

INSTALLATION INSTRUCTIONS



Air Conditioner

This air conditioner uses the refrigerant R410A.

Model No.

Outdoor Units		Rated Capacity				
Type	Outdoor Unit Type	8 HP	10 HP	12 HP	14 HP	16 HP
MF3	3WAY System	U-8MF3R7	U-10MF3R7	U-12MF3R7	U-14MF3R7	U-16MF3R7

• To be connecting Indoor Unit

Indoor Units		Rated Capacity					
Type	Indoor Unit Type	22	28	36	45	56	60
D1	1-Way Cassette		S-28MD1E5	S-36MD1E5	S-45MD1E5	S-56MD1E5	
L1	2-Way Cassette	S-22ML1E5	S-28ML1E5	S-36ML1E5	S-45ML1E5	S-56ML1E5	
U2	4-Way Cassette	S-22MU2E5A	S-28MU2E5A	S-36MU2E5A	S-45MU2E5A	S-56MU2E5A	S-60MU2E5A
Y2	4-Way Cassette 60 × 60	S-22MY2E5A	S-28MY2E5A	S-36MY2E5A	S-45MY2E5A	S-56MY2E5A	
K2	Wall-Mounted	S-22MK2E5A	S-28MK2E5A	S-36MK2E5A	S-45MK2E5A	S-56MK2E5A	
T2	Ceiling			S-36MT2E5A	S-45MT2E5A	S-56MT2E5A	
F2	Low Silhouette Ducted	S-22MF2E5A	S-28MF2E5A	S-36MF2E5A	S-45MF2E5A	S-56MF2E5A	S-60MF2E5A
M1	Slim Low Static Ducted	S-22MM1E5A	S-28MM1E5A	S-36MM1E5A	S-45MM1E5A	S-56MM1E5A	
P1	Floor Standing	S-22MP1E5	S-28MP1E5	S-36MP1E5	S-45MP1E5	S-56MP1E5	
R1	Concealed Floor Standing	S-22MR1E5	S-28MR1E5	S-36MR1E5	S-45MR1E5	S-56MR1E5	
Z1	Slim Type Ducted	S-22MZ1H4A	S-28MZ1H4A	S-36MZ1H4A	S-45MZ1H4A	S-56MZ1H4A	S-60MZ1H4A

Type	Indoor Unit Type	Rated Capacity				
		71 / 73	90	106 / 112	140	160
D1	1-Way Cassette	S-73MD1E5				
L1	2-Way Cassette	S-73ML1E5				
U2	4-Way Cassette	S-73MU2E5A	S-90MU2E5A	S-106MU2E5A	S-140MU2E5A	S-160MU2E5A
K2	Wall-Mounted	S-73MK2E5A		S-106MK2E5A		
T2	Ceiling	S-73MT2E5A		S-106MT2E5A	S-140MT2E5A	
F2	Low Silhouette Ducted	S-73MF2E5A	S-90MF2E5A	S-106MF2E5A	S-140MF2E5A	S-160MF2E5A
E1	High Static Pressure Ducted	S-73ME1E5		S-106ME1E5	S-140ME1E5	
	Ducted		S-90ME1R5A	S-112ME1R5A	S-140ME1R5A	S-160ME1R5A
P1	Floor Standing	S-71MP1E5				
R1	Concealed Floor Standing	S-71MR1E5				
Z1	Slim Type Ducted	S-73MZ1H4A				

Type	Indoor Unit Type	Rated Capacity		
		180	224	280
E1	High Static Pressure Ducted		S-224ME1E5	S-280ME1E5
E2	High Static Pressure Ducted	S-180ME2E5	S-224ME2E5	S-280ME2E5



Read through the Installation Instructions before you proceed with the installation. In particular, you will need to read under the "IMPORTANT!" section at the top of the page.

IMPORTANT!

Please Read Before Starting

This air conditioner must be installed by the sales dealer or installer.

This information is provided for use only by authorized persons.

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

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- This air conditioner shall be installed in accordance with National Wiring Regulations.
- This product is intended for professional use. Permission from the power supplier is required when installing the U-8MF3R7 outdoor unit that is connected to a 16 A distribution network.
- This equipment complies with EN/IEC 61000-3-12 provided that the short-circuit power S_{sc} is greater than or equals to the values corresponding to each model as shown in the table below at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure; by consultation with the distribution network operator if necessary that the equipment is connected only to supply with a short-circuit power S_{sc} greater than or equals to the values corresponding to each model as shown in the table below.

	U-10MF3R7	U-12MF3R7
Ssc	1,600 kVA	1,600 kVA
	U-14MF3R7	U-16MF3R7
Ssc	2,000 kVA	2,150 kVA

- The product meets the technical requirements of EN/IEC 61000-3-3.
- Pay close attention to all warning and caution notices given in this manual.



WARNING

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



CAUTION

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

If Necessary, Get Help

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

In Case of Improper Installation

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

SPECIAL PRECAUTIONS

WARNING When Wiring



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

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

	Circuit breaker		Circuit breaker
U-8MF3R7	25 A	U-14MF3R7	40 A
U-10MF3R7	25 A	U-16MF3R7	40 A
U-12MF3R7	30 A		

- Provide a power outlet exclusively for each unit, and full disconnection means having a contact separation by 3 mm in all poles must be incorporated in the fixed wiring in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded. 
- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.

When Transporting

- It may need two or more people to carry out the installation work.
- Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

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

...In a Room

Properly insulate any tubing run inside a room to prevent “sweating” that can cause dripping and water damage to walls and floors.



CAUTION

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

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

Pay particular attention to refrigerant leakages.



WARNING

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

When Servicing

- Turn the power OFF at the main power box (mains), wait at least 5 minutes until it is discharged, then open the unit to check or repair electrical parts and wiring. 
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit.



WARNING

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Do not clean inside the indoor and outdoor units by users. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact the sales dealer or service dealer for a repair and disposal.



CAUTION

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

Others

When disposal of the product, comply with national regulations.



CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured. 
- Do not sit or step on the unit. You may fall down accidentally. 
- Do not stick any object into the FAN CASE. You may be injured and the unit may be damaged.  

Check of Density Limit

Check the amount of refrigerant in the system and floor space of the room according to the legislation on refrigerant drainage. If there is no applicable legislation, follow the standards described below.

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its density will not exceed a set limit.

The refrigerant (R410A), which is used in the air conditioner, is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws imposed to protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of refrigerant is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power, etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared to conventional individual air conditioners. If a single unit of the multi air conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its density does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

In a room where the density may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device. The density is as given below.

Total amount of refrigerant (kg)

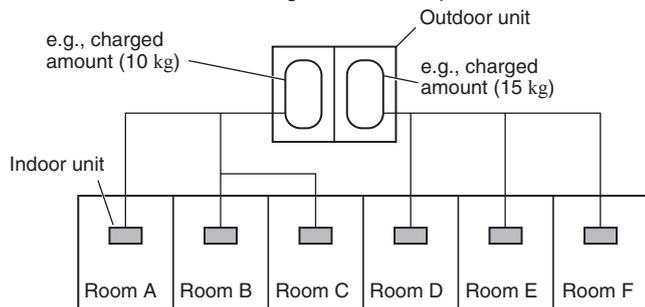
$$\frac{\text{Min. volume of the indoor unit installed room (m}^3\text{)}}{\leq \text{Density limit (kg/m}^3\text{)}}$$

The density limit of refrigerant which is used in multi air conditioners is 0.44 kg/m³ (ISO 5149).

NOTE

- If there are 2 or more refrigerating systems in a single refrigerating device, the amount of refrigerant should be as charged in each independent device.

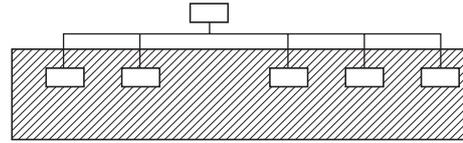
For the amount of charge in this example:



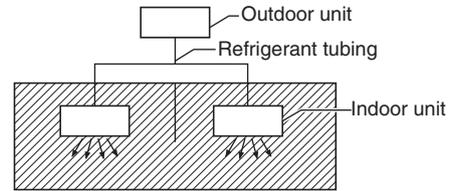
The possible amount of leaked refrigerant gas in rooms A, B and C is 10 kg.

The possible amount of leaked refrigerant gas in rooms D, E and F is 15 kg.

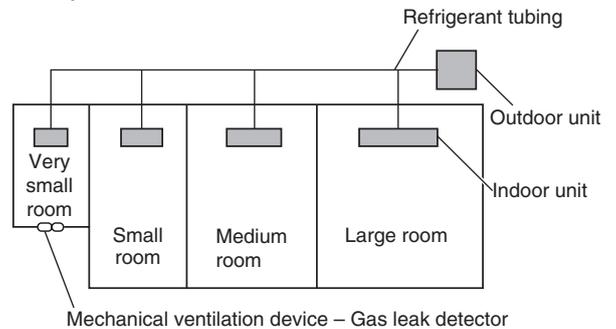
- The standards for minimum room volume are as follows.
 - No partition (shaded portion)



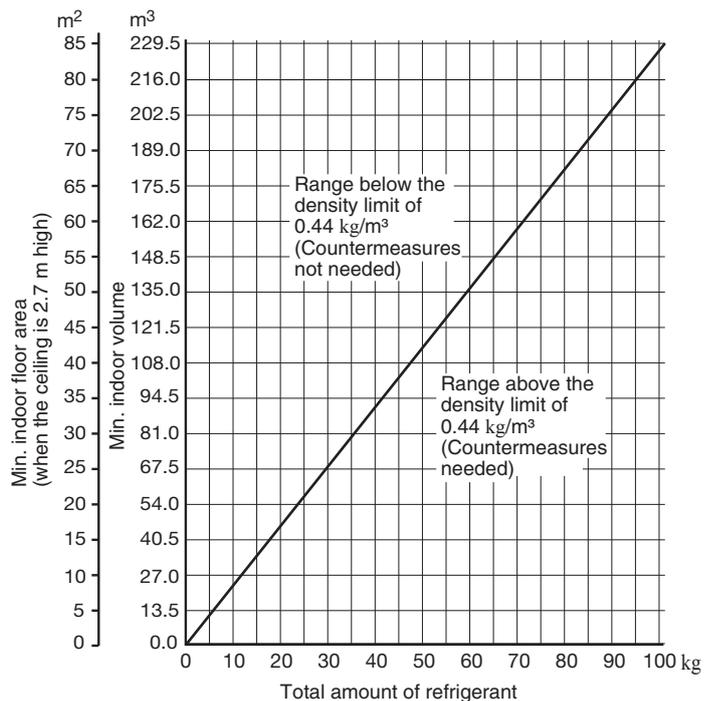
- When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).



- If an indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest room of course becomes the object. But when mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.



- The minimum indoor floor space compared with the amount of refrigerant is roughly as follows: (When the ceiling is 2.7 m high)



Precautions for Installation Using New Refrigerant

1. Care regarding tubing

1-1. Process tubing

- **Material:** Use seamless phosphorous deoxidized copper tube for refrigeration. Wall thickness shall comply with the applicable legislation. The minimal wall thickness must be in accordance with the table below. For tubes of $\phi 22.22$ or larger, use the material of temper 1/2H or H (Hard copper tube). Do not bend the hard copper tube.
- **Tubing size:** Be sure to use the sizes indicated in the table below.
- Use a tube cutter when cutting the tubing, and be sure to remove any flash. This also applies to distribution joints (optional).
- When bending tubing, use a bending radius that is 4 times the outer diameter of the tubing or larger.



CAUTION Use sufficient care in handling the tubing. Seal the tubing ends with caps or tape to prevent dirt, moisture, or other foreign substances from entering. These substances can result in system malfunction.

Unit: mm

Material		Temper - O (Soft copper tube)				
Copper tube	Outer diameter	6.35	9.52	12.7	15.88	19.05
	Wall thickness	0.8	0.8	0.8	1.0	1.2

Unit: mm

Material		Temper - 1/2 H, H (Hard copper tube)					
Copper tube	Outer diameter	22.22	25.4	28.58	31.75	38.1	41.28
	Wall thickness	1.0	1.0	1.0	1.1	over 1.35	over 1.45

1-2. Prevent impurities including water, dust and oxide from entering the tubing. Impurities can cause R410A refrigerant deterioration and compressor defects. Due to the features of the refrigerant and refrigerating machine oil, the prevention of water and other impurities becomes more important than ever.

2. Be sure to recharge the refrigerant only in liquid form.

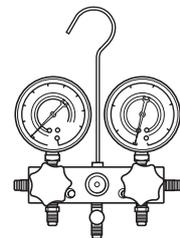
- 2-1. Since R410A is a non-azeotrope, recharging the refrigerant in gas form can lower performance and cause defects in the unit.
- 2-2. Since refrigerant composition changes and performance decreases when gas leaks, collect the remaining refrigerant and recharge the required total amount of new refrigerant after fixing the leak.

3. Different tools required

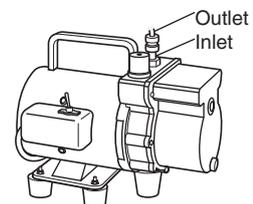
3-1. Tool specifications have been changed due to the characteristics of R410A. Some tools for R22- and R407C-type refrigerant systems cannot be used.

Item	New tool?	R407C tools compatible with R410A?	Remarks
Manifold gauge	Yes	No	Types of refrigerant, refrigerating machine oil, and pressure gauge are different.
Charge hose	Yes	No	To resist higher pressure, material must be changed.
Vacuum pump	Yes	Yes	Use a conventional vacuum pump if it is equipped with a check valve. If it has no check valve, purchase and attach a vacuum pump adapter.
Leak detector	Yes	No	Leak detectors for CFC and HCFC that react to chlorine do not function because R410A contains no chlorine. Leak detectors for HFC134a can be used for R410A.
Flaring oil	Yes	No	For systems that use R22, apply mineral oil (Suniso oil) to the flare nuts on the tubing to prevent refrigerant leakage. For machines that use R407C or R410A, apply synthetic oil (ether oil) to the flare nuts.

Manifold gauge



Vacuum pump

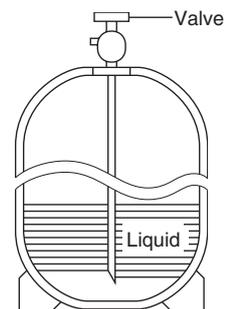


* Using tools for R22 and R407C and new tools for R410A together can cause defects.

3-2. Use R410A exclusive cylinder only.

Single-outlet valve (with siphon tube)

Liquid refrigerant should be recharged with the cylinder standing on end as shown.



Important Information Regarding The Refrigerant Used

This product contains fluorinated greenhouse gases. Do not vent gases into the atmosphere.

Refrigerant type: R410A

GWP⁽¹⁾ value: 2088

⁽¹⁾GWP = global warming potential

Periodical inspections for refrigerant leaks may be required depending on European or local legislation.
Please contact your local dealer for more information.

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1. GENERAL

This booklet briefly outlines where and how to install the air conditioning system. Please read over the entire set of instructions for the outdoor unit and make sure all accessory parts listed are with the system before beginning.

1-1. Tools Required for Installation (not supplied)

1. Flathead screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Carpenter's level
6. Sabre saw or keyhole saw
7. Hacksaw
8. Core bits
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)
16. Hexagonal wrench (4 mm and 5 mm)
17. Pliers
18. Cutting pliers

1-2. Accessories Supplied with Outdoor Unit

See Table 1.

1-3. Type of Copper Tube and Insulation Material

If you wish to purchase these materials separately from a local source, you will need:

1. Deoxidized annealed copper tube for refrigerant tubing.
2. Foamed polyethylene insulation for copper tubes as required to precise length of tubing. See section "5-3. Insulating the Refrigerant Tubing" for details.
3. Use insulated copper wire for field wiring. Wire size varies with the total length of wiring. See section "4. ELECTRICAL WIRING" for details.



CAUTION

Check local electrical codes and regulations before obtaining wire. Also, check any specified instructions or limitations.

1-4. Additional Materials Required for Installation

1. Refrigeration (armored) tape
2. Insulated staples or clamps for connecting wire (See your local codes.)
3. Putty
4. Refrigeration tubing lubricant
5. Clamps or saddles to secure refrigerant tubing
6. Scale for weighing

Table 1 Outdoor Unit

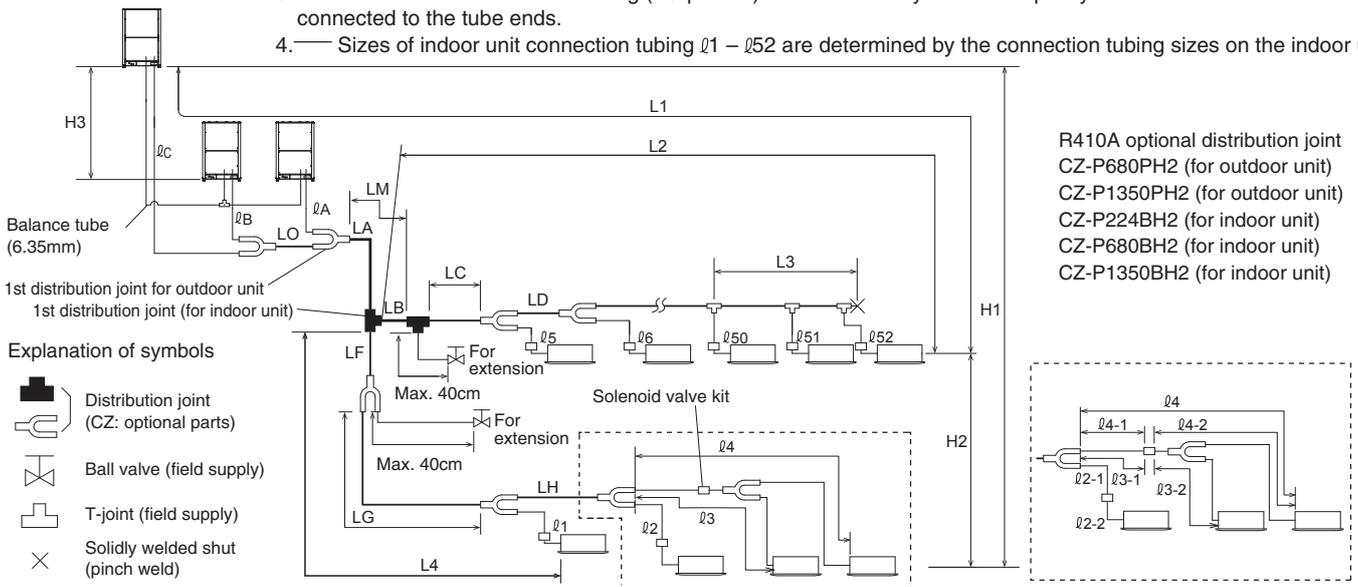
Unit: mm

Part Name	Unit	8 HP	10 HP	12 HP	14 HP	16 HP
Connection tubing	Q'ty	0	1	1	1	2
	For discharge	—	Outer diameter ø15.88  Outer diameter ø19.05	Outer diameter ø15.88  Outer diameter ø19.05	Inner diameter ø19.05  Outer diameter ø22.22	Inner diameter ø19.05  Outer diameter ø22.22
	For suction	—	—	—	—	Inner diameter ø25.4  Outer diameter ø28.58
Operating Instructions	Q'ty	1	1	1	1	1
						
Installation Instructions	Q'ty	1	1	1	1	1
						

1-5. Tubing Length

Select the installation location so that the length and size of refrigerant tubing are within the allowable range shown in the figure below.

1. — Main tubing length (maximum tubing size of discharge tube, suction tube and liquid tube) $LM = LA + LB \dots$
2. — Main distribution tubes $LC - LH$ are selected according to the capacity after the distribution joint.
3. The outdoor connection main tubing (LO portion) is determined by the total capacity of the outdoor units that are connected to the tube ends.
4. — Sizes of indoor unit connection tubing $\varnothing 1 - \varnothing 52$ are determined by the connection tubing sizes on the indoor units.



NOTE

* Be sure to use special R410A distribution joints (CZ: optional parts) for outdoor unit connections and tubing branches.

Table 2 Ranges that Apply to Refrigerant Tubing Lengths and to Differences in Installation Heights

Unit: m

Item	Mark	Contents	Length	
Allowable tubing length	L1	Max. tubing length	Actual length	$\leq 200^{*2}$
			Equivalent length	$\leq 210^{*2}$
	$\Delta L (L2 - L4)$	Difference between max. length and min. length from the 1st distribution joint	$\leq 50^{*4}$	
	LM	Max. length of main tubing (maximum tubing size of discharge tube, suction tube and liquid tube) * Even after 1st distribution joint, LM is allowed if at maximum tubing length.	— *3	
	$\varnothing 1, \varnothing 2 \sim \varnothing 52$	Max. length of each distribution tube	$\leq 50^{*5}$	
	$L1 + \varnothing 1 + \varnothing 2 \sim \varnothing 51 + \varnothing A + \varnothing B + LF + LG + LH$	Total max. tubing length including length of each distribution tube (only liquid tube)	≤ 500	
	$\varnothing A, \varnothing B + LO, \varnothing C + LO$	Maximum tubing length from outdoor's 1st distribution joint to each outdoor unit	≤ 10	
	$\varnothing 1-2, \varnothing 2-2 \sim \varnothing 52-2$	Max. length between solenoid valve kit and indoor unit	≤ 30	
Allowable elevation difference	H1	When outdoor unit is installed higher than indoor unit	≤ 50	
		When outdoor unit is installed lower than indoor unit	≤ 40	
	H2	Max. difference between indoor units	≤ 15	
	H3	Max. difference between outdoor units	≤ 4	
Allowable length of joint tubing	L3	T-joint tubing (field-supply); Max. tubing length between the first T-joint and solidly welded-shut end point	≤ 2	

$L^*, \varnothing^* = \text{Length}$ $H^* = \text{Height}$

NOTE

- 1: The outdoor connection main tubing (LO portion) is determined by the total capacity of the outdoor units that are connected to the tube ends.
- 2: If the longest tubing length (L1) exceeds 90 m (equivalent length), increase the sizes of the main tubes (LM) by 1 rank for the suction tubes, discharge tubes and liquid tubes. Use a field supply reducer. Select the tube size from the table of main tubing sizes (Table 3) and from the table of refrigerant tubing sizes (Table 8).
- 3: If the longest main tubing length (LM) exceeds 50 m, increase the main tubing size at the portion before 50 m by 1 rank for the suction tubes and discharge tubes. Use a field supply reducer. Determine the length less than the limitation of allowable maximum tubing length. For the portion that exceeds 50 m, set based on the main tubing size (LA) listed in Table 3.
- 4: If the tubing length marked "L" (L2 - L4) exceeds 40 m, increase the tubing size at the portion after the 1st distribution joint by 1 rank for the liquid tube, suction tube and discharge tube. Refer to the Technical Data for the details.

5: If any of the tubing length exceeds 30 m, increase the size of the tubes (liquid tube, suction tube and discharge tube) between the distribution tube and solenoid valve kit by 1 rank and also increase the size of the tubes (liquid tube and gas tube) between the solenoid valve kit and indoor unit by 1 rank.

* However, in the case of the Type 56 solenoid valve kit, it is not necessary to increase the tubes (liquid tube, suction tube and discharge tube) between the distribution tube and solenoid valve kit by 1 rank.

1-6. Tubing Size

Table 3 Main Tubing Size (LA)

Unit: mm

kW	22.4	28.0	33.5	40.0	45.0	50.0	56.0	61.5	68.0	73.0	78.5	85.0	90.0	96.0
Total system horsepower	8	10	12	14	16	18	20	22	24	26	28	30	32	34
Combined outdoor units	8	10	12	14	16	8 10	8 12	10 12	12 12	10 16	12 16	14 16	16 16	8 10 16
Suction tube	ø19.05	ø22.22	ø25.4		ø28.58					ø31.75				
Discharge tube	ø15.88	ø19.05		ø22.22				ø25.4			ø28.58			
Liquid tube	ø9.52		ø12.7			ø15.88				ø19.05				

kW	101	107	113	118	124	130	135
Total system horsepower	36	38	40	42	44	46	48
Combined outdoor units	8 12 16	10 12 16	8 16 16	10 16 16	12 16 16	14 16 16	16 16 16
Suction tube	ø38.10						
Discharge tube	ø28.58	ø31.75					
Liquid tube	ø19.05						

*1: If future extension is planned, select the tubing diameter based on the total horsepower after extension. However, extension is not possible if the resulting tubing size is two ranks higher.

*2: The balance tube (outdoor unit tube) diameter is ø6.35.

*3: The refrigerant tubing should be used with R410A refrigerant.

Size of Tubing (LO) Between Outdoor Units

Select the size of tubing between outdoor units based on the main tubing size (LA) as given in the table above.

Table 4 Main Tubing Size After Distribution (LB, LC...)

HP=horsepower Unit: mm

Total capacity after distribution	Over kW	—	7.1 (2.5 HP)	16.0 (6 HP)	25.0 (9 HP)	30.0 (11 HP)	36.4 (13 HP)	42.0 (15 HP)	47.6 (17 HP)	58.8 (21 HP)
	Below kW	7.1 (2.5 HP)	16.0 (6 HP)	25.0 (9 HP)	30.0 (11 HP)	36.4 (13 HP)	42.0 (15 HP)	47.6 (17 HP)	58.8 (21 HP)	70.0 (25 HP)
Tubing size	Suction tube	ø15.88	ø19.05	ø19.05	ø22.22	ø25.40	ø25.40	ø28.58	ø28.58	ø28.58
	Discharge tube	ø12.70	ø15.88	ø15.88	ø19.05	ø19.05	ø22.22	ø22.22	ø22.22	ø25.40
	Liquid tube	ø9.52	ø9.52	ø9.52	ø9.52	ø12.70	ø12.70	ø12.70	ø15.88	ø15.88

Total capacity after distribution	Over kW	70.0 (25 HP)	75.6 (27 HP)	98.0 (35 HP)	103.6 (37 HP)
	Below kW	75.6 (27 HP)	98.0 (35 HP)	103.6 (37 HP)	—
Tubing size	Suction tube	ø31.75	ø31.75	ø38.10	ø38.10
	Discharge tube	ø25.40	ø28.58	ø28.58	ø31.75
	Liquid tube	ø19.05	ø19.05	ø19.05	ø19.05

*1: The outdoor unit connection tubing (LO) is determined by the total capacity of the outdoor units connected to the tube ends. The tubing size is selected based on the table of main tube sizes after the branch.
*2: If the total capacity of the indoor units connected to the tube ends is different from the total capacity of the outdoor units, then the main tube size is selected based on the total capacity of the outdoor units. (For LA, LB, and LF in particular)

Table 5 Outdoor Unit Tubing Connection Size (øA – øC)

kW	22.4	28.0	33.5	40.0	45.0
Suction tube	ø19.05	ø22.22	ø25.4		ø28.58
	Braze connection				
Discharge tube	ø15.88	ø19.05		ø22.22	
	Flare		Braze connection		
Liquid tube	ø9.52		ø12.7		
	Flare connection				
Balance tube	ø6.35				
	Flare connection				

Unit: mm

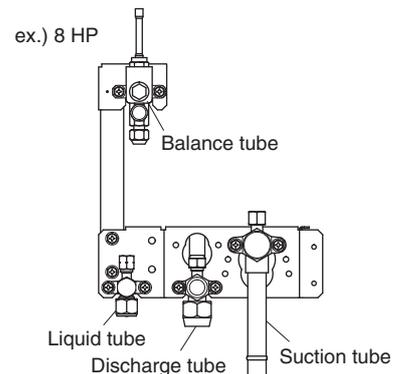


Table 6 Indoor Unit Tubing Connection Size

Unit: mm

Indoor unit type		22	28	36	45	56	60	73	90	106	112	140	160	180 ^{*1}	224 ^{*1}	280 ^{*1}
Distribution joint – solenoid valve kit tubing	Suction tube	ø15.88												ø19.05	ø22.22	
	Discharge tube	ø12.70												ø15.88	ø19.05	
	Liquid tube	ø9.52														
Solenoid valve kit – Indoor unit tubing connection	Gas tube	ø12.70				ø15.88						ø19.05	ø22.22			
	Liquid tube	ø6.35				ø9.52										

*1: For the solenoid valve kits, use CZ-P160HR3 with parallel specifications. Branch the tubing before and after the solenoid valve kits.

1-7. Straight Equivalent Length of Joints

Design the tubing system by referring to the following table for the straight equivalent length of joints.

Table 7 Straight Equivalent Length of Joints

Gas tubing size (mm)		12.7	15.88	19.05	22.22	25.4	28.58	31.75	38.1	41.28
90° elbow		0.30	0.35	0.42	0.48	0.52	0.57	0.70	0.79	0.85
45° elbow		0.23	0.26	0.32	0.36	0.39	0.43	0.53	0.59	0.64
U-shape tube bent (R60-100 mm)		0.90	1.05	1.26	1.44	1.56	1.71	2.10	2.37	2.55
Trap bend		2.30	2.80	3.20	3.80	4.30	4.70	5.00	5.80	6.80
Y-branch distribution joint		Equivalent length conversion not needed.								
Ball valve for service		Equivalent length conversion not needed.								

Table 8 Refrigerant Tubing

Tubing size (mm)			
Material Temper - O		Material Temper - 1/2 H • H	
ø6.35	t0.8	ø22.22	t1.0
ø9.52	t0.8	ø25.4	t1.0
ø12.7	t0.8	ø28.58	t1.0
ø15.88	t1.0	ø31.75	t1.1
ø19.05	t1.2	ø38.1	over t1.35
		ø41.28	over t1.45

* When bending the tubes, use a bending radius that is at least 4 times the outer diameter of the tubes. In addition, take sufficient care to avoid crushing or damaging the tubes when bending them.

1-8. Additional Refrigerant Charge

Additional refrigerant charge amount is calculated below.

Required amount of additional refrigerant charge = [(Amount of additional refrigerant charge per meter of each size of liquid tube × its tube length) + (...) + (...)] + [(Necessary amount of additional refrigerant charge per outdoor unit) + (...) + (...)] + [(Necessary amount of additional refrigerant charge per meter of each size of discharge tube × its tube length) + (...) + (...)]
--

*Always charge accurately using a scale for weighing.

*If the existing tubing is used and the amount of on-site refrigerant charge exceeds the value listed below, change the size of the tubing to reduce the amount of refrigerant.

- Total amount of refrigerant for the system with 1 outdoor unit: 50 kg
- Total amount of refrigerant for the system with 2 outdoor units: 80 kg
- Total amount of refrigerant for the system with 3 outdoor units: 105 kg

Table 9 Necessary Amount of Additional Refrigerant Charge Per Meter, According to Liquid Tubing Size

Liquid tubing size (mm)	6.35	9.52	12.7	15.88	19.05	22.22
Amount of additional refrigerant charge/m (g/m)	26	56	128	185	259	366

Table 10 Necessary Amount of Additional Refrigerant Charge Per Outdoor Unit

U-8MF3R7	U-10MF3R7	U-12MF3R7	U-14MF3R7	U-16MF3R7
1.0 kg	1.0 kg	3.9 kg	3.9 kg	3.9 kg

Table 11 Refrigerant Charge Amount at Shipment (for Outdoor Unit)

U-8MF3R7	U-10MF3R7	U-12MF3R7	U-14MF3R7	U-16MF3R7
9.8 kg	9.8 kg	11.8 kg	11.8 kg	11.8 kg

Table 12 Necessary Amount of Additional Refrigerant Charge per meter, According to Discharge Tubing Size

Discharge tubing size	mm	ø12.7	ø15.88	ø19.05	ø22.22	ø25.4	ø28.58	ø31.75	ø38.1
Additional amount	g/m	12	21	31	41	55	71	89	126

*Additional refrigerant charge amount of discharge tubing should be less than 9,000g.

1-9. System Limitations

Table 13 System Limitations

Max. No. allowable connected outdoor units	3 *2
Max. capacity allowable connected outdoor units	135 kW (48 HP)
Max. connectable indoor units	52 *1
Max. allowable indoor/outdoor capacity ratio	50 – 150 %*3

- *1: In the case of 26 HP or smaller units, the number is limited by the total capacity of the connected indoor units.
- *2: Up to 3 units can be connected if the system has been extended.
- *3: It is strongly recommended that you choose the unit so the load can become between 50 and 130%.

Maximum number of connectable indoor units when connected with minimum capacity

Total horse power	Number of indoor units	Total horse power	Number of indoor units	Total horse power	Number of indoor units
8 HP	15	16 HP	30	24 HP	46
10 HP	19	18 HP	34	26 HP	49
12 HP	22	20 HP	38	28-48 HP	52
14 HP	27	22 HP	41		

Table 14 System Limitations of Total Refrigerant Amount

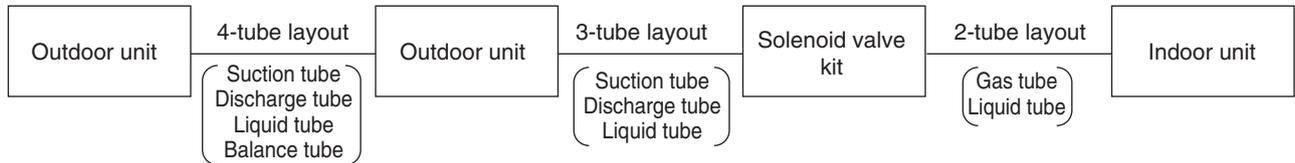
Combination number of outdoor unit	1	2	3	
Upper limit	kg	50	80	105

Make sure the values calculated using the following formula should not exceed the maximum allowable values (Table 13).

Total refrigerant amount = Refrigerant charge amount at shipment (for outdoor unit)
 + Necessary amount of additional refrigerant charge per meter according to liquid tubing size
 + Necessary amount of additional refrigerant charge per outdoor unit
 + Necessary amount of additional refrigerant charge per meter according to discharge tubing size

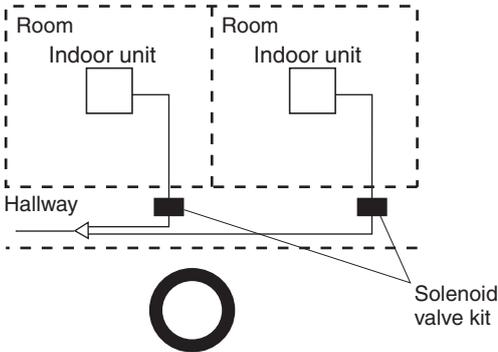
1-10. Installation Standards

Relationship between A/C units and refrigerant tubing

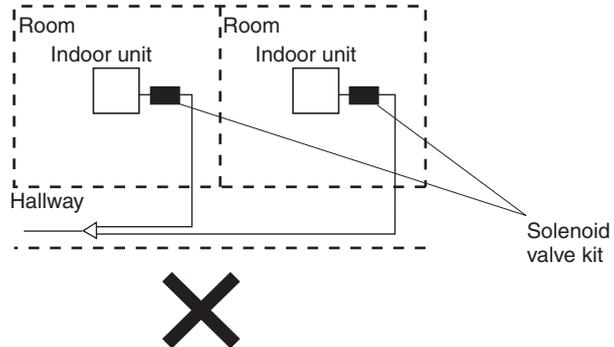


- Install the solenoid valve kit 50 m or less from the indoor unit.
- In quiet locations such as hospitals, libraries, and hotel rooms, the refrigerant noise may be somewhat noticeable. It is recommended that the solenoid valve kit be installed inside the corridor ceiling, at a location outside the room.
- The solenoid valve kit must be located not less than 2.5 m above the floor or that cannot be touched.

Strongly recommended installation



Avoid



Common solenoid valve kit

- Multiple indoor units under group control can utilize a solenoid valve kit in common.
- Categories of connected indoor unit capacities are determined by the solenoid valve kit.

Type of solenoid valve kit	Total capacity of indoor units (kW)
CZ-P160HR3	5.6 < Total capacity ≤ 16.0
CZ-P56HR3	Total capacity ≤ 5.6

- If the capacity range is exceeded, use 2 solenoid valves connected in parallel.

WARNING Always check the gas density limit for the room in which the unit is installed.

1-11. Check of Limit Density

When installing an air conditioner in a room, it is necessary to ensure that even if the refrigerant gas accidentally leaks out, its density does not exceed the limit level for that room. If the density could exceed the limit level, it is necessary to provide an opening between the unit and the adjacent room, or to install mechanical ventilation which is interlocked with a leak detector.

(Total refrigerant charged amount: kg)

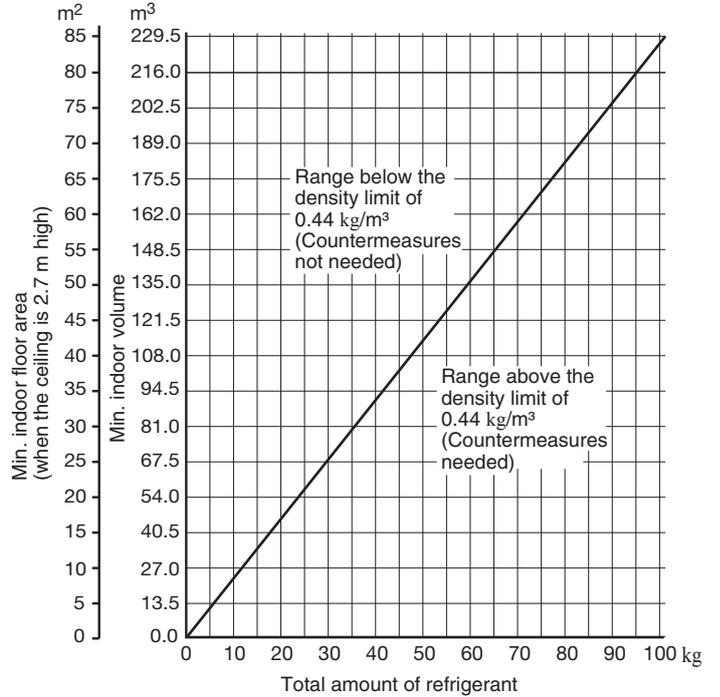
(Min. indoor volume where the indoor unit is installed: m³)

≤ Limit density 0.44 (kg/m³)

The limit density of refrigerant R410A which is used in this unit is 0.44 kg/m³ (ISO 5149).

The shipped outdoor unit comes charged with the amount of refrigerant fixed for each type, so add it to the amount that is charged in the field. (For the refrigerant charge amount at shipment, refer to the unit's nameplate.)

Minimum indoor volume & floor area as against the amount of refrigerant is roughly as given in the following table.



CAUTION Pay special attention to any location, such as a basement, etc., where leaking refrigerant can accumulate, since refrigerant gas is heavier than air.

1-12. Installing Distribution Joint

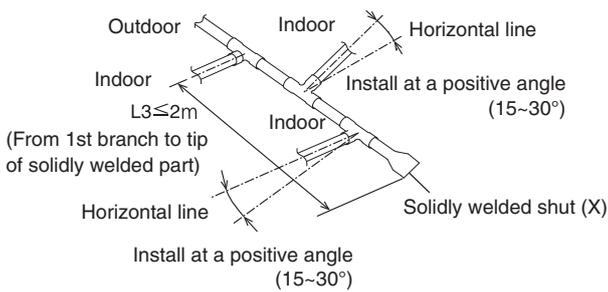
(1) Refer to "HOW TO ATTACH DISTRIBUTION JOINT" enclosed with the optional distribution joint kit (CZ-P680PH2, CZ-P1350PH2, CZ-P224BH2, CZ-P680BH2, CZ-P1350BH2).

- When connecting a branch tubing to the indoor unit directly, it is necessary for each branch tubing to install at a positive angle with respect to horizontal in order to prevent accumulation of refrigerant oil in stopped units. See the below chart.

Branch tubing system ——— Restricted - - - - - Not restricted

How to install branch tubing 	When connecting branch tubing to indoor unit directly			When not connecting branch tubing to indoor unit directly
	Gas tube		Liquid tube	Suction, discharge & liquid tubes
	When connecting to A	When connecting to B		
Horizontal				
Vertical	Upward			
	Downward			

Header branch system (Main tubing is horizontal.)



- Be sure to solidly weld shut the T-joint end (marked by X in the figure). In addition, pay attention to the insertion depth of each connected tube so that the flow of refrigerant within the T-joint is not impeded. Be sure to use a commercial available T-joint.
- When using the header joint system, do not make further branches in the tubing.
- Do not use the header joint system on the outdoor unit side.

1-13. Optional Distribution Joint Kits

See the installation instructions packaged with the distribution joint kit for the installation procedure.

Table 15

Model name	Cooling capacity after distribution	Remarks	Model name	Cooling capacity after distribution	Remarks
1. CZ-P680PH2	68.0 kW or less	For outdoor unit	3. CZ-P224BH2	22.4 kW or less*	For indoor unit
2. CZ-P1350PH2	more than 68.0 kW	For outdoor unit	4. CZ-P680BH2	68.0 kW or less*	For indoor unit
			5. CZ-P1350BH2	more than 68.0 kW *	For indoor unit

*In case the total capacity of indoor units connected after distribution exceeds the total capacity of the outdoor units, select the distribution tubing size for the total capacity of the outdoor units.

■ Tubing size (with thermal insulation)

CZ-P680PH2

For outdoor unit (Capacity after distribution joint is 68.0 kW or less.)

Example: (C below indicates inner diameter. © below indicates outer diameter.)

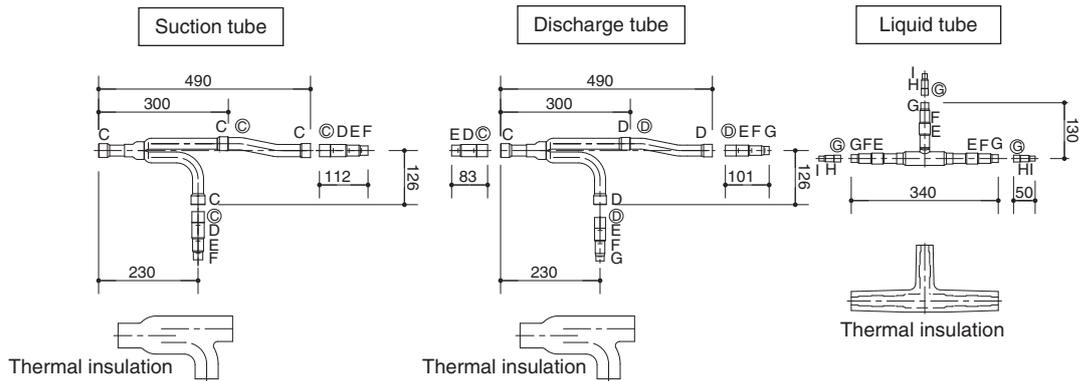


Table 16 Dimensions for connections of each part

Unit: mm

Position	A	B	C	D	E	F	G	H	I	J
Dimension	—	—	ø28.58	ø25.4	ø22.22	ø19.05	ø15.88	ø12.7	ø9.52	—

CZ-P1350PH2

For outdoor unit (Capacity after distribution joint is more than 68.0 kW.)

Example: (C below indicates inner diameter. © below indicates outer diameter.)

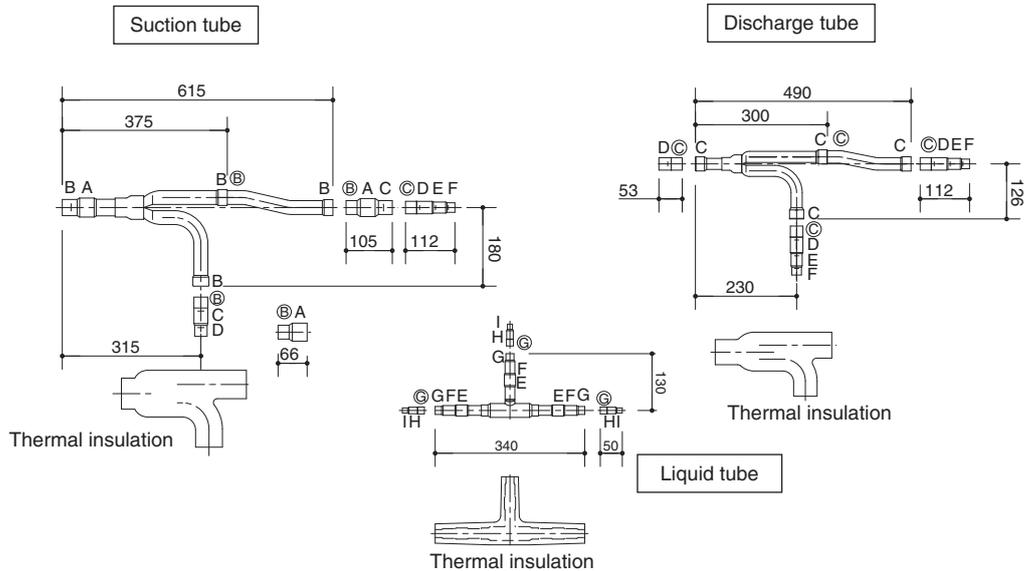


Table 17 Dimensions for connections of each part

Unit: mm

Position	A	B	C	D	E	F	G	H	I	J
Dimension	ø38.1	ø31.75	ø28.58	ø25.4	ø22.22	ø19.05	ø15.88	ø12.7	ø9.52	—

* If the tube diameter is more than ø38.1, use field-supply reducer.

Table 18 Dimensions for connections of each part

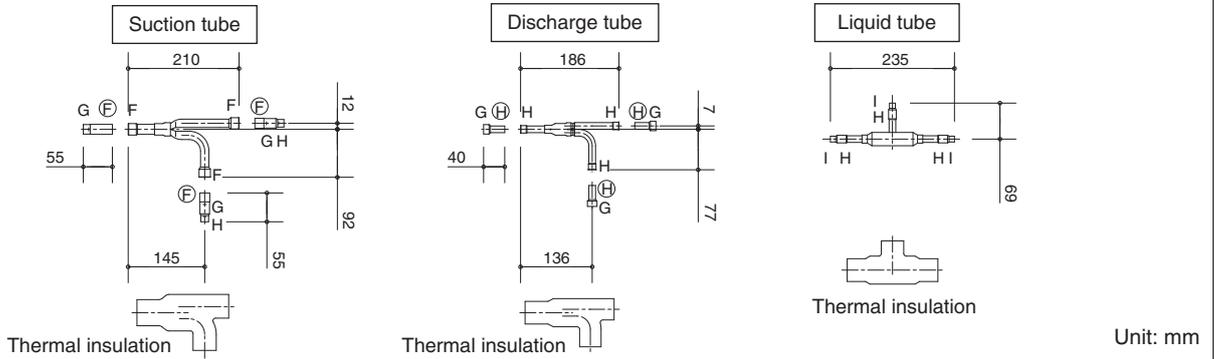
Unit: mm

Position	A	B	C	D	E	F	G	H	I	J
Dimension	ø38.1	ø31.75	ø28.58	ø25.4	ø22.22	ø19.05	ø15.88	ø12.7	ø9.52	-

CZ-P224BH2

Use: For indoor unit (Capacity after distribution joint is 22.4 kW or less.)

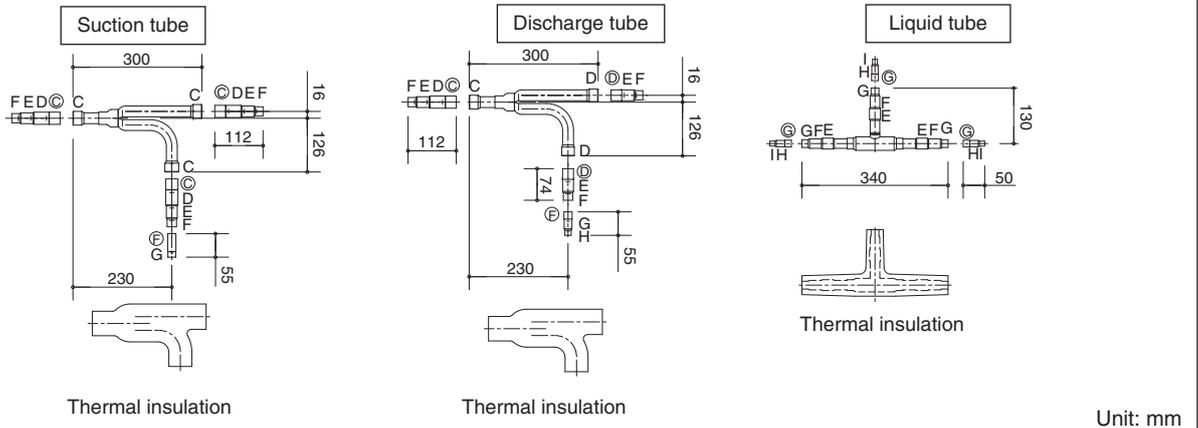
Example: (F below indicates inner diameter. ⊕ below indicates outer diameter.)



CZ-P680BH2

Use: For indoor unit (Capacity after distribution joint is greater than 22.4 kW and no more than 68.0 kW.)

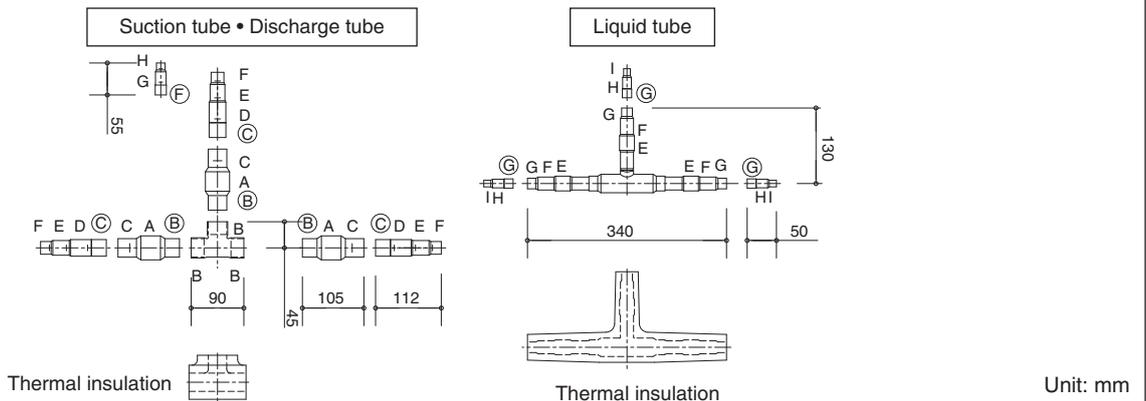
Example: (C below indicates inner diameter. ⊙ below indicates outer diameter.)



CZ-P1350BH2

Use: For indoor unit (Capacity after distribution joint is more than 68.0 kW.)*

Example: (B below indicates inner diameter. ⊕ below indicates outer diameter.)



*If the tube diameter is more than ø38.1, use field-supply reducer. * If the tube diameter is more than ø19.05, use field-supply reducer.

* In case the total capacity of indoor units connected after distribution exceeds the total capacity of the outdoor units, select the distribution tubing size for the total capacity of the outdoor units.

1-14. Optional Solenoid Valve Kit

NOTE

Refer to the installation instructions attached to the optional Solenoid Valve Kit.

1-15. Example of Tubing Size Selection and Refrigerant Charge Amount

Additional refrigerant charging

Based on the values in Tables 3, 4, 5, 6, 9, 10 and 12, use “the liquid tubing size and length” and “the discharge tubing size and length”, and calculate the amount of additional refrigerant charge using the formula below.

Unit of account (g)

Required additional refrigerant charge (g)	Necessary Amount of Additional Refrigerant Charge Per Outdoor Unit $= + 366 \times (a) + 259 \times (b) + 185 \times (c) + 128 \times (d) + 56 \times (e) + 26 \times (f)$ $+ 126 \times (A) + 89 \times (B) + 71 \times (C) + 55 \times (D) + 41 \times (E) + 31 \times (F) + 21 \times (G) + 12 \times (H)$
--	---

(a) : Liquid tubing	Total length of ø22.22 (m)	(A) : Discharge tubing	Total length of ø38.1 (m)
(b) : Liquid tubing	Total length of ø19.05 (m)	(B) : Discharge tubing	Total length of ø31.75 (m)
(c) : Liquid tubing	Total length of ø15.88 (m)	(C) : Discharge tubing	Total length of ø28.58 (m)
(d) : Liquid tubing	Total length of ø12.7 (m)	(D) : Discharge tubing	Total length of ø25.4 (m)
(e) : Liquid tubing	Total length of ø9.52 (m)	(E) : Discharge tubing	Total length of ø22.22 (m)
(f) : Liquid tubing	Total length of ø6.35 (m)	(F) : Discharge tubing	Total length of ø19.05 (m)
		(G) : Discharge tubing	Total length of ø15.88 (m)
		(H) : Discharge tubing	Total length of ø12.7 (m)

● Charging procedure

Be sure to charge with R410A refrigerant in liquid form.

- After performing a vacuum, charge with refrigerant from the liquid tubing side. At this time, all valves must be in the “fully closed” position.
- If not charged as prescribed amount, charge from the refrigerant charge connection port while operating in the cooling mode. (This is performed at the time of the test run. For this, all valves must be in the “fully open” position. However, if only one outdoor unit is installed, a balance tube is not used. Therefore, leave the valves fully closed.)

Charge with R410A refrigerant in liquid form.

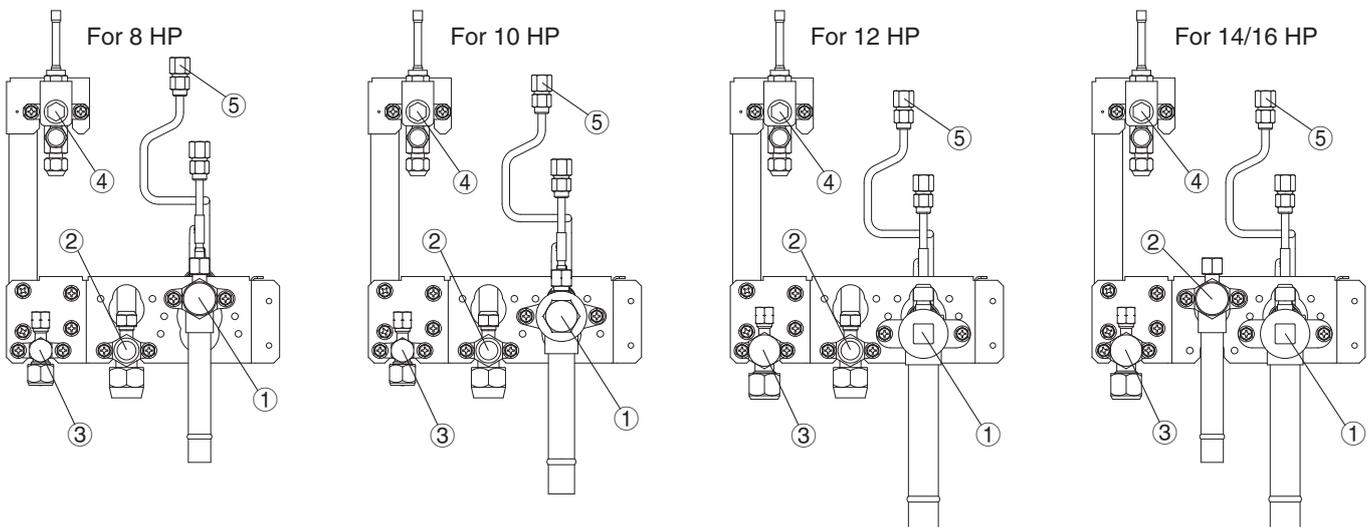
With R410A refrigerant, charge while adjusting the amount being fed a little at a time in order to prevent liquid refrigerant from backing up.

- After charging is completed, turn all valves to the “fully open” position.
- Replace the tubing covers as they were before.



CAUTION

- R410A additional charging absolutely must be done through liquid charging.**
- The R410A refrigerant cylinder has a gray base color, and the top part is pink.**
- The R410A refrigerant cylinder includes a siphon tube. Check that the siphon tube is present. (This is indicated on the label at the top of the cylinder.)**
- Due to differences in the refrigerant, pressure, and refrigerant oil involved in installation, it is not possible in some cases to use the same tools for R22 and for R410A.**

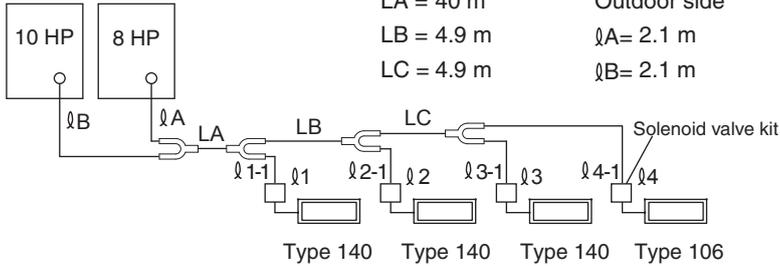


① Suction tube		② Discharge tube		③ Liquid tube	④ Balance tube
(For 8 HP) Use a hex wrench (width 5mm) and turn to the left to open.	(For 10 HP) Use a hex wrench (width 8mm) and turn to the left to open.	(For 12/14/16 HP) Use a hex wrench (width 10mm) and turn to the left to open.	(For 8/10/12 HP) Use a hex wrench (width 4mm) and turn to the left to open.	(For 14/16 HP) Use a hex wrench (width 5mm) and turn to the left to open.	Use a hex wrench (width 4mm) and turn to the left to open. Use a flathead screwdriver and open by turning the part with the screw groove to the right, from “-” to “ ”.
⑤ Refrigerant charge connection port (width 15mm)					
Tightening torque : 9±1 N · m					

Example:

● Example of each tubing length

Outdoor unit



Main tubing

LA = 40 m
LB = 4.9 m
LC = 4.9 m

Distribution joint tubing

Outdoor side	Indoor side
lA = 2.1 m	l 1 = 30 m l 1-1 = 25 m
lB = 2.1 m	l 2 = 4.9 m l 2-1 = 4 m
	l 3 = 4.9 m l 3-1 = 4 m
	l 4 = 19.8 m l 4-1 = 15 m

- Obtain liquid tubing size from Tables 3, 4, 5, 6 and 9.

Main tubing

LA = ϕ 15.88 m (Total capacity of indoor unit is 52.6kW)
LB = ϕ 12.7 m (Total capacity of indoor unit is 38.6kW)
LC = ϕ 9.52 m (Total capacity of indoor unit is 24.6kW)

Distribution joint tubing

Outdoor side l A: ϕ 9.52 m l B: ϕ 9.52 m (from outdoor unit connection tubing)
Indoor side l 1-1: ϕ 9.52 m l 2-1: ϕ 9.52 m l 3-1: ϕ 9.52 m l 4-1: ϕ 9.52 m (from indoor unit connection tubing)

- Obtain discharge tubing size from Tables 3, 4 and 12.

Main tubing

LA = ϕ 22.22 m LB = ϕ 22.22 m LC = ϕ 15.88 m

Distribution joint tubing

Outdoor side l A: ϕ 15.88 m l B: ϕ 19.05 m (from outdoor unit connection tubing)
Indoor side l 1: ϕ 15.88 m l 2: ϕ 15.88 m l 3: ϕ 15.88 m l 4: ϕ 15.88 m (from solenoid valve kit connection tubing)

- Obtain additional charge amount for each tubing size and additional refrigerant charge amount for outdoor unit.

Note 1: The charge amounts per 1 meter are different for each liquid tubing size.

ϕ 15.88 m	→ LA	$40 \text{ m} \times 185 \text{ g/m} = 7,400\text{g}$
ϕ 12.7 m	→ LB	$4.9 \text{ m} \times 128 \text{ g/m} = 627\text{g}$
ϕ 9.52 m	→ LC + l A + l B + l 1 + l 2 + l 3 + l 4	$68.7 \text{ m} \times 56 \text{ g/m} = 3,847\text{g}$
		Total 11,874g

Additional refrigerant charge amount is 11,874g.

Note 2: Necessary amount of additional refrigerant charge per outdoor unit is 2,000g in combination of 2 units. (See Table 10.)

Note 2) Amount of additional charge for outdoor unit (combination number) : 2,000g

Note 3: The charge amounts per 1 meter are different for each discharge tubing size.

ϕ 22.22 m	→ LA + LB	$44.9 \text{ m} \times 41 \text{ g/m} = 1,841\text{g}$
ϕ 19.05 m	→ l B	$2.1 \text{ m} \times 31 \text{ g/m} = 65\text{g}$
ϕ 15.88 m	→ LC + l A	$7 \text{ m} \times 21 \text{ g/m} = 147\text{g}$
ϕ 12.7 m	→ l 1-1 + l 2-1 + l 3-1 + l 4-1	$48.0 \text{ m} \times 12 \text{ g/m} = 576\text{g}$
		Total 2,629g

Additional refrigerant charge amount is 2,629g.

Note 1) Amount of additional charge per liquid tubing length	: 11,874g
Note 2) Amount of additional charge for outdoor unit (combination number)	: 2,000g
Note 3) Amount of additional charge per discharge tubing length	: 2,629g

Total of additional refrigerant charge amount : 16,503g

Therefore, the total of additional refrigerant charge amount reaches 16,503g.

- Obtain overall refrigerant charge amount.

Overall refrigerant charge amount of the system indicates the calculated value shown above the additional charge amount in addition to the total refrigerant charge amount (shown in Table 6) at shipment in total cooling capacity of outdoor unit.

Refrigerant charge amount at shipment

(Total cooling capacity of outdoor unit)	:	19,600g
Total of additional refrigerant charge amount	:	16,503g
		Grand total 36,103g

Therefore, overall refrigerant charge amount of the system reaches 36,103g.

Remark: Be sure to include the values in Table 10 Necessary Amount of Additional Refrigerant Charge Per Outdoor Unit.



CAUTION Be sure to check the limit density for the room in which the indoor unit is installed.

Checking of limit density

Density limit is determined on the basis of the size of a room using an indoor unit of minimum capacity.
 For instance, when an indoor unit is used in a room (floor area 15 m² × ceiling height 2.7 m = room volume 40.5 m³), the graph at right shows that the maximum overall refrigerant charge amount of limit density (0.44 kg/m³) that is not required to install a ventilation fan should be calculated as follows.

Due to the room volume,

Maximum overall refrigerant charge amount

$$\begin{aligned}
 &= (\text{room volume}) \times (\text{limit density}) \\
 &= 40.5 \text{ (m}^3\text{)} \times 0.44 \text{ (kg/m}^3\text{)} \\
 &= 17.82 \text{ kg}
 \end{aligned}$$

Overall refrigerant charge amount for this system is 36.103 (kg).
 The formula for the minimum room volume should be determined as follows.

Required minimum room volume

$$\begin{aligned}
 &= (\text{overall refrigerant charge amount}) \div (\text{limit density}) \\
 &= 36.103 \text{ (kg)} \div 0.44 \text{ (kg/m}^3\text{)} \\
 &= 82.05 \text{ (m}^3\text{)}
 \end{aligned}$$

Required minimum floor area

$$\begin{aligned}
 &= (\text{minimum room volume}) \div (\text{ceiling height}) \\
 &= 82.05 \text{ (m}^3\text{)} \div 2.7 \text{ (m)} \\
 &= 30.4 \text{ (m}^2\text{)}
 \end{aligned}$$

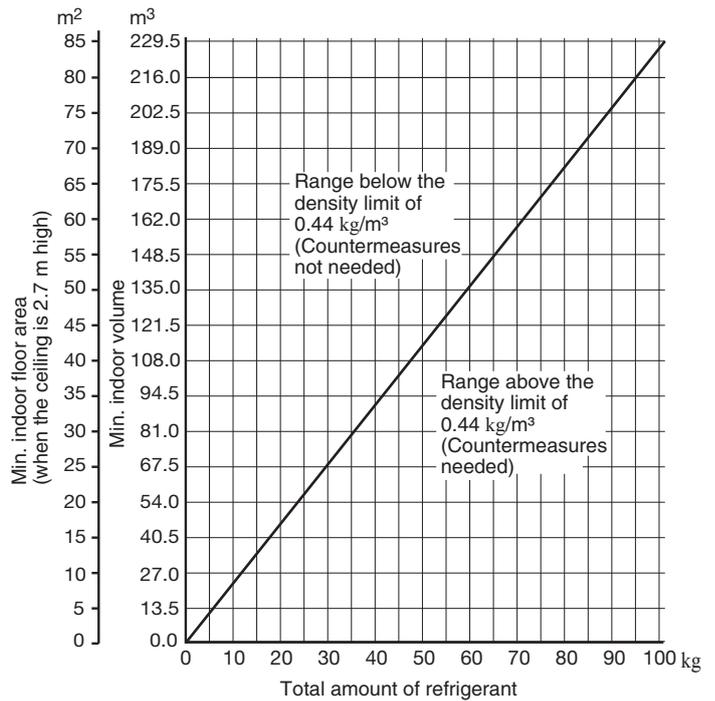
Therefore an opening for ventilation is required.

< Formula for computation >

Overall refrigerant charge amount for the air conditioner: kg

$$\begin{aligned}
 &= \frac{\text{(Minimum room volume for indoor unit: m}^3\text{)}}{40.5 \text{ (m}^3\text{)}} \\
 &= \frac{36.103 \text{ (kg)}}{40.5 \text{ (m}^3\text{)}} \\
 &= 0.89 \text{ (kg/m}^3\text{)} > 0.44 \text{ (kg/m}^3\text{)}
 \end{aligned}$$

Accordingly, it is necessary to install a ventilation fan for this room.



2. SELECTING THE INSTALLATION SITE

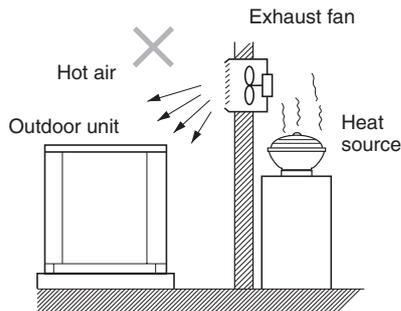
2-1. Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc.
- damp, humid or uneven locations
- indoors (no-ventilation location)

DO:

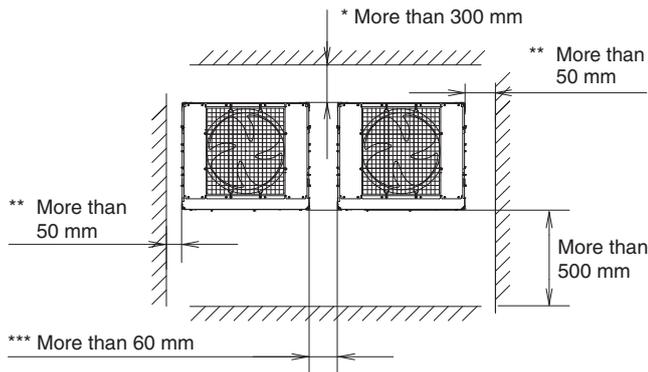
- choose a place as cool as possible.
- choose a place that is well ventilated.
- allow enough room around the unit for air intake/exhaust and possible maintenance.



Installation Space

Install the outdoor unit where there is enough space for ventilation. Otherwise the unit may not operate properly. The figure shows the minimum space requirement around the outdoor units when 3 sides are open and only 1 side is shuttered, with open space above the unit. The mounting base should be concrete or a similar material that allows for adequate drainage. Make provisions for anchor bolts, platform height, and other site-specific installation requirements.

Example of installation of 2 units
(when 3 sides are open and only 1 side is shuttered)



- * Make a walk-in space behind the unit to erase maintenance and servicing.
- ** When setting the anchor bolt to position "B" or "C", make the space between the unit and the wall more than 250 mm for installation operation.
- *** When setting the anchor bolt to position "B" or "C", make the space between the outdoor units more than 180 mm for installation operation.



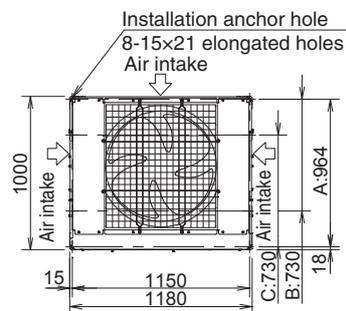
CAUTION

- Leave space open above the unit.
- Construct louvers or other openings in the wall, if necessary, to ensure adequate ventilation.

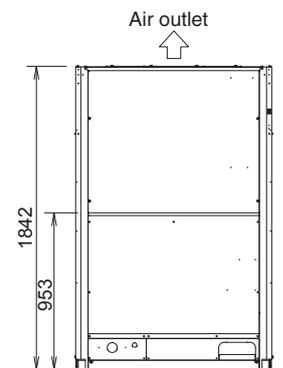
NOTE

- Do not do any wiring or tubing within 30 cm of the front panel, because this space is needed as a servicing space for the compressor.
- Ensure a base height of 100 mm or more to ensure that drainage water does not accumulate and freeze around the bottom of the unit.
- If installing a drain pan, install the drain pan prior to installing the outdoor unit.
- * Make sure there is at least 150 mm between the outdoor unit and the ground.
Also, the direction of the tubing and electrical wiring should be from the front of the outdoor unit.

Top view



Front view

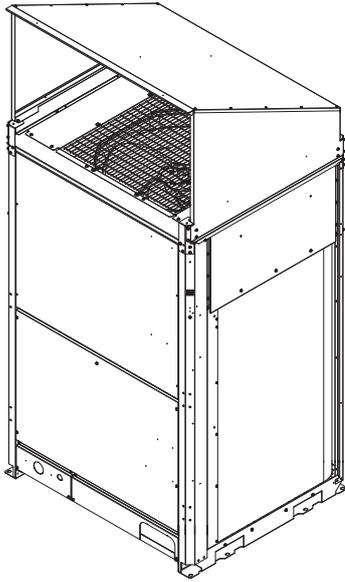


Unit: mm

According to the installation site, you may choose the setting position in the depth direction of the anchor bolt from A, B or C.
A: (Installation hole pitch) For removing the tube forward
B: (Installation hole pitch) For removing the tube downward
C: (Installation hole pitch)

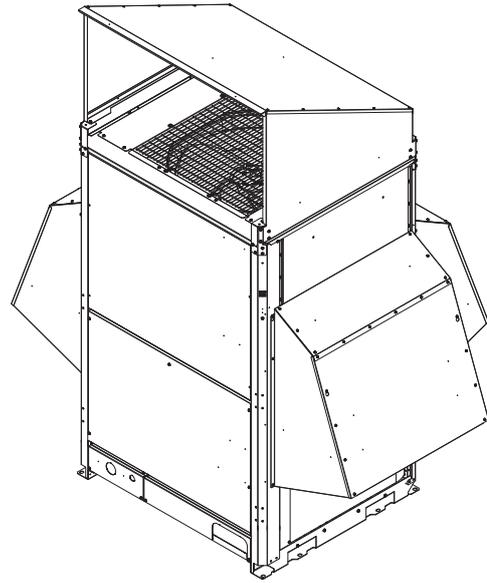
2-2. Shield for Horizontal Exhaust Discharge

It is necessary to install an air-discharge chamber (field supply) to direct exhaust from the fan horizontally if it is difficult to provide a minimum space of 2 m between the air-discharge outlet and a nearby obstacle.



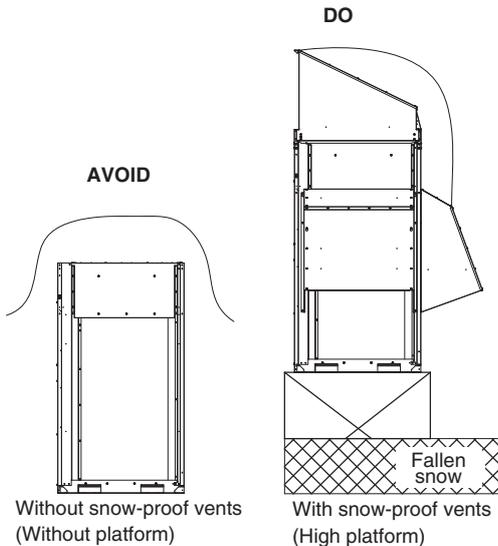
2-3. Installing the Outdoor Unit in Heavy Snow Areas

In locations where wind-blown snow can be a problem, snow-proof vents should be fitted to the unit and direct exposure to the wind should be avoided as much as possible.



CAUTION

In regions with heavy snowfall, the outdoor unit should be provided with a solid, raised platform and snow-proof vents.



The following problems may occur if proper countermeasures are not taken:

- The fan in the outdoor unit may stop running, causing the unit to be damaged.
- There may be no air flow.
- The tubing may freeze and burst.
- The condenser pressure may drop because of strong wind, and the indoor unit may freeze.

2-4. Precautions When Installing in Heavy Snow Areas

- a) The platform should be higher than the maximum snow depth.
- b) The 2 anchoring feet of the outdoor unit should be used for the platform, and the platform should be installed beneath the air-intake side of the outdoor unit.
- c) The platform foundation must be solid and the unit must be secured with anchor bolts.
- d) When installing on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being overturned.

**2-5. Dimensions of Wind Ducting
Reference diagram for air-discharge chamber (field supply)**

For further details, see section "SUPPLEMENT".

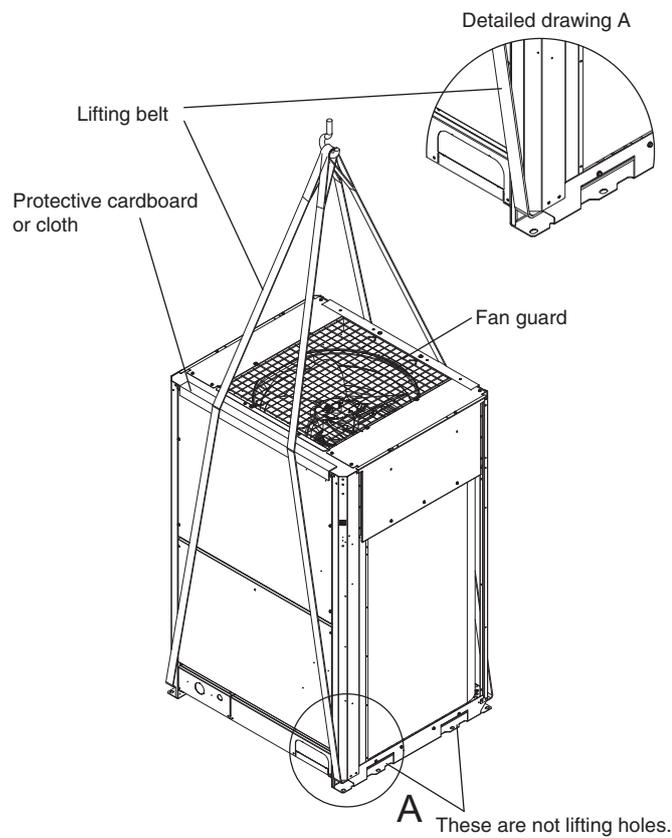
**2-6. Dimensions of Snow Ducting
Reference diagram for snow-proof vents (field supply)**

For further details, see section "SUPPLEMENT".

3. HOW TO INSTALL THE OUTDOOR UNIT

3-1. Transporting

When transporting the unit, have it delivered as close to the installation site as possible without unpacking. Use a hook for suspending the unit respectively according to the type of model.

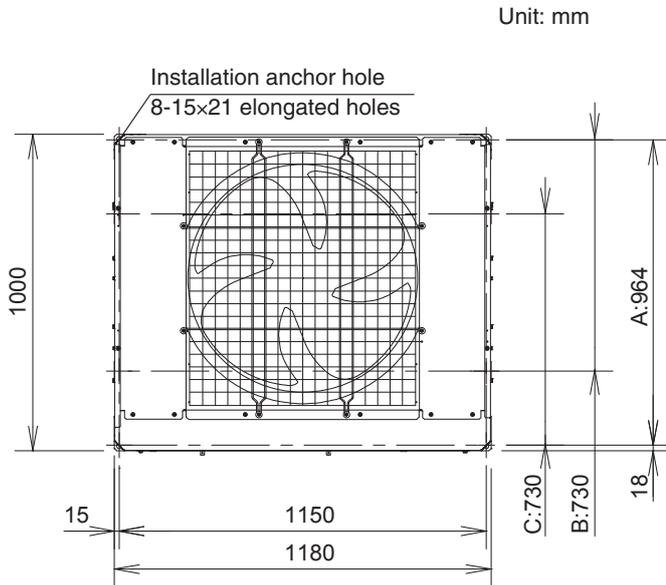


⚠ CAUTION

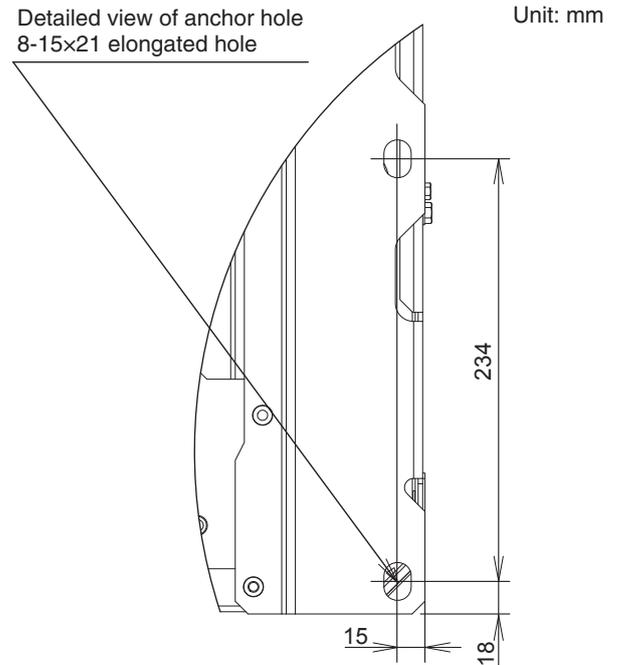
- When hoisting the outdoor unit, pass lifting belts through the left and right holes of the bottom plate as shown in the following figures. Use two lengths of lifting belt 7.5 meters long or longer.
- Hang the lifting belt at an oblique angle of the four corners of the bottom plate. If it is hung at other areas, the lifting belt becomes loose and the outdoor unit will be damaged or you may be injured.
- Pay high attention to the unit not to lose the balance when lifting. Also, safety measures should be taken not to loosen the belt when lifting the load.
- Use protective panels or padding at all locations where the lifting belt contacts the outer casing or other parts to prevent scratching. In particular, use protective material (such as cloth or cardboard) to prevent the edges of the top panel from being scratched.

3-2. Installing the Outdoor Unit

- (1) Use four anchor bolts (M12 or similar) to securely anchor the unit. Regarding the positioning anchor bolts of the depth direction, select one of three types according to the installation site as shown in the following figures. Normally, select the position A. When removing the connection tube in a downward direction, select the position B.



- (2) When only using a single outdoor unit, see the figure below.



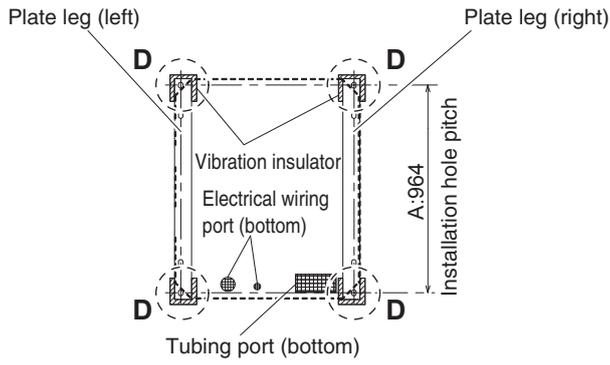
In case of the combination with different units, see section "SUPPLEMENT".

*When positioning the anchor bolt at B or C, make a sufficient space between the units or from the wall for installation. (Make a space between the units wider than 180mm and left and right space wider than 250mm from the wall.)

- (3) The vibration insulator or the like should be kept secure to satisfy the width and depth for the plate legs. Use a washer from the upper direction larger than the hole size for fixing the installation.

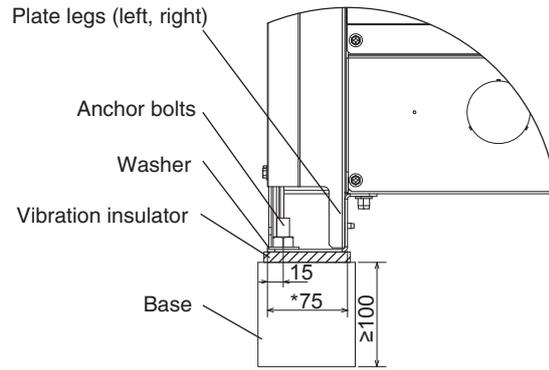
- Below shows vibration insulator position when setting anchor bolt at position A.

Unit: mm



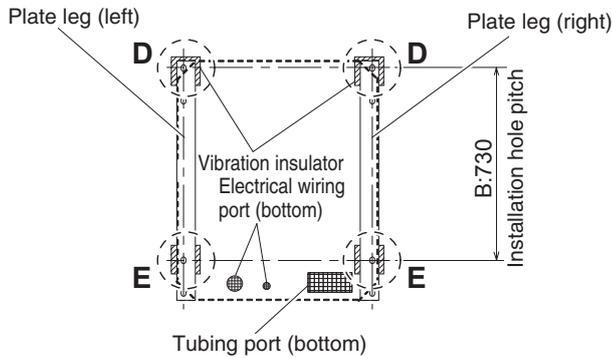
Detailed view of D

Unit: mm



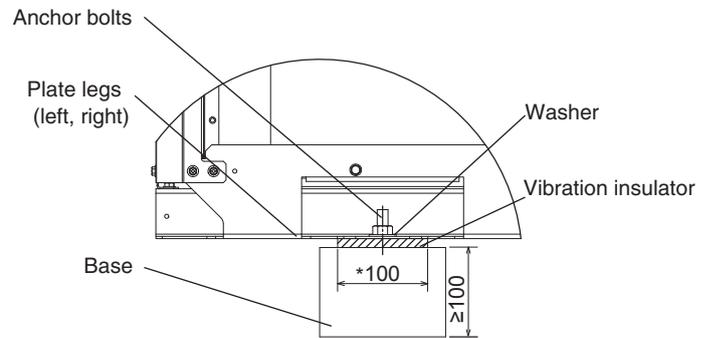
- Below shows vibration insulator position when setting anchor bolt at position B.

Unit: mm



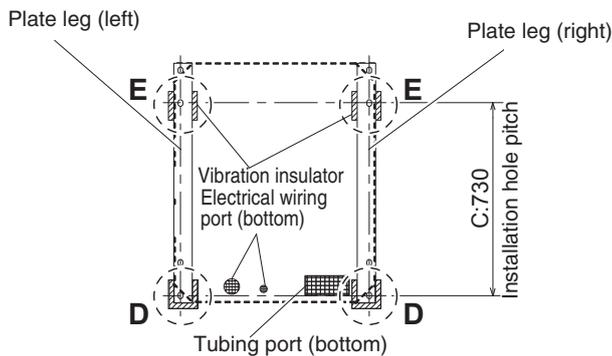
Detailed view of E

Unit: mm



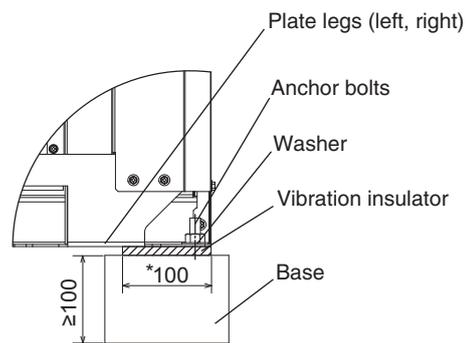
- Below shows vibration insulator position when setting anchor bolt at position C.

Unit: mm



Detailed view of D

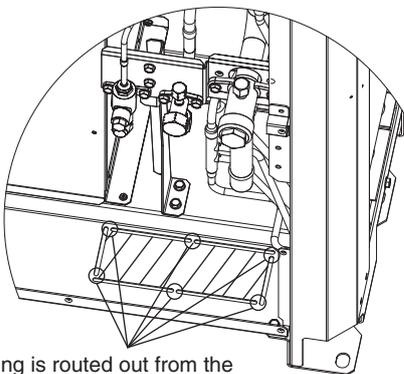
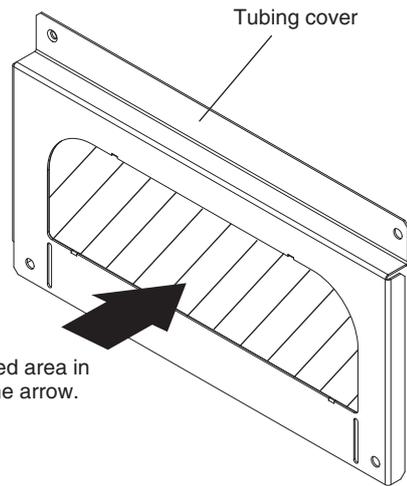
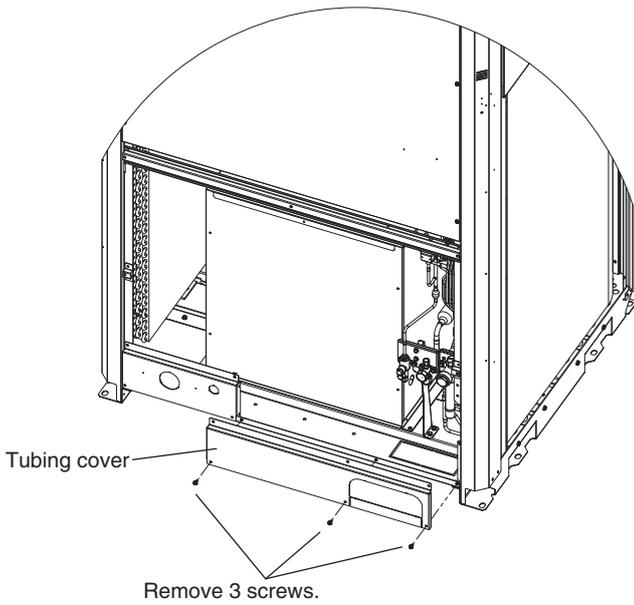
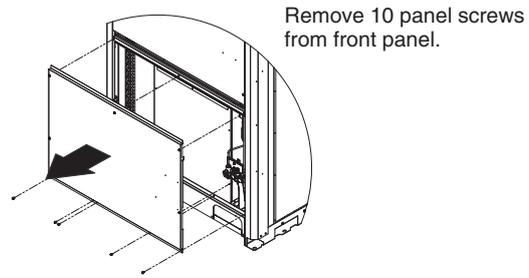
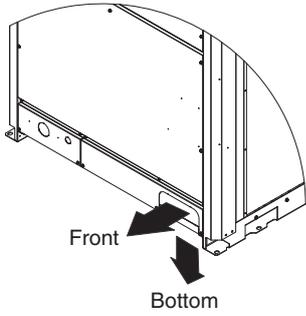
Unit: mm



NOTE: Proceed with the work following the dimensions showing the asterisk.

3-3. Routing the Tubing

- The tubing can be routed out either from the front or from the bottom.
 - The connecting valve is contained inside the unit. Therefore, remove the front panel.
- (1) If the tubing is routed out from the front, cut out the slit part (▨).
- Be careful not to damage the tubing cover.
- (2) If the tubing is routed out from the bottom, use cutting pliers or a similar tool to cut out the tubing outlet slit (part indicated by ▨) from the tubing cover.
- Be careful not to damage the tubing cover.



If the tubing is routed out from the bottom, use cutting pliers or a similar tool to cut out the shaded area.

3-4. Prepare the Tubing

- **Material:** Use seamless phosphorous deoxidized copper tube for refrigeration. Wall thickness shall comply with the applicable legislation. The minimal wall thickness must be in accordance with the table below. For tubes of $\phi 22.22$ or larger, use the material of temper 1/2H or H (Hard copper tube). Do not bend the hard copper tube.
- **Tubing size**
Use the tubing size indicated in the table below.
- **When cutting the tubing,** use a tube cutter, and be sure to remove any burrs.
The same applies to distribution tubing (optional).
- **When bending the tubes,** bend each tube using a radius that is at least 4 times the outer diameter of the tube. When bending, use sufficient care to avoid crushing or damaging the tube.
- **For flaring,** use a flare tool, and be sure that flaring is performed correctly.



CAUTION

Use sufficient caution during preparation of the tubing.
Seal the tube ends by means of caps or taping to prevent dust, moisture, or other foreign substances from entering the tubes.

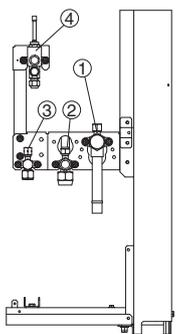
Refrigerant tubing

Tubing size (mm)			
Material Temper - O (Soft copper tube)		Material Temper - 1/2 H, H (Hard copper tube)	
Outer dia.	Thickness	Outer dia.	Thickness
$\phi 6.35$	t0.8	$\phi 22.22$	t1.0
$\phi 9.52$	t0.8	$\phi 25.4$	t1.0
$\phi 12.7$	t0.8	$\phi 28.58$	t1.0
$\phi 15.88$	t1.0	$\phi 31.75$	t1.1
$\phi 19.05$	t1.2	$\phi 38.1$	over t1.35
		$\phi 41.28$	over t1.45

3-5. Connect the Tubing

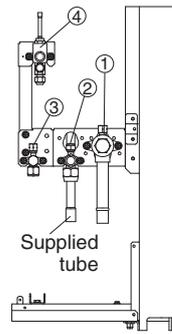
- When operating the refrigerant tube installation in the field, do not apply the flame of welding to the surrounding sheet-metal parts. If necessary, use a wet rag to prevent overheating of the heat exchanger.
- Use the supplied connector tubing.

8 HP



	Refrigerant tubing	Connection method	Use Supplied connector tube?
①	Suction tube	Brazing	No
②	Discharge tube	Flare	No
③	Liquid tube	Flare	No
④	Balance tube	Flare	No

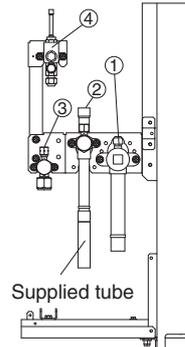
10/12 HP



	Refrigerant tubing	Connection method	Use Supplied connector tube?
①	Suction tube	Brazing	No
②	Discharge tube	Service valve mounted on the unit side: Flare connection Tubing side: Brazing	Yes $\phi 15.88$ Flare ↓ $\phi 19.05$ Brazing
③	Liquid tube	Flare	No
④	Balance tube	Flare	No

Unit: mm

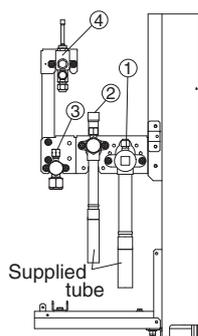
14 HP



	Refrigerant tubing	Connection method	Use Supplied connector tube?
①	Suction tube	Brazing	No
②	Discharge tube	Brazing	Yes $\phi 19.05$ → $\phi 22.22$
③	Liquid tube	Flare	No
④	Balance tube	Flare	No

Unit: mm

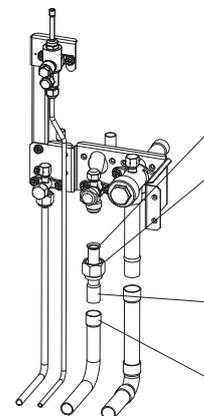
16 HP



	Refrigerant tubing	Connection method	Use Supplied connector tube?
①	Suction tube	Brazing	Yes $\phi 25.4$ → $\phi 28.58$
②	Discharge tube	Brazing	Yes $\phi 19.05$ → $\phi 22.22$
③	Liquid tube	Flare	No
④	Balance tube	Flare	No

Unit: mm

In case of 10/12 HP



Flaring process to the tip of the supplied tubes

Remove flare nuts attached to the service valve and reuse them.

Note: Make sure the service valve is completely closed.
If not, the gas leak will be occurred.

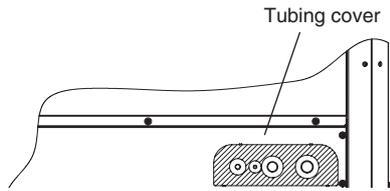
Use the wide area of the outer tubing surface of the supplied tubes.

- Supplied tubing outer diameter $\phi 19.05$
- Local tubing inner diameter $\phi 19.05$

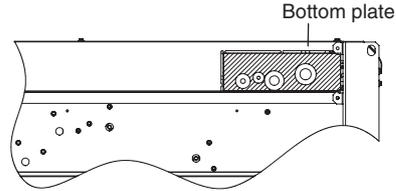
Refrigerant tube port

- Use caulking, putty, or a similar material to fill any gaps at the refrigerant tube port () in order to prevent rainwater, dust or foreign substances from entering the unit.

* Perform this work even if the tubing is routed out in a downward direction.



Tubing routed out through the front side



Tubing routed out through the bottom

- Tighten each cap as specified below.

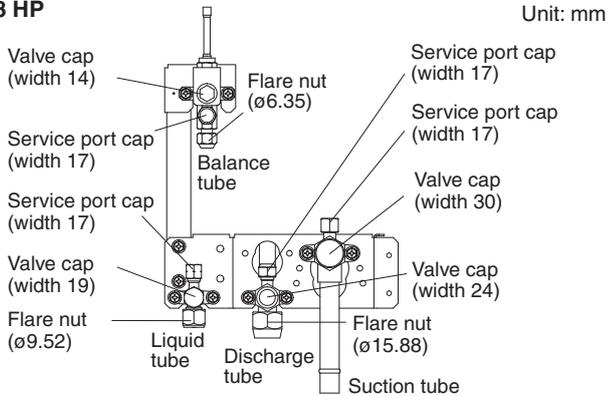
Tightening torque for each cap

Cap tightening torque

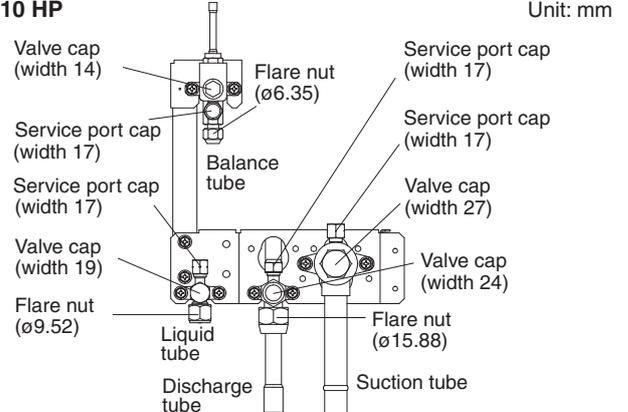
HP: horsepower

		Unit	8 HP	10 HP	12 HP	14 HP	16 HP
The liquid tube valve	Service port cap	N · m	12.7±2				
		{kgf · cm}	{127±20}				
	Valve cap	N · m	24.5±3.9		53.9±5.9		
		{kgf · cm}	{245±39}		{539±59}		
	Flare nut	N · m	38±4		55±6		
		{kgf · cm}	{380±40}		{550±60}		
The discharge tube valve	Service port cap	N · m	12.7±2			11±1	
		{kgf · cm}	{127±20}			{110±10}	
	Valve cap	N · m	53.9±5.9			42.5±2.5	
		{kgf · cm}	{539±59}			{425±25}	
	Flare nut	N · m	75±7			-	
		{kgf · cm}	{750±70}			-	
The suction tube valve	Service port cap	N · m	11±1		9±1		
		{kgf · cm}	{110±10}		{90±10}		
	Valve cap	N · m	42.5±2.5	50±3	44.5±2.5		
		{kgf · cm}	{425±25}	{500±30}	{445±25}		
The balance tube valve	Service port cap	N · m	10±1				
		{kgf · cm}	{100±10}				
	Valve cap	N · m	22.5±2.5				
		{kgf · cm}	{225±25}				
	Flare nut	N · m	16±2				
		{kgf · cm}	{160±20}				

8 HP

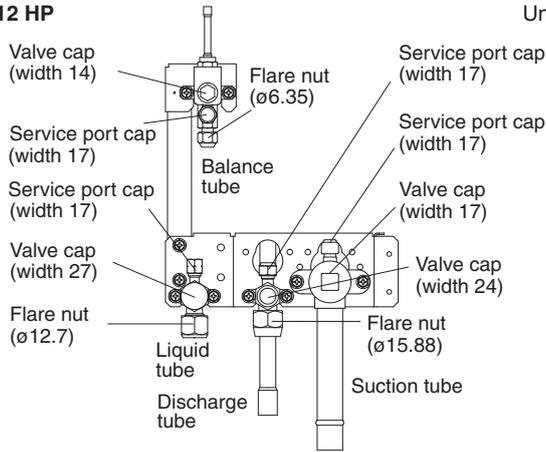


10 HP



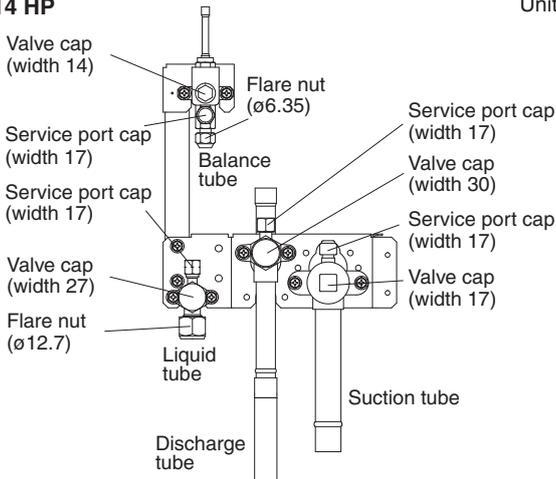
12 HP

Unit: mm



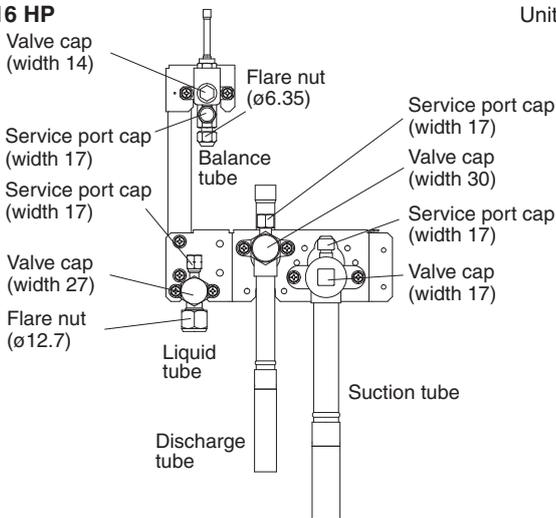
14 HP

Unit: mm

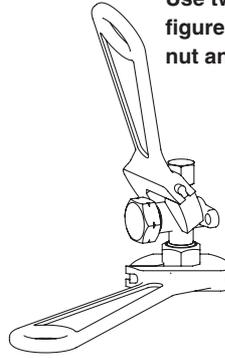


16 HP

Unit: mm



Use two adjustable wrenches, as shown in the figure, when removing the liquid tube valve flare nut and the discharge tube valve flare nut.



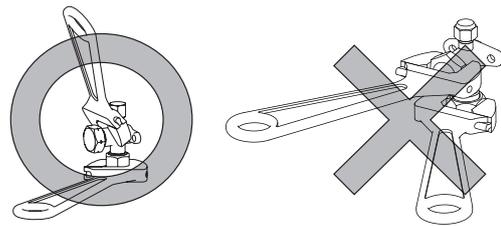
1. Do not apply a wrench to the valve cap when removing or installing the flare nuts. Doing so may damage the valve.
2. If the valve cap is left off for a long period of time, refrigerant leakage will occur. Therefore, do not leave the valve cap off.
3. Applying refrigerant oil to the flare surface can be effective in preventing gas leakage, however, be sure to use a refrigerant oil which is suitable for the refrigerant that is used in the system. (This unit utilizes R410A refrigerant, and the refrigerant oil is ether oil (synthetic oil). However, hub oil (synthetic oil) can also be used.)

Use two adjustable wrenches when removing or installing the balance tube flare nut.

In particular, do not apply an adjustable wrench to the hexagonal part at the top of the valve.

If force is applied to this part, gas leakage will occur.

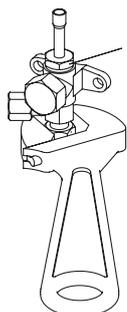
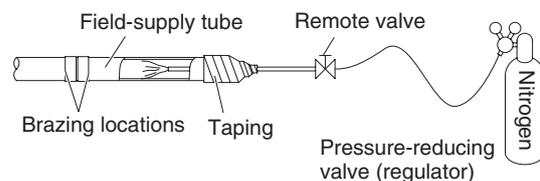
Apply an adjustable wrench to settle the fixing tool as shown in the figure. If not used, the valve fixing tool will get distorted.



● Precautions for brazing

- Be sure to replace the air inside the tube with nitrogen to prevent oxide film from forming during the brazing process.
- Be sure to use a damp cloth or other means to cool the valve unit during brazing.

Work method



Do not apply an adjustable wrench to the hexagonal part.

Do not use two adjustable wrenches when removing or installing the balance tube flare nut. In particular, do not apply an adjustable wrench to the hexagonal part at the top of the valve. (If force is applied to this part, gas leakage will occur.)

⚠ CAUTION

1. Be sure to use nitrogen. Oxygen, CO₂, and CFC must not be used.
2. Use a pressure-reducing valve on the nitrogen tank.
3. Do not use agents intended to prevent the formation of oxide film. They will adversely affect the refrigeration oil, and may cause equipment failure.
4. The balance tube is not used if only 1 outdoor unit is installed. Use the unit in the same conditions as when it was shipped from the factory.

4. ELECTRICAL WIRING

4-1. General Precautions on Wiring

- (1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.



WARNING

- (2) This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.
Earth Leakage Circuit Breaker (ELCB) must be incorporated in the fixed wiring in accordance with the wiring regulations. The Earth Leakage Circuit Breaker (ELCB) must be an approved circuit capacity, having a contact separation in all poles.
- (3) To prevent possible hazards from insulation failure, the unit must be grounded.
- (4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.
- (5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.
- (6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.
- (7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning. You must ensure that installation complies with all relevant rules and regulations.
- (8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:
 - The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
 - Use shielded wires for inter-unit control wiring between units and ground the shield on both sides.
- (9) Use a waterproof conduit for outdoor unit wiring to avoid damaging the wire and to prevent accumulation of liquid inside the unit.

4-2. Wire Length and Wire Diameter for Power Supply System

Outdoor unit

	(A) Power supply		Time delay fuse or circuit capacity	or	(A) Power supply		Time delay fuse or circuit capacity
	Min. wire size	Max. length			Min. wire size	Max. length	
U-8MF3R7	4 mm ² *1	56 m*2	25 A		6 mm ² *1	84 m*2	25 A
U-10MF3R7	6 mm ² *1	65 m*2	25 A		—	—	—
U-12MF3R7	6 mm ² *1	59 m*2	30 A		—	—	—
U-14MF3R7	10 mm ² *1	65 m*2	40 A		—	—	—
U-16MF3R7	10 mm ² *1	61 m*2	40 A		—	—	—

Indoor unit

Type	(B) Power supply	Time delay fuse or circuit capacity
D1, L1, U2, Y2, K2, T2, F2, M1, P1, R1, E1, E2, Z1	Refer to the Installation Instructions of the indoor unit.	

Control wiring

(C) Inter-unit (between outdoor and indoor units) control wiring		or	(D) Remote control wiring	
0.75 mm ² Use shielded wiring *3 Max. 1,000 m			2.0 mm ² Use shielded wiring *3 Max. 2,000 m	0.75 mm ² Max. 500 m
(E) Control wiring for group control			(F) Inter-outdoor unit control wiring	
0.75 mm ² Max. 200 m (Total)			0.75 mm ² Use shielded wiring Max. 300 m	

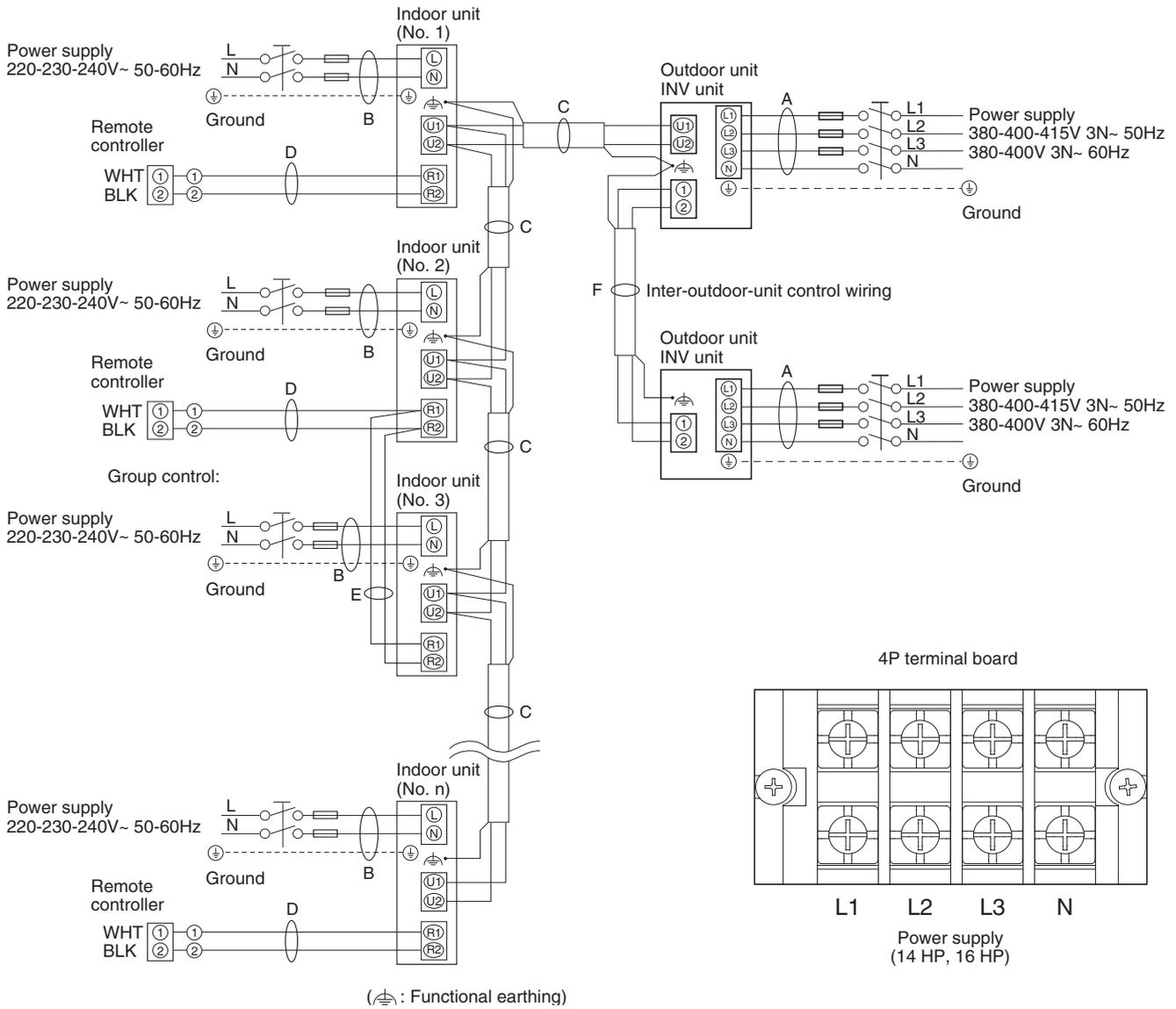
NOTE

*1 Maximum applicable wire for terminal board of outdoor unit : 22 mm²

*2 Maximum length shows a 2% voltage drop.

*3 With ring-type wire terminal

4-3. Wiring System Diagram



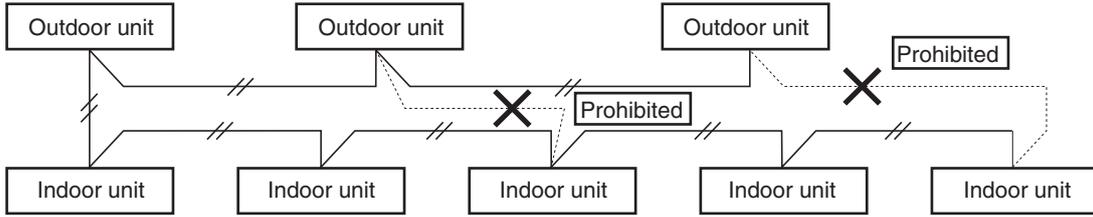
NOTE

- (1) See section "4-2. Wire Length and Wire Diameter for Power Supply System" for the explanation of "A," "B," "C," "D," "E" and "F" in the above diagram.
- (2) The basic connection diagram of the indoor unit shows the 6P terminal board, so the terminal boards in your equipment may differ from the diagram.
- (3) Refrigerant Circuit (R.C.) address should be set before turning the power on.
- (4) Regarding the R.C. address setting, it can be executed by remote controller automatically. See section "7-4. Auto Address Setting".

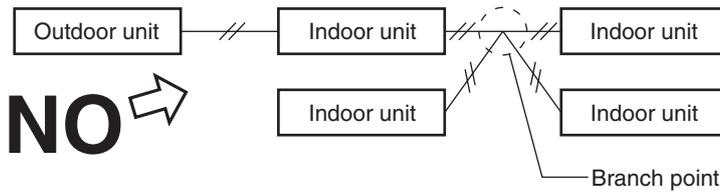
Type MF3

CAUTION

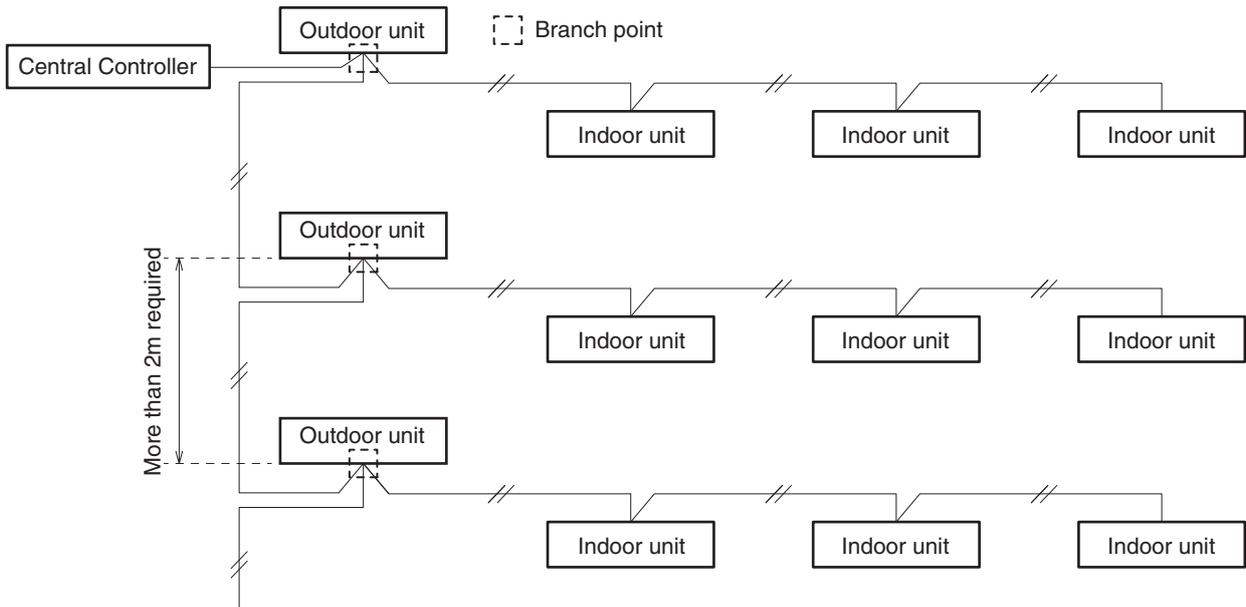
- (1) When linking outdoor units in a network, see section “ATTENTION!”.
- (2) Do not install the inter-unit control wiring in a way that forms a loop.



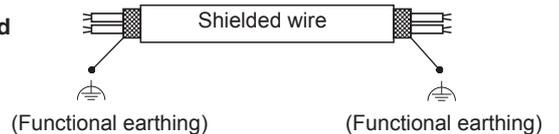
- (3) Do not install the inter-unit control wiring such as star branch wiring. Star branch wiring causes mis-address setting.



- (4) If branching the inter-unit control wiring, the number of branch points should be 16 or fewer.



- (5) Use shielded wires for inter-unit control wiring (C) and ground the shield on both sides, otherwise misoperation from noise may occur. Connect wiring as shown in the section “4-3. Wiring System Diagram.”



- (6) Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conform to CENELEC (HAR) rating specifications) or use the cables based on IEC standard. (60245 IEC57, 60245 IEC66)



WARNING

Loose wiring may cause the terminal to overheat or result in unit malfunction.
 A fire hazard may also exist.
 Therefore, ensure that all wiring is tightly connected.

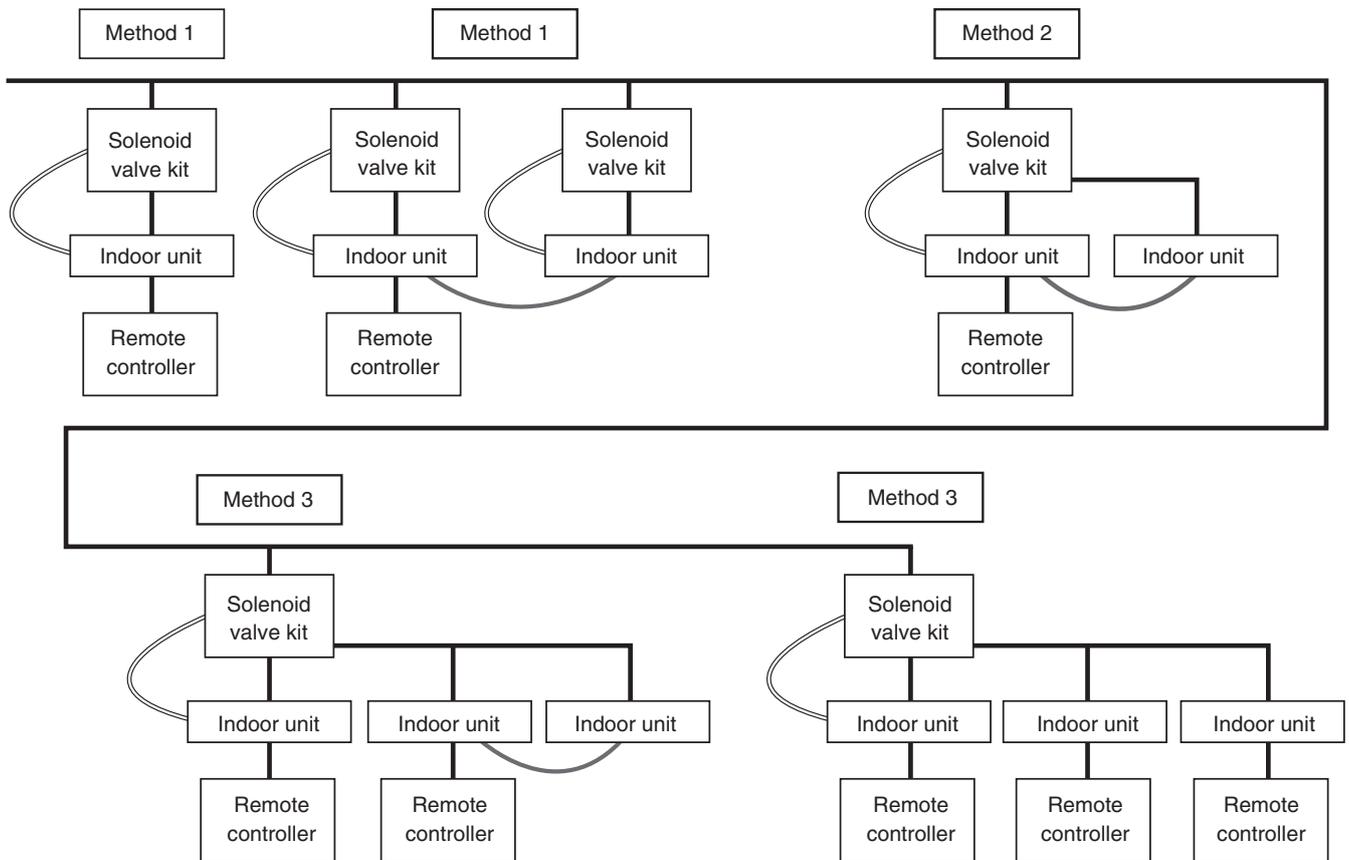
When connecting each power wire to the terminal, follow the instructions on “How to Connect Wiring to Terminal” and fasten the wire securely with the fixing screw of the terminal board.

4-4. Connecting Multiple Indoor Units to a Single Solenoid Valve Kit

- It is possible to connect plural indoor units to one solenoid valve kit. The indoor units can be controlled individually or be operated as a group.
- It is possible to adopt plural indoor units with a common use of the solenoid valve kit per piece of refrigerant.
- Categories of connected indoor unit capacities are determined by the solenoid valve kit.

Type of solenoid valve kit	Total capacity of indoor units (kW)
CZ-P160HR3	5.6 < Total capacity ≤ 16.0
CZ-P56HR3	Total capacity ≤ 5.6

* If the capacity range is exceeded, use two solenoid valves connected in parallel.



Each Method (General) and Conditions

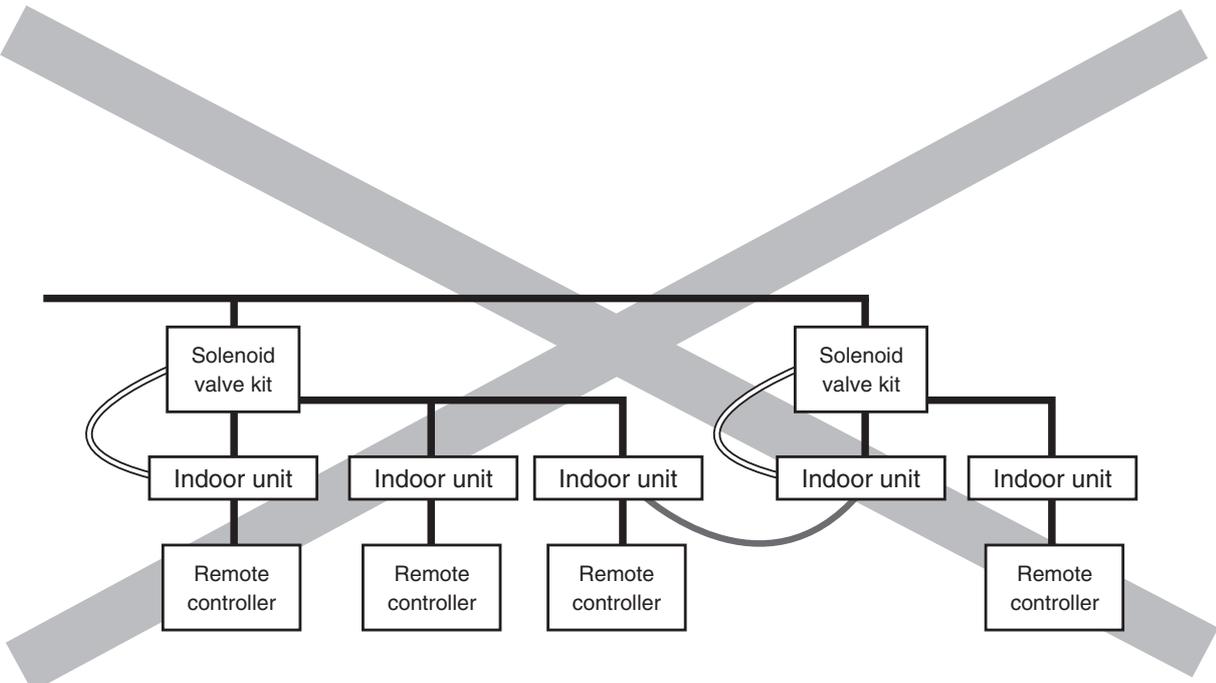
	Method 1	Method 2	Method 3
Method	Connecting one indoor unit with one solenoid valve kit	Group control is possible by connecting plural indoor units to one solenoid valve kit.	Indoor units can operate individually by connecting plural indoor units to one solenoid valve kit.
Connectable number of remote controls	1 piece	1 piece	Over 2 pieces
Possible operating functions	Individual control	Group control * Thermostat On/Off function is possible only in individual control (when selecting the body thermostat).	Individual control available * Mixed group control available
Possible operating modes	Cool, Dry, Heating, Auto, Fan	Cool, Dry, Heating, Auto, Fan	Cooling, Dry, Heating, Fan * Auto selection is impossible.
Condition	–	• Mixed cooling and heating is impossible.	• Mixed cooling and heating is impossible. • Auto selection is impossible.

Necessity of setting changes by combination of each method

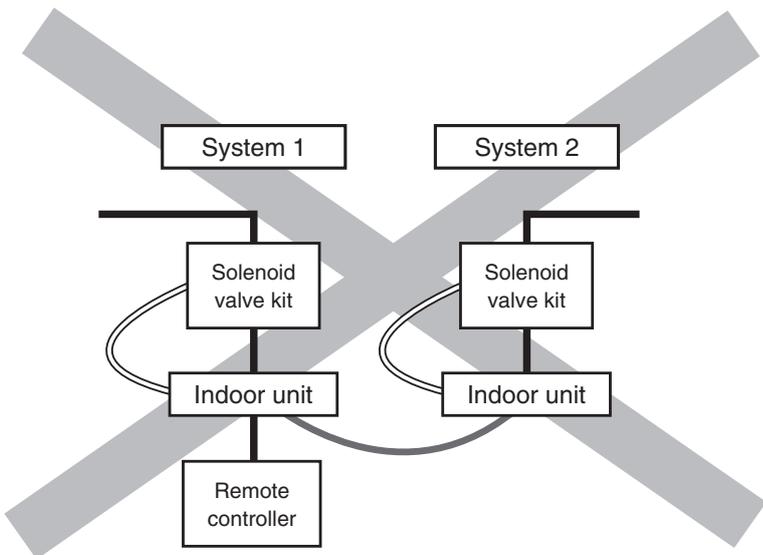
Type of combination: Necessity of setting
Method 1 only: Setting is unnecessary.
Method 2 included: Setting up in common use of a solenoid valve kit from "Remote Control" is necessary. *1 * Method 2 only is set. * Method 3 excluded
Method 3 included: Setting up in common use of a solenoid valve kit from a specific program settings software is necessary. *1 * Setting all connected indoor units * Contact your local distributor to obtain a specific program settings software.

*1: Refer to "Test Run" for setting instructions.

Please note the following system example is prohibited and avoid the following connection.



Method 3 individual control is possible and group wiring should be made by other solenoid valve kit.

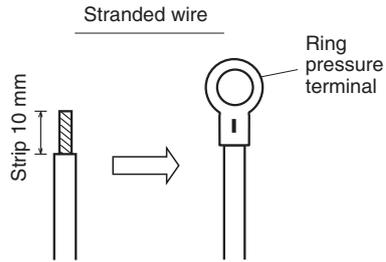


Group wiring should be made by different type of refrigerant.

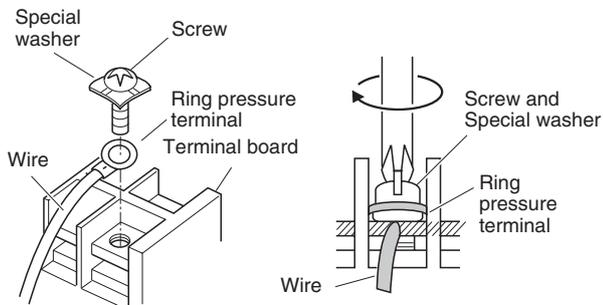
How to Connect Wiring to Terminal

■ For stranded wiring

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



- (2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal board.
- (3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.
- (4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver.

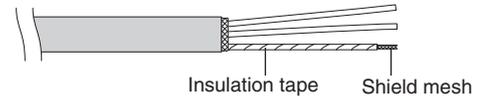


■ Examples of shield wires

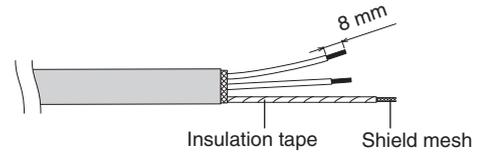
- (1) Remove cable coat not to scratch braided shield.



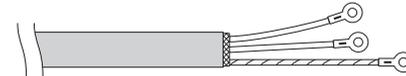
- (2) Unbraid the braided shield carefully and twist the unbraided shield wires tightly together. Insulate the shield wires by covering them with an insulation tube or wrapping insulation tape around them.



- (3) Remove coat of signal wire.



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

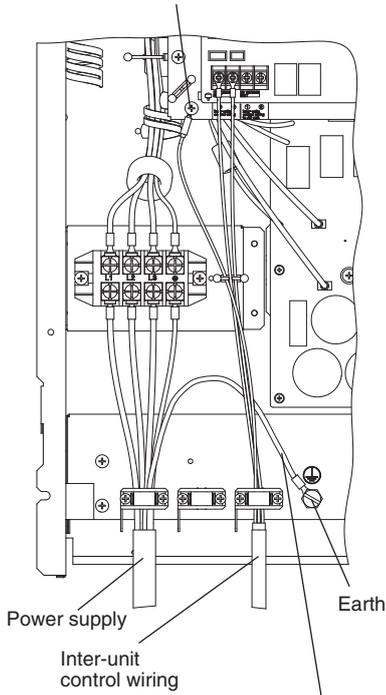


■ Earth wire for power supply

The earth wire should be longer than the other lead wires for electrical safety.

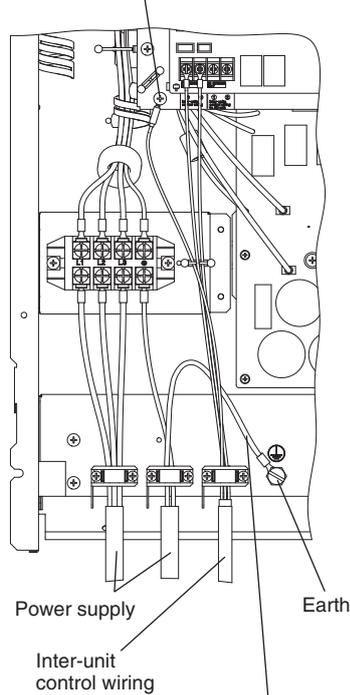
■ Wiring sample

Use this screw when connecting to ground for the inter-unit control wiring.
(: Functional earthing)



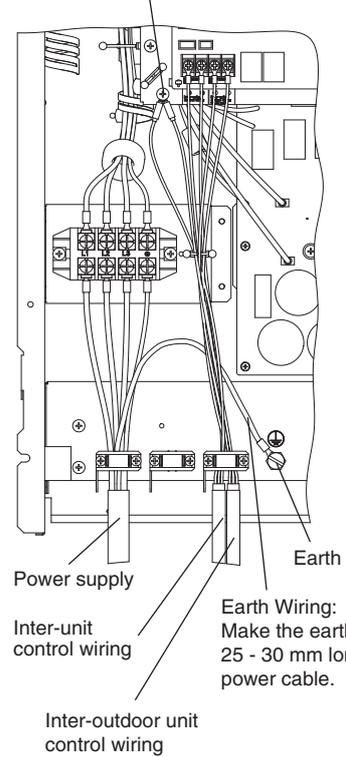
Earth Wiring:
Make the earth wiring 25 - 30 mm longer than power cable.

Use this screw when connecting to ground for the inter-unit control wiring.
(: Functional earthing)



Earth Wiring:
Make the earth wiring 25 - 30 mm longer than power cable.

Use this screw when connecting to ground for the inter-unit control wiring and inter-outdoor unit control wiring.
(: Functional earthing)



Torque values of power supply terminal board

8/10/12 HP: 2.2 N·m ±0.05 N·m {22 kgf·cm ±0.5 kgf·cm}

14/16 HP: 2.7 N·m ±0.1 N·m {27 kgf·cm ±1 kgf·cm}

Torque value of communication terminal board: 1.3 N·m ±0.1 N·m {13 kgf·cm ±1 kgf·cm}

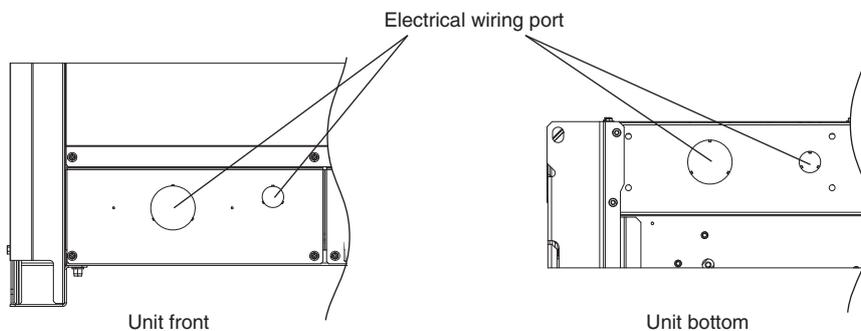
ATTENTION: Comply with the torque values.

If tightening over torque values, the screw will be damaged.

ATTENTION: Apply an adjustable wrench to the valve vertically not to damage the P.C.board.

NOTE

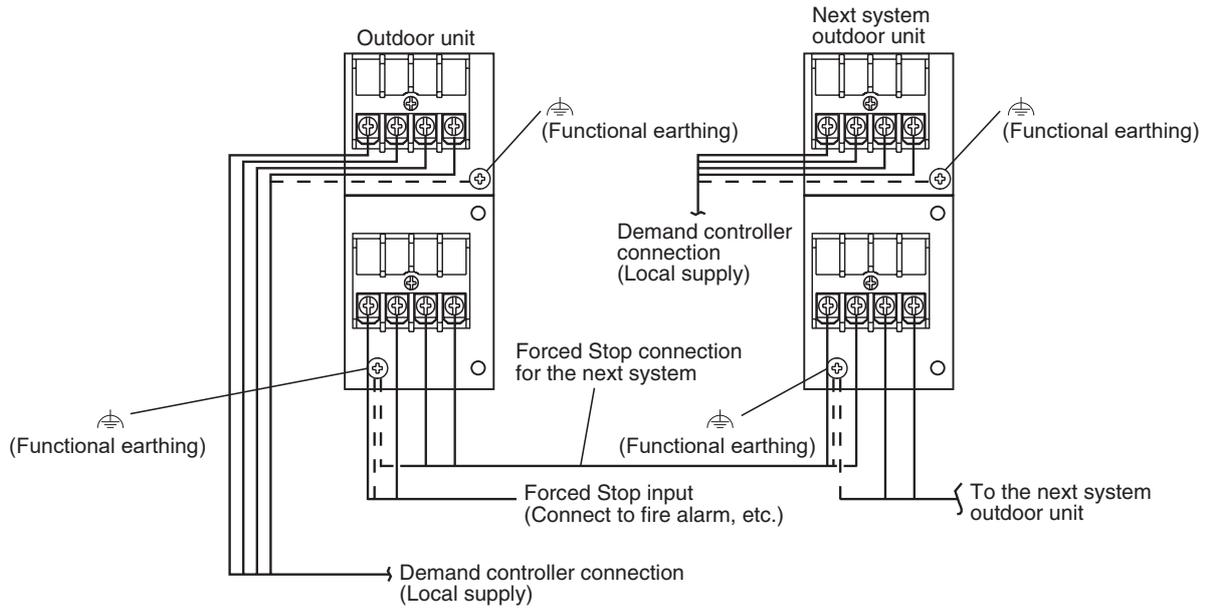
- Fix the wires with the clammer to the wiring fixture plates (2 locations) and do not allow them to touch the refrigerant tubing and compressor.
- Use a waterproof conduit for outdoor unit wiring to avoid damaging the wire and to prevent accumulation of liquid inside the unit.



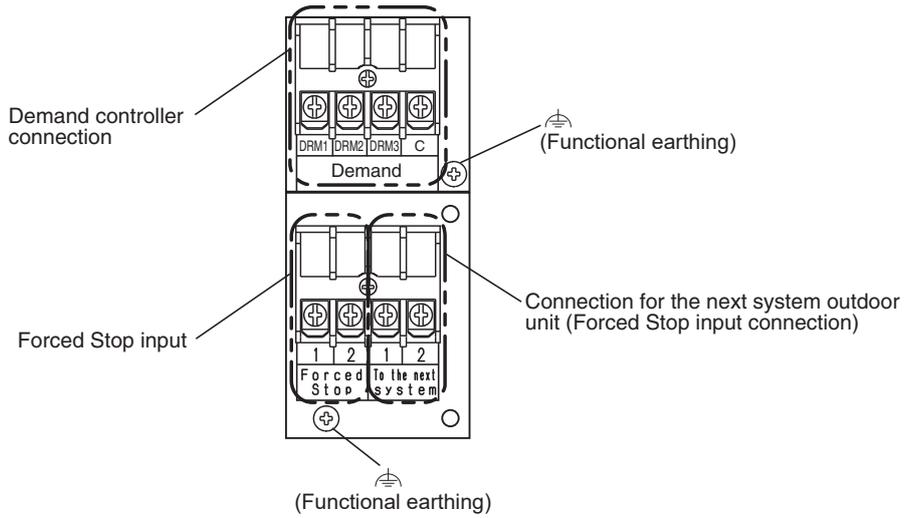
Connection for demand and forced stop

■ Connection procedures

Be sure to always turn the power off before setting up the wire and cable connections.
 Failure to do so may lead to electric shocks or malfunctions.

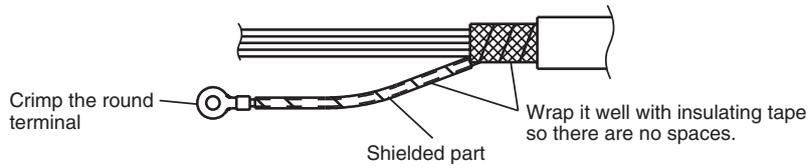


The demand terminal setup is shown in the following illustration.



- Use a shielded cable for the cable connection.

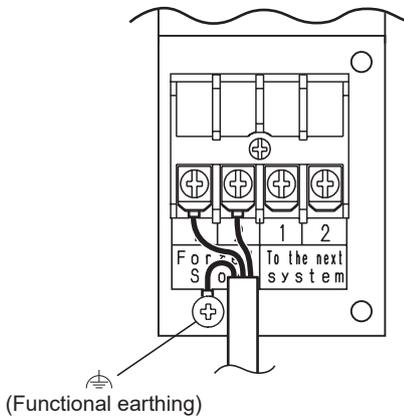
Twist out the end of the shielded part of the cable, crimp it with a round terminal, and connect it to  (Functional earthing) screw. After crimping it with a round terminal, wrap it with insulating tape so there are no spaces and adjust it so the shielded part does not come into contact with any live parts.



CAUTION Be sure that the shielded part of the cable does not come into contact with the terminal block or any live parts. Failure to do so may lead to electric shock or fire.

When connected to the forced stop input

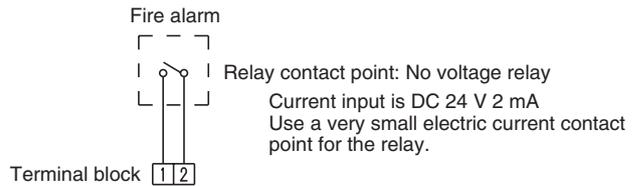
With the Forced Stop input, it is possible to override air conditioning operations to force a stop when signals are received from fire alarms, etc.



Connect the wire (2-wire) to points 1 and 2 on the left side of the terminal block.

The shielded part of the cable is connected with  (Functional earthing) at the bottom of the terminal block.

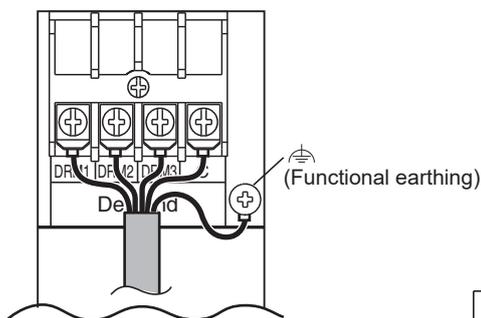
Secure the wire with the cord clamp located on the lower part of the terminal block.



When connecting the demand controller input

It is possible to choose various demand levels. Refer to the table shown on the right.

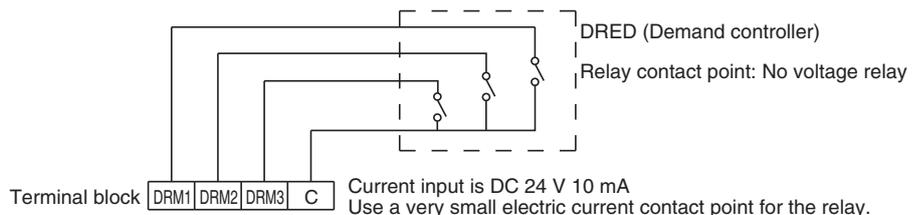
Terminal No. for demand section	Description
DRM3	Approx. 75% of rated power input
DRM2	Approx. 50% of rated power input
DRM1	Compressor off



Connect the wire (4-wire) to the Demand section (DRM1, DRM2, DRM3, C) on the terminal block.

The shielded part of the cable is connected with  (Functional earthing) at the bottom of the terminal block.

Secure the wire with the cord clamp located on the lower part of the terminal block.



When connecting to the next system unit

- Forced Stop input can be transferred to the next system unit.
- When using the Forced Stop input, connect the wiring to terminal points 1 and 2 on the right side of the lower part of the terminal block.
- The maximum wire/cable length is 100 m.
- The demand control cannot be transferred to the next system unit.
- When transferring to the next system, the maximum number of connected units is 30.

1. Connecting the wiring to the lower part of the terminal block.

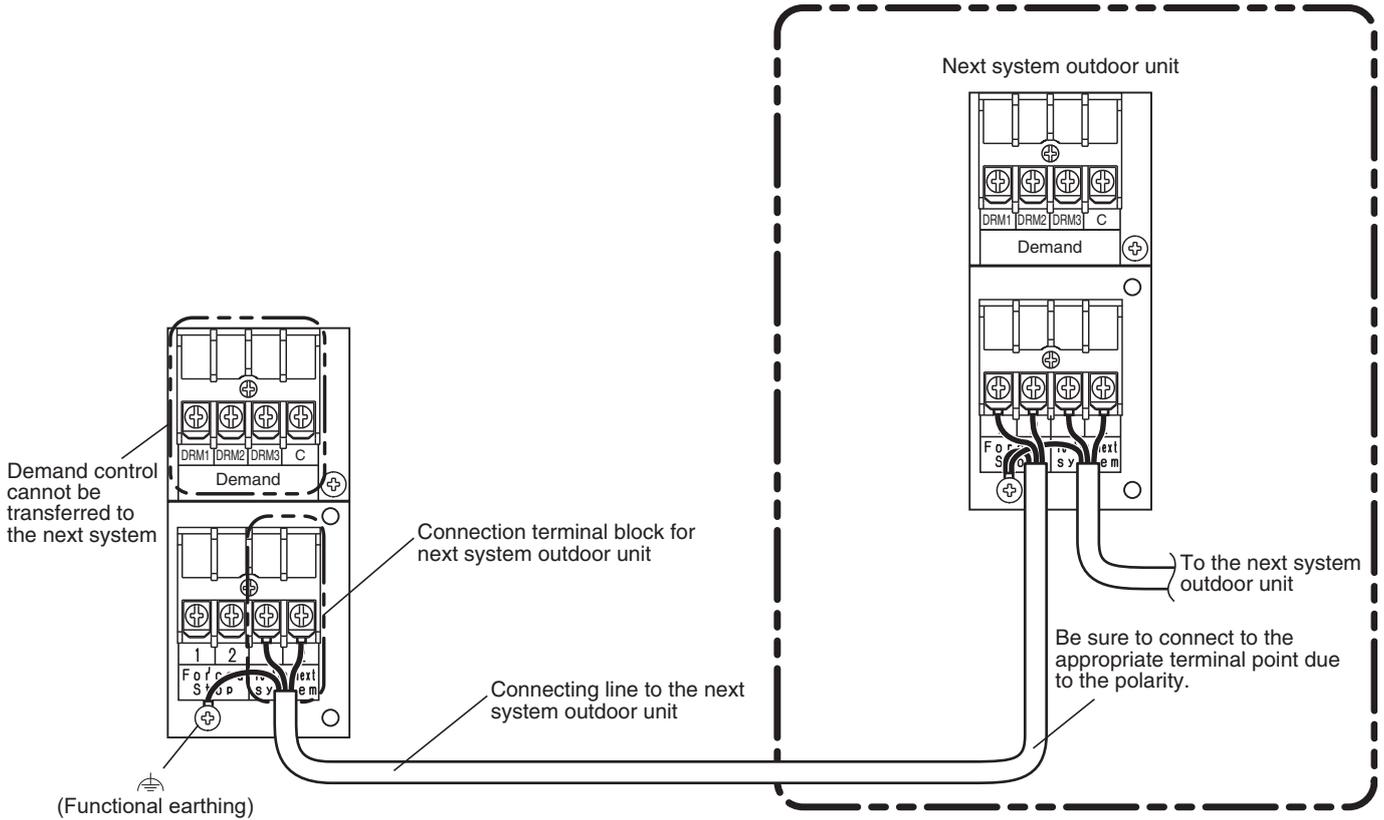
When transferring the Forced Stop input to the next system, connect the wire (2-wire) to terminal points 1 and 2 at the lower right side of the terminal block.

The shielded part of the shielded cable is connected with  (Functional earthing) at the bottom of the terminal block. Secure the wire with the cord clamp located on the lower part of the terminal block.

2. Connecting the shielded cable to the terminal block for the next system.

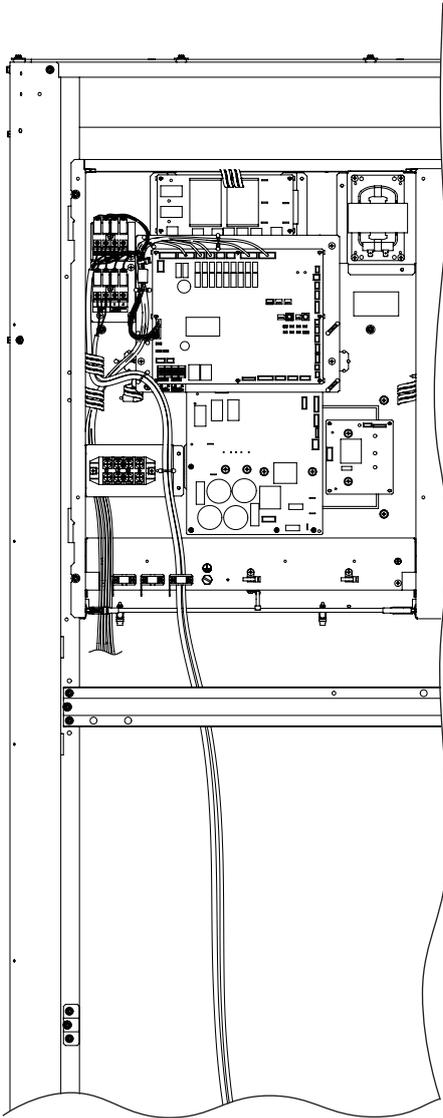
For the Forced Stop input, connect the wire to terminal points 1 and 2 at the lower right side of the terminal block.

When connecting to the next system, be sure to connect to the appropriate terminal point due to the polarity.

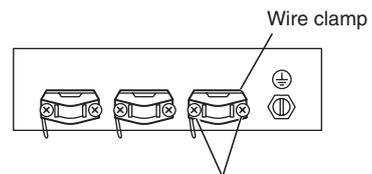


■ Wiring procedures

Follow the wiring procedure below for terminal connections.

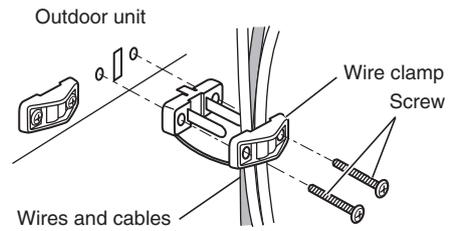


- (1) Remove the wire clamps from the outdoor unit.



Loosen two screws to remove.

- (2) Secure the wires and cables with the wire clamps.
- (3) Install the wire clamps on the outdoor unit.



■ Check after completing installation

Check the signals to make sure the unit operates properly with the use of an external input device.

5. HOW TO PROCESS TUBING

The liquid tubing side is connected by a flare nut, and the gas tubing side is connected by brazing.

5-1. Connecting the Refrigerant Tubing

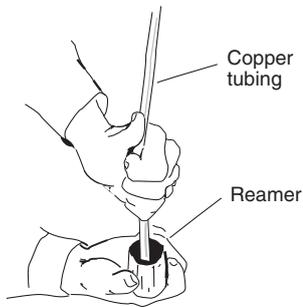
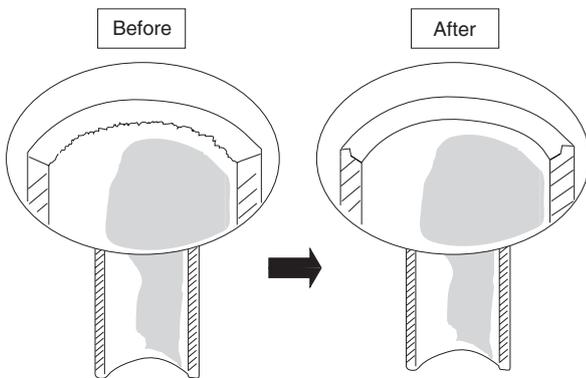
Use of the Flaring Method

Many of conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.

Flaring Procedure with a Flare Tool

- (1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut approx. 30 – 50 cm longer than the tubing length you estimate.
- (2) Remove burrs at the end of the copper tube with a tube reamer or a similar tool. This process is important and should be done carefully to make a good flare. Be sure to keep any contaminants (moisture, dirt, metal filings, etc.) from entering the tubing.

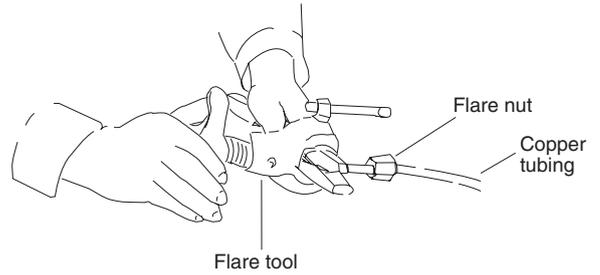
Deburring



NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube.

- (3) Remove the flare nut from the unit and be sure to mount it on the copper tube.
- (4) Make a flare at the end of copper tube with a flare tool.



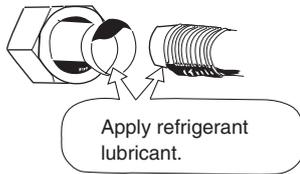
NOTE

A good flare should have the following characteristics:

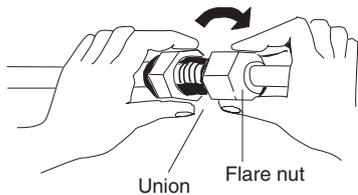
- Inside surface is glossy and smooth
- Edge is smooth
- Tapered sides are of uniform length

Caution Before Connecting Tubes Tightly

- (1) Apply a sealing cap or water-proof tape to prevent dust or water from entering the tubes before they are used.
- (2) Be sure to apply refrigerant lubricant (ether oil) to the inside of the flare nut before making piping connections. This is effective for reducing gas leaks.



- (3) For proper connection, align the union tube and flare tube straight with each other, then screw in the flare nut lightly at first to obtain a smooth match.



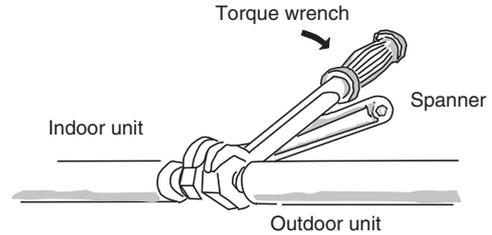
- Adjust the shape of the liquid tube using a tube bender at the installation site and connect it to the liquid tubing side valve using a flare.

Cautions During Brazing

- **Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process. (Oxygen, carbon dioxide and Freon are not acceptable.)**
- **Do not allow the tubing to get too hot during brazing. The nitrogen gas inside the tubing may overheat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool when brazing.**
- **Use a reducing valve for the nitrogen cylinder.**
- **Do not use agents intended to prevent the formation of oxide film. These agents adversely affect the refrigerant and refrigerant oil, and may cause damage or malfunctions.**

5-2. Connecting Tubing Between Indoor and Outdoor Units

- (1) Tightly connect the indoor-side refrigerant tubing extended from the wall with the outdoor-side tubing.
- (2) To fasten the flare nuts, apply the following specified torque:
 - When removing the flare nuts from the tubing connections, or when tightening them after connecting the tubing, be sure to use a torque wrench and a spanner.



If the flare nuts are over-tightened, the flare may be damaged, which could result refrigerant leakage and cause injury or asphyxiation to room occupants.

- For the flare nuts at tubing connections, be sure to use the flare nuts that were supplied with the unit, or else flare nuts for R410A (type 2). The refrigerant tubing that is used must be of the correct wall thickness as shown in the following table.

Tube diameter	Tightening torque, approximate	Tube thickness
ø6.35 (1/4")	16±2 N · m {160±20 kgf · cm}	0.8 mm
ø9.52 (3/8")	38±4 N · m {380±40 kgf · cm}	0.8 mm
ø12.7 (1/2")	55±6 N · m {550±60 kgf · cm}	0.8 mm
ø15.88 (5/8")	75±7 N · m {750±70 kgf · cm}	1.0 mm
ø19.05 (3/4")	110±10 N · m {1100±100 kgf · cm}	1.2 mm

Because the pressure is approximately 1.6 times higher than conventional refrigerant pressure, the use of ordinary flare nuts (type 1) or thin-walled tubes may result in tube rupture, injury, or asphyxiation caused by refrigerant leakage.

- In order to prevent damage to the flare caused by over-tightening of the flare nuts, use the table above as a guide when tightening.
- When tightening the flare nut on the liquid tube, use an adjustable wrench with a nominal handle length of 200 mm.

5-3. Insulating the Refrigerant Tubing

Tubing Insulation

● Standard Selection of Insulation Material

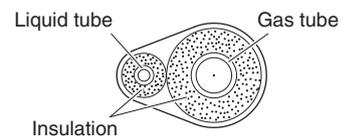
Under the environment of the high temperature and high humidity, the surface of the insulation material is easy to become condensation. This will result in leakage and dew drop. Refer to the chart shown below when selecting the insulation material. In case that the ambient temperature and relative humidity are placed above the line of the insulation thickness, the condensation may occasionally make a dew drop on the surface of the insulation material. In this case, select the better insulation efficiency.

* However, since the condition will be different due to the sort of the insulation material and the environmental condition of the installation place, see the chart shown below as a reference when making a selection.

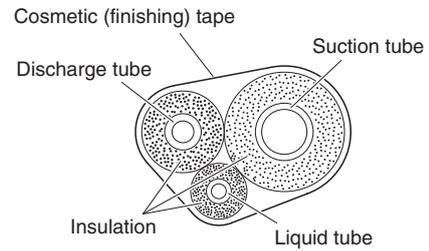
Standard Selection of Tubing Insulation

Sort of insulation material	Polyethylene heat resisting material
Upper limits of usage temperature	Gas tubing : 120 °C or above Other tubing : 80 °C or above
Calculating condition	
Thermal conductivity of insulation material	0.043 W/(m · K) (Average temperature 23 °C)
Refrigerant temperature	2 °C

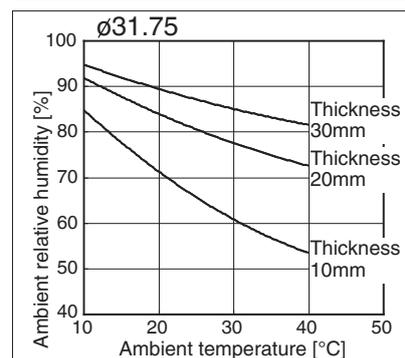
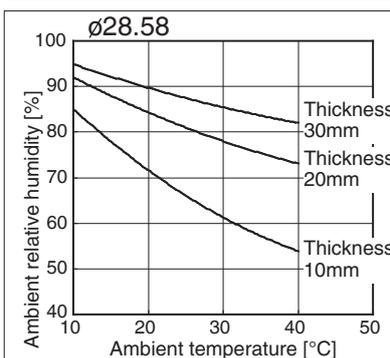
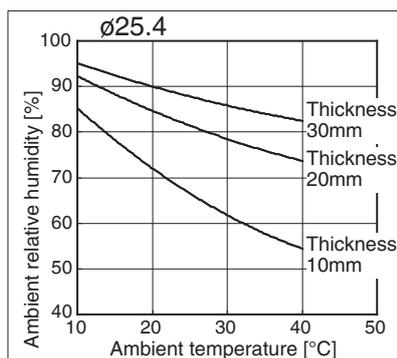
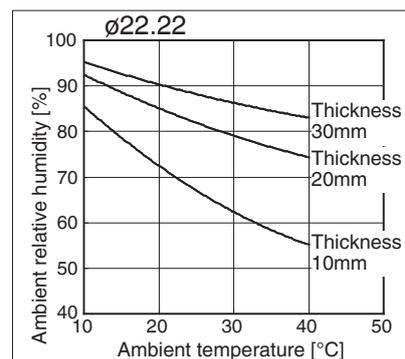
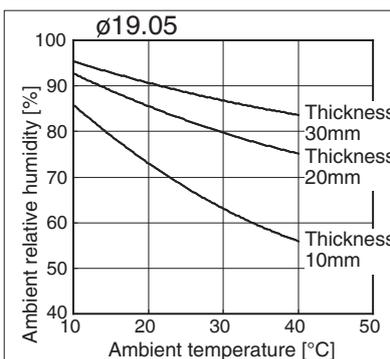
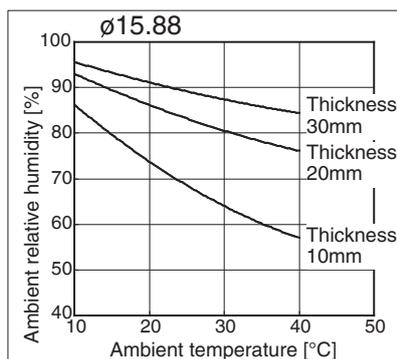
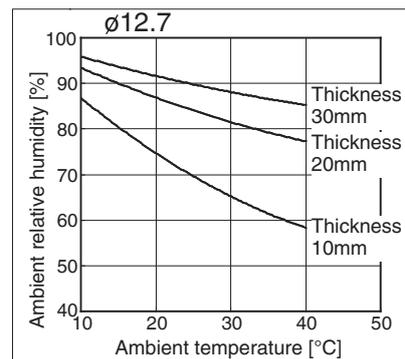
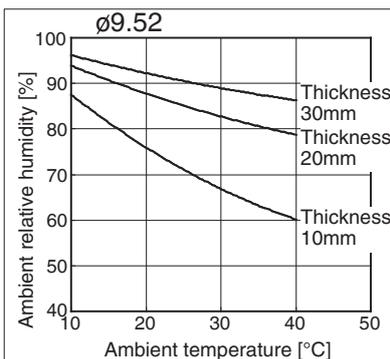
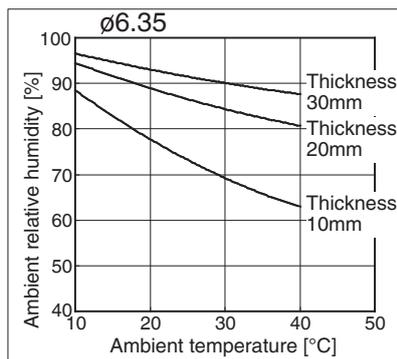
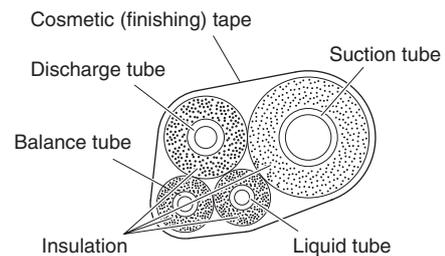
Two tubes arranged together

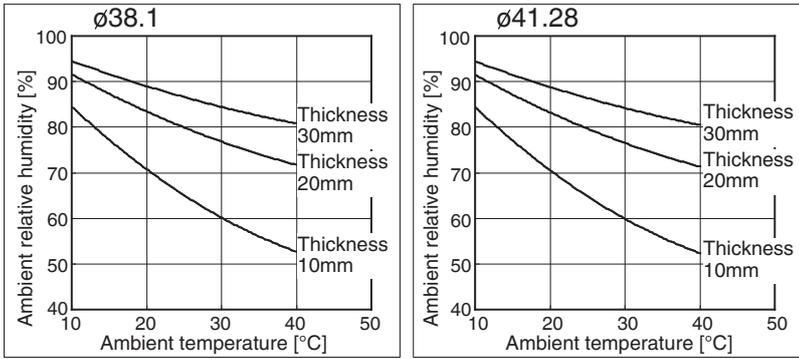


Three tubes arranged together



Four tubes arranged together

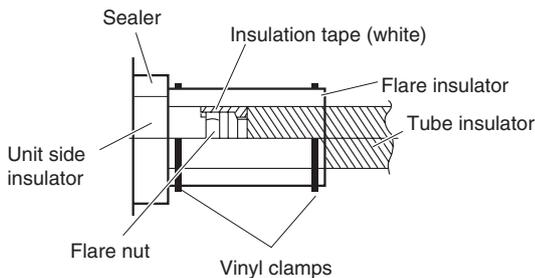




If the exterior of the outdoor unit valves has been finished with a square duct covering, make sure you allow sufficient space to use the valves and to allow the panels to be attached and removed.

Taping the flare nuts

Wind the white insulation tape around the flare nuts at the gas tube connections. Then cover up the tubing connections with the flare insulator, and fill the gap at the union with the supplied black insulation tape. Finally, fasten the insulator at both ends with the supplied vinyl clamps.



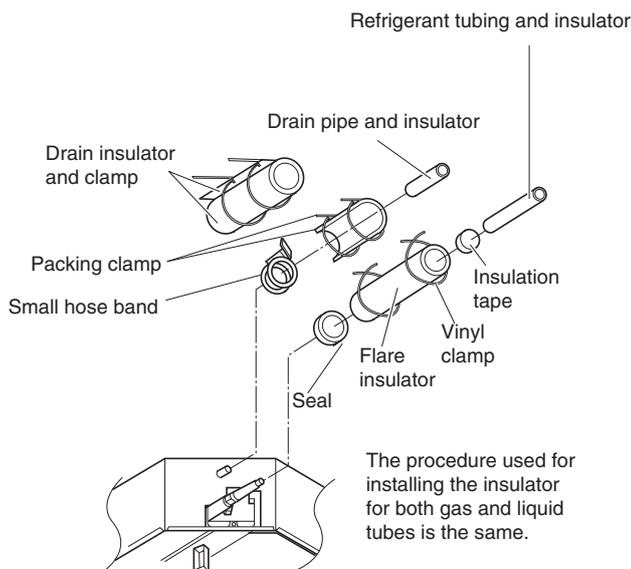
Insulation material

The material used for insulation must have good insulation characteristics, be easy to use, be age resistant, and must not easily absorb moisture.

Be sure to use the heat-resistant insulator corresponding to the gas tube of 120 °C or above and other tubes of 80 °C or above.



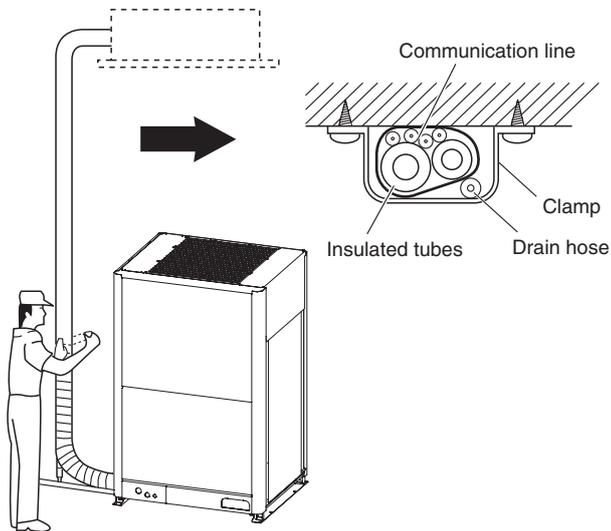
After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.



Never grasp the drain or refrigerant connecting outlets when moving the unit.

5-4. Taping the Tubes

- (1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped together with armoring tape in 1 bundle. To prevent the condensation from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.
- (2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall. As you wrap the tubing, overlap half of each previous tape turn.
- (3) Clamp the tubing bundle to the wall, using 1 clamp approx. each meter.

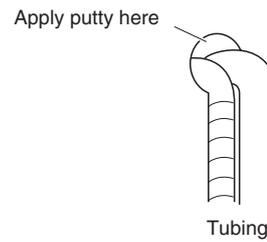


NOTE

Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also ensure that the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

5-5. Finishing the Installation

After finishing insulating and taping over the tubing, use sealing putty to seal off the hole in the wall to prevent rain and draft from entering.

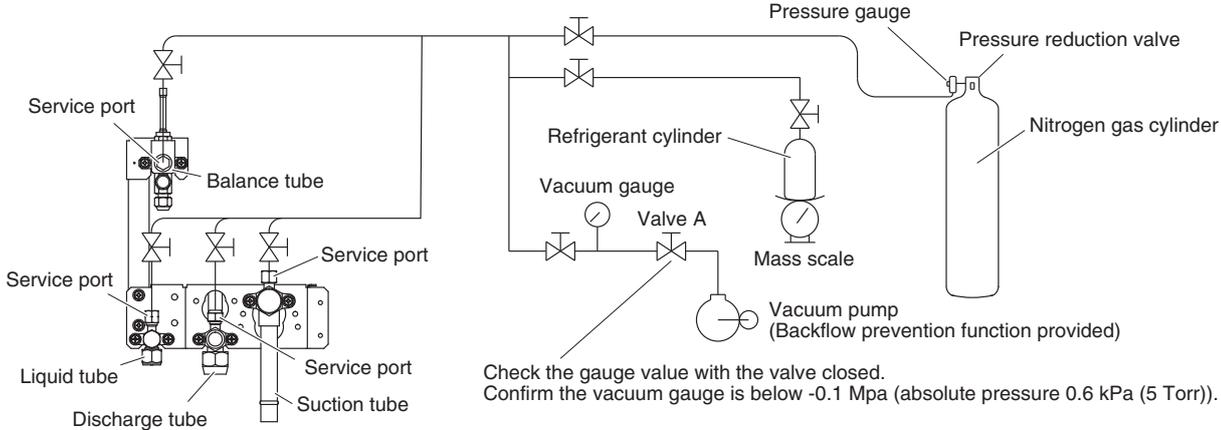


6. AIR PURGING

Leak Test and Evacuation

Do a leak test by performing the following procedures. Confirm that there is no leakage in the connection area.

- Connect the nitrogen gas cylinder, refrigerant cylinder and vacuum pump to the service ports of the discharge tube, suction tube, liquid tube and balance tube as shown in figure. Be sure to keep the valves of discharge tube, suction tube, liquid tube and balance tube closed.



Leak Tightness Test Method :

The design pressure and the pressure of the leak test of this unit is 3.8 MPa.

- Do not pressurize to the default value at once. Pressurize gradually.
 - (1) Pressurize to 0.5 MPa and then leave it for 5 minutes to ensure that the pressure does not drop.
 - (2) Pressurize to 1.5 MPa and then leave it for 5 minutes to ensure that the pressure does not drop.
 - (3) For the test, pressurize to 3.8 MPa and leave it for about 1 day to ensure that the pressure does not drop.
 - (4) The pressure drops at a rate of approximately 0.01 MPa per 1°C decrease in ambient temperature.
Therefore, make a pressure correction. The equation for the pressure correction is given below.

$$\text{Measured absolute pressure} = \frac{(\text{Pressurized absolute pressure}) \times (\text{Measured temperature} + 273)}{(\text{Pressurized temperature} + 273)}$$

- (5) In case that the pressure drop is observed, there is a possibility of leakage. Make a correction and perform the leak test again.

Evacuation Method :

- After performing the leak test, evacuate and perform vacuum drying the indoor unit and tubing.
 - (1) Confirm that the shut-off valves of discharge tube, suction tube, liquid tube and balance tube are kept closed.
 - (2) Connect the vacuum pump and vacuum gauge to the service ports of the discharge tube, suction tube, liquid tube and balance tube as shown in figure.
 - (3) Evacuate and perform vacuum drying the indoor unit and tubing.
 - (4) Evacuate until the reading of the vacuum gauge reaches less than -0.1 MPa (absolute pressure 0.6 kPa (5 Torr)) or lower.
 - (5) When the gauge reading is less than -0.1 MPa, run the vacuum pump for over one hour continuously and then evacuate and perform vacuum drying.
 - (6) Fully close the valve A. Then loosen the hose connected to the vacuum pump and turn off the vacuum pump.
 - (7) After leaving it for one hour, confirm the pressure of the vacuum gauge does not increase shortly after Step (6) above. Then stop vacuum drying.

In case that the pressure of the vacuum gauge is increased, water might be left inside of the tube or leaked. If any water remains inside the tube, fill with the dry nitrogen (0.05 MPa (gauge pressure)) until the positive pressure is reached. Then evacuate and perform vacuum drying again. (Due to prevention of humid air entering the pipe before returning to positive pressure.)

If there is any water leakage, eliminate leaks and perform the leak test again, and then evacuate and perform vacuum drying again.

NOTE

Be sure to perform the operations from all service ports simultaneously.

It is recommended that the leak test for the tubing among the first unit be checked without connecting to the outdoor unit: tube alone. Use nitrogen gas for the leak tightness test. (Oxygen, carbon dioxide gas and freon gas shall be prohibited.)

- Be sure to use vacuum gauge. Gauge manifold cannot read precisely.
- Use the vacuum pump with the backflow prevention function. If not, there is a risk that the oil filled in the vacuum pump will flow back when the vacuum pump is stopped.

Charging additional refrigerant



CAUTION Use a cylinder designed for use with R410A.

- Charging additional refrigerant (calculated from the liquid tube length as shown in the section “1-8. Additional Refrigerant Charge”) using the liquid tube service valve.
- Use a balance or scale to measure the refrigerant accurately.
- If the additional refrigerant charge amount cannot be charged at once, charge the remaining refrigerant in liquid form by using the refrigerant charge connection port with the system in Cooling mode at the time of test run.
- Close the valve on the cylinder containing R410A.

Finishing the job

- (1) With a flathead screwdriver, turn the liquid tube service valve counter-clockwise to fully open the valve.
- (2) Turn all service valve counter-clockwise to fully open the valve.
- (3) Close all stop valves and loosen the “Lo” knob of the manifold valve.
- (4) Loosen the charge hose connected to all service port, then remove the hose.
- (5) Replace all valve caps at all service ports and fasten them securely.

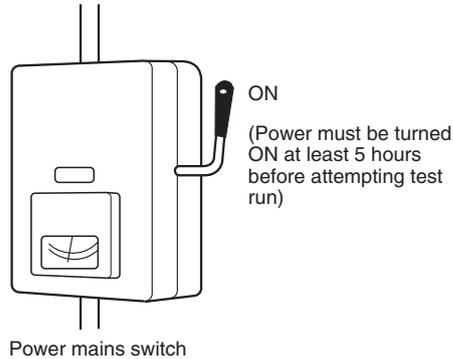
This completes air purging with a vacuum pump. The air conditioner is now ready for a test run.

7. TEST RUN

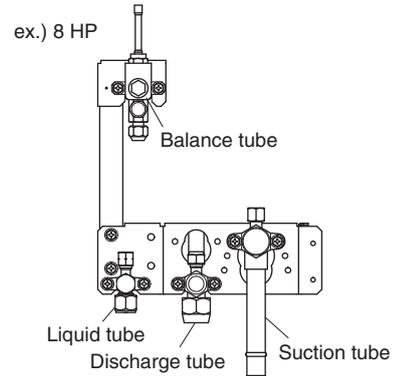
7-1. Preparing for Test Run

● Before attempting to start the air conditioner, check the following.

- (1) The control wiring is correctly connected and all electrical connections are tight.
- (2) The transportation pads for the indoor fan have been removed. If not, remove them now.
- (3) The power has been connected to the unit for at least 5 hours before starting the compressor. The bottom of the compressor should be warm to the touch and the crankcase heater around the feet of the compressor should be hot to the touch.

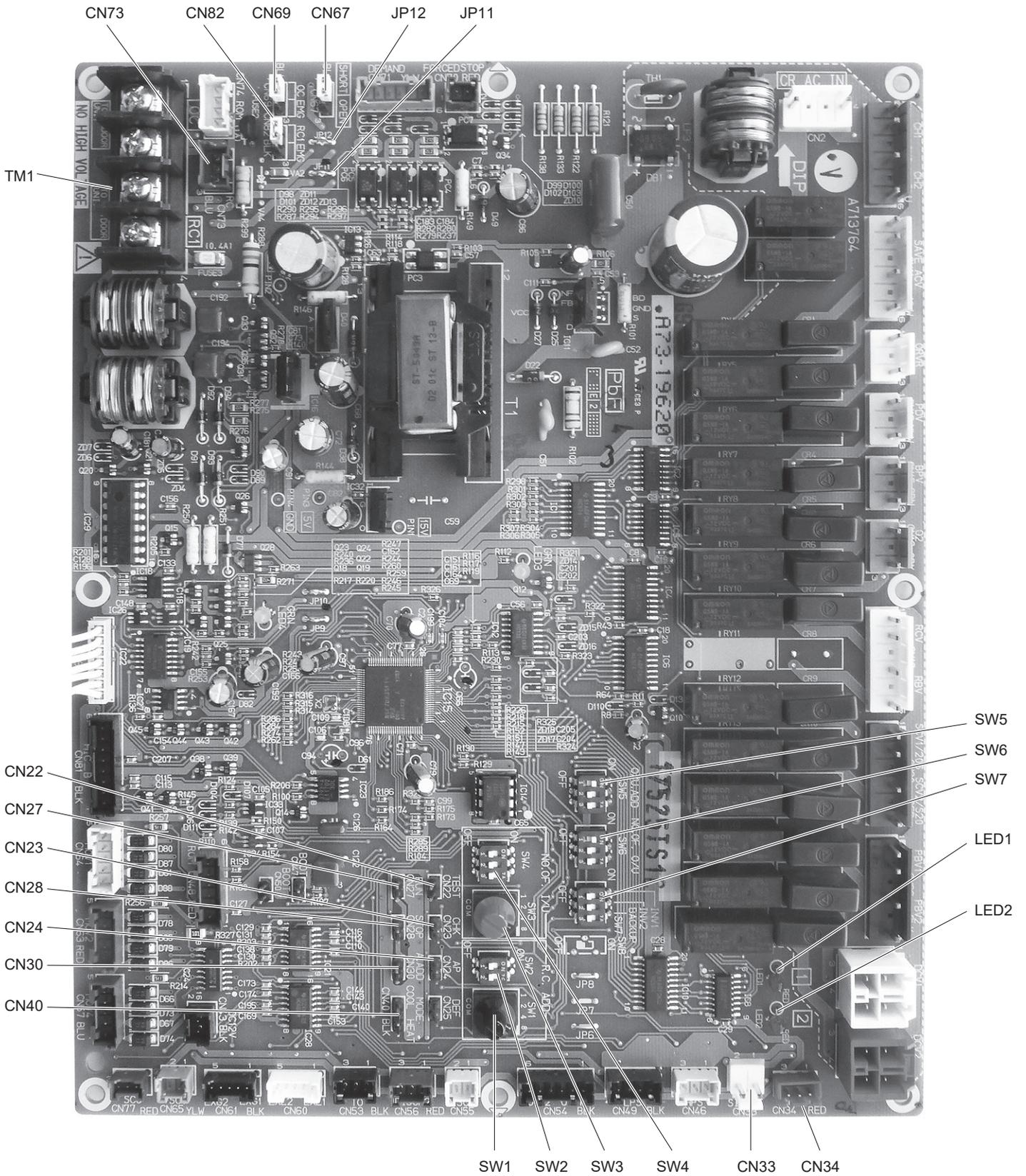


- (4) If only 1 outdoor unit is installed, close the service valve on the balance tubes, and open the service valve on the other 3 tubes (suction, discharge, and liquid tubes). If 2 or 3 outdoor units are installed, open the service valves on all 4 tubes (suction, discharge, liquid, and balance tubes).

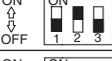
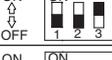
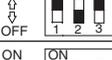


- (5) Do not perform the heating test run out of range temperatures using in heating mode.
- (6) Request that the customer be present for the trial run. Explain the contents of the operating instructions, then have the customer actually operate the system.
- (7) Be sure to give the operating instructions and installation instructions to the customer.
- (8) When replacing the control PCB, be sure to make all the same settings on the new PCB as were in use before replacement.
The existing EEPROM is not changed, and is connected to the new control PCB.

7-3. Main Outdoor Unit PCB Setting



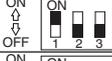
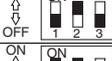
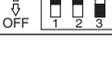
● Examples of the No. of indoor units settings (SW4, SW3)

No. of indoor units	Indoor unit setting (SW4) (3P DIP switch) 10 20 30	Indoor unit setting (SW3) (Rotary switch)
1 unit (factory setting)	All OFF 	 Set to 1
11 units	1 ON 	 Set to 1
21 units	2 ON 	 Set to 1
31 units	3 ON 	 Set to 1
40 units	1 & 3 ON 	 Set to 0
52 units	2 & 3 ON 	 Set to 2

● Examples of refrigerant circuit (R.C.) address settings (required when link wiring is used) (SW2, SW1)

System address No.	System address (SW2) (2P DIP switch) 10 20	System address (SW1) (Rotary switch)
System 1 (factory setting)	Both OFF 	 Set to 1
System 11	1 ON 	 Set to 1
System 21	2 ON 	 Set to 1
System 30	1 & 2 ON 	 Set to 0

● Examples of the No. of outdoor units settings (SW6)

No. of outdoor units	Outdoor unit setting (SW6) (3P DIP switch)
1 unit (factory setting)	1 ON 
2 units	2 ON 
3 units	1 & 2 ON 

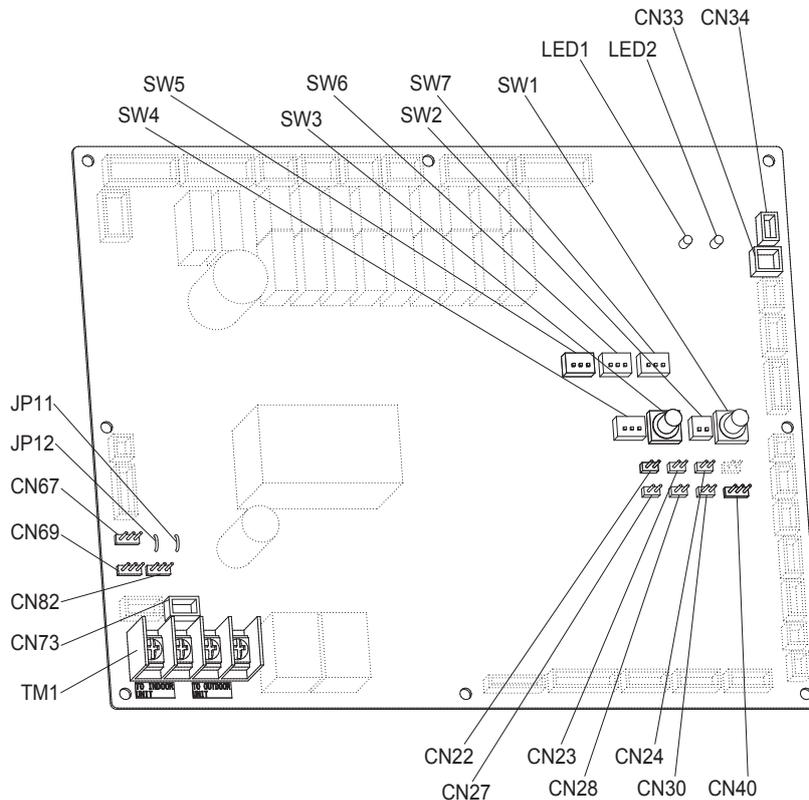
● Address setting of main outdoor unit (SW5)

Unit No. setting	Address setting of outdoor unit (SW5) (3P DIP switch)
Unit No. 1 (main unit) (factory setting)	1 ON 

● Address setting of sub outdoor unit (SW5)

Unit No. setting	Address setting of outdoor unit (SW5) (3P DIP switch)
Unit No. 2 (sub unit)	2 ON 
Unit No. 3 (sub unit)	1 & 2 ON 

The sub unit control PCB contains the same switches as the main unit control PCB for No. of indoor units, No. of outdoor units, and system address. However it is not necessary to set these switches.



● Name And Function Of Each Switch On Outdoor Unit Control P.C. Board

Function Switch	Remarks
MODE pin (3P, BLK) (CN40)	Changes to cooling/heating mode. (outdoor main unit is only usable.) When in normal operation: When short circuited the COOL side, indoor unit operation in the same refrigerant system changes to all cooling mode. When short circuited the HEAT side, indoor unit operation in the same refrigerant system changes to all heating mode. When in auto address setting: Changes to heating mode with open-circuit.
A.ADD pin (2P, BLK) (CN30)	Short circuited for over 1 second long → Auto address setting starts with open-circuit. If short circuit lasts for over 1 second long during auto address setting, the setting is interrupted.
CHK pin (2P, BLK) (CN23)	When short circuited, test run begins. (If the remote controller is connected in test run mode, it is automatically cancelled after 1 hour.) Also, if short-circuit is cancelled, test run mode is cancelled.
RC plug (3P, BLU) (CN73)	Connects to outdoor unit maintenance remote controller and content of alarm message will be checked.
RUN pin (2P, BLK) (CN27)	When short circuited and pulse signal is given, all indoor units operate in the same refrigerant system.
STOP pin (2P, BLK) (CN28)	When short circuited and pulse signal is given, all indoor units stop in the same refrigerant system. (When short circuited, operation cannot be performed by the indoor unit's remote controller.)
AP pin (2P, BLK) (CN24)	Can be used when vacuuming the outdoor unit.
SNOW plug (3P, RED) (CN34)	Can be used when installing a snowfall sensor device.
SILENT plug (2P, WHT) (CN33)	Can be used when setting the outdoor unit fan in sound absorbing mode.
OC EMG terminal (3P, BLK) (CN69)	If "TO INDOOR UNIT" accidentally connected to high voltage, use the terminal base TM1. Method: 1. Replace the pins 1 and 2 of CN69 with the pins 2 and 3. 2. Disconnect JP11.
RC1 EMG terminal (3P, BLK) (CN82)	If "TO OUTDOOR UNIT" accidentally connected to high voltage, use the terminal base TM1. Method: 1. Replace the pins 1 and 2 of CN82 with the pins 2 and 3. 2. Disconnect JP12.

For details, refer to the Test Run Service Manual.

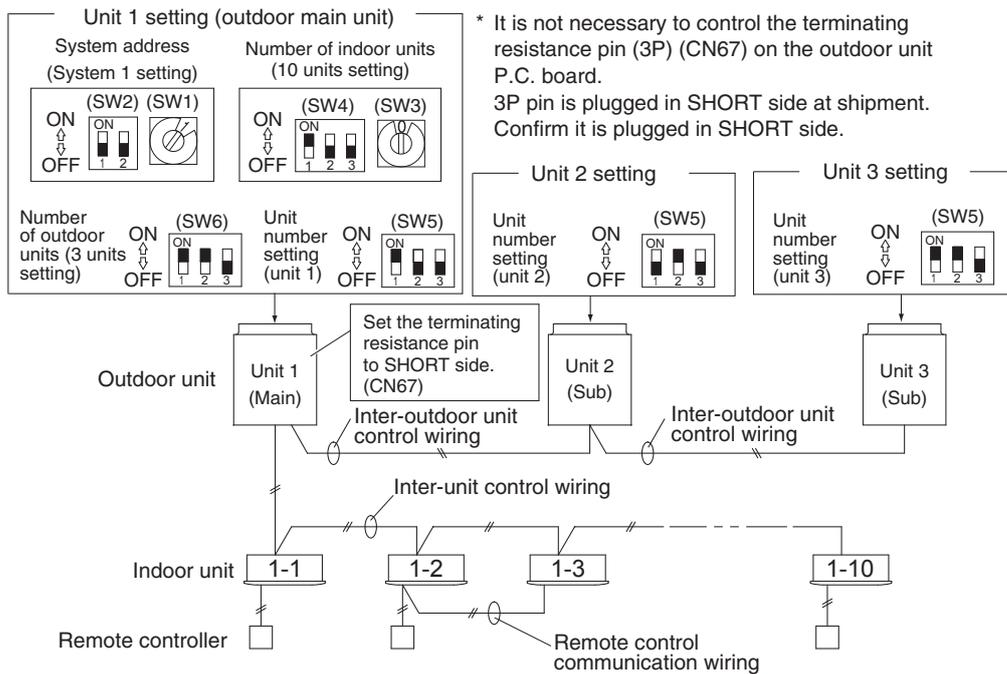
7-4. Auto Address Setting

Example: Basic Wiring Diagram (1)

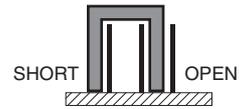
- **Case of no link wiring**

(Inter-unit control wiring is not connected to a multiple system.)

Indoor unit address setting is possible without starting the compressor.



3P terminating resistance pin (SHORT side)



Case 1

Auto Address Control from Outdoor Unit

- Regarding the number of outdoor units, set the Dip switch (SW6) for setting the number of outdoor units on Unit 1 control P.C.B to 3 units and the Unit Number Setting Dip switch (SW5) to unit number 1.
 - SW6: ON (1), ON (2), ON (3)
 - SW5: ON (1), OFF (2), OFF (3)

This unit becomes the outdoor main unit.
- Set the Unit Number Setting switch (SW5) on unit 2 control P.C. board to unit number 2.
 - SW5: OFF (1), ON (2), OFF (3)

Set the Unit Number Setting switch (SW5) on unit 3 control P.C. board to unit number 3.

 - SW5: ON (1), OFF (2), OFF (3)
- Check the refrigerant system's Address Setting Rotary switch (SW1) on outdoor main unit control P.C. board to "1" and the Dip switch (SW2) to "0" (at shipment).
 - SW1: ON (1), OFF (2)
 - SW2: ON (1), OFF (2)
- Regarding the setting of the number of indoor units connected to the outdoor unit, set the Dip switch (SW4) for setting the number of indoor units on outdoor main unit control P.C. board connected to the outdoor unit to "1".
 - SW4: ON (1), OFF (2), OFF (3)

If the Rotary switch (SW3) set to "0", 10 units can be prepared for operation.
- Turn on power to indoor and outdoor units.
- Short circuit the A.ADD pin (CN30) on outdoor main unit control P.C. board for over 1 second long and open circuit. Communication for auto address setting begins.
 - * To cancel, short circuit the A.ADD pin (CN30) again for over 1 second long and then open circuit. The LED that indicates auto address setting goes out and the process is stopped. Be sure to perform auto address setting again.

Auto address setting is completed when LEDs 1 and 2 on outdoor main unit control P.C. board go out.
- Remote control operation is now available.
 - * When auto address setting is controlled by the remote controller, perform auto address setting by the remote controller after step 5 described above.

Example: Basic Wiring Diagram (2)

• Case of link wiring

* See section "ATTENTION!".

Setting of terminal pin (CN67)

No. 1 refrigerant system

Refrigerant circuit No. 1

Unit No. 1 (Main) : short-circuit (at shipment)

Unit No. 2 (Sub) : short-circuit (at shipment)

Unit No. 3 (Sub) : short-circuit (at shipment)

Refrigerant circuit No. 2 to Z-1

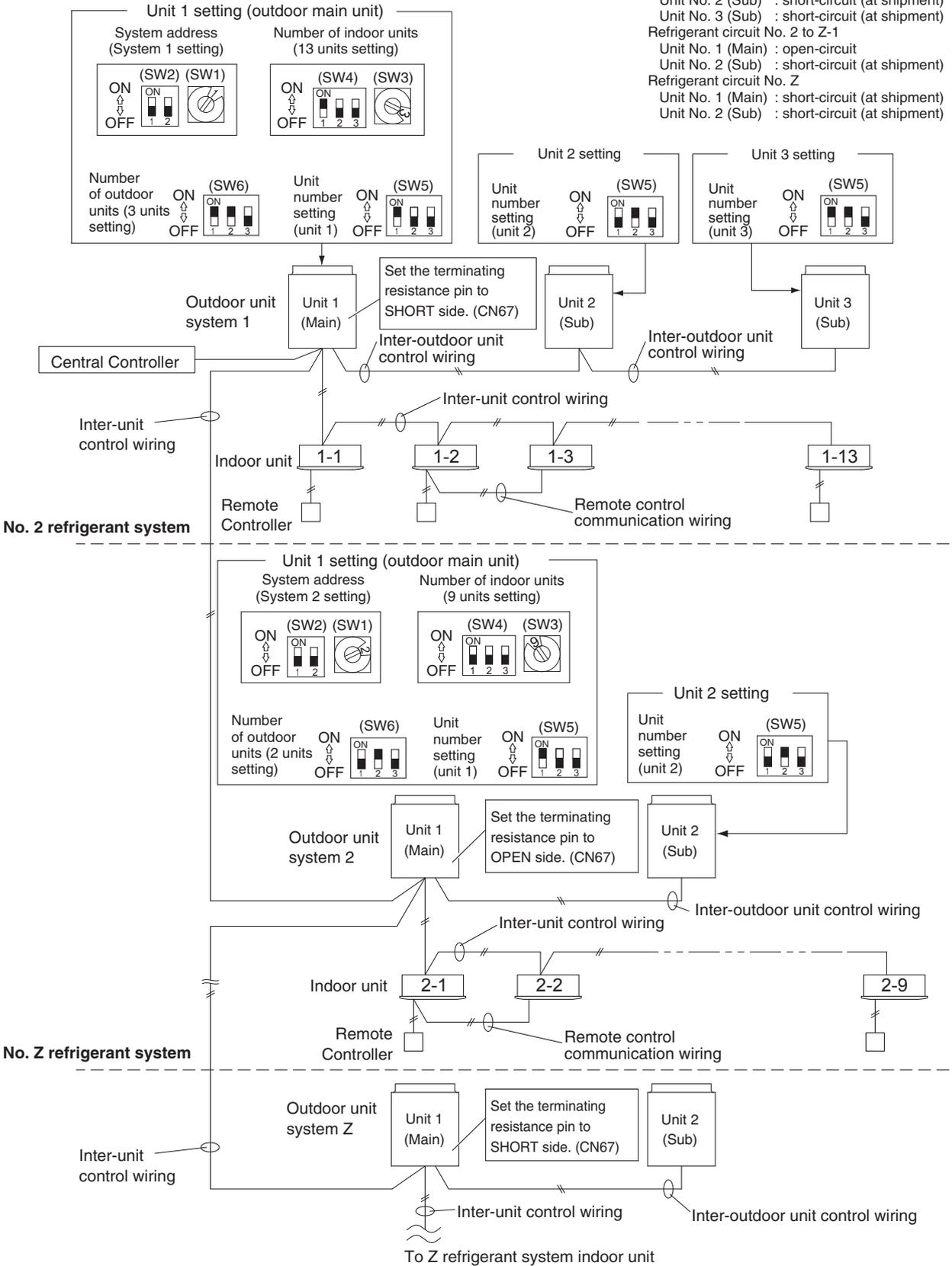
Unit No. 1 (Main) : open-circuit

Unit No. 2 (Sub) : short-circuit (at shipment)

Refrigerant circuit No. Z

Unit No. 1 (Main) : short-circuit (at shipment)

Unit No. 2 (Sub) : short-circuit (at shipment)



● **Final check before operation**

Final check must be done under the conditions of inter-outdoor unit control wiring connected to the centralized control system and the resistor between conductors must be measured by a Megger. Check if it is showing between 30Ω and 120Ω.

If the resistance value is out of range, check adjustment of the termination resistor again. Even if it is out of range, the problem is caused by wiring.

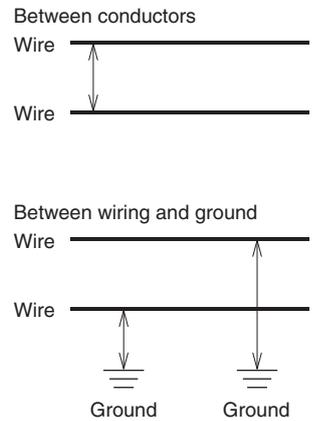
- Is the wiring connection properly completed?
- Are there any scratches or deterioration on the coverage?
- Measure between conductors and also between wiring and ground by 500V Megger insulation resistance tester.

Make sure the Megger is showing more than 100MΩ.

When measuring, remove both ends of the wiring from the terminal board.

If not removed, it will be damaged.

If it is less than 100MΩ, a new wiring connection should be made.



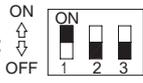
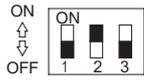
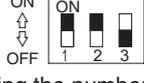
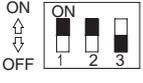
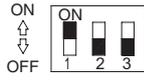
● **Make settings according to each case as described below.**

- In case of possibility of turning ON power to indoor/outdoor units for each refrigerant system → **Case 2**
- In case of impossibility of turning ON power to indoor/outdoor units for each refrigerant system
 - Auto address setting in heating mode → **Case 3.a**
 - Auto address setting in cooling mode → **Case 3.b**

Case 2 Possibility of turning ON power to indoor/outdoor units for each refrigerant system

Indoor unit address setting can be made without starting the compressor.

How to Control Auto Address Setting from Outdoor Unit

- Set the unit number setting switch (SW5) on unit 1 (outdoor main unit) control P.C. board to: Unit 1: This unit becomes the outdoor main unit.
 
- Set the unit number setting switch (SW5) on unit 2 control P.C. board to:
 
- Set the unit number setting switch (SW5) on unit 3 control P.C. board to:
 
- Regarding the number of outdoor units, set the Dip switch (SW6) for setting the number of outdoor units on outdoor main unit control P.C. board to 3 units.
 
- Check that the refrigerant system address Rotary switch (SW1) on outdoor main unit control P.C. board in 1 refrigerant system is set to "1" and the Dip switch (SW2) is set to "0" (at shipment).
 
- Regarding the number of indoor units connected to the outdoor unit, set the Dip switch (SW4) for setting the number on indoor units on outdoor main unit control P.C. board to "1" and set the Rotary switch (SW3) to "3".
 

Total of 13 units installation are made.
- Turn ON power to all indoor and outdoor units in one refrigerant system.
- Short circuit the A.ADD pin (CN30) of outdoor main unit for over 1 second long and then open circuit. Communication for auto address setting begins.
 - * To cancel, again short circuit the A.ADD pin (CN30) for over 1 second long and then open circuit. LEDs 1 and 2 that indicate auto address setting is in progress go out and that process is stopped.
 - Be sure to perform auto address setting again.**

Auto address setting is completed when the compressor stops and LEDs 1 and 2 on outdoor main unit control P.C. board go out.
- Turn ON power to indoor and outdoor units only for another refrigerant system and repeat steps 1 to 5 described above. Complete auto address setting for each refrigerant system.
- Remote control operation is now available.
 - * When performing auto address setting by the remote controller, perform auto address setting by the remote controller after step 5.

● See section "Auto Address Setting from the Remote Controller".

Case 3.a Auto Address Setting in Heating Mode

- In case of impossibility of turning ON power to indoor/outdoor units in each refrigerant system:
Indoor unit auto address setting cannot be made unless the compressor is started.

How to Control Auto Address from Outdoor Unit

1. Make all settings following the same procedure described under steps 1 to 4 in **Case 2**.
5. Turn ON power to all indoor and outdoor units in all refrigerant systems.



6. If you wish to make auto address setting in **heating mode**, short circuit the A.ADD pin (CN30) on outdoor main unit control P.C. board for the desired auto address setting in a refrigerant system for over 1 second long and then open circuit.
Be sure to make settings in each refrigerant system. It is impossible to perform auto address setting in a multiple refrigerant system simultaneously.



Communication for auto address setting begins and the compressor is started and auto address setting in heating mode begins. All indoor units can also be operated.



- * To cancel, again short circuit the A.ADD pin (CN30) for over 1 second long and then open circuit. LEDs 1 and 2 that indicate auto address setting is in progress go out and that process is stopped.

Be sure to perform auto address setting again.

Auto address setting is completed when the compressor stops and LEDs 1 and 2 on outdoor main unit control P.C. board go out.



7. Short circuit the A.ADD pin (CN30) on outdoor main unit in another refrigerant system for over 1 second long and then open circuit.



Repeat the same procedure and complete auto address setting.

8. Remote control operation is now available.

* When installing auto address setting by the remote controller, control auto address setting by the remote controller after step 5.

- See section "Auto Address Setting from the Remote Controller".

Case 3.b Auto Address Setting in Cooling Mode

- In case of impossibility of turning ON power to indoor/outdoor units in each refrigerant system:
The indoor unit auto address setting cannot be made unless the compressor is started.

How to Control Auto Address from Outdoor Unit

1. Make all settings following the same procedure described under steps 1 to 4 of [Case 2](#).
5. Turn ON power to all indoor and outdoor units in all refrigerant systems.
6. If you wish to make auto address setting in [cooling mode](#), while short circuiting COOL side of the MODE pin (CN40) on outdoor main unit control P.C. board for the desired auto address setting, short circuit the A.ADD pin (CN30) for over 1 second long and then open circuit.
Be sure to install address settings in each refrigerant system. It is impossible to perform auto address setting in a multiple refrigerant system simultaneously.



Communication for auto address setting begins and the compressor starts and auto address setting in cooling mode begins. All indoor units can also be operated.



- * To cancel, again short circuit the A.ADD pin (CN30) for over 1 second long and then open circuit. LEDs 1 and 2 that indicate auto address setting is in progress go out and that process is stopped.

Be sure to perform auto address setting again.

Auto address setting is completed when the compressor stops and LEDs 1 and 2 on outdoor main unit control P.C. board go out.



7. Short circuit the A.ADD pin (CN30) on outdoor main unit in another refrigerant system for over 1 second long and then open circuit.



Repeat the same procedure and complete auto address setting.



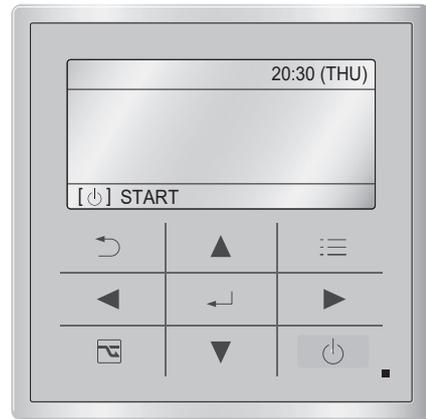
8. Remote control operation is now available.

* **It is impossible to perform auto address setting in cooling mode by the remote controller.**

Auto Address Setting from the High-spec Wired Remote Controller (CZ-RTC5B)

- Keep pressing the , and buttons simultaneously for 4 or more seconds.
The "Maintenance func" screen appears on the LCD display.
- Press the or button to see each menu.
If you wish to see the next screen instantly, press the or button.
Select "9. Auto address" on the LCD display and press the button.

Maintenance func	20:30 (THU)
9. Auto address	
10. Set elec. consumption	
11. Set touch key	
12. Check touch key	
◆ Sel. ◀▶ Page [◀] Confirm	



CZ-RTC5B

- The "Auto address" screen appears on the LCD display.
Change the "Code no." to "A1" by pressing the or button.

Auto address	20:30 (THU)
Code no.	O/D unit no.
▲ A1 ▼	1
◆ Sel. ▶ Next	

- Select the "O/D unit no." by pressing the or button.
Select one of the "O/D unit no." for auto address by pressing the or button.
Approximately about 10 minutes are required.
When auto address setting is completed, the units return to normal stopped status.

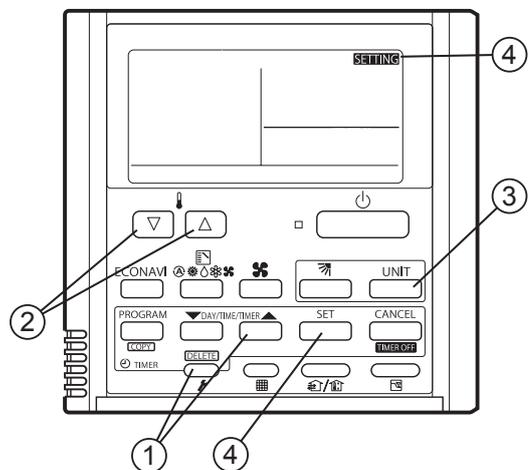
Auto Address Setting* from the Remote Controller (CZ-RTC4)

* Auto address setting in Cooling mode cannot be done from the remote controller.

NOTE

- Selecting each refrigerant system individually for auto address setting
- Auto address setting for each system
: Item code "A1"

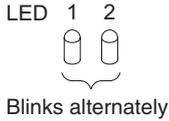
- Press the remote controller timer time button and button at the same time.
(Press and hold for 4 seconds or longer.)
- Next, press either the temperature setting / button. (Check that the item code is "A1".)
- Use either the button to set the system No. to perform auto address setting.
- Then press the button.
(Auto address setting for one refrigerant system begins.) (When auto address setting for one system is completed, the system returns to normal stopped status.)
<Approximately 4 – 5 minutes is required.>
(During auto address setting, "SETTING" is displayed on the remote controller.
This message disappears when auto address setting is completed.)
- Repeat the same steps to perform auto address setting for each successive system.



CZ-RTC4

Display During Auto Address Setting

- On the surface of outdoor unit control P.C. board



- * Do not short circuit the A.ADD pin (CN30) again during auto address setting. LEDs 1 and 2 go out and address setting is interrupted.
- * When auto address setting is normally completed, both LEDs 1 and 2 go out. In other cases, correct settings referring to the following table and perform auto address setting again.

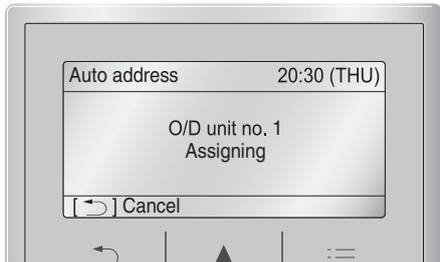
- Contents of LEDs 1 and 2 on outdoor unit control P.C. board

- ☀ : Illuminating
- ⚡ : Blinking
- : Go out

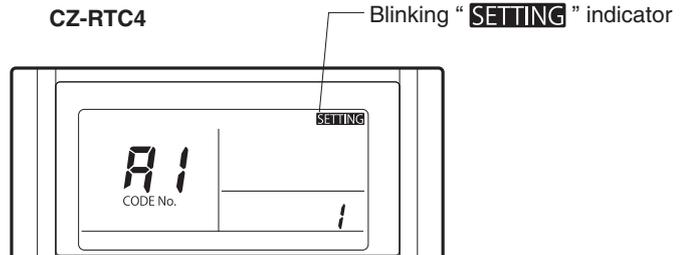
LED 1	LED 2	Contents of display
☀	☀	After turned ON power (not during auto address setting), it is entirely impossible to communicate with the indoor unit in the system.
●	☀	After turned ON power (not during auto address setting), although the indoor units more than 1 unit in the system are recognized, there are inconsistencies between the number of indoor units and setting number of indoor units.
⚡	⚡	Under auto address setting
Alternately		
●	●	Auto address setting completed
⚡	⚡	There are inconsistencies between the number of indoor units and setting number of indoor units. (at the time of auto address setting)
Simultaneously		
⚡	⚡	See section “7-7. Self-Diagnosis Function Table and Contents of Alarm Display”.
Alternating		

- Display of remote controller

CZ-RTC5B



CZ-RTC4



Request concerning recording the indoor/outdoor unit combination Nos.

After auto address setting has been completed, be sure to record them for future reference.

List the outdoor main unit system address and the addresses of the indoor units in that system in an easily visible location (next to the nameplate), using a permanent marking pen or similar means that cannot be abraded easily.

Example: (Outdoor) 1 - (Indoor) 1-1, 1-2, 1-3... (Outdoor) 2 - (Indoor) 2-1, 2-2, 2-3...

These numbers are necessary for later maintenance. Please be sure to indicate them.

Checking the indoor unit addresses

Use the remote controller to check the indoor unit address.

CZ-RTC5B (High-spec wired remote controller)

- Keep pressing the , and buttons simultaneously for 4 or more seconds.
The "Maintenance func" screen appears on the LCD display.

Maintenance func	20:30 (THU)
1. Outdoor unit error data	
2. Service contact	
3. RC setting mode	
4. Test run	
Sel. Page [] Confirm	

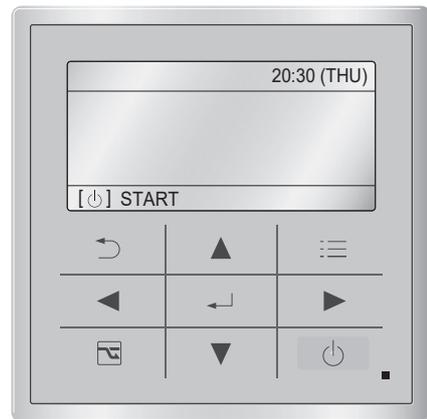
- Press the or button to see each menu.
If you wish to see the next screen instantly, press the or button.
Select "7. Simple settings" on the LCD display and press the button.

Maintenance func	20:30 (THU)
5. Sensor info.	
6. Servicing check	
7. Simple settings	
8. Detailed settings	
Sel. Page [] Confirm	

- The "Simple settings" screen appears on the LCD display.
Select the "Unit no." by pressing the or button for changes.

Simple settings		20:30 (THU)
Unit no.	Code no.	Set data
1-1	01	0001
Sel.	Next	

The indoor unit fan operates only at the selected indoor unit.

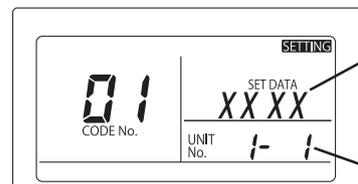


CZ-RTC5B

CZ-RTC4 (Timer remote controller)

<If 1 indoor unit is connected to 1 remote controller>

- Press and hold the button and button for 4 seconds or longer (simple settings mode).
- The address is displayed for the indoor unit that is connected to the remote controller.
(Only the address of the indoor unit that is connected to the remote controller can be checked.)
- Press the button again to return to normal remote controller mode.

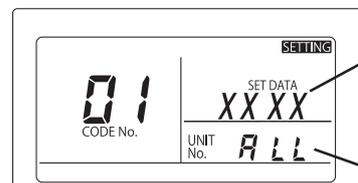


Number changes to indicate which indoor unit is currently selected.

Indoor unit address

<If multiple indoor units are connected to 1 remote controller (group control)>

- Press and hold the button and button for 4 seconds or longer (simple settings mode).
- "ALL" is displayed on the remote controller.
- Next, press the button.
- The address is displayed for 1 of the indoor units which is connected to the remote controller. Check that the fan of that indoor unit starts and that air is discharged.
- Press the button again and check the address of each indoor unit in sequence.
- Press the button again to return to normal remote controller mode.



Number changes to indicate which indoor unit is currently selected.

Indoor unit address

Individual Control of Solenoid Valve kit

How to change the setting for utilizing the solenoid valve kit in the indoor unit in common.
 Setting change may be necessary due to the type of connection of the solenoid valve kit and indoor unit as shown below.
 Be sure to change according to the following method.

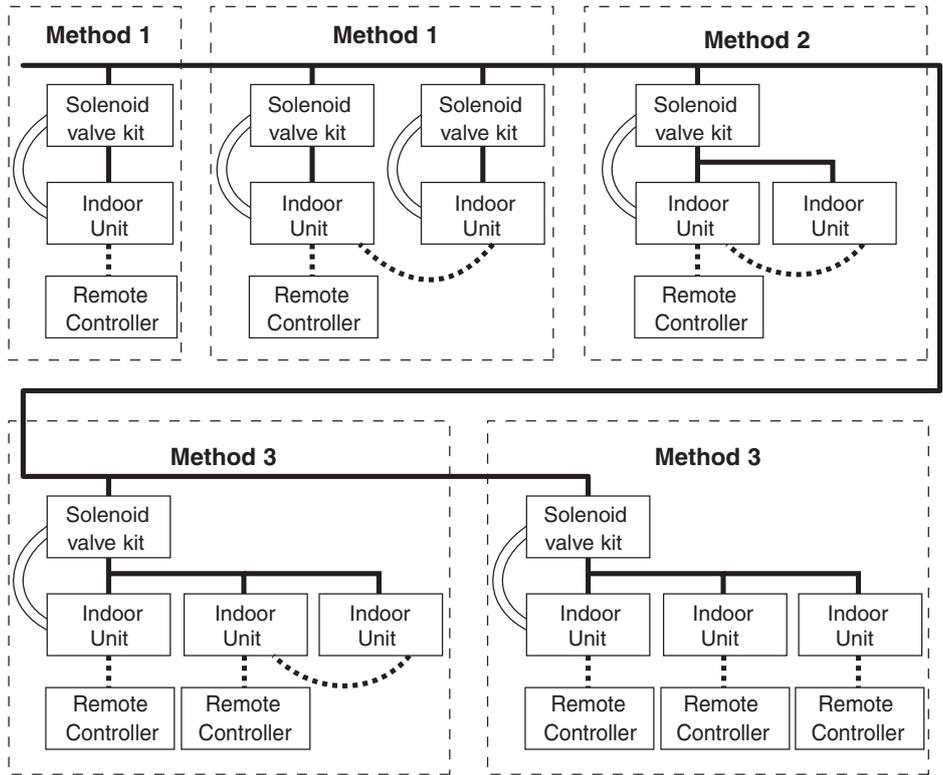


Chart of setting change according to each method

* An alarm will occur or the air conditioner will not operate properly unless proper setting changes are performed.
 Be sure to change the setting as follows.

Combination	Shared solenoid valve kit YES/NO	Change necessary YES/NO	Change of indoor unit	How to change
Method 1 only	NO	NO	—	—
Method 2 included *Method 3 excluded	YES	YES	Method 2 only	From indoor unit *1
Method 3 included	YES	YES	All indoor units	From PC *2

*1 How to change the setting from the remote controller

- Be sure to make a setting when utilizing the shared solenoid valve kit by Method 2.
- When only utilizing the solenoid valve kit in common, make a setting from the remote controller as described in the following pages.
- Be sure to make a setting after auto address setting as described in the following pages.

*2 How to change the setting from PC

- Be sure to make a setting from a personal computer when utilizing the shared solenoid valve kit by Method 3.
- Setting change must be necessary at all indoor units of same refrigerant system.
- Consult how to change the setting.

CZ-RTC5B (High-spec wired remote controller)

- ① Keep pressing the ,  and  buttons simultaneously for 4 or more seconds. The "Maintenance func" screen appears on the LCD display.

Maintenance func		20:30 (THU)
1.	Outdoor unit error data	
2.	Service contact	
3.	RC setting mode	
4.	Test run	
◆ Sel.	◀ ▶ Page [↵] Confirm	

- ② Press the  or  button to see each menu. If you wish to see the next screen instantly, press the  or  button.

Select "7. Simple settings" on the LCD display and press the  button.

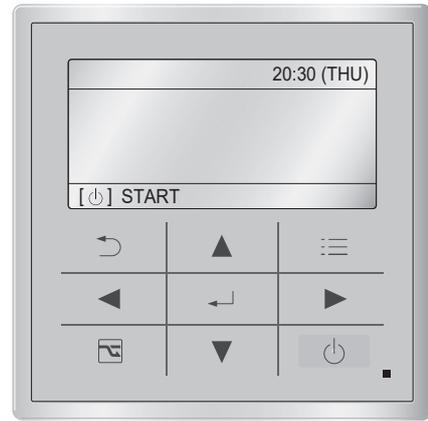
Maintenance func		20:30 (THU)
5.	Sensor info.	
6.	Service check	
7.	Simple settings	
8.	Detailed settings	
◆ Sel.	◀ ▶ Page [↵] Confirm	

- ③ The "Simple settings" screen appears on the LCD display. Select the "Unit no." by pressing the  or  button for changes.

Simple settings		20:30 (THU)
Unit no.	Code no.	Set data
ALL	01	0001
◆ Sel.	▶ Next	

- ④ Select the "Code no." by pressing the  or  button. Change the "Code no." by pressing the  or  button.

Simple settings		20:30 (THU)
Unit no.	Code no.	Set data
ALL	0E	0001
◆ Sel.	▶ Next	



CZ-RTC5B

- ⑤ Select the "Set data" by pressing the  or  button. Select one of the "Set data" by pressing the  or  button. Then press the  button.

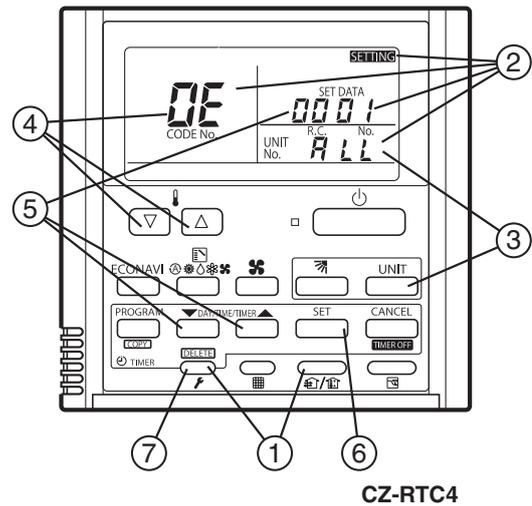
Simple settings		20:30 (THU)
Unit no.	Code no.	Set data
3-1	0E	0001
◆ Sel.	[↵] Confirm	

- ⑥ Select the "Unit no." by pressing the  or  button and press the  button. The "Exit simple settings and restart?" (Simple setting-end) screen appears on the LCD display. Select "YES" and press the  button.

Exit simple settings and restart?		20:30 (THU)
YES	NO	
◆ Sel.	▶ Next	

CZ-RTC4 (Timer remote controller)

1. Press and hold the  button and  button for 4 seconds or longer (simple settings mode).
2. "ALL" is displayed on the remote controller.
At this time, the indoor unit fan (or all indoor unit fans in the case of group control) begins operating.
3. If group control is in effect, press the  button and select the address (unit No.) of the indoor unit to set.
* If unit No. "ALL" is displayed, the same setting will be made for all indoor units.
4. Press the temperature setting  /  button to select the "0E" code.
5. Press the timer time  /  buttons to set the setting data to "0001".
6. Press the  button. (The display stops blinking and remains lit, and setting is completed.)
7. Press the  button to return to normal remote controller display.



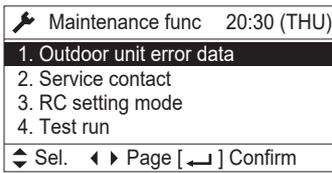
CZ-RTC4

7-5. Setting Test Run Remote Controller

CZ-RTC5B (High-spec wired remote controller)

- Keep pressing the , and buttons simultaneously for 4 or more seconds.

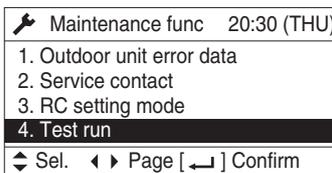
The "Maintenance func" screen appears on the LCD display.



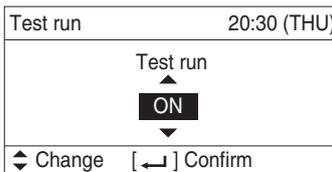
- Press the or button to see each menu.

If you wish to see the next screen instantly, press the or button.

Select "4. Test run" on the LCD display and press the button.



Change the display from OFF to ON by pressing the or button. Then press the button.



CZ-RTC4 (Timer remote controller)

- Press the remote controller button for 4 seconds or longer.

Then press the button.

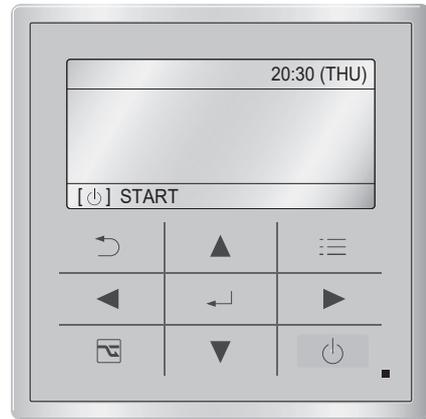
- "TEST" appears on the LCD display while the test run is in progress.
 - The temperature cannot be adjusted when in Test Run mode. (This mode places a heavy load on the machines. Therefore use it only when performing the test run.)
- The test run can be performed using the HEAT, COOL, or FAN operation modes.

NOTE

The outdoor units will not operate for approximately 3 minutes after the power is turned ON and after operation is stopped.

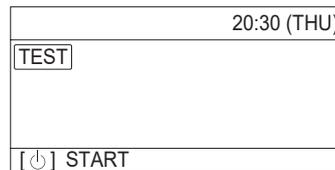
- If correct operation is not possible, a code is displayed on the remote controller LCD display. (See the section "7-7. Self-Diagnostic Function Table and Contents of Alarm Display" and correct the problem.)
- After the test run is completed, press the button again. Check that "TEST" disappears from the LCD display. (To prevent continuous test runs, this remote controller includes a timer function that cancels the test run after 60 minutes.)

* If the test run is performed using the wired remote controller, operation is possible even if the cassette-type ceiling panel has not been installed. ("P09" display does not occur.)

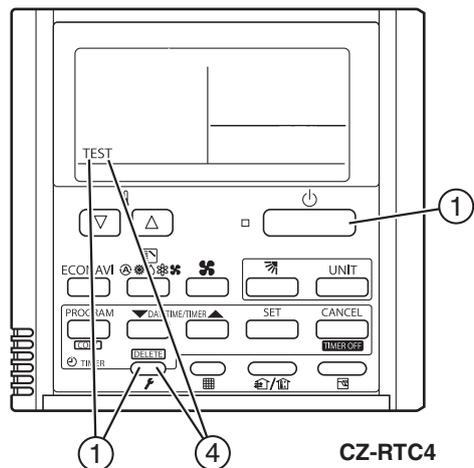
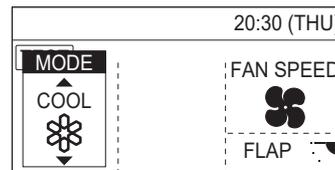


CZ-RTC5B

- Press the button. "TEST" will be displayed on the LCD display.



- Press the button. Test run will be started. Test run setting mode screen appears on the LCD display.



CZ-RTC4

7-6. Caution for Pump Down

Pump down means refrigerant gas in the system is returned to the outdoor unit.
 Pump down is used when the unit is to be moved, or before servicing the refrigerant circuit.
 (Refer to the Service Manual)



CAUTION

- This outdoor unit cannot collect more than the rated refrigerant amount as shown by the nameplate on the back.
- If the amount of refrigerant is more than that recommended, do not conduct pump down. In this case use another refrigerant collecting system.

7-7. Self-Diagnosis Function Table and Contents of Alarm Display

How to know LEDs 1 and 2 alarm display on outdoor unit control P.C. board

LED 1	LED 2	Contents of Alarm Display															
✱	✱	Alarm display															
Alternating		After LED1 blinks M times, LED2 blinks N times. This will be repeated.															
		<table border="1"> <thead> <tr> <th></th> <th>Number of blinks</th> <th>Type of alarm</th> </tr> </thead> <tbody> <tr> <td rowspan="5" style="text-align: center;">M</td> <td style="text-align: center;">2</td> <td style="text-align: center;">Alarm P</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">Alarm H</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Alarm E</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">Alarm F</td> </tr> <tr> <td style="text-align: center;">6</td> <td style="text-align: center;">Alarm L</td> </tr> </tbody> </table>		Number of blinks	Type of alarm	M	2	Alarm P	3	Alarm H	4	Alarm E	5	Alarm F	6	Alarm L	N = number of alarm No.
	Number of blinks	Type of alarm															
M	2	Alarm P															
	3	Alarm H															
	4	Alarm E															
	5	Alarm F															
	6	Alarm L															
		For example: After LED1 blinks twice, LED2 blinks 17 times. This will be repeated. The alarm shows "P17".															

(✱ : Blink) Connect the outdoor unit maintenance remote controller to the RC plug (3P, BLU) on outdoor main unit control P.C. board and make confirmation.

■ Self-Diagnosis Function Table

- Cause and countermeasure against the symptom of auto address failure

Symptom	Cause and countermeasure
<ul style="list-style-type: none"> ● When turning ON power to the outdoor main unit, LEDs 1 and 2 illuminate or blink excluding going out. Auto address setting is not available. 	See "Contents of Alarm Display" and make corrections.
<ul style="list-style-type: none"> ● When auto address setting by the remote controller begins, the alarm display appears immediately. 	
<ul style="list-style-type: none"> ● When auto address setting by the remote controller begins, no display appears. 	Are remote control wiring and inter-unit control wiring connected properly? Is indoor unit turned ON power?

- Auto address setting begins but finishes improperly.

Symptom	Cause and countermeasure
<ul style="list-style-type: none"> ● Soon after a few seconds or after a few minutes, the alarm content is displayed on the remote controller. 	See "Contents of Alarm Display" and make a correction.
<ul style="list-style-type: none"> ● After a few minutes when auto address setting begins, the compressor may occasionally start and stop several times. LEDs 1 and 2 on outdoor unit control P.C. board show the display of auto address setting with blinking alternately but LEDs 1 and 2 do not indicate the completion of auto address setting (go out). 	Are remote control wiring and inter-unit control wiring connected properly? Is indoor unit turned ON power?

- If the alarm display “E15”, “E16” and “E20” appear after auto address setting began, check the following items.

Alarm display	Alarm contents
E15	Recognized number of indoor units at the time of auto address setting are fewer than that of indoor units set by SW3 and SW4 on outdoor main unit P.C. board.
E16	Recognized number of indoor units at the time of auto address setting are more than that of indoor units set by SW3 and SW4 on outdoor main unit P.C. board.
E20	Outdoor unit could not entirely receive serial communication signal from the indoor unit within 90 seconds after auto address setting began.

Check	E15	E16	E20
Have you forgotten to turn ON power to indoor unit?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Are indoor and outdoor control wiring connected properly? (Check for incorrect wiring to open & short-circuit, terminal pin and remote control terminal.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is remote control wiring connected properly? (Check for open & short-circuit, wrong connection to indoor/outdoor unit control wiring terminal, inter-unit control wiring.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Are the number of the connecting indoor units set by SW3 and SW4 of outdoor main unit control P.C. board connected properly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is additional appropriate amount of refrigerant charge? (Compressor ON at the time of auto address setting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is the refrigerant tubing connected properly? (Compressor ON at the time of auto address setting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Are E1 and E3 sensors of indoor unit normal? (Compressor ON at the time of auto address setting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Are there any wrong system address installed in indoor units caused by manual or incorrect auto address control?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 1) When auto address setting from outdoor main unit control P.C. board or remote controller begins, “Under Setting” appears on the remote controller as for normal indoor units under the inter-unit control wirings and remote control wirings. LEDs 1 and 2 indicators on outdoor main unit control P.C. board blink alternately.
 - 2) If there is an error at the inter-unit control wiring of the remote controller when in the indoor unit group control, address setting may not occasionally be made although “under setting” is displayed.
 - 3) Although the alarm “E15” and “E16” are displayed, addresses will be installed in the recognized indoor units. The installed addresses can be checked by the remote controller. See section “Checking the indoor unit address”.
- When operating the remote controller after auto address setting completed (LEDs 1 and 2 indicators on outdoor main unit control P.C. board go out), correct the symptom if the following alarms appear on the remote controller.

Remote control display	Cause
No display	Remote controller is not connected properly. (Power failure) When auto address setting was completed, the power of indoor unit was turned off.
E01	Remote controller is not connected properly. (Receiving failure from remote control) Indoor unit address was mistakenly controlled by undesired indoor unit remote controller. (Impossible to communicate with outdoor unit)
E02	Remote controller is not connected properly. (Impossible to communicate with indoor unit by remote controller)
P09	Connector of indoor unit ceiling panel is not connected properly.

If any other alarm appear on the display, refer to the Test Run Service Manual.

- Alarm display can be checked by the outdoor maintenance remote controller. When operating, refer to the Test Run Service Manual. Alarm display can also be checked by number of blinking of LEDs 1 and 2 on outdoor unit control P.C. board. (See section “How to know LEDs 1 and 2 alarm display on outdoor unit control P.C. board” under the section “7-7. Self-Diagnosis Function Table and Contents of Alarm Display”.)

Remote control display	Alarm contents
E06	Some indoor units does not respond to outdoor unit.
E12	Auto Address failed to start.
E15	Fewer indoor units are found in Auto Addressing than the setting on outdoor PCB.
E16	More indoor units are found in Auto Addressing than the setting on outdoor PCB.
E20	No indoor unit responded in Auto Addressing.
E24	No response from sub outdoor unit.
E25	The outdoor unit address is duplicating.

Remote control display	Alarm contents
E26	The number of responding outdoor units does not match with the setting on the main outdoor unit.
E27	Improper wiring between main and sub outdoor units.
E29	No response from main outdoor unit.
E30	The outdoor unit is having error in sending serial communication signal on main-sub communication line.
E31	Error in communication inside outdoor unit control box.
F04	Compressor 1 discharge temperature sensor has failure. (DISCH1)
F05	Compressor 2 discharge temperature sensor has failure. (DISCH2)
F06	Outdoor unit heat exchanger 1 gas temperature sensor has failure. (EXG1)
F07	Outdoor unit heat exchanger 1 liquid temperature sensor has failure. (EXL1)
F08	Outdoor temperature sensor has failure. (TO)
F12	Compressor inlet temperature sensor has failure. (SCT)
F14	Subcooling heat exchanger temperature sensor has failure. (SCG)
F16	High pressure sensor has failure. (HPS)
F17	Low pressure sensor has failure. (LPS)
F23	Outdoor unit heat exchanger 2 gas temperature sensor has failure. (EXG2)
F24	Outdoor unit heat exchanger 2 liquid temperature sensor has failure. (EXL2)
F31	EEPROM on outdoor unit PCB has failure.
H01	Compressor 1 primary current is overcurrent.
H03	Compressor 1 current sensor is disconnected or shorted.
H05	Compressor 1 discharge temperature sensor is disconnected, shorted or misplaced. (DISCH1)
H06	Low pressure sensor value is too low.
H07	Compressor or refrigerant circuit has low oil.
H08	Compressor 1 oil temperature sensor has failure. (OIL1)
H11	Compressor 2 primary current is overcurrent.
H13	Compressor 2 current sensor is disconnected or shorted.
H15	Compressor 2 discharge temperature sensor is disconnected, shorted or misplaced. (DISCH2)
H21	Compressor 2 HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.
H27	Compressor 2 oil temperature sensor has failure. (OIL2)
H31	Compressor 1 HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.
L04	Duplicate system address setting on outdoor units.
L05	Two or more indoor units are set as priority indoor unit (priority indoor unit).
L06	Two or more indoor units are set as priority indoor unit (non-priority indoor unit).
L10	Capacity setting of outdoor unit is not correct.
L17	Model mismatch between outdoor units.
P03	Compressor 1 discharge temperature is too high.
P04	High pressure switch is activated.
P05	Compressor 1 AC power supply has abnormal.
P14	O ₂ sensor has activated.
P15	Compressor 2 AC power supply has abnormal.
P16	Compressor 1 secondary current is overcurrent.
P17	Compressor 2 discharge temperature is too high.
P19	Compressor 2 start failure. Compressor 2 is missing phase.
P22	Outdoor unit fan motor has failure.
P26	Compressor 2 secondary current is overcurrent.
P29	Compressor 1 start failure. Compressor 1 is missing phase.
P31	Other indoor unit in group control has an alarm.

- Contents of alarm display on remote controller

For the remote controller, there are other alarm contents listed on the following table besides the alarm display on outdoor main unit control P.C. board.

Wired remote control display	Detected contents	
<E01>	Remote controller is detecting error signal from indoor unit.	Indoor unit does not respond to remote controller.
<E02>		Remote controller is having error in sending serial communication signal.
<<E03>>	Controller does not respond to indoor unit.	
E04	Indoor unit is detecting error signal from main outdoor unit.	Outdoor unit does not respond to indoor unit.
E08	Improper setting of indoor unit or remote controller.	Indoor unit address is duplicating.
<<E09>>		Two or more remote controllers are set as main on R1-R2 link.
E18	No response from sub indoor to the main indoor unit in group control wiring.	
L01	Indoor unit address setting has error. (No main indoor unit in group control.)	
<<L02>>	Improper setting.	Indoor unit model does not match with the outdoor unit model. (Multi-split/mini-split)
<L03>		Two or more indoor units are set as main in group control.
L07		Group control wiring is detected for indoor unit set as individual control.
L08		Indoor unit address is not set.
<<L09>>		Capacity setting of indoor unit is not correct.
L11		Incorrect wiring of remote group control wiring (in case of shared solenoid valve kit)
L13		Indoor unit model does not match with outdoor unit.
<<F01>>	Indoor thermistor is either open or damaged.	Indoor unit heat exchanger liquid temperature sensor has failure. (E1)
<<F02>>		Indoor unit heat exchanger temperature sensor has failure. (E2)
<<F03>>		Indoor unit heat exchanger gas temperature sensor has failure. (E3)
<<F10>>		Indoor suction air (room) temperature sensor has failure. (TA)
<<F11>>		Indoor discharge air temperature sensor has failure. (BL)
<<P01>>	Protective device in indoor unit is activated.	Thermal protector for Indoor unit fan motor is activated.
<<P09>>		Connection to the panel of indoor unit is not good.
<<P10>>		Float switch of drain pan safety is activated.
<<P11>>		Drain pump failure or locked motor.
<<P12>>		Indoor unit fan inverter protection control is activated.
P14		O ₂ sensor has activated.
<P31>	Indoor unit communication error of group control wiring.	Other indoor unit in group control has an alarm.
F29	EEPROM on indoor unit PCB failure	

- The parentheses of << >> used in the table of alarm display does not affect anything the operation of other indoor units.
- The parentheses of < > used in the table of alarm display implies that there are two cases: according to the content of the symptom, some affect the operation of other indoor units and others do not affect anything.

Alarm messages displayed on system controller

Serial communication errors Mis-setting	Error in transmitting serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller.	C05
	Error in receiving serial communication signal	Indoor or main outdoor unit is not operating correctly. Mis-wiring of control wiring between indoor unit, main outdoor unit and system controller. CN1 is not connected properly.	C06
Activation of protective device	Protective device of sub indoor unit in group control is activated.	When using wireless remote controller or system controller, in order to check the alarm message in detail, connect wired remote controller to indoor unit temporarily.	P30

NOTE

1. Alarm messages in << >> do not affect other indoor unit operations.
2. Alarm messages in < > sometimes affect other indoor unit operations depending on the fault.

ATTENTION!

Adjustment of terminating resistance (pin) is necessary.

Communication failure will occur unless adjustment is made correctly.

- Terminating resistance (pin) is mounted on outdoor unit control P.C. board.
- When connecting central controller, interface or peripheral equipment, adjustment of terminating resistance (pin) is necessary. Although the connection is not made, confirmation is necessary for VRF systems.
- In the case of a refrigerant system, the terminating resistance (pin) for this inter-unit control wiring (S-LINK wiring) is one location (See section "7-4. Auto Address Setting").
For 2 or more refrigerant systems, 2 locations should be valid ("SHORT" for VRF systems at shipment). See section "7-4. Auto Address Setting".
In order to make 2 locations valid, let the terminating resistance (pin) of the nearest outdoor unit and the farthest outdoor unit be valid (SHORT side) from the location of central controller.
In other refrigerant systems excepting 2 locations described above, make them invalid (OPEN side).
It is prohibited making more than 3 locations of terminating resistance valid.
- Since the use of linking the sub outdoor units of VRF systems is not connected to the inter-unit control wiring, it is not necessary to make the terminating resistance invalid "OPEN side".

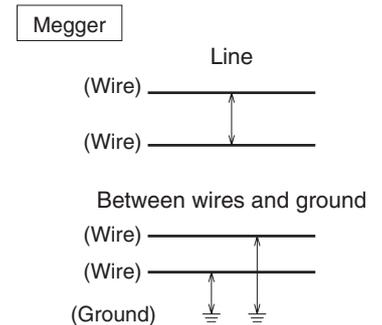
Make final confirmation regarding the central controller or interface & inter-unit control wiring (S-LINK wiring) connected to the peripheral equipment.

Measure the line resistance with a tester and check whether the values are in the range of $30\Omega - 120\Omega$.

If the resistance values are out of range, check again the terminating resistance.

Nevertheless, if the values are out of range, the problem comes from wiring.

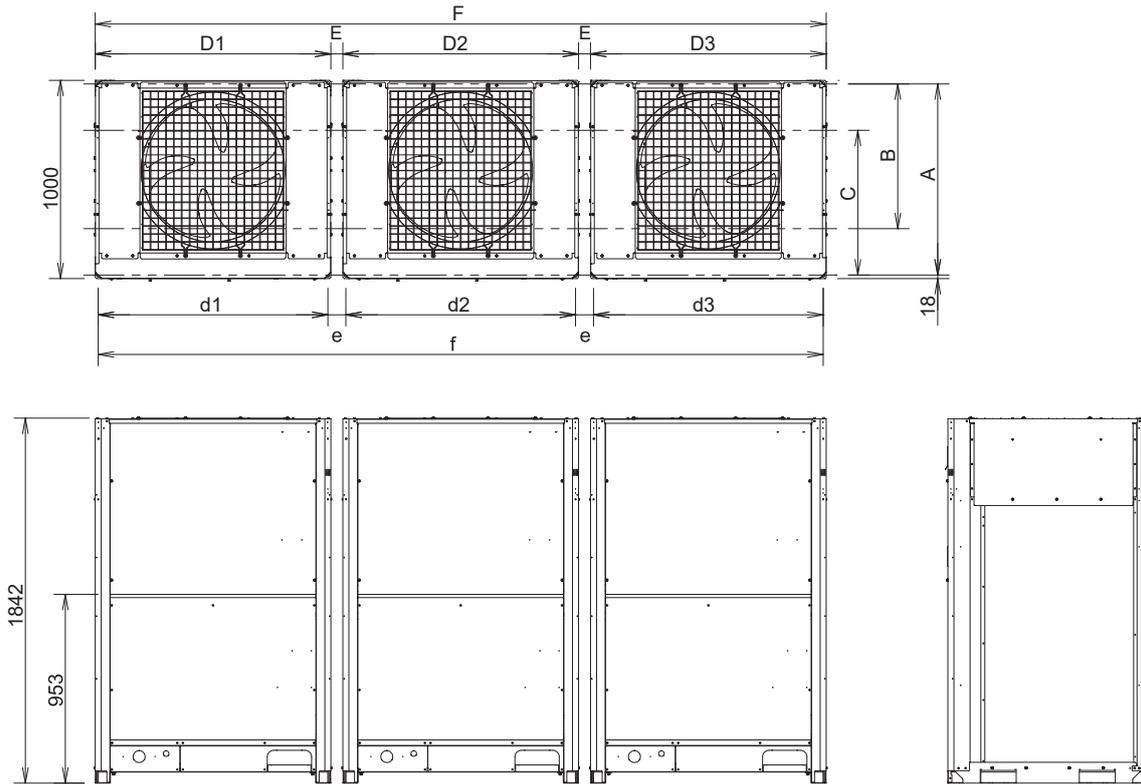
- Is the connection properly made?
- Are there any scratches or damages on the coated surface?
- Measure the line, between wires and ground with the 500V megger (insulation resistance meter) and check the values are over $100M\Omega$.
- When measuring, be sure to remove both edges of the wire from the terminal board. If not removed, it will be damaged.
- If the line resistance is within $100M\Omega$, newly carry out the wiring work.



SUPPLEMENT

1. Combination with various type of outdoor units

Unit: mm



Capacity	Dimensions of single unit			Distance between units		Dimensions of combination unit		Dimensions of single unit installation hole			Distance between unit installation hole		Dimensions of combination unit installation hole	
	D1	D2	D3	E(*1)	E(*2)	F(*1)	F(*2)	d1	d2	d3	e(*1)	e(*2)	f(*1)	f(*2)
8HP	1180	—	—	—	—	1180	1180	1150	—	—	—	—	1150	1150
10HP	1180	—	—	—	—	1180	1180	1150	—	—	—	—	1150	1150
12HP	1180	—	—	—	—	1180	1180	1150	—	—	—	—	1150	1150
14HP	1180	—	—	—	—	1180	1180	1150	—	—	—	—	1150	1150
16HP	1180	—	—	—	—	1180	1180	1150	—	—	—	—	1150	1150
18HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
20HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
22HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
24HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
26HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2100
28HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
30HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
32HP	1180	1180	—	60	180	2420	2540	1150	1150	—	90	210	2390	2510
34HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
36HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
38HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
40HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
42HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
44HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
46HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870
48HP	1180	1180	1180	60	180	3660	3900	1150	1150	1150	90	210	3630	3870

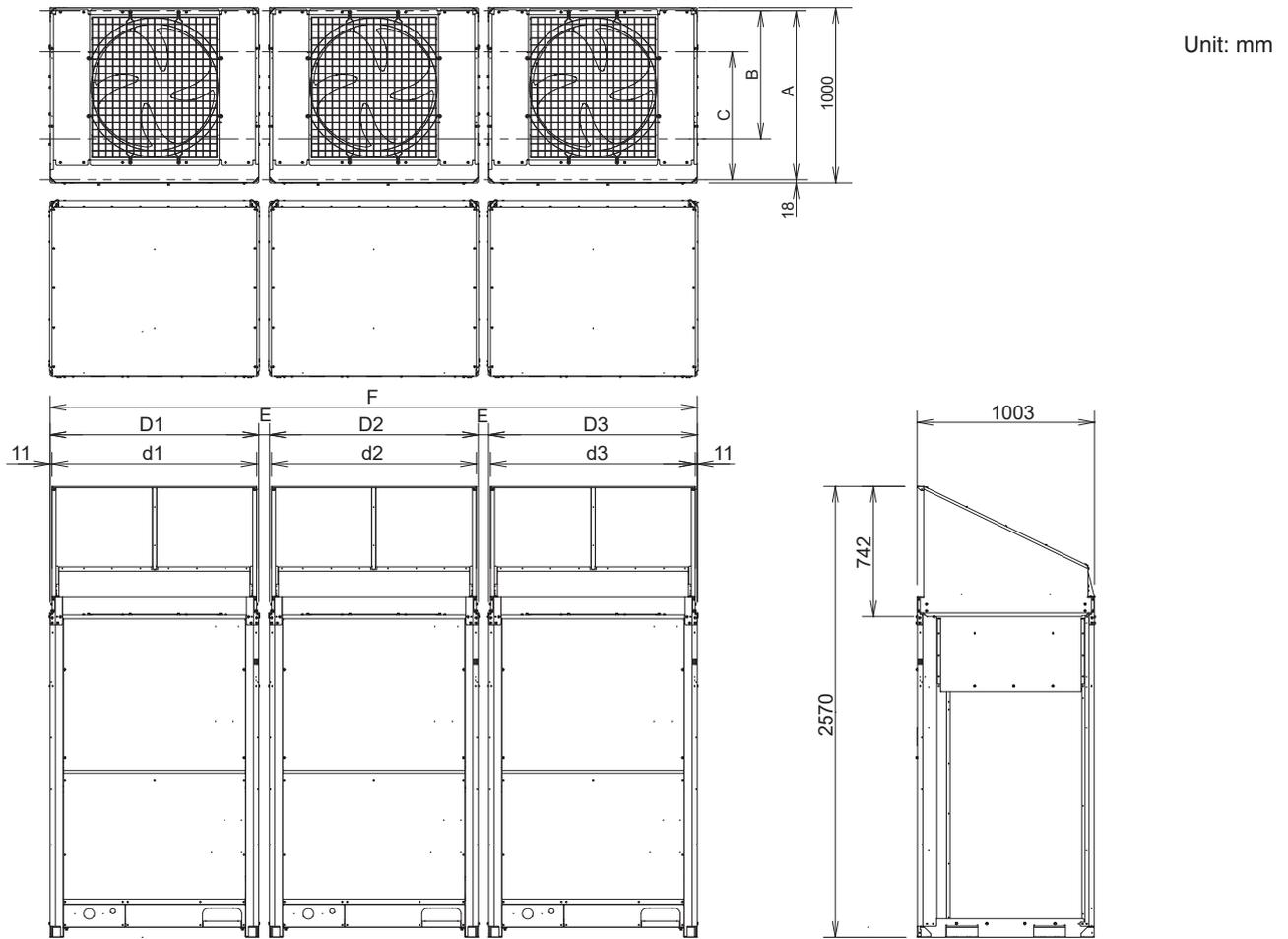
According to the installation site, you may choose the setting position in the depth direction of the anchor bolt from A, B or C.
 A: 964: (Installation hole pitch) : For removing tube forward. Use the data with the asterisk (*1) in combination of each unit dimension.
 B: 730: (Installation hole pitch) : For removing tube downward. Use the data with the asterisk (*2) in combination of each unit dimension.
 C: 730: (Installation hole pitch) : Use the data with the asterisk (*2) in combination of each unit dimension.

2. Dimensions of Wind Ducting

Reference diagram for air-discharge chamber (field supply)

Can be installed so that the air direction is to the front or rear direction.

According to the installation site, you may choose the setting position in the depth direction of the anchor bolt from “A”, “B” or “C”.



Capacity	Dimensions of air-discharge chamber						Distance between units		Dimensions of air-discharge chamber	
	D1	D2	D3	d1	d2	d3	E(*1)	E(*2)	F(*1)	F(*2)
8HP	1180	—	—	1158	—	—	—	—	1180	1180
10HP	1180	—	—	1158	—	—	—	—	1180	1180
12HP	1180	—	—	1158	—	—	—	—	1180	1180
14HP	1180	—	—	1158	—	—	—	—	1180	1180
16HP	1180	—	—	1158	—	—	—	—	1180	1180
18HP	1180	1180	—	1158	1158	—	60	180	2420	2540
20HP	1180	1180	—	1158	1158	—	60	180	2420	2540
22HP	1180	1180	—	1158	1158	—	60	180	2420	2540
24HP	1180	1180	—	1158	1158	—	60	180	2420	2540
26HP	1180	1180	—	1158	1158	—	60	180	2420	2540
28HP	1180	1180	—	1158	1158	—	60	180	2420	2540
30HP	1180	1180	—	1158	1158	—	60	180	2420	2540
32HP	1180	1180	—	1158	1158	—	60	180	2420	2540
34HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
36HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
38HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
40HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
42HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
44HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
46HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900
48HP	1180	1180	1180	1158	1158	1158	60	180	3660	3900

The air-discharge chamber will be obtained at a local field. According to the installation site, you may choose the setting position in the depth direction of the anchor bolt from A, B or C.

A: 964 (Installation hole pitch) : For removing tube forward. Use the data with the asterisk (*1) in combination of each unit dimension.

B: 730 (Installation hole pitch) : For removing tube downward. Use the data with the asterisk (*2) in combination of each unit dimension.

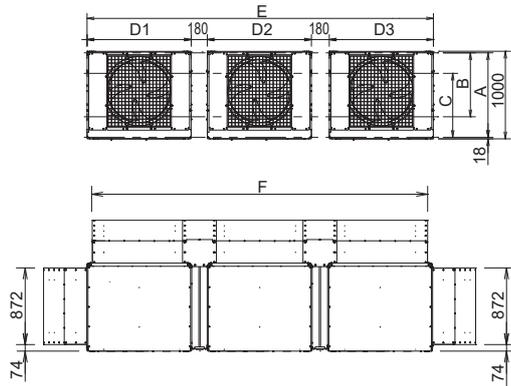
C: 730 (Installation hole pitch) : Use the data with the asterisk (*2) in combination of each unit dimension.

3. Dimensions of Snow Ducting

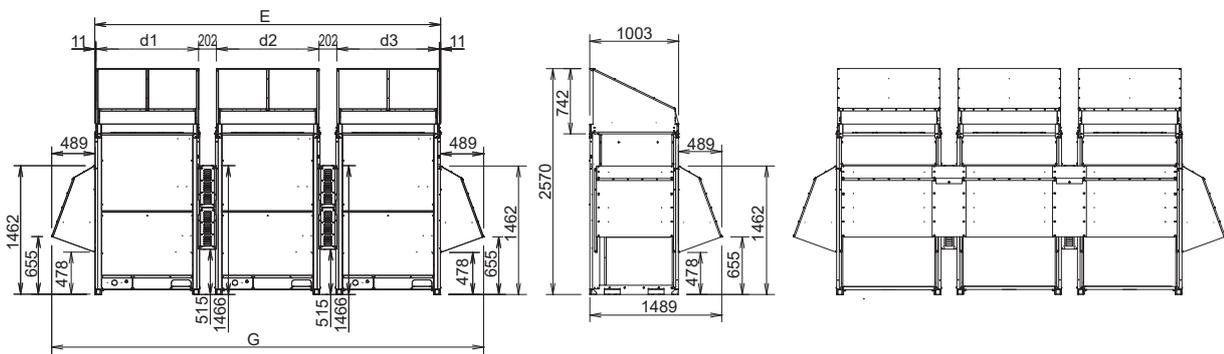
Reference diagram for snow-proof vents (field supply)

According to the installation site, you may choose the setting position in the depth direction of the anchor bolt from “A”, “B” or “C”.

Unit: mm



The snow-proof vents will be obtained at a local field. According to the installation site, you may choose the setting position in the depth direction of the anchor bolt from A, B or C.
 A: 964 (Installation hole pitch) : For removing tube forward.
 B: 730 (Installation hole pitch) : For removing tube downward.
 C: 730 (Installation hole pitch)



Capacity	Dimensions of snow-proof vents (mm)						Units dimensions (mm)	Dimensions of snow-proof vents (mm)	
	D1	D2	D3	d1	d2	d3		E	F
8HP	1180	—	—	1158	—	—	1180	1073	2158
10HP	1180	—	—	1158	—	—	1180	1073	2158
12HP	1180	—	—	1158	—	—	1180	1073	2158
14HP	1180	—	—	1158	—	—	1180	1073	2158
16HP	1180	—	—	1158	—	—	1180	1073	2158
18HP	1180	1180	—	1158	1158	—	2540	2433	3518
20HP	1180	1180	—	1158	1158	—	2540	2433	3518
22HP	1180	1180	—	1158	1158	—	2540	2433	3518
24HP	1180	1180	—	1158	1158	—	2540	2433	3518
26HP	1180	1180	—	1158	1158	—	2540	2433	3518
28HP	1180	1180	—	1158	1158	—	2540	2433	3518
30HP	1180	1180	—	1158	1158	—	2540	2433	3518
32HP	1180	1180	—	1158	1158	—	2540	2433	3518
34HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
36HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
38HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
40HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
42HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
44HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
46HP	1180	1180	1180	1158	1158	1158	3900	3793	4878
48HP	1180	1180	1180	1158	1158	1158	3900	3793	4878

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