Panasonic

INSTALLATION INSTRUCTIONS

Air Handling Unit control kit

Model No.
CZ-560MAH1
CZ-280MAH1

Caution	Only Indoor Installation

Carefully reading this "INSTALLATION INSTRUCTIONS", correctly and safely conducting installation or electrical work.
Especially, before conducting installation or electrical work, be sure to read " Safety Precautions" (page3) .

Contents

Warranty policy
We are held responsible for the quality and performance of the AHU kit we supply, but not held responsible for the performances, operations and machine controls of your complete AHU system which incorporates our AHU kit. We are not held responsible for the components used in the refrigerant cycle of your AHU system either. Such components are, but not limited to, Compressors, High-pressure switches, Check valves, Strainers, Oil separators, Expansion valves, Solenoid valves, 4-way valves, High/Low pressure sensors, Capillary tubes, Receiver tanks, Accumulator tanks, Heat exchanger tubes. We are not held responsible for any damages and defects caused in the process of installing our AHU kit, by the system design and/or during assembly of your AHU system. We do not publish the certificate to show conformity to the EMC and the product safety requirements applicable to your complete AHU system.

1. Safety Precautions

- Before conducting installation or electrical work, be sure to carefully read these" Safety Precautions". Follow instructions exactly in all installation or electrical work.
- The following symbols used in this manual, alert you to potentially dangerous conditions to users, service personnel or the appliance:

⚠ Warning	This warning mark indicates that "A possibility of serious injury or death exists".	⚠ Caution	This cautionary mark indicates that "A possibility of injury or damage to property exists".

⚠ Warning

- Be sure to arrange installation at the dealer where the system was purchased or use a professional installer. Leaks, electric shock or fire may result if an inexperienced person performs any installation or wiring procedures incorrectly.
- Installation should be performed exactly according to the "Installation Instructions". Electric shock or fire may result if an inexperienced person performs any installation or wiring procedures incorrectly.
- Only a qualified electrician should attempt to install this system, in accordance with the provisions of "Installation Instructions".
  Be sure to use a dedicated electrical circuit. Insufficient electrical circuit capacity or inadequate workmanship may cause electric shock or fire.
- Always use a dedicated branch circuit for electrical wiring. Do not use with any other electric devices. Use with other electric devices may result in circuit breaker breaks.
- Use the specified cables (type and wiring diameter) for the electrical connections, and securely connect the cables. Run and fasten the cables securely so that external forces or pressure placed on the cables will not be transmitted to the connection terminals. Overheating or fire may result if connections or attachments are not secure.
- Install so that even if cooling gas leaks into the room, it will not exceed the limit density of 0.3kg/m3, accordance with the standard for facility air conditioning equipment (S0010). If it does exceed the limit density, install an opening in a neighboring room, or install ventilation equipment triggered by gas leak detection sensors. Suffocation can result if cooling gas leaks and exceeds the limit density in a small room.
- Install in a location that is fully strong enough to support the weight of the equipment. If it is not strong enough, the equipment may fall, resulting in injury.
- Perform installation that is secure enough to withstand earthquakes, and typhoons and other strong winds. Incorrect installation can result in falling equipment and other accidents.
- Ventilate the work area if cooling gas leaks during installation. Poisonous gas can result if cooling gas comes into contact with fire.
- After installation of cooling pipes, perform a nitrogen gas sealing test to check that there are no leaks. Poisonous gas can result if cooling gas leaks into the room and comes into contact with a fan heater, stove, range, or other source of fire.

⚠ Caution

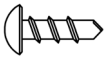
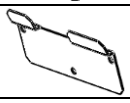
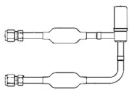
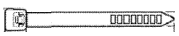
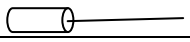
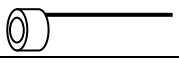
- When handling cooling gas, be careful not to touch the cooling gas directly. Frostbite injuries can occur.
- Do not install the system in locations where flammable gas can be generated, enters, build up, or leak. Do not install in locations where volatile inflammable materials are handled. Flammable gas or inflammable materials may ignite, cause fires.
- Be sure to ground equipment properly. Do not attach ground wires to gas pipes, water pipes, lightning arresters, or telephone ground lines. Failure to ground completely can cause electric shock.
- Always install an earth leakage breaker. Failure to install an earth leakage breaker can cause shock and fires.

2. System Lineup

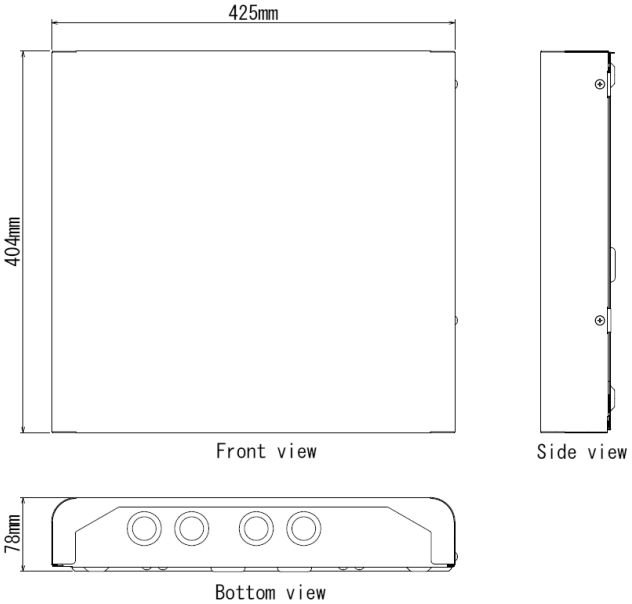
Capacity	Outdoor combination			Connectable AHU-kit combination		
28kW	U-10ME1E81	−	−	CZ-280MAH1	−	−
56kW	U-20ME1E81	−	−	CZ-560MAH1	−	−
84kW	U-16ME1E81	U-14ME1E81	−	CZ-560MAH1	CZ-280MAH1	−
112kW	U-20ME1E81	U-20ME1E81	−	CZ-560MAH1	CZ-560MAH1	−
140kW	U-18ME1E81	U-16ME1E81	U-16ME1E81	CZ-560MAH1	CZ-560MAH1	CZ-280MAH1
168kW	U-20ME1E81	U-20ME1E81	U-20ME1E81	CZ-560MAH1	CZ-560MAH1	CZ-560MAH1

*Mix connection with standard indoor units is not allowed.
*Applicable system is only above. (2way ECO-i system, ME1E81 series)

3. Supplied Parts

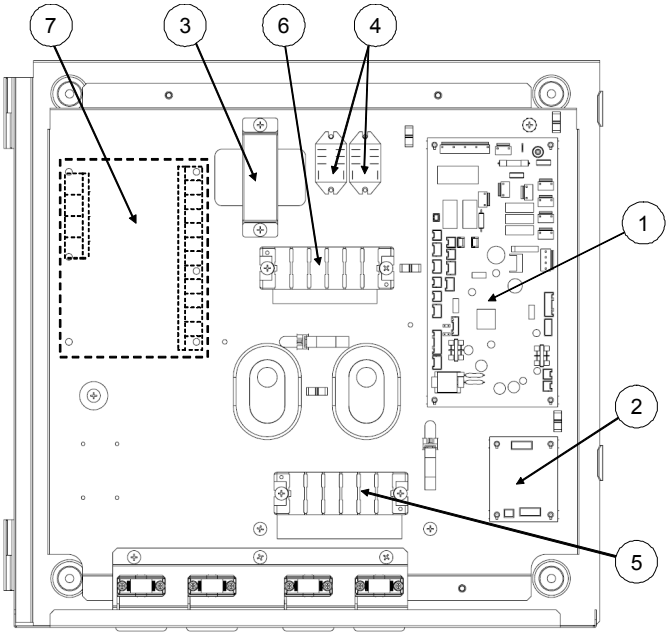
Part name	Form	Quantity	Notes
Self Drilling Screw (4x13)		7	For fixing the product. (Kit and its bracket)
Screw(4x8)		2	For attaching remote controller. (option parts)
Bracket		1	For supporting the product. At the time of shipment, be glued to the back of the product.
Installation Instructions		1	
AHU System Check List		1	For selection of AHU and operating test run.
Expansion valve		1	
Insulation		2	For thermistor insulation.
Clamper		5	For fixing thermistor, and making wire down to Blower signal line.
Thermistor		4	Attached to the body of AHU kit.
Magnetic coil for Expansion valve		1	Attached to the body of AHU kit.

4. Outside View



Weight of the control box : 6.3kg

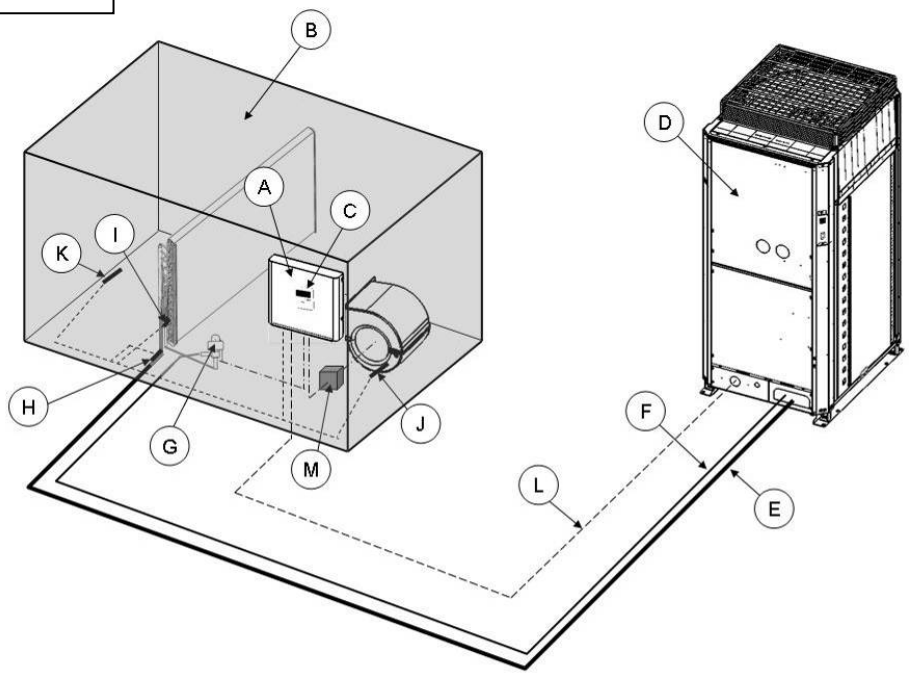
5. Control Box Configuration



① PCB(main)
② PCB(coil)
③ Transformer
④ Magnetic relay
⑤ Terminal(power supply, control line)
⑥ Terminal(Blower signal line)
⑦ Space for Optional controller installation
(for Mini Seri-Para I/O unit <CZ-CAPBC2>)

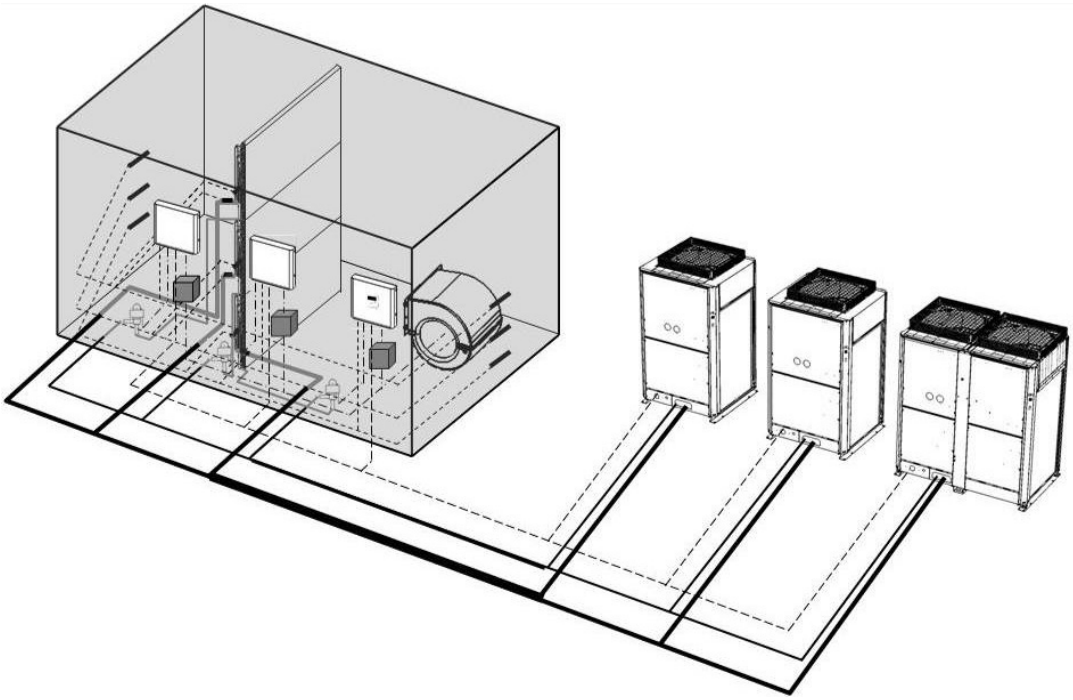
6. System Overview

Single connection



A:AHU kit controller box (with control PCB)
B:AHU equipment (Field supplied)
C:Remote controller (option parts)
D:Outdoor unit
E:Gas piping (Field supplied)
F:Liquid piping (Field supplied)
G:Electronic expansion valve
H:Thermistor for Gas pipe (E3)
I:Thermistor for Liquid pipe (E1)
J:Thermistor for Suction air (TA)
K:Thermistor for Discharge air (BL)
L:Inter unit wiring
M:Magnetic relay for operating the blower (Field supplied)

Multi connection



*All heat exchanger of AHU which are installed in the same refrigerant system have to be in the same chassis equipped with one fan motor.
*Each heat exchanger require AHU kit one by one, and regarding the fan motor operation, wirings have to connect to all AHU kit. Magnetic relay is required one by one to each AHU kit.
*All AHU kit shall be connected and controlled by group control wiring of remote controller.

7. Limitations of AHU

7.1. Temperature range

The limitation of temperature range is below.

		Cooling	Heating
Outdoor temperature	Minimum	-10℃(DB)	-20℃(WB)
	Maximum	43℃(DB)	15℃(WB)
Inter air temperature (to the heat exchanger)	Minimum	18℃(DB)	16℃(DB)
	Maximum	32℃(DB)/23℃(WB)	30℃(DB)

7.2. Inside volume of heat exchanger

Capacity(Cooling)		kW	28.0	56.0	84.0	112.0	140.0	168.0
Heat exchanger volume	Maximum	dm^3	5.4	10.7	16.1	21.4	26.8	32.1
	Minimum	dm^3	2.8	5.6	8.4	11.2	14.0	16.8

7.3. Air volume of AHU

Capacity(Cooling)		kW	28.0	56.0	84.0	112.0	140.0	168.0
Air volume	Maximum	m^3/h	5000	10000	15000	20000	25000	30000
	Minimum	m^3/h	3500	7000	10500	14000	17500	21000

But in addition, system requires other complex limitation like pressure loss, sufficient pressure of refrigerant, etc. An appropriate AHU can be easily selected by using software named "AHU for VRF.exe".

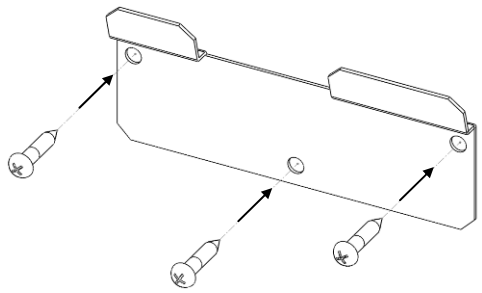
8. Installation

8.1. AHU kit Installation

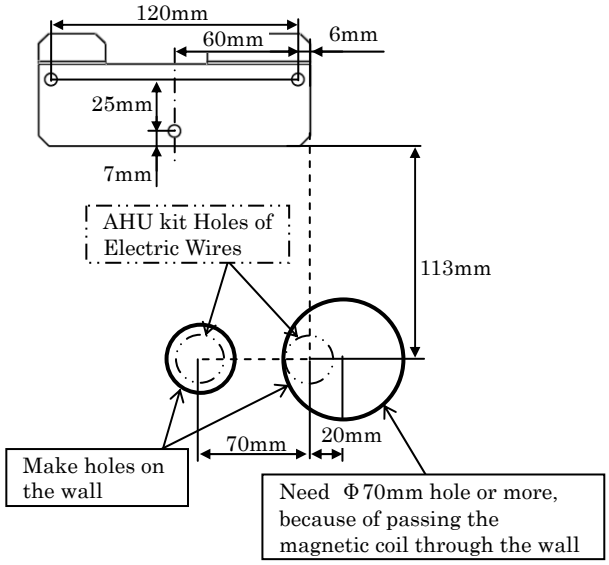
Mount AHU kit according to following instructions.

* Attach AHU kit to Air Handling Unit directly to avoid exposing wires of thermistors and electronic expansion valve to outside.

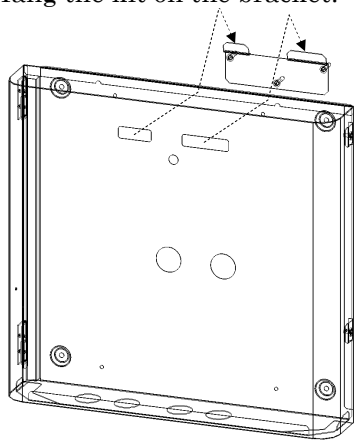
1. Install the bracket to the wall with the screws.(Three screws)



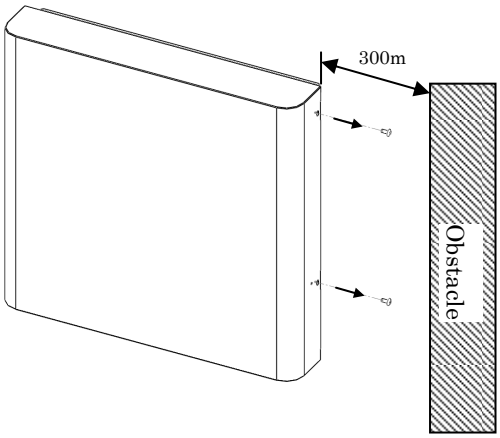
2. Make two holes (for wiring).



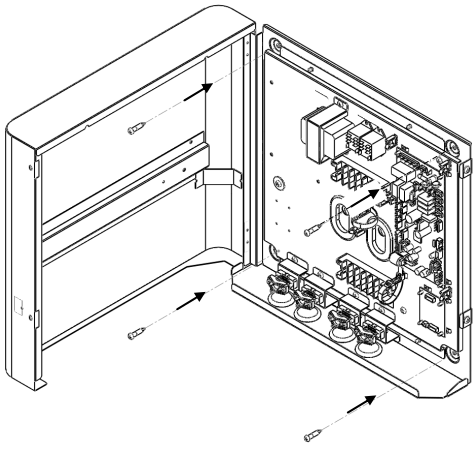
3. Hang the kit on the bracket.



4. Remove the two screws on the right side of the unit. (Support the unit with your free hand while removing the screws.)



5. Open the front panel and fix the unit to the wall with the screws.(4 screws)



8.2. Piping Installation

8.2.1. Dimension of connecting pipe to heat exchanger of AHU

Capacity	Model name	Liquid pipe	Gas pipe
28kW	CZ-280MAH1	Φ9.52mm	Φ22.22mm
56kW	CZ-560MAH1	Φ15.88mm	Φ28.58mm

8.2.2. Main piping diameter

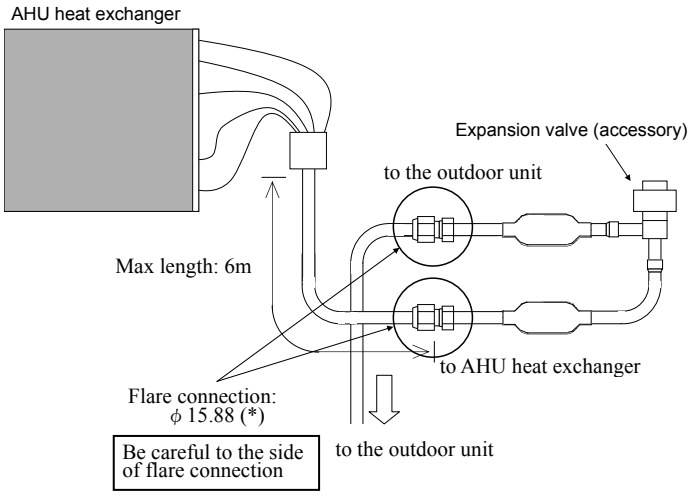
System size	Liquid pipe	Gas pipe
28kW	Φ9.52mm	Φ22.22mm
56kW	Φ15.88mm	Φ28.58mm
84kW	Φ19.05mm	Φ31.75mm
112kW	Φ19.05mm	Φ38.10mm
140kW	Φ19.05mm	Φ38.10mm
168kW	Φ19.05mm	Φ38.10mm

8.2.3. System piping length

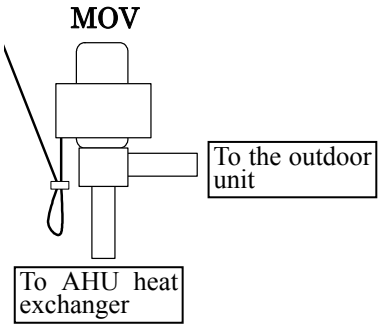
Max. piping length: 100m (actual) / 120m (equivalent)
Difference between longest and shortest piping from first branch: 10m
Max. length of branch tubing: 12m
* Other conditions to be referred the standard piping design regulations.

8.3. Expansion Valve Installation

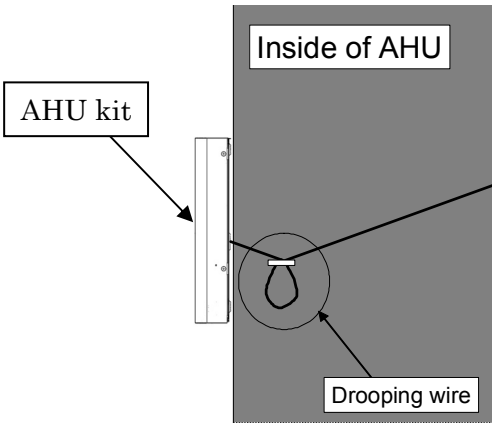
If there are multiple heat exchanges in one system, each heat exchanger requires the same expansion valve. Inclination of Expansion valve must be less than ±15° of vertical. The distance from AHU heat exchanger should be a maximum of 6m.
* Don't put wires out of equipments.
* Don't cut wires and don't detach connecter of wires.



* For 10HP system, piping size to outdoor unit is ϕ 9.52.
Reduce the piping size in field.



Inclination of Expansion valve must be less than ±15° of vertical.



Insert coil wire drooped in the AHU body.
Drooping wire is close to AHU kit.

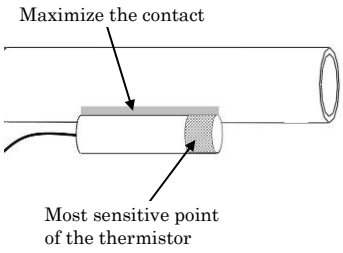
8.4. Thermistor Installation

If there are multiple heat exchanges in one system, each heat exchanger reqires the thermistor. Identify the thermistors by the tag which is wound to each thermistor.

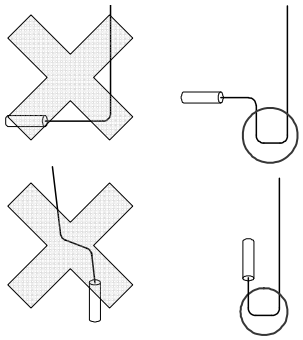
* Don't put wires out of equipment.
* Don't cut wires and don't detach connecter of wires.

8.4.1. Caution for Thermistor Installation

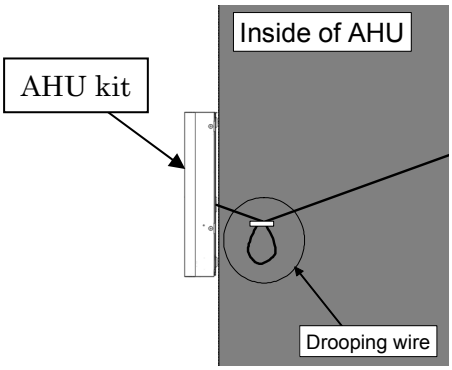
Attach the head of thermistor exactly onto the pipe because the head is most sensitive point of the thermistor.



Put the thermistor wire down to avoid water to the thermistor.



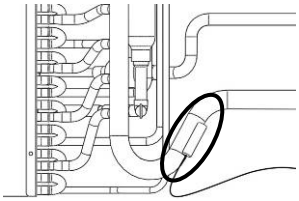
Insert thermistor wire down into AHU body.
The wire down is close to AHU kit.



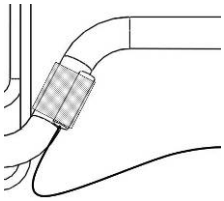
8.4.2. Thermistor Installation for Gas Pipe

Put "E3" thermistor to gas pipe of AHU heat exchanger according to the steps below.

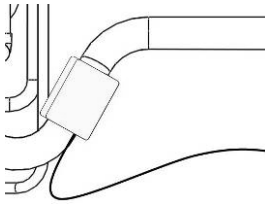
1. Attach the gas thermistor onto the collecting gas pipe in the heat exchanger.



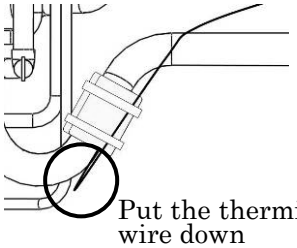
2. Cover the thermistor and pipe with aluminum tape.



3. Cover the aluminum tape with thermal insulation.



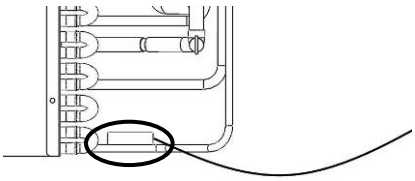
4. Thermal insulation and wiring are fixed by two bands. Then, it must not make tension to the wire.



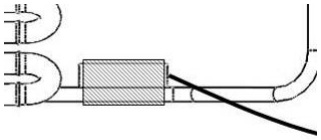
8.4.3. Thermistor Installation for Liquid Pipe

Put "E1" thermistor to liquid pipe of AHU heat exchanger according to the steps below.

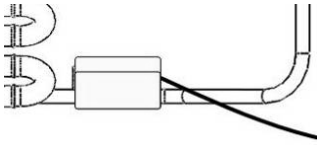
1. Attach the liquid thermistor to the liquid pipe located in the lowest position after distributer in heat exchanger.



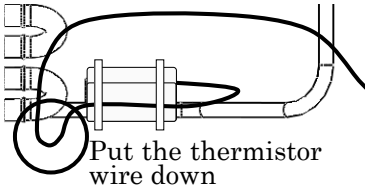
2. Cover the thermistor and pipe with aluminum tape.



3. Cover the aluminum tape with thermal insulation.



4. Thermal insulation and wiring are fixed by two bands. Then, it must not make tension to the wire.



8.4.4. Thermistor Installation for Air (Suction and Discharge)

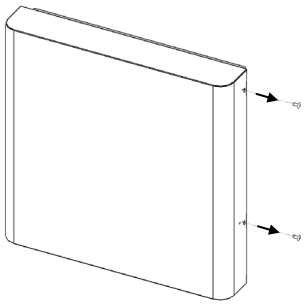
Attach Suction Thermistor (TA) to the position where air suction temperature can be measurable. And attach Discharge Thermistor (BL) to the position where air discharge temperature can be measurable.

8.5. Remote Controller Installation (Option parts)

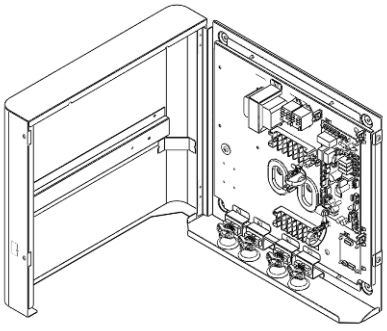
When you install a remote controller (option parts), follow the step below.

① Remove the front panel

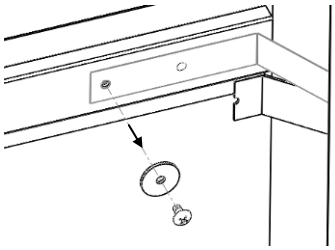
1. Remove the two screws on the right side of the unit.



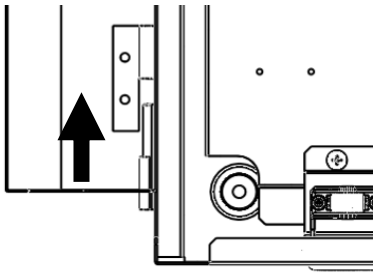
2. Open the front panel.



3. Remove the screw and washer fixing film on the front panel.

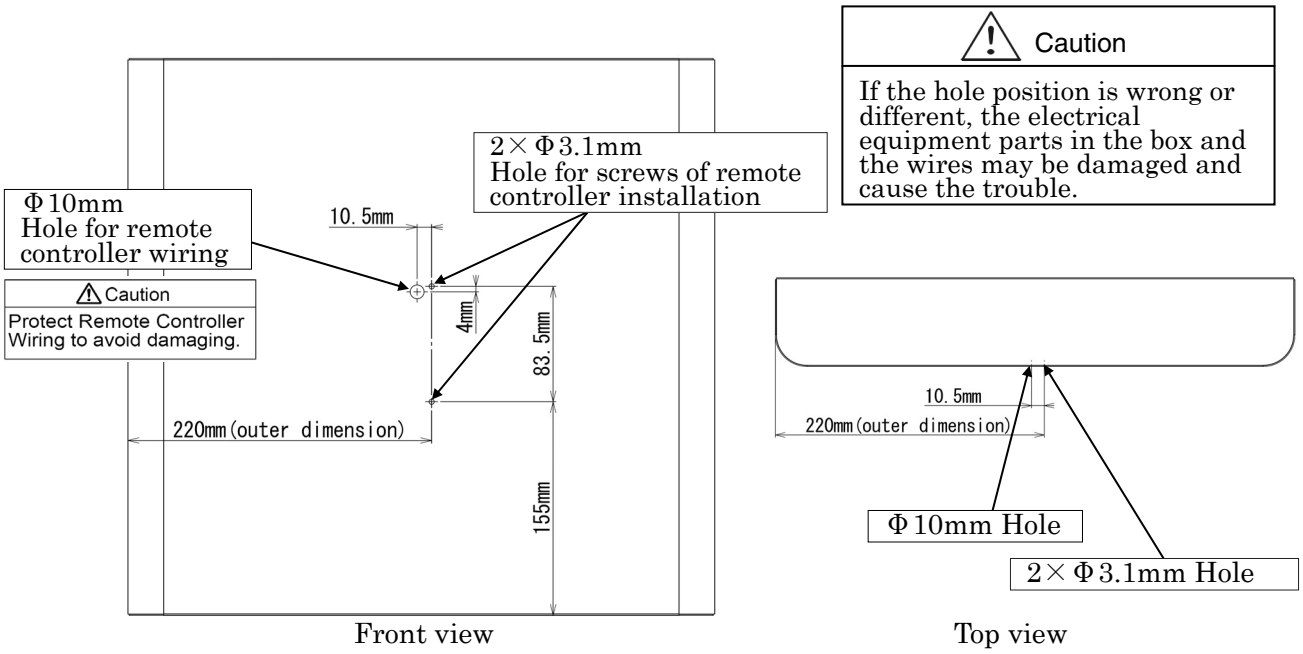


4. Remove hinges and lift up the front panel.



② Make holes on the front panel

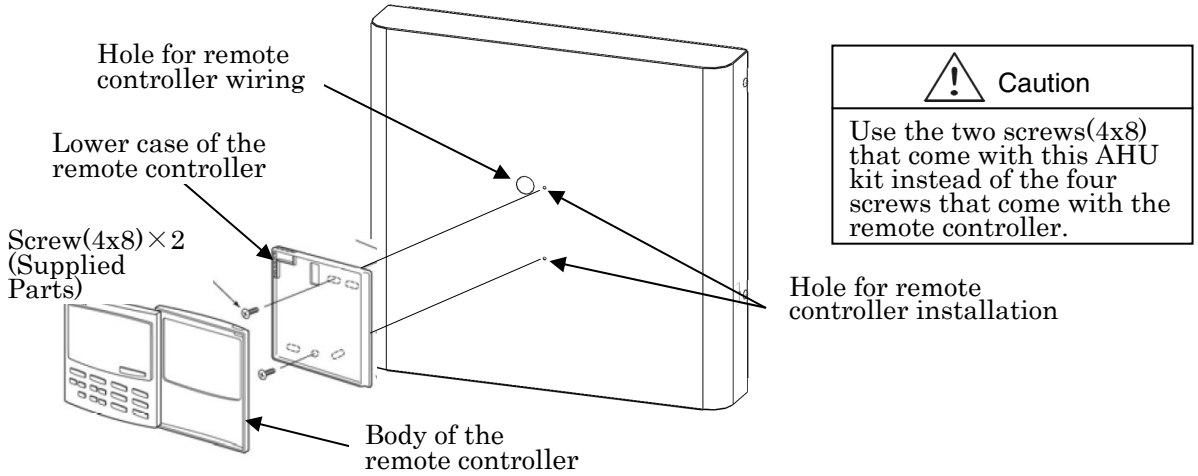
Make holes (x3) correctly at the following position. (2 screw holes, a wire hole)



③ Remote controller installation

1. Push the driver into the groove of the lower body of the remote control, and then remove the lower case.

2. Fixed the case of the remote control with screws onto the front panel.
3. Connect the remote control wiring to the main PCB of AHU kit.
4. Fit the body of the remote control to the lower case, and then install it.



④ Attach the front panel

1. Replace front panel.
2. Fix the film to the front panel with the screw and washer.
3. Close the front panel.
4. Replace the two screws on the right side of the unit.

9. Electrical Wiring

9.1. General Precautions on Wiring

(1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.
(2) This equipment is not provided with a power supply cord. Circuit breaker must be incorporated in the fixed wiring in accordance with national wiring regulations. The circuit breaker must be approved, suitable for the voltage and current ratings of equipment and have a contact separation in all poles.
(3) To prevent possible hazards from insulation failure, the unit must be grounded.
(4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.
(5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.
(6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.
(7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning.
You must ensure that installation complies with all relevant rules and regulations.
(8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:

- The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
- Use shielded wires for inter-unit control wiring (between units) and ground the shield on both sides.

(9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop designated by the manufacture, because special-purpose tools are required.

9.2. Recommended Wire Length and Wire Diameter for Power Supply System

Type	(B) Power supply	Time delay fuse or circuit capacity
	$2.5mm^2$	
AHU kit Controller	Max. 150m	10–16 A

Control wiring

(C) Inter–unit (between outdoor and indoor units) control wiring			(D) Remote control wiring	(E) Control wiring for group control	(F) Inter– Outdoor unit control wiring
$0.75mm^2$ (AWG#18) Use shielded wiring*	or	$2.0mm^2$ (AWG#14) Use shielded wiring*	$0.75\ mm^2$ (AWG#18)	$0.75\ mm^2$ (AWG#18)	$0.75mm^2$ (AWG#18) Use shielded wiring
Max. 1,000m		Max. 2,000m	Max. 500m	Max. 200m (Total)	Max. 300m

*For "(A) Power supply of outdoor unit", refer to "INSTALLATION INSTRUCTIONS" of outdoor unit.

9.3. Wiring System Diagrams

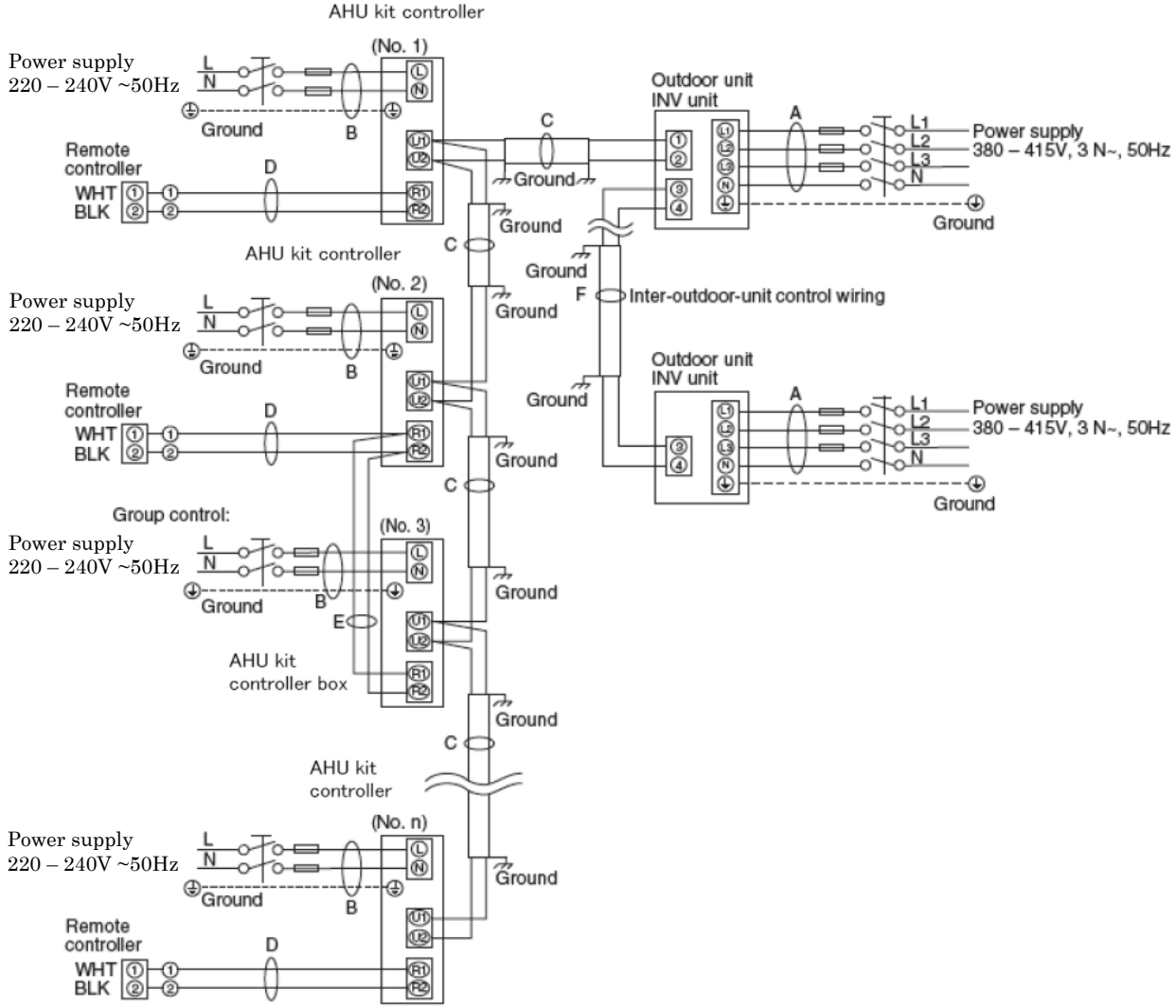


Fig.9-1

NOTE

(1) Refer to Section 9.2. "Recommended Wire Length and Wire Diameter for Power Supply System" for the explanation of "A", "B", "C", "D", "E" and "F" in the above diagram.

(2) The basic connection diagram of the indoor unit shows the terminal boards, so the terminal boards in your equipment may differ from the diagram.(Fig.9-2)

(3) Refrigerant Circuit (R.C.) address should be set before turning the power on.

(4) Regarding R.C. address setting, refer to the installation instructions supplied with the remote controller unit(optional). Auto address setting can be executed by remote controller automatically. Refer to the installation instructions supplied with the remote controller unit(optional).

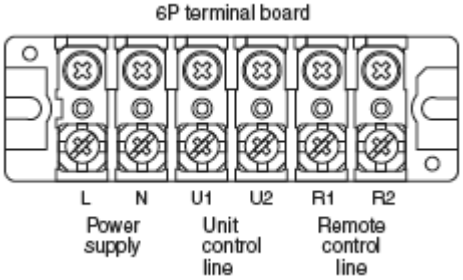


Fig.9-2

⚠ CAUTION

(1) When linking the outdoor units in a network, disconnect the terminal extended from the short plug from all outdoor units except any one of the outdoor units.
(When shipping: in shorted condition.)
For a system without link(no wiring connection between outdoor units), do not remove the short plug.

(2) Do not install the inter-unit control wiring in a way that forms a loop.(Fig.9-3)

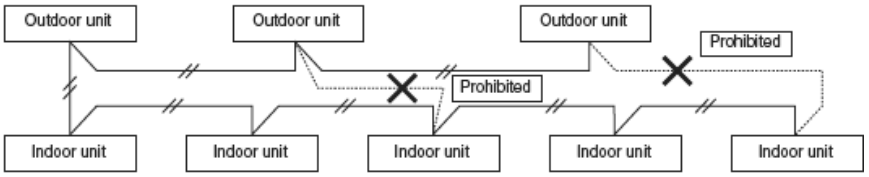


Fig.9-3

(3) Do not install inter-unit control wiring such as star branch wiring. Star branch wiring causes mis-address setting.(Fig.9-4)

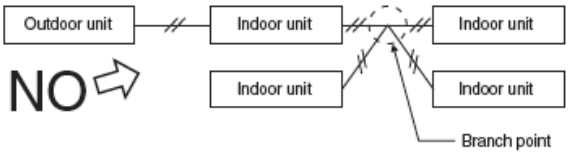


Fig.9-4

(4) If branching the inter-unit control wiring, the number of branch points should be 16 or fewer.(Branches that are less than 1m are not included in the total branch number.)(Fig.9-5)

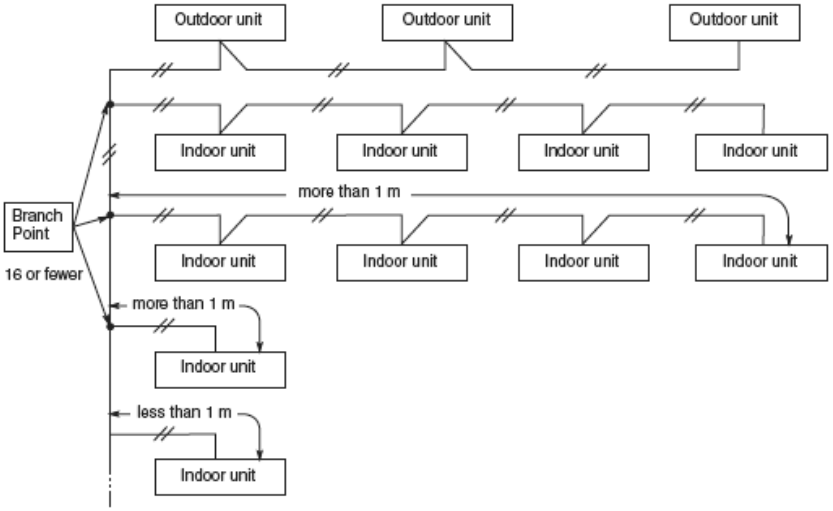


Fig.9-5

(5) Use shielded wires for inter-unit control wiring(c) which shielded woven mesh grounded on both sides, otherwise misoperation from noise may occur.(Fig.9-6) Connect wiring as shown in Section" 9.3.Wiring System Diagrams".

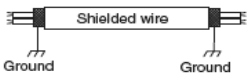


Fig.9-6

(6) Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conform to CENELEC(HAR) rating specifications) or use the cables based on IEC standard.(245 IEC57, 245 IEC66)

⚠ WARNING

Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also occur. Therefore, ensure that all wiring is tightly connected. When connecting each power wire to the terminal, follow the instructions on "How to connect wiring to the terminal" and fasten the wire securely with the terminal screw.

9.4. How to Connect Wiring to the Terminal

■ For stranded wiring

(1) Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wiring about 10mm and tightly twist the wire ends. (Fig.9-7)

(2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal plate.

(3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.

(4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver.(Fig.9-8)

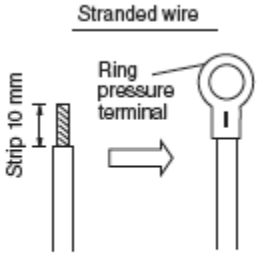


Fig.9-7

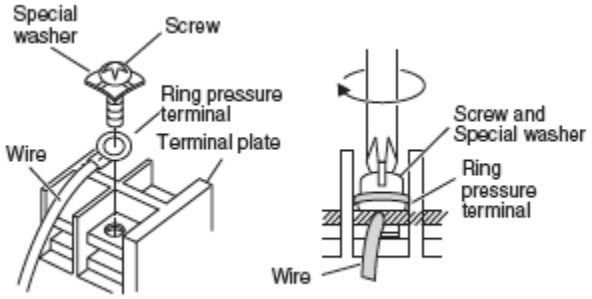


Fig.9-8

■ Examples of shield wires

(1) Remove cable sheath not to scratch braided shield. (Fig.9-9)

(2) Unbraid the braided shield carefully and twist the unbraided shield wires tightly together. Insulate the shield wires by covering them with an insulation tube or wrapping insulation tape around wire. (Fig.9-10)

(3) Remove insulation of signal wire.(Fig.9-11)

(4) Attach ring pressure terminals to the signal wires and the shield wires insulated in Step (2).(Fig.9-12)

Fig.9-9

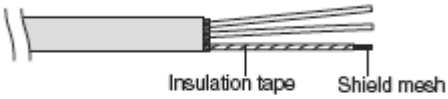


Fig.9-10

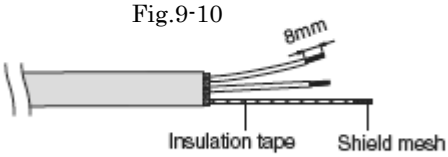


Fig.9-11

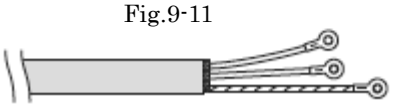
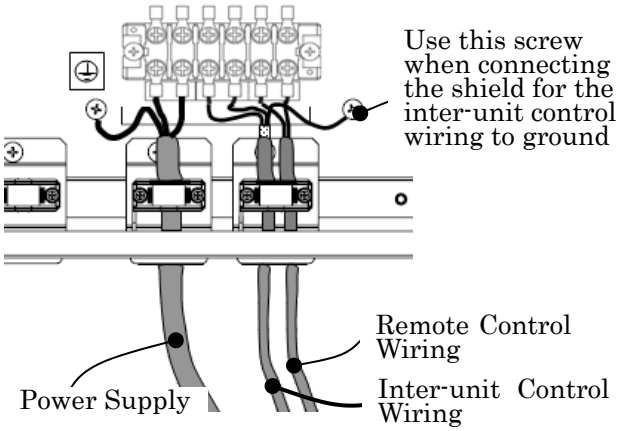
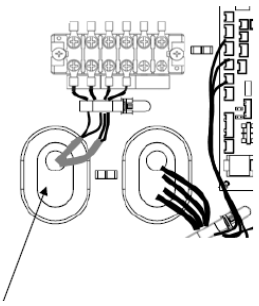


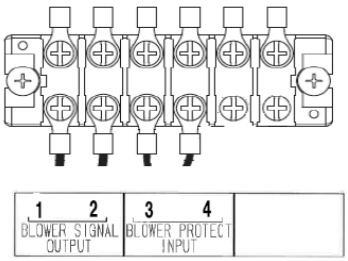
Fig.9-12

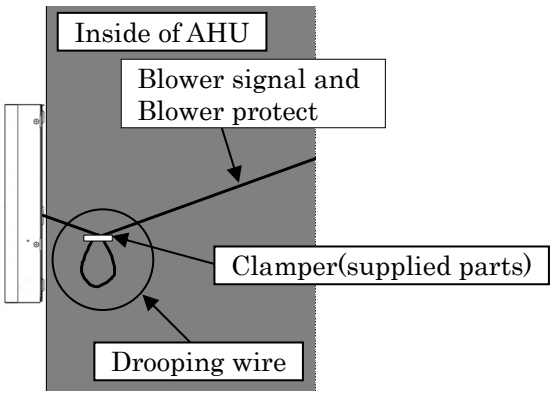


9.5. Connecting Distant Signal Line(Blower signal and Blower protect)



Blower signal and Blower protect are connected from this hole and fixed by clamper.

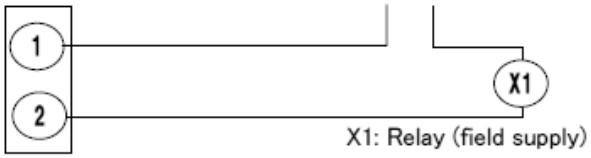




Make wire down to Blower signal and Blower protect by clamper(supplied parts) so as to avoid water into AHU kit.

■ Blower signal output

A fan control. It is usually at ON position at the time of operating, but it becomes OFF in defrosting.

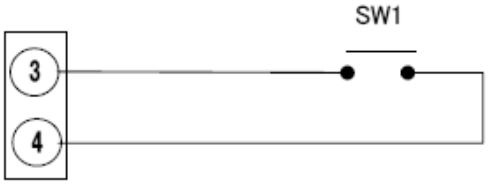


Minimum applicable load
DC5 V, 1 mA

Maximum applicable load
AC230V,2A

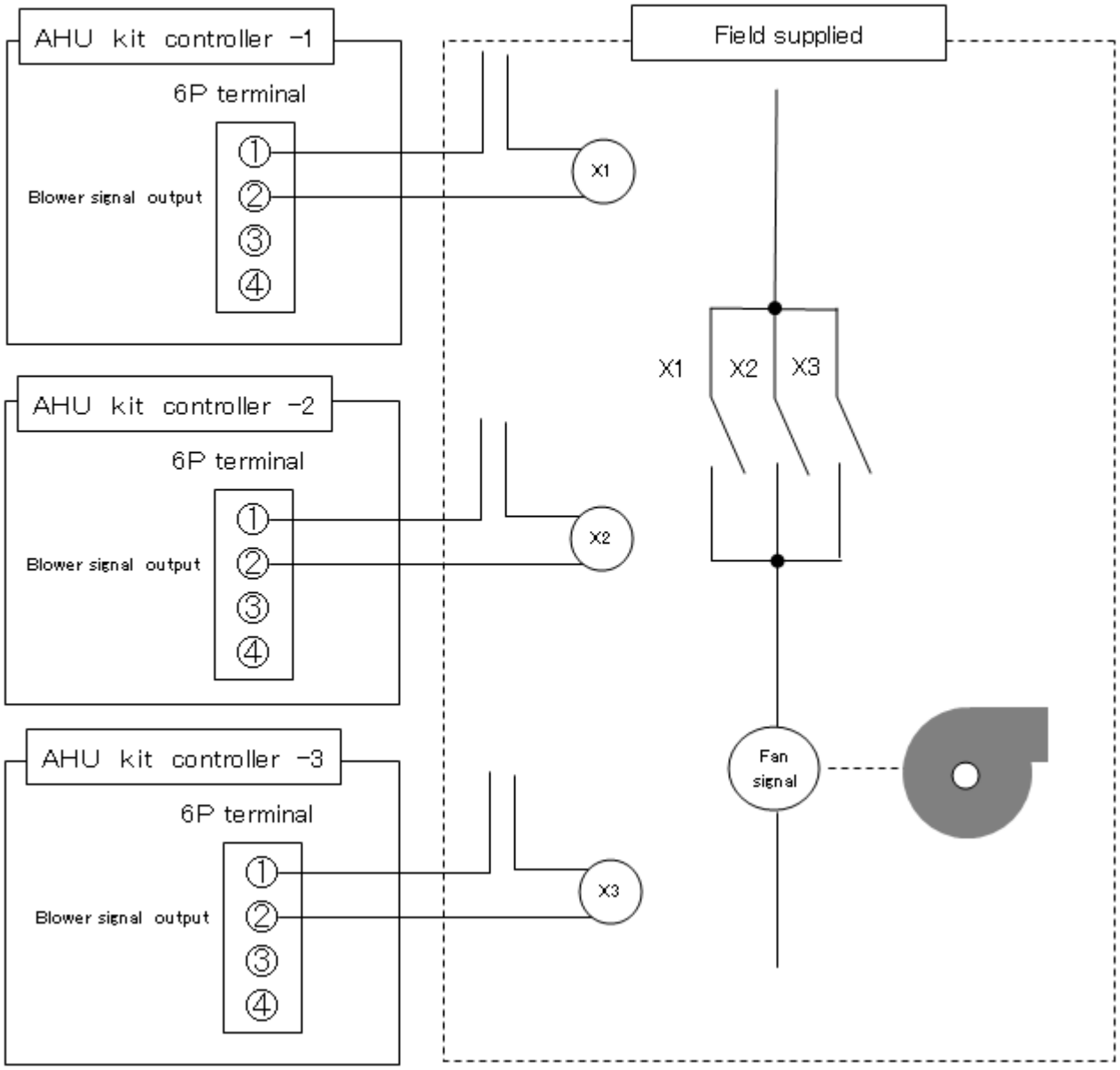
■ Blower protect input

If a switch opens, an alarm “P01” appears on a remote control display, and operation stops.



SW1:operation command(field supply)
AC220～240 V 0.1A

■ Example) 3set connection electric circuit



10. Test Run

Operate Test Run according to "7.TEST RUN" which is in INSTALLATION INSTRUCTIONS of Outdoor Unit and "AHU System Check List" which is an accessory of this product.

If alarm messages are indicated on the outdoor unit PCB (blink of LED) or the wired remote controller, refer "7-7. Meaning of Alarm Message" which is in INSTALLATION INSTRUCTIONS of Outdoor Unit.

— MEMO —

Authorized representative in EU
Panasonic Testing Centre
Panasonic Marketing Europe GmbH
Winsbergring 15, 22525 Hamburg, Germany

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Printed in Japan

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