

INSTALLATION INSTRUCTIONS

– Solenoid Valve Kit – For 3WAY VRF System

CZ-PXXXHR3
(Multiple type)

IMPORTANT!

Please Read Before Starting

This solenoid Valve kit must be installed by the sales dealer or installer.

This information is provided for use only by authorized persons.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This solenoid Valve kit shall be installed in accordance with National Wiring Regulations.
- Pay close attention to all warning and caution notices given in this manual.



WARNING

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.



CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS



WARNING When Wiring



ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system.
Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- Provide a power outlet to be used exclusively for each unit.

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.

- To prevent possible hazards from insulation failure, the unit must be grounded.



- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

...In a Room

- Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.
- The solenoid valve kit produces some refrigerant noise. If it is to be installed in a quiet place such as a hospital, library or hotel, it is strongly recommended that the solenoid valve kit be installed in the ceiling of a corridor, etc. apart from the room.



CAUTION

Keep the fire alarm and the air outlet at least 1.5 m away from the unit.

When Connecting Refrigerant Tubing

Pay particular attention to refrigerant leakages.

CAUTION

- When performing piping work, do not mix air except for specified refrigerant (R410A) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high tension inside the refrigerant cycle.
 - If the refrigerant comes in contact with a flame, it produces a toxic gas.
 - Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury, etc.
-
- Ventilate the room immediately, in the event that is refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of toxic gas.
 - Keep all tubing runs as short as possible.
 - Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
 - Check carefully for leaks before starting the test run.
 - Do not leak refrigerant while piping work for an installation or re-installation, and while repairing refrigeration parts. Handle liquid refrigerant carefully as it may cause frostbite.

When Servicing

- Turn the power OFF at the main power box (mains) before opening the unit to check or repair electrical parts and wiring. 
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal chips or bits of wiring have been left inside the unit.

WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Do not clean inside the indoor and outdoor units by users. Engage authorized dealer or specialist for cleaning.

- In case of malfunction of this appliance, do not repair by yourself. Contact the sales dealer or service dealer for repair.

CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Leaked refrigerant gas, on contact with fire or heat, can produce dangerous toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove, gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

Others

CAUTION

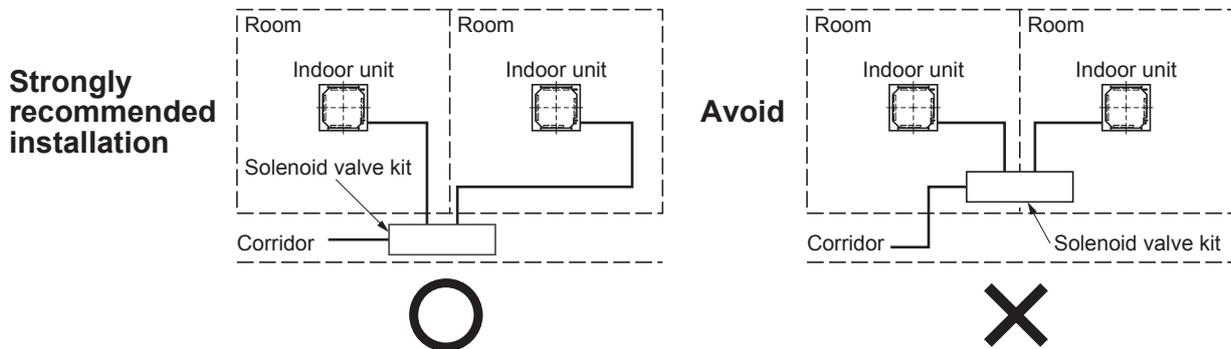
- Do not sit or step on the unit, you may fall down accidentally. 

1. Accessories

Part Name	Figure	Q'ty				Remarks
		Type 456	Type 656	Type 856	Type 4160	
Washer		8	8	8	8	For suspension bolts
Tapping screw (L=8mm)		16	24	32	16	For Solenoid Valve Relay Kit
Wire holder		4	6	8	4	For Solenoid Valve Relay Kit wiring
Solenoid Valve Relay Kit		4	6	8	4	
Clamper		9	13	17	9	For electrical wiring
Protection tube (Liquid)		1	1	1	1	For Solenoid Valve Kit (connecting to the left side)
Protection tube (Discharge)		1	1	1	1	For Solenoid Valve Kit (connecting to the left side)
Protection tube (Suction)		1	1	1	1	For Solenoid Valve Kit (connecting to the left side)

2. Positioning for Installation

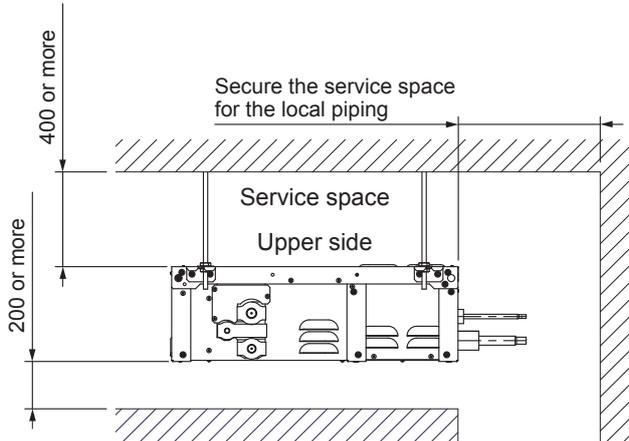
- The solenoid valve kit produces some refrigerant noise. If it is to be installed in a quiet place such as a hospital, library or hotel, it is strongly recommended that the solenoid valve kit be installed in the ceiling of a corridor, etc. apart from the room.



NOTE

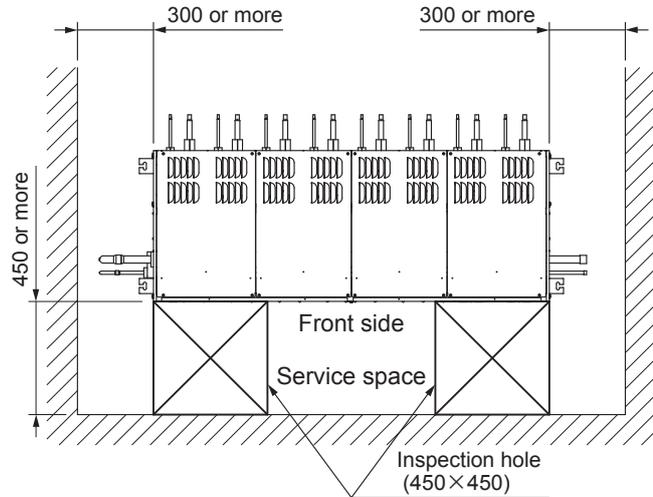
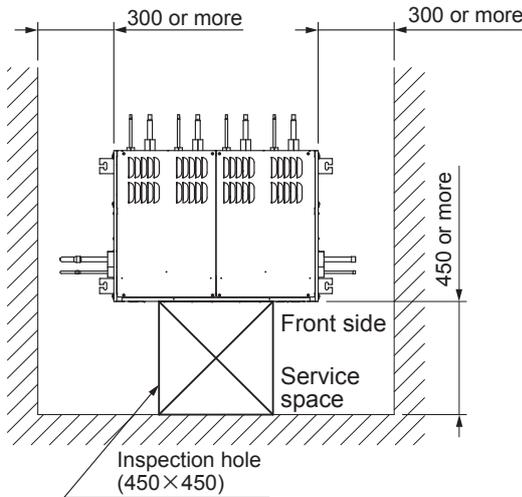
After the power is turned on, the sound of the solenoid valve coil may sometimes occur. Note that this is not a fault. The sound level will gradually become small at the time of starting operation.

- Be sure to secure the solenoid valve kit to the structure and the suspension bolts. Do not place the solenoid valve kit directly on the ceiling surface.
When installing the solenoid valve kit, **remember to install it with the top surface facing upward.**
(See the figure shown in the subsection "How to use the fittings" in " 3. Valve Dimensions and Hanging Method.")
- Provide a service space as shown in the below figure.
- **Never conduct drilling or welding on the sheet metal.**
- Do not cover air holes.
- Provide the inspection hole as shown in the below figure.



Type 456, 656, 4160

Type 856



Unit : mm

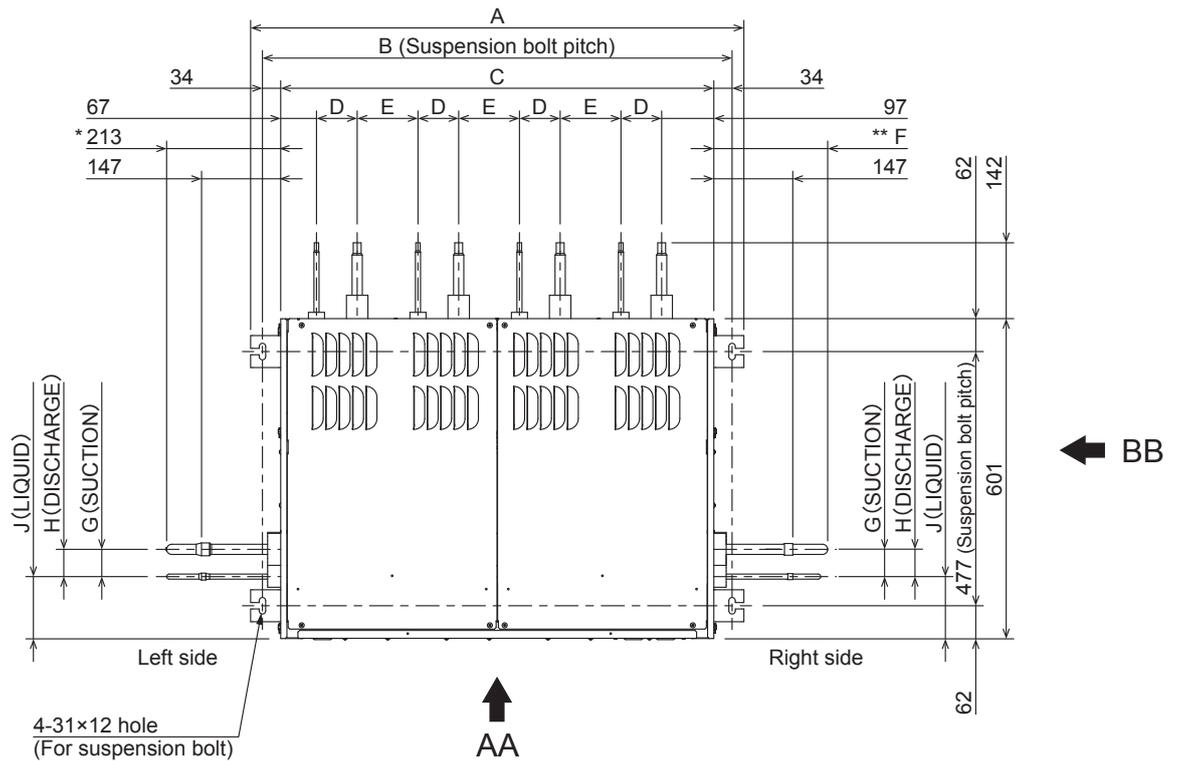
3. Valve Dimensions and Hanging Method

- There are 4 types of solenoid valve kits: type 456, 656, 856 and type 4160. The corresponding indoor unit model capacities are shown in the table at right.

Solenoid Valve Kit	No. of port	Indoor Unit Capacity per 1 port
CZ-P456HR3	4	Type 56 or under
CZ-P656HR3	6	
CZ-P856HR3	8	
CZ-P4160HR3	4	Type 160 or under

	Type 456	Type 656	Type 856	Type 4160
A	919	1297	1675	919
B (Suspension bolt pitch)	874	1253	1631	874
C	807	1185	1563	807
D	67			
E	113			
F	213			207
G (SUCTION)	51	54	53	55
H (DISCHARGE)	51	55	53	54
J (LIQUID)	117	115	115	113

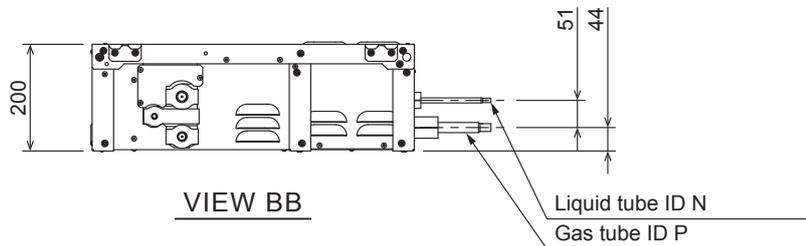
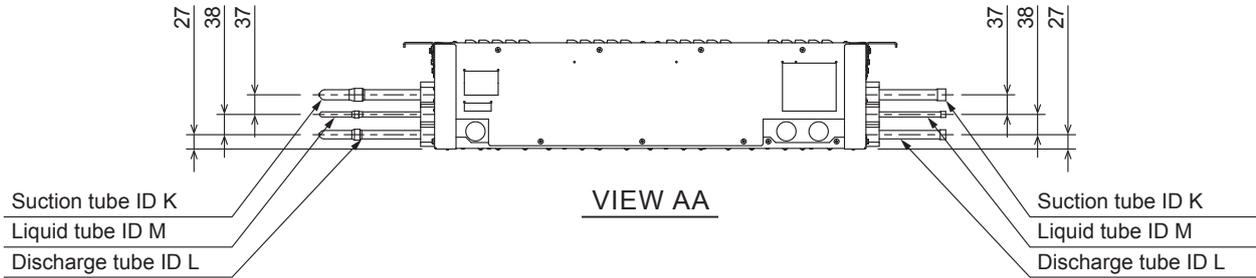
Unit : mm



* In case of right side connection.
 ** Including the protection tubes when connecting to the left side.

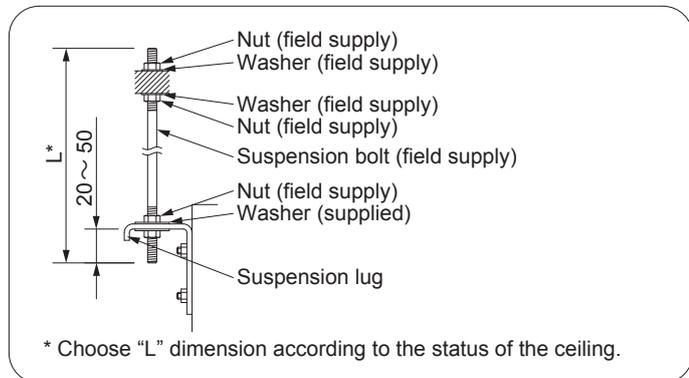
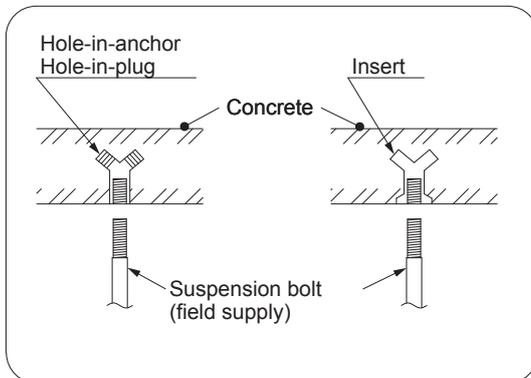
	Type 456	Type 656	Type 856	Type 4160
K (SUCTION)	φ19.05	φ25.4	φ28.58	φ28.58
L (DISCHARGE)	φ15.88	φ19.05	φ22.22	φ25.4
M (LIQUID)	φ9.52	φ12.7	φ12.7	φ15.88
N		φ6.35		φ9.52
P		φ12.7		φ15.88

Unit : mm



How to use the fittings

1. Check the suspension bolt pitch.
2. Ensure that the ceiling is strong enough to support the weight of the unit.
3. To prevent the unit from dropping, firmly fasten the suspension bolts as shown in the figure below.

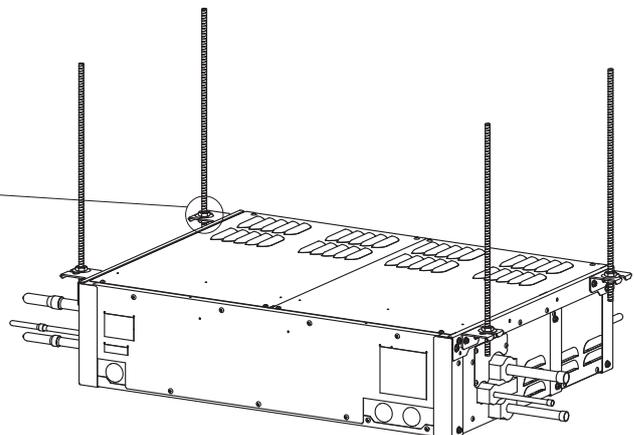


Suspension bolt (3/8" or M10) (field supply)

Nut (field supply) (3/8" or M10)

Washer (supplied)

4 - POSITION

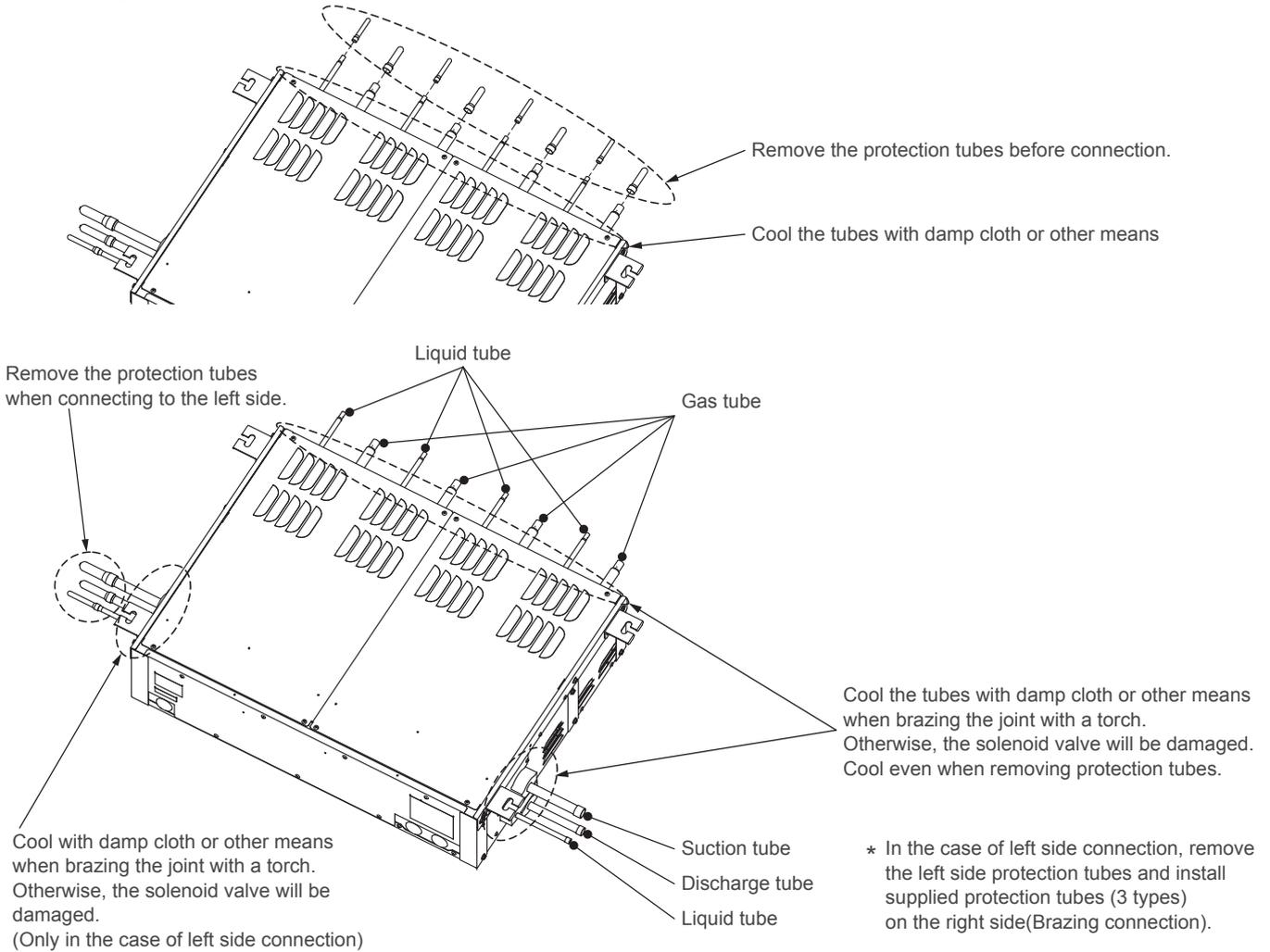


CAUTION

Wrong positioning will become unfitted center of gravity position, causing injuries or product damage.

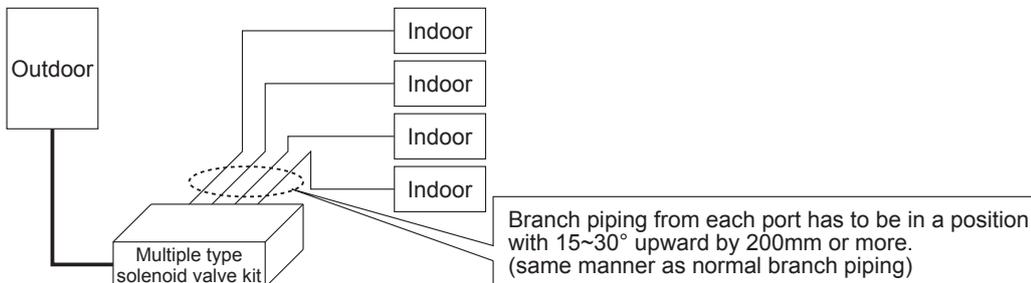
4. Wiring, Tubing and Heat Insulation

4-1. Refrigerant tubing



NOTE

- When brazing, be sure to perform nitrogen replacement inside the tube so that oxidation coating does not form inside the tube. Then stop performing when nitrogen replacement is completed. The solenoid valve, however, will be damaged if nitrogen is applied while brazing.
- Heat sensitive components, protect from flame and heat conduction.
- Comply with all Local Code Requirements.
- Branch piping from each port has to be in a position with 15~30° upward by 200mm or more. (same manner as normal branch piping)



4-2. Heat Insulation

- Be sure to insulate the tubing after finishing leakage inspection.
- Wrap insulators (field supplied) with the heat resistance of 120°C or more around the discharge tubes and gas tubes, and 80°C or more around the suction tubes and liquid tubes.
- Wrap around the each tube not to make gaps between the thermal insulation.
- Failure to conduct shielding gaps and thermal insulation will cause water leakage.
- Insulate the protection tubes of outdoor unit side and indoor unit side.

5. ELECTRICAL WIRING

5-1. 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) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.
- (3) Do not allow wiring to touch the refrigerant tubing.
- (4) 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.
- (5) 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.
- (6) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop designated by the manufacturer, because special-purpose tools are required.



WARNING

- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown. Earth Leakage Circuit Breaker (ELCB) must be incorporated in the fixed wiring in accordance with the wiring regulations. The Earth Leakage Circuit Breaker (ELCB) must be an approved 10-16 A, having a contact separation in all poles.
- To prevent possible hazards from insulation failure, the unit must be grounded.

5-2. Recommended Wire Length and Wire Diameter for Power Supply System

Table.5-1 Solenoid valve kit

Type	Power supply	Time delay fuse or circuit capacity
	2.5 mm ²	
456 656 856 4160	Max. 130m	10-16 A

Table.5-2 Control wiring

Type	Inter-unit (between relay kit and solenoid valve kit) control wiring
456 656 856 4160	0.75 mm ² (AWG #18)
	Max. 30m



CAUTION

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. (60245 IEC57, 60245 IEC66)

5-3. Wiring System Diagram

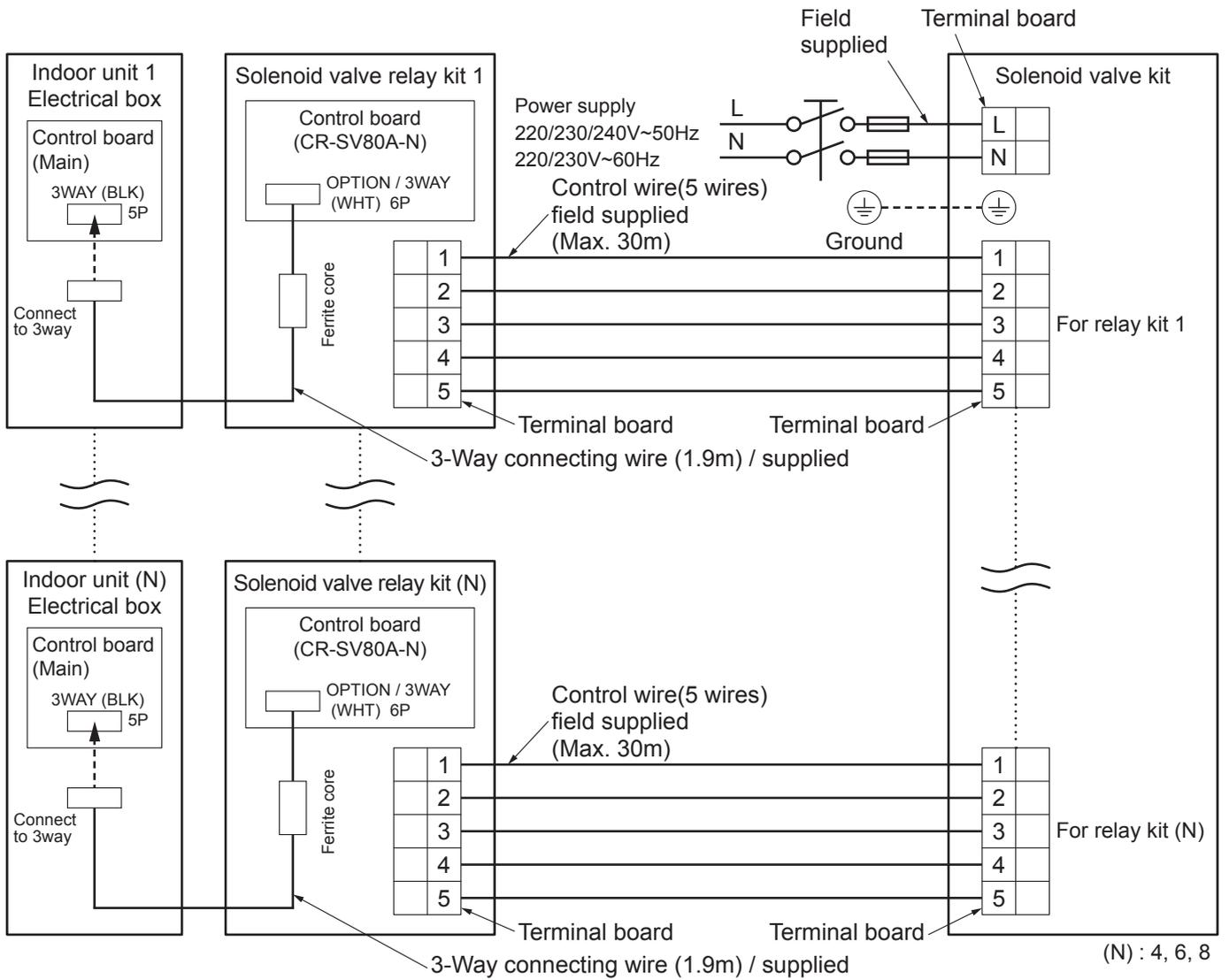
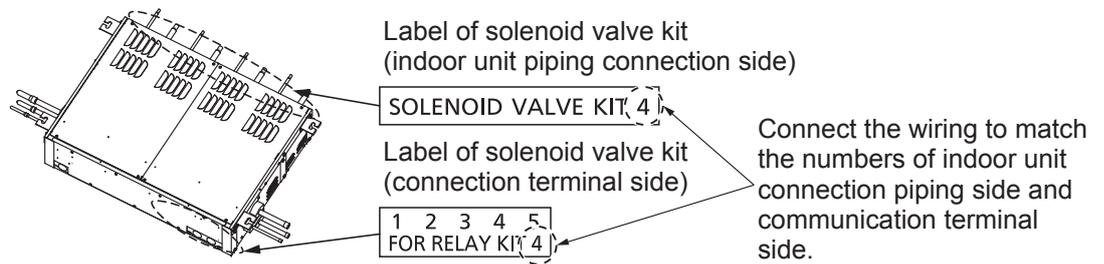
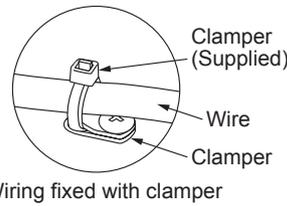
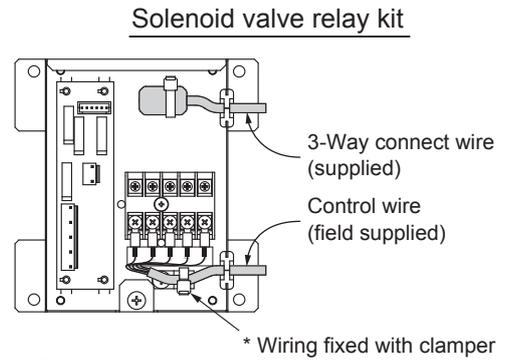
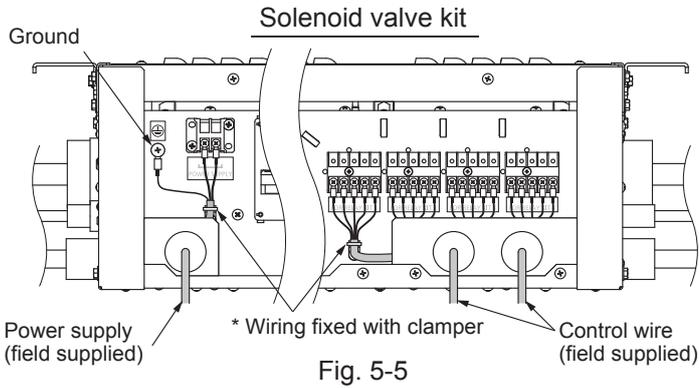


Fig. 5-3



5-4. Procedure

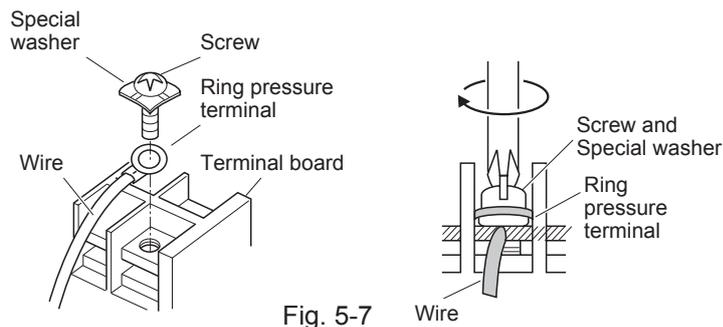
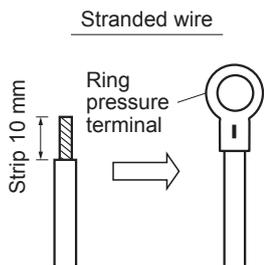
1. Connect the power supply wire to the solenoid valve kit, using the wire shown in Table 5-1. (Fig. 5-5)
2. Connect the solenoid valve kit to the solenoid valve relay kit, using the wire shown in Table 5-2. (Fig. 5-4, Fig. 5-5)
3. Connect the solenoid valve relay kit to the indoor unit, using the supplied connecting wire. (Fig. 5-3, Fig. 5-4)
4. The left-over wires connected to the solenoid valve relay kit should be tied up in a bundle of wires by the supplied wire holder not to leave the wires loose as shown in the diagram at right. (Fig. 5-4)



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 10 mm and tightly twist the wire ends. (Fig. 5-6)
- (2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal board.
- (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. 5-7)



CAUTION

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.

5-5. Installation to the Solenoid Valve Relay Kit

Install the solenoid valve relay kit into the indoor unit and fix it using a Philips-head screwdriver. See the diagram in the section of "7. Installation Diagrams of the Solenoid Valve Relay Kit".



WARNING

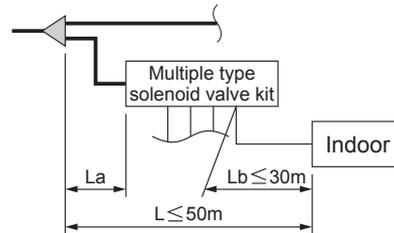
- Do not install outside the building and the area where the water is splashed. Failure to do so could result in product or property damage.
- Do not handle or touch the unit with wet hands. Failure to do so could result in electric shock.

6. Piping system design limitation

6-1. Design limitations overview

Type	Limitations		Remarks
Connectable Indoor capacity (kW)	56 Type	≤ 5.6	It is possible that 2 ports is used in parallel. Refer to "6-5. 2 ports to be used in parallel".
	160 Type	≤ 16.0	
Distance from Indoor unit *	Within 30m from Indoor unit		Distance between distribution joint and I/U is within 50m.
Installation place	Corridor : Strongly recommended Room : Avoid		
Branch to several indoor unit under 1 port (Same mode operation)	Possible up to 2 indoor units		
Individual ON/OFF control under 1 port	Possible		Need Initial setting by PC software

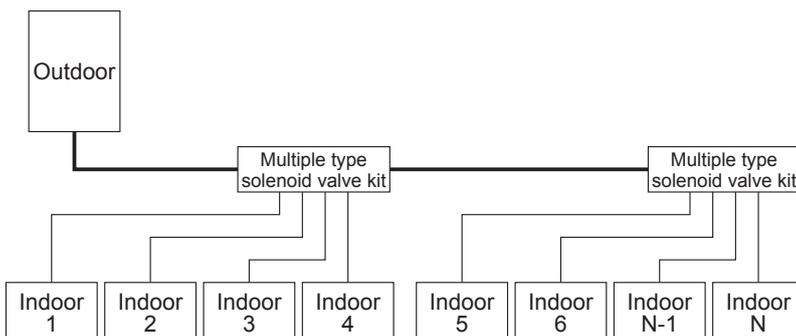
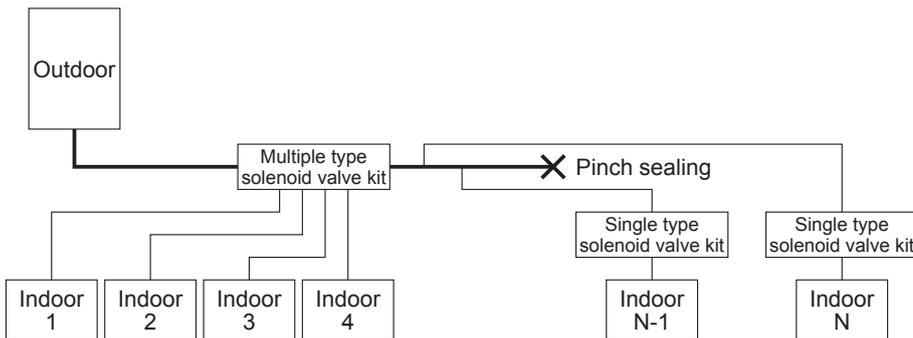
* If the distance between distribution joint and indoor unit (L) is more than 30m, for the pipe between distribution joint and Multiple type solenoid valve kit (La), and for the pipe between Multiple type solenoid valve kit and indoor unit (Lb), increase the piping size by 1 rank. Refer to the installation instruction of outdoor unit for the piping size.



NOTE

The following chart shows that the total capacity of combined indoor units connected from the Multiple type solenoid valve kit includes the further indoor unit connected to the Single or Multiple type solenoid valve kit.

Type	456	656	856	4160
Total allowable capacity (kW)	≤ 25.0	≤ 36.4	≤ 47.6	≤ 70.0

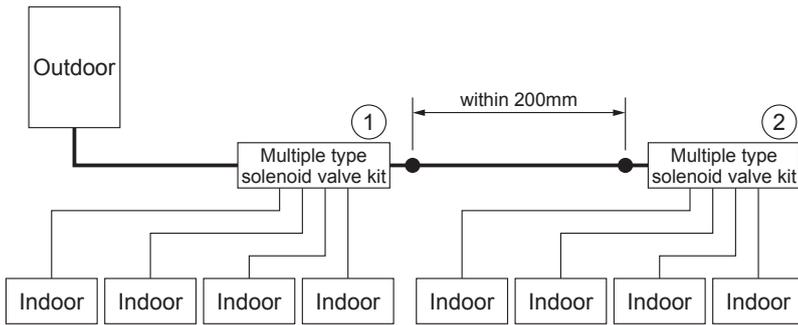


ex) Total allowable capacity = total capacity of indoor 1-indoor N

6-2. Series connection by 2 Multiple type solenoid valve kit

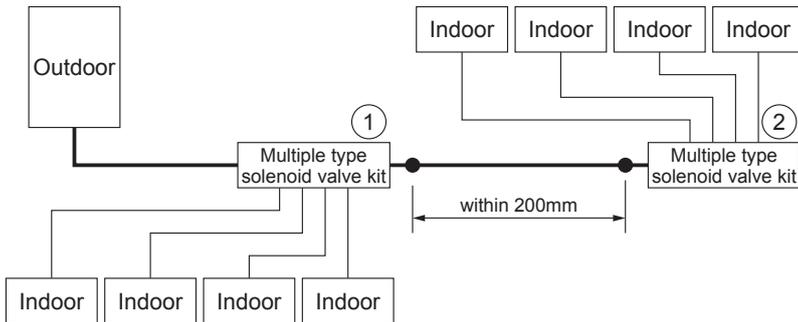
The length between the Multiple type solenoid valve kits shall be within 200mm.

(Refer right table for detail about 2 box combination.)



Available combination		OK/NG
① First box	② Second box	
4 port (456 type)	4 port (456 type)	○
	6 port (656 type)	✗
	4 port (4160 type)	✗
6 port (656 type)	4 port (456 type)	✗
	4 port (4160 type)	✗
4 port (4160 type)	4 port (456 type)	○
	6 port (656 type)	✗
	4 port (4160 type)	○

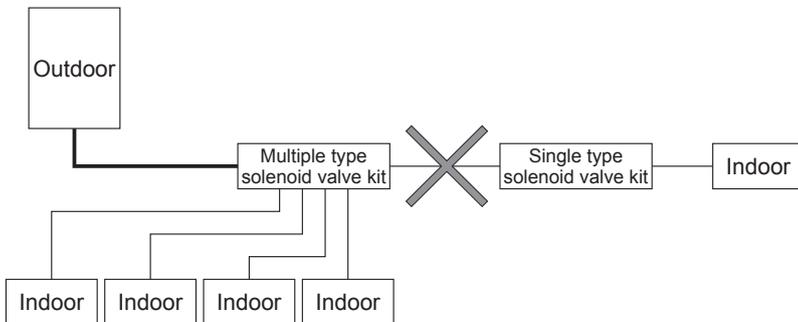
The piping of indoor unit side is possible to connect in the opposite direction as shown in the below figure.



NOTE

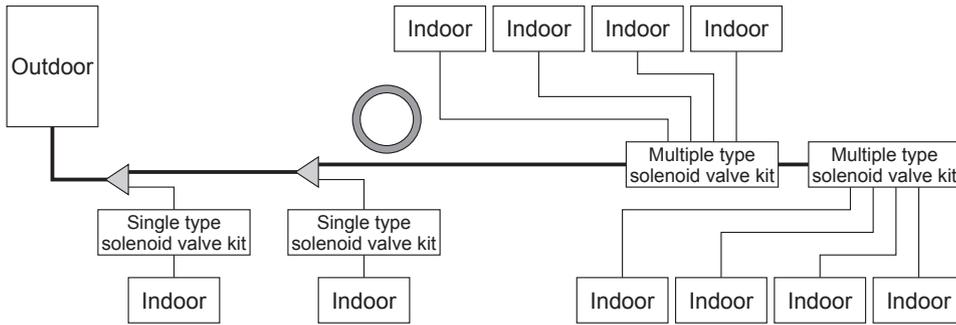
Piping between the Multiple type solenoid valve kits, maintain straight line, and use the same size piping as ② Second box.

Direct connection of indoor unit just after the Multiple type solenoid valve kits is disapproved

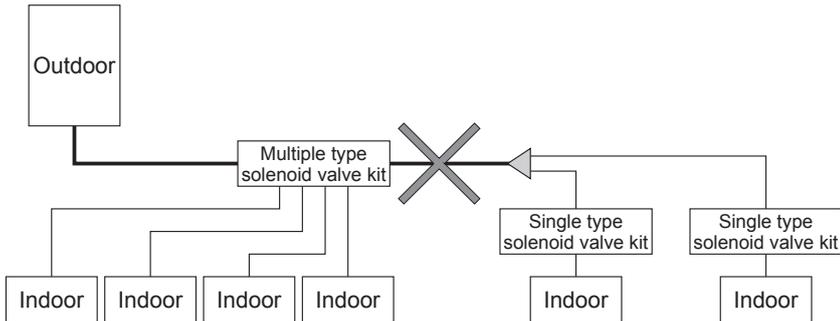


6-3. Connection with Distribution Joint

Multiple type solenoid valve kit after the distribution joint kit is possible.



Multiple type solenoid valve kit before the distribution joint is disapproved



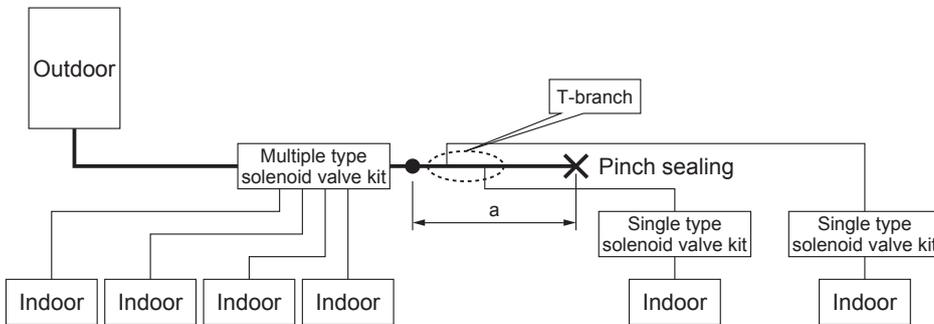
6-4. Connection with T-branch (field supplied)

T-branch after Multiple type solenoid valve kit is possible

- * Connectable total indoor unit capacity after Multiple type solenoid valve kit is limited.
- * Piping length "a" shall conform to the below table.

Limitation of piping length (a)

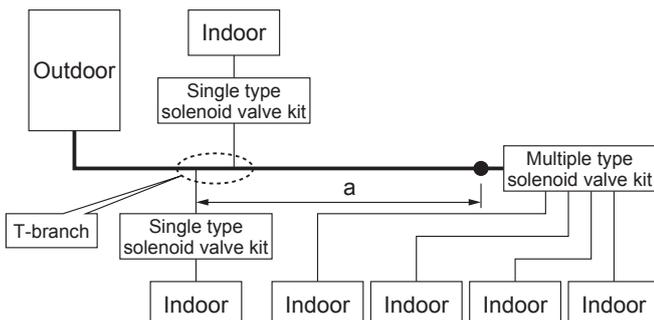
Type	456	656	856	4160
a (mm)	≤ 1100	≤ 700	≤ 300	≤ 1100



NOTE

From pinch sealing to Multiple type solenoid valve kit, keep the pipe in a straight line.

T-branch before Multiple type solenoid valve kit is possible.

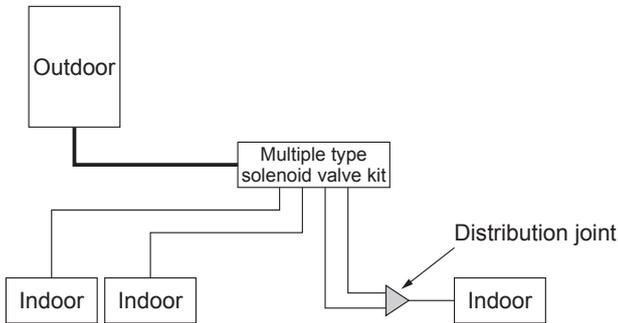


NOTE

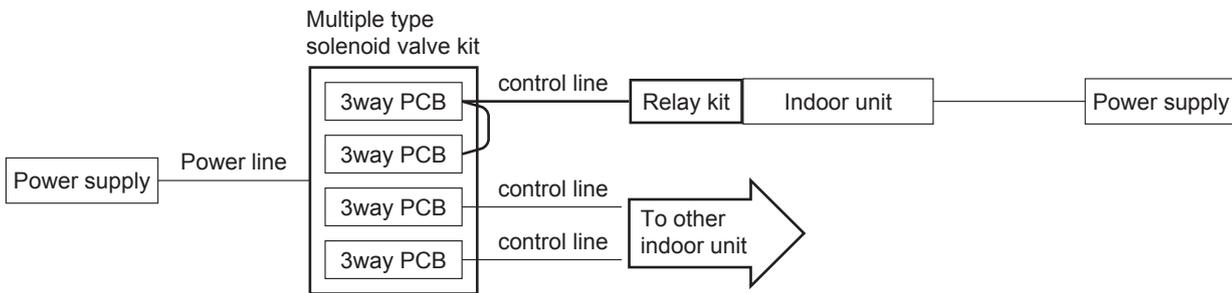
From end of T-branch to Multiple type solenoid valve kit, keep the pipe in a straight line.

6-5. 2 ports to be used in parallel

- 2 ports to be used in parallel for the unit 180/224/280 type
Use 4160 type Multiple type solenoid valve kit.
- 2 ports to be used in parallel for the unit 60-140 type
Use 856 type, 656 type and 456 type Multiple type solenoid valve kit.
- Use distribution joint to unite 2 outlet ports to 1 port.



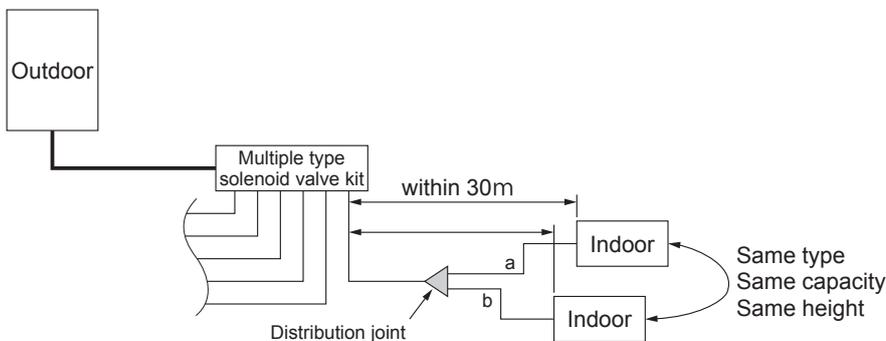
- Use 1 Relay kit on indoor unit.
- Pass the control line between 2 ports on Multiple type solenoid valve kit.



6-6. Connection with Distribution Joint

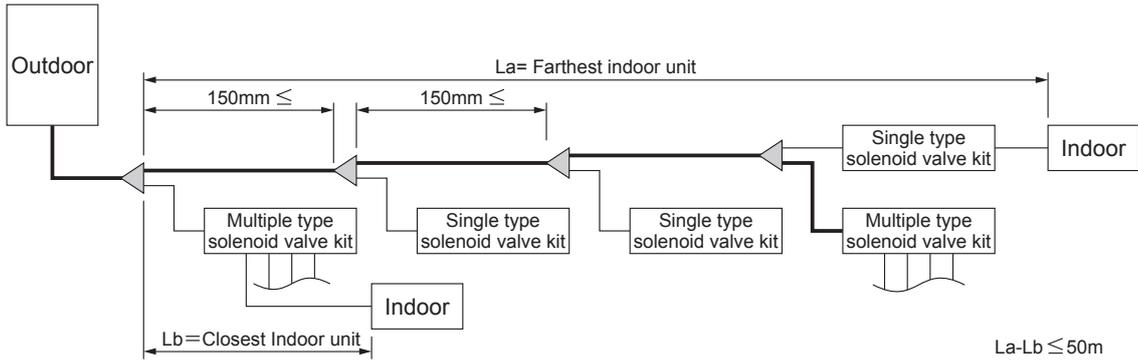
Multiple type solenoid valve kit before the distribution joint is disapproved

- Use distribution joint to divide 1 outlet port to 2 ports. (T-joint is not allowed.)
- Indoor unit type shall be the same.
Ex.) 4way + 4way=OK, Wall +Wall =OK, but, 4way + Wall = NG.
- Capacity of each indoor unit shall be the same, and the total indoor unit capacity under 1 port shall not exceed than allowable max capacity of the port.
Ex.) In case of 656 type box, allowable max capacity of the port is 5.6 kW or less.
2.8kW+2.8kW= OK, 3.6kW+3.6kW=NG, 3.6kW+2.2kW=NG.
- Piping length from Multiple type solenoid valve kit to each indoor unit shall be within 30 m.
- Difference of piping length between 2 distribution joints shall be within 5m. ($\Delta(a-b) \leq 5m$)
- No height difference between indoor units.
- Relay kit may be connected to either one of the indoor unit.



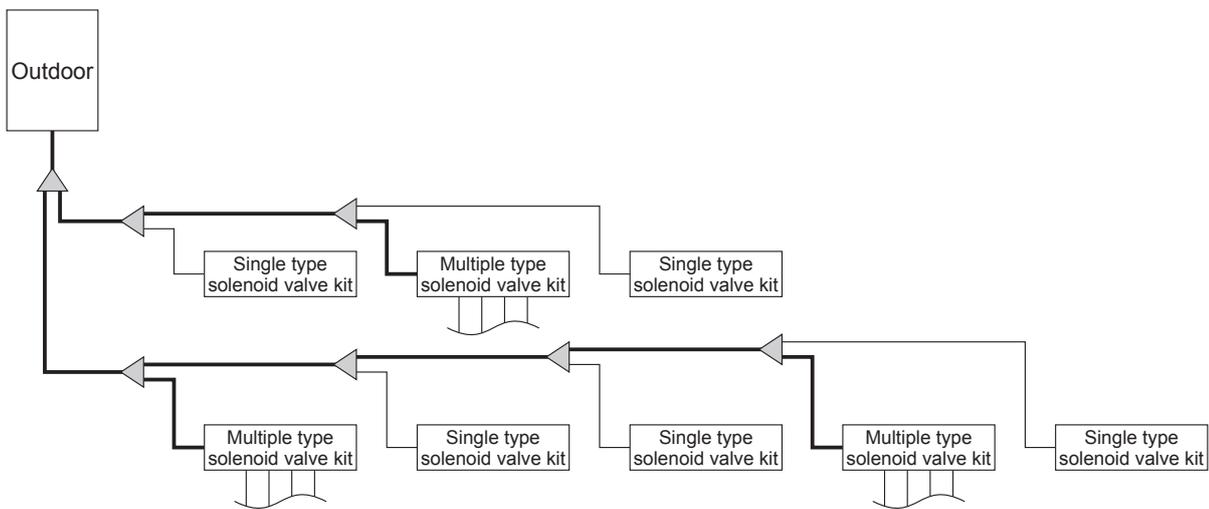
6-7. Single Floor Building Layout

Multiple type solenoid valve kit after the distribution joint is possible.



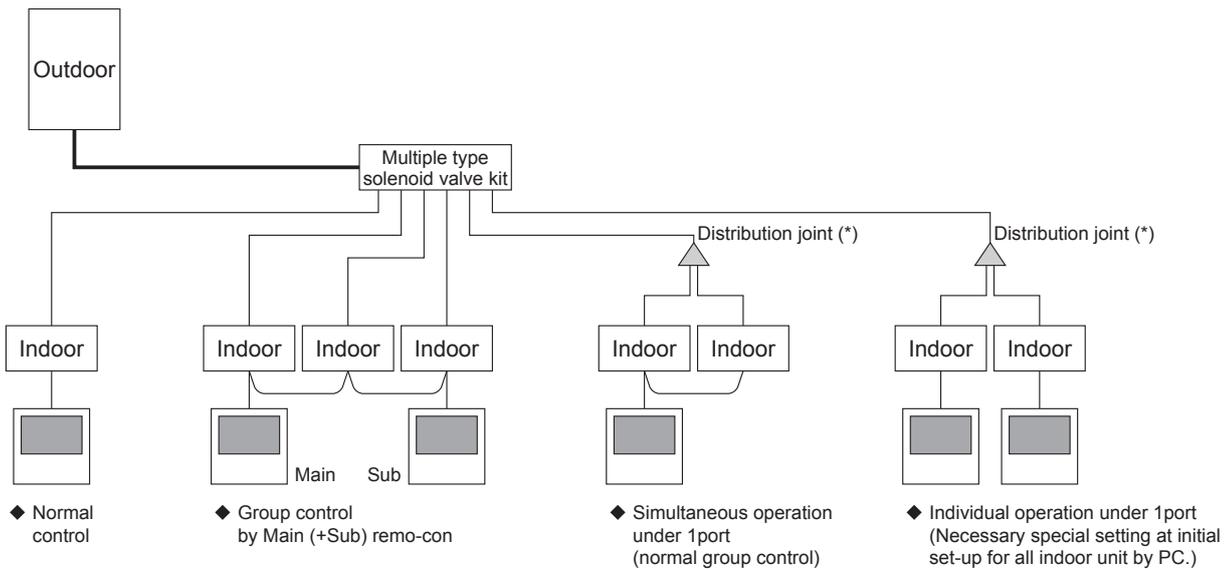
6-8. Multi Floor Building Layout

It is possible in terms of layout, however, be sure piping diameter/piping length, including the indoor units are within the allowance.



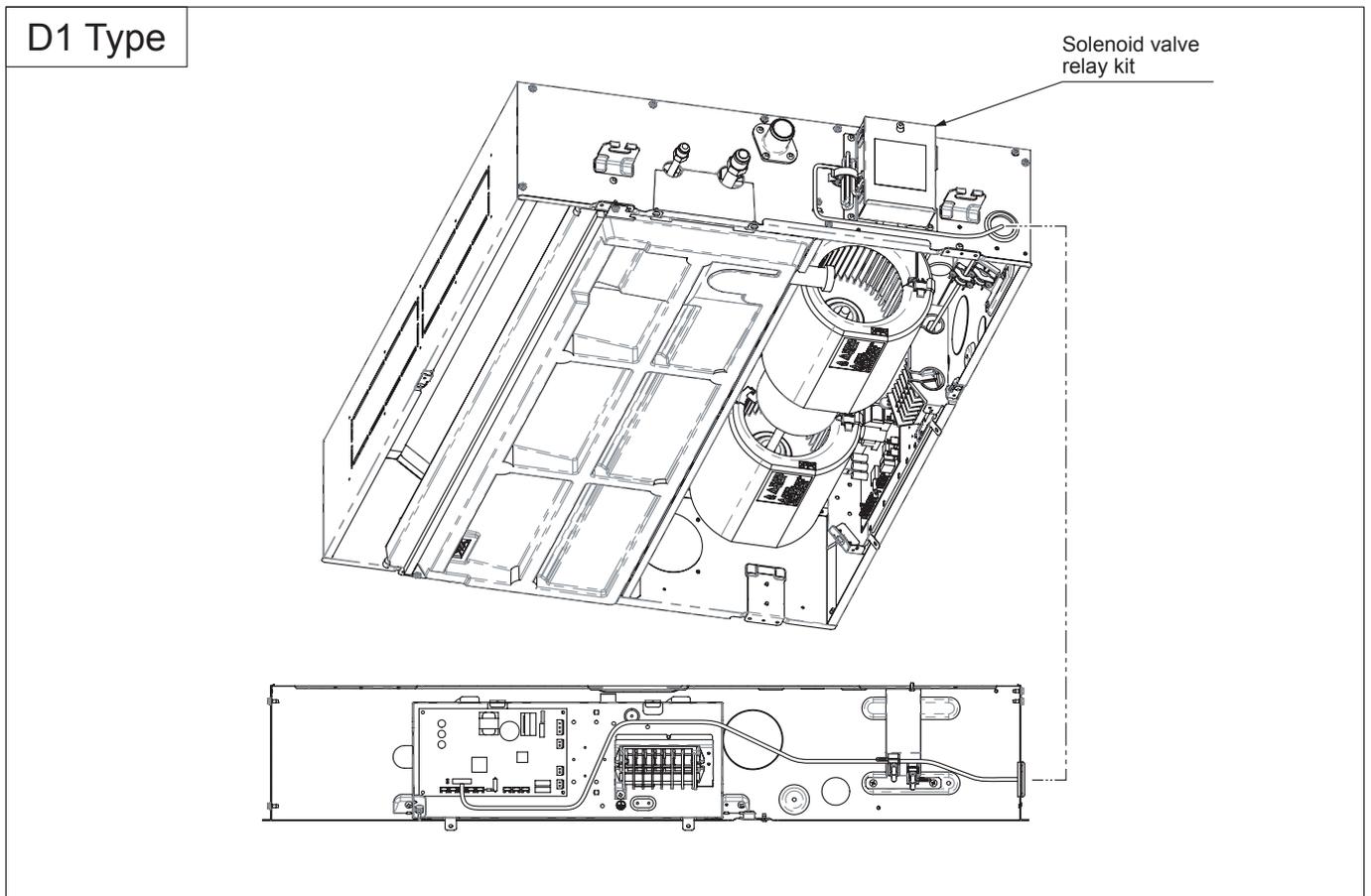
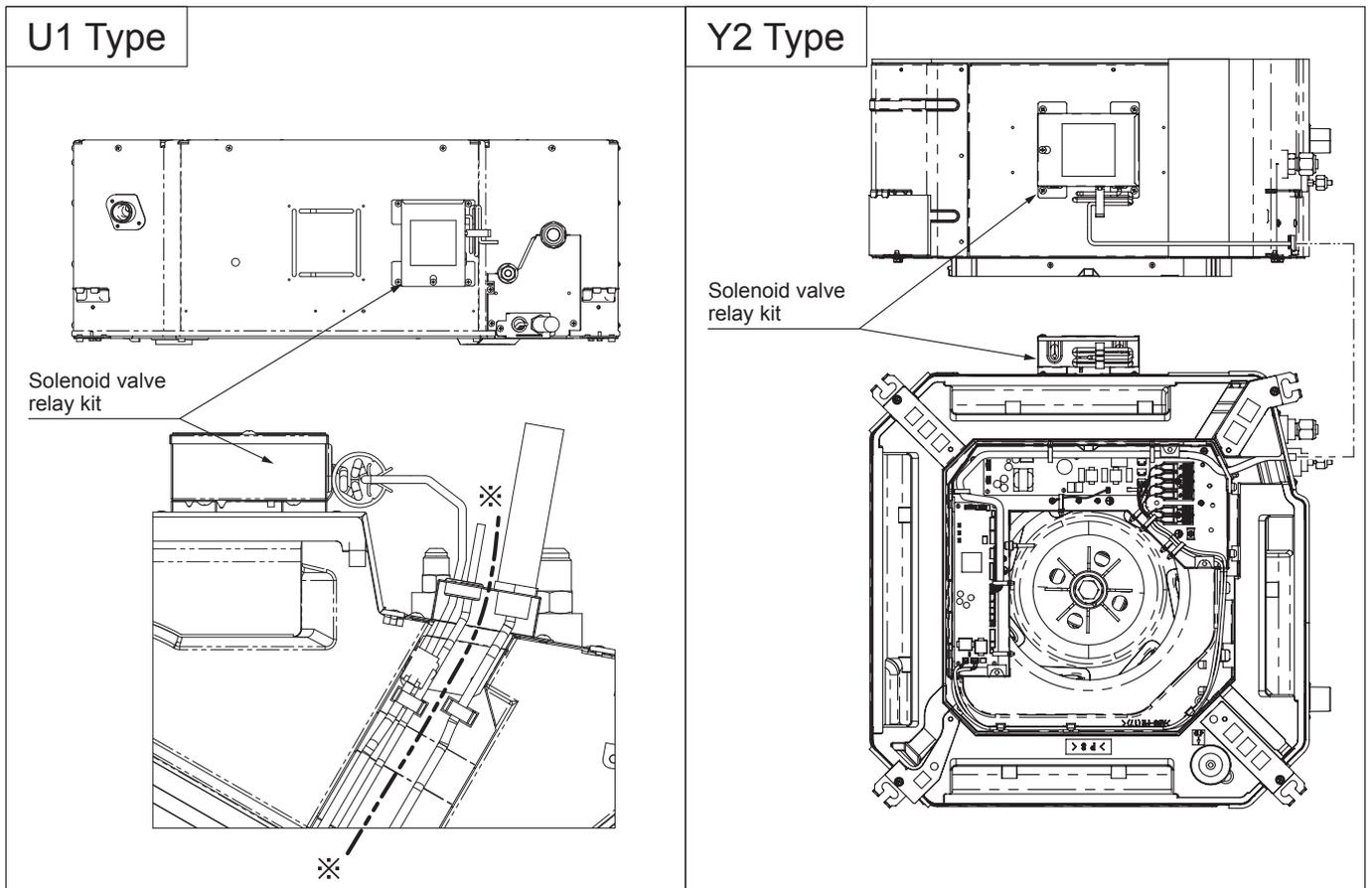
6-9. Indoor unit control method

These control methods are possible.

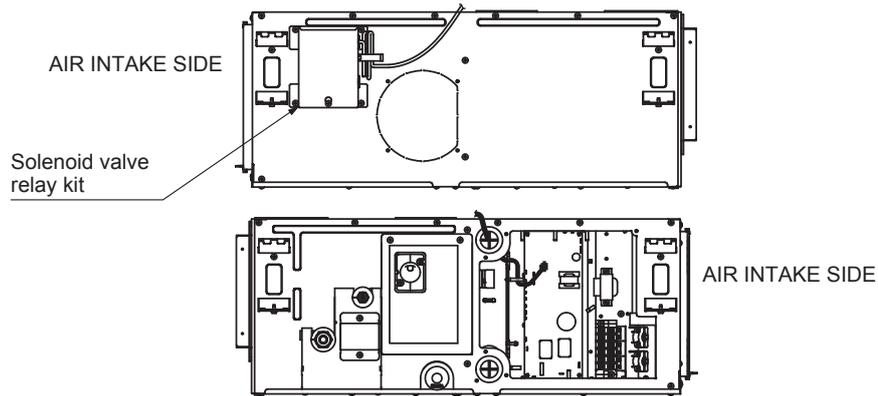


7. Installation Diagrams of the Solenoid Valve Relay Kit

※ Make sure that the power supply wiring, communication wiring and 3-way wiring will not be crossed each other.



F2 Type



K1 Type

Install the solenoid valve relay kit on the wall.

K2 Type

Important:
Installation behind the wall or ceiling is required that the maintenance should become capable.

L1 Type

M1 Type

E1 Type

E2 Type

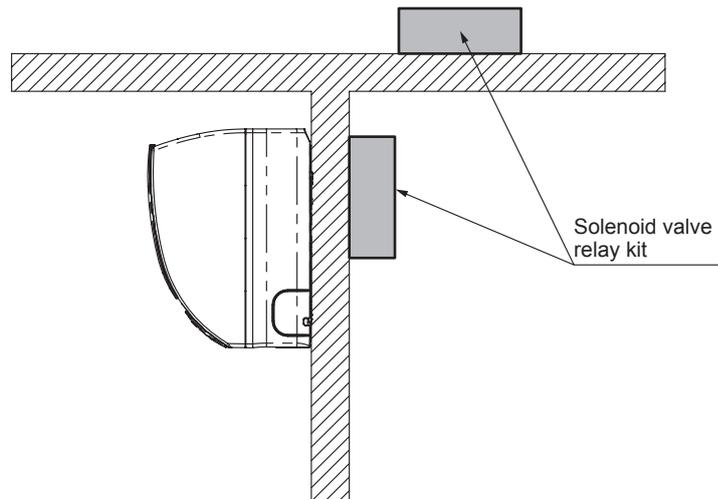
P1 Type

R1 Type

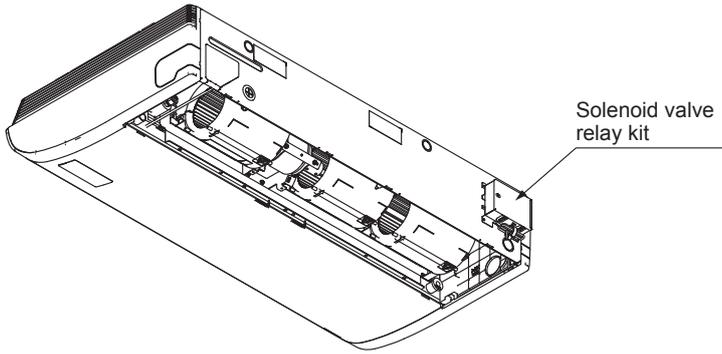
W1 Type

H1 Type

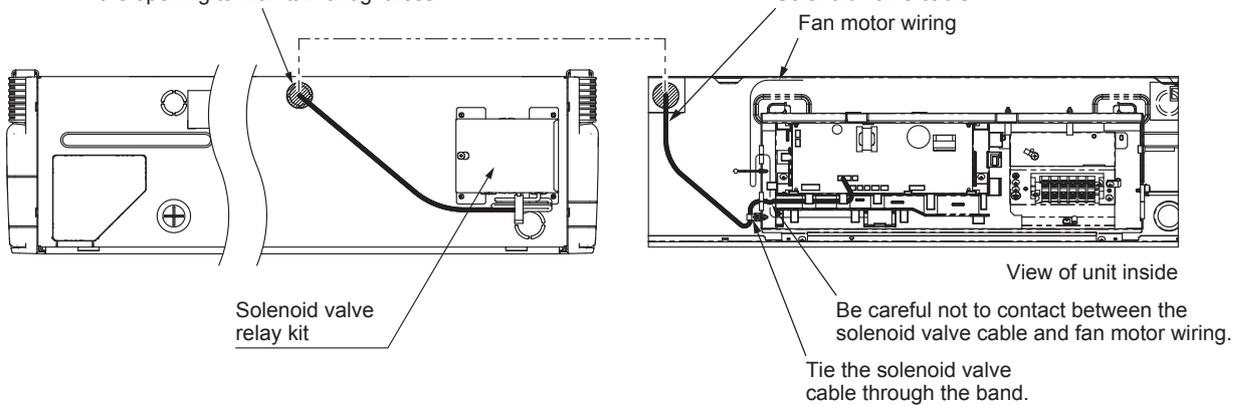
Z1 Type



T2 Type



Cut out the hole and lead the cable of the solenoid valve kit through the hole. Remove the burr around a rim of the punched hole to prevent damage to the cable. Seal or apply putty around the opening to maintain airtightness.



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