



CITY MULTI

Air-Conditioners

PUMY-P112, P125, P140VKM4

PUMY-P112, P125, P140YKM4

PUMY-P112, P125, P140YKME4

For use with R410A

INSTALLATION MANUAL

For safe and correct use, read this manual and the indoor unit installation manual thoroughly before installing the air-conditioner unit.

FOR INSTALLER

English (GB)

Contents

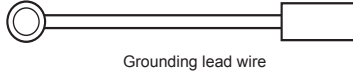
1. Safety precautions.....	2	5. Drainage piping work.....	14
2. Installation location.....	4	6. Electrical work.....	14
3. Installing the outdoor unit.....	7	7. Test run.....	23
4. Installing the refrigerant piping.....	7		

⚠ Caution:

- Do not vent R410A into the atmosphere.

Confirmation of parts attached

In addition to this manual, the following part is supplied with the outdoor unit. It is used for grounding the S terminal of transmission terminal block TB7. For detail refer to "6. Electrical work".



Grounding lead wire

1. Safety precautions

- ▶ Before installing the unit, make sure you read all the "Safety precautions".
- ▶ Please report to or take consent by the supply authority before connection to the system.
- ▶ PUMY-P-VKM series complying with IEC/EN 61000-3-12
- ▶ PUMY-P-VKM series and PUMY-P-YKME series are designed for use in the residential, commercial and light-industrial environment.
- ▶ PUMY-P-YKM series is designed as professional equipment.
- ▶ When connecting an ATW indoor unit (EHST20C and EHSC series) with a 3-phase model, use PUMY-P-YKME4.

⚠ Warning:

Describes precautions that must be observed to prevent danger of injury or death to the user.

⚠ Caution:

Describes precautions that must be observed to prevent damage to the unit.

⚠ Warning:

- The unit must not be installed by the user. Ask a dealer or an authorized technician to install the unit. If the unit is installed incorrectly, water leakage, electric shock, or fire may result.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R410A refrigerant. The R410A refrigerant in the HFC system is pressurized 1.6 times the pressure of usual refrigerants. If pipe components not designed for R410A refrigerant are used and the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.
- The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.
- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
- If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.
- Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.
- All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The units must be powered by dedicated power lines and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.

After installation work has been completed, explain the "Safety Precautions," use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⚡: Indicates a part which must be grounded.

⚠ Warning:

Carefully read the labels affixed to the main unit.

- Use only specified cables for wiring. The wiring connections must be made securely with no tension applied on the terminal connections. Also, never splice the cables for wiring (unless otherwise indicated in this document). Failure to observe these instructions may result in overheating or a fire.
- The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.
- When installing or relocating, or servicing the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards. The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.
- Use only accessories authorized by Mitsubishi Electric and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or fire may result.
- Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.
- The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.
- After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.
- The appliance shall be installed in accordance with national wiring regulations.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

1. Safety precautions

1.1. Before installation

⚠ Caution:

- Do not use the unit in an unusual environment. If the air conditioner is installed in areas exposed to steam, volatile oil (including machine oil), or sulfuric gas, areas exposed to high salt content such as the seaside, or areas where the unit will be covered by snow, the performance can be significantly reduced and the internal parts can be damaged.
- Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.
- The outdoor unit produces condensation during the heating operation. Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.
- When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the air conditioner to malfunction or breakdown. The air conditioner may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.

1.2. Before installation (relocation)

⚠ Caution:

- Be extremely careful when transporting the units. Two or more persons are needed to handle the unit, as it weighs 20 kg or more. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or other parts.
- Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stabs or other injuries.
- The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.
- Do not clean the air conditioner unit with water. Electric shock may result.
- Tighten all flare nuts to specification using a torque wrench. If tightened too much, the flare nut can break after an extended period and refrigerant can leak out.

1.3. Before electric work

⚠ Caution:

- Be sure to install circuit breakers. If not installed, electric shock may result.
- For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.
- When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.
- Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.
- Use circuit breakers (ground fault interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.

1.4. Before starting the test run

⚠ Caution:

- Turn on the main power switch more than 12 hours before starting operation. Starting operation just after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation season.
- Before starting operation, check that all panels, guards and other protective parts are correctly installed. Rotating, hot, or high voltage parts can cause injuries.
- Do not touch any switch with wet hands. Electric shock may result.
- Do not touch the refrigerant pipes with bare hands during operation. The refrigerant pipes are hot or cold depending on the condition of the flowing refrigerant. If you touch the pipes, burns or frostbite may result.
- After stopping operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.

1.5. Using R410A refrigerant air conditioners

⚠ Caution:

- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to page 7) Note the following if reusing existing pipes that carried R22 refrigerant.
- Do not use refrigerant other than R410A refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.
- Use the following tools specifically designed for use with R410A refrigerant. The following tools are necessary to use R410A refrigerant. Contact your nearest dealer for any questions.

- Replace the existing flare nuts and flare the flared sections again.

- Do not use thin pipes. (Refer to page 7)

- Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, oil deterioration or compressor breakdown may result.

- Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result.

Tools (for R410A)	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adapter
Torque wrench	Electronic refrigerant charging scale

- Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant lines, refrigeration oil deterioration may result.
- Do not use a charging cylinder. If a charging cylinder is used, the composition of the refrigerant will change and the efficiency will be lowered.

2. Installation location

2.1. Refrigerant pipe

Refer to Fig. 4-1.

2.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

2.3. Outline dimensions (Outdoor unit) (Fig. 2-1)

Constraints on indoor unit installation

You should note that indoor units that can be connected to this outdoor unit are the following models.

- Indoor units with model numbers 15-140 can be connected.
- When using Branch box, Indoor units with model numbers 15-100 can be connected.
- Refer to the table 1 below for possible room, indoor unit combinations.

Verification

The rated capacity should be determined by observing the table below. The unit's quantities are limited as shown in the following table 2. For the next step, make sure that the total rated capacity selected will stay in a range of 50% – 130% of the outdoor unit capacity.

- PUMY-P112 6.3 – 16.2 kW
- PUMY-P125 7.1 – 18.2 kW
- PUMY-P140 8.0 – 20.2 kW

Table 1-1 City Multi indoor units (P-FY series)

Indoor unit type	P15*	P20	P25	P32	P40	P50	P63	P71	P80	P100	P125	P140
Rated capacity (Cooling) (kW)	1.7	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	11.2	14.0	16.0

Table 1-2 (M series, P series, S series)

Indoor unit type	15	20	22	25	35	42	50	60	71	80	100
Rated capacity (Cooling) (kW)	1.5	2.0	2.2	2.5	3.5	4.2	5.0	6.0	7.1	8.0	10.0

Combinations in which the total capacity of indoor units exceeds the capacity of the outdoor unit will reduce the cooling capacity of each indoor unit below their rated cooling capacity. Thus, combine indoor units with an outdoor unit within the outdoor unit's capacity, if possible.

* When all the indoor units are P15 models, 12 indoor units can be connected to 1 outdoor unit.

2.4. Connecting a PWFY Unit

When using a PWFY unit as an indoor unit, be aware of the following points because the PWFY unit is different from other indoor units.

A PWFY unit cannot be connected within the EU.

2.4.1. Connection restrictions

- Only 1 PWFY-P100VM-E-AU can be connected. PWFY-P200VM-E-AU and PWFY-P100VM-E-BU cannot be connected.
- The PWFY unit cannot be the only unit connected to an outdoor unit. Select an outdoor unit so that the total rated capacity of the indoor units, excluding the PWFY unit, is 50–100% of the outdoor unit capacity.

Limits for the total rated capacity of the indoor units when connecting a PWFY unit

- PUMY-P112 (1 PWFY unit + Non-PWFY units [6.3 – 12.5 kW])
- PUMY-P125 (1 PWFY unit + Non-PWFY units [7.1 – 14.0 kW])
- PUMY-P140 (1 PWFY unit + Non-PWFY units [8.0 – 15.5 kW])

2.4.2. Indoor unit specifications

When connecting a PWFY unit to a PUMY unit, the following specifications will change.

- The PWFY unit can operate only in heating mode. The PWFY unit cannot operate in cooling mode. However, the indoor units other than the PWFY unit can operate in cooling mode.
- The other indoor units cannot operate at the same time as the PWFY unit.
- The operation of the PWFY unit has priority. When the PWFY unit is in the operation mode, the other indoor units will stop.
- The temperature setting of the remote controller is the target value for the outlet water temperature.

2.4.3. Switch settings (Fig. 2-2)

When connecting a PWFY unit to a PUMY unit, set DIP switches SW1-1, SW4-2, and SW4-6 of the PWFY unit to ON.

2.4.4. Test run

If the test run is carried out using the outdoor unit switches, the PWFY unit will not operate. Carry out the test run using the PWFY unit switches or the remote controller.

For information about carrying out the test run, refer to the data book or the service manual for the PWFY unit.

2.4.5. Refrigerant collecting (Pump down)

Step ① in the pump down procedure instructs the user to "operate all indoor units in cooling mode". However, the PWFY unit will not operate in cooling mode. Operate all of the indoor units, excluding the PWFY unit, in cooling mode.

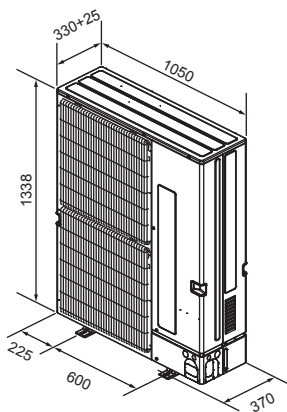


Fig. 2-1

Table 2 Connectable indoor units quantities

- City Multi indoor units

P112	1-9 *1
P125	1-10 *2
P140	1-12 *3

*1 When connecting M series indoor units via Connection kit, 10 indoor units can be connected.

*2 When connecting M series indoor units via Connection kit, 12 indoor units can be connected.

*3 When all the indoor units are P15 models, 12 indoor units can be connected.

- Branch Box system (M, S, P series indoor units via Branch box)

P112	2-8
P125	2-8
P140	2-8

- Mixed system (City Multi indoor units and M, S, P series indoor units via Branch box)

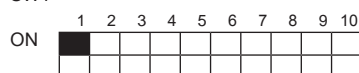
	One Branch box		Two Branch boxes	
	Via Branch box	City Multi indoor	Via Branch box	City Multi indoor
P112	Max. 5	Max. 5*1	Max. 7	Max. 3*1
			Max. 8	Max. 2*1
P125	Max. 5	Max. 5*1	Max. 8	Max. 3*1
P140	Max. 5	Max. 5*1	Max. 8	Max. 3*1

1 PKFY-P-VBM, PFFY-P-VKM, and PFFY-P-VL type indoor units cannot be used in a mixed system.

Table 3 PWFY unit specifications

Model		PWFY-P100VM-E-AU
Temp. range of Heating	Outdoor temp.	-15 to 21°C (DB), -15 to 15°C (WB)
	Inlet Water temp.	10 to 45°C
Temp. range of Cooling	Outdoor temp.	-
	Inlet Water temp.	-

SW1



SW4



Fig. 2-2

2. Installation location

2.5. Connecting a Cylinder (EHST20C) or Hydrobox (EHSC) unit

When connecting a Cylinder or Hydrobox unit, be aware of the following points because the Cylinder and Hydrobox unit are different from other indoor units.

2.5.1. Connection restrictions

- Only 1 Cylinder (EHST20C) or 1 Hydrobox (EHSC) unit can be connected.
(EHST20C-MEC, EHST20D series, EHPT20X series, EHSD series, EHSC-MEC, ERSD series, ERSC series and EHPX series cannot be connected.)
- When connecting Ecodan systems, use a PAC-MK32/52BC(B) branch box. (A PAC-MK31/51BC(B) branch box cannot be used.)
- PWFY units cannot be connected at the same time as a Cylinder or Hydrobox unit.
- ATA indoor units*1 with a total rated capacity of 50% – 130% of the outdoor unit capacity and 1 Cylinder or 1 Hydrobox unit can be connected.

*1 ATA indoor unit: An indoor unit excluding a PWFY, Cylinder unit, and Hydrobox unit.

PUMY-P112 1 Cylinder or 1 Hydrobox + ATA indoor units [max 16.2 (1.3*2) kW]

PUMY-P125 1 Cylinder or 1 Hydrobox + ATA indoor units [max 18.2 (2.8*2) kW]

PUMY-P140 1 Cylinder or 1 Hydrobox + ATA indoor units [max 20.2 (4.3*2) kW]

*2 In case of the operating a Cylinder or Hydrobox unit in Heating mode / DHW mode and operating ATA indoor units at the same time.

However, the following combinations can be connected.

· PUMY-P112: MSZ-SF15VE × 1

· PUMY-P125: MSZ-SF15VE × 2

· PUMY-P140: MSZ-SF15VE × 3

2.5.2. Indoor unit specifications

When connecting a Cylinder or a Hydrobox unit, the following specifications will change.

- The Cylinder or Hydrobox unit cannot operate in cooling mode.
- The operation mode of the Cylinder or Hydrobox unit always has priority.
- The DHW operation eco mode cannot be used.
- Maximum flow temperature is 55°C. (Dip SW1-2 on the Cylinder or Hydrobox unit must be changed to OFF.)
- Energy monitoring can be used only when an external power meter is connected.
- Multiple outdoor units cannot be controlled.
- A Cylinder or Hydrobox unit cannot be connected to an M-NET remote controller and a centralized controller.
- Boiler interlock can be used only when switching to the outside air temperature.
- A Cylinder or Hydrobox unit cannot be grouped with an ATA indoor unit.
- In case of the operating a Cylinder or Hydrobox unit in the **Heating mode** and operating ATA indoor units at the same time, be aware of the following points.
 - Heating flow temperature range of Cylinder or Hydrobox unit is 45°C - 55°C.
Please set the flow temperature range in reference to the Cylinder or Hydrobox installation Manual.
 - The outdoor temperature must be -10°C or more. When the outdoor temperature is less than 7°C, the flow temperature and blow off temperature are lowered.
- When operating a Cylinder or Hydrobox unit in the **DHW mode** and operating ATA indoor units at the same time, the outdoor temperature must be 7°C or more.
When the outdoor temperature is less than 7°C, they cannot operate at the same time.

2.5.3. Switch settings

When connecting a Cylinder or Hydrobox unit to a PUMY unit, set the DIP switch SW1-2 on Cylinder or Hydrobox unit to OFF.

2.5.4. Test run

Perform the test run for the Cylinder or Hydrobox unit from the indoor unit.

(For details about the test run, refer to the installation manual for the Cylinder or Hydrobox unit.)

2.5.5. Refrigerant collecting (Pump down)

Perform the procedures in 7.3.

2.6. Connecting a cooling-only indoor unit

If a system includes one or more cooling-only indoor units, set the entire system as a cooling system.

Set the units as indicated in table 4.

Table 4 Cooling-only setting procedure

Unit		Setting
Outdoor unit	PUMY-P·V/YKM(E)4	DIP switch SW2-6 on multi-controller circuit board: ON
Branch box	PAC-MK-BC(B)	DIP switch SW4-5 on branch box controller circuit board: ON
Indoor unit	CITY MULTI Series	DIP switch SW3-1 on indoor unit controller circuit board: ON
	M, S, P Series	Setting is not necessary.

2.7. Connecting a PEFY-P-VMA3-E

When using a PEFY-P-VMA3-E, use the following combinations for the connected indoor units.

	PUMY-P112	PUMY-P125	PUMY-P140
OK	PEFY-P25VMA3-E × 2 + PEFY-P32VMA3-E × 2	PEFY-P32VMA3-E × 4	PEFY-P32VMA3-E × 3 + PEFY-P40VMA3-E × 1
NO	All combinations excluding the above combinations Ex. 1: PEFY-P25VMA3-E × 2 + PEFY-P32VMA3-E × 2 Ex. 2: PEFY-P25VMA3-E × 2 + PEFY-P32VMA3-E × 1 Ex. 3: PEFY-P32VMA3-E × 4 (A combination for a PUMY-P125) Ex. 4: PEFY-P25VMA3-E × 2 + PEFY-P32VMA3-E × 2 + MSZ-FH25VE × 1	All combinations excluding the above combinations Ex. 1: PEFY-P32VMA3-E × 3 + PEFY-P32VMA3-E × 1 Ex. 2: PEFY-P32VMA3-E × 3 Ex. 3: PEFY-P25VMA3-E × 2 + PEFY-P32VMA3-E × 2 (A combination for a PUMY-P112) Ex. 4: PEFY-P32VMA3-E × 3 + PLFY-P20VFM-E × 1 + SEZ-KD25VA × 1	All combinations excluding the above combinations Ex. 1: PEFY-P32VMA3-E × 3 + PEFY-P40VMA3-E × 1 Ex. 2: PEFY-P32VMA3-E × 2 + PEFY-P40VMA3-E × 1 Ex. 3: PEFY-P32VMA3-E × 4 (A combination for a PUMY-P125) Ex. 4: PEFY-P32VMA3-E × 3 + PCFY-P40VKM-E × 1 + MSZ-SF15VA × 1

Ex. 1: A ceiling-concealed unit other than a VMA3 series is selected. Combinations with a ceiling-concealed different series are not possible.
Ex. 2: The number of units is incorrect.
Ex. 3: The combination is for a unit with a different capacity.
Ex. 4: The combination is not an "OK" combination.

2.8. Connecting a PLFY-EP-VEM-E

For the PLFY-EP-VEM-E, up to 2 units can be connected.

Other indoor units*1 can be connected within the total rated capacity and maximum number of connected units.

*1 Excluding the PEFY-P-VMA3-E and PEFY-P-VMH-EF.

2. Installation location

2.9. Ventilation and service space

2.9.1. When installing a single outdoor unit

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

Refer to the figures for each case.

- ① Obstacles at rear only (Fig. 2-3)
- ② Obstacles at rear and above only (Fig. 2-4)
 - * Do not install the optional air outlet guides for upward airflow.
- ③ Obstacles at rear and sides only (Fig. 2-5)
 - * When using an optional air outlet guide, the clearance is 500 mm or more.
- ④ Obstacles at front only (Fig. 2-6)
- ⑤ Obstacles at front and rear only (Fig. 2-7)
 - * When using an optional air outlet guide, the clearance is 500 mm or more.
- ⑥ Obstacles at rear, sides, and above only (Fig. 2-8)
 - * Do not install the optional air outlet guides for upward airflow.

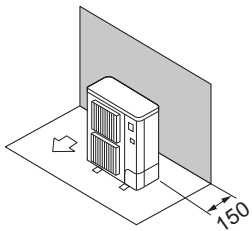


Fig. 2-3

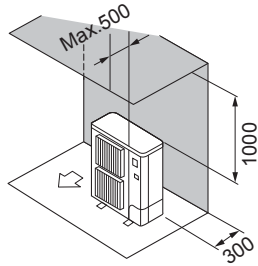


Fig. 2-4

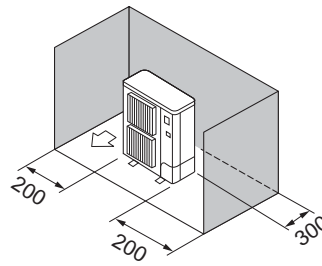


Fig. 2-5

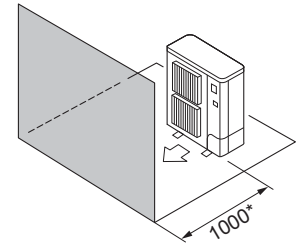


Fig. 2-6

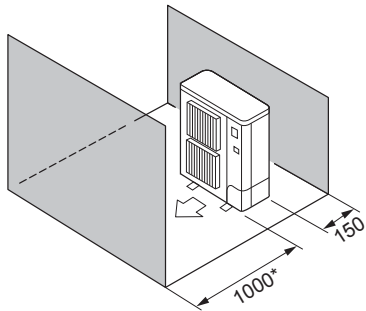


Fig. 2-7

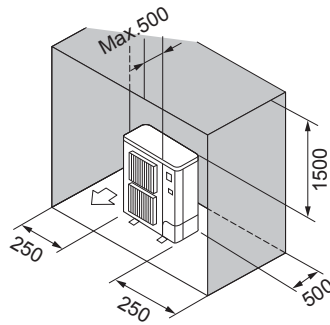


Fig. 2-8

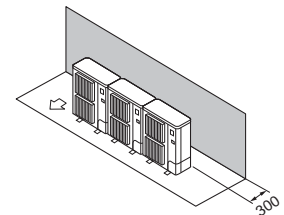


Fig. 2-9

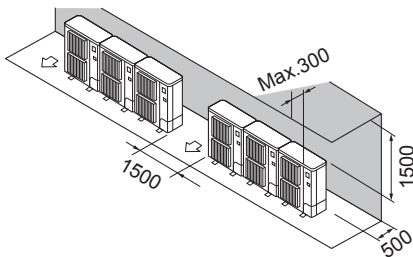


Fig. 2-10

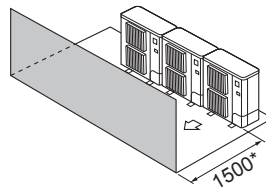


Fig. 2-11

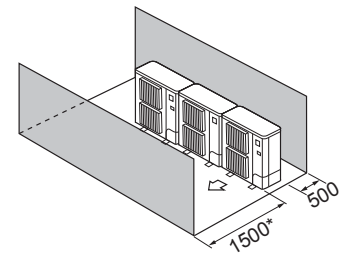


Fig. 2-12

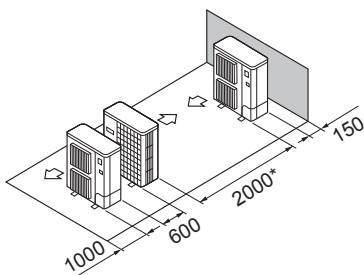


Fig. 2-13

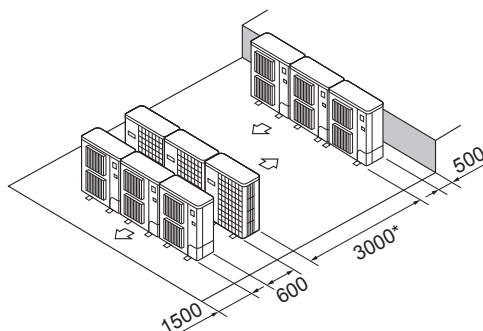


Fig. 2-14

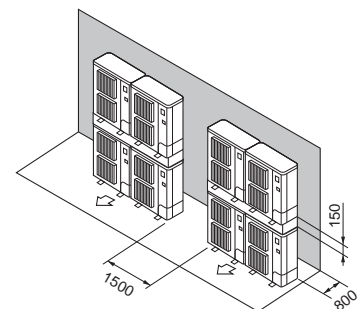


Fig. 2-15

2.9.2. When installing multiple outdoor units

Leave 25 mm space or more between the units.

- ① Obstacles at rear only (Fig. 2-9)
- ② Obstacles at rear and above only (Fig. 2-10)
 - * No more than three units must be installed side by side. In addition, leave space as shown.
 - * Do not install the optional air outlet guides for upward airflow.
- ③ Obstacles at front only (Fig. 2-11)
 - * When using an optional air outlet guide, the clearance is 1000 mm or more.
- ④ Obstacles at front and rear only (Fig. 2-12)
 - * When using an optional air outlet guide, the clearance is 1000 mm or more.
- ⑤ Single parallel unit arrangement (Fig. 2-13)
 - * When using an optional air outlet guide installed for upward airflow, the clearance is 1000 mm or more.
- ⑥ Multiple parallel unit arrangement (Fig. 2-14)
 - * When using an optional air outlet guide installed for upward airflow, the clearance is 1500 mm or more.
- ⑦ Stacked unit arrangement (Fig. 2-15)
 - * The units can be stacked up to two units high.
 - * No more than two stacked units must be installed side by side. In addition, leave space as shown.

2. Installation location

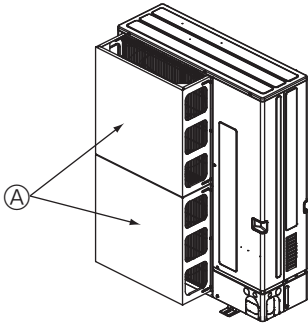


Fig. 2-16

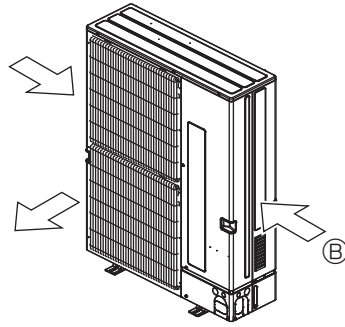


Fig. 2-17

2.9.3. Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows two examples of precautions against strong winds.

- ① Install an optional air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-16)
 - Ⓐ Air guide
- ② Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-17)
 - Ⓑ Wind direction

3. Installing the outdoor unit

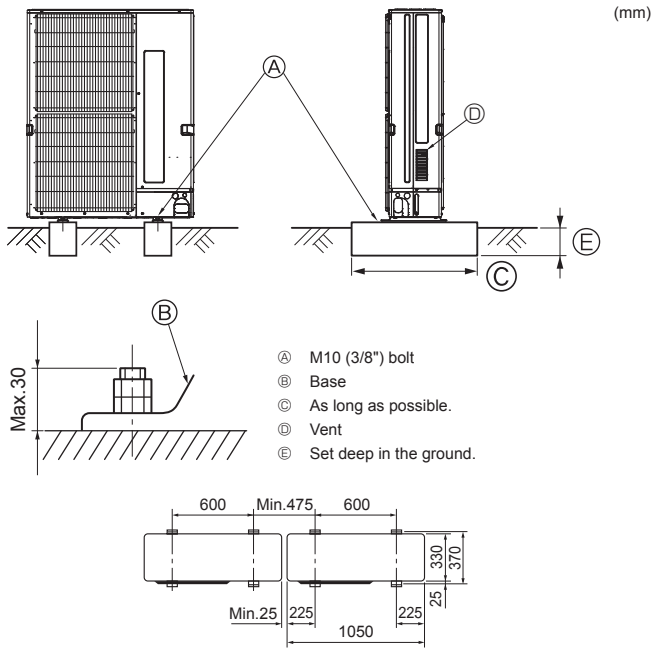


Fig. 3-1

- Be sure to install the unit in a sturdy, level surface to prevent rattling noises during operation. (Fig. 3-1)

<Foundation specifications>

Foundation bolt	M10 (3/8")
Thickness of concrete	120 mm
Length of bolt	70 mm
Weight-bearing capacity	320 kg

- Make sure that the length of the foundation bolt is within 30 mm of the bottom surface of the base.
 - Secure the base of the unit firmly with four-M10 foundation bolts in sturdy locations.
- Installing the outdoor unit**
- Do not block the vent. If the vent is blocked, operation will be hindered and breakdown may result.
 - In addition to the unit base, use the installation holes on the back of the unit to attach wires, etc., if necessary to install the unit. Use self-tapping screws (ø5 × 15 mm or less) and install on site.

⚠ Warning:

- The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.
- The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.

⚠ Caution:

- Install unit on a rigid structure to prevent excessive operation sound or vibration.

4. Installing the refrigerant piping

4.1. Precautions for devices that use R410A refrigerant

- Refer to page 3 for precautions not included below on using air conditioners with R410A refrigerant.
- Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections.
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Use refrigerant pipes with the thicknesses specified in the table to the below. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.

⚠ Warning:

When installing or relocating, or servicing the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines.

If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards. The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

ø6.35, ø9.52, ø12.7	Thickness 0.8 mm
ø15.88	Thickness 1.0 mm

- Do not use pipes thinner than those specified above.
- The thicknesses listed in the table above are based on Japanese standards. Use pipes with a maximum working pressure of 4.15 MPa [601 PSIG] or higher according to local standards.

4. Installing the refrigerant piping

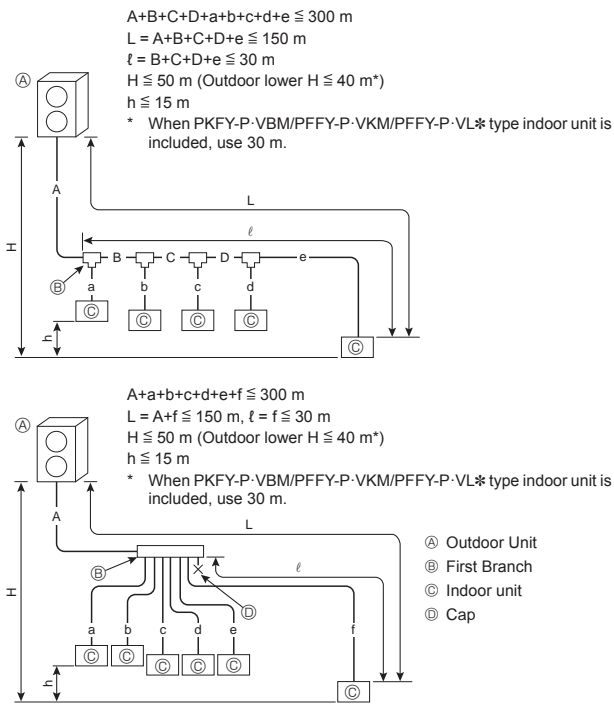


Fig. 4-1

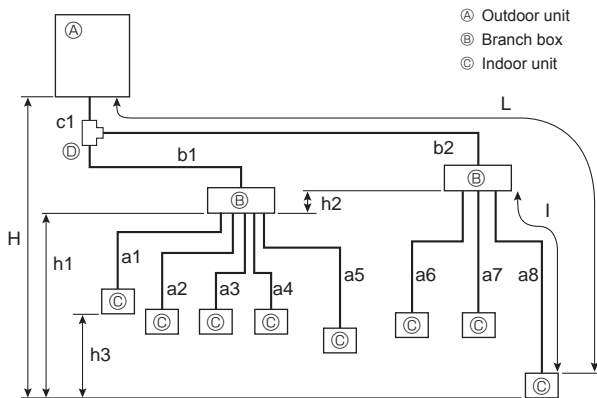


Fig. 4-2

Permissible length (one-way)	Total piping length	$c1 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 \leq 150$ m
	Farthest piping length (L)	$c1 + b2 + a8 \leq 80$ m
	Piping length between outdoor unit and branch boxes	$c1 + b1 + b2 \leq 55$ m
	Farthest branch box from the first joint (b2)	$b2 \leq 30$ m
	Farthest piping length after branch box (l)	$a8 \leq 25$ m
	Total piping length between branch boxes and indoor units	$a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 \leq 95$ m
Permissible height difference (one-way)	In indoor/outdoor section (H)*1	$H \leq 50$ m (In case of outdoor unit is set higher than indoor unit) $H \leq 40$ m (In case of outdoor unit is set lower than indoor unit)
	In branch box/indoor unit section (h1)	$h1 + h2 \leq 15$ m
	In each branch unit (h2)	$h2 \leq 15$ m
	In each indoor unit (h3)	$h3 \leq 12$ m
Number of bends		$ c1 + b1 + a1 , c1 + b1 + a2 , c1 + b1 + a3 , c1 + b1 + a4 , c1 + b1 + a5 , c1 + b2 + a6 , c1 + b2 + a7 , c1 + b2 + a8 \leq 15$

*1 Branch box should be placed within the level between the outdoor unit and indoor units.

4.2. Pipe length and height difference

4.2.1. Connection without Branch Box (Fig. 4-1)

A	(mm)	
	(A) Liquid pipe	(B) Gas pipe
PUMY-P112-140	$\phi 9.52$	$\phi 15.88$

B, C, D	(mm)	
(C) Total capacity of indoor units	(A) Liquid pipe	(B) Gas pipe
	$\phi 9.52$	$\phi 15.88$

a, b, c, d, e, f	(mm)	
(D) Model number	(A) Liquid pipe	(B) Gas pipe
15, 20, 25, 32, 40, 50	$\phi 6.35$	$\phi 12.7$
63, 80, 100, 125, 140	$\phi 9.52$	$\phi 15.88$

(E) Branch kit model
CMY-Y62-G-E

(F) 4-Branching header	(G) 8-Branching header
CMY-Y64-G-E	CMY-Y68-G-E

* When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT when selecting the pipe size and piping length.

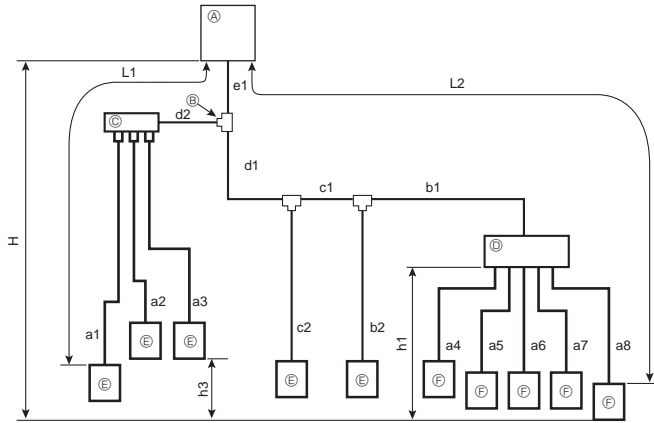
4.2.2. Connection with Branch Box (Fig. 4-2)

- This unit has flared connections on each indoor unit and branch box and outdoor unit sides.
- Remove the valve cover of the outdoor unit, then connect the pipe.
- Refrigerant pipes are used to connect the branch box and outdoor unit.

4. Installing the refrigerant piping

4.2.3. Mixed system (City Multi indoor units and M, S, P series indoor units via Branch box) (Fig. 4-3)

1. In case of using 1-Branch boxes



- Ⓐ Outdoor Unit
- Ⓑ First joint
- Ⓒ Branch header (CMY)
- Ⓓ Branch box (PAC-MK-BC(B))
- Ⓔ CityMulti Indoor unit*

Ⓕ M, S, P series Indoor unit, Cylinder unit or Hydrobox unit

* PKFY-P-VBM, PFFY-P-VKM, and PFFY-P-VL* type indoor units cannot be used in a mixed system.

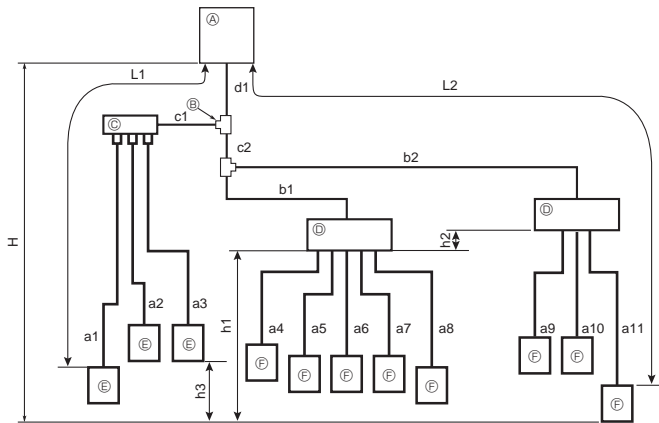
Fig. 4-3 (a)

Permissible length (One-way)	Total piping length	$e1 + d1 + d2 + c1 + c2 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 \leq 300 \text{ m}^*3$
	Farthest piping length (L1)	$e1 + d2 + a1 \text{ or } e1 + d1 + c1 + b2 \leq 85 \text{ m}$
	Farthest piping length. Via Branch box (L2)	$e1 + d1 + c1 + b1 + a8 \leq 80 \text{ m}$
	Piping length between outdoor unit and branch box	$e1 + d1 + c1 + b1 \leq 55 \text{ m}$
	Farthest piping length from the first joint	$d1 + c1 + b1, d1 + c1 + b2, d1 + c2 \text{ or } d2 + c1 \leq 30 \text{ m}$
	Farthest piping length after branch box	$a8 \leq 25 \text{ m}$
	Total piping length between branch boxes and indoor units	$a4 + a5 + a6 + a7 + a8 \leq 95 \text{ m}$
Permissible height difference (One-way)	In indoor/outdoor section (H) *2	$H \leq 50 \text{ m}$ (In case of outdoor unit is set higher than indoor unit) $H \leq 40 \text{ m}$ (In case of outdoor unit is set lower than indoor unit)
	In branch box/indoor unit section (h1)	$h1 \leq 15 \text{ m}$
	In each indoor unit (h3)	$h3 \leq 12 \text{ m}$
Number of bends		$ e1 + d2 + a1 , e1 + d2 + a2 , e1 + d2 + a3 , e1 + d1 + c2 , e1 + d1 + c1 + b2 , e1 + d1 + c1 + b1 + a4 , e1 + d1 + c1 + b1 + a5 , e1 + d1 + c1 + b1 + a6 , e1 + d1 + c1 + b1 + a7 , e1 + d1 + c1 + b1 + a8 \leq 15$

*2: Branch box should be placed within the level between the outdoor unit and indoor units.

*3: When a Cylinder unit or Hydrobox unit is connected, the maximum piping length is 150 m.

2. In case of using 2-Branch boxes



- Ⓐ Outdoor Unit
- Ⓑ First joint
- Ⓒ Branch header (CMY)
- Ⓓ Branch box (PAC-MK-BC(B))
- Ⓔ CityMulti Indoor unit*

Ⓕ M, S, P series Indoor unit, Cylinder unit or Hydrobox unit

* PKFY-P-VBM, PFFY-P-VKM, and PFFY-P-VL* type indoor units cannot be used in a mixed system.

Fig. 4-3 (b)

Permissible length (One-way)	Total piping length	$d1 + c1 + c2 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 + a9 + a10 + a11 \leq 240 \text{ m}^*3$
	Farthest piping length (L1)	$d1 + c1 + a1 \leq 85 \text{ m}$
	Farthest piping length. Via Branch box (L2)	$d1 + c2 + b2 + a11 \leq 80 \text{ m}$
	Piping length between outdoor unit and branch boxes	$d1 + c2 + b1 + b2 \leq 55 \text{ m}$
	Farthest piping length from the first joint	$c2 + b2 \text{ or } c1 + a1 \leq 30 \text{ m}$
	Farthest piping length after branch box	$a11 \leq 25 \text{ m}$
	Farthest branch box from outdoor unit	$d1 + c2 + b2 \leq 55 \text{ m}$
Total piping length between branch boxes and indoor units	$a4 + a5 + a6 + a7 + a8 + a9 + a10 + a11 \leq 95 \text{ m}$	
Permissible height difference (One-way)	In indoor/outdoor section (H) *2	$H \leq 50 \text{ m}$ (In case of outdoor unit is set higher than indoor unit) $H \leq 40 \text{ m}$ (In case of outdoor unit is set lower than indoor unit)
	In branch box/indoor unit section (h1+h2)	$h1 + h2 \leq 15 \text{ m}$
	In each branch unit (h1)	$h2 \leq 15 \text{ m}$
	In each indoor unit (h3)	$h3 \leq 12 \text{ m}$
Number of bends		$ d1 + c1 + a1 , d1 + c1 + a2 , d1 + c1 + a3 , d1 + c2 + b1 + a4 , d1 + c2 + b1 + a5 , d1 + c2 + b1 + a6 , d1 + c2 + b1 + a7 , d1 + c2 + b1 + a8 , d1 + c2 + b2 + a9 , d1 + c2 + b2 + a10 , d1 + c2 + b2 + a11 \leq 15$

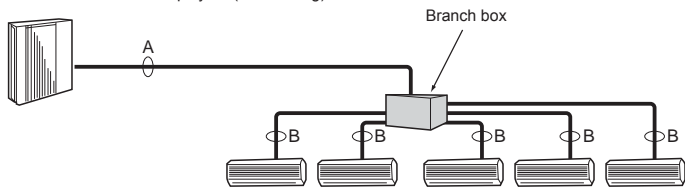
*2: Branch box should be placed within the level between the outdoor unit and indoor units.

*3: When a Cylinder unit or Hydrobox unit is connected, the maximum piping length is 150 m.

4. Installing the refrigerant piping

■ In case of using 1-branch box

Flare connection employed. (No. brazing)



■ In case of using 2-branch boxes

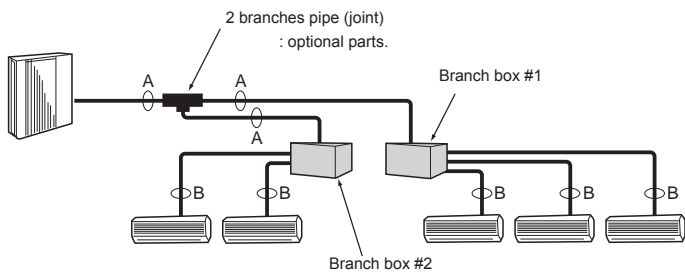


Fig. 4-4

(1) Valve size for outdoor unit

For liquid	ø9.52 mm
For gas	ø15.88 mm

(2) Valve size for branch box

UNIT	Pipe	Valve size (mm)
A UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
B UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
C UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
D UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
E UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø12.7 mm

* 3-branch type : only A, B, C unit

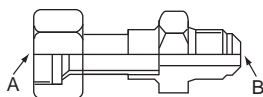


Fig. 4-5

Conversion formula

1/4 F	ø6.35
3/8 F	ø9.52
1/2 F	ø12.7
5/8 F	ø15.88
3/4 F	ø19.05

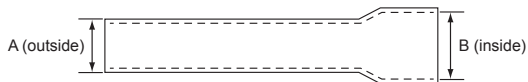


Fig. 4-6

4.3. Selecting pipe size

4.3.1. Connection without Branch Box

		Indoor unit		Outdoor unit
		15-50	63-140	112-140
Gas side	Pipe size (mm)	ø12.7	ø15.88	ø15.88
Liquid side	Pipe size (mm)	ø6.35	ø9.52	ø9.52

4.3.2. Connection with Branch Box (Fig. 4-4)

	A	B
Liquid (mm)	ø9.52	The piping connection size differs according to the type and capacity of indoor units. Match the piping connection size of branch box with indoor unit. If the piping connection size of branch box does not match the piping connection size of indoor unit, use optional different-diameter (deformed) joints to the branch box side. (Connect deformed joint directly to the branch box side.)
Gas (mm)	ø15.88	

Different-diameter joint (optional parts) (Fig. 4-5)

Model name	Connected pipes diameter	Diameter A	Diameter B
	mm	mm	mm
MAC-A454JP	ø9.52 → ø12.7	ø9.52	ø12.7
MAC-A455JP	ø12.7 → ø9.52	ø12.7	ø9.52
MAC-A456JP	ø12.7 → ø15.88	ø12.7	ø15.88
PAC-493PI	ø6.35 → ø9.52	ø6.35	ø9.52
PAC-SG76RJ-E	ø9.52 → ø15.88	ø9.52	ø15.88

Different-diameter joint (optional parts) (Fig. 4-6)

Model name	Connected pipes diameter	Outside Diameter A	Inside Diameter B
	mm	mm	mm
PAC-SG78RJB-E	ø9.52 → ø12.7	ø9.52	ø12.7
PAC-SG79RJB-E	ø12.7 → ø9.52	ø12.7	ø9.52
PAC-SG80RJB-E	ø12.7 → ø15.88	ø12.7	ø15.88
PAC-SG77RJB-E	ø6.35 → ø9.52	ø6.35	ø9.52
PAC-SG76RJB-E	ø9.52 → ø15.88	ø9.52	ø15.88

Piping preparation

① Table below shows the specifications of pipes commercially available.

Outside diameter	Insulation thickness	Insulation material Heat resisting foam plastic 0.045 specific gravity
mm	mm	
6.35	8	
9.52	8	
12.7	8	
15.88	8	

② Ensure that the 2 refrigerant pipes are insulated to prevent condensation.

③ Refrigerant pipe bending radius must be 100 mm or more.

⚠ Caution:

Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and branch box, and lack of thickness may cause dew dripage.

2-branch pipe (Joint) : Optional parts (According to the connection method, you can choose the favorite one.)

Model name	Connection method
MSDD-50AR-E	flare
MSDD-50BR-E	brazing

■ Installation procedure (2 branches pipe (Joint))

Refer to the installation manuals of MSDD-50AR-E and MSDD-50BR-E.

■ Pipe size (Outdoor unit-Branch box)

	A liquid pipe	B Gas pipe
PUMY-P112-140	ø9.52	ø15.88

■ Pipe size (Branch box-Indoor unit) Case of M series or S series Indoor unit *1

Indoor unit series	Model number	A liquid pipe	B Gas pipe
M series or S series	15~42	ø6.35	ø9.52
	50	ø6.35	ø12.7
	60	ø6.35	ø15.88
	71~80	ø9.52	ø15.88
P series	35, 50 *2	ø6.35	ø12.7
	60~100	ø9.52	ø15.88
Cylinder unit		ø9.52	ø15.88
Hydrobox unit		ø9.52	ø15.88

*1 The lineup of a connectable indoor unit depends on a district/areas/country.

*2 When using 35, 50 type indoor unit of P series, use the flare nut attached to the indoor unit.

Do not use the flare nut in the indoor unit accessory. If it is used, a gas leakage or even a pipe extraction may occur.

4. Installing the refrigerant piping

4.3.3. Mixed system

(City Multi indoor units and M, S, P series indoor units via Branch box)
(Fig. 4-7)

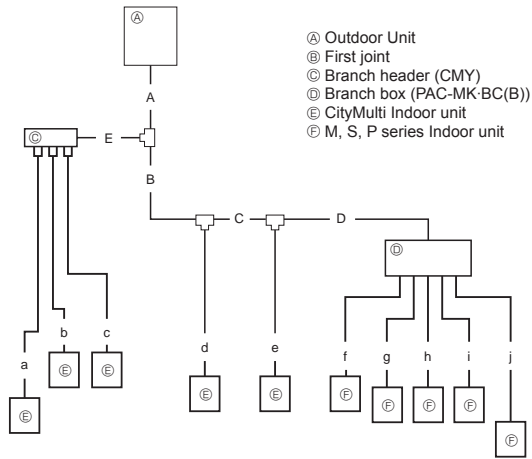


Fig. 4-7

Pipe size

A, B, C, D, E

	A liquid pipe	B Gas pipe
PUMY-P112-140	ø9.52	ø15.88

a, b, c~j

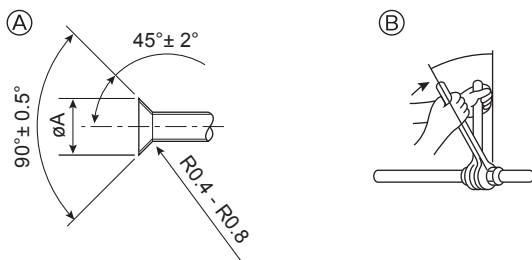
Indoor unit series	Model number	A liquid pipe	B Gas pipe
CityMulti	15~50	ø6.35	ø12.7
	63~140	ø9.52	ø15.88
M series or S series	15~42	ø6.35	ø9.52
	50	ø6.35	ø12.7
	60	ø6.35	ø15.88
	71~80	ø9.52	ø15.88
P series	35, 50 *1	ø6.35	ø12.7
	60~100	ø9.52	ø15.88
Cylinder unit Hydrobox unit	—	ø9.52	ø15.88

2-branch joint	CMY-Y62-G-E
4-branch header	CMY-Y64-G-E
8-branch header	CMY-Y68-G-E

*1 When using 35, 50 type indoor unit of P series, use the flare nut attached to the indoor unit.

Do not use the flare nut in the indoor unit accessory. If it is used, a gas leakage or even a pipe extraction may occur.

4. Installing the refrigerant piping



- Ⓐ Flare cutting dimensions
Ⓑ Flare nut tightening torque

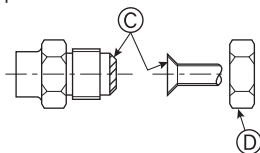


Fig. 4-8

Ⓐ (Fig. 4-8)

Copper pipe O.D. (mm)	Flare dimensions ØA dimensions (mm)
ø6.35	8.7 - 9.1
ø9.52	12.8 - 13.2
ø12.7	16.2 - 16.6
ø15.88	19.3 - 19.7

Ⓑ (Fig. 4-8)

Copper pipe O.D. (mm)	Flare nut O.D. (mm)	Tightening torque (N·m)
ø6.35	17	14 - 18
ø6.35	22	34 - 42
ø9.52	22	34 - 42
ø12.7	26	49 - 61
ø12.7	29	68 - 82
ø15.88	29	68 - 82
ø15.88	36	100 - 120

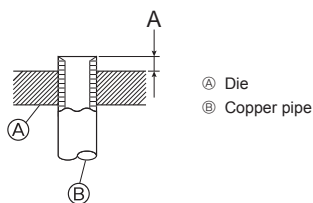


Fig. 4-9

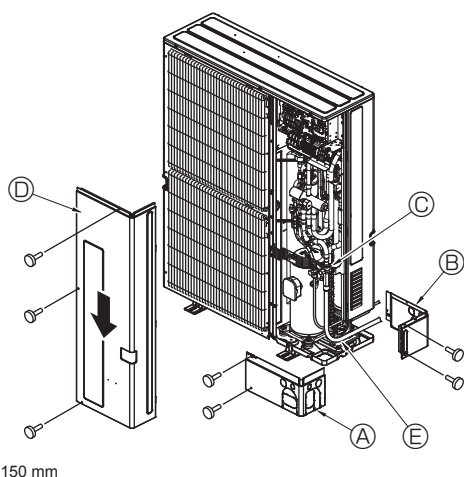


Fig. 4-10

4.4. Connecting pipes (Fig. 4-8)

- Conduct sufficient anti-condensation and insulation work to prevent water dripping from the refrigerant piping. (liquid pipe/gas pipe)
- Increase insulation depending on the environment where the refrigerant piping is installed, or condensation may occur on the surface of the insulation material. (Insulation material Heat-resistant temperature: 120 °C, Thickness: 15 mm or more)
 - * When the refrigerant piping is used in locations subject to high temperature and humidity such as in the attic, further addition of insulation may be required.
- To insulate the refrigerant piping, apply heat-resistant polyethylene foam between the indoor unit and insulation material as well as to the net between the insulation material filling all gaps. (Condensation forming on the piping may result in condensation in the room or burns when contacting the piping.)
- The indoor parts of the drain pipe should be wrapped with polyethylene foam insulation materials (specific gravity of 0.03, thickness of 9 mm or more).
- Apply thin layer of refrigerant oil to pipe and joint seating surface before tightening flare nut. Ⓐ
- Use two wrenches to tighten piping connections. Ⓑ
- Use leak detector or soapy water to check for gas leaks after connections are completed.
- Apply refrigerating machine oil over the entire flare seat surface. Ⓒ
- Use the flare nuts for the following pipe size. Ⓓ
- When bending the pipes, be careful not to break them. Bend radius of 100 mm to 150 mm is sufficient.
- Make sure the pipes do not contact the compressor. Abnormal noise or vibration may result.

- ① Pipes must be connected starting from the indoor unit. Flare nuts must be tightened with a torque wrench.
- ② Flare the liquid pipes and gas pipes and apply a thin layer of refrigeration oil (Applied on site).
- When usual pipe sealing is used, refer to Table 3 for flaring of R410A refrigerant pipes. The size adjustment gauge can be used to confirm A measurements.

⚠ Warning:

When installing the unit, securely connect the refrigerant pipes before starting the compressor.

* To connect the CONNECTION KIT (PAC-LV11M-J), refer to the installation manual for the CONNECTION KIT.

Table 3 (Fig. 4-9)

Copper pipe O.D. (mm)	A (mm)	
	Flare tool for R410A	Flare tool for R22-R407C
	Clutch type	
ø6.35	0 - 0.5	1.0 - 1.5
ø9.52	0 - 0.5	1.0 - 1.5
ø12.7	0 - 0.5	1.0 - 1.5
ø15.88	0 - 0.5	1.0 - 1.5
ø19.05	0 - 0.5	1.0 - 1.5

4.5. Refrigerant piping (Fig. 4-10)

Remove the service panel Ⓓ (three screws) and the front piping cover Ⓐ (two screws) and rear piping cover Ⓑ (two screws).

- ① Perform refrigerant piping connections for the indoor/outdoor unit when the outdoor unit's stop valve is completely closed.
- ② Vacuum-purge air from the indoor unit and the connection piping.
- ③ After connecting the refrigerant pipes, check the connected pipes and the indoor unit for gas leaks. (Refer to 4.6. Refrigerant pipe airtight testing method)
- ④ Vacuumize the refrigerant lines through the service port of the liquid and gas stop valves. And then open the stop valves completely (for both the liquid and gas stop valves). This will completely connect the refrigerant lines of the indoor and outdoor units.
 - If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
 - Use a leak detector or soapy water to check for gas leaks at the pipe connection sections of the outdoor unit.
 - Do not use the refrigerant from the unit to purge air from the refrigerant lines.
 - After the valve work is completed, tighten the valve caps to the correct torque: 20 to 25 N·m (200 to 250 kgf·cm). Failure to replace and tighten the caps may result in refrigerant leakage. In addition, do not damage the insides of the valve caps as they act as a seal to prevent refrigerant leakage.
- ⑤ Use sealant to seal the ends of the thermal insulation around the pipe connection sections to prevent water from entering the thermal insulation.

4. Installing the refrigerant piping

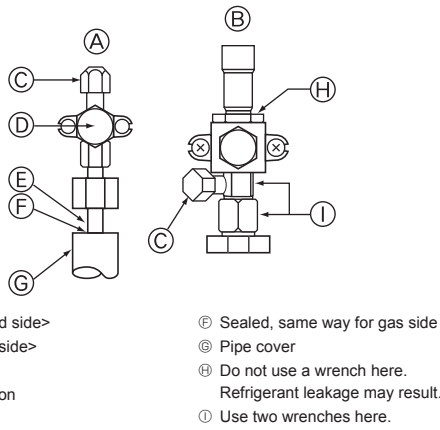


Fig. 4-11

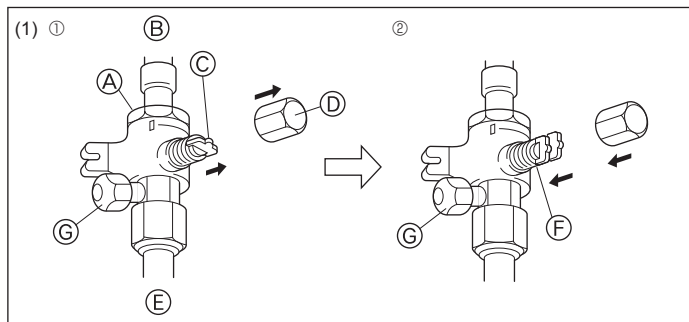


Fig. 4-12

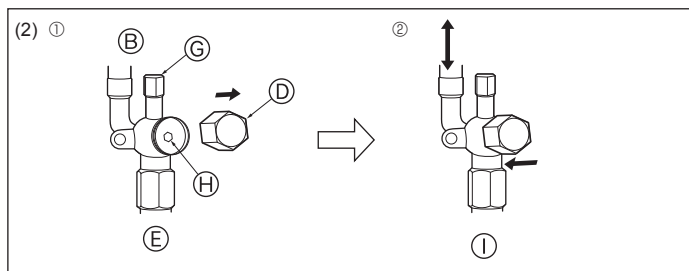


Fig. 4-13

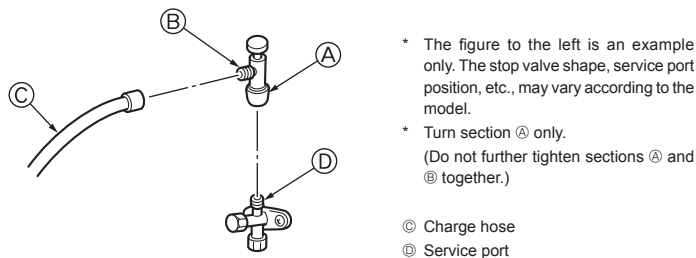


Fig. 4-14

4.6. Refrigerant pipe airtight testing method

(1) Connect the testing tools.

- Make sure the stop valves (A) (B) are closed and do not open them.
- Add pressure to the refrigerant lines through the service port (C) of the liquid stop valve (A) and the gas stop valve (B).

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.

- ① Pressurize to 0.5 MPa (5 kgf/cm²G), wait five minutes, and make sure the pressure does not decrease.
- ② Pressurize to 1.5 MPa (15 kgf/cm²G), wait five minutes, and make sure the pressure does not decrease.
- ③ Pressurize to 4.15 MPa (41.5 kgf/cm²G) and measure the surrounding temperature and refrigerant pressure.

(3) If the specified pressure holds for about one day and does not decrease, the pipes have passed the test and there are no leaks.

- If the surrounding temperature changes by 1°C, the pressure will change by about 0.01 MPa (0.1 kgf/cm²G). Make the necessary corrections.

(4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.

4.7. Stop valve opening method

(1) Gas side (Fig. 4-12)

① Remove the cap, pull the handle toward you and rotate 1/4 turn in a counterclockwise direction to open.

② Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.

(2) Liquid side (Fig. 4-13)

① Remove the cap and turn the valve rod counterclockwise as far as it will go with the use of a 4 mm hexagonal wrench. Stop turning when it hits the stopper.

($\varnothing 6.35$: Approximately 4.5 revolutions) ($\varnothing 9.52$: Approximately 10 revolutions)

② Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.

- Ⓐ Valve
- Ⓑ Unit side
- Ⓒ Handle
- Ⓓ Cap
- Ⓔ Local pipe side
- Ⓕ Open position side
- Ⓖ Service port
- Ⓗ Wrench hole
- Ⓘ Refrigerant flow direction

Refrigerant pipes are protectively wrapped

- The pipes can be protectively wrapped up to a diameter of $\varnothing 90$ before or after connecting the pipes. Cut out the knockout in the pipe cover following the groove and wrap the pipes.

Pipe inlet gap

- Use putty or sealant to seal the pipe inlet around the pipes so that no gaps remain. (If the gaps are not closed, noise may be emitted or water and dust will enter the unit and breakdown may result.)

Precautions when using the charge valve (Fig. 4-14)

Do not tighten the service port too much when installing it, otherwise, the valve core could be deformed and become loose, causing a gas leak.

After positioning section (B) in the desired direction, turn section (A) only and tighten it. Do not further tighten sections (A) and (B) together after tightening section (A).

* The figure to the left is an example only. The stop valve shape, service port position, etc., may vary according to the model.

* Turn section (A) only. (Do not further tighten sections (A) and (B) together.)

- Ⓒ Charge hose
- Ⓓ Service port

4. Installing the refrigerant piping

4.8. Additional refrigerant charge

Additional refrigerant charge

Refrigerant for the extended piping is not included in the outdoor unit when the unit is shipped from the factory. Therefore, charge each refrigerant piping system with additional refrigerant at the installation site. In addition, in order to carry out service, enter the size and length of each liquid pipe and additional refrigerant charge amounts in the spaces provided on the "Refrigerant amount" plate on the outdoor unit.

Calculation of additional refrigerant charge

- Calculate the additional charge using the liquid pipe size and length of the extended piping and total capacity of connected indoor units.
- In the calculation, use 11.2 kW for the capacity of the Cylinder or Hydrobox unit.
- Calculate the additional refrigerant charge using the procedure shown to the right, and charge with the additional refrigerant.
- For amounts less than 0.1 kg, round up the calculated additional refrigerant charge.
(For example, if the calculated charge is 6.01 kg, round up the charge to 6.1 kg.)

<Additional Charge>

Calculation of refrigerant charge

Pipe size Liquid pipe ø6.35 (m) × 19.0 (g/m)	+	Pipe size Liquid pipe ø9.52 (m) × 50.0 (g/m)	+	Total capacity of connected indoor units ~ 8.0 kW 8.1 ~ 16.0 kW 16.1 kW ~	Amount for the indoor units 1.5 kg 2.5 kg 3.0 kg
---	---	---	---	---	--

Included refrigerant amount when shipped from the factory

Included refrigerant amount
4.8 kg

<Example>

Outdoor model : P125	A : ø9.52 30 m	} At the conditions below:
Indoor 1 : P63 (7.1 kW)	a : ø9.52 15 m	
2 : P40 (4.5 kW)	b : ø6.35 10 m	
3 : P25 (2.8 kW)	c : ø6.35 10 m	
4 : P20 (2.2 kW)	d : ø6.35 20 m	

The total length of each liquid line is as follows:

$$\text{ø9.52 : } A + a = 30 + 15 = 45 \text{ m}$$

$$\text{ø6.35 : } b + c + d = 10 + 10 + 20 = 40 \text{ m}$$

The total capacity of connected indoor unit is as follows:

$$7.1 + 4.5 + 2.8 + 2.2 = 16.6$$

<Calculation example>

Additional refrigerant charge

$$40 \times \frac{19.0}{1000} + 45 \times \frac{50.0}{1000} + 3.0 = 6.1 \text{ kg (rounded up)}$$

5. Drainage piping work

Outdoor unit drainage pipe connection

When drain piping is necessary, use the drain socket or the drain pan (option).

	P112-140
Drain socket	PAC-SG61DS-E
Drain pan	PAC-SH97DP-E

6. Electrical work

6.1. Caution

- Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.
- Wiring for control (hereinafter referred to as transmission line) shall be (5 cm or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert transmission line and power source wire in the same conduit.)
- Be sure to provide designated grounding work to outdoor unit.
- Give some allowance to wiring for electrical part box of indoor and outdoor units, because the box is sometimes removed at the time of service work.
- Never connect the main power source to terminal block of transmission line. If connected, electrical parts will be burnt out.
- Use 2-core shield cable for transmission line. If transmission lines of different systems are wired with the same multiplecore cable, the resultant poor transmitting and receiving will cause erroneous operations.
- Only the transmission line specified should be connected to the terminal block for outdoor unit transmission.
(Transmission line to be connected with indoor unit : Terminal block TB3 for transmission line, Other : Terminal block TB7 for centralized control)
Erroneous connection does not allow the system to operate.
- In case to connect with the upper class controller or to conduct group operation in different refrigerant systems, the control line for transmission is required between the outdoor units each other.
Connect this control line between the terminal blocks for centralized control. (2-wire line with no polarity)
When conducting group operation in different refrigerant systems without connecting to the upper class controller, replace the insertion of the short circuit connector from CN41 of one outdoor unit to CN40.
- Group is set by operating the remote controller.
- When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT.
- When connecting a branch box, be sure to turn on the indoor units and the branch box before turning on the outdoor unit.

6. Electrical work

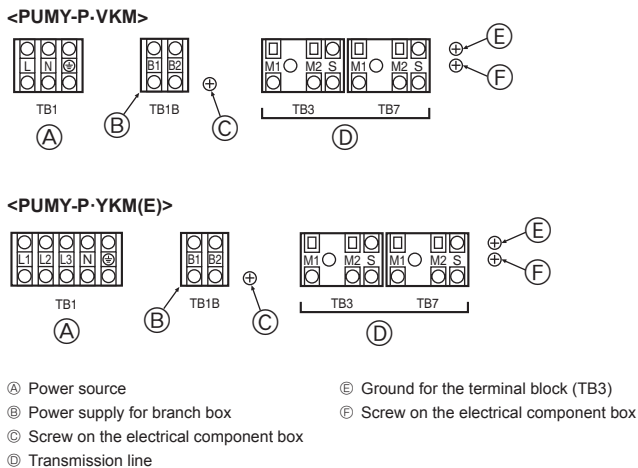


Fig. 6-1

6.2. Control box and connecting position of wiring (Fig. 6-1)

- Connect the indoor unit transmission line to transmission terminal block (TB3), or connect the wiring between outdoor units or the wiring with the centralized control system to the centralized control terminal block (TB7).
When using shielded wiring, connect shield ground of the indoor unit transmission line to the screw (Ⓔ) and connect shield ground of the line between outdoor units and the centralized control system transmission line to the shield (S) terminal of the centralized control terminal block (TB7). In addition, in the case of outdoor units whose power supply connector CN41 has been replaced by CN40, the shield terminal (S) of terminal block (TB7) of the centralized control system should also be connected to the screw (Ⓔ) using attached lead wire.
- The terminal bed (TB1B) is for supplying power to the branch box (220 – 240 VAC, max 6 A).
- Fix power source wiring to terminal box by using buffer bushing for tensile force (PG connection or the like).

⚠ Caution:

Never connect the transmission line for the indoor unit or the centralized control system transmission line to this terminal bed (TB1B). If the transmission lines are connected, the indoor unit terminal block or centralized control terminal block could be damaged.

6.3. Wiring transmission cables

① Types of control cables

- Wiring transmission cables
 - Types of transmission cables: Shielding wire CVVS, CPEVS or MVVS
 - Cable diameter: More than 1.25 mm²
 - Maximum wiring length: Within 200 m

② M-NET Remote control cables

Kind of remote control cable	Shielding wire CVVS, CPEVS or MVVS
Cable diameter	0.5 to 1.25 mm ²
Remarks	When 10 m is exceeded, use cable with the same specifications as transmission line wiring cables.

③ MA Remote control cables

Kind of remote control cable	Sheathed 2-core cable (unshielded) CVV
Cable diameter	0.3 to 1.25 mm ² (0.75 to 1.25 mm ²)*
Remarks	Within 200 m

* Connected with simple remote controller.

② Wiring examples

- Controller name, symbol and allowable number of controllers.

Name	Symbol	Allowable number of controllers	
Outdoor unit controller	OC	-	
Indoor unit controller	M-IC	PUMY-P112	1 to 9 units per 1 OC *1
		PUMY-P125	1 to 10 units per 1 OC *1
		PUMY-P140	1 to 12 units per 1 OC *1
	A-IC	PUMY-P112	2 to 8 units per 1 OC *1
PUMY-P125			
PUMY-P140			
Branch box	-	-	0 to 2 units per 1 OC
Remote controller	RC	M-NET RC *2	Maximum of 12 controllers for 1 OC (Can not be connected if Branch box is used.)
		MA-RC	Maximum of 2 per group

Note:

- *1. The number of connectable units may be limited by some conditions such as an indoor unit's capacity or each unit's equivalent power consumption.
- *2. Don't use the Lossnay controller (PZ-61DR-E, PZ-43SMF-E, PZ-52SF-E, PZ-60DR-E).

Example of a group operation system with multiple outdoor units (Shielding wires and address setting are necessary.)

<Examples of Transmission Cable Wiring: When Not Using a Branch Box>

■ Refer to Fig. 6-6 from Fig. 6-2.

<Wiring Method and Address Settings: without Branch box system>

- Always use shielded wire when making connections between the outdoor unit (OC) and the indoor unit (M-IC).
- Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1, M2 and terminal S on the transmission cable terminal block of the indoor unit (M-IC).
- Connect terminals 1 (M1) and 2 (M2) on the transmission cable terminal block of the indoor unit (M-IC) that has the most recent address within the same group to the terminal block on the remote controller (M-NET RC).
- Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
- The jumper connector CN41 on the control panel does not change.
- Connect shield ground of the indoor units transmission line to the shield (S) terminal of (TB3) and also connect (S) terminal to the screw (Ⓔ or Ⓕ) using attached lead wire.
Connect shield ground of the line between outdoor units and the centralized control system transmission line to the shield (S) terminal of (TB7).
- Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC (Main)	01 to 50	Use the most recent address within the same group of indoor units
M-IC (Sub)	01 to 50	Use an address, other than that of the IC (Main) from among the units within the same group of indoor units. This must be in sequence with the IC (Main)
Outdoor Unit	51 to 100	Use the most recent address of all the indoor units plus 50 * The address automatically becomes "100" if it is set as "01 - 50".
M-NET R/C (Main)	101 to 150	Set at an IC (Main) address within the same group plus 100
M-NET R/C (Sub)	151 to 200	Set at an IC (Main) address within the same group plus 150
MA R/C	-	Unnecessary address setting (Necessary main/sub setting)

- The group setting operations among the multiple indoor units is done by the remote controller (M-NET RC) after the electrical power has been turned on.

i. When connecting a PWFY unit

- Do not perform the group settings for the PWFY unit and the indoor units.
- The PWFY unit and a Lossnay unit cannot be set to operate at the same time.
- Use a WMA remote controller for the PWFY unit.

For details, refer to the installation manual for the PWFY unit.

j. When connecting a Cylinder or Hydrobox unit

- Do not perform the group settings for the Cylinder or Hydrobox unit and the other indoor units.

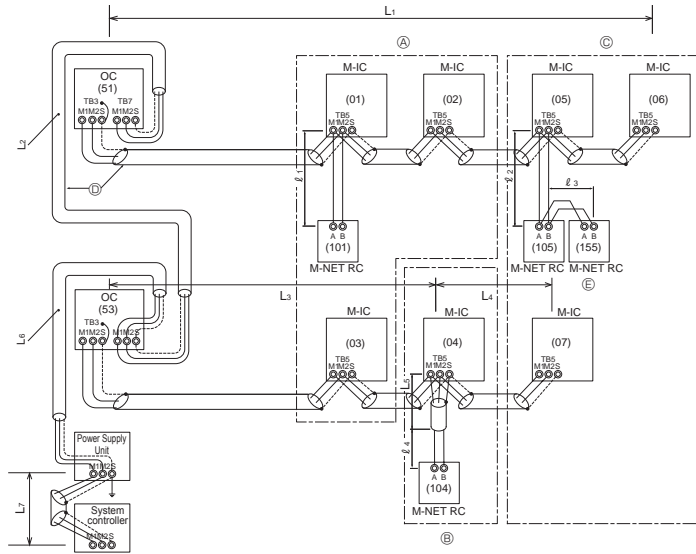
<Wiring Method and Address Setting: include Branch box system>

Please refer to the Branch box Installation Manual.

6. Electrical work

<Example of Transmission Cable Wiring: Not using Branch box>

■ M-NET Remote Controller



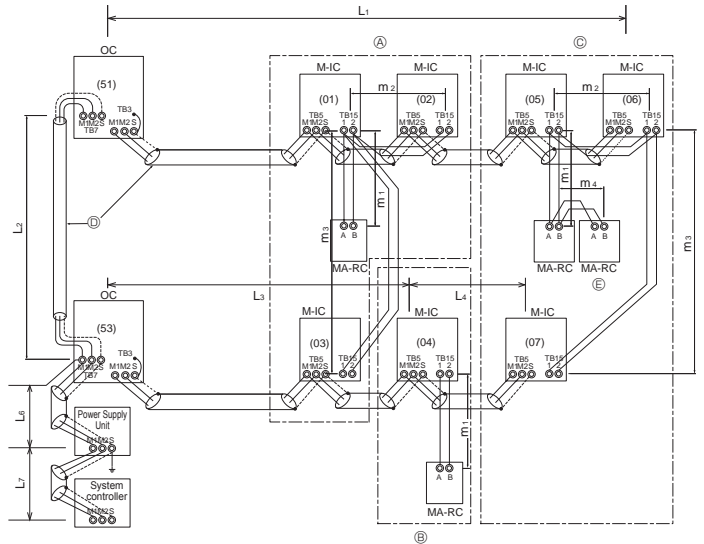
- Ⓐ : Group 1
- Ⓑ : Group 2
- Ⓒ : Group 3
- Ⓓ : Shielded Wire
- Ⓔ : Sub Remote Controller
- () : Address

<Permissible Lengths>

- Max length via outdoor units: $L_1 + L_2 + L_3 + L_4$ and $L_1 + L_2 + L_3 + L_5$ and $L_1 + L_2 + L_6 + L_7 \leq 500$ m (1.25 mm² or more)
 - Max transmission cable length: L_1 and $L_3 + L_4$ and $L_3 + L_5$ and $L_2 + L_6$ and $L_7 \leq 200$ m (1.25 mm² or more)
 - Remote controller cable length: $l_1, l_2, l_2 + l_3, l_4 \leq 10$ m (0.5 to 1.25 mm²)
- If the length exceeds 10 m, use a 1.25 mm² shielded wire. The length of this section (L_6) should be included in the calculation of the maximum length and overall length.

Fig. 6-2

■ MA Remote Controller

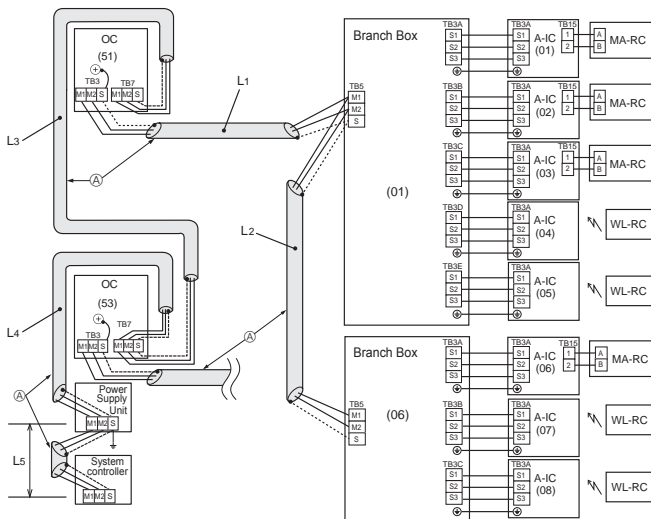


<Permissible Lengths>

- Max length via outdoor unit (M-NET cable): $L_1 + L_2 + L_3 + L_4$ and $L_1 + L_2 + L_6 + L_7 \leq 500$ m (1.25 mm² or more)
- Max transmission cable length (M-NET cable): L_1 and $L_3 + L_4$ and $L_2 + L_6$ and $L_7 \leq 200$ m (1.25 mm² or more)
- Remote controller cable length: m_1 and $m_1 + m_2 + m_3$ and $m_1 + m_2 + m_3 + m_4 \leq 200$ m (0.3 to 1.25 mm²)

Fig. 6-3

<Example of Transmission Cable Wiring: Connecting with Branch box>



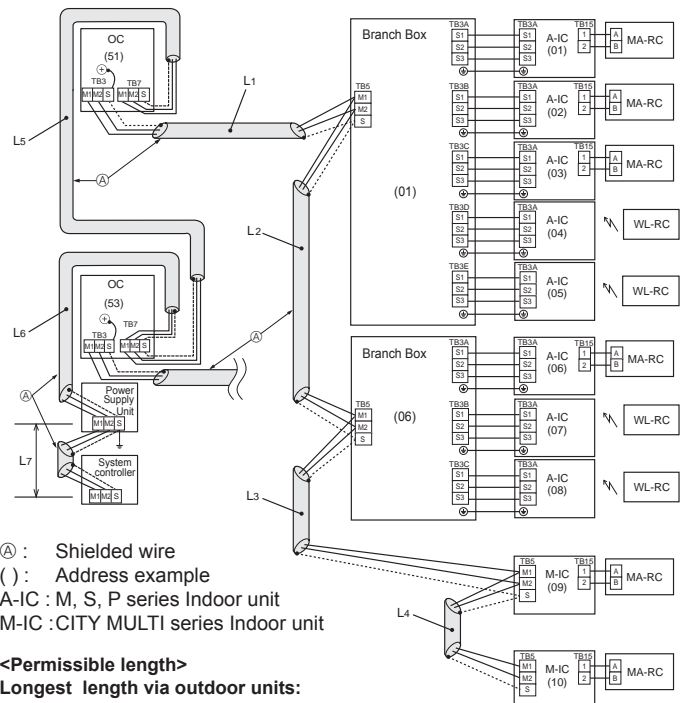
- Ⓐ : Shielded wire
- () : Address example
- A-IC : M, S, P series Indoor unit

<Permissible Lengths>

- Max length via outdoor units (M-NET cable): $L_1 + L_2 + L_3 + L_4 + L_5 \leq 500$ m (1.25 mm² or more)
- Max transmission cable length (M-NET cable): $L_1 + L_2, L_3 + L_4, L_5 \leq 200$ m (1.25 mm² or more)

Fig. 6-4

<Example of Transmission Cable Wiring: Mixing system>



- Ⓐ : Shielded wire
- () : Address example
- A-IC : M, S, P series Indoor unit
- M-IC : CITY MULTI series Indoor unit

<Permissible length>

- Longest length via outdoor units: $L_1 + L_2 + L_3 + L_4 + L_5 + L_6 + L_7 \leq 500$ m (1640 ft.) (1.25 mm² or more)
- Longest transmission cable length: $L_1 + L_2 + L_3 + L_4, L_5 + L_6, L_7 \leq 200$ m (656 ft.) (1.25 mm² or more)

Fig. 6-5

Note:

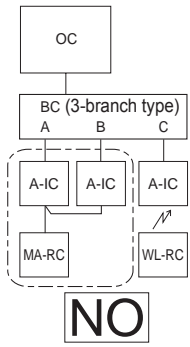
The Cylinder or Hydrobox unit cannot be grouped with a unit other than a Cylinder or Hydrobox unit.

In addition, when the Cylinder or Hydrobox unit is connected, multiple outdoor units cannot be operated together.

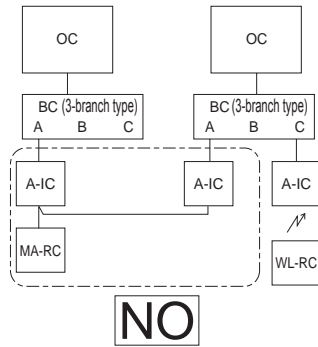
6. Electrical work

<Incorrect Systems>

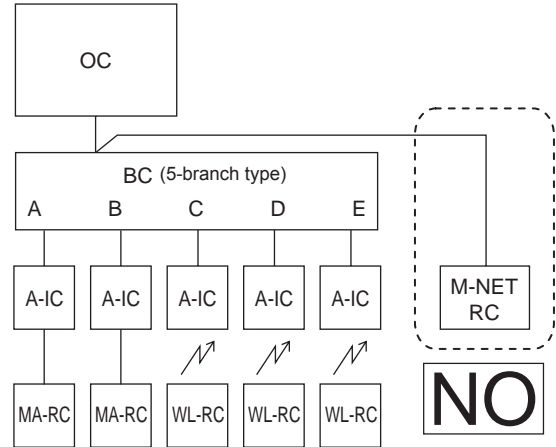
1. Group operation by single remote controller



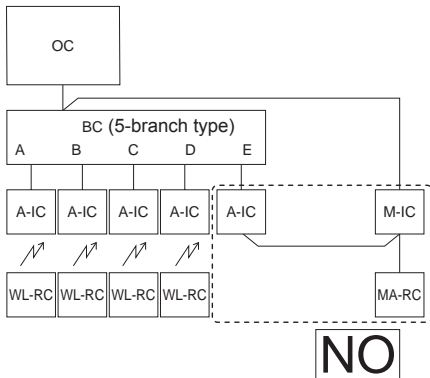
2. Group operation between different refrigerant systems



3. Connection of M-NET Remote controller



4. Group operation between A-control system and M-NET control system.



1. Plural indoor units cannot be operated by a single remote controller.
2. Different refrigerant systems cannot be connected together.
3. M-NET remote controller cannot be connected.
4. Different types control systems (A-IC/M-IC) cannot be connected together.

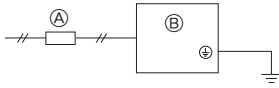
6. Electrical work

6.4. Wiring of main power supply and equipment capacity

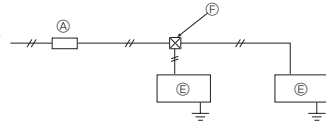
Schematic Drawing of Wiring: When Not Using a Branch Box (Example) (Fig. 6-6)

■ PUMY-P-VKM4

~N 220-230-240 V 50 Hz
~N 220-230 V 60 Hz



~N 220-230-240 V 50 Hz
~N 220-230 V 60 Hz



■ PUMY-P-YKM(E)4

• YKM4
3N~380-400-415 V 50 Hz
3N~380 V 60 Hz
• YKME4
3N~380-400-415 V 50 Hz

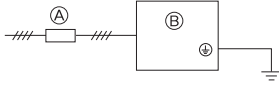


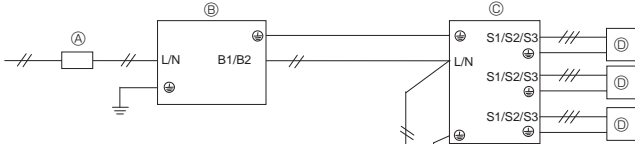
Fig. 6-6

Schematic Drawing of Wiring: When using a Branch Box (Example) (Fig. 6-7)

<When Power Is Supplied from the Outdoor Unit>

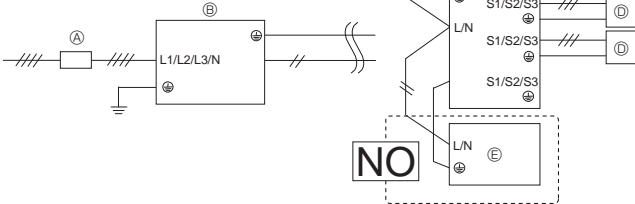
■ PUMY-P-VKM4

~N 220-230-240 V 50 Hz
~N 220-230 V 60 Hz

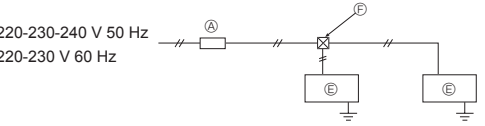


■ PUMY-P-YKM(E)4

• YKM4
3N~380-400-415 V 50 Hz
3N~380 V 60 Hz
• YKME4
3N~380-400-415 V 50 Hz



~N 220-230-240 V 50 Hz
~N 220-230 V 60 Hz



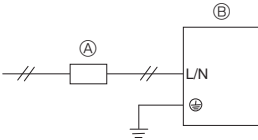
- Ⓐ Switch
(Breakers for Wiring and Current Leakage)
- Ⓑ Outdoor Unit
- Ⓒ Branch Box
- Ⓓ A-Control Indoor Unit
(M, S, P series indoor unit)
- Ⓔ M-NET Control Indoor Unit
(City Multi indoor unit)
- Ⓕ Pull Box

* The M-NET Control Indoor unit cannot receive power supplied from an outdoor unit, so provide it with power separately.

<When Power Is Supplied Separately>

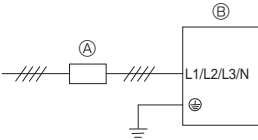
■ PUMY-P-VKM4

~N 220-230-240 V 50 Hz
~N 220-230 V 60 Hz

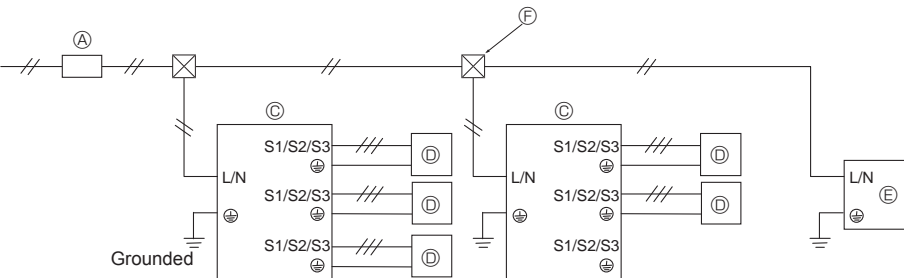


■ PUMY-P-YKM(E)4

• YKM4
3N~380-400-415 V 50 Hz
3N~380 V 60 Hz
• YKME4
3N~380-400-415 V 50 Hz



~N 220-230-240 V 50 Hz
~N 220-230 V 60 Hz



Note: Reactor BOX (Optional parts)

When the product is used for a purpose other than as professional equipment, the Reactor BOX may be necessary.

Outdoor unit	Branch box power supply method	
	Power supply from outdoor unit	Separate power supply
1-phase power supply	Unnecessary	Necessary
3-phase power supply	Necessary	Necessary

Fig. 6-7

6. Electrical work

Cross-sectional area of Wire for Main Power Supply and On/Off Capacities

<When power is supplied separately>

Model	Power Supply	Minimum Wire Cross-sectional area (mm ²)			Breaker for Wiring *1	Breaker for Current Leakage	
		Main Cable	Branch	Ground			
Outdoor Unit	P112-140VKM4	~N 220-230-240 V 50 Hz ~N 220-230 V 60 Hz	6	–	6	32 A	32 A 30 mA 0.1 sec. or less
	P112-140YKM4	3N~380-400-415 V 50 Hz 3N~380 V 60 Hz	1.5	–	1.5	16 A	16 A 30 mA 0.1 sec. or less
	P112-140YKME4	3N~380-400-415 V 50 Hz					

<When power is supplied from the outdoor unit>

Model	Power Supply	Minimum Wire Cross-sectional area (mm ²)			Breaker for Wiring *1	Breaker for Current Leakage	
		Main Cable	Branch	Ground			
Outdoor Unit	P112-140VKM4	~N 220-230-240 V 50 Hz ~N 220-230 V 60 Hz	6	–	6	40 A	40 A 30 mA 0.1 sec. or less
	P112-140YKM4	3N~380-400-415 V 50 Hz 3N~380 V 60 Hz	2.5	–	2.5	20 A	20 A 30 mA 0.1 sec. or less
	P112-140YKME4	3N~380-400-415 V 50 Hz					

*1 A breaker with at least 3.0 mm contact separation in each poles shall be provided. Use non-fuse breaker (NF) or earth leakage breaker (NV).

<Indoor units>

Total operating current of the indoor unit	Minimum wire thickness (mm ²)			Ground-fault interrupter *1	Local switch (A)		Breaker for wiring (NFB)
	Main Cable	Branch	Ground		Capacity	Fuse	
F0 = 16 A or less *2	1.5	1.5	1.5	20 A current sensitivity *3	16	16	20
F0 = 25 A or less *2	2.5	2.5	2.5	30 A current sensitivity *3	25	25	30
F0 = 32 A or less *2	4.0	4.0	4.0	40 A current sensitivity *3	32	32	40

Apply to IEC61000-3-3 about max. permissive system impedance.

*1 The Ground-fault interrupter should support inverter circuit.

The Ground-fault interrupter should combine using of local switch or wiring breaker.

*2 Please take the larger of F1 or F2 as the value for F0.

F1 = Total operating maximum current of the indoor units × 1.2

F2 = {V1 × (Quantity of Type 1)/C} + {V1 × (Quantity of Type 2)/C} + {V1 × (Quantity of Type 3)/C} + ... + {V1 × (Quantity of Type 14)/C}

Connect to Branch box (PAC-MK-BC(B))

Indoor unit		V1	V2	
Type 1	PEAD-RP-JA(L)Q, PEAD-M-JA(L), PEY-(S)P-JA	26.9	2.4	
Type 2	SEZ-KD-VAQ(L), SEZ-M-DA(L), PCA-RP-KAQ, PCA-M-KA, PLA-ZRP-BA, PLA-RP-EA, SLZ-KF-VA2, SLZ-M-FA, PLY-(S)P-BA, SEZ-KH-VALT, PCY-(S)P-KA	19.8		
Type 3	MLZ-KA-VA, SLZ-KA-VAQ(L)3	9.9		
Type 4	MFZ-KJ-VE2, MSXY-FJ-VE, MSZ-LN-VG, MSZ-AP-VG, MLZ-KP-VF	7.4		
Type 5	MSZ-FH-VE, MSZ-SF-VE, MSZ-EF-VE, MSZ-SF-VA, MSZ-GF-VE, MSZ-GE-VA, MSZ-EF-VA, MSY-GE-VA, MSY-EF-VA, MSZ-FH-VA, MSY-GH-VA, MSZ-FK-VA, MSZ-GC-NA	6.8		
Type 6	Branch box (PAC-MK-BC(B))	5.1		3.0
Type 7	ecodan C generation			5.0 *5

*5 This value may increase due to a locally connected actuator.

Connect to Connection kit (PAC-LV11M-J)

Indoor unit		V1	V2
Type 8	MFZ-KJ-VE2	7.4	2.4
Type 9	MSZ-GE-VA, MSZ-SF-VA, MSZ-SF-VE, MSZ-EF-VE, MSZ-FH-VE, MSY-GE-VA, MSY-GH-VA	6.8	
Type 10	Connection kit (PAC-LV11M-J)	3.5	

Indoor unit		V1	V2
Type 11	PEFY-VMA(L)-E, PEFY-VMA3-E	38.0	1.6
Type 12	PMFY-VBM-E, PLFY-VEM-E, PLFY-VFM-E1, PEFY-VMS1(L)-E, PCFY-VKM-E, PKFY-VHM-E, PKFY-VKM-E, PFFY-VKM-E2, PFFY-VLRMM-E, PLFY-EP-VEM-E, PMFY-P-VFM-D	19.8	2.4
Type 13	PKFY-VBM-E	3.5	2.4
Type 14	PLFY-VLMD-E, PEFY-VMR-E-L/R, PDFY-VM-E, PEFY-VMH-E, PFFY-VLEM-E, PFFY-VLRM-E, PWFY-VM-E1(2)-AU, PEFY-P-VMH-E-F, GUF-RD(H)4	0.0	0.0

C : Multiple of tripping current at tripping time 0.01s

Please pick up "C" from the tripping characteristic of the breaker.

6. Electrical work

<Example of "F2" calculation>

Condition PEFY-VMS × 4 + PEFY-VMA × 1, C = 8 (refer to right sample chart)

$$F2 = 19.8 \times 4/8 + 38 \times 1/8$$

$$= 14.65$$

→ 16 A breaker (Tripping current = 8×16 A at 0.01 s)

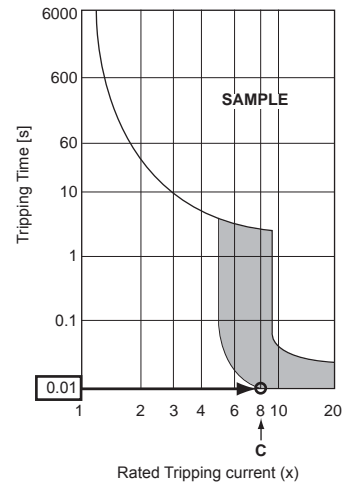
*3 Current sensitivity is calculated using the following formula.

$$G1 = V2 \times (\text{Quantity of Type1}) + V2 \times (\text{Quantity of Type2}) + V2 \times (\text{Quantity of Type3}) + \dots + V2 \times (\text{Quantity of Type14}) + V3 \times (\text{Wire length[km]})$$

G1	Current sensitivity
30 or less	30 mA 0.1 sec or less
100 or less	100 mA 0.1 sec or less

Wire thickness	V3
1.5 mm ²	48
2.5 mm ²	56
4.0 mm ²	66

Sample chart



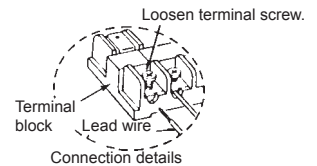
1. Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.
2. The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker consideration of voltage drops. Make sure the power-supply voltage does not drop more than 10%.
3. Specific wiring requirements should adhere to the wiring regulations of the region.
4. Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57). For example, use wiring such as YZW.
5. Install an earth longer than other cables.

⚠ Warning:

- Be sure to use specified wires to connect so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.
- Be sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.
- Be sure to attach the terminal block covers/panel of the outdoor unit securely. If it is not attached correctly, it could result in a fire or an electric shock due to dust, water, etc.

⚠ Caution:

- Be careful not to make mis-wiring.
- Firmly tighten the terminal screws to prevent them from loosening.
- After tightening, pull the wires lightly to confirm that they not move.
- If the connecting wire is incorrectly connected to the terminal block, the unit does not operate normally.
- Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.
- Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.



IMPORTANT

Make sure that the current leakage breaker is one compatible with higher harmonics.

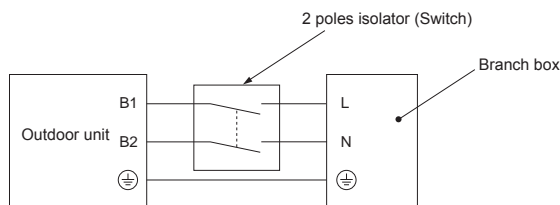
Always use a current leakage breaker that is compatible with higher harmonics as this unit is equipped with an inverter.

The use of an inadequate breaker can cause the incorrect operation of inverter.

Never splice the power cable or the indoor-outdoor-branch box connection cable, otherwise it may result in a smoke, a fire or communication failure.

⚠ Warning:

- Please turn off the main power supply when servicing. And do not touch the B1, B2 terminals when the power is energized. If isolator should be used between outdoor unit and branch box/indoor unit and branch box, please use 2-pole type. (Please refer to figure below.)



⚠ Caution:

After using the isolator, be sure to turn off and on the main power supply to reset the system. Otherwise, the outdoor unit may not be able to detect the branch box(es) or indoor units.

Be sure to connect the outdoor-branch box/indoor-branch box connecting cables directly to the units (no intermediate connections).







Intermediate connections can lead to communication errors if water enters the cables and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.

(If an intermediate connection is necessary, be sure to take measures to prevent water from entering the cables.)

6. Electrical work

6.5. Address setting

Switch address setting

	Outdoor	Branch Box				M, S, P Series Indoor	CITY MULTI series																																										
		Address		Connection Setting																																													
Switch	  tens digit ones digit SWU2 SWU1	  tens digit ones digit SW12 SW11	A B C D E - <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> </table> ON: Indoor connect OFF: No connection (SW1-6 not use)		1	2	3	4	5	6	None	  tens digit ones digit SW12 SW11																																					
1	2	3	4	5	6																																												
Range	51 - 100	1 - 50		-		-	1 - 50																																										
Setting	M-Control Indoor or Branch Box address +50	<ul style="list-style-type: none"> According to the set address (for example, 01), the addresses for the connected indoor units are set sequentially (for example, 02, 03, 04, and 05). <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>SW1</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td></td> </tr> <tr> <td>Port</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td></td> </tr> <tr> <td>Address</td> <td>01</td> <td></td> <td></td> <td></td> <td></td> <td>(SW11, 12)</td> </tr> <tr> <td></td> <td></td> <td>02</td> <td>03</td> <td>04</td> <td>05</td> <td>(sequential numbers)</td> </tr> </table>		SW1	1	2	3	4	5		Port	A	B	C	D	E		Address	01					(SW11, 12)			02	03	04	05	(sequential numbers)	<ul style="list-style-type: none"> Specify whether indoor units are connected to each port (A, B, C, D, and E). <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>SW1</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>(6)</td> </tr> <tr> <td>Port</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>not use</td> </tr> </table> <p style="text-align: center;">Indoor units are connected ON Indoor units are not connected OFF</p>		SW1	1	2	3	4	5	(6)	Port	A	B	C	D	E	not use	There are no address settings for the indoor units.	-
SW1	1	2	3	4	5																																												
Port	A	B	C	D	E																																												
Address	01					(SW11, 12)																																											
		02	03	04	05	(sequential numbers)																																											
SW1	1	2	3	4	5	(6)																																											
Port	A	B	C	D	E	not use																																											

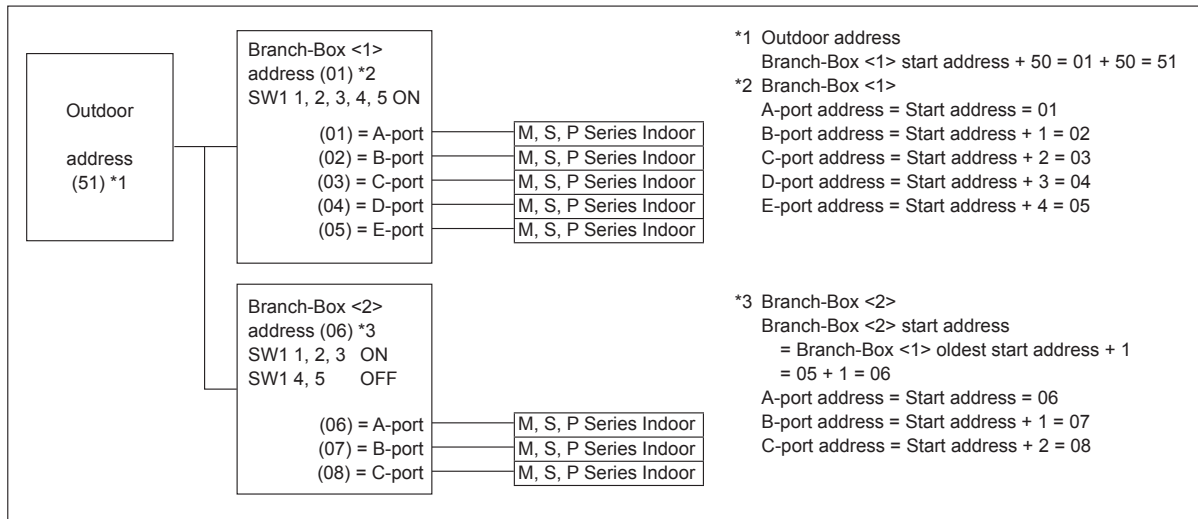
Note: 1. Branch box address

When setting the address, use a number within the range 1–50.

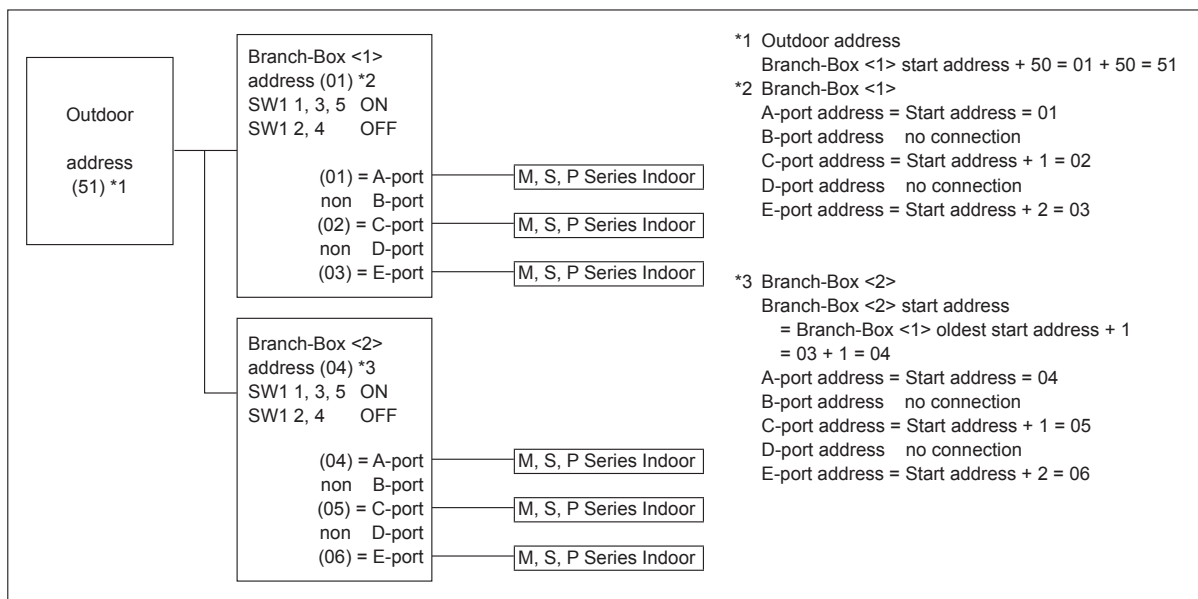
Ex. The set address is (47) and there are 5 indoor units (A, B, C, D, and E).

If A: (47), B: (48), C: (49), D: (50), and E: (51), E is incorrect because it exceeds 50.

Ex1. Outdoor + Branch <1> (M, S, P Series Indoor A, B, C, D, E) + Branch <2> (M, S, P Series Indoor A, B, C)

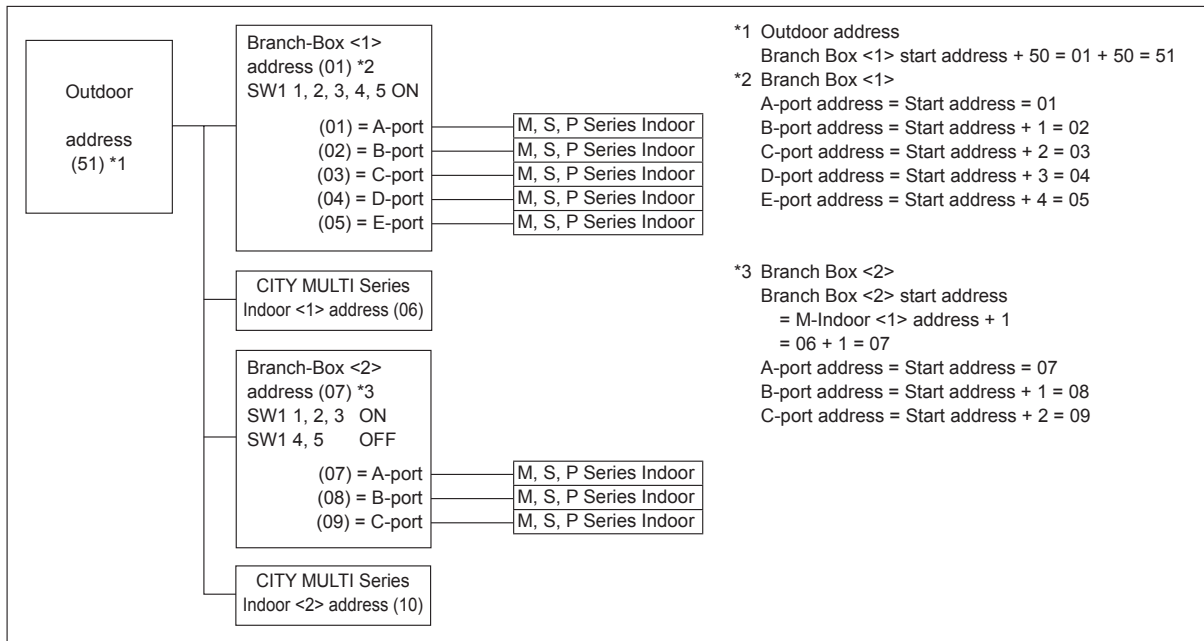


Ex2. Outdoor + Branch <1> (M, S, P Series Indoor A, C, E) + Branch <2> (M, S, P Series Indoor A, C, E)



6. Electrical work

Ex3. Outdoor + Branch <1> (M, S, P Series Indoor A, B, C, D, E) + Branch <2> (M, S, P Series Indoor A, B, C) + CITY MULTI Series Indoor <1> + CITY MULTI Series Indoor <2>



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7. Test run

7.1. Before test run

- ▶ After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and no disconnection of one phase in the supply.
- ▶ Use a 500-volt M-ohm tester to check that the resistance between the power supply terminals and ground is at least 1 MΩ.
- ▶ Do not carry out this test on the control wiring (low voltage circuit) terminals.

⚠ Warning:

Do not use the air conditioner if the insulation resistance is less than 1 MΩ.

Insulation resistance

After installation or after the power source to the unit has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulating in the compressor. This is not a malfunction. Perform the following procedures.

1. Remove the wires from the compressor and measure the insulation resistance of the compressor.
2. If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due to the accumulation of refrigerant in the compressor.

3. After connecting the wires to the compressor, the compressor will start to warm up after power is supplied. After supplying power for the times indicated below, measure the insulation resistance again.
 - The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for 12 hours.
(The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.)
 - To operate the compressor with refrigerant accumulated in the compressor, the compressor must be warmed up at least 12 hours to prevent breakdown.
4. If the insulation resistance rises above 1 MΩ, the compressor is not faulty.

⚠ Caution:

• The compressor will not operate unless the power supply phase connection is correct.

• Turn on the power at least 12 hours before starting operation.

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.

▶ The followings must be checked as well.

- The outdoor unit is not faulty. LED on the control board of the outdoor unit flash when the outdoor unit is faulty.
- Both the gas and liquid stop valves are completely open.

7.2. Test run

7.2.1. Using remote controller

Refer to the indoor unit installation manual.

- Be sure to perform the test run for each indoor unit. Make sure each indoor unit operates properly following the installation manual attached to the unit.
- If you perform the test run for all indoor units at once, you cannot detect any erroneous connection, if any, of the refrigerant pipes and the connecting wires.
- * The compressor operation is not available for 3 minutes at least after the power is supplied.
- The compressor can emit noise just after turn on the power supply or in case of low outside air temperature.
- Depending on the operating conditions, the outdoor unit fan may stop while the compressor is operating, but this is not a malfunction.

About the restart protective mechanism

Once the compressor stops, the restart preventive device operates so the compressor will not operate for 3 minutes to protect the air conditioner.

7.3. Refrigerant collecting (Pump down)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

- ① Turn off the circuit breaker.
- ② Connect the low pressure side of the gauge manifold to the service port of the gas side stop valve.
- ③ Close the liquid stop valve.
- ④ Supply power (circuit breaker).
 - * Start-up of the indoor-outdoor communication takes about 3 minutes after the power (circuit breaker) is turned on. Start the pump-down operation 3 to 4 minutes after the power (circuit breaker) is turned ON.
- ⑤ Confirm that SW3-2 is set to OFF, and then set SW3-1 to ON to perform the test run for cooling operation. The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and test run for cooling operation begins. Immediately after performing the test run for cooling operation, set the outdoor service switch SW2-4 (pump down switch) from OFF to ON.
 - * Do not continue to operate for a long time with the switch SW2-4 set to ON. Make sure to switch it to OFF after pump down is completed.

- ⑥ Fully close the gas stop valve when the pressure reading on the gauge drops 0.05 - 0.00 MPa (approximately 0.5 - 0.0 kgf/cm²)

- ⑦ Stop the air conditioner operation (SW3-1: OFF). Set the outdoor service switch SW2-4 from ON to OFF.

- ⑧ Turn off the power supply (circuit breaker).

* If too much refrigerant has been added to the air conditioner system, the pressure may not drop to 0.05 MPa (0.5 kgf/cm²). If this occurs, use a refrigerant collecting device to collect all of the refrigerant in the system, and then recharge the system with the correct amount of refrigerant after the indoor and outdoor units have been relocated.

⚠ Warning:

When pumping down the refrigerant, stop the compressor before disconnecting the refrigerant pipes. The compressor may burst and cause injury if any foreign substance, such as air, enters the system.

This product is designed and intended for use in the residential,
commercial and light-industrial environment.

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Please be sure to put the contact address/telephone number on
this manual before handing it to the customer.