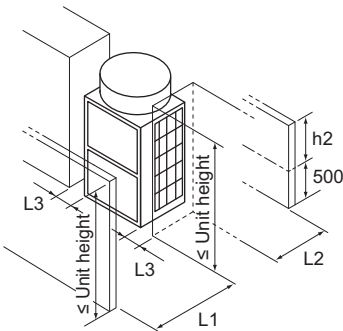
	Required minimum distance [mm]		
	L1 (Front)	L2 (Rear)	L3 (Right/Left)
When the distance behind the unit (L2) needs to be small	500	300	50

(2) When one or more walls exceed their height limits*.

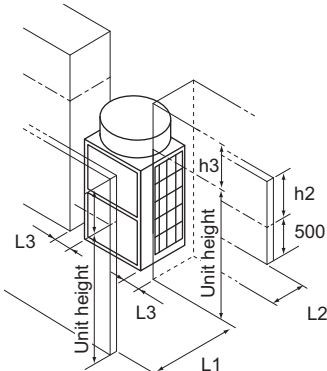
When the wall(s) at the front and/or the right/left exceed(s) their height limits



When the wall at the rear exceeds its height limit



When all walls exceed their height limits



Add the dimension that exceeds the height limit (shown as "h1" through "h3" in the figures) to L1, L2, and L3 as shown in the table below.

	Required minimum distance [mm]		
	L1 (Front)	L2 (Rear)	L3 (Right/Left)
When the distance behind the unit (L2) needs to be small	500 + h1	300 + h2	50 + h3

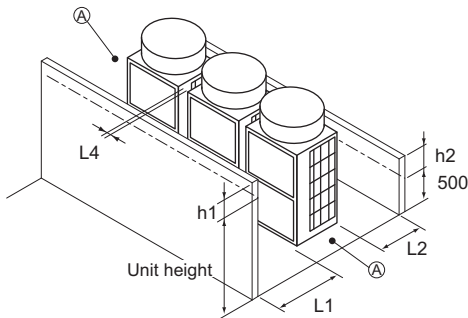
3. Installation

2. Multiple unit installation

When installing multiple units, make sure to take into consideration factors such as providing enough space for people to pass through, ample space between blocks of units, and sufficient space for airflow. (The areas marked with Ⓐ in the figures below must be left open.)

In the same way as with the single unit installation, add the dimension that exceeds the height limit (shown as "h1" through "h3" in the figures) to L1, L2, and L3 as shown in the tables below.

(1) Side-by-side installation



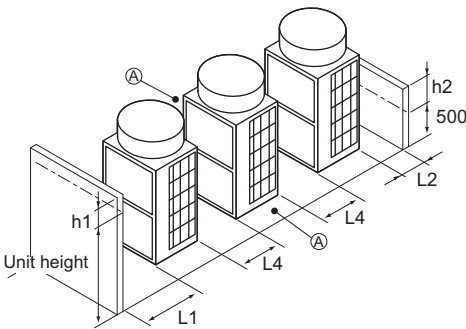
[mm]

Required minimum distance [mm]		
L1 (Front)	L2 (Rear)	L4 (Between)
$500 + h1$	$300 + h2$	100

Ⓐ Leave open in two directions.

(2) Face-to-face installation

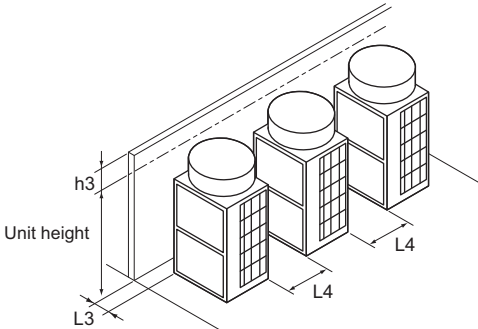
When there are walls in the front and rear of the block of units



Required minimum distance [mm]		
L1 (Front)	L2 (Rear)	L4 (Between)
500	300	500

Ⓐ Leave open in two directions.

When there is a wall on either the right or left side of the block of units

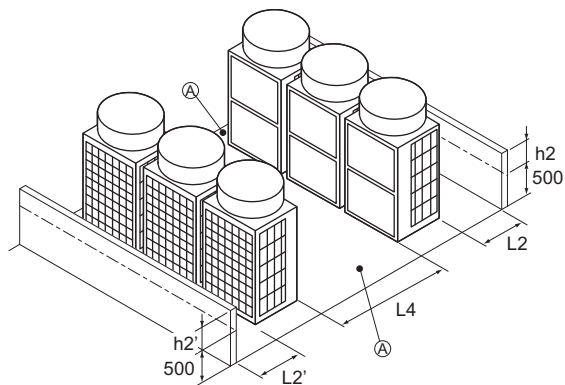


Required minimum distance [mm]	
L3 (Right/Left)	L4 (Between)
$50 + h3$	500

3. Installation

3. Combination of face-to-face and side-by-side installations

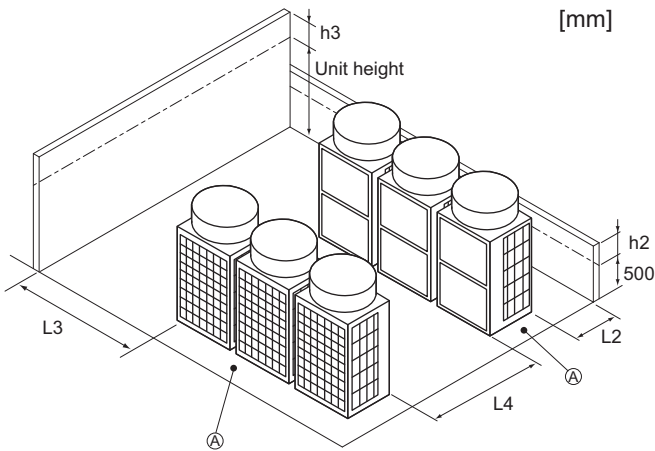
When there are walls in the front and rear of the block of units



Required minimum distance [mm]		
L2 (Right)	L2' (Left)	L4 (Between)
300 + h2	300 + h2'	1000

A Leave open in two directions.

When there are two walls in an L-shape



Required minimum distance [mm]		
L2 (Right)	L3 (Right/Left)	L4 (Between)
300 + h2	1000 + h3	1000

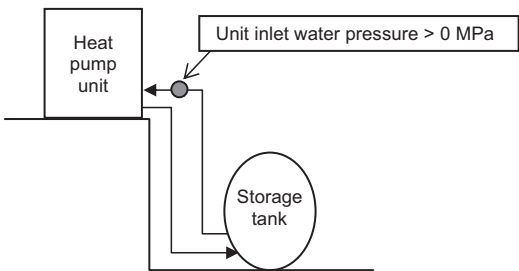
3-1-3. System installation restrictions

•Piping length restrictions

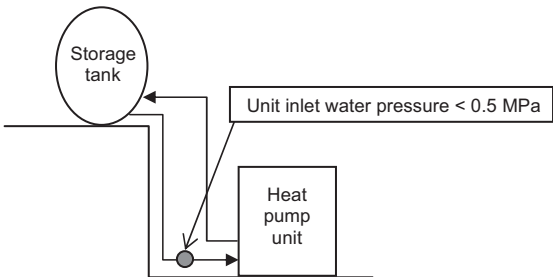
The maximum piping length is 60 m.
Select appropriate diameter pipes to prevent negative pressure from the pumping head and the pressure loss in the pipes.
Pumping head (when maximum flow rate is 17 m/s): 70 kPa

•Installation height restrictions

- When the unit is installed above the storage tank
Decide the height so that the unit inlet water pressure will not be negative for the tank pressure.



- When the unit is installed below the storage tank
Decide the height so that the unit inlet water pressure will be 0.5 MPa or below for the tank pressure.



3. Installation

3-2. Unit Installation

Units should be installed only by personnel certified by Mitsubishi Electric.

- Securely fix the unit with bolts to keep the unit from falling down during earthquakes or due to strong winds.
- Install the unit on a foundation made of concrete or iron.
- Noise and vibrations from the unit may be transmitted through the floor and walls. Provide adequate protection against noise and vibration.
- Build the foundation in such way that the corners of the installation legs are securely supported as shown in the figure below. When using rubber vibration isolators, make sure they are large enough to cover the entire width of the unit's legs. If the corners of the legs are not firmly seated, the legs may bend.
- The projecting length of the anchor bolt should be less than 30 mm.
- This unit is not designed to be installed using hole-in anchor bolts unless brackets are used to support the four corners of the unit.
- The legs on the unit are detachable.
- Detaching the legs

Loosen the three screws on the legs to detach each leg (two each in the front and back). If the finish coat becomes damaged when detaching the legs, be sure to touch it up.

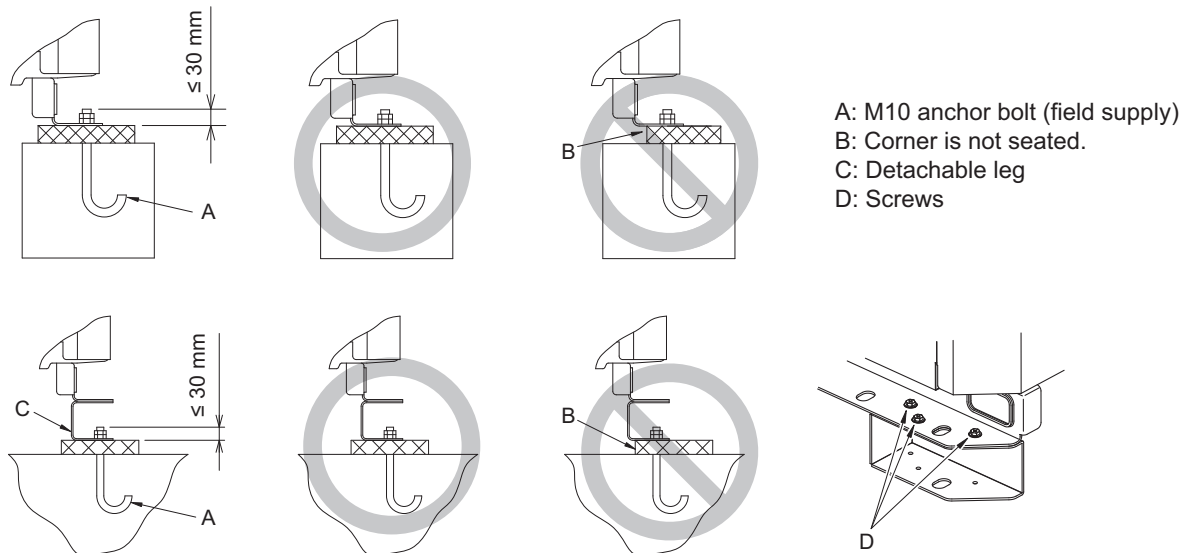
⚠ WARNING

- Be sure to install the unit on a surface strong enough to withstand its weight to keep the unit from falling down and causing injury.
- Provide adequate protection against strong winds and earthquakes. Improper installation may cause the unit to fall down, resulting in personal injury.

When building the foundation, take the floor strength, water drainage during operation, and piping and wiring routes into consideration.

Precautions for routing the pipes and wires underneath the unit without detachable legs

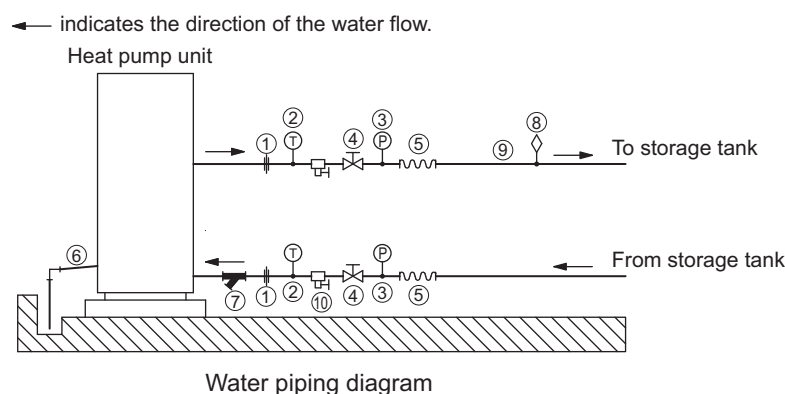
When routing the pipes and wires underneath the unit, make sure that the foundation will not block the piping access holes. Also, make sure the foundation is at least 100 mm high so that the piping can pass under the unit.



4. System Design

4-1. Water Pipe Installation

4-1-1. Schematic Piping Diagram and Piping System Components

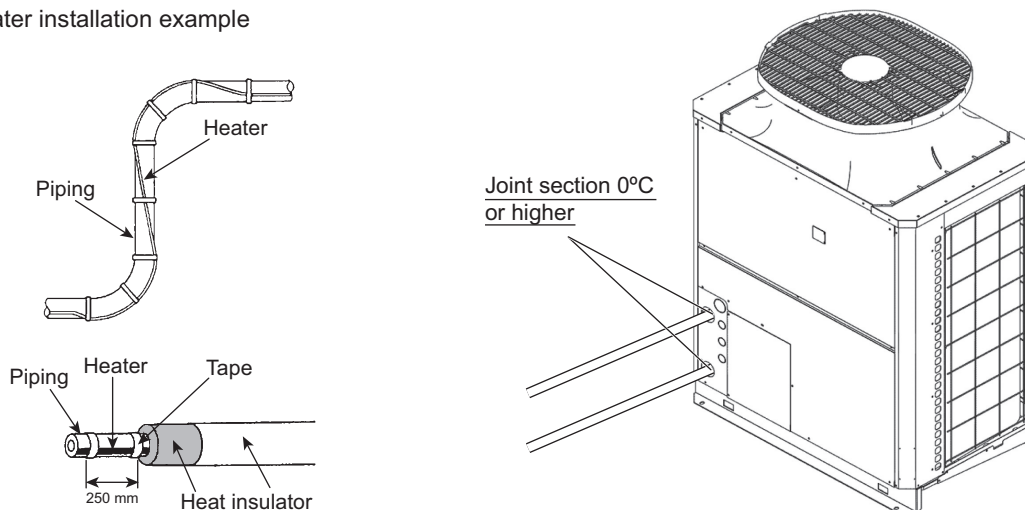


①	Union joints/flange joints	Required to allow for a replacement of equipment.
②	Thermometer	Required to check the performance and monitor the operation of the units.
③	Water pressure gauge	Recommended for checking the operation status.
④	Valve	Required to allow for a replacement or cleaning of the flow adjuster.
⑤	Flexible joint	Recommended to prevent the noise and vibration from the pump from being transmitted.
⑥	Drain pipe	Install the drain pipe with a downward inclination of between 1/100 and 1/200. To prevent drain water from freezing in winter, install the drain pipe as steep an angle as practically possible and minimize the straight line. For cold climate installation, take an appropriate measure (e.g., drain heater) to prevent the drain water from freezing.
⑦	Strainer	Install a strainer near the unit to keep foreign materials from entering the water-side head exchanger (supplied).
⑧	Air vent valve	Install air venting valves to the places where air can accumulate. Automatic air vent valves are effective.
⑨	Water pipe	Use pipes that allow for easy air purging, and provide adequate insulation.
⑩	Drain valve	Install drain valves so that water can be drained for servicing.

* Installing a freezing prevention heater

- (1) In cold areas (where the outside temperature drops below freezing), provide a freezing prevention heater at all local pipes to prevent spontaneous freezing.
- (2) After the heater is installed, check outside temperature +25°C is ensured at the EcoCute inlet/outlet pipe joint section (at outside temperature -25°C, joint section 0°C or higher).
- (3) Depending on the local piping material, prevent overheating by selecting a self temperature adjustment type heater or other method.

Heater installation example

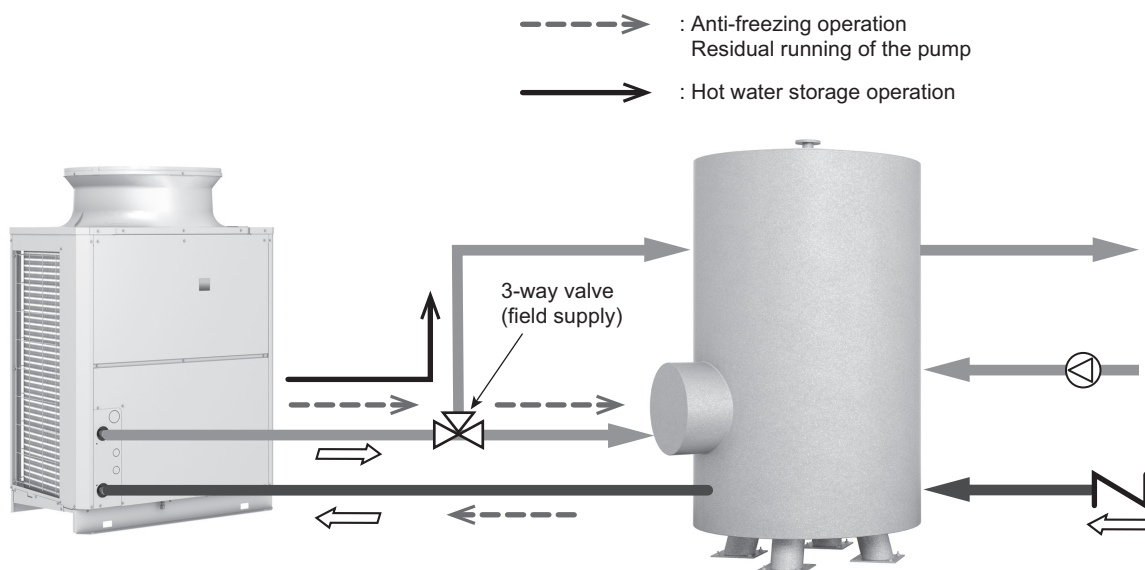


4. System Design

* 3-way valve installation

Please connect 3-way valve on the lower part of the storage tank except when the unit is in operation.

Anti-freezing operation will keep the water in the tank circulated and water storage tanks can become thermally stratified.



4. System Design

4-1-2. Notes on pipe Corrosion

Water treatment and water quality control

Poor-quality circulating water can cause the water-side heat exchanger to scale up or corrode, reducing heat exchange performance. Properly control the quality of the circulating water.

- Removing foreign objects and impurities in the pipes

During installation, keep foreign objects, such as welding and sealant fragments and rust, out of the pipes.

- Water Quality Control

- (1) Poor-quality water can corrode or scale up the heat exchanger. Regular water treatment is recommended.

Water circulation systems using open heat storage tanks are particularly prone to corrosion.

When using an open heat storage tank, install a water-to-water heat exchanger, and use a closed-loop circuit on the air-conditioner side. If a water supply tank is installed, keep contact with air to a minimum, and keep the level of dissolved oxygen in the water no higher than 1 mg/l.

- (2) Water quality standard

Items		Higher mid-range temperature water system Water Temp. > 60°C	Tendency	
		Recirculating water	Corrosive	Scale-forming
Standard items	pH (25°C)	6.5 ~ 8.0	O	O
	Electric conductivity (mS/m) (25°C)	30 or less	O	O
	(μS/cm) (25°C)	[300 or less]		
	Chloride ion (mg Cl ⁻ /l)	30 or less	O	
	Sulfate ion (mg SO ₄ ²⁻ /l)	30 or less	O	
	Acid consumption (pH4.8) (mg CaCO ₃ /l)	50 or less		O
	Calcium hardness (mg CaCO ₃ /l)	6.5 ≤ pH ≤ 7.5: 90 or less 7.5 ≤ pH ≤ 8.0: 50 or less		O
Reference items	Ionic silica (mg SiO ₂ /l)	30 or less		O
	Iron (mg Fe/l)	0.3 or less	O	O
	Copper (mg Cu/l)	0.1 or less	O	
	Sulfide ion (mg S ²⁻ /l)	Not to be detected	O	
	Ammonium ion (mg NH ₄ ⁺ /l)	0.1 or less	O	
	Residual chlorine (mg Cl/l)	0.1 or less	O	
	Free carbon dioxide (mg CO ₂ /l)	10.0 or less	O	

Reference: Guideline of Water Quality for Refrigeration and Air Conditioning Equipment. (JRA GL02E-1994)

- (3) Please consult with a water quality control specialist about water quality control methods and water quality calculations before using anti-corrosive solutions for water quality management.

- (4) When replacing an air conditioner (including when only the heat exchanger is replaced), first analyze the water quality and check for possible corrosion.

Corrosion can occur in water systems in which there has been no signs of corrosion. If the water quality level has dropped, adjust the water quality before replacing the unit.

- (5) Suspended solids in the water

Sand, pebbles, suspended solids, and corrosion products in water can damage the heating surface of the heat exchanger and cause corrosion. Install a good quality strainer (60 mesh or better) at the inlet of the unit to filter out suspended solids.

- (6) Connecting pipes made from different materials

If different types of metals are placed in direct contact with each other, the contact surface will corrode.

Install an insulating material between pipes that are made of different materials to keep them out of direct contact with each other.

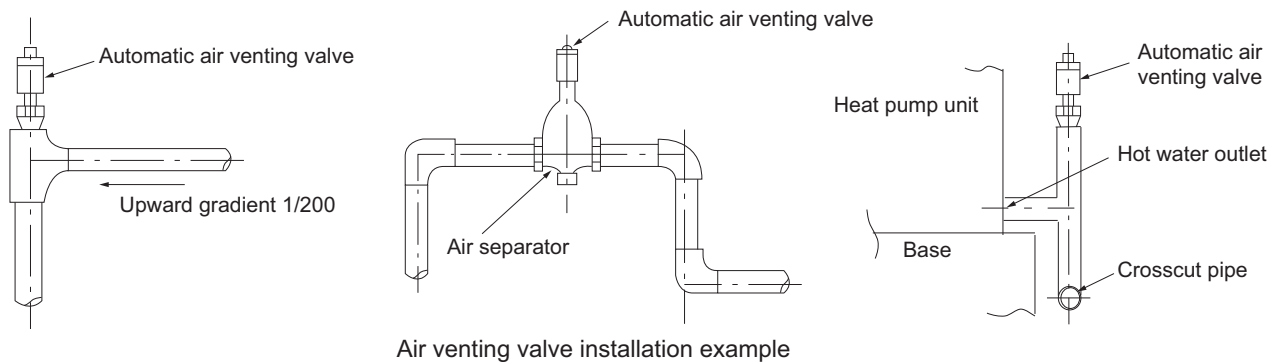
4. System Design

4-1-3. Pipe gradient and air venting valve (Outlet hot water pipe)

During the hot water storage operation, the air dissolved in the water is discharged in the form of bubbling from the outlet hot water pipe to quickly raise low-temperature water to the required temperature. When the air accumulates in the pipe, the resistance of the water circuit will increase and the flow rate will extremely decrease. Because of this, an installation of automatic air venting valves is required when there is a pipe that slopes down in the outlet hot water pipe. Install the pipe with an upward gradient of 1/200 or more toward the air vent to prevent air accumulation in the pipe. Also, install air venting valves to the places where air can accumulate. The installation example is shown below.

Note

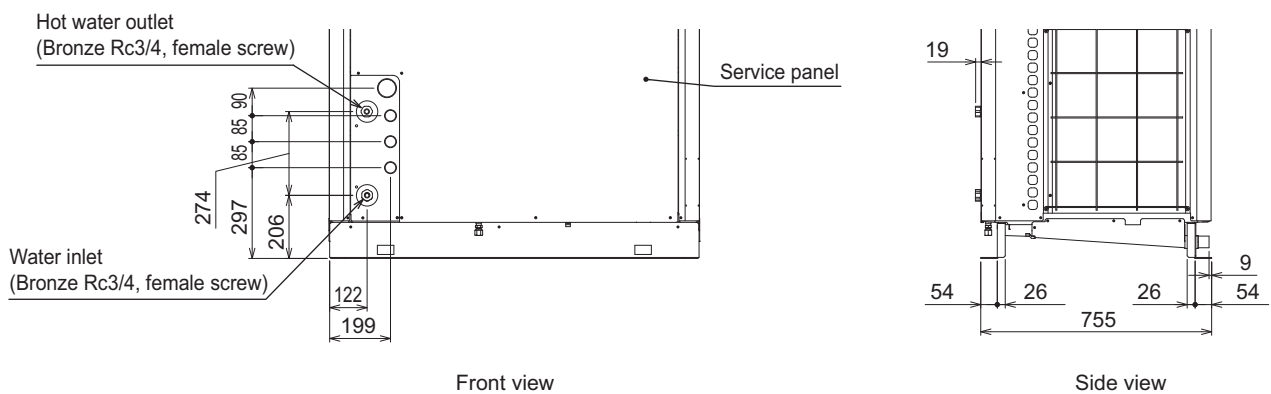
- If the crosscut pipe is located lower than the hot water outlet of the heat pump unit, raise the pipe near the unit and install an automatic air venting valve.



4-1-4. Outlet check valve (When installing multiple units)

When connecting multiple units with pipes in parallel, install a check valve at the outlet pipe of each unit. If a check valve is not installed, a circuit in which warm water flows back will be created in some units during the defrost cycle or abnormal stop, and other units will come to an abnormal stop due to sudden change of the inlet water temperature.

4-1-5. Water Pipe Hole Size and Location



5. Wiring Design

5-1. System Configurations

1. Types of control cables

Control cable wiring	Remote controller cable	Size	0.3 - 1.25 mm ² (Max. 200 m total) *2
		Recommended cable types	CVV
	M-NET cable between units *1	Size	More than 1.25 mm ² (Max. 120 m total)
		Recommended cable types	Shielding wire CVVS, CPEVS or MVVS
	External input wire size		Min. 0.3 mm ²
	External output wire size		1.25 mm ²

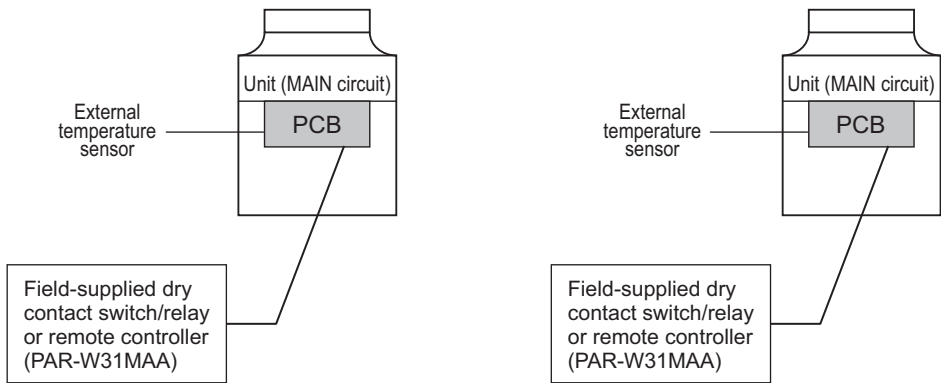
*1. Use a CVVS or CPEVS cable (Max. total length of 200 m) if there is a source of electrical interference near by (e.g., factory) or the total length of control wiring exceeds 120 m.

*2. When the wiring length exceeds 10 m, use wire of 1.25 mm².

2. System Configuration

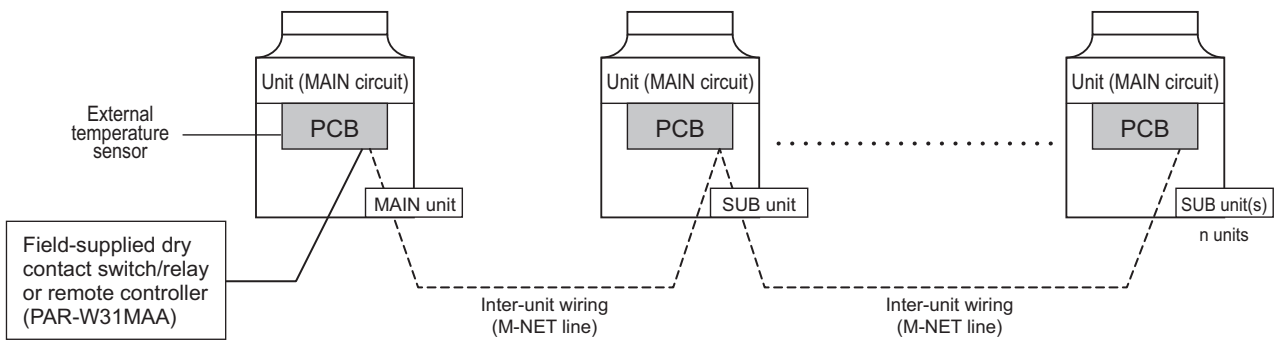
(1) Individual system

* Each unit is operated individually by connecting a dry contact switch/relay to each unit.



(2) Multiple system (2-16 units)

* A group of unit that consists of one main unit and up to 15 sub units is operated collectively by connecting an external water temperature sensor and a dry contact switch/relay to the main unit.



5. Wiring Design

5-2. Electrical Wiring Installation

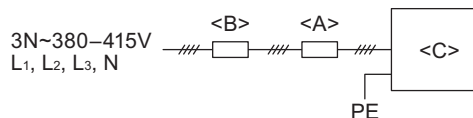
5-2-1. Main Power Supply Wiring and Switch Capacity

Schematic Drawing of Wiring (Example)

<A> Switch (with current breaking capability)

 Current leakage breaker

<C> Outdoor unit



Main power supply wire size, switch capacities, and system impedance

Model	Minimum wire thickness (mm ²)			Current leakage breaker	Local switch (A)		No-fuse breaker (A)	Max. Permissible System Impedance
	Main cable	Branch	Ground		Capacity	Fuse		
QAHV-N560YA-HPB	10	-	10	63 A 100 mA 0.1 sec. or less	63	63	63	0.21 Ω

- 1) Use a dedicated power supply for each unit. Ensure that each unit is wired individually.
- 2) When installing wiring, consider ambient conditions (e.g., temperature, sunlight, rain).
- 3) The wire size is the minimum value for metal conduit wiring. If voltage drop is a problem, use a wire that is one size thicker. Make sure the power-supply voltage does not drop more than 10%.
- 4) Specific wiring requirements should adhere to the wiring regulations of the region.
- 5) Power supply cords of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57).
- 6) A switch with at least 3 mm contact separation in each pole shall be provided by the Air Conditioner installer.
- 7) Do not install a phase advancing capacitor on the motor. Doing so may damage the capacitor and result in fire.

⚠ WARNING

- ♦ Be sure to use specified wires and ensure no external force is imparted to terminal connections. Loose connections may cause overheating and fire.
- ♦ Be sure to use the appropriate type of overcurrent protection switch. Note that overcurrent may include direct current.

⚠ CAUTION

- ♦ Some installation sites may require an installation of an earth leakage breaker for the inverter. If no earth leakage breaker is installed, there is a danger of electric shock.
- ♦ Only use properly rated breakers and fuses. Using a fuse or wire of the wrong capacity may cause malfunction or fire.

Note

- ♦ This device is intended for the connection to a power supply system with a maximum permissible system impedance shown in the above table at the interface point (power service box) of the user's supply.
- ♦ Ensure that this device is connected only to a power supply system that fulfills the requirements above. If necessary, consult the public power supply company for the system impedance at the interface point.
- ♦ This equipment complies with IEC 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equal to $S_{sc} (*2)$ at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, in consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to $S_{sc} (*2)$.

$S_{sc}(*2)$

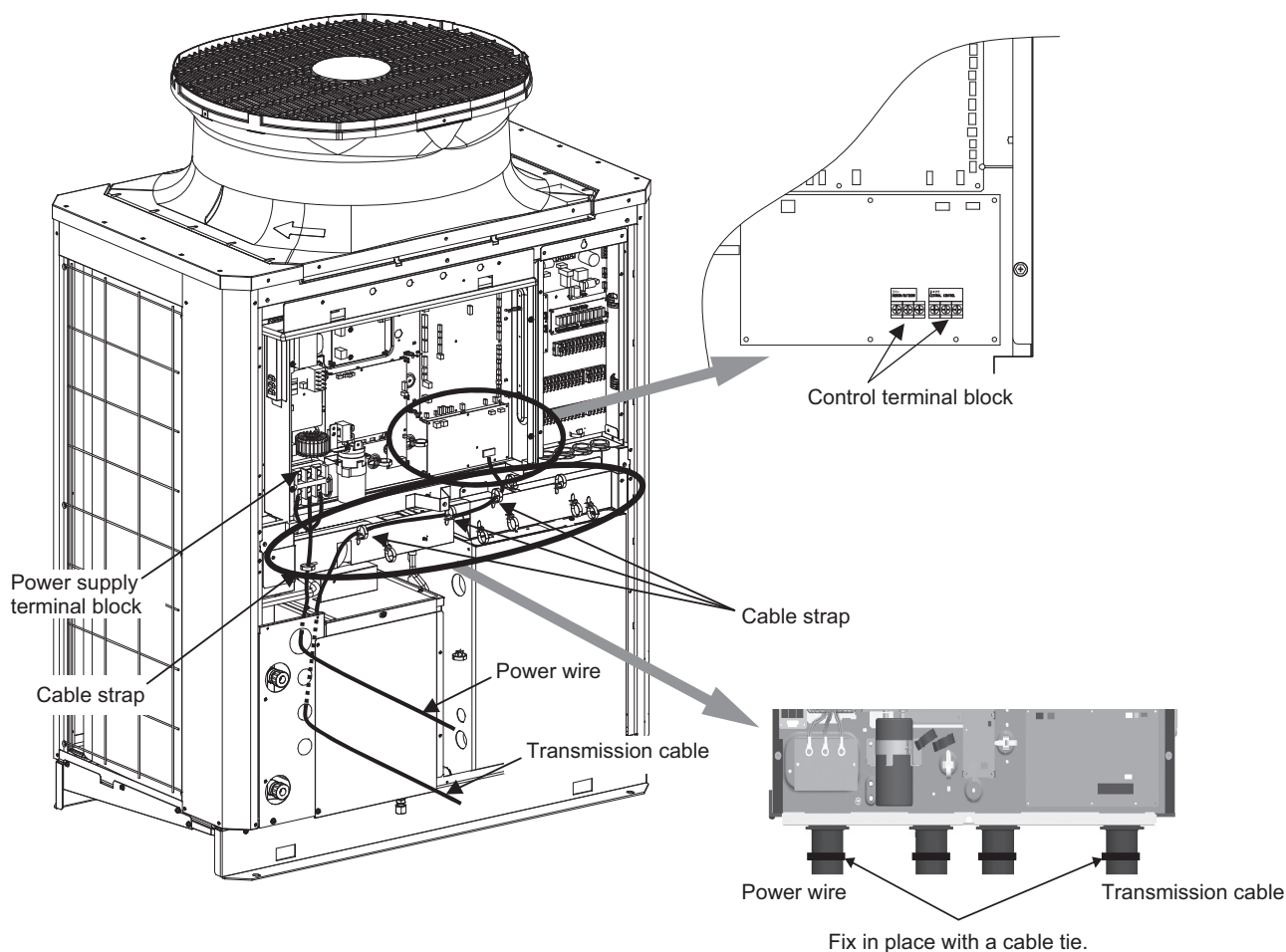
S_{sc} (MVA)
2.62 Ω

5. Wiring Design

5-2-2. Cable Connections

1. Schematic Diagram of a Unit and Terminal Block Arrangement

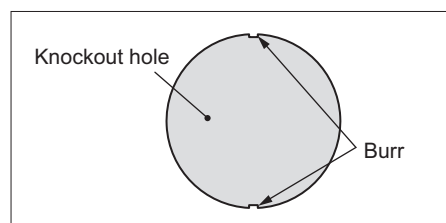
To remove the front panel of the control box, unscrew the four screws and pull the panel forward and then down.



Important: Power supply cables larger than 25 mm² in diameter are not connectable to the power supply terminal block (TB2). Use a pull box to connect them.

2. Installing the conduit tube

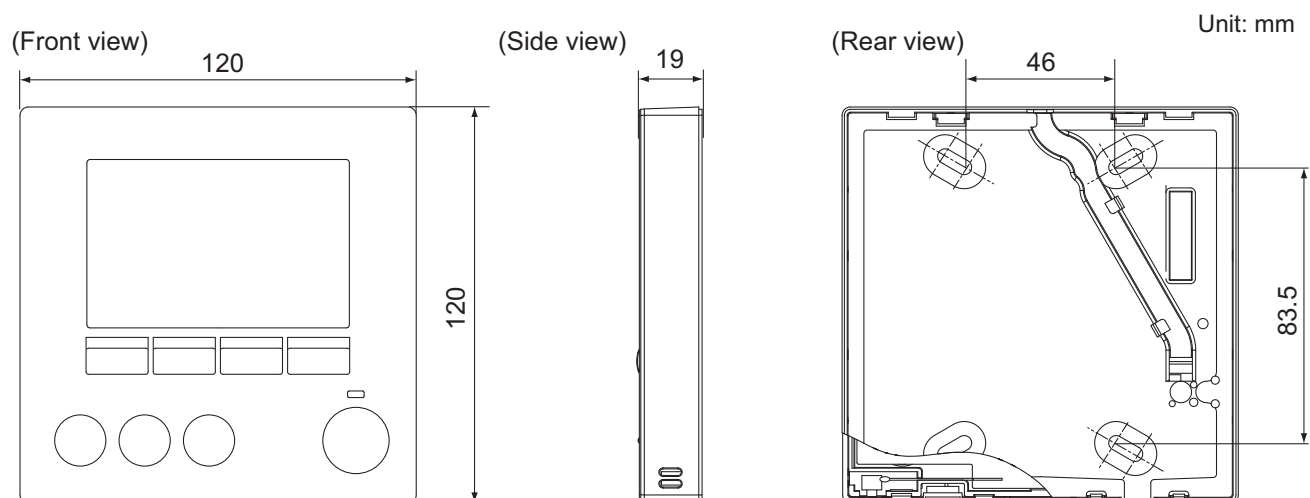
- Punch out the knockout hole for wire routing at the bottom of the front panel with a hammer.
- When putting wires through knockout holes without protecting them with a conduit tube, deburr the holes and protect the wires with protective tape.
- If damage from animals is a concern, use a conduit tube to narrow the opening.



6. Controller

6-1. PAR-W31MAA specifications

Item	Description	Operations	Display
ON/OFF	Runs and stops the operation of a group of units	○	○
Operation mode switching	Switches between Mode 1/Mode 2/Mode 3 * Available operation modes vary depending on the unit to be connected. * Switching limit setting can be made via a remote controller.	○	○
Water temperature setting	Temperature can be set within the ranges below. (in increments of 0.5°C or 0.5°F) 40°C ~ 90°C * The settable range varies depending on the unit to be connected.	○	○
Water temperature display	10°C ~ 90°C (in increments of 0.5°C or 0.5°F) * The settable range varies depending on the unit to be connected.	×	○
Permit/Prohibit local operation	Individually prohibits operations of each local remote control function: ON/OFF, Operation modes, water temperature setting, Circulating water replacement warning reset. * Upper level controller may not be connected depending on the unit to be connected.	×	○
Weekly scheduler	ON/OFF/Water temperature setting can be done up to 8 times one day in the week. (in increments of a minute)	○	○
Error	When an error is currently occurring on a unit, the afflicted unit and the error code are displayed.	×	○
Self check (Error history)	Searches the latest error history by selecting "CHECK" from the Main menu.	○	○
LANGUAGE setting	The language on the dot matrix LCD can be changed. (11 languages) English/French/German/Swedish/Spanish/Italian/Danish/Dutch/Finnish /Norwegian/Portuguese	○	○





for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

⚠ Warning

- Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.
 - Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
 - It may also be in violation of applicable laws.
 - MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.

mitsubishi electric corporation

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