

Компания Полель - официальный
дистрибьютор **SANYO**

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Кондиционеры
Сплит-системы
Полупромышленные кондиционеры
Мультizonальные **VRF** системы кондиционирования
Чиллеры

— Single and Simultaneous Operation Multi System Air Conditioner —

Indoor Units and Outdoor Units

	Indoor Units Type	9	12	18	25	36	48
① AS	1-Way Air Discharge Semi-Concealed	SPW- AS93GH56	SPW- AS123GH56				
② S	2-Way Air Discharge Semi-Concealed	SPW- S93GH56	SPW- S123GH56	SPW- S183GH56	SPW- S253GH56		
③ X	4-Way Air Discharge Semi-Concealed		SPW- X123GH56	SPW- X183GH56	SPW- X253GH56	SPW- X363GH56	SPW- X483GH56
④ K	Wall-Mounted	SPW- K93GH56	SPW- K123GH56	SPW- K183GH56			
⑤ T	Ceiling-Mounted			SPW- T183GH56	SPW- T253GH56	SPW- T363GH56	SPW- T483GH56
⑥ U	Concealed-Duct		SPW- U123GH56	SPW- U183GH56	SPW- U253GH56	SPW- U363GH56	SPW- U483GH56
⑦ D	Concealed-Duct High Static Pressure				SPW- D253GH56	SPW- D363GH56	SPW- D483GH56
⑧ C	Outdoor Units	SPW-C253GH5, SPW-C253GH8, SPW-C363GH8, SPW-C483GH8					
⑨	Remote Controller	RCS-SH80TG (Optional part), RCS-SH80TGWL (Optional part)					
⑩	Weekly Timer	TM-WBG (Optional part)					

Model Combination

Combine indoor and outdoor units only as listed below.

Outdoor Units	System Combination	Indoor Units
SPW-C253GH5 SPW-C253GH8	Single type	SPW- X, S, T, U, D 253GH56
	Twin type	SPW- X, S, AS, K, U 123GH56 × 2
SPW-C363GH8	Single type	SPW- X, T, U, D 363GH56
	Twin type	SPW- X, S, T, K, U 183GH56 × 2
	Triple type	SPW- X, S, AS, K, U 123GH56 × 3
		SPW- X, S, T, U 183GH56 × 1
	Quartet type	+ S, AS, K 93GH56 × 2 SPW- S, AS, K 93GH56 × 4
SPW-C483GH8	Single type	SPW- X, T, U, D 483GH56
	Twin type	SPW- X, S, T, U, D 253GH56 × 2
	Triple type	SPW- K 183GH56 × 3
		SPW- X, S, T, U, D 253GH56 × 1
	Quartet type	+ X, S, AS, K, U 123GH56 × 2 SPW- X, S, AS, K, U 123GH56 × 4

● The last digit(s) of the model number indicates the required power supply to the unit.

56 : 50 Hz / 60 Hz, (single-phase), 220 - 240 V

5 : 50 Hz, (single-phase), 220 - 240 V

8 : 50 Hz, 3N~ (3-phase), 380 - 415 V



— The last digit(s) of model number

Important

Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

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.
- Observe all local, state, and national electrical codes.
- 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

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 **accidentally injury or death**.
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

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

When Installing

...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.

...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

- Execute enough ventilation in case refrigerant gases leak during operations. Be careful that the contact of the refrigerant gases with the flare will cause the generation of poisonous gases.
- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- 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.

NOTE

Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "narrow" or "wide" rather than as "liquid" or "gas".

When Servicing

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



WARNING Check of Limit Density

The room in which air conditioner is installed is required to be designed so that just in case the refrigerant gas leaks out, its density should not exceed a limit value.

R-22 which is used in the air conditioner is a safe medium which does not have the toxicity or combustibility of ammonia, and which does not come under the restrictions scheduled to be imposed for protection of the ozone layer; however since it is not simply air, and poses the risk of choking if its density should rise excessively. Choking accidents due to leakage of freon are almost never noticed; however in the recently growing high density buildings, the installation of multi air conditioner systems is on the increase due to the needs of effective use of floor space, individual control, energy conservation by curtailing heat carrying power, etc.

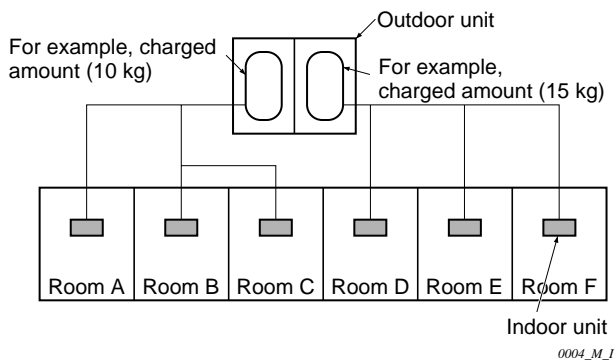
Especially, the multi air conditioner has the feature of replenishing large amount of refrigerant as compared to the conventional individual air conditioners. If a single indoor unit of the multi air conditioner is to be installed in a small room, select the model and its installation so that if the refrigerant accidentally leaks out of it, its density does not reach the limit value (which permits take emergency measures without inflicting injury). In rooms where the density howsoever exceeds the limit, install an opening with the adjacent rooms, or install mechanical ventilation which is interlocked with a gas leak detection device. The limit density is as given below.

Total amount of refrigerant (kg)

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

The limit density of R-22 which is used in multi air conditioners is 0.15 kg/m³. (ASHRAE Standard)

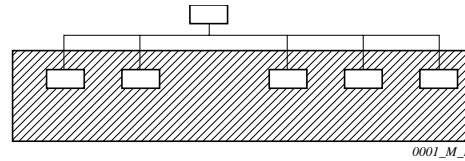
NOTE 1 : If there are 2 or more refrigerating systems in a single refrigerating device, the amounts of refrigerant shall be as charged in each independent device.



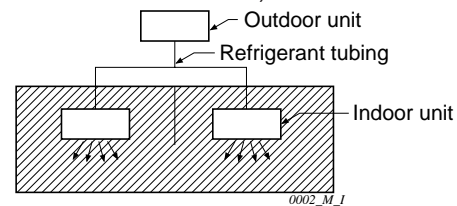
In case of the amount of charge in this example:
 The amount of leaking refrigerant gas in rooms A, B, and C shall be 10 kg.
 The amount of leaking refrigerant gas in rooms D, E and F shall be 15 kg.

NOTE 2 : The examples about minimum room volume are as follows.

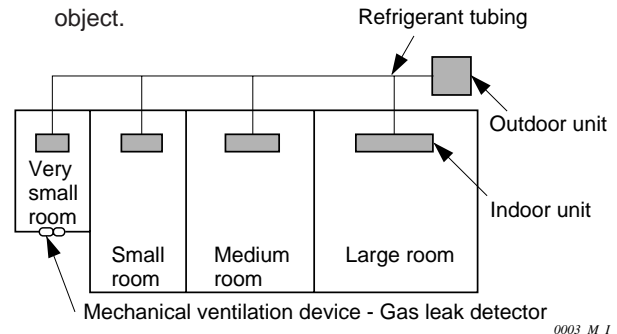
(1) In case of no partition (shaded portion)



(2) In case 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 and bottom of the door)

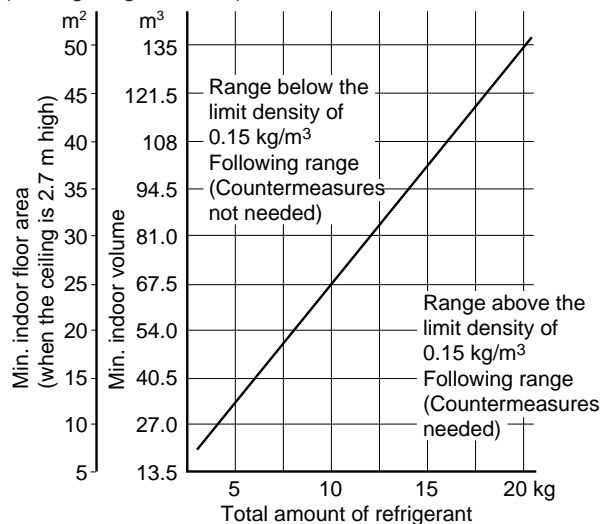


(3) If a indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest room of course becomes the object. But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the limit density is exceeded, the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



NOTE 3 :

The minimum indoor floor space as against the amount of refrigerant is roughly as follows.
 (Ceiling height : 2.7 m)



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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 indoor and outdoor units and make sure all accessory parts listed are with the system before beginning.

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

1. Standard screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Level
6. Sabre saw or key hole 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)

1-2. Accessories Supplied with Unit

See Table 1-1 to 1-8.

Table	Type
1-1	1-Way Air Discharge Semi-Concealed
1-2	2-Way Air Discharge Semi-Concealed
1-3	4-Way Air Discharge Semi-Concealed
1-4	Wall-Mounted
1-5	Ceiling-Mounted
1-6	Concealed-Duct
1-7	Concealed-Duct High Static Pressure

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 15.88 mm (5/8") or 19.05 mm (3/4") O.D. copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 8 mm.

3. Use insulated copper wire for field wiring. Wire size varies with the total length of wiring. Refer to Section 5. 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 1-1 (1-Way Air Discharge Semi-Concealed)













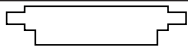
Part Name	Figure	Q'ty	Remarks
Full-scale installation diagram		1	For determining suspension bolt pitch
Elbow for water supply		1	For test of drain pump
Flare insulator		2	For wide and narrow tubes
Insulating tape	 (Black)	3	For wide and narrow tubes
	 (White -for insulating)	2	For wide and narrow tube flare nuts
Vinyl clamp		4	Ends of flare insulator
Hose band		2	For securing drain hose
Packing		1	For drain joint
Drain insulator		1	For drain joint
Clamp (small)		2	For packing drain joint
Clamp (large)		2	For drain joint insulating
Drain hose		1	
Paper diagram		1	For inspection of ceiling

Table 1-2 (2-Way Air Discharge Semi-Concealed)











Part Name	Figure	Q'ty	Remarks
Full-scale installation diagram		1	For determining suspension bolt pitch
Flare insulator		2	For wide and narrow tubes
Insulating tape	 (White -for insulating)	2	For wide and narrow tube flare nuts
Vinyl clamp		4	Ends of flare insulator
Hose band		1	For securing drain hose
Packing		1	For drain joint
Drain insulator		1	For drain joint
Clamp (small)		2	For packing drain joint
Clamp (large)		2	For drain joint insulating
Tube connector		1	For sizing up of narrow tube from 6.35 to 9.52 (Only for 25 type)

Table 1-3 (4-Way Air Discharge Semi-Concealed)




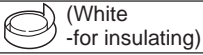



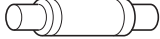


Part Name	Figure	Q'ty	Remarks
Full-scale installation diagram		1	For determining suspension bolt pitch
Flare insulator		2	For wide and narrow tubes
Installation gauge		1	For adjusting the unit position
Insulating tape		1	For wide tube flare nuts
Hose band		2	For securing drain hose
Packing		1	For drain joint
Drain insulator		1	For drain joint
Drain hose		1	
Sealing putty		1	For sealing recessed portion of power supply
Tube connector		1	For sizing up of narrow tube from 6.35 to 9.52 (only for 25 type)

Table 1-4 (Wall-Mounted)


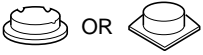

Part Name	Figure	Q'ty	Remarks
Rawl plug		10	For fixing the rear panel
Plastic cover		1	For improved tubing appearance
Tapping screw	Truss-head Phillips 4 X 16mm 	10	For fixing the rear panel

Table 1-5 (Ceiling-Mounted)



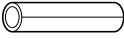







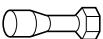













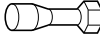
Part Name	Figure	Q'ty	Remarks
Special washer		4	For temporarily suspending indoor unit from ceiling
Toggle wing nut		4	For M10 and 3/8" suspension bolts (2 each)
Drain insulator		1	For drain hose joint
Flare insulator		2 Sets	For wide and narrow tube joints
Drain hose		1	
Drain hose clamp		4	
Insulating tape	 Black	3	For wide & narrow tube and drain hose joint
	 White (heat-resisting)	2	For wide and narrow tube flare joints
Vinyl clamp		4	For ends of flare insulator
Full-scale installation diagram		1	For determining suspension bolt pitch
Tube connector		1	For sizing up of narrow tube from 6.35 to 9.52 (only for 25 type)

Table 1-6 (Concealed-Duct)

Part Name	Figure	Q'ty	Remarks
Flare insulator		2	For wide and narrow tubes
Insulating tape	 (Black)	2	For wide and narrow tubes
	 (White -for insulating)	2	For wide and narrow tube flare nuts
Tapping screw TOTA4-10		14 or 20 or 24	For air intake duct connection
Booster cable*		1	For increasing the fan speed
Hose band		1	For securing drain hose
Packing		1	For drain joint
Drain insulator		1	For drain joint
Clamp		9	For securing drain hose & refrigerant tubing
Tube connector		1	For sizing up of narrow tube from 6.35 to 9.52 (only for 25 type)

* Booster cable is housed inside the electrical component box.

Table 1-7 (Concealed-Duct High Static Pressure)

Part Name	Figure	Q'ty	Remarks
Special washer		8	For suspending indoor unit from ceiling
Flare insulator		2	For wide and narrow tubes
Drain socket		1	For drain pipe connection
Tube connector		1	For sizing up of narrow tube from 6.35 to 9.52 (only for 25 type)

1-5. Tubing Length

(A) Single type

- Refrigerant tubing between the indoor and outdoor units shall be kept as short as possible.
- The length of the refrigerant tubes between the indoor and outdoor units are limited by the elevation difference between the two units. During tubing work, try to make both the tubing length (L) and the difference in elevation (H) as short as possible. Refer to Table 1-9 for the details.

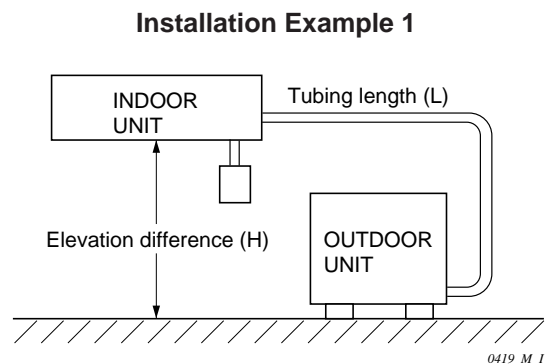


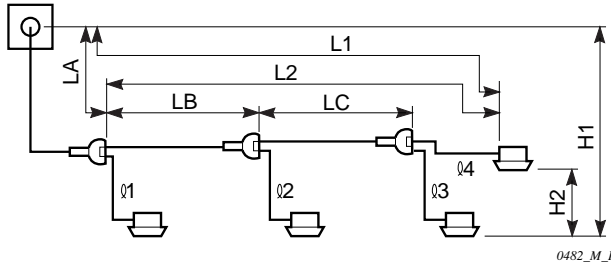
Table 1-9

Tubing Data		Models	25 type	36 type	48 type
Tubing size outer diameter	Narrow tube	mm (in.)	6.35 (1/4)	9.52 (3/8)	9.52 (3/8)
	Wide tube	mm (in.)	15.88 (5/8)	19.05 (3/4)	19.05 (3/4)
Limit of tubing length		(m)	50	50	50
Limit of elevation difference between the two units	Outdoor unit is placed upper	(m)	50	50	50
	Outdoor unit is placed lower	(m)	30	30	30
Max. allowable tubing length at shipment		(m)	30	30	30
Required additional refrigerant *1		(g/m)	a) 45	b) 50	b) 50
Refrigerant charged at shipment		(kg)	3.0	3.5	4.5

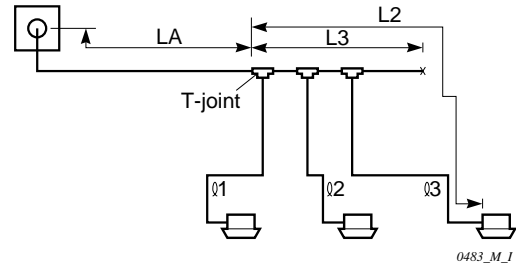
No additional charge of compressor oil is necessary.

*1 If total tubing length becomes 30 to 50 m, charge additional refrigerant (R22) by a) 45 or b) 50 g/m.

B) Multi type (Twin, Triple, Quartet)
Installation Example 2



Installation Example 3



Select and decide the installation location so that the length of the refrigerant tubing will be within the limits given in Table.

Symbol meanings:




-  : Optional distribution joint kit (APR-DV64MB)
-  : T-joint (field supply)
-  : Weld solidly (pinch shut)

Table 1-10

Items	Marks	Contents	Length (m)	
Allowable tubing length	L1	Maximum tubing length	Actual length	$\leq 50^*$
			Equivalent length	≤ 70
	L2	Maximum length from the No.1 distribution joint	≤ 20	
	l_1, l_2, l_3, l_4	Maximum length of each distribution joint	≤ 20	
	$l_1+l_2+l_3$ + L1	Total maximum tubing length including length of each distribution joint	≤ 70	
		Max. allowable tubing length including length of each distribution joint at shipment	$\leq 30^*$	
Allowable elevation difference	H1	When outdoor unit installed higher	≤ 50	
		When outdoor unit installed lower	≤ 30	
	H2	Maximum difference between indoor units	≤ 4	
Allowable length of header tube	L3	Maximum tubing length between the first T-joint and terminated (weld shut) end point	≤ 1	

* If (total) actual length becomes 30 to 50 m, additional refrigerant charge (R22) is required. See table 1-11.



CAUTION

1. This unit requires no additional refrigerant charge up to tubing length 30 m. In case of more than 30 m, additional refrigerant charge is required. Please refer to “1-7. Additional Refrigerant Charge”.
2. In case of multi type installation, indoor units should be installed at a same room. If indoor units are installed at different room, temperature control may develop problems because the thermostat operation follows the thermostat condition of one of indoor units (main units).

1-6. Tubing Size

Table 1-11 Main Tubing Size (L1, LA, LB, LC)

Unit: mm (in.)

	Single type		Multi type (Twin, Triple, Quartet)			
	Main tube (L1) OD		Main tube (LA) OD		Main tube (LB, LC) OD	
					Total unit's cooling capacity Q after distribution joint kW (BTU/h)	
	25 type	36, 48 type	25 type	36, 48 type	16.0 (54,600) or less but more than 7.3 (25,000) $16.0 \geq Q > 7.3$	Less than 7.3 (25,000) $Q \leq 7.3$
Wide tube	15.88 (5/8)	19.05 (3/4)	15.88 (5/8)	19.05 (3/4)	19.05 (3/4)	15.88 (5/8)
Narrow tube	6.35 (1/4)	9.52 (3/8)	6.35 (1/4)	9.52 (3/8)	9.52 (3/8)	9.52 (3/8)
Required additional refrigerant (g/m)	45	50	45	50	50	50

Table 1-12 Distribution Branch Size (l_1, l_2, l_3, l_4)

Unit: mm (in.)

Indoor unit type	9 type	12 type	18 type	25 type	36 type	48 type
Wide tube	12.7 (1/2)		15.88 (5/8)		19.05 (3/4)	
Narrow tube	9.52 (3/8)*					

NOTE

* In case of 25 type, use the “Tube connector” (accessory part with unit) for sizing up narrow tube from 6.35 to 9.52.

1-7. Additional Refrigerant Charge

If total tubing length becomes a) 30 to 50 m for $\phi 6.35$, b) 30 to 50 m for $\phi 9.52$, additional refrigerant (R22) charge by a) 45 or b) 50 g/m is required.

(No additional charge of compressor oil is necessary.) Regarding to the charging refrigerant, refer to page 77.



WARNING

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

■ 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 outside, its density does not exceed the limit level.

If the density might exceed the limit level, it is necessary to set up an opening between it and the adjacent room, or to install a mechanical ventilation which is interlocked with the leak detector.

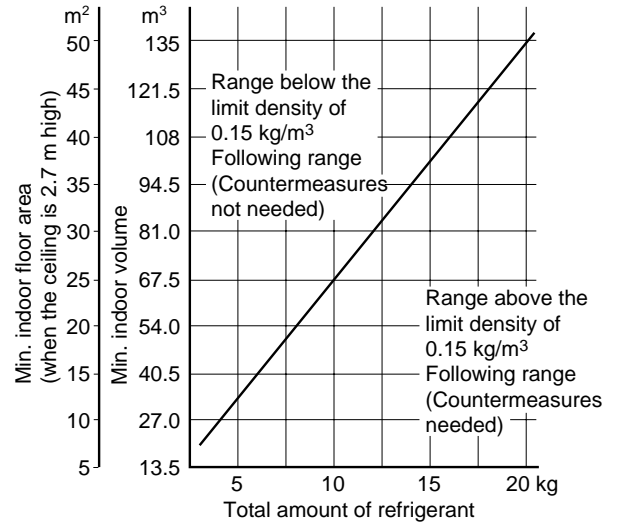
$$\frac{\text{(Total refrigerant charged amount : kg)}}{\text{(Min indoor volume where the indoor unit is installed : m}^3\text{)}} \leq \text{Limit density 0.15 (kg/m}^3\text{)}$$

The limit density of R-22 which is used in this unit is 0.15 kg/m³ (ASHRAE Standard).

The shipped outdoor unit comes charged with the amount of refrigerant fixed for each type; so add it to the amount that is charged at the field.

(For the refrigerant charge amount at shipment, please 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.



0010_M_1

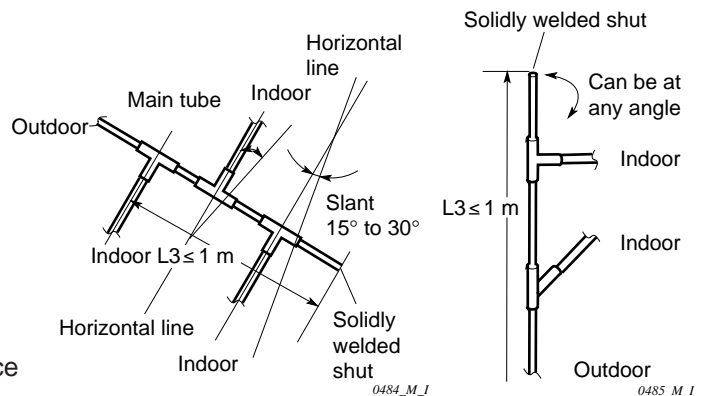
1-8. Installing Distribution Joint

(1) Refer to "HOW TO ATTACH DISTRIBUTION JOINT" enclosed with the optional distribution joint kit (APR-DV64MB, APR-HV63MB1).

(2) ● The T-joint (not provided) installation direction should be either horizontal or vertical. The direction of the connection port to each indoor must be slanted slightly upward (15° to 30°) when the main tube is horizontal and can be any direction but the branch tube must be slightly upward when the tube is vertical (L3 shows tubing connected by a T-joint (1 meter or less)).

● Make sure that the end point is solidly welded shut. Also pay attention to the insertion distance of each connection tube so refrigerant flow inside the T-joint is not blocked.

● Never diverge a branch tube again after the T-joint (that is, there can only be 1 branch in a line).



When in horizontal use

When in vertical use

- (3) The branch tube must have a trap when the branch tube after distribution is connected to only 1 indoor unit. If not, in case the indoor unit is defective, do not operate the system until the defective unit is repaired. Otherwise the compressor may develop problems because the refrigerant oil accumulates in the branch tube.

1-9. Optional Distribution Joint Kits

- APR-HV63MB1 : Cooling capacity after distribution is 16.0 kW (54,600 BTU/h) or less
- APR-DV64MB : Cooling capacity after distribution is 16.0 kW (54,600 BTU/h) or less

Table 1-13 Distribution Branch Size (Ø1, Ø2, Ø3, Ø4)

Unit: mm (in.)

Indoor Unit	9 type	12 type	18 type	25 type	36 type	48 type
Wide tube	12.7 (1/2)		15.88 (5/8)		19.05 (3/4)	
Narrow tube	9.52 (3/8)*					

NOTE * In case of 25 type, use the "Tube connector" (accessory part with unit) for sizing up narrow tube from 6.35 to 9.52.

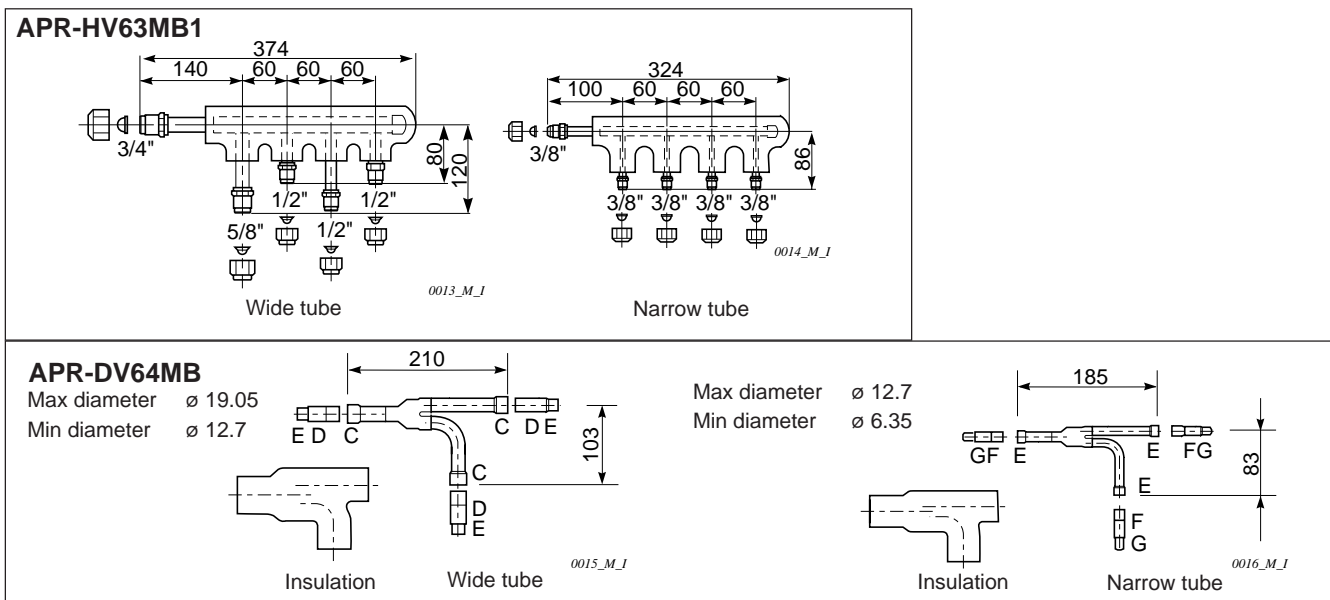


Table 1-14 Dimensions of connections (shows the inner diameter of tubing)

Unit: mm

Position	A	B	C	D	E	F	G
Size	Ø 28.58	Ø 25.4	Ø 19.05	Ø 15.88	Ø 12.7	Ø 9.52	Ø 6.35

2. Installation Site Selection

Indoor Unit

AVOID:

- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.
- direct sunlight
- locations where nearby heat sources may affect performance of the unit.
- locations where nearby external air may enter the room directly. This may cause “sweating” on the air discharge ports, causing them to spray or drip.
- locations where the remote controller will be splashed with water or affected by dampness or humidity.
- installing the remote controller behind curtains or furniture.

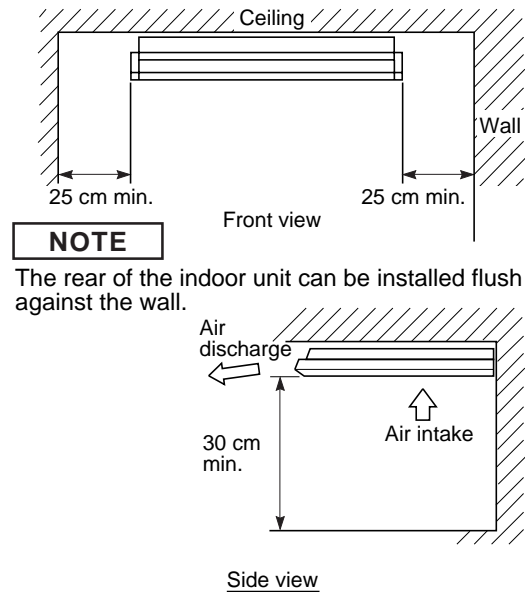
DO:

- select an appropriate position from which every corner of the room can be uniformly cooled.
- select a location where the ceiling is strong enough to support the weight of the unit.
- select a location where tubing and drain pipe have the shortest run to the outside.
- allow room for operation and maintenance as well as unrestricted air flow around the unit.
- install the unit within the maximum elevation difference (H) above or below the outdoor unit and within a total tubing length (L) from the outdoor unit as detailed in Table 1-9.
- allow room for mounting the remote controller about 1 m off the floor, in an area that is not in direct sunlight nor in the flow of cool air from the indoor unit.

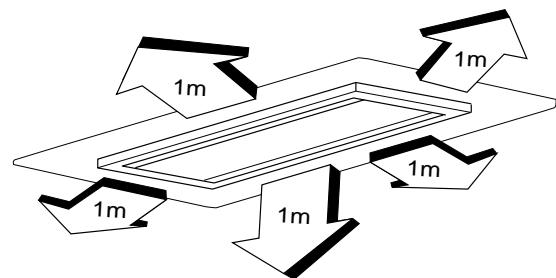
NOTE

Air delivery will be degraded if the distance from the floor to the ceiling is greater than 3 m.

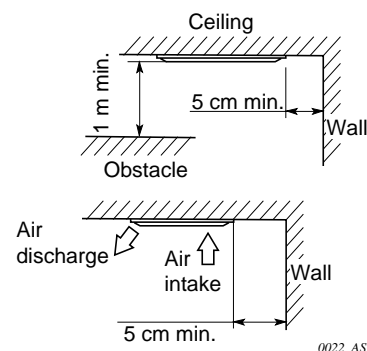
Ceiling-Mounted Type



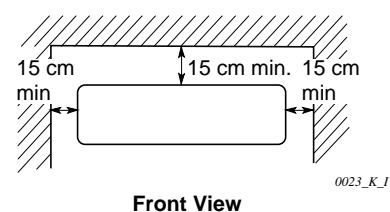
2-Way, 4-Way Semi-Concealed Type



1-Way Semi-Concealed Type



Wall-Mounted Type



Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc. (Fig. 2-1)
- damp, humid or uneven locations.

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated and outside air temperature does not exceed maximum 45 °C constantly.
- allow enough room around the unit for air intake / exhaust and possible maintenance. (Fig. 2-2)
- provide a solid base; about 15 cm above ground level to reduce humidity and possible water damage in unit and decrease service life. (Fig. 2-3)
- use lag bolts or equal to bolt down unit, reducing vibration and noise.

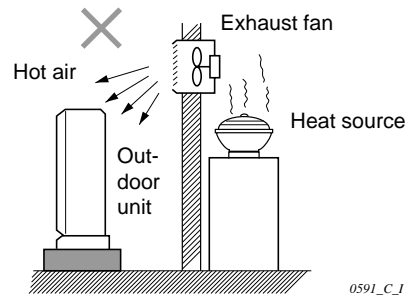


Fig. 2-1

Table 2-1 ① Dimensions

Model	Min. (cm)
25 type	10
36, 48 type	20

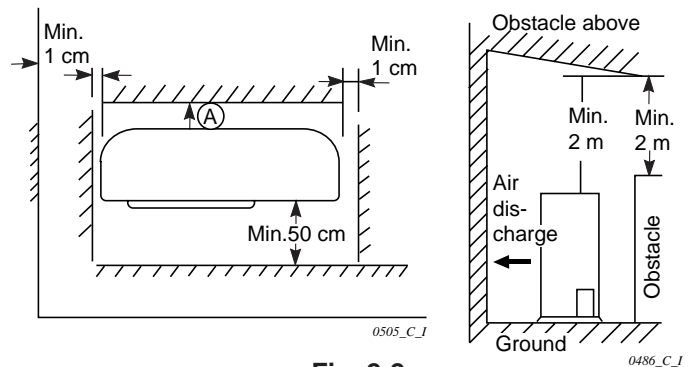
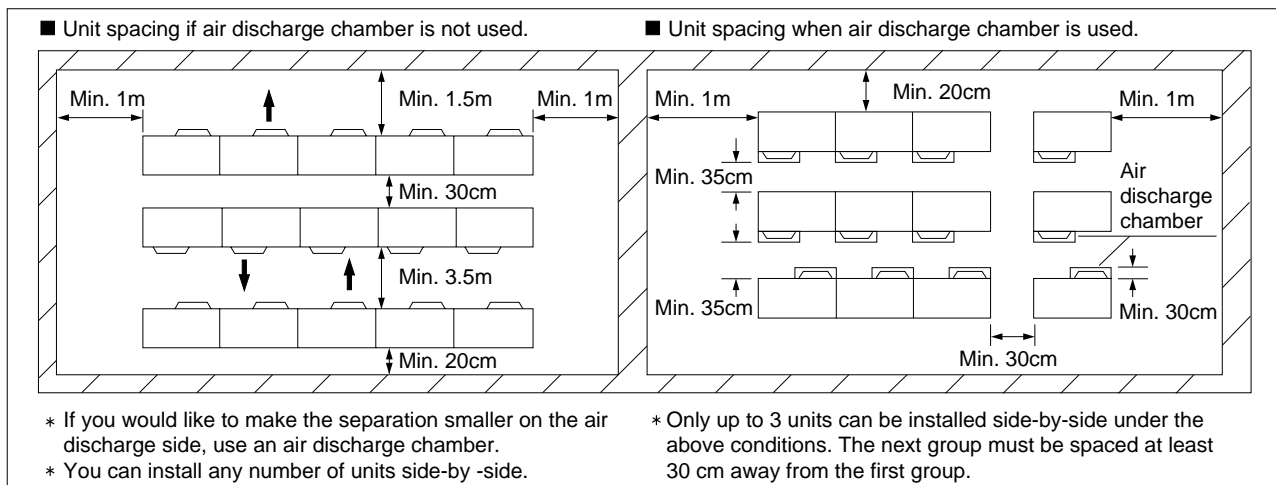


Fig. 2-2

In case of multiple installations



0424_C_1

- provide a solid base (concrete block, 10 × 40 cm beams or equal), a minimum of 15 cm above ground level to reduce humidity and protect the unit against possible water damage and decreased service life. (Fig. 2-3)
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

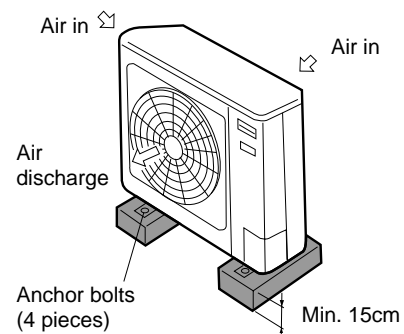


Fig. 2-3

0425_C_1

2-1. Air Discharge Chamber for Top Discharge

Be sure to install the air discharge chamber in the field when:

- it is difficult to keep a space of min. 50 cm between the air discharge outlet and the obstacle.
 - the air discharge outlet is facing to the sidewalk and discharged hot air annoys the passers.
- Refer to Fig. 2-4.

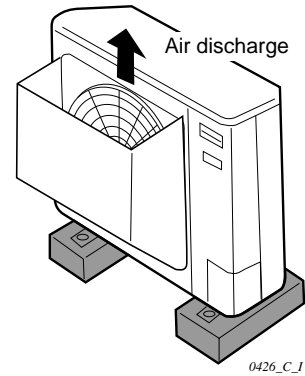


Fig. 2-4

2-2. Installing the Unit in Heavy Snow Areas

In positions with strong wind, snow-proof ducting should likewise be fitted and direct exposure to the wind should be avoided as much as possible.

Countermeasures against snow and wind in regions with snow and strong wind, the following problems may occur when the outdoor unit is not provided with a platform and snow-proof ducting.

- a) The outdoor fan may not run and damage of the unit may be caused.
- b) There may be no air flow.
- c) The tubing may freeze and burst.
- d) The condenser pressure may drop because of strong wind, and the indoor unit may freeze.

In regions with snow fall, the outdoor unit should be provided with a platform and snow-proof duct.

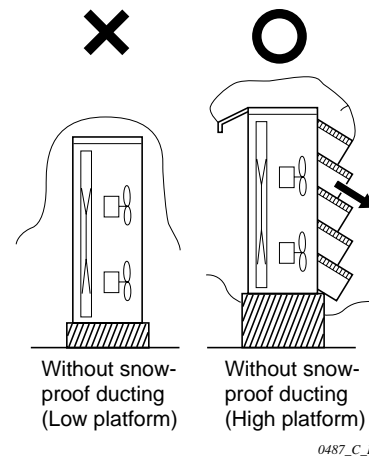


Fig. 2-5

Fig. 2-6

2-3. Precautions for Installation in Heavy Snow Areas

- (1) The platform should be higher than the max. snow depth. (Fig. 2-5)
- (2) The two fixing feet of the outdoor unit should be used for the platform, and the platform should be installed beneath the air intake side of outdoor unit.
- (3) The platform foundation must be firmer and the unit must be secured with anchor bolts.
- (4) In case of installation on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being blown over.

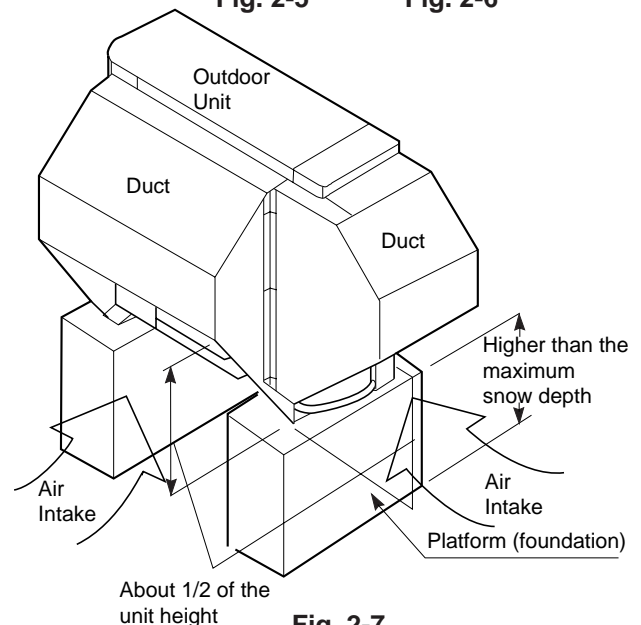
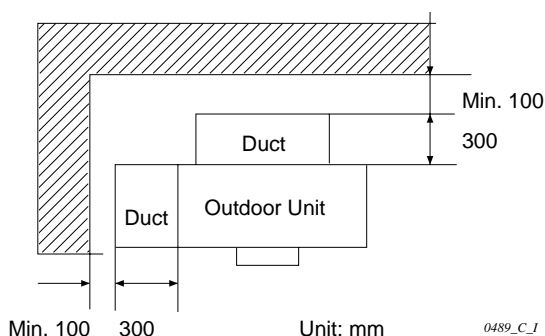
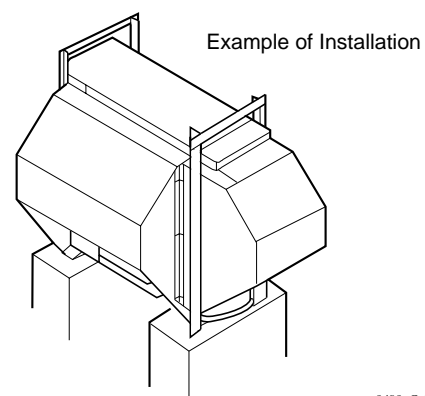


Fig. 2-7

2-4. Dimensions of Snow / Wind-proof Ducting and Refrigerant Space for Installation



0489_C_1



0490_C_1

3. How to Install the Indoor Unit

■ 1-Way Air Discharge Semi-Concealed Type

3-1. Suspending the Indoor Unit

- (1) Place the full-scale diagram (accessory) on the ceiling at the spot where you want to install the indoor unit. Use a pencil to mark the drill holes. Refer to Figs. 3-1 to 3-3.

NOTE

Since the diagram is made of paper, it may shrink or stretch slightly due to temperature or humidity. For this reason, before drilling the holes maintain the correct dimensions between the markings.

- (2) Follow the diagrams to make the holes in the ceiling. (Figs. 3-2 and 3-3)
- (3) Depending on the ceiling type:
 - Insert bolt anchors as shown in Fig. 3-4
 - or
 - Use existing ceiling supports or construct a suitable support as shown in Fig. 3-5.



WARNING

It is highly important that you use extreme care in supporting the indoor unit from the ceiling. Be sure that the ceiling is sufficiently strong to support the weight of the unit. Before hanging the unit, test the strength of each attached suspension bolt.

- (4) Cut the ceiling material, if necessary (Refer to Figs. 3-2 and 3-3).

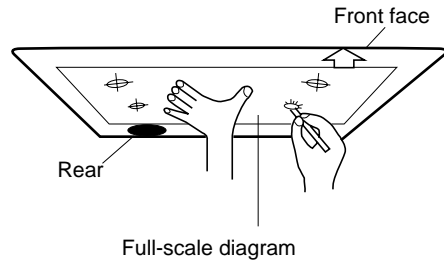


Fig. 3-1

0035_T_1

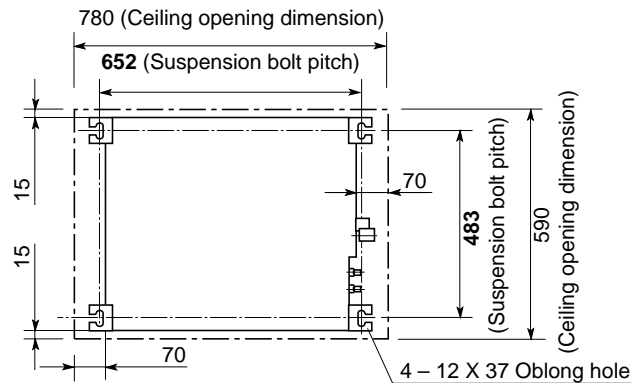


Fig. 3-2

0036_AS_1

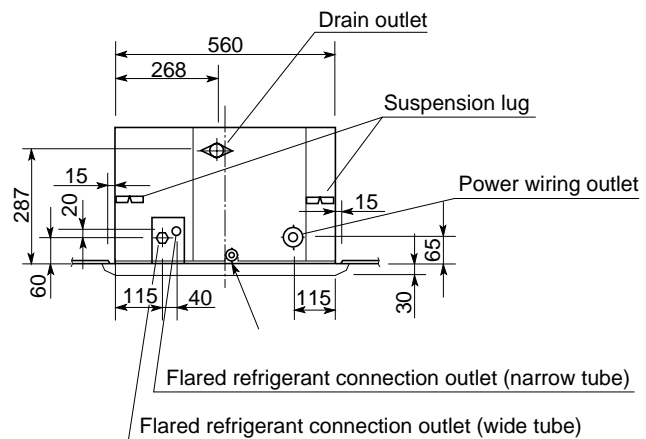


Fig. 3-3

0037_AS_1

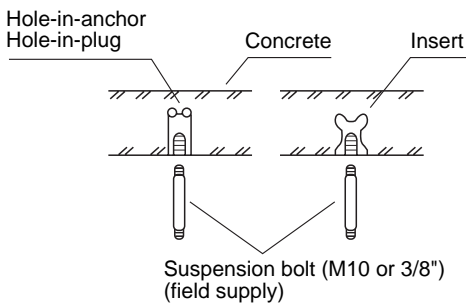


Fig. 3-4

0038_T_1

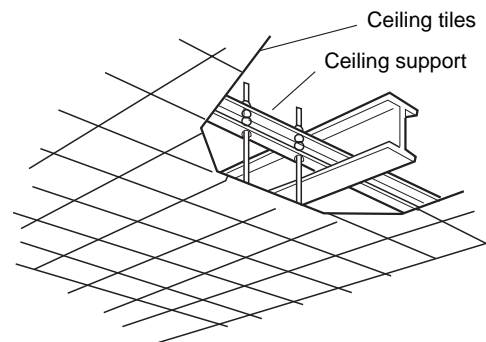


Fig. 3-5

0039_S_1

If the system requires drawing air into the unit, cut and remove the insulation material (both externally and internally) at the location shown as (A) in Fig. 3-6.



CAUTION

When making the cuts to the insulation, be careful not to damage the drain pan.

3-2. Placing the Unit Inside the Ceiling

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts using the provided full-scale installation diagram. (Fig. 3-1)
Tubing must be laid and connected inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing into position for connection to the unit before placing the unit inside the ceiling.
- (2) Thread the 2 hexagonal nuts and washers (field supply) onto the 4 suspension bolts as shown in Fig. 3-7. Be sure to use 2 sets of nuts and washers (upper and lower), otherwise the unit may fall off the suspension lugs in the event of an earthquake.
- (3) The distance between the unit and the ceiling opening, and the distance between the bottom face of the ceiling material and the bottom face of the flange of the unit should follow the dimensions given in Fig. 3-8 and 3-9.

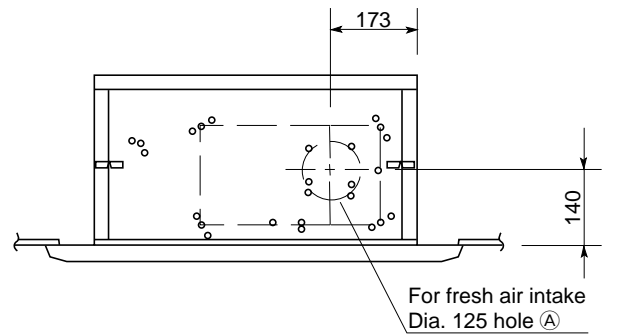


Fig. 3-6

0040_AS_1

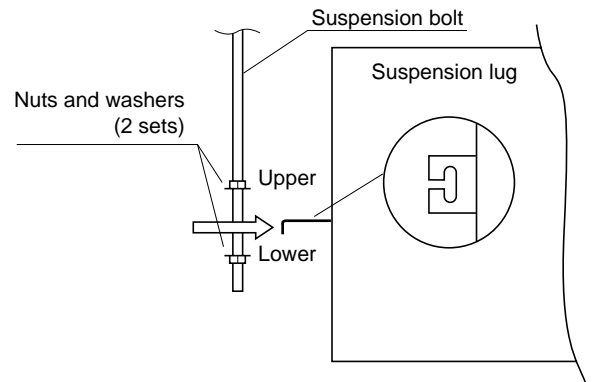


Fig. 3-7

0041_X_1

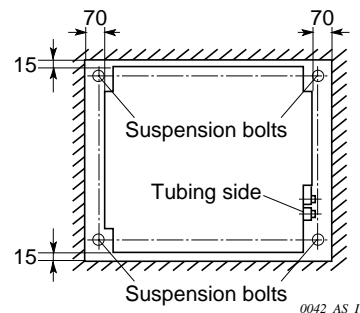


Fig. 3-8

0042_AS_1

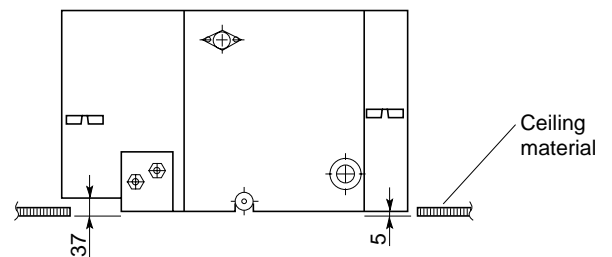


Fig. 3-9

0043_AS_1

- (4) Adjust the dimensions between the unit and the ceiling opening to give clearances of 15 mm in the front and back directions and 70 mm in the right and left directions, and so that the height between the bottom face of the flange of the unit and the bottom face of the ceiling material is 37 mm and the air intake side is 5 mm.

To check these dimensions for positioning the unit, use the accessory paper diagram which is taped on the unit body. (Fig. 3-10)

- (5) With the paper diagram, confirm all clearances as follows:
- Between each side of unit and ceiling opening:
 - 15 mm
 - 70 mm
 - Between bottom of unit flange and ceiling material:
 - 5 mm (2 corners)
 - 37 mm (2 corners)

Improper clearance will give poor mounting of the ceiling panel, which may cause condensation and dripping. (Fig. 3-10)

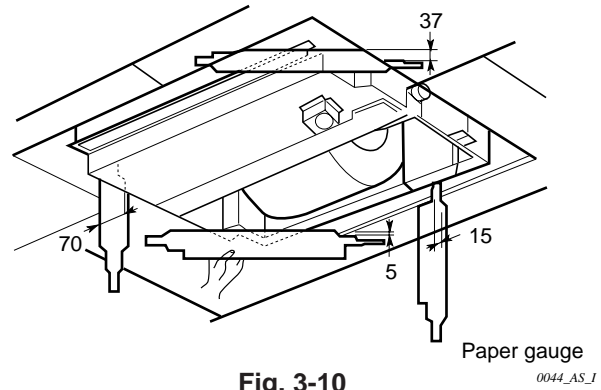


Fig. 3-10

0044_AS_I

3-3. Installing the Drain Piping

- (1) Prepare standard hard polyvinyl chloride (PVC) pipe (O.D. 32 mm) for the drain and use the accessory transparent drain pipe using the accessory drain pipe clamps to prevent water leaks.

When doing this, leave a gap between the unit's drain socket and the hard PVC pipe to allow you to check drainage. (Fig. 3-11)

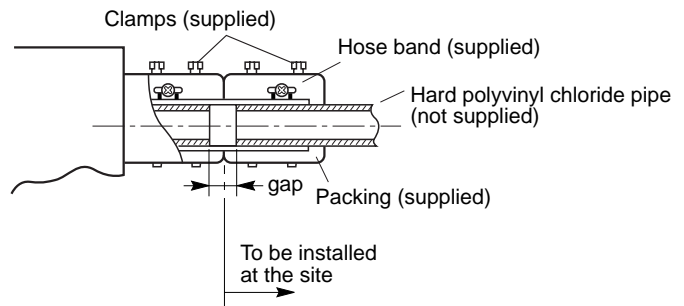


Fig. 3-11

0045_X_I



CAUTION

Tighten the hose clamps so their locking nuts face upward. (Fig. 3-11)

- (2) After checking the drainage with a drain test, wrap the accessory packing and drain pipe insulator around the pipe, then secure it with the supplied clamp. (Fig. 3-12)

NOTE

Be sure the drain pipe has a downward gradient (1 / 100 or more) and that there are no water traps.

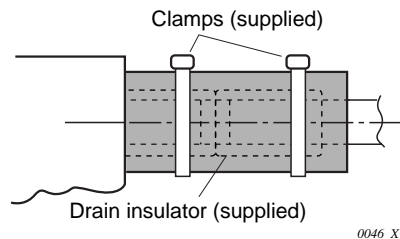


Fig. 3-12

0046_X_I



- Do not install air bleeding tubes, as this may cause water to spray from the drain tube outlet. (Fig. 3-13)
- If it is necessary to increase the height of the drain pipe somewhat, the portion directly after the connection port can be raised a maximum of 25 cm. Do not raise it any higher than 25 cm, as this could result in water leaks. (Fig. 3-14)
- Do not install pipe with an upward gradient after the connection port. It will cause the drain water to flow backwards and leak when the unit is stopped. (Fig. 3-15)
- Do not apply force to the piping on the unit side when connecting the drain pipe. The pipe should not be allowed to hang unsupported from its connection to the unit. Fasten the pipe to a wall, frame or other support as close to the unit as possible. (Fig. 3-16)
- Be sure to provide insulation for any drain tubes installed indoors.

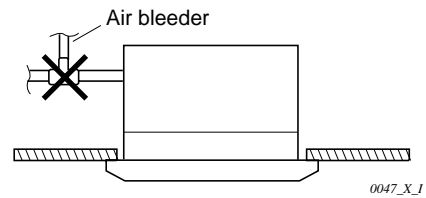


Fig. 3-13

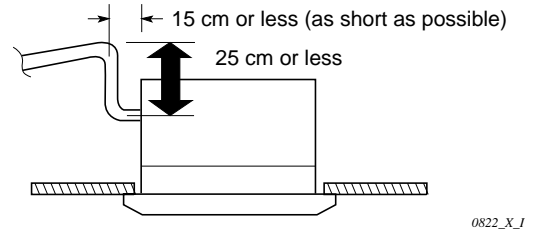


Fig. 3-14

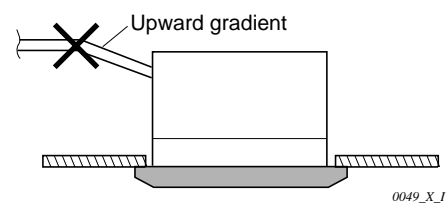


Fig. 3-15

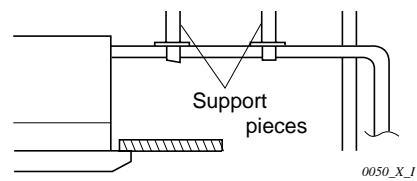


Fig. 3-16

3-4. Checking the Drainage

After wiring and piping are completed, use the following procedure to check that the water will drain properly.

For this, you should have a bucket and wiping cloth ready to catch and wipe up spilled water.

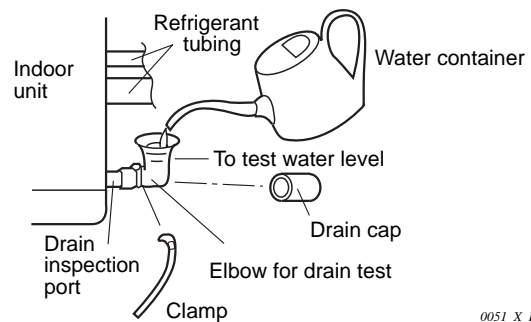
- (1) Connect power to the power terminal board (L1,L2 terminal) inside the electrical component box.
- (2) Remove the insulator and drain cap from the drain inspection port, insert the accessory elbow, and connect it using the accessory clamp (Fig. 3-17)
- (3) Pour water into the opening in the elbow up to the water test mark on the inside of the elbow. If any more water is poured in it will drain out through the hole. This prevents excess water.
- (4) Short the check pin (CN5 white) on the indoor control board and operate the drain pump. Check the water flow and see if there is any leakage.



CAUTION

Be careful since the fan will start turning when you short the pin on the indoor control board.

- (5) Drainage is normal if the water level gradually drops from the water test mark.
- (6) When drain checking is finished, open the check pin (CN5 white) and remount the insulator and drain cap onto the drain inspection port.



0051_X_I

Fig. 3-17

■ 2-Way Air Discharge Semi-Concealed Type

3-5. Suspending the Indoor Unit

- Place the full-scale diagram (accessory) on the ceiling at the spot where you want to install the indoor unit. Use a pencil to mark the drill holes. Refer to Table 3-1 and Figs. 3-18 to 3-20.

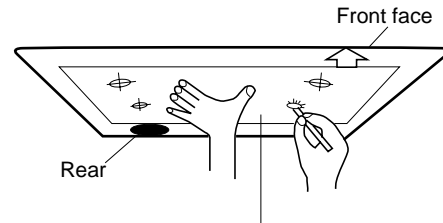
NOTE

Since the diagram is made of paper, it may shrink or stretch slightly due to temperature or humidity. For this reason, before drilling the holes maintain the correct dimensions between the markings.

- Follow the diagrams to make the holes in the ceiling.

Table 3-1

Model	A	B	C	D
9, 12 Type	960	330	1,070	640
18, 25 Type	1,240	330	1,350	640



Full-scale diagram

0035_T_I

Fig. 3-18

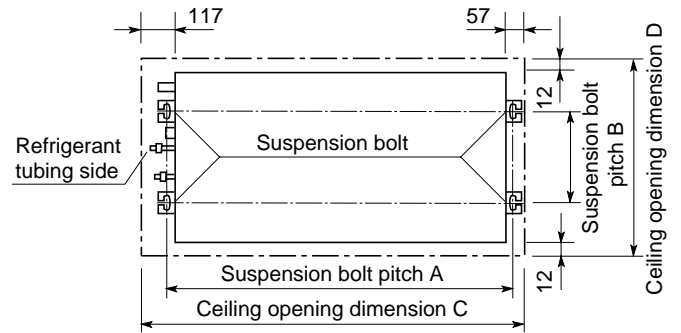


Fig. 3-19

0052_S_I

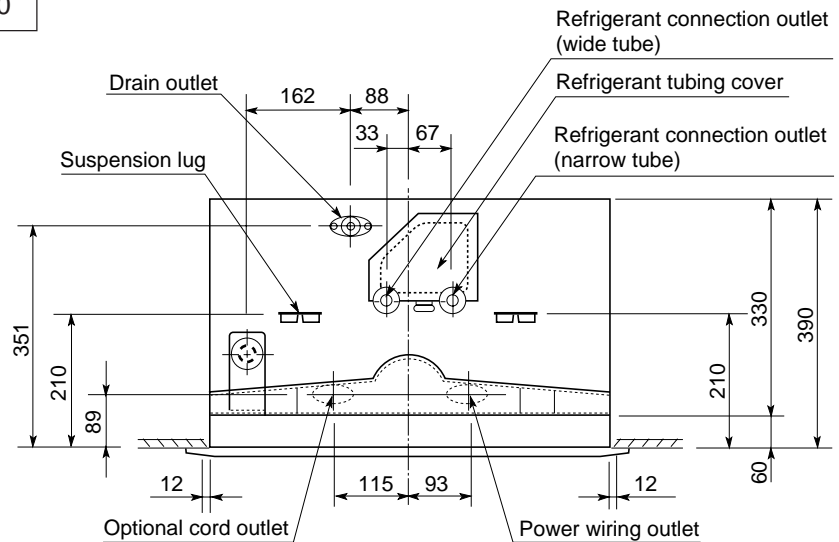


Fig. 3-20

0053_S_I

- Depending on the ceiling type:
 - Insert bolt anchors as shown in Fig. 3-21.
 - or
 - Use existing ceiling supports or construct a suitable support as shown in Fig. 3-22.



WARNING

It is highly important that you use extreme care in supporting the indoor unit from the ceiling. Be sure that the ceiling is sufficiently strong to support the weight of the unit. Before hanging the unit, test the strength of each attached suspension bolt.

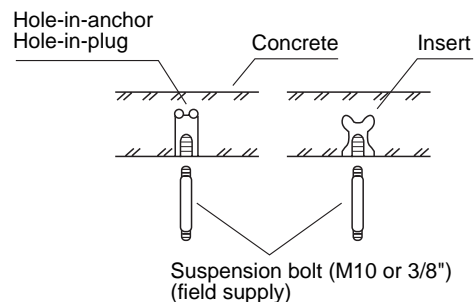


Fig. 3-21

0038_T_I

- Cut the ceiling material, if necessary (Refer to Figs. 3-19 and 3-20, and Table 3-1.).

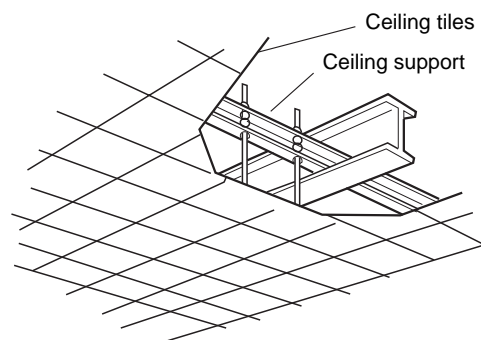


Fig. 3-22

0039_S_I

If the system requires drawing air into the unit, cut and remove the insulation material (both externally and internally) at the location shown as Ⓐ in Fig. 3-23.



CAUTION

When making the cuts to the insulation, be careful not to damage the drain pan.

3-6. Placing the Unit Inside the Ceiling

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts using the provided full-scale installation diagram. (Fig. 3-24)

Tubing must be laid and connected inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing into position for connection to the unit before placing the unit inside the ceiling.

- (2) Thread the 2 hexagonal nuts and washers (field supply) onto the 4 suspension bolts as shown in Fig. 3-25. Be sure to use 2 sets of nuts and washers (upper and lower), otherwise the unit may fall off the suspension lugs in the event of an earthquake.
- (3) Adjust the distance between the unit and the surface of the ceiling (60 mm) using the 2 hexagonal nuts as shown in Fig. 3-24. Use the accessory installation gauge to check it.

3-7. Installing the Drain Piping

- (1) Prepare standard hard polyvinyl chloride (PVC) pipe (O.D. 32 mm) for the drain and use the accessory hose band to prevent water leaks. The PVC pipe must be purchased separately.

When doing this, leave a gap between the unit's drain socket and the hard PVC pipe to allow you to check drainage. (Fig. 3-26)



CAUTION

Tighten the hose clamps so their locking nuts face upward. (Fig. 3-26)

- (2) After checking the drainage with a drain test, wrap the accessory packing and drain pipe insulator around the pipe, then secure it with the supplied clamps. (Fig. 3-27)

NOTE

Be sure the drain pipe has a downward gradient (1 / 100 or more) and that there are no water traps.

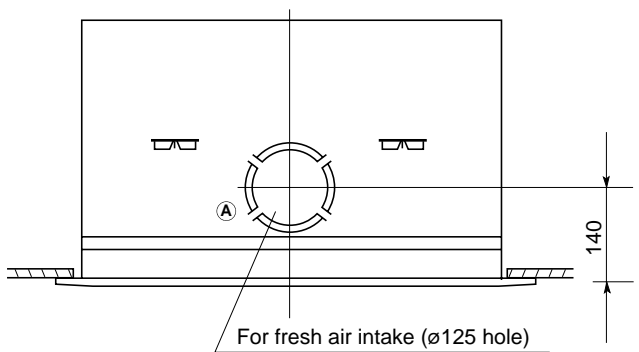


Fig. 3-23

0054_S_I

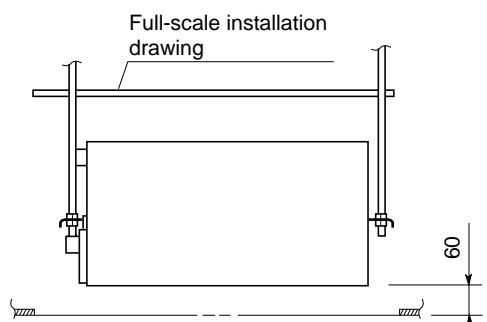


Fig. 3-24

0055_S_I

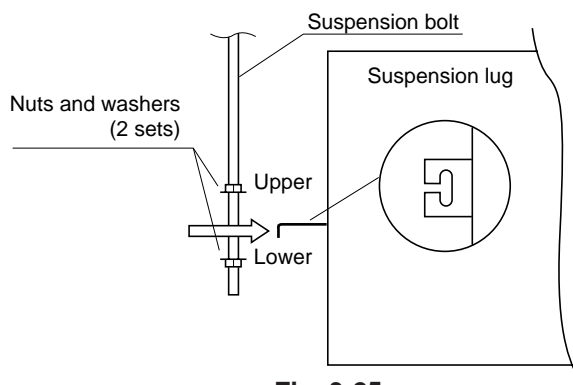


Fig. 3-25

0041_X_I

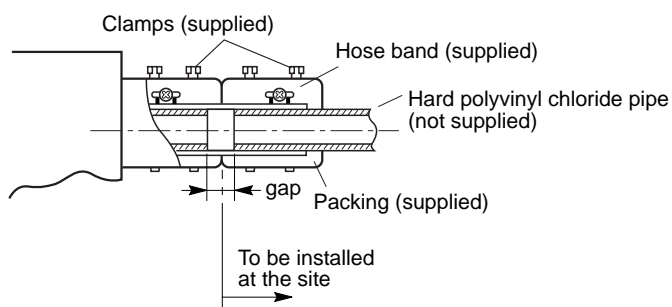


Fig. 3-26

0045_X_I

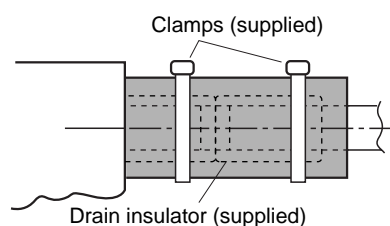


Fig. 3-27

0046_X_I



CAUTION

- Do not install air bleeding tubes, as this may cause water to spray from the drain tube outlet. (Fig. 3-28)
- If it is necessary to increase the height of the drain pipe somewhat, the portion directly after the connection port can be raised a maximum of 25 cm. Do not raise it any higher than 25 cm, as this could result in water leaks. (Fig. 3-29)
- Do not install the pipe with an upward gradient after the connection port. This will cause the drain water to flow backwards and leak when the unit is stopped. (Fig. 3-30)
- Do not apply force to the piping on the unit side when connecting the drain pipe. The pipe should not be allowed to hang unsupported from its connection to the unit. Fasten the pipe to a wall, frame or other support as close to the unit as possible. (Fig. 3-31)
- Make sure to provide insulation for any drain piping installed indoors.

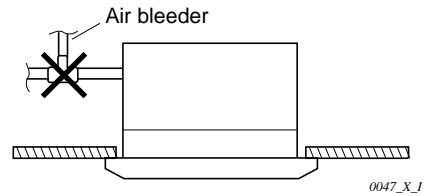


Fig. 3-28

0047_X_1

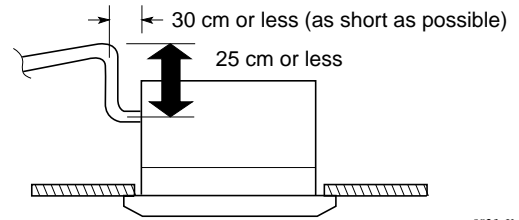


Fig. 3-29

0823_X_1

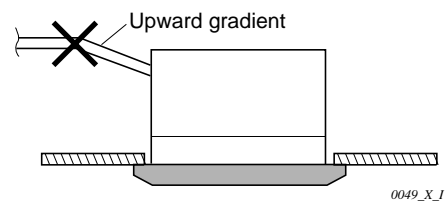


Fig. 3-30

0049_X_1

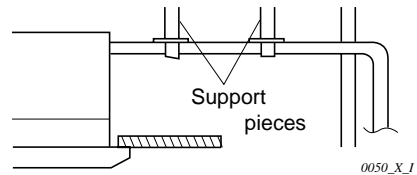


Fig. 3-31

0050_X_1

3-8. Checking the Drainage

After wiring and piping are completed, use the following procedure to check that the water will drain properly. For this, you should have a bucket and wiping cloth ready to catch and wipe up spilled water.

- (1) Connect power to the power terminal board (L1, L2 terminal) inside the electrical component box.
- (2) Take off the tube cover and from the opening, slowly pour about 1,200 cc of water into the drain pan to check drainage.
- (3) Short the check pin (CN5 white) on the indoor control main board and operate the drain pump. Check the water flow and see if there is any leakage.



CAUTION

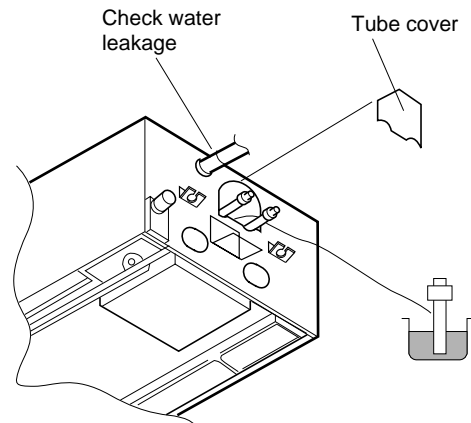
Be careful since the fan will start turning when you short the pin on the indoor control board.

- (4) When drain checking is finished, open the check pin (CN5 white) and remount the tube cover. (Fig. 3-32)



CAUTION

To mount the tube cover, use 4 × 8 tapping screws. If a long screw is used, it can make a hole in the drain pan and cause water leakage.



0056_S_1

Fig. 3-32

■ 4-Way Air Discharge Semi-Concealed Type

3-9. Suspending the Indoor Unit

This unit uses a drain pump. Use a carpenter's level to check that the unit is level.

3-10. Preparation for Suspending

- (1) Fix the suspension bolts securely in the ceiling using the method shown in the drawings (Figs. 3-33 and 3-34), by attaching them to the ceiling support structure, or by any other method that insures that the unit will be securely and safely suspended.
- (2) Follow Fig. 3-34 and Table 3-2 to make the holes in the ceiling.

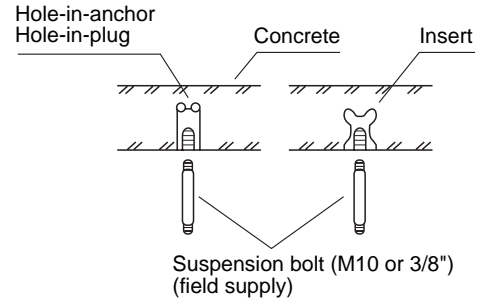


Fig. 3-33

0038_T_I

Table 3-2 Unit:mm

Model	A	B
12,18, 25 Type	820	730
36,48 Type	1110	1020

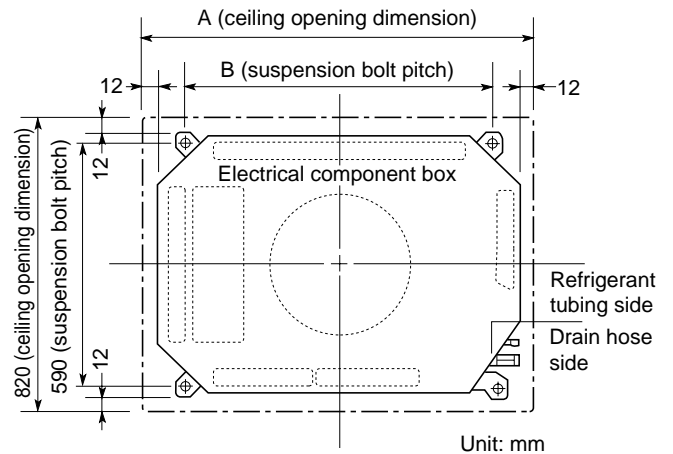


Fig. 3-34

0057_S_I

- (3) Determine the pitch of the suspension bolts using the provided full-scale installation diagram. The diagram and table (Fig. 3-35 and Table 3-3) show the relationship between the positions of the suspension fitting, the unit, and the panel.

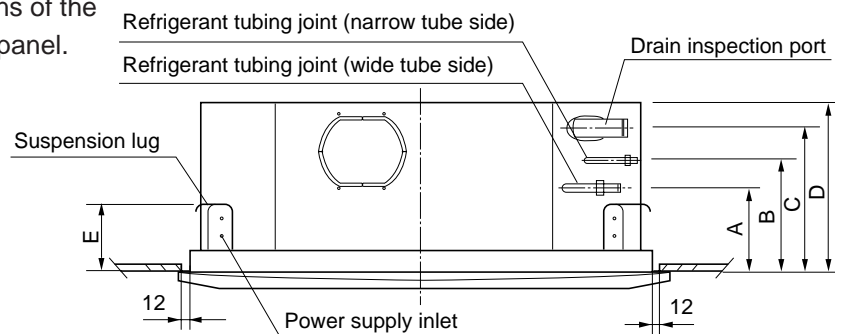


Fig. 3-35

0058_X_I

Table 3-3 Unit: mm

Model	A	B	C	D	E
12,18, 25 Type	150	200	255	298	125
36,48 Type	165	235	285	328	125

3-11. Burying Inside the Ceiling

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts using the provided full-scale installation diagram. (Fig. 3-36)

Tubing and wiring must be laid inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing and wiring into position for connection to the unit before placing the unit inside the ceiling.

- (2) The length of suspension bolt must be so that the distance between the bottom of the bolt and the bottom of the ceiling is more than 60 mm as shown in Fig. 3-36.

- (3) Thread the 2 hexagonal nuts and washers (field supply) onto the 4 suspension bolts as shown in Fig. 3-37.

Be sure to use 2 sets of nuts and washers (upper and lower), otherwise the unit may fall off the suspension lugs in the event of an earthquake.

- (4) Remove the protective cardboard used to protect the fan parts during transport.
- (5) Adjust the distance between the unit and surface of the ceiling (48 mm) using the accessory gauge. (Fig. 3-36)

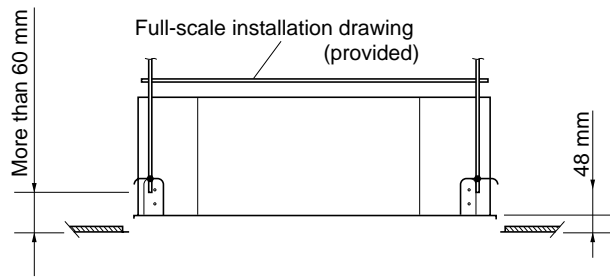


Fig. 3-36

0059_X_I

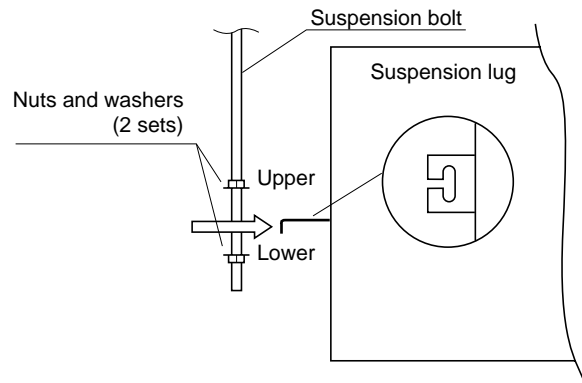


Fig. 3-37

0041_X_I

3-12. Installing the Drain Piping

- Prepare standard hard polyvinyl chloride (PVC) pipe (O.D. 32 mm) for the drain and use the accessory drain hose and hose band to prevent water leaks.

The PVC pipe must be purchased separately.

The transparent part allows you to check drainage. (Fig. 3-38)

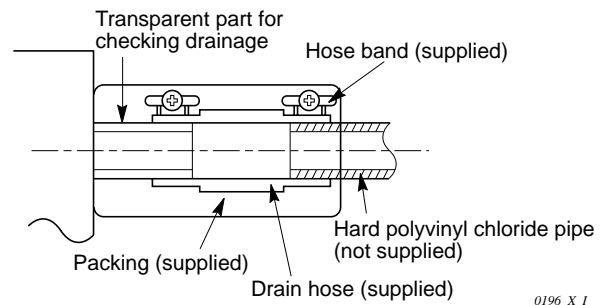


Fig. 3-38



CAUTION

Tighten the hose clamps so their locking nuts face upward. (Fig. 3-38)

- After checking the drainage with a drain test, wrap the accessory packing and drain pipe insulator around the pipe. (Fig. 3-39)

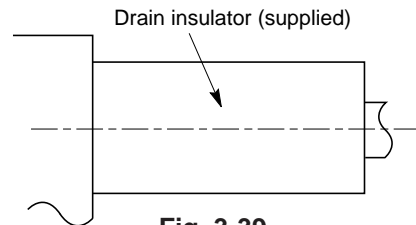


Fig. 3-39

NOTE

Be sure the drain pipe has a downward gradient (1 / 100 or more) and that there are no water traps.



CAUTION

- Do not install air bleeding tubes, as this may cause water to spray from the drain tube outlet. (Fig. 3-40)

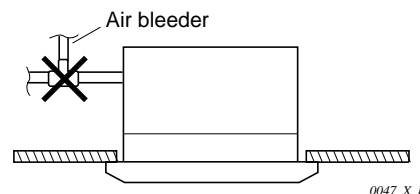


Fig. 3-40

- If it is necessary to increase the height of the drain pipe somewhat, the portion directly after the connection port can be raised a maximum of 25 cm. Do not raise it any higher than 25 cm, as this could result in water leaks. (Fig. 3-41)

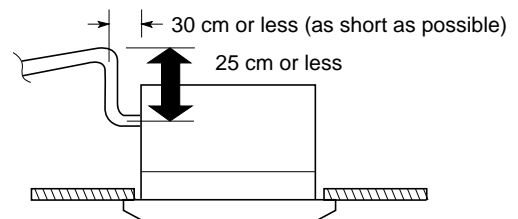


Fig. 3-41

- Do not install pipe with an upward gradient from the connection port. It will cause the drain water to flow backwards and leak when the unit is stopped. (Fig. 3-42)

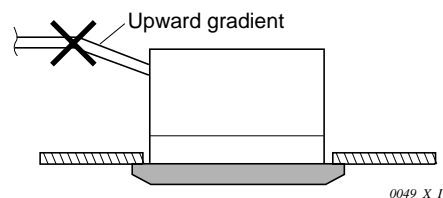


Fig. 3-42

- Do not apply force to the piping on the unit side when connecting the drain pipe. The pipe should not be allowed to hang unsupported from its connection to the unit. Fasten the pipe to a wall, frame, or other support as close to the unit as possible. (Fig. 3-43)
- Be sure to provide insulation for any drain piping installed indoors.

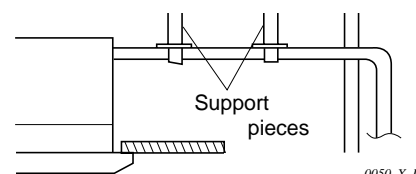


Fig. 3-43

3

X

3-13. Checking the Drainage

After wiring and piping are completed, use the following procedure to check that the water will drain properly. For this, you should have a bucket and wiping cloth ready to catch and wipe up spilled water.

- (1) Connect power to the power terminal board (L1, L2 terminal) inside the electrical component box.
- (2) Take off the tube cover and from the opening, slowly pour about 1,200 cc of water into the drain pan to check drainage.
- (3) Short the check pin (CN5 white) on the indoor control main board and operate the drain pump. Check the water flow and see if there is any leakage.

3

X



CAUTION

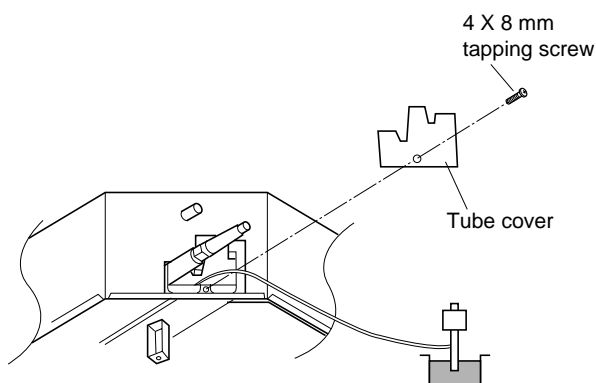
Be careful since the fan will start turning when you short the pin on the indoor control board.

- (4) When drain checking is finished, open the check pin and remount the tube cover.



CAUTION

To mount the tube cover, use 4 × 8 tapping screws. If a long screw is used, it can make a hole in the drain pan and cause water leakage.



0062_X_1

Fig. 3-44

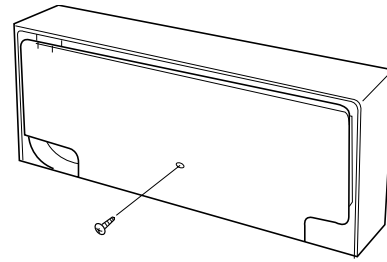
■ Wall-Mounted Type

3-14. Remove the Rear Panel from the Unit

Remove and discard the set screw and take off the rear panel. (Fig.3-45)

NOTE

Tubing can be extended in 3 directions as shown in Fig. 3-46. Select the direction you need providing the shortest run to the outside unit.



Set screw only for transportation

0063_K_I

Fig. 3-45

3-15. Make a Hole

- (1) Remove the rear panel from the indoor unit and place it on the wall at the location selected. Make sure the unit is horizontal, using a carpenter's level or tape measure to measure down from the ceiling.
- (2) Determine which side of the unit you should make the hole. (Fig. 3-47)
- (3) Before making a hole, check carefully that no studs or pipes are directly run behind the spot to be cut.

The above precautions are also applicable if tubing goes through the wall in any other location.

- (4) Using a sabre saw, key hole saw or hole-cutting drill attachment, cut a hole (dia. 80 mm) in the wall. (Fig. 3-48)
- (5) Measure the thickness of the wall from the inside edge to the outside edge and cut PVC pipe at a slight angle 6 mm shorter than the thickness of the wall. (Fig.3-49)

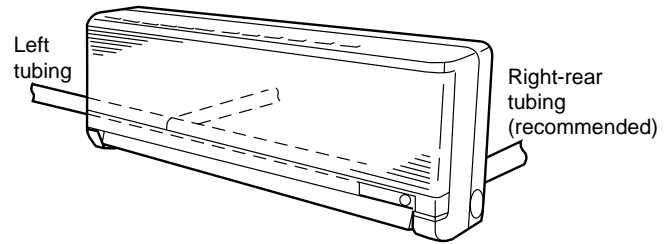
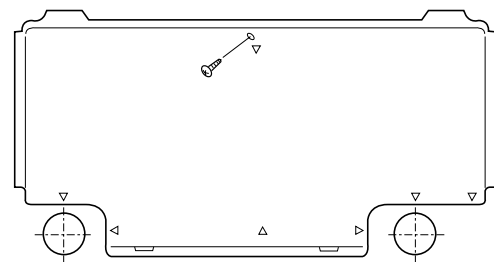


Fig. 3-46

0064_K_I



Center of left-rear tubing hole

Fig. 3-47

Center of right-rear tubing hole

0065_K_I



CAUTION

Also avoid areas where electrical wiring or conduits are located.

- (6) Place the plastic cover over the end of the pipe. (for indoor side only) and insert in the wall. (Fig. 3-50)

NOTE

Hole should be made at a slight downward slant to the outdoor side.

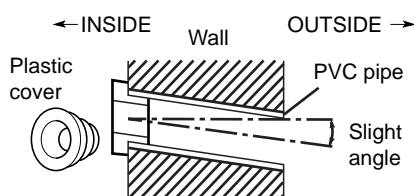


Fig. 3-50

0067_K_I

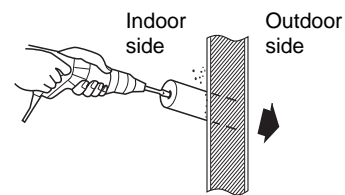
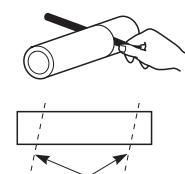


Fig. 3-48

0066_T_I

PVC pipe (locally purchased)



Cut at slight angle

Fig. 3-49

0069_T_I

4
K

3-16. Install the Rear Panel on the Wall

Be sure to confirm that the wall is strong enough to suspend the unit.

See either Item a) or b) below depending on the wall type.

a) If Wooden Wall

(1) Attach the rear panel to the wall with the 8 screws provided. (Fig. 3-51)

If you are not able to line up the holes in the rear panel with the beam locations marked on the wall, use Rawl plugs or toggle bolts to go through the holes on the panel or drill 5 mm dia. holes in the panel over the stud locations and then mount the rear panel.

(2) Double check with a tape measure or carpenter's level that the panel is level. This is important to install the unit properly. (Fig. 3-52)

(3) Make sure the panel is flush against the wall. Any space between the wall and unit will cause noise and vibration.

b) If Block, Brick, Concrete or Similar Type Wall

Make 4.8 mm dia. holes in the wall. Insert Rawl plugs for appropriate mounting screws. (Fig. 3-53)

3-17. Remove the Grille to Install the Indoor Unit



CAUTION

For clamping the air deflector blades during transportation, a protective gasket was mounted at the air outlet of the air conditioner. Be sure to remove and discard the gasket before installation. (Fig. 3-54)

Before wiring, you should remove the grille as follows:

How to remove the grille

- (1) Set the flap in the horizontal position.
- (2) Unscrew the screws. (Fig. 3-55)
- (3) Remove the grille.

NOTE

When replacing the grille, push the grille at the mark (▲) shown as Fig. 3-56 until the grille clicks back into place.

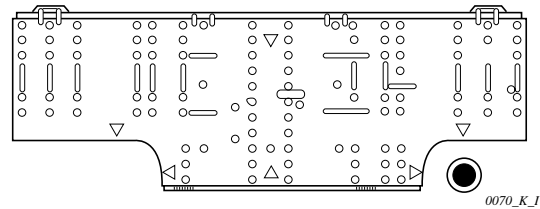


Fig. 3-51

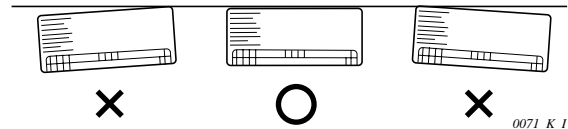


Fig. 3-52

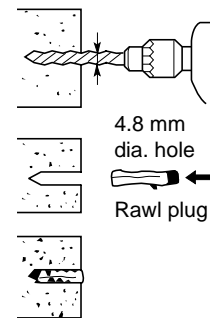


Fig. 3-53

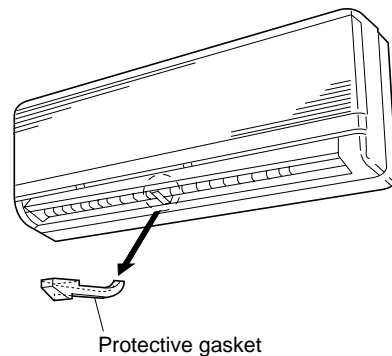


Fig. 3-54

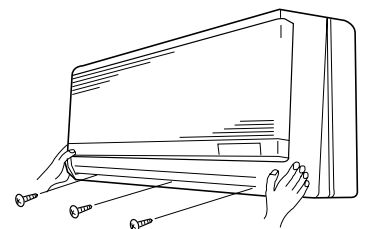


Fig. 3-55

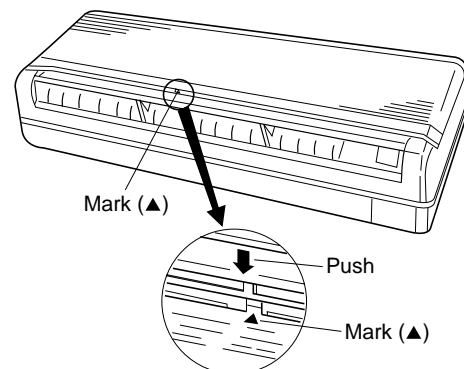


Fig. 3-56

3-18. Shape the Indoor Side Tubing

- (1) Arrangement of tubing by directions
 - a) Left tubing

The corners of left frames need to be cut by a hacksaw or the like. (Fig. 3-57)
 - b) Right-rear or left-rear tubing

In this case, the corners of the frame need not to be cut.
- (2) To mount the indoor unit on the rear panel:

Hang the 2 tabs of the unit on the upper notches of the rear panel. (Fig. 3-58)

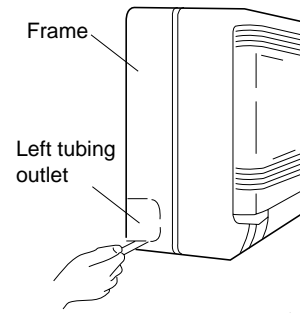


Fig. 3-57 0076_K_I

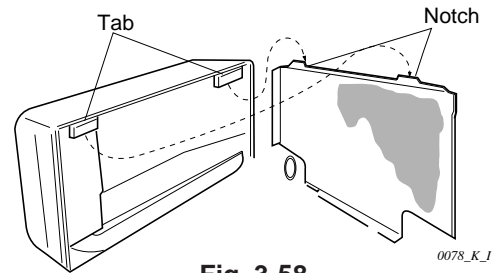


Fig. 3-58 0078_K_I

3-19. Mounting

- (1) Shape the refrigerant tubing so that it can easily go into the wall hole. (Fig. 3-59)
- (2) Push the wiring, refrigerant tubing and drain hose through the hole in the wall. Adjust the indoor unit so it is securely seated on the rear panel.
- (3) Carefully bend the tubing (if necessary) to run along the wall in the direction of the outdoor unit and then tape as far as the fittings. The drain hose should come straight down the wall to a point where water runoff won't stain the wall.
- (4) Connect the refrigerant tubing to the outdoor unit. (After performing a leak test on the connecting part, insulate it with the tubing insulation. (Fig. 3-60)) Also, refer to section 8-3. Connecting Tubing between Indoor and Outdoor Units.
- (5) Assemble the refrigerant tubing, drain hose, and inter-unit wiring as shown in (Fig. 3-61).

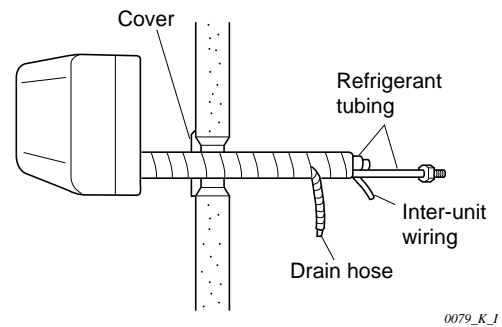


Fig. 3-59 0079_K_I

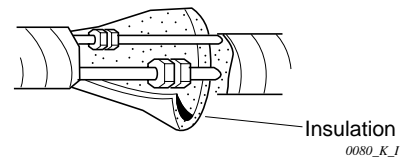


Fig. 3-60 0080_K_I

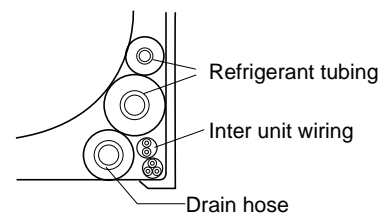


Fig. 3-61 0081_K_I



3-20. Installing the Drain Hose

- a) The drain hose should be slanted downward to the outdoors. (Fig. 3-62)
- b) Never from a trap in the course of the hose.
- c) If the drain hose will run in the room, insulate the hose with insulation* so that chilled condensation will not damage furniture or floors. (Fig. 3-63)

* Foamed polyethylene or its equivalent is recommended.



WARNING

Do not supply power to the unit or operate it until all tubing and wiring to the outside unit are completed.

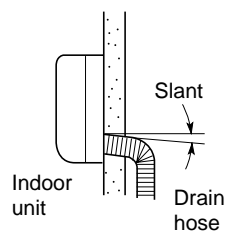


Fig. 3-62

0082_K_I

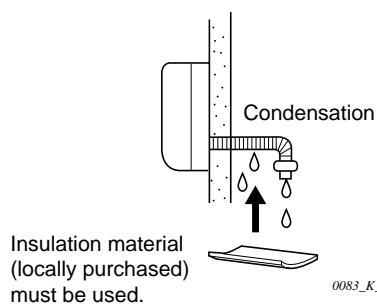


Fig. 3-63

0083_K_I

4

K

■ Ceiling-Mounted Type

3-21. Suspending the Indoor Unit

- (1) Place the full-scale diagram (accessory) on the ceiling at the spot where you want to install the indoor unit. Use a pencil to mark the drill holes. (Fig. 3-64).

NOTE

Since the diagram is made of paper, it may shrink or stretch slightly due to temperature or humidity. For this reason, before drilling the holes maintain the correct dimensions between the markings.

- (2) Drill holes at the 4 points indicated on the full-scale diagram.
- (3) Depending on the ceiling type:
 - a) Insert bolt anchors as shown in Fig. 3-65.
 - or
 - b) Use existing ceiling supports or construct a suitable support as shown in Fig. 3-66.



WARNING

It is highly important that you use extreme care in supporting the indoor unit from the ceiling. Be sure that the ceiling is sufficiently strong to support the weight of the unit. Before hanging the ceiling unit, test the strength of each attached suspension bolt.

- (4) Screw in the suspension bolts, allowing them to protrude from the ceiling as shown in Fig. 3-66. Distance "A" of each exposed bolt must be of equal length.
- (5) Before suspending the indoor unit, remove its air intake grille and service cover. (Fig. 3-67)
- (6) Suspend the indoor unit as follows:
 - a) Temporarily mount the accessory toggle wing nuts at diagonal locations (Fig. 3-68) on the suspension bolts.

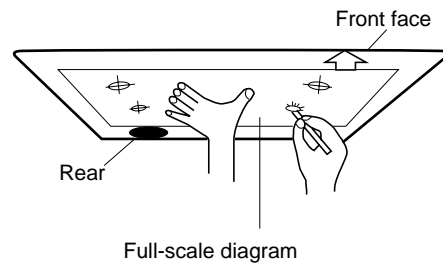


Fig. 3-64

0035_T_I

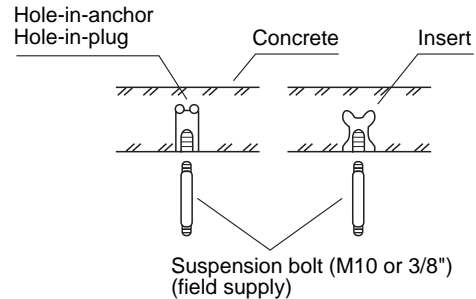


Fig. 3-65

0038_T_I

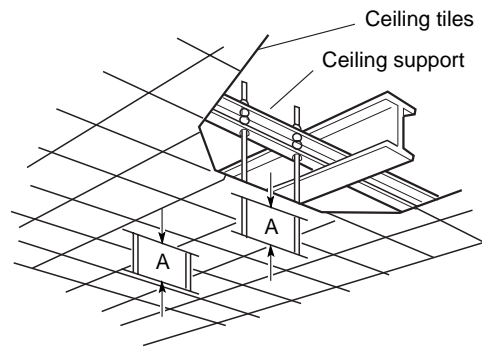


Fig. 3-66

0084_T_I

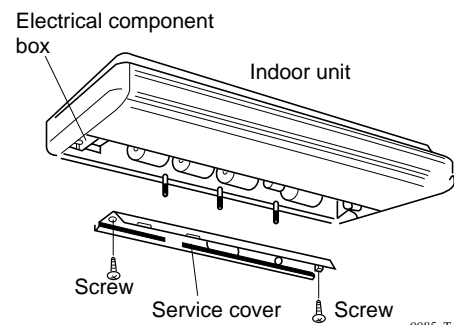


Fig. 3-67

0085_T_I

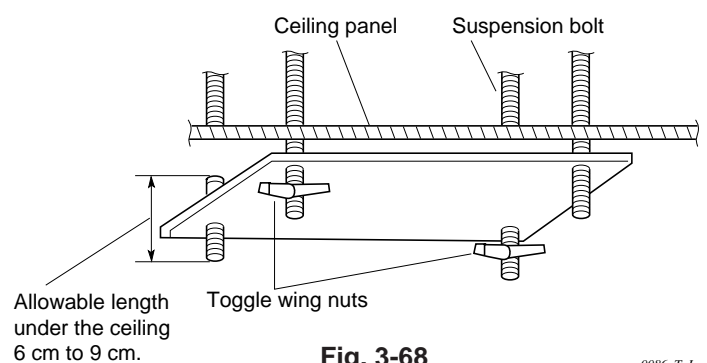


Fig. 3-68

0086_T_I



When using toggle wing nuts

- The 2 toggle wing nuts are used as temporary measure when suspending the unit. You must observe the tolerances shown at right. The unit cannot be installed correctly if more than 5 mm clearance is given between the end of the suspension bolt and the bottom of the toggle wing nut as noted in the illustration. (Fig.3-69)
- After suspending the unit to the correct level, the toggle wing nuts must be removed and permanently replaced with the supplied special washers and hex nuts.
 - b) Lift the indoor unit and position it so that the toggle wing nuts (mounted diagonally as shown in Fig. 3-70) slip through the unit's suspension holes. The wings will pop out and the unit is temporarily secured.
 - c) Check that no wiring is caught or crushed between the toggle wing nuts and the indoor unit. Then attach the 2 sets of special washers and hex nuts to the remaining 2 suspension bolts. Thread on the hex nuts enough so that the weight of the unit is removed from the 2 temporary toggle wing nuts.
 - d) Remove and replace the 2 toggle wing nuts with the remaining 2 sets of special washers and hex nuts. Use only 1 hex nut for each bolt until final adjustment (next step).
 - e) Adjust all 4 sets of washers and hex nuts so that the indoor unit is levelly suspended.
 - f) Finish the suspension by adding 1 additional hex nut to each suspension bolt. Tighten these nuts tightly to prevent the upper nuts from loosening. (Fig. 3-70)

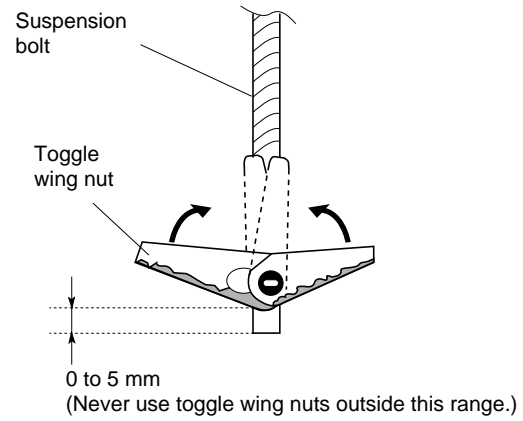


Fig. 3-69

0087_T_I

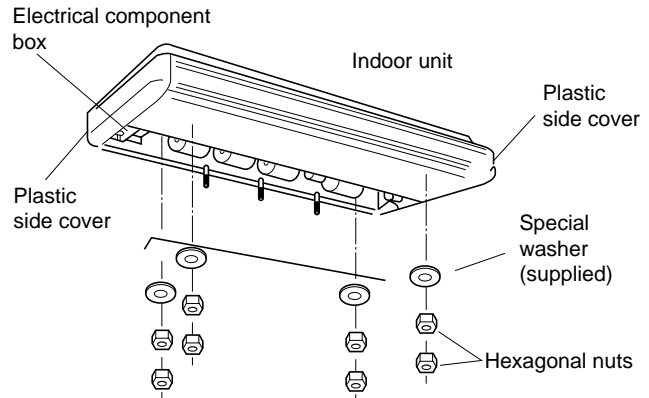
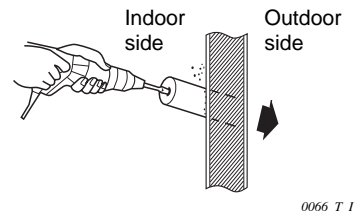


Fig. 3-70

0088_T_I

NOTE

The hole should be made at a slight downward slant to the outside.



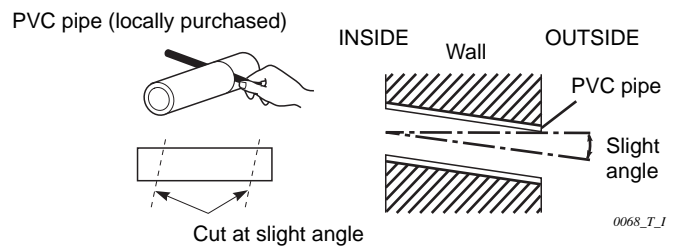
0066_T_I

Fig. 3-71

NOTE

The ceiling face is not always level. So that the installation looks good, leave a clearance of 1 cm between the ceiling panel and the ceiling face and fill the gap with an appropriate insulation or filler material.

- (7) If the tubing and wiring are to go directly out the back of the unit, make holes in the wall. (Fig. 3-71)
- (8) Measure the thickness of the wall from the inside edge of the outside edge and cut PVC pipe at a slight angle to fit. Insert the PVC pipe in the wall. (Fig. 3-72)



0069_T_I

Fig. 3-72

0068_T_I

3-22. Partial Flush Mounting

- (1) When the indoor unit is to be partially flush mounted onto the ceiling, place the full-scale diagram (supplied) to make holes for the suspension bolts.
(Fig.3-73)

NOTE

You must embed the suspension bolts in the ceiling if it is made of concrete or a similar hard material. Make sure the ceiling is strong enough to suspend the indoor unit.

- (2) If a construction beam (or beams) is to be used to suspend the indoor unit, firmly secure the suspension bolts to the construction beam(s) and use the full-scale diagram to reconfirm the bolt mounting positions. (Fig. 3-74)
- (3) Place insulation (thickness: 10 mm min.) around the embedded part of the indoor unit to prevent dripping from the ceiling. (Fig. 3-75)
- (4) For the rest of the suspension procedure, refer to steps (1) to (5) of section 3-21. Suspending the Indoor Unit.
- (5) Adjust the double hex nuts to level the unit. Afterward, tighten the second hex nut of each pair to permanently secure the unit.

NOTE

In some cases the ceiling may not be consistently level, leaving gaps between the indoor unit and the ceiling face. This can allow the entrance of humid air into the room, and thus degrade the air conditioner's performance. To prevent this, leave a clearance of 1 cm between the ceiling face and the indoor unit and fill the gap with an appropriate insulation or filler material. (Figs. 3-75 and 3-76)

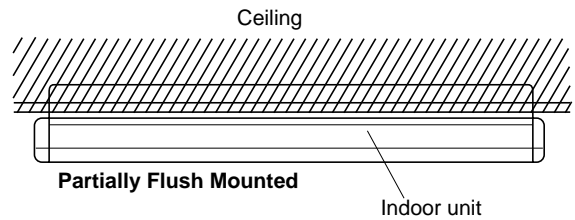


Fig. 3-73

0089_T_I

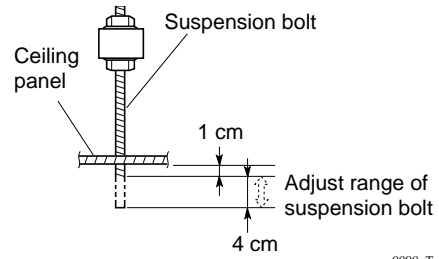


Fig. 3-74

0090_T_I

NOTE

The lower end of the suspension bolt should be within the indicated adjusted range. (Fig. 3-74)

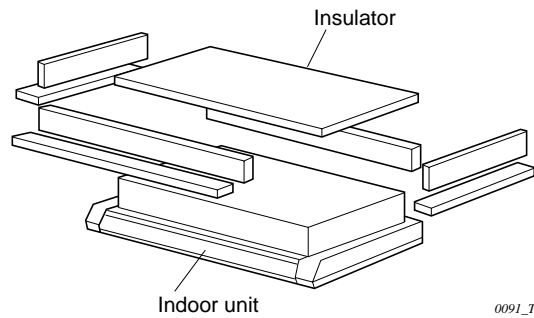


Fig. 3-75

0091_T_I

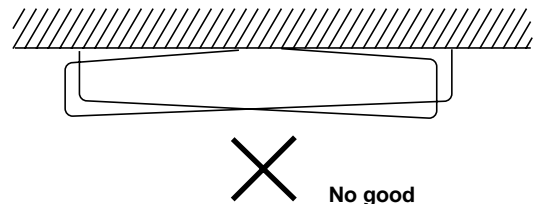
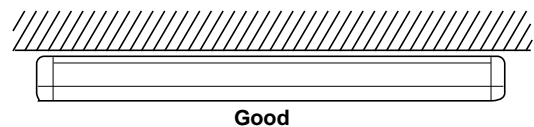


Fig. 3-76

0092_T_I



3-23. When Suspended Away from the Ceiling

Follow the procedure given below if the indoor unit is to be suspended some distance from the ceiling surface.

- (1) Follow step (1) to (5) of section 3-21 to affix the suspension bolts and adjust the double hex nuts (1) in advance to suspend the indoor unit. (Fig. 3-77)
- (2) Suspend the indoor unit according to step (6) of Section 3-21.
- (3) Attach mounting brackets (4 pcs / field supply) to the suspension bolts and secure each with double hex nuts as shown in Fig. 3-77 and 3-78.

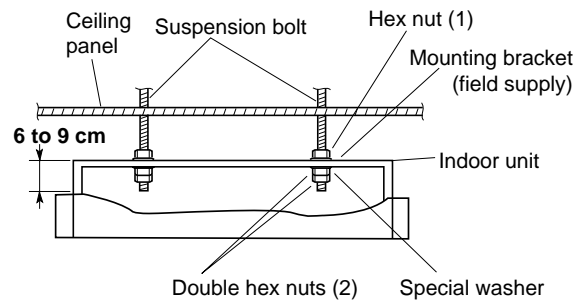


Fig. 3-77

0093_T_I

3-24. Installing the Drain Piping

- Prepare standard PVC pipe (O.D. 26 mm) for the drain and connect it to the indoor unit drain pipe with the supplied hose clamps to prevent water leaks.
- Connect the drain piping so that it slopes downward from the unit to the outside. (Fig. 3-79)
- Never allow traps to occur in the course of the piping.
- Be sure to insulate any piping inside the room to prevent dripping.
- Use the supplied drain pipe to connect the drain pipe with the indoor unit's drain outlet.
- After connecting the drain pipe securely, wrap the accessory drain pipe insulator around the pipe, seal the gap at the drain socket with the supplied black insulation tape, then secure it with clamps.
- After finishing the drain piping, pour water into the drain pan to check that the water drains smoothly.

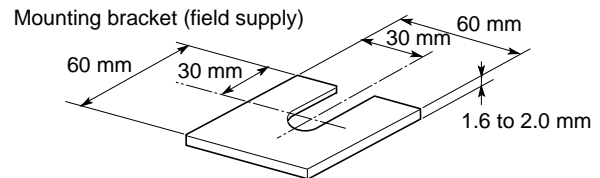


Fig. 3-78

0094_T_I

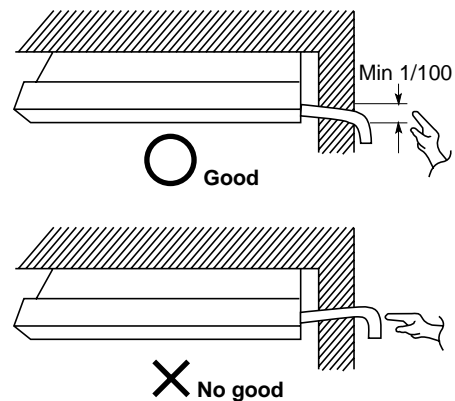


Fig. 3-79

0095_T_I



CAUTION

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

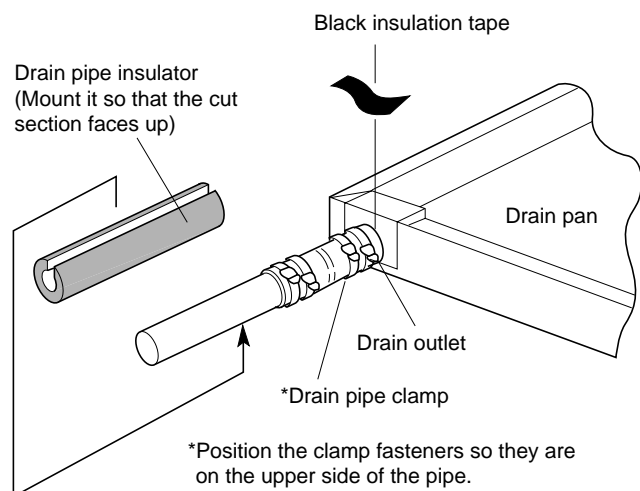


Fig. 3-80

0097_T_I

■ Concealed Duct Type

3-25. Required Minimum Space for Installation and Service

- This air conditioner is usually installed above the ceiling so that the indoor unit and ducts are not visible. Only the air intake and air outlet ports are visible from below.
- The minimum space for installation and service is shown in Fig. 3-81 and Table 3-4.
- It is recommended to provide inspection access (450 × 450 mm) for checking and servicing the electrical system.
- Fig. 3-82 and Table 3-5 show the detailed dimensions of the indoor unit.

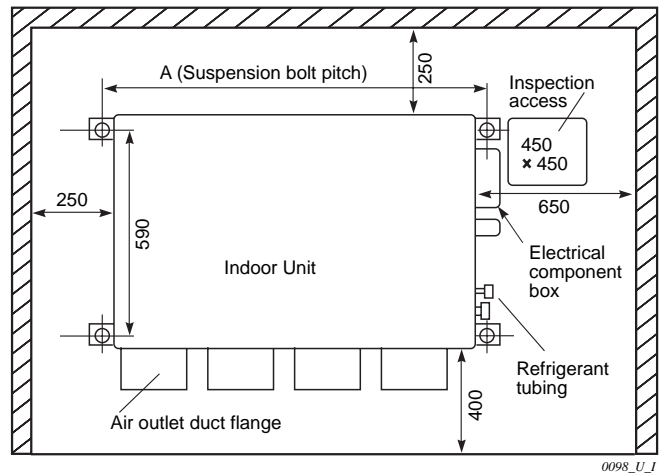


Fig. 3-81

Table 3-4

Model	12, 18 Type	25 Type	36, 48 Type
Dimension			
A	830	1,130	1,560
Number of duct flanges	2	3	4

Table 3-5

Dimension	A	B	C	D	E	F	G	H	I
Model									
12, 18 Type	692	900 (150 × 4)	46	280	310	750	830	220	35
25 Type	992	900 (150 × 6)	46	290	310	1,050	1,130	240	45
36, 48 Type	1,422	1,350 (150 × 9)	36	335	315	1,480	1,560	280	60

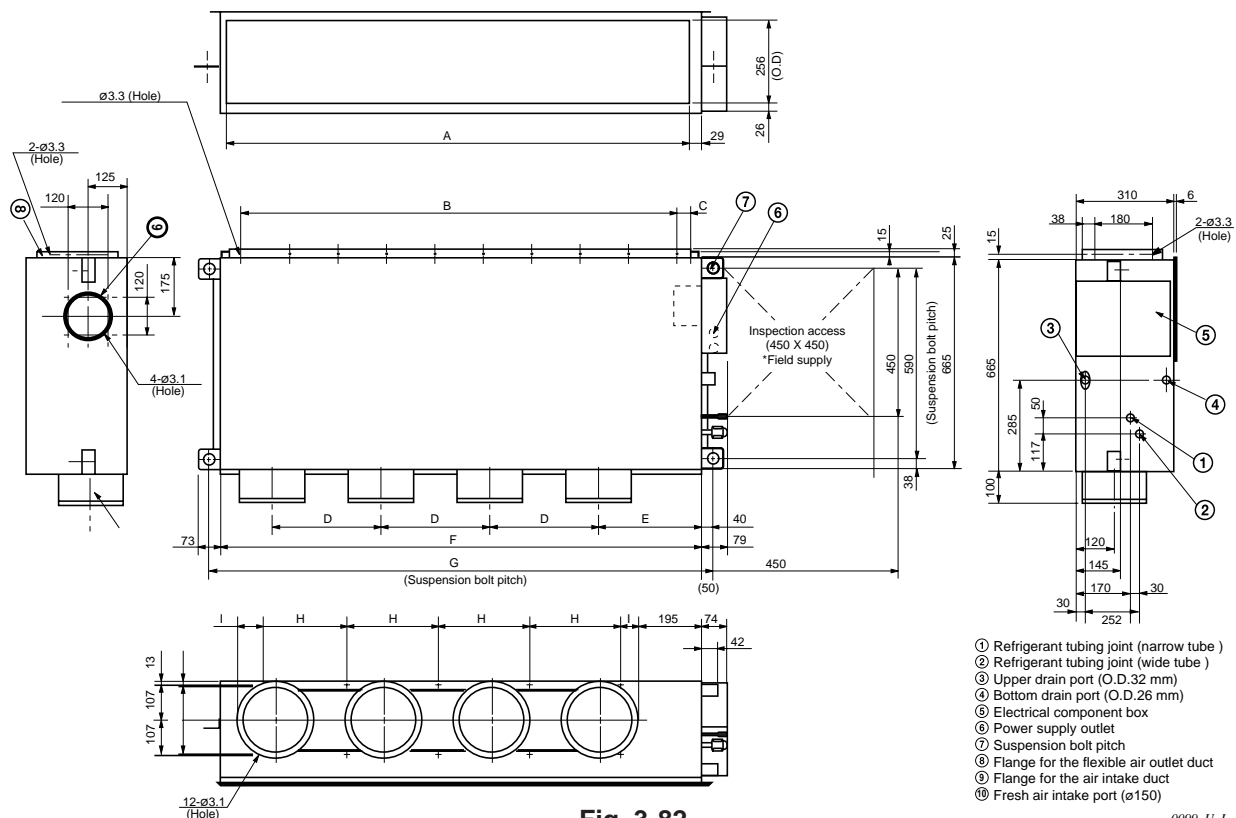


Fig. 3-82

0099_U_1

3-26. Suspending the Indoor Unit

Depending on the ceiling type:

- Insert bolt anchors as shown in Fig. 3-83 or
- Use existing ceiling supports or construct a suitable support as shown in Fig. 3-84.



WARNING

It is highly important that you use extreme care in supporting the indoor unit inside the ceiling. Be sure that the ceiling is sufficiently strong to accept the weight of the unit. Before hanging the unit, test the strength of each attached suspension bolt.

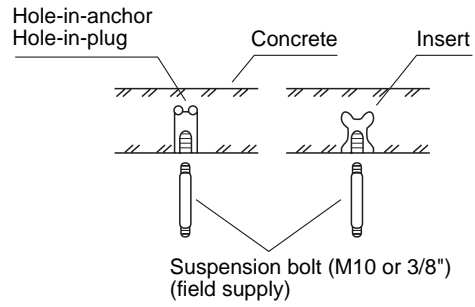


Fig. 3-83

0038_T_I

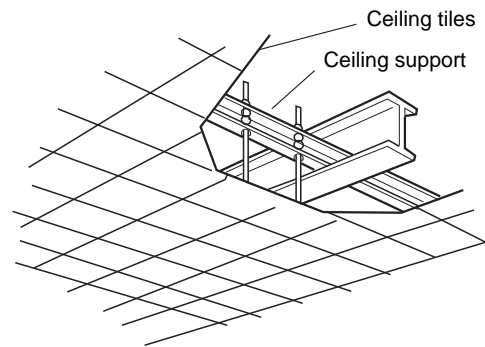


Fig. 3-84

0039_S_I

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts referring to the dimensional data on the previous page. (Fig. 3-82)

Tubing must be laid and connected inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing into position for connection to the unit before placing the unit inside the ceiling.

- (2) Screw in the suspension bolts allowing them to protrude from the ceiling as shown in Fig. 3-83. (Cut the ceiling material, if necessary.)
- (3) Thread the 2 hexagonal nuts and washers (field supply) onto the 4 suspension bolts as shown in Figs. 3-85 and 3-86. Be sure to use 2 sets of nuts and washer, otherwise the unit may fall off suspension lugs in the event of an earthquake.

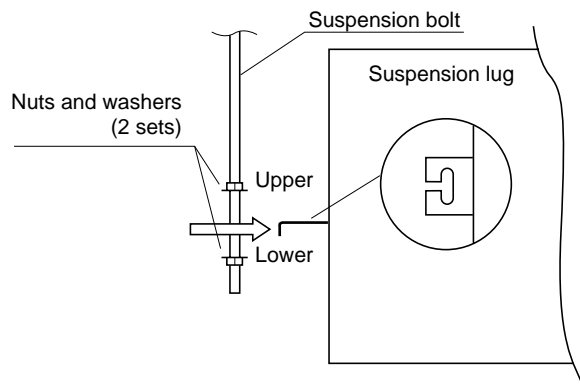


Fig. 3-85

0041_X_I

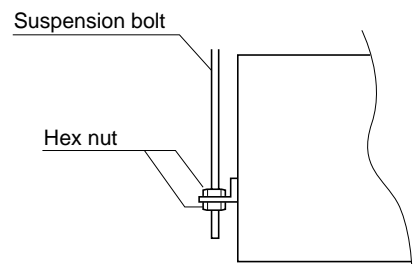


Fig. 3-86

0100_U_I

- Fig. 3-87 shows an example of installation.

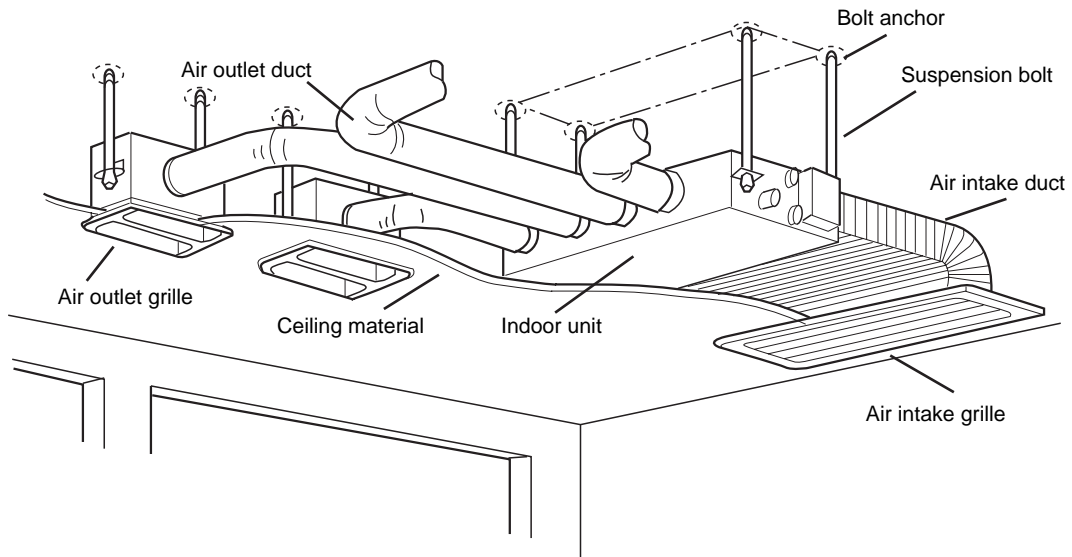


Fig. 3-87

0101_U_1

3-27. Installing the Drain Piping

- (1) Prepare standard hard polyvinyl chloride (PVC) pipe (O.D. 32 mm) for the drain and use the accessory hose band to prevent water leaks. The PVC pipe must be purchased separately.

When doing this, leave a gap between the unit's drain socket and the hard PVC pipe to allow you to check drainage. (Fig. 3-88)

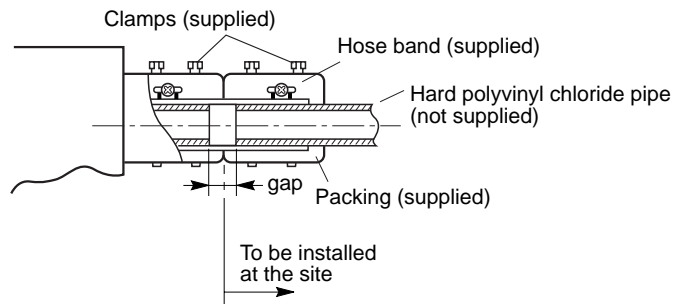


Fig. 3-88

0045_X_1



CAUTION

Tighten the hose clamps so their locking nuts face upward. (Fig. 3-88)

- (2) After connecting the drain pipe securely, wrap the accessory packing and drain pipe insulator around the pipe, then secure it with the supplied clamps. (Fig. 3-89)

NOTE

Be sure the drain pipe has a downward gradient (1 / 100 or more) and that there are no water traps.

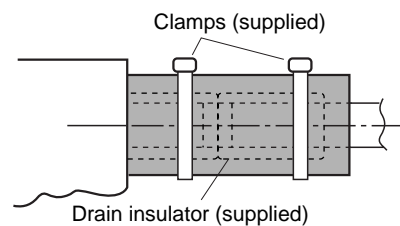


Fig. 3-89

0046_X_1



CAUTION

- Do not install air bleeding tubes, as this may cause water to spray from the drain tube outlet. (Fig. 3-90)
- If it is necessary to increase the height of the drain pipe somewhat, the portion directly after the connection port can be raised a maximum of 25 cm. Do not raise it any higher than 25 cm, as this could result in water leaks. (Fig. 3-91)
- Do not give the pipe an upward gradient after the connection port. This will cause water to flow backwards when the unit is stopped, resulting in water leaks. (Fig. 3-92)
- Do not apply force to the piping on the unit side when connecting the drain pipe. The pipe should not be allowed to hang loose from its connection to the unit. Fasten the pipe to a wall, frame or other support as close to the unit as possible. (Fig. 3-93)

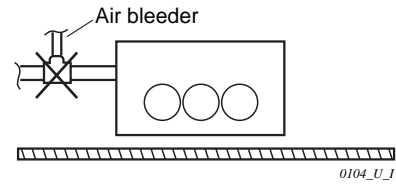


Fig. 3-90

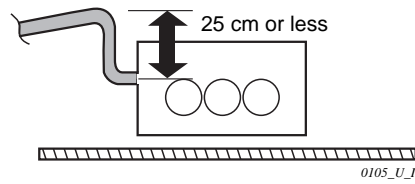


Fig. 3-91

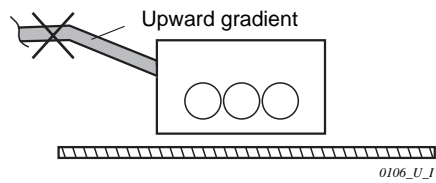


Fig. 3-92

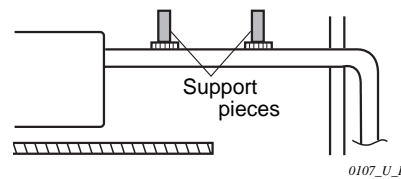


Fig. 3-93

3-28. To increase the Fan Speed

If external static pressure is too great (due to long extension of ducts, for example), the air flow volume may drop too low at each air outlet. This problem is solved by increasing the fan speed using the following procedure:

- (1) Remove 4 screws on the electrical component box and remove the cover plate.
- (2) Disconnect the fan motor sockets in the box.
- (3) Take out the booster cable (with sockets at both ends) clamped in the box.
- (4) Securely connect the booster cable sockets between the disconnected fan motor sockets in step 2 as shown in the Fig. 3-94.
- (5) Place the cable neatly in the box and reinstall the cover plate.

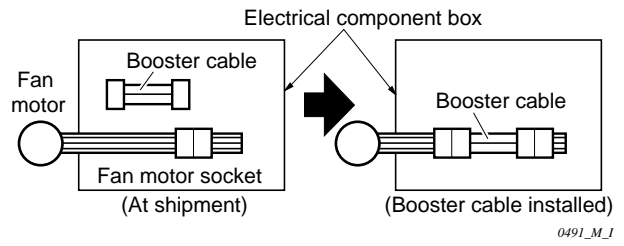


Fig. 3-94

Indoor Fan Performance

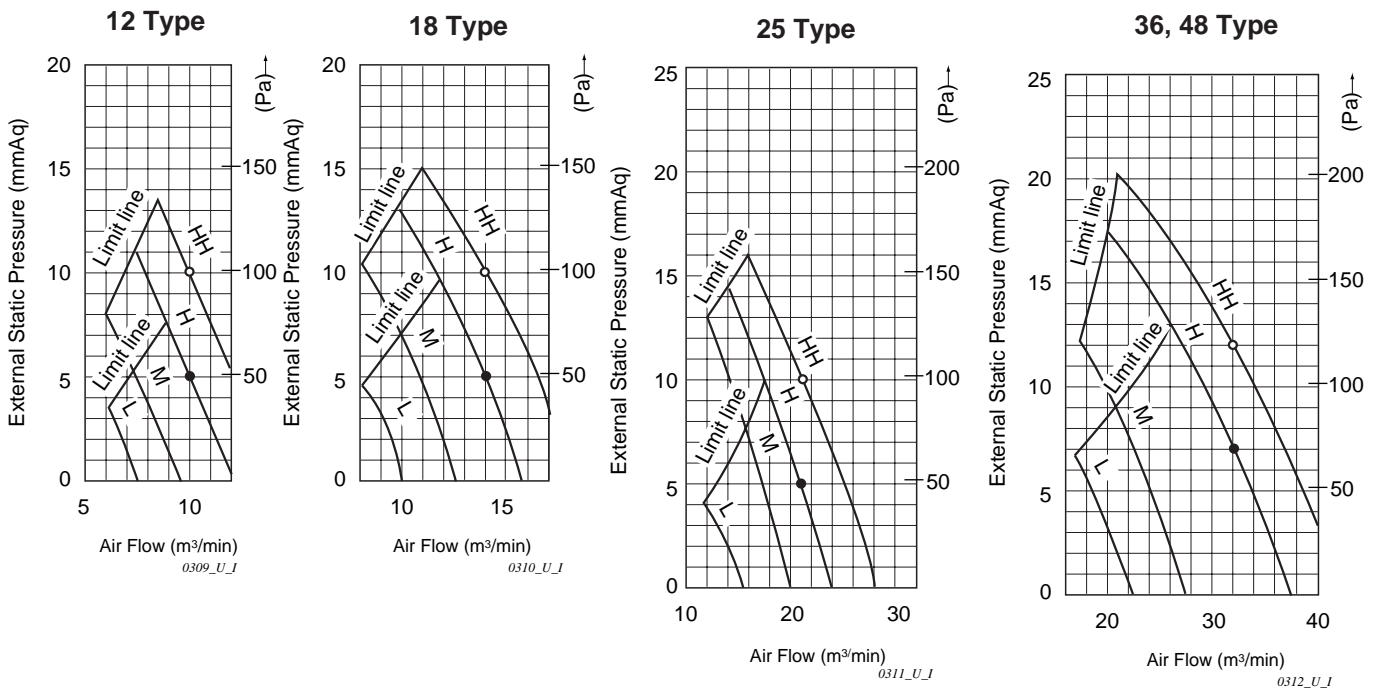




Fig. 3-95

NOTE HH : Using the booster cable 
 H : At shipment 

How to read the diagram

The vertical axis is the external static pressure (mmAq) while the horizontal axis represents the AIR FLOW (m³/min.). The characteristic curves for “HH,” “H,” “Med,” and “Low” fan speed control are shown.

The nameplate values are shown based on the “H” air flow. In case of model 25 type, the air flow is 21 m³/min., while the external static pressure is 5 mmAq at “H” position. If external static pressure is too great (due to long extension of duct, for example), the air flow volume may drop too low at each air outlet.

This problem may be solved by increasing the fan speed as explained above.

3-29. Checking the Drainage

After wiring and drain piping are completed, use the following procedure to check that the water will drain properly. For this, you should have a bucket and wiping cloth ready to catch and wipe up spilled water.

- (1) Connect power to the power terminal board (L1, L2 terminal) inside the electrical component box.
- (2) Take off the tube cover and from the opening, slowly pour about 1,200 cc of water into the drain pan to check drainage.
- (3) Short the check pin (CN5 white) on the indoor control main board and operate the drain pump. Check the water flow and see if there is any leakage.



CAUTION

Be careful since the fan will start turning when you short the pin on the indoor control board.

- (4) When drain checking is finished open the check pin (CN5 white) and remount the tube cover.



CAUTION

To mount the tube cover, use 4 × 8 tapping screws. If a long screw is used, it can make a hole in the drain pan and cause water leakage.

■ Concealed-Duct High Static Pressure Type

3-30. Required Minimum Space for Installation and Service

- This air conditioner is usually installed above the ceiling so that the indoor unit and ducts are not visible. Only the air intake and air outlet ports are visible from below.
- The minimum space for installation and service is shown in Fig. 3-96.
- It is recommended to provide inspection access (600 × 600 mm) for checking and servicing the electrical system.
- Fig. 3-97 and Table 3-6 show the detailed dimensions of the indoor unit.

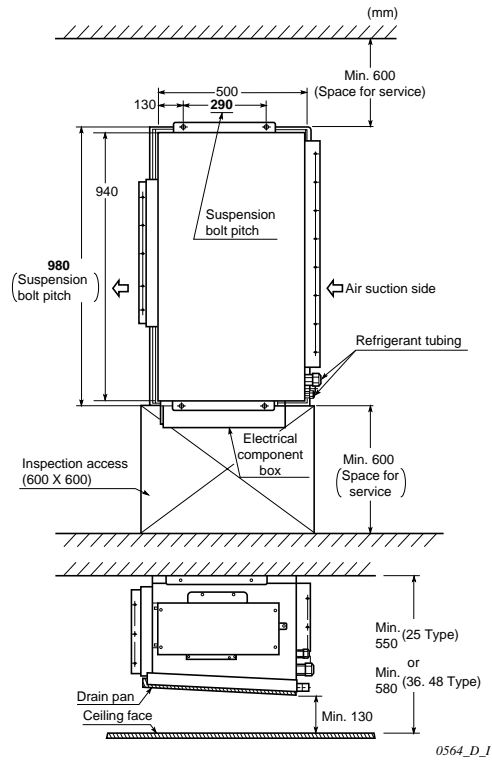


Fig. 3-96

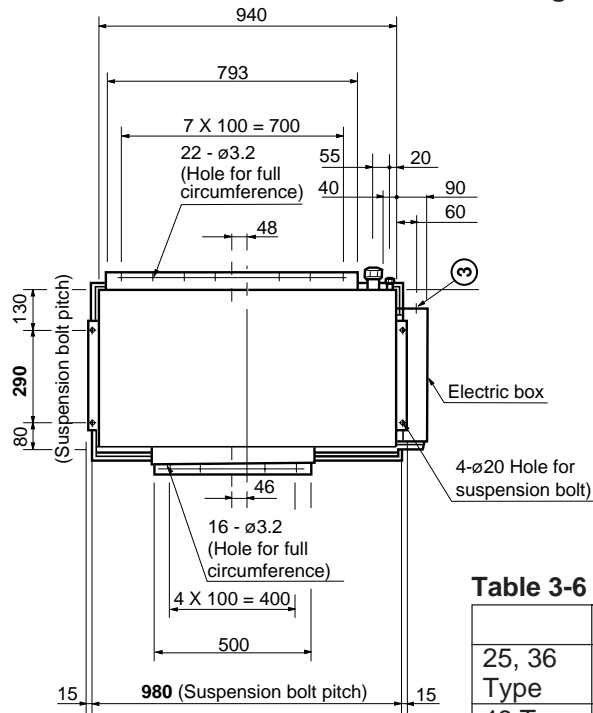


Table 3-6

	A	B	C
25, 36 Type	420	395	68
48 Type	450	425	98

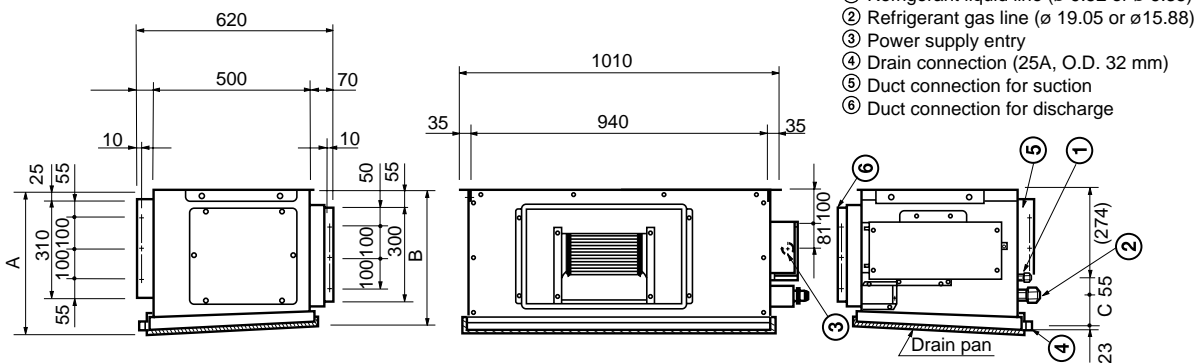


Fig. 3-97



3-31. Suspending the Indoor Unit

Depending on the ceiling type:

- Insert bolt anchors as shown in Fig. 3-98 or
- Use existing ceiling supports or construct a suitable support as shown in Fig. 3-99.



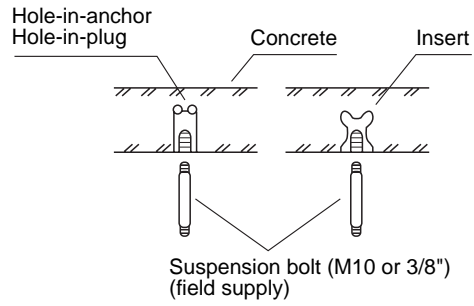
WARNING

It is highly important that you use extreme care in supporting the indoor unit inside the ceiling. Be sure that the ceiling is sufficiently strong to accept the weight of the unit. Before hanging the unit, test the strength of each attached suspension bolt.

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts referring to the dimensional data on the previous page. (Fig. 3-96, 97)

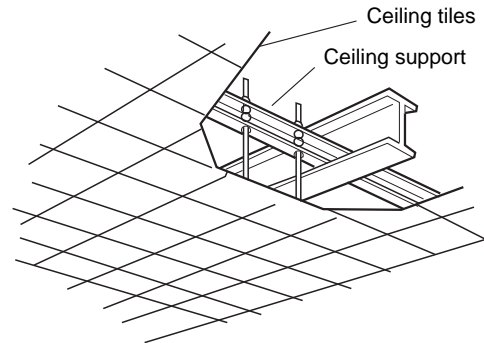
Tubing must be laid and connected inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing into position for connection to the unit before placing the unit inside the ceiling.

- (2) Screw in the suspension bolts allowing them to protrude from the ceiling as shown in Fig. 3-98. (Cut the ceiling material, if necessary.)
- (3) Suspend and fix the indoor unit using the 2 hexagonal nuts (field supply) and special washers (supplied with unit) as shown in Fig. 3-100.



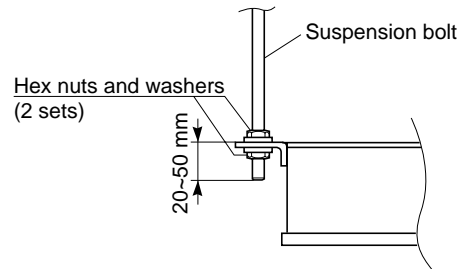
0038_T_1

Fig. 3-98



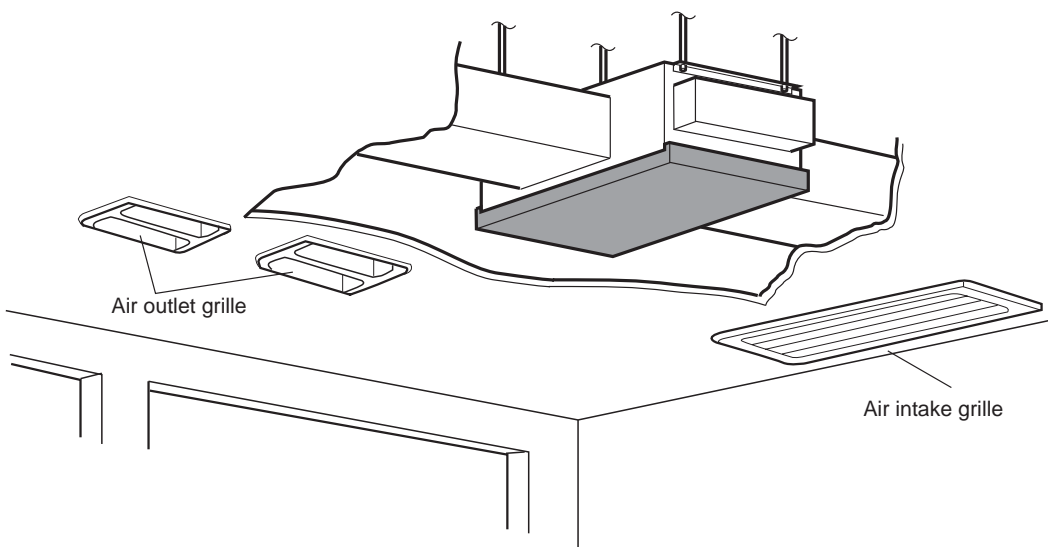
0039_S_1

Fig. 3-99



0189_D_1

Fig. 3-100



0113_D_1

Fig. 3-101

3-32. Installing the Drain Piping

- (1) Prepare standard hard polyvinyl chloride (PVC) pipe (O.D. 32 mm) for the drain and use the accessory drain socket to prevent water leaks. The PVC pipe must be purchased separately.

When doing this, be sure to apply the adhesive for PVC at connection point.

- (2) After connecting the drain pipe securely, be sure to wrap the insulator (field supply) around the pipe.
- (3) Be sure the drain pipe has a downward gradient (1/100 or more) and prepare traps as indicated in the right figure. (Fig. 3-102)
- (4) Prepare traps also in a part of the pipe arrangement, however, prepare a plug in this part in order to make cleaning of the dusts which cause a leak of water. (Fig. 3-103)
- (5) After wiring and drain piping are completed, use the following procedure to check that the water will drain properly. For this, you should have a bucket and wiping cloth ready to catch and wipe up spilled water.

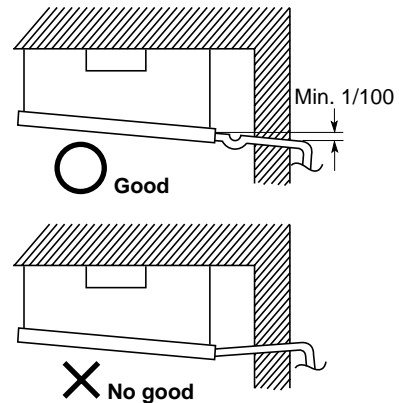


Fig. 3-102

0096_T_I

- Remove the insulator and rubber cap from the drain inspection port, insert the accessory elbow and connect it using the accessory clamp.
- Pour water into the opening in the elbow up to the water test mark on the inside of the elbow. If any more water is poured in it will drain out through the hole. This prevents excess water.

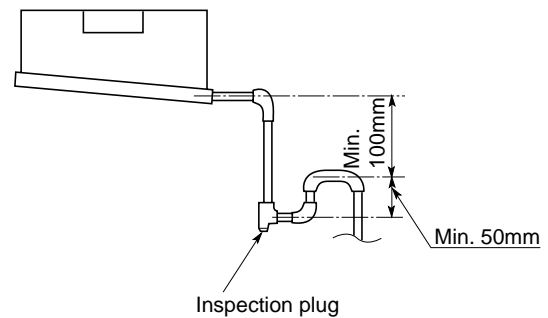


Fig. 3-103

0114_D_I

3-33. Caution for Ducting Work

- This unit is high static pressure type (applicable external static pressure Max. 167~186 pa (17~19 mm Aq)).
In case of small pressure resistance (for instance short duct), install the damper for adjusting air flow volume as air flow volume / air flow noise becomes big.
- If this unit is installed for airconditioning the room which needs low sound level such as office, meeting room, be sure to provide supply and return noise absorption chamber with acoustic liner.
- Be sure to provide the air filter (field supply) at return duct.

4. How to Install the Outdoor Unit

4-1. Removing the Protective Spacer for Transportation

Remove the packing skid from the bottom of unit and then remove the plastic spacer used to secure the compressor during transportation. (Fig. 4-1)

Place the unit on a level concrete pad, block or equal and anchor.

Refer to Section 2. "Installation Site Selection".

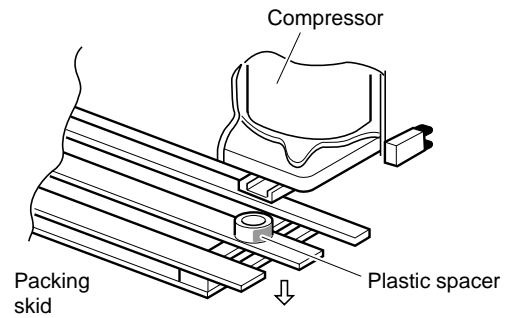


Fig. 4-1

0496_C_1

4-2. Installing the Outdoor Unit

- (1) Install blocks or a solid platform under the outdoor unit which provides a minimum height of 15 cm from ground level. (Fig. 4-2)
- (2) The outdoor unit must be bolted down tightly to the blocks or platform with 4 anchor bolts.

4-3. Tubing Direction

- Tubing can be extended in 4 different directions as shown in Fig. 4-3.
 - Service valves are housed inside the unit. To access them, remove the access panel by removing the 2 attaching screws, then slide the panel downward and pull it toward you.
- If either rear, right, or front tubing is needed, punch out the knockout hole with a hammer or similar tool.
- After punching out the Knockout holes, mount accessory rubber bushings or plastic protectors on the tubing outlets. These accessories are packed inside the unit and can be accessed through the access panel.
 - Use tube benders to extend internal tubing to the outside.

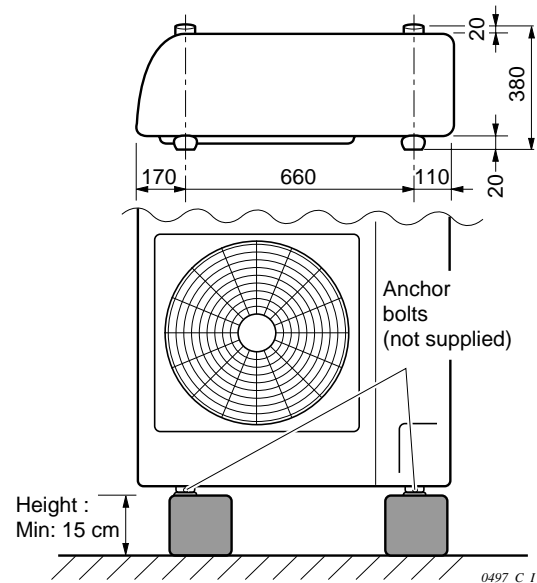


Fig. 4-2

0497_C_1

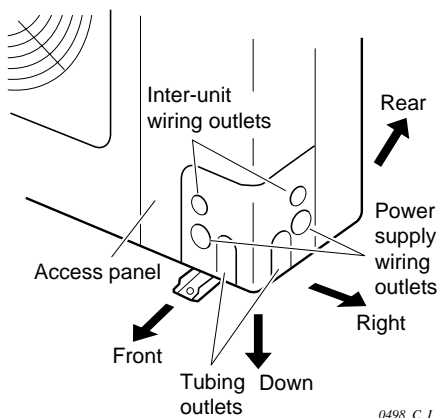


Fig. 4-3

0498_C_1

5. Electrical Wirng

5-1. General Precautions on Wiring

- (1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.
- (2) **Provide a power outlet to be used exclusively for each unit, and a power supply disconnect and circuit breaker for overcurrent protection should be provided in the exclusive line.**
- (3) To prevent possible hazards due to 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 insure 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 shielded on both sides.
- (9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop appointed by the manufacture, because special purpose tools are required.

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

* AWG = American Wire Gauge

(1) Single Type (One indoor unit / one outdoor unit)

Type	(A) Power Supply	(B) Inter-unit wiring	Time Delay Fuse or Circuit Capacity	Power Supply Terminal Base	
	4 mm ²	2.5 mm ²		Capacity	Max. Wire Diameter
25 type (3 phase)	102 m	50 m	15 A	25 A	5.5 mm ² (AWG#10)
36 type (3 phase)	96 m	50 m	15 A	25 A	5.5 mm ² (AWG#10)
48 type (3 phase)	63 m	50 m	25 A	25 A	5.5 mm ² (AWG#10)
25 type (1 phase)	17 m	50 m	40 A	50 A	14 mm ² (AWG#6)

(2) Twin, Triple and Quartet Type (Multiple indoor units / one outdoor unit)

• Outdoor Unit

Type	(A) Power Supply	Time Delay Fuse or Circuit Capacity	Power Supply Terminal Base	
	4 mm ²		Capacity	Max. Wire Diameter
25 type (3 phase)	117 m	15 A	25 A	5.5 mm ² (AWG#10)
36 type (3 phase)	109 m	15 A	25 A	5.5 mm ² (AWG#10)
48 type (3 phase)	69 m	25 A	25 A	5.5 mm ² (AWG#10)
25 type (1 phase)	20 m	40 A	50 A	14 mm ² (AWG#6)

• Indoor Unit

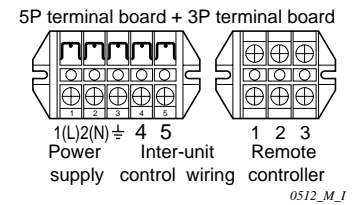
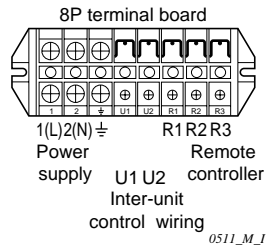
Type	(F) Power Supply	Time Delay Fuse or Circuit Capacity	Power Supply Terminal Base	
	2.5 mm ²		Capacity	Max. Wire Diameter
X, S, AS, T, U	245 m	15 A	50 A	14 mm ² (AWG#6)
K	588 m	15 A	25 A	5.5 mm ² (AWG#10)
D	89 m	15 A	50 A	14 mm ² (AWG#6)

Control Wiring

(C) Inter-Unit Control Wiring	(D) Remote Control Wiring	(E) Control Wiring For Group Control
0.75 mm ² (AWG#18) Use Shielded Wiring	0.75 mm ² (AWG#18)	0.75 mm ² (AWG#18)
Max. 1000 m	Max. 1000 m	Max. 1000 m

NOTE

- 1) Refer to the Wiring System Diagrams (See next page) for the meaning of “A”, “B”, “C”, “D”, “E”, and “F” in the above tables.
- 2) Inter-Unit Control Wiring (c) has no polarity. But for other wiring, respect polarity. Be sure to connect as shown in the Wiring System Diagram.
- 3) The basic connection diagram of the indoor unit shows the 8P terminal board, so the terminal boards in your equipment may differ from the diagram.
- 4) For accordance with conformity of EC Directive No. 89/336/EEC, supply connection at the time of installation work it should be consider guidance showing below.
 - * Do not share a common installation group with other equipment.
 - * Be sure that supply network impedance is sufficiently low ($|Z_{\text{sys}}| \leq R_{\Omega}$). It may be necessary to consult the power supply authority before connection of the air conditioner to a low-voltage public network.



Only for K type

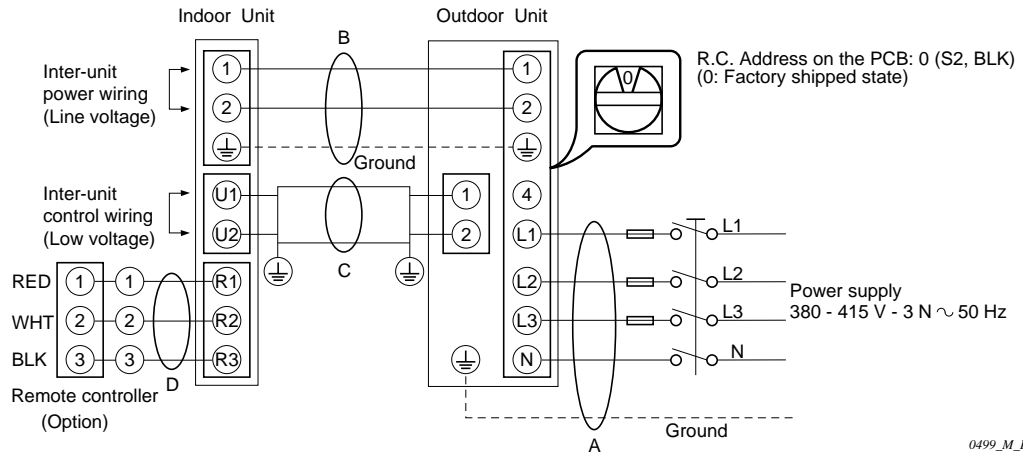
Models	R_{Ω}	Remarks
25 type (3 phase)	—	Care is not needed
36 type (3 phase)	0.270	Conforms to the local code
48 type (3 phase)	0.122	Ditto
25 type (1 phase)	0.126	Ditto

5-3. Wiring System Diagrams

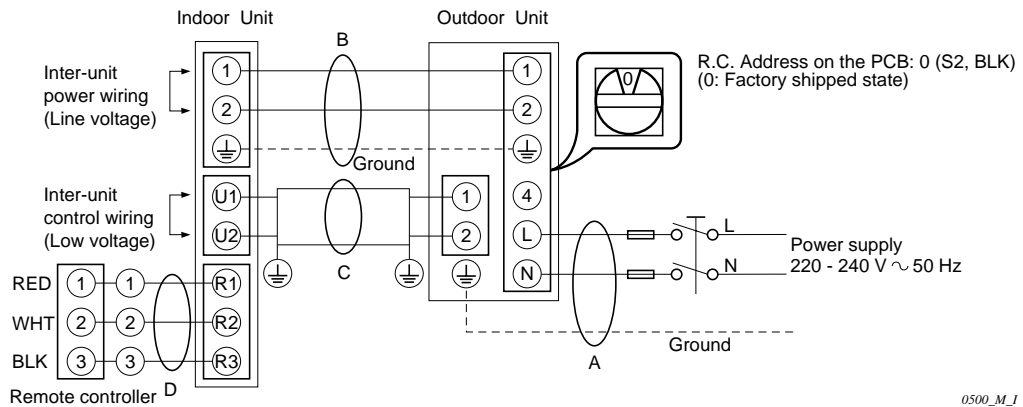
(1) Basic wiring diagram for standard control

① Single type (one indoor unit)

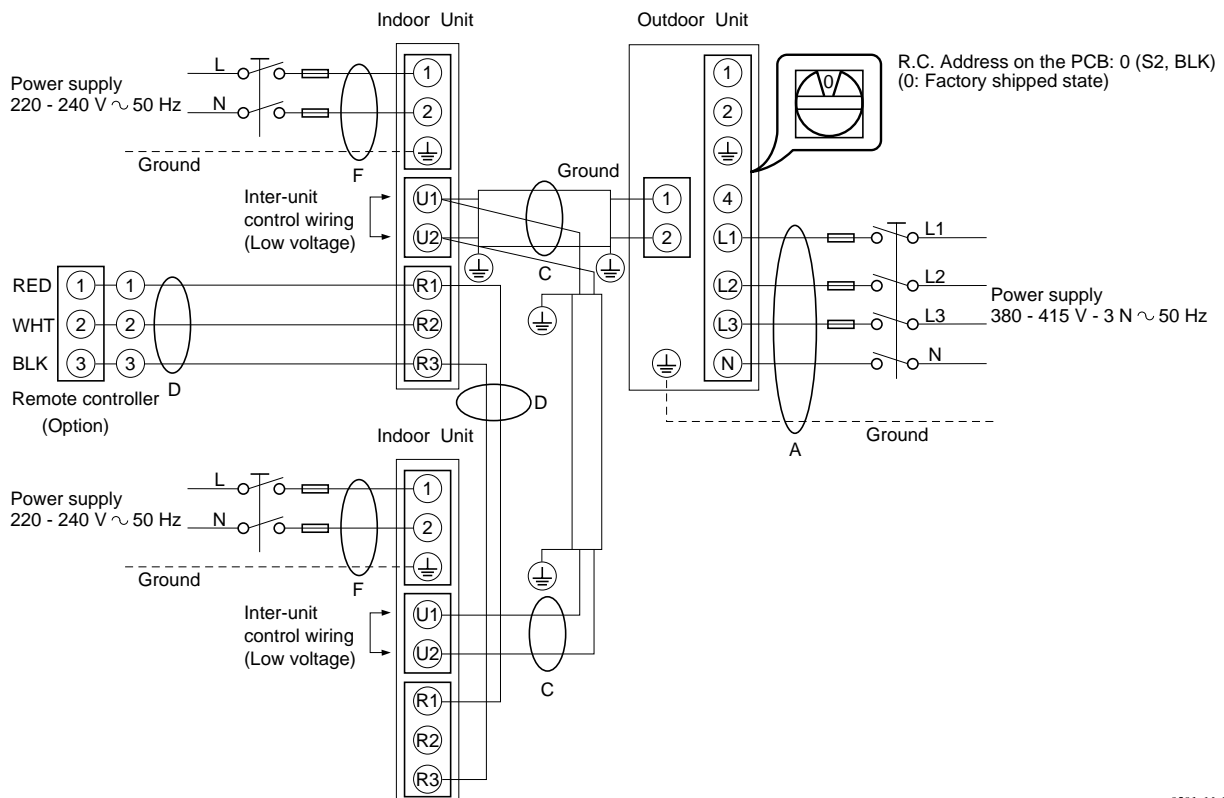
①-1. 3-phase outdoor unit



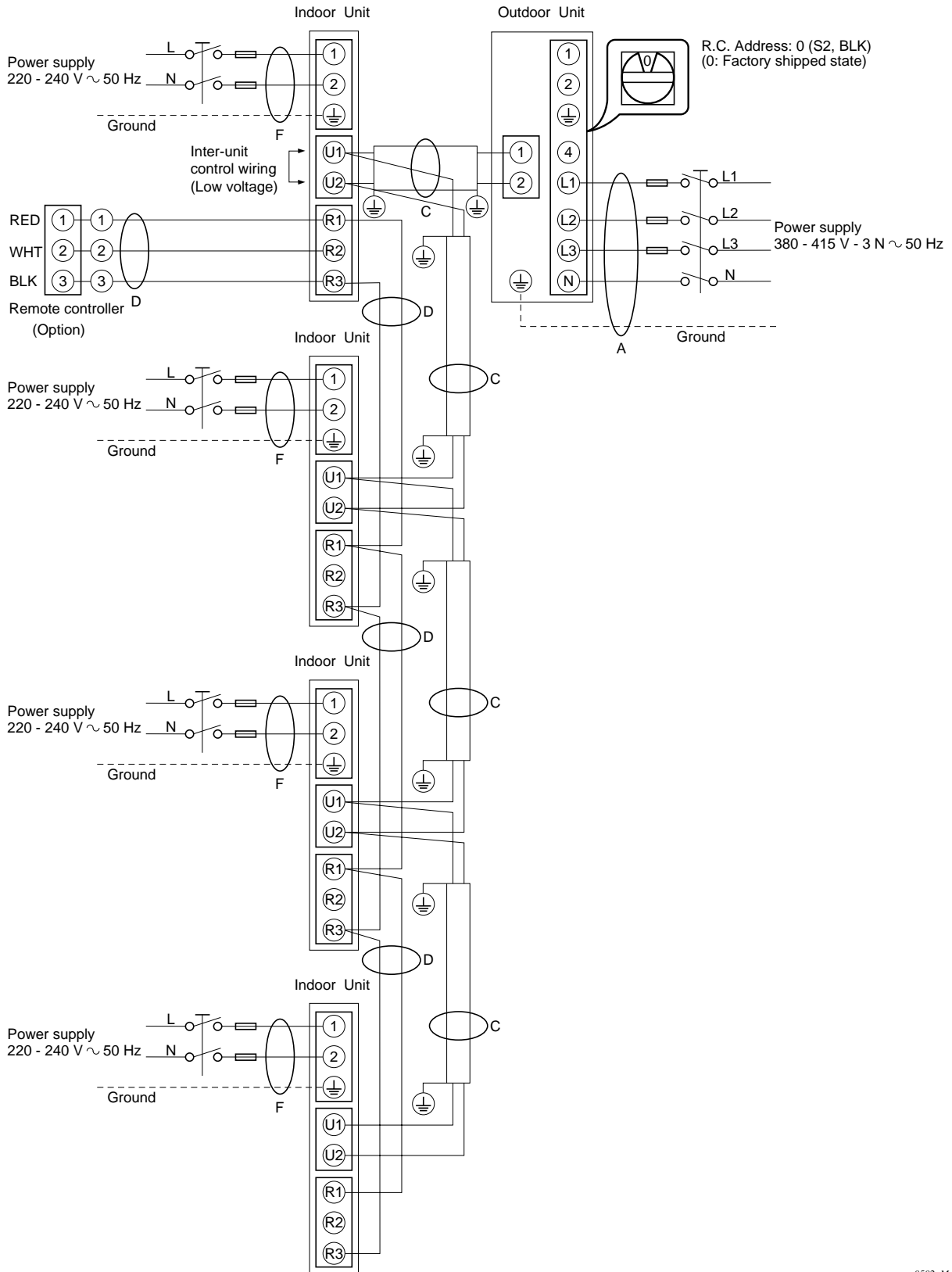
①-2. Single-phase outdoor unit



② Twin type (two indoor units)



③ Triple or Quartet type

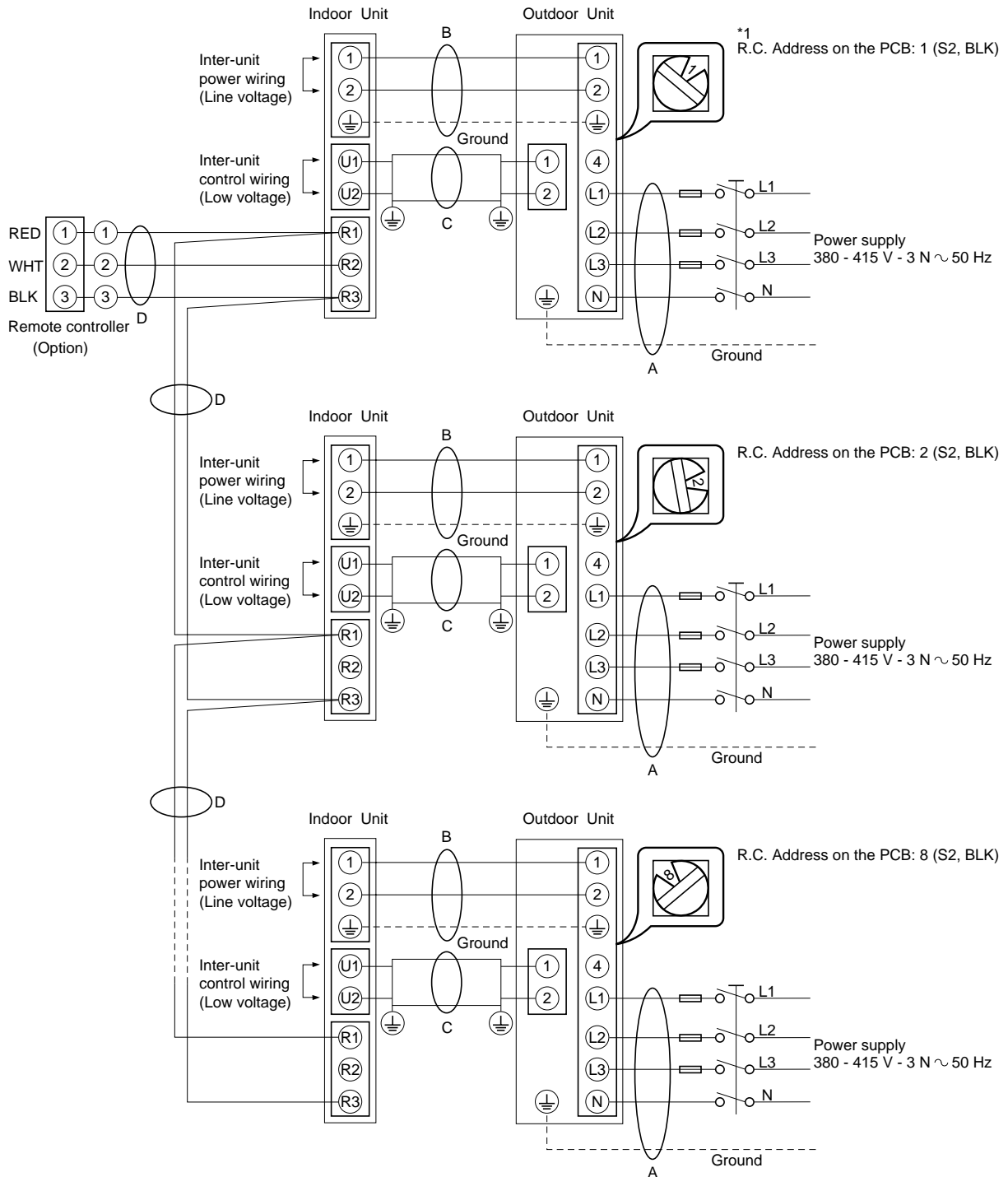


0502_M_1

- Address setting is executed automatically when the power supply is turned on. It takes about 2 or 3 min in case of ① single type, for instance.

(2) Basic wiring diagram for group control

This diagram shows when several units (max. 8) are controlled by a remote controller. In this case, a remote controller can be connected at any indoor unit.



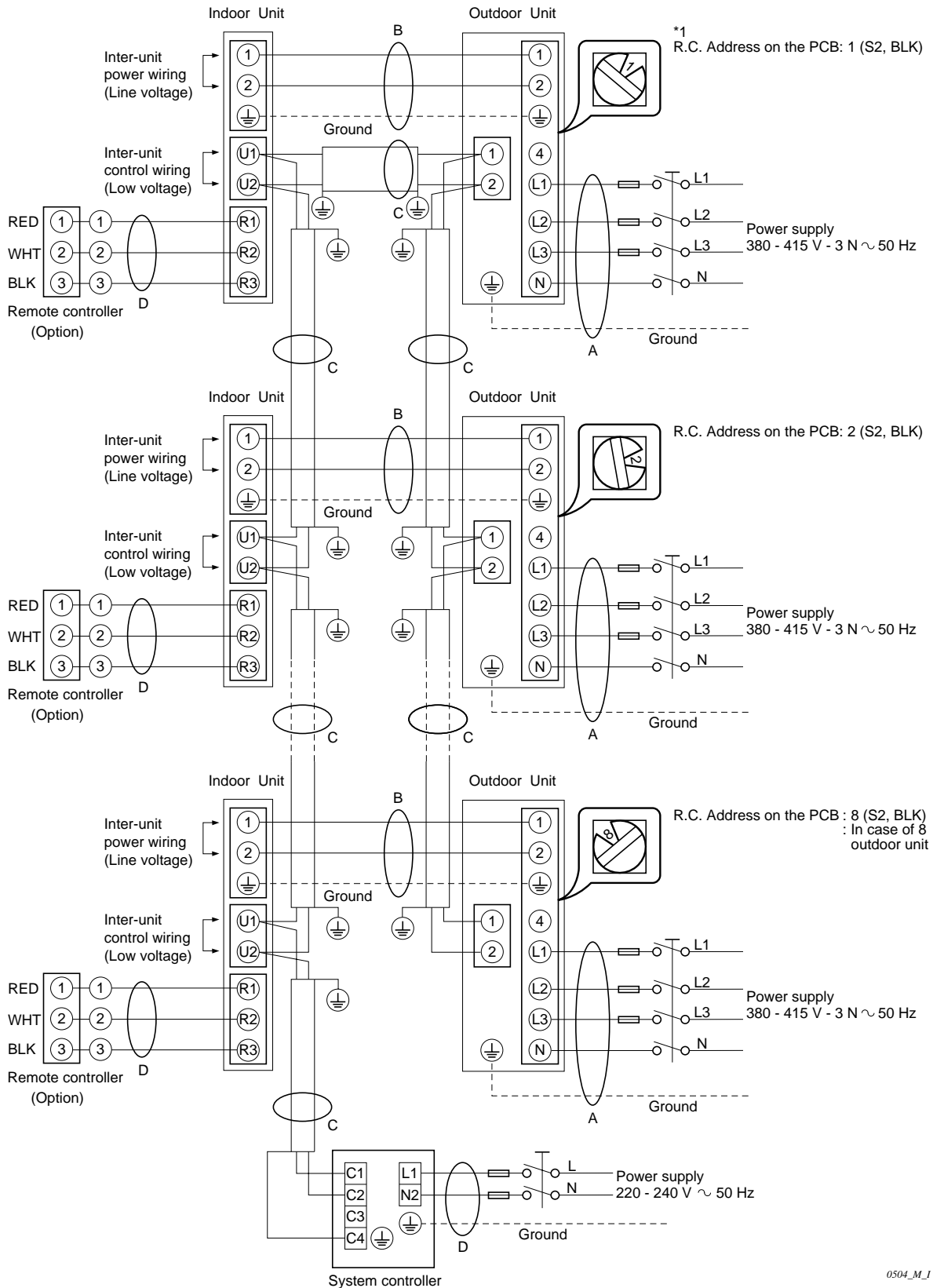
0503_M_1

NOTE

- R.C. Address should be set before turning the power on.
- Auto. address setting can be executed by a remote controller automatically. Please refer to 12-4 "Automatic Address Setting Method".
- Each successive unit will respond at one-second intervals following the order of the R.C. address when the remote controller is operated.
- Regarding the feature of group control, refer to the Engineering Manual SM831032.

(3) Basic wiring diagram for central control
(link system)

This diagram shows when several units (max. 30 outdoor units + max. 64 indoor units) are controlled by a system controller individually.



0504_M_1

NOTE

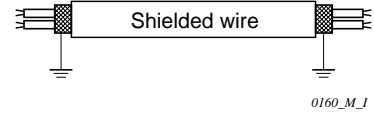
● R.C. Address should be set before turning the power on.

(4) Special cautions on wiring

- ① Use shielded wires for inter-unit control wiring (c) and ground the shielded on both sides.

All wiring except inter-unit control wiring (c) has polarity.

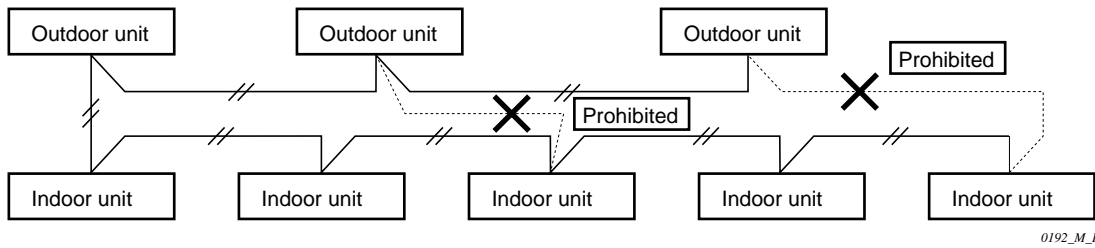
Otherwise misoperation due to noise may be generated at times.



- ② When linking outdoor units in a network (S-net link system), remove the short plug (CN4, 2P Black, location: near CPU on the outdoor control PCB, see page 87) from all outdoor units except any one of outdoor unit. Otherwise the communication of S-net link system does not perform.

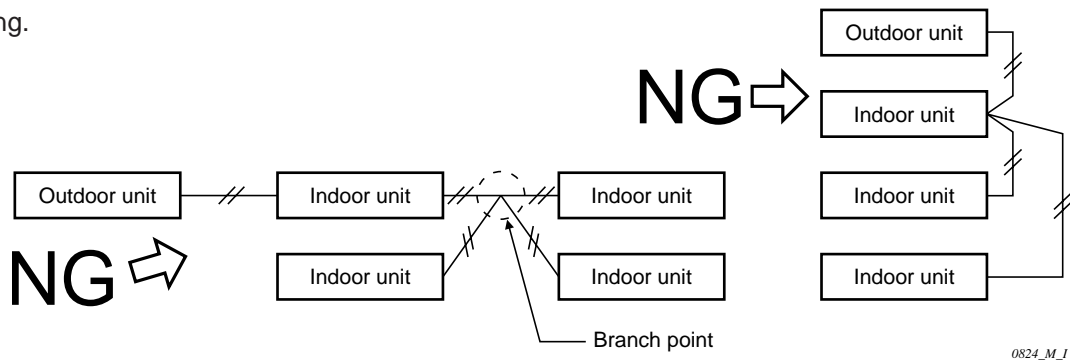
In case of no link system (No connection wiring between outdoor units), do not remove the short plug.

- ③ Do not wire the inter-unit control wiring such as loop wiring (Fig. below)

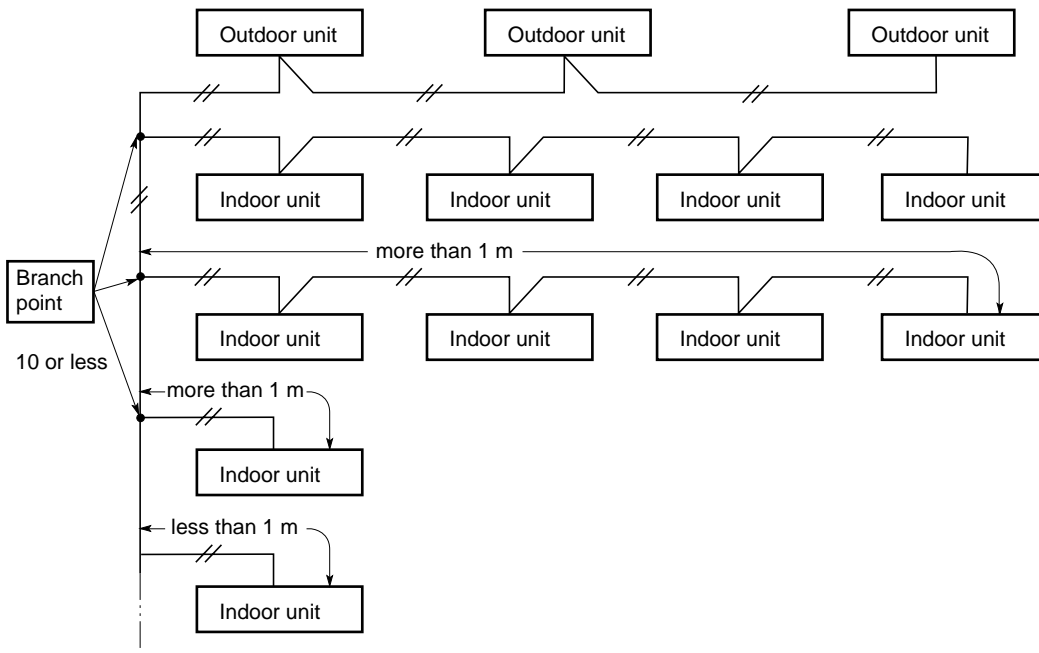


- ④ Don't install the inter-unit control wiring such as star branch wiring.

Star branch wiring causes mis-address setting.



- ⑤ If branching the inter-unit control wiring, the No. of branch point should be 10 or less.
(The branch length less than 1 m does not include the branch No.)



0193_M_I



WARNING

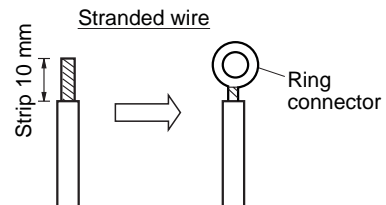
Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.

When connecting each power wire to the corresponding terminal, follow instructions “How to connect wiring to the terminal” and fasten the wire securely tight with the fixing screw of the terminal plate.

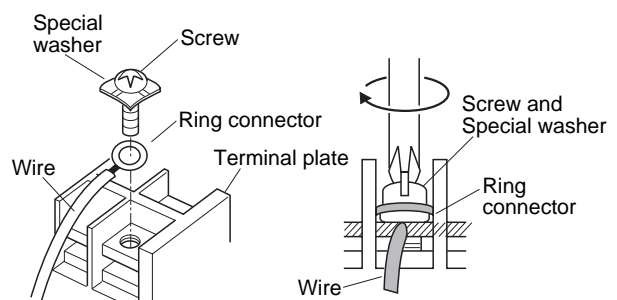
How to connect wiring to the terminal

■ For stranded wiring

- (1) Cut the wire end with a cutting pliers, then strip the insulation to expose the stranded wiring about 10 mm and tightly twist the wire ends.
- (2) Using a screwdriver, remove the terminal screw(s) on the terminal plate.
- (3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring connector.
- (4) Place the ring connector wire, and replace and tighten the removed terminal screw using a screwdriver.



0119_M_I



0120_M_I

6. How to Install the Remote Controller (Optional Part)

Remote controller wiring can be extended to max. 1000 m.

■ How to install the remote controller (Optional Controller)



CAUTION

- Do not twist the control wiring with the power wiring or run it in the same metal conduit, because this may cause malfunction.
- Install the remote controller away from sources of electrical noise.
- Install a noise filter or take other appropriate action if electrical noise affects the power supply circuit of the unit.

The mounting position for the remote controller should be located in an accessible place for control. Never cover over the remote controller or recess it into the wall.

- (1) When you open the decorative cover, you will see two gaps under the remote controller. Insert a coin into these gaps and pry off the back case.

6-1. When Using a Wall Box for Flush Mounting

- If local codes allow, this remote controller can be mounted using a conventional wall box for flush mounting.
- (2) Attach the back case with the 2 small screws provided. Using a screwdriver, push open the cut-outs on the back case. These holes are for screws. Use the spacers and take care not to tighten the screws excessively. If the back case will not seat well, cut the spacers to a suitable thickness.
 - (3) Connect the remote controller wiring (3 wires) correctly to the corresponding terminals in the indoor unit's electrical component box.



CAUTION

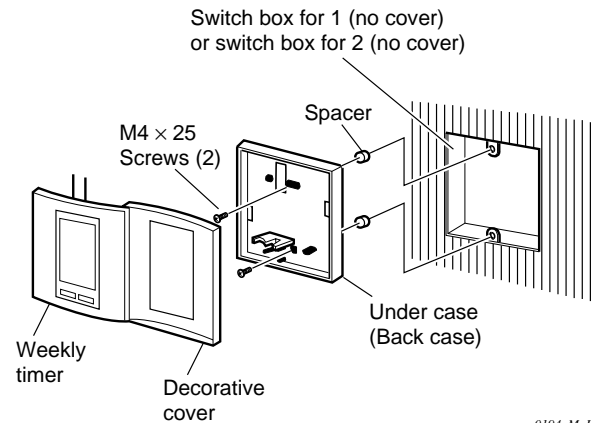
When wiring, do not connect the remote controller wires to the adjacent terminal block for the power wiring. Otherwise, the unit will break down.

- (4) To finish, fit the back case's tabs into the remote controller and mount it.

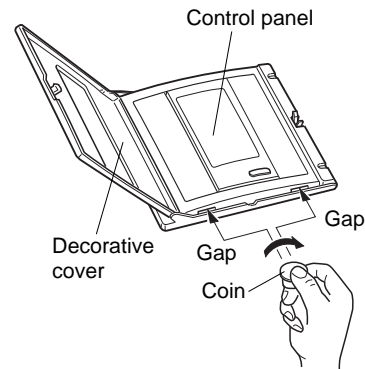


CAUTION

Do not supply power to the unit or try to operate it until the tubing and wiring to the outdoor unit is completed.



0194_M_I



0158_M_I

No.	Accompanying parts	Q'ty
①	Remote controller (comes with 20 cm wire)	1
②	Machine screws M4x25	2
③	Wood screws	2
④	Spacers	2

No.	Accompanying parts	Q'ty
⑤	Clamper	2
⑥	Wire joints	3

9

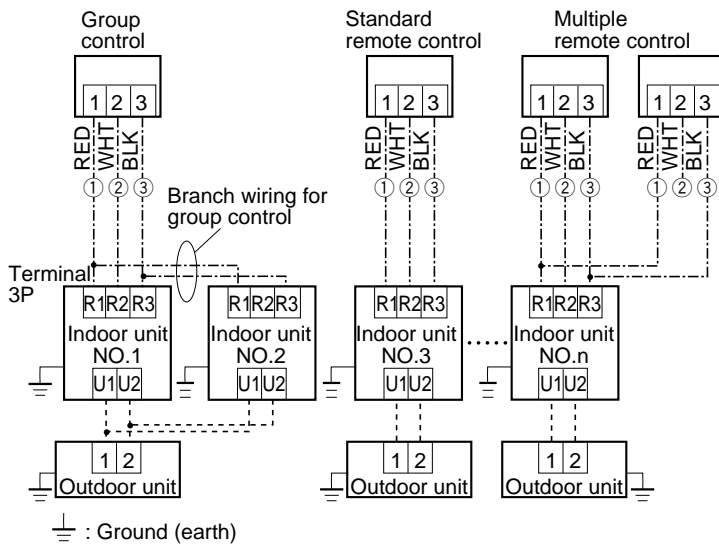
RC

6-2. Basic Wiring Diagram



CAUTION

Make correct wiring
without any mistakes
(incorrect wiring will
damage the equipment).



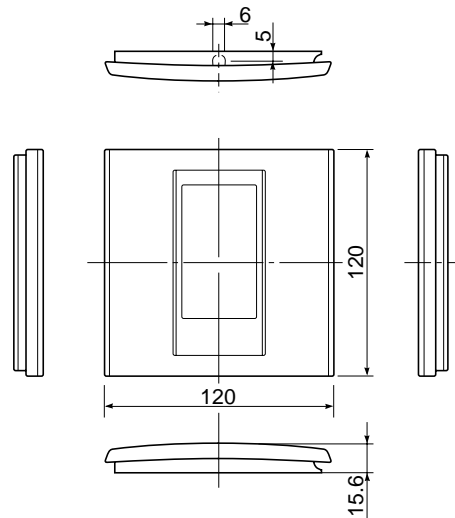
0565_M_I

● Wiring procedure

Do the wiring according to the above wiring diagram.

- Recommended wire diameter and allowable length for remote control wiring and its branch wiring: 0.75 mm² (AWG#18)
Max. 1000 m

● Diagram of outer dimensions



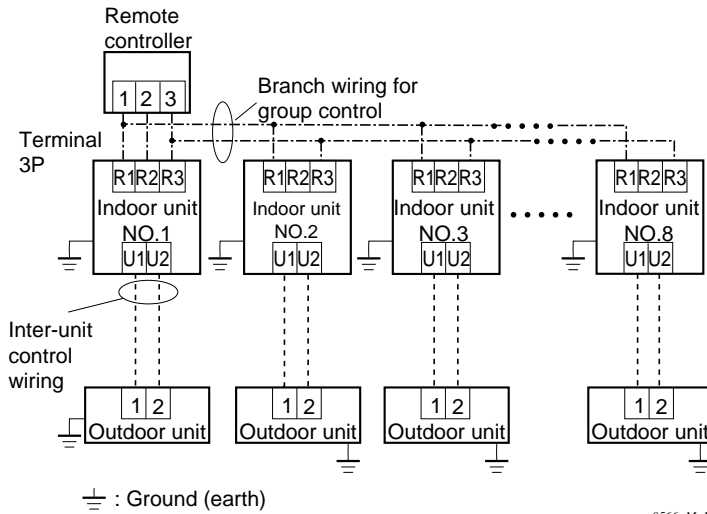
0162_M_I

9

RC

6-3. Wiring System Diagram for Group Control

This diagram shows when several units (max. 8) are controlled by a remote controller. In this case, a remote controller can be connected at any indoor unit.



Wiring procedure

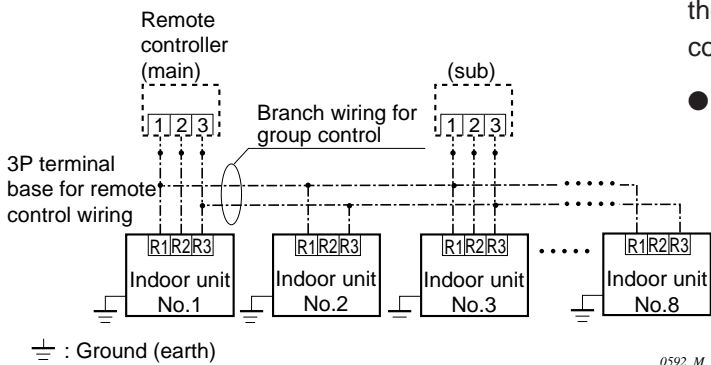
Wire according to the left diagram:

- Address setting is executed automatically when the outdoor unit is turned on.
- Each successive unit will respond at one-second intervals following the order of the group address when the remote controller is operated.

● Group control using 2 remote controllers.

It does not matter which of the 2 remote controllers you set as the main controller.

When using multiple remote controllers, up to 2 of them can be used, in which 1 is the main remote controller and the remaining is sub remote controller.



- To set up a sub remote controller, turn its remote control address switch (RCU. ADR) located on its PCB from OFF to ON (OFF: when shipped from factory).

6-4. Wiring System Diagram for Multi-Remote Control

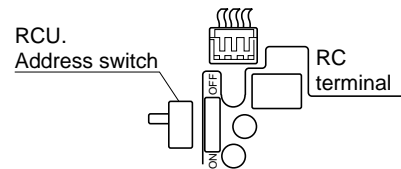
■ When Installing Multiple Remote Controllers

This multi remote controller system is used for operating the unit(s) by different positions. (Max. 2 remote controllers can be installed)

● Setting method

To execute this control, make the setting according to the following procedure.

- (1) Out of two installed remote controllers, make one the main remote controller (factory shipped state).
- (2) For another remote controller, turn the RCU address switch on the PCB from OFF to ON. In this state, it functions as sub remote controller.



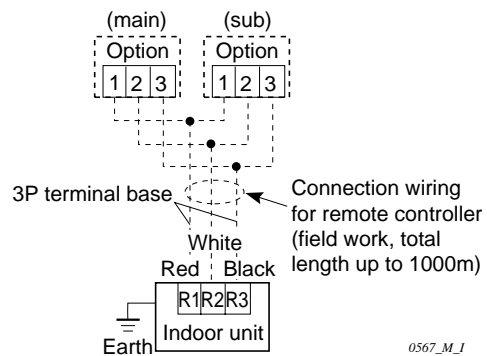
● Basic wiring diagram



CAUTION

Make correct wiring without any mistakes (incorrect wiring will damage the equipment).

- To operate 1 indoor unit with 2 remote controllers set at different places.



6-5. Meanings for Alarm Message


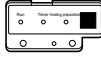



Possible cause of trouble		Alarm message	
<ul style="list-style-type: none"> • Serial communication errors • Mis-setting 	Remote controller is not connected properly.	Error receiving of serial communications signal.	E1
		Error transmitting of serial communications signal.	E2
	• Indoor unit is detecting abnormal signal from the remote controller. (No serial communications signal)		E3
	Indoor unit is detecting abnormal signal from outdoor unit.	Error receiving of serial communications signal.	E4
		Error transmitting of serial communications signal	E5
	Outdoor unit is detecting abnormal signal from indoor unit.	Error receiving of serial communications signal	E6
	Indoor unit is abnormal.	<ul style="list-style-type: none"> • Indoor unit is damaged. • Power is not supplied. 	
	Outdoor unit is transmitting error signal.	Error transmitting of serial communications signal.	E7
	Improper setting of indoor unit or remote controller.	Indoor unit address setting is duplicated.	E8
		Remote controller address (RCU.ADR) switch is duplicated.	E9
		—	E10
		—	E11
		Don't press auto. address button S1: (A. ADD) of another R.C. line during auto address operation	E12
	• Indoor unit is error transmitting of serial communications signal to remote controller.		E13
	When using group control, main indoor unit address setting is duplicated.		E14
	Auto. address setting is abnormal. (No. or capacity of judged indoor unit is small.)		E15
	Auto. address setting is abnormal. (No. or capacity of judged indoor unit is large.)		E16
	Indoor unit is transmitting error signal to another indoor unit.		E17
Indoor unit is detecting abnormal signal from another indoor unit.		E18	
Activation of protective device	Protective device in indoor unit is activated.	• Thermal protector in indoor fan motor is activated.	P1
		Protective device in outdoor unit is activated.	• Thermal protector in outdoor fan motor is activated.
	• Compressor thermal protector is activated.		
	• Power supply voltage is abnormal (More than 260 V or less than 160 V between L and N phase.)		
	Discharge gas temperature is abnormal.		P3
	High pressure switch is activated.		P4
	Power supply voltage is abnormal. Negative phase or defective phase.	P5	
		—	P6 ~8
Protective device in indoor unit is activated.	Improper wiring connections of ceiling panel.	P9	
	Float switch is activated.	P10	
	—	P11 ~17	
Thermistor failure	Indoor thermistor is either open or damaged.	Indoor coil temp. (E1 = TH1) cannot be detected.	F1
		Indoor coil temp. (E2 = TH2) cannot be detected.	F2
		Indoor coil temp. (E3 = TH3) cannot be detected.	F3
	Outdoor thermistor is either open or damaged.	Discharge gas temp.A (TH0A) cannot be detected.	F4
		Outdoor coil liquid temp. (C1 = TH0E) cannot be detected.	F6
		Outdoor coil gas temp. (C2 = TH0C) cannot be detected.	F7
		—	F8
		• Other thermistor is either open or damaged.	F9
EEROM of indoor unit's PCB is abnormal.		F29	






Fault with compressor and its circuit	Protective device for compressor is activated.	Compressor motor is overloaded.	H1
		Compressor motor is locked.	H2
		Compressor current detection circuit is abnormal.	H3
		—	H4
		—	H5
		—	H6
		—	H7
		—	H8
		—	H10
		—	H11
		—	H12
		—	H13
		—	H14
		—	H15
		—	H16
		—	H17
		Compressor contactor (Mg SW) is chattering.	H18

Possible cause of trouble	Alarm message
Main indoor unit address is not set. (Group control setting of indoor unit is abnormal.)	L1
Model setting of indoor unit is not matching the outdoor unit.	L2
When using group control, main indoor unit address setting is duplicated. (judging by indoor unit.)	L3
Indoor unit address is duplicated.	L4
Priority setting of indoor unit is duplicated.	L5
—	L6
Improper wiring between indoor units. (There is group connection wiring in case of individual control.)	L7
Indoor unit address (or group address) is not set.	L8
Capacity code of indoor unit is not set.	L9
Capacity code of outdoor unit is not set.	L10
Improper wiring of group control wiring.	L11
Model setting of indoor unit is not proper.	L13

7. How to Install the Wireless Remote Controller (Optional Part)

■ Accessories

No.	Accompanying parts	Q'ty
①	Operation controller 	1
②	Indicator section 	1
③	Remote controller 	1
④	Remote controller mounting cradle 	1
⑤	Battery 	2

No.	Accompanying parts	Q'ty
⑥	Spacer 	2
⑦	Instruction Manual 	1
⑧	Pan-head tapping screw 4 × 10 	4
⑨	Truss-head tapping screw 4 × 16 	2
⑩	Vinyl clamp L 150 	3
⑪	ALARM MESSAGE LABEL	1

■ 4-Way Air Discharged Semi-concealed Type (X type)

7-1. Indicator section Installation

● Remove the ceiling panel and indicator cover and install the indicator section.

- (1) Remove the ceiling panel.
- (2) Remove the corner cover behind the mark section. (3 screws)
- (3) Remove the mark section inside the ceiling panel. (2 screws)
- (4) Install the indicator section in the location where the mark section was attached. (2 screws)
- (5) Form the wire to match the panel ribs as in the Fig. 7-2.
- (6) Install the corner cover. (Restrain the wire with the corner cover.)

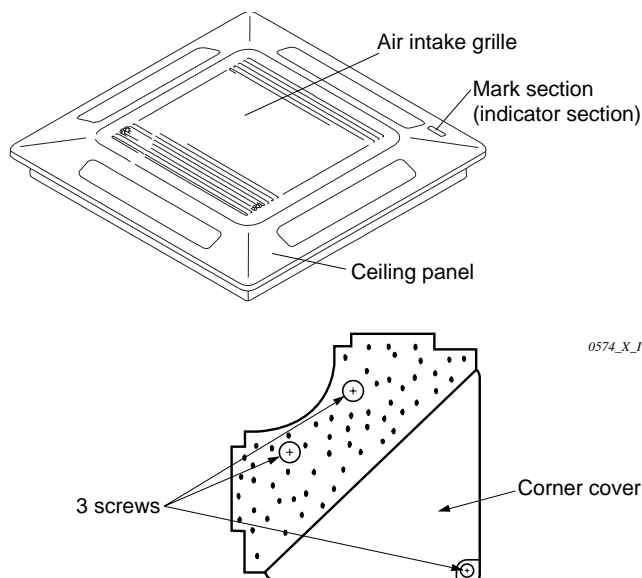


Fig. 7-1

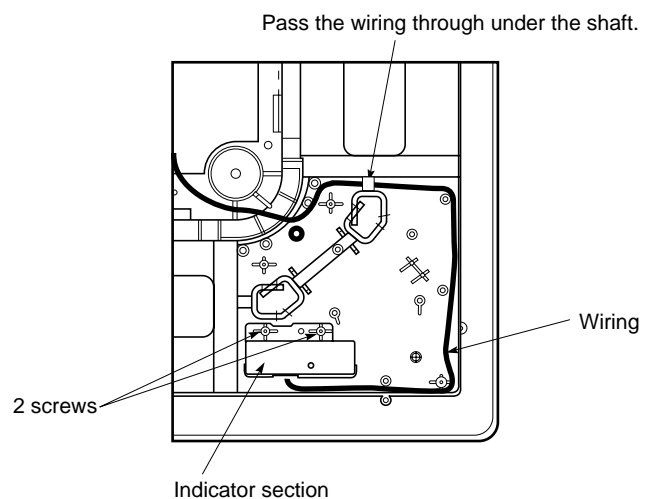


Fig. 7-2

7-2. Operating Controller Installation

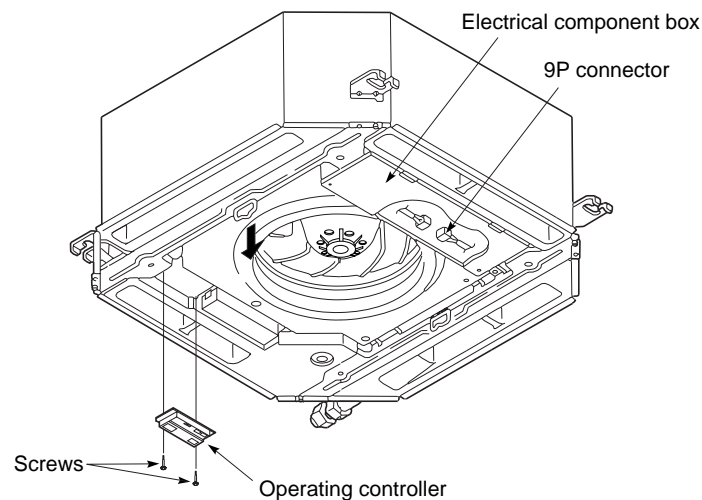


CAUTION

- Do not twist the operating controller wires together with the power supply wires. Doing so can result in malfunction.
- If noise is induced in the unit power supply, take appropriate measures, for example installing a noise filter.

Install the operating controller at the indoor unit intake port section.

- (1) Fasten the operating controller to the indoor unit intake port section (electrical component box opposite side) with the 2 accessory screws (4 × 10).
- (2) Connect the operating controller 4P connector (Blue) to the WL connector (Blue, CN42) on the indoor PCB. (For details on the wiring, see “7-5. Electrical wiring” P66.)
- (3) Install the ceiling panel.
- (4) Connect the indicator section and the operating controller by 6P connector (white).
- (5) Form the wires with vinyl clampers and fasten.
- (6) Connect the 9P ceiling panel wiring connector to the 9P body connector in the electrical component box.
- (7) For details on test operation, see “Test Run”.



0519_X_1

Fig. 7-3

■ Ceiling-Mounted type (T type)

7-3. Indicator Section Installation

Remove the indoor unit side panel and install the indicator section.

- (1) Remove the side panel.
 - (a) Open the intake grille and remove the 1 screw. (① screw)
 - (b) If you move the side panel to the front (the direction of the arrow), you can remove it.
- (2) Remove Cover A and Cover B.
 - (a) When you remove the 1 screw (② screw) from the unit side, you can remove Cover A and Cover B as a set from the unit front.
- (3) Remove Cover B.
- (4) Install the indicator section on Cover A.
- (5) Pass the leads through the indoor unit holes and install Cover A and the indicator section.
- (6) Form the leads as in the figure. (⑥)
- (7) Install the side panel. (1 screw (① screw))

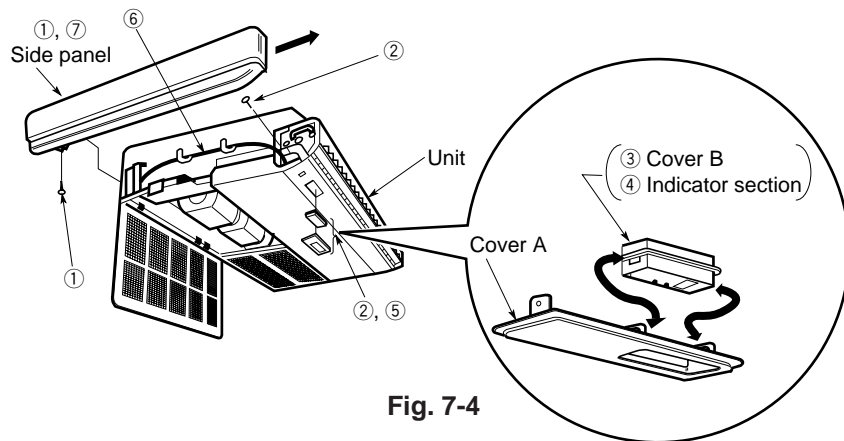


Fig. 7-4

0523_T_I

7-4. Operating Controller Installation



CAUTION

- Do not twist the operating controller wires together with the power supply wires. Doing so can result in malfunction.
- If noise is induced in the unit power supply, take appropriate measures, for example install a noise filter.

Install the operating controller at the indoor unit intake port section.

- (1) Remove the wire guard.
- (2) Fasten the operating controller to the service cover (the cover with the handle) with the two accessory screws (4 × 10).
- (3) Pass the wires (②) over the shaft (top side), clamp, and form.
- (4) Connect the indicator section and operating controller 6P relay connector.
- (5) Reinstall the wire guard.

(For details on wiring, see next page.)

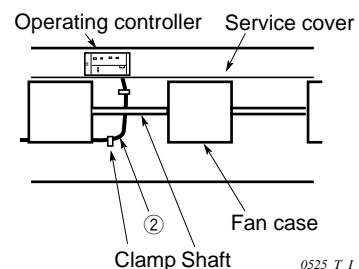


Fig. 7-5

0525_T_I

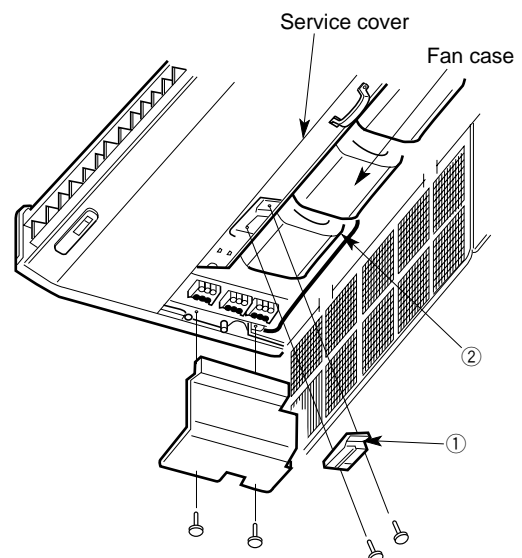


Fig. 7-6

0526_T_I

7-5. Electrical Wiring

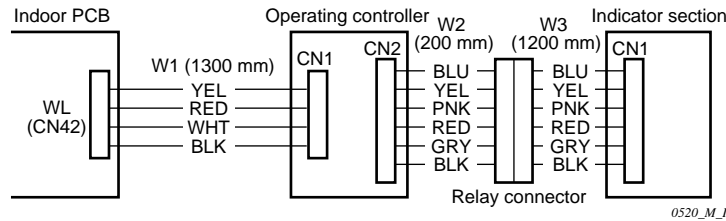


Fig. 7-7

Connection method

- (1) Connect W1 to the indoor PCB WL connector.
- (2) Connect W3 from the indicator section with W2 from the operating controller using the relay connector.

7-6. Room Temperature Sensor Setting

The room temperature sensors are built into the indoor unit and the wireless remote controller. Either of these room temperature sensors can operate.

The system is shipped from the factory set to the indoor unit sensor. To switch to the remote controller sensor, press the sensor switching button (* mark) on the rear of the remote controller and check that A/C SENSOR on the LCD display panel goes out.

NOTE

If the sensor switch is set to the remote controller side, but no room temperature data is sent to the main unit for 10 minutes, the sensor is automatically switched to the indoor unit side. As much as possible, install the remote controller facing the unit.

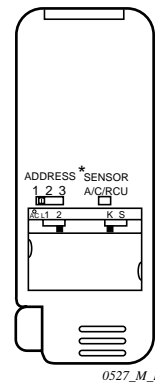


Fig. 7-8

7-7. Address Switches

If you are installing more than 1 indoor unit (up to 3) in the same room, it is necessary for you to assign each unit its own address so they each can be operated by their remote controller.

Up to 3 indoor units can be controlled separately through the address switches. The operating control has the reception address switch and the remote controller has transmission address switch. This function is utilized by matching the transmission and reception address switches.

EX) 3 indoor units in 1 room

Operating indoor units A, B, and C with their own remote controllers		Operating indoor units A, B, C with 1 remote controller.	
Main unit type	Indoor unit address switch position (reception)	Remote controller address switch position (transmission)	
A unit			Align both the indoor unit and remote controller address switch positions at the same number.
B unit			
C unit			

* Reception may be impossible if the remote controller is too far away. In this case, either use individual control or group control.

7-8. Setting the Model Code

Check that the model code switch within the remote controller battery compartment matches following.

Setting the model code

1	2	K	S	Corresponding model
	■	■		4-way discharge, Ceiling suspended

7-9. Test Run Switch

Test run switch is located at operating control unit.

See Fig. 7-10.

Regarding the test run, please refer to section 11. Test Run.

NOTE

- In case of 4-way air discharge type, test run operation is not possible without the ceiling panel installation.
- During the test run, all of the 3 indicator lamps on the indoor unit will flash.
- During the test run, the air conditioner runs continuously and the thermostat does not control the system.
- To protect the air conditioner from overloading, the outdoor unit will not start running for 3 minutes after power is applied or the air conditioner is turned off and then back on.
- When the air conditioner fails to start the test run, 1 or more of the 3 alarm indicator lamps on the indoor unit will flash (See next section).

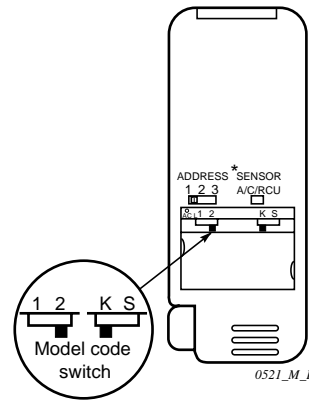


Fig. 7-9

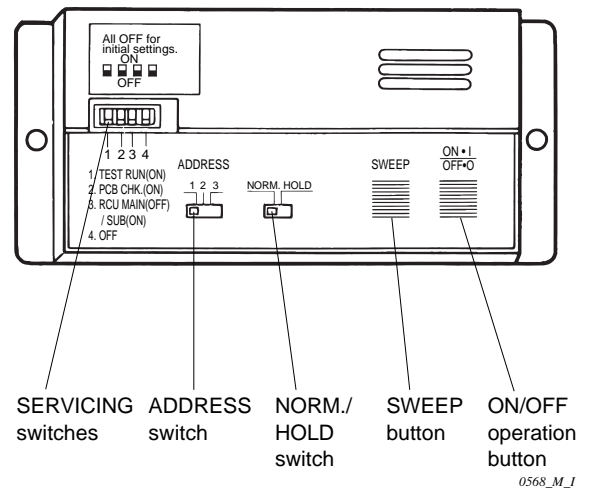


Fig. 7-10

7-10. Misoperation Alarm Indicators

Alarm indicator lamps on the indoor unit indicate the error cause when the air conditioner fails to operate upon being switched on. The possible alarm indications are given in Table 7-1. Fig.7-11 shows the location of the alarm lamps on the indoor unit. (See Table 7-1, Fig. 7-11)

Table 7-1

Alarm			Cause of Trouble
OPERATION lamp	TIMER lamp	STANDBY lamp	
☼	●	●	S.C. errors* between the indoor unit's controller (PCB) and the remote controller.
●	☼	●	Compressor protector is working.
●	●	☼	S.C. errors between indoor and outdoor units.
☼	☼	●	Indoor or outdoor thermistor is malfunctioning.
☼	●	☼	Outdoor unit protector is working.
●	☼	☼	Indoor unit protector is working.
☼	☼	☼	TEST RUN switch on the operation controller is in ON state.

* S.C. : Serial communications

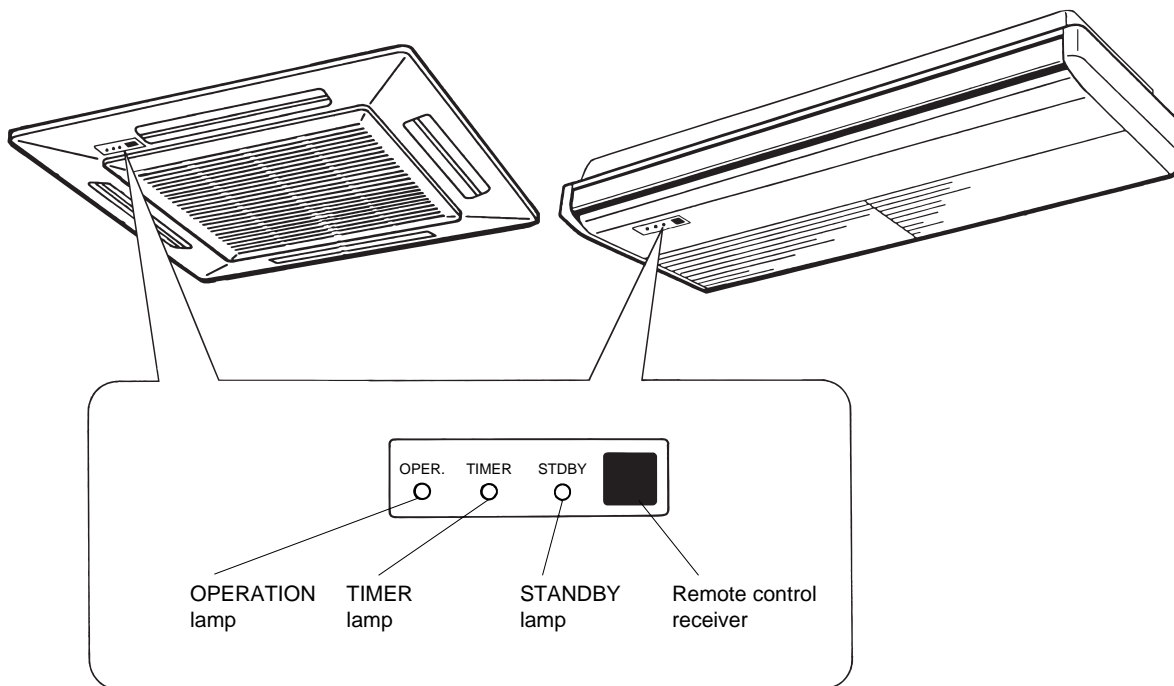


Fig. 7-11

0569_M_1

NOTE

Stick the alarm message label accompanying with the wireless remote controller on the electrical component box to find the cause of trouble in case of need.

7-11. Wireless Remote Controller Installation

The remote controller can be operated from either a non-fixed position or a wall-mounted position.

To ensure that the air conditioner operates correctly, do not install the remote controller in the following places:

- In direct sunlight.
- Behind a curtain or other place where it is covered.
- More than 8 m away from the air conditioner.
- In the path of the air conditioner's airstream.
- Where it may become extremely hot or cold.
- Where it may be subject to electrical or magnetic interference.

(1) If Non-fixed Position

Raise the rear plate of the remote controller mounting cradle and insert the remote controller. The unit can be used either in that position (placed on a table, for instance) or held in the hand. (Fig. 7-12)

(2) If Wall-mounted Fixed Position

Install the remote controller at a convenient location on a nearby wall. However, before attaching the remote controller mounting cradle, check that the remote controller can operate from the desired wall position. (Fig. 7-13)

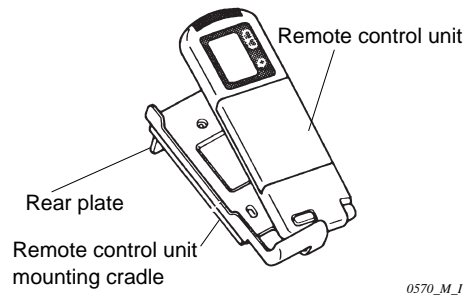


Fig. 7-12

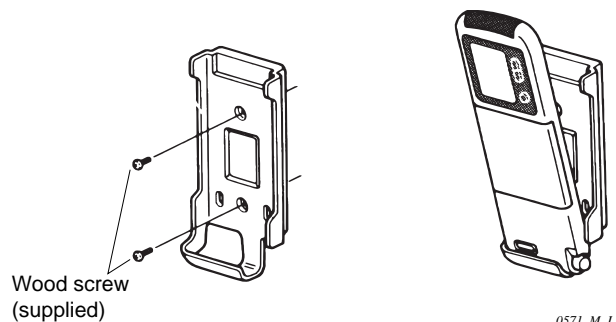


Fig. 7-13

■ How to Install Batteries

See Fig. 7-14.

- (1) Press and slide the lid on the back of the remote controller in the direction of the arrow.
- (2) Install two AAA alkaline batteries. Make sure the batteries point in the direction marked in the battery compartment.
- (3) Press the ACL button, then replace the lid. If you press it, the current time, ON time, and OFF time are all reset to 0:00.

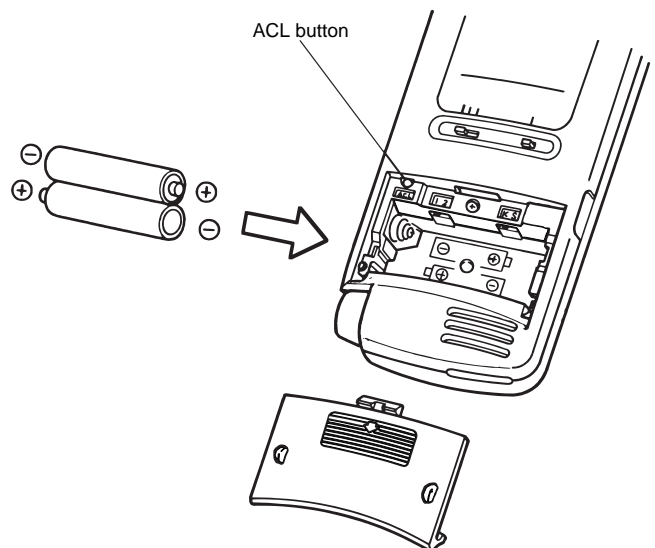


Fig. 7-14





8. How to Install the Weekly Timer (Optional Controller)







WARNING

Do not supply power to the unit or try to operate it until the tubing and wiring to the outdoor unit is completed.

Accessories

No.	Accompanying parts	Q'ty
①	Weekly timer 	1
②	Connecting wiring length 1.2 m 	2
③	Screws M4 x 25 	2
④	Wooden screws 	2

No.	Accompanying parts	Q'ty
⑤	Spacer 	2
⑥	Clampers 	2
⑦	Operation manual 	1
⑧	Installation manual 	1



CAUTION

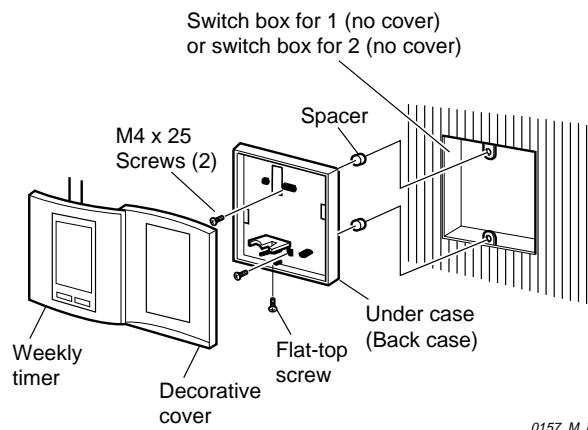
- Do not twist the control wiring with the power wiring or run it in the same metal conduit, because this may cause malfunction.
- Install the weekly timer away from sources of electrical noise.
- Install a noise filter or take other appropriate action if electrical noise affects the power supply circuit of the unit.

The mounting position for the weekly timer should be located in an accessible place for control. Never cover over the weekly timer or recess it into the wall.

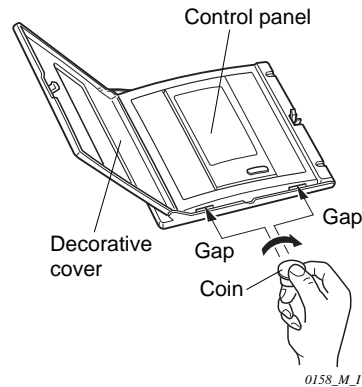
- (1) Remove the flat-top screw on the bottom of the back case. When you open up the decorative cover, you will see two gaps under the weekly timer. Insert a coin into these gaps and pry off the back case.

8-1. When Using a Wall Box for Flush Mounting

- If local codes allow, this weekly timer can be mounted using a conventional wall box for flush mounting.
- (2) Attach the back case with the 2 small screws provided. Using a screwdriver, push open the cut-outs on the back case. These holes are for screws. Use the spacers and take care not to tighten the screws excessively. If the back case will not seat well, cut the spacers to a suitable thickness.
 - (3) Connect the 4 wires to the weekly timer 4P terminal base. (see next page)
 - (4) To finish, fit the back case's tabs into the weekly timer and mount it using the flat-top screw.

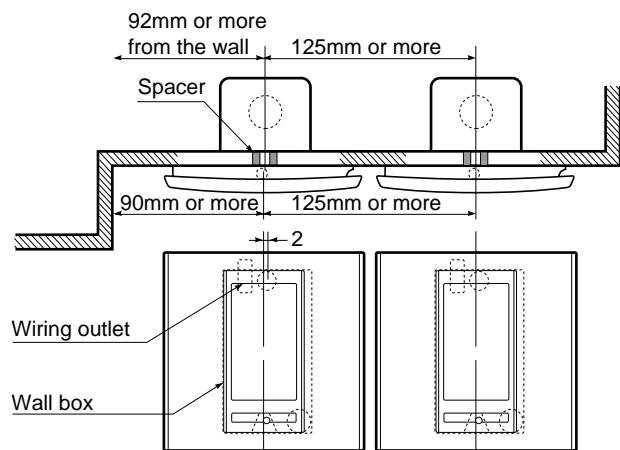


0157_M_1



0158_M_1

Mounting dimensions in case of continuous installation

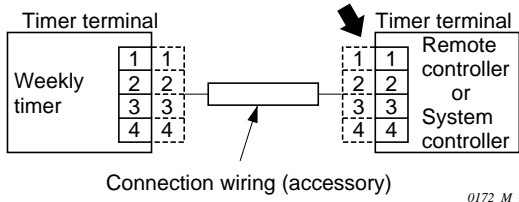


0171_M_1

- In case of vertically continuous installation, the space between the weekly timer and controller must be 25 mm or more.

8-2. Wiring Diagram

(for wiring, invariably use the accompanying wiring)



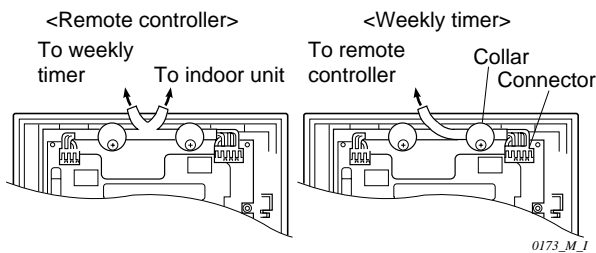
● Layout

The weekly timer and remote controller may be located, either one on the left or right sides.

● Wiring procedure

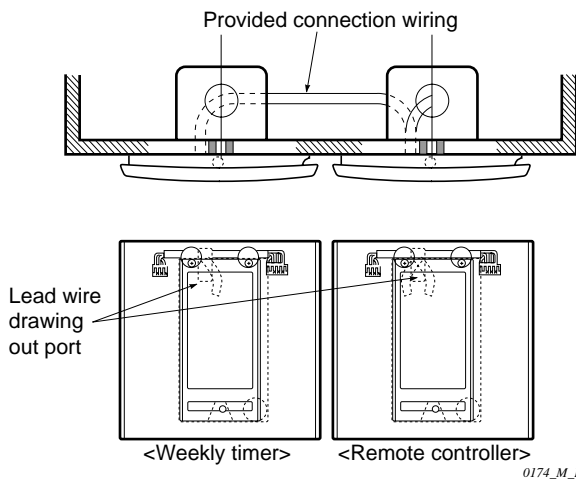
Do the wiring according to the following procedure.

- Loosen the retaining screw of the lead wire of weekly timer, remove the collar, and connect the provided connection wiring to the timer terminal (4P connector) of weekly timer. Place the provided connection wiring into the groove neatly, and then fit back the fastening collar.



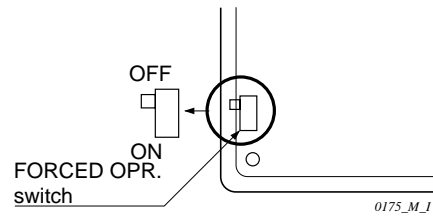
- Take out the provided connection wiring through the lead wire drawing out port on the bottom case of weekly timer, pass it behind the wall, and connect it to the timer terminal (4P terminal) of the remote controller.

(Use the provided fastening collar for fastening the wiring of remote controller).



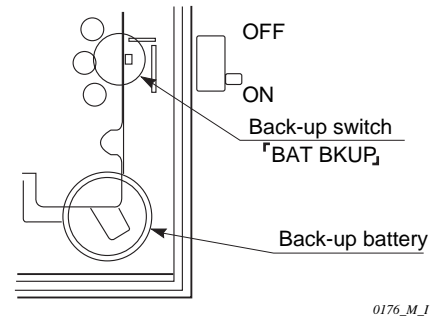
8-3. Test Run Setting

- After installation, check the output state of weekly timer with the "FORCED OPR." switch (OFF to ON) located on the rear side of its PCB. After confirming normal operation, turn the "FORCED OPR." switch back to OFF without fail.



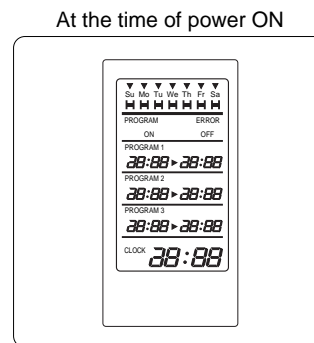
8-4. Memory Back Up Function for Power Failure Compensation

- This weekly timer keeps the settings of operating buttons memorized; so that after a power failure the operation can be restarted in the same set state by pressing the PROGRAM button.
- Using the "Back Up" After installation, confirm that the BAT.BKUP switch on the rear side of the weekly timer's PCB is ON.

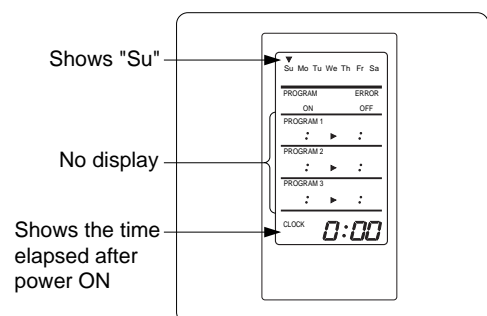


8-5. State at Time of Power ON

- When the power is turned ON, the weekly timer shows the following display.



After 5 sec.



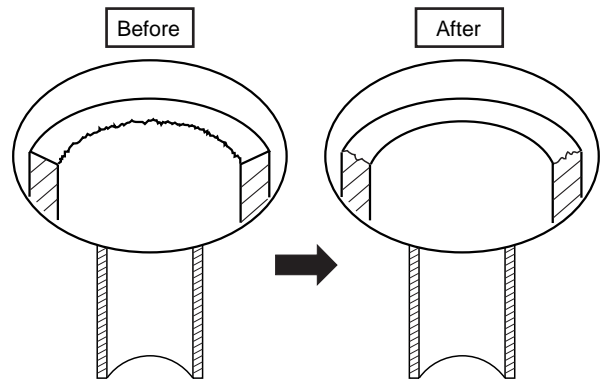
9. How to Process Tubing

The narrow tubing side is connected by flare, and the wide tubing side is connected by brazing.

9-1. Connecting Narrow Tubing Side

Use of the Flaring Method

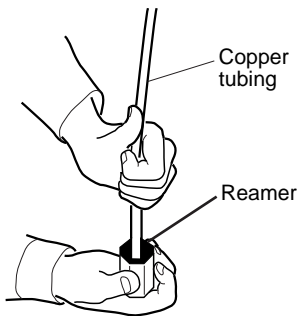
Many of the conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.



0126_M_I

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 file. This process is important and should be done carefully to make a good flare.

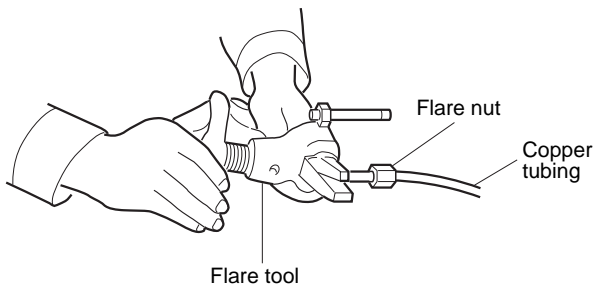


0127_M_I

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.*
*Use "RIGID" or equivalent.)



0128_M_I

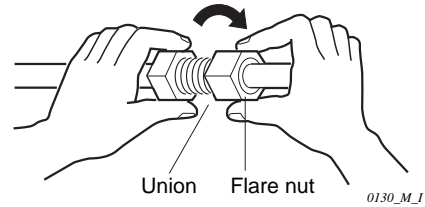
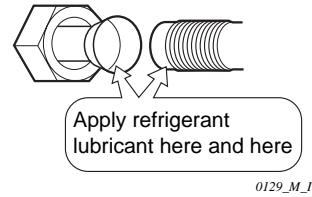
NOTE

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) Be sure to apply a sealing cap or water-proof tape to prevent dust or water from getting into the tubes before they are used.
 - (2) Be sure to apply refrigerant lubricant to the matching surfaces of the flare and union before connecting them together. 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 narrow tube (liquid tube) using a tube bender at the installation site and connect it to narrow tubing side (liquid tubing side) valve using a flare.



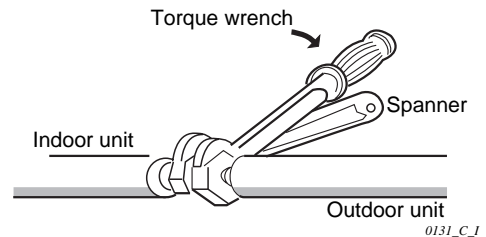
9-2. Connecting Wide Tubing Side

Cautions During Brazing

- Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process.
- Do not let the tubing get too hot during brazing. The nitrogen gas inside the tubing may over-heat, causing refrigerant system valves to become damaged. Consequently, let the tubing cool between brazing.

9-3. 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 specified torque as:



Tube Dia.	Tightening Torque
6.35 mm (1/4")	Approx. 140 — 180 kg-cm (120 — 160 lbs-in.)
9.52 mm (3/8")	Approx. 340 — 420 kg-cm (300 — 360 lbs-in.)
12.7 mm (1/2")	Approx. 490 — 610 kg-cm (430 — 530 lbs-in)
15.88 mm (5/8")	Approx. 680 — 820 kg-cm (590 — 710 lbs-in.)
19.05 mm (3/4")	Approx. 1000 — 1200 kg-cm (870 — 1040 lbs-in.)
25.4 (1) 28.58 (1-1/8") Bolt to fasten flange	Approx. 300 — 350 kg-cm (260 — 310 lbs-in.)

9-4. Insulation of Refrigerant Tubing

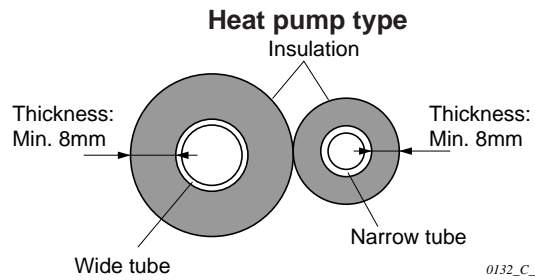


CAUTION

Always insulate tubes after draining water and completing leak tests on all connection points.

Important

To avoid condensation and water leaks, both the wide tube and narrow tube must be insulated with the insulation materials (field supply).



0132_C_I

Taping the flare nuts

Wind white insulation tape around the flare nuts at the wide tube connections. Then cover up the tubing connections with the flare nut insulator, and fill the gap at the union with the supplied black insulation tape.

Finally, fix the insulator at both ends with plastic clamps.

Insulation material

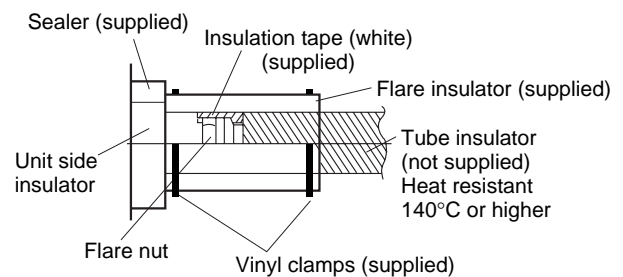
The material used for insulation must have good insulation characteristics, be easy to use, be age resistant, and must not easily absorb moisture.



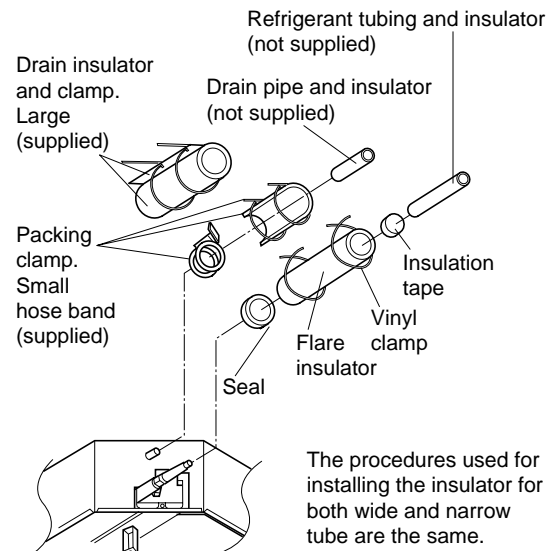
CAUTION

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.

Refrigerant tubing



0134_X_I



0135_X_I

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

9-5. Taping the Tubes

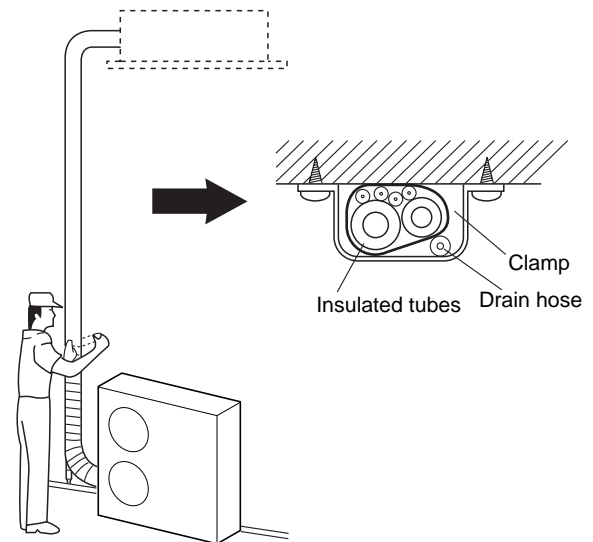
- (1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped with armoring tape as 1 bundle. To prevent the condensate from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.
- (2) Wrap the armoring tape from the bottom of the 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. every 1m.

NOTE

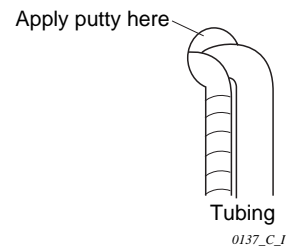
Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also be sure the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

9-6. 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.



0136_M_1



10. Air Purging

Air and moisture remaining in the refrigerant system have undesirable effects as indicated below.

- pressure in the system rises
- operating current rises
- cooling (or heating) efficiency drops
- moisture in the refrigerant circuit may freeze and block capillary tubing
- water may lead to corrosion of parts in the refrigerant system

Therefore, the indoor unit and tubing between the indoor and outdoor unit must be leak tested and evacuated to remove any noncondensables and moisture from the system.

■ Air Purging with a Vacuum Pump (for Test Run)

Preparation

Check that each tube (both narrow and wide) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Remove the valve caps from both the wide and narrow service valves on the outdoor unit. Note that both narrow and wide tube service valves on the outdoor unit are kept closed at this stage.

Leak test

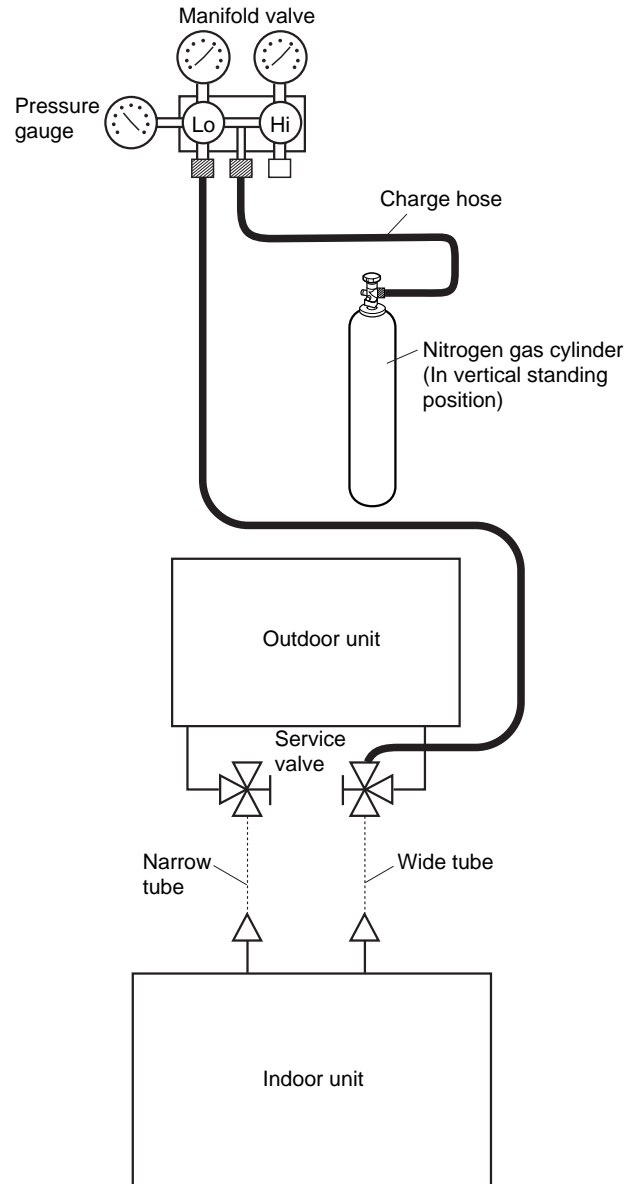
- (1) With the service valves on the outdoor unit remaining closed, remove the 1 / 4 in. flare nut and its bonnet on the wide tube service valve. (Save for reuse.)
- (2) Attach a manifold valve (with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.



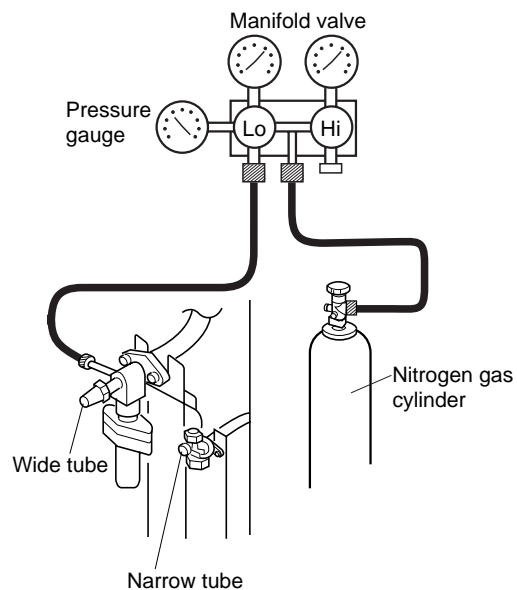
CAUTION

Be sure to use a manifold valve for air purging. If it is not available, use a stop valve for this purpose. The “Hi” knob of the manifold valve must always be kept closed.

- (3) Pressurize the system to no more than 30 kg/cm²G with dry nitrogen gas and close the cylinder valve when the gauge reading reaches 30 kg/cm²G. Then, test for leaks with liquid soap.



0138_C_1



0139_C_1



CAUTION

To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than its bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position. (Refer to the previous page)

- (4) Do a leak test of all joints of the tubing (both indoor and outdoor) and both wide and narrow service valves. Bubbles indicate a leak. Be sure to wipe of the soap with a clean cloth after a leak test.
- (5) After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.

Evacuation

- (1) Attach the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit. Confirm that the “Lo” knob of the manifold valve is open. Then, run the vacuum pump. The operation time for evacuation varies with the tubing length and capacity of the pump. The following tables shows the amount of time for evacuation:

Required time for evacuation when 30 gal/h vacuum pump is used	
If tubing length is less than 15 m	If tubing length is longer than 15 m
45 min. or more	90 min. or more

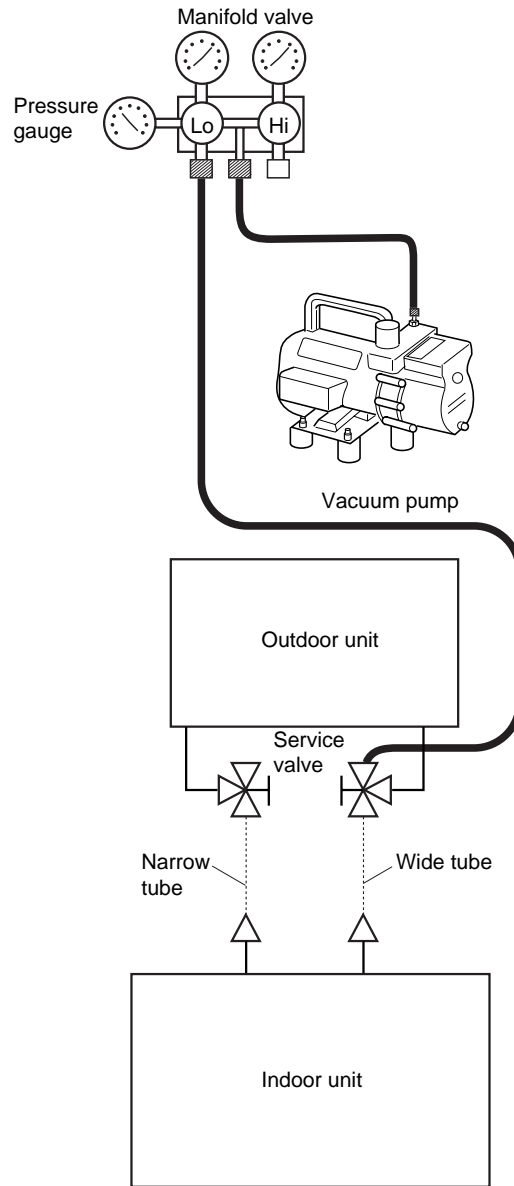
NOTE

The required time in the above table is calculated based on the assumption that the ideal (or target) vacuum condition is around 10 mmHg abs.

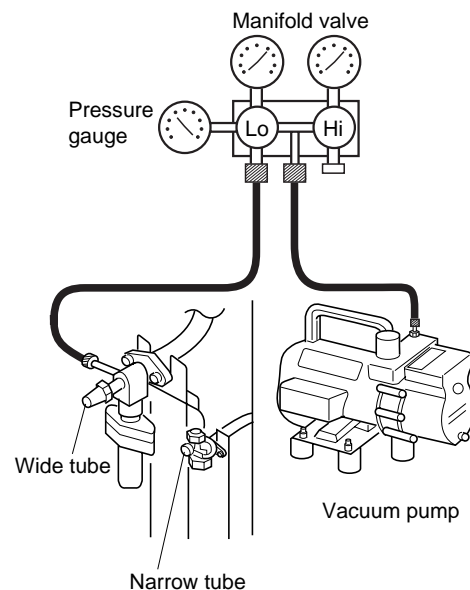
- (2) When the desired vacuum is reached, close the “Lo” knob of the manifold valve and stop the vacuum pump.

Charging additional refrigerant

- Charging additional refrigerant (calculated from the narrow tube length as shown in Sec. 1-7) using the narrow tube service valve.
- Be sure to use a weight scale for accurate charging.



0140_C_1



0141_C_1



- If the calculated additional refrigerant charge amount cannot be charged at once, charge the balance refrigerant in a gas condition by using the wide tube service valve with the system in cooling operation mode.

Finishing the job

- (1) With a hex wrench, turn the narrow tube service valve stem counter-clockwise to fully open the valve.
- (2) Turn the wide tube service valve stem counter-clockwise to fully open the valve.

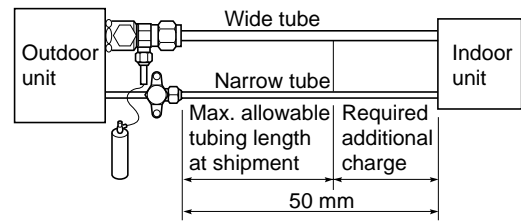


CAUTION

To avoid gas from leaking when removing the charge hose, make sure the stem of the wide tube is turned all the way out (“BACK SEAT” position).

- (3) Loosen the charge hose connected to the wide tube service port (1 / 4 in) slightly to release the pressure, then remove the hose.
- (4) Replace the 1 / 4 in. flare nut and its bonnet on the wide tube service port and fasten the flare nut securely with an adjustable wrench or box wrench. This process is very important to prevent gas from leaking from the system.
- (5) Replace the valve caps at both wide and narrow service valves and fasten them securely tight.

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



0573_M_I

11. How to Install the Ceiling Panel

■ 1-Way Air Discharge Semi-Consaled Type

11-1. Installing the Ceiling Panel

- (1) Screw the M5 × 40 screws provided (in the unit packing) into 4 points on the flange face of the unit body bolted to the ceiling. Screw in the screws to extent such that distance between the bottom of the screw head and the bottom face of the flange is at least 19.05 mm. (Fig. 11-1)
- (2) Next, lift the ceiling panel in this position so that the 4 protruding screws pass through the key hole-shaped openings in the panel, then shift the panel sideways until it is caught by the screws.
- (3) Keeping the ceiling panel in this position, check to see if the joining edge of the ceiling panels are in line with those of the ceiling material.
If they are not in line, remove the ceiling panel and finely adjust the suspension position of the unit body.
- (4) Once the joining edges are properly aligned with each other, install the accessory stoppers into the key hole-shaped openings, then screw in the 4 screws until the ceiling panel touches the flange face of the unit body.

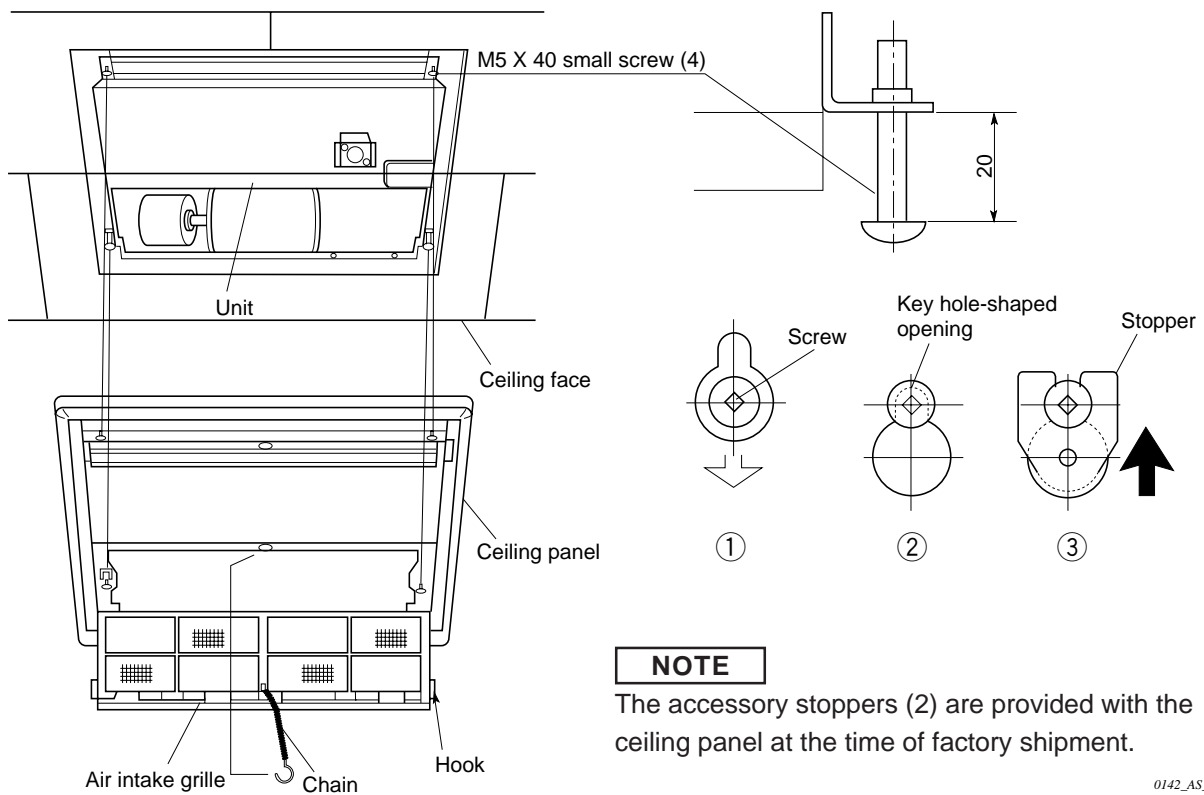


Fig. 11-1

11-2. How to Use the Accessory Stoppers

- (1) Pass through screws on the unit body into the key hole-shaped opening on the panel.
- (2) Then, shift the panel sideways until it is caught by the screws.
- (3) Insert stoppers (ccessory parts) in the direction of the arrow as shown, confirm that the bent portion of each stopper is securely in the hole, A and B, then tighten the screw. (Fig. 11-1)

■ **2-Way Air Discharge Semi-Concealed Type**

11-3. Before Installing the Ceiling Panel

- (1) Adjust the distance between the unit and the surface of the ceiling (60 mm) using the 2 hexagonal nuts as shown in Fig. 11-2 while paying attention to the accessory installation gauge.
- (2) Remove the air intake panel and the air filter from the ceiling panel as shown in Fig. 11-3 and 11-4.

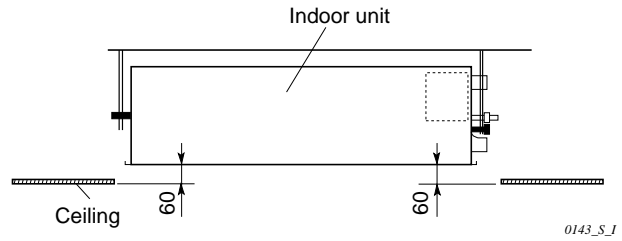


Fig. 11-2

②
S



CAUTION

Never touch or attempt to move the air direction louver by hand or you may damage the unit. Instead, use the remote controller if you want to change the direction of air flow.

How to remove the air intake panel (from either side) (Fig.11-4)

- ① Push in. → ② Slide. → ③ Pull.
- ④ Remove.

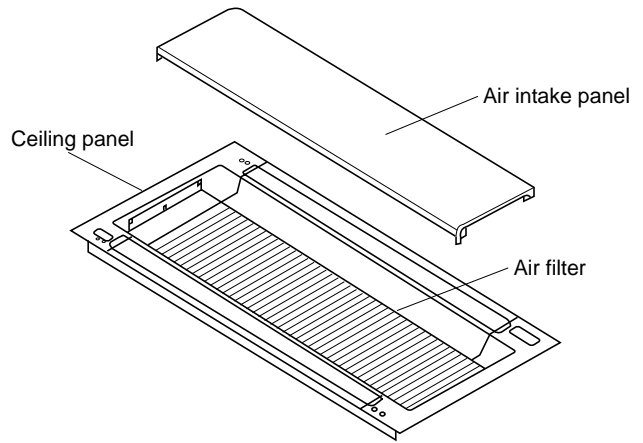


Fig. 11-3

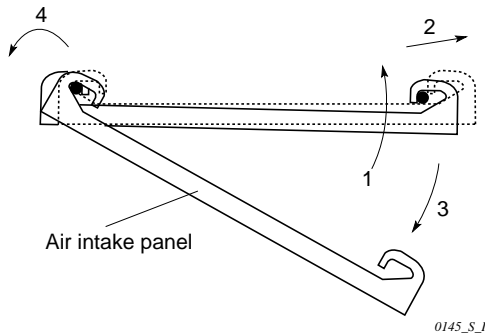


Fig. 11-4

11-4. Installing the Ceiling Panel

- (1) Lift the ceiling panel and position it to align the panel catches with the catch recesses of the indoor unit.
- (2) Hook the stationary catch first and then press up on the opposite side to engage the level catch to install as shown in Figs. 11-5 and 11-6.

NOTE

The ceiling panel must be mounted correctly. Listen for the click to determine it is securely shut.

- (3) Next, check to see that the ceiling panel is properly aligned with the seamline of the ceiling. If it is not, remove the ceiling panel and slightly readjust the indoor unit body to the proper suspension point.
- (4) When the ceiling panel has been properly aligned, use the provided 4 mounting screws (M5) with washers to permanently fasten the ceiling panel.
- (5) Connect the wiring connector from the ceiling panel to the connector inside the indoor unit (15P connector if heat pump model) inside the electrical component box. After doing the connection, use the clamp on the indoor unit body to secure the wiring.

NOTE

If the connector is not connected, a misoperational signal ("P9" on the remote control display) will be displayed when the unit is turned on.

- (6) Install the air filter and air intake grille by performing the steps in Figs. 11-3 and 11-4 in reverse.

11-5. When Removing the Ceiling Panel for Servicing

When removing the ceiling panel for servicing, remove the air intake grille and air filter, disconnect the wiring connector inside the electrical component box, and then remove the 4 mounting screws.

Release one side of the panel by pressing the panel catch in the direction of the arrow(*). Completely remove the ceiling panel by disengaging the stationary catch (Fig. 11-6).

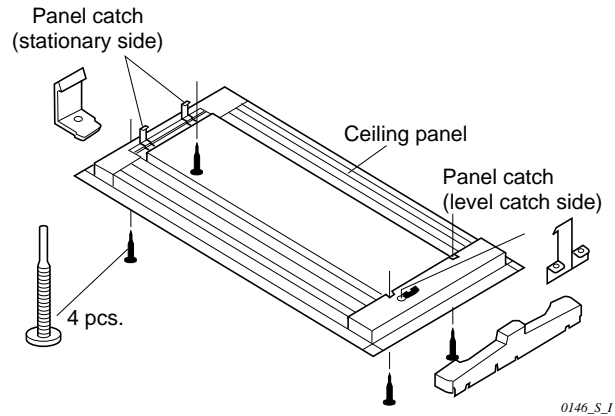


Fig. 11-5

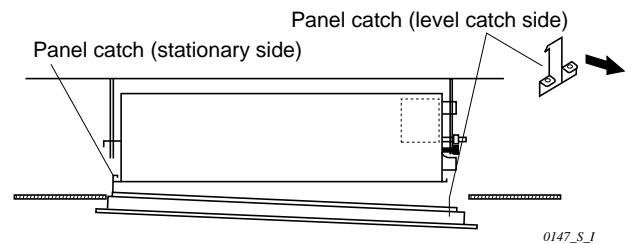


Fig. 11-6

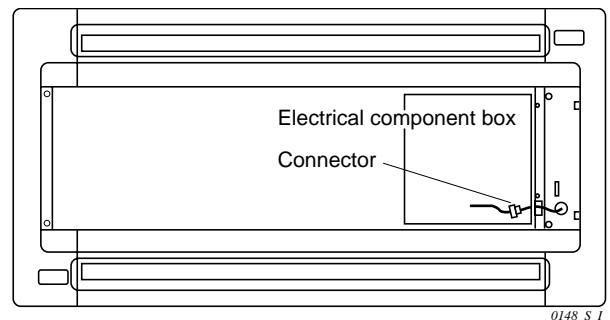


Fig. 11-7

■ 4-Way Air Discharge Semi-Concealed Type

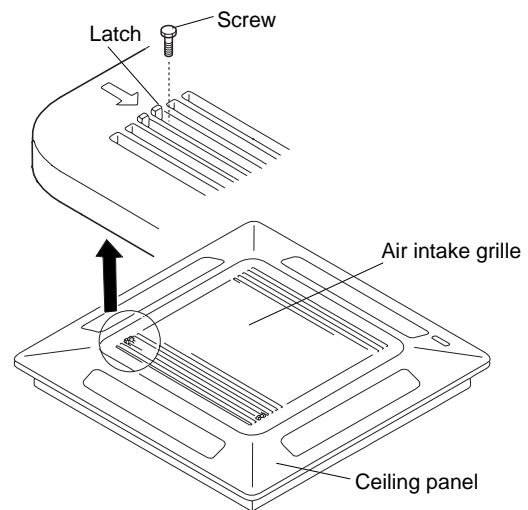


CAUTION

Never touch or attempt to move the air direction louver by hand or you may damage the unit. Instead, use the remote controller if you want to change the direction or air flow.

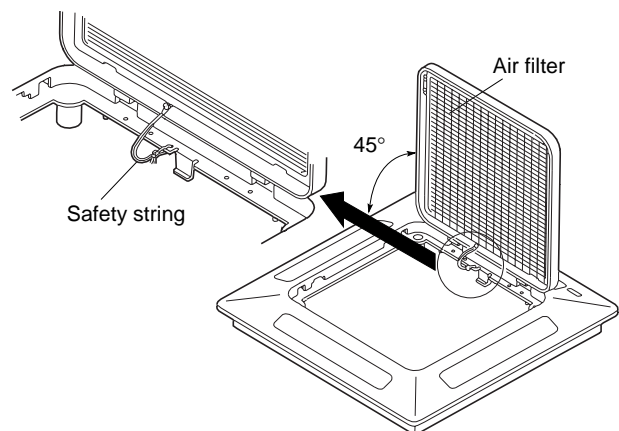
11-6. Before Installing the Ceiling Panel

- (1) Remove the air intake grille and air filter from the ceiling panel.
(Figs. 11-8 and 11-9)
 - (a) Remove the 2 screws by the latch from the air intake grille. (Fig. 11-8)
 - (b) Press on the 2 latches of the air intake grille with your thumb in the direction of the arrow to open the grille. (Fig. 11-8)
 - (c) With the air intake grille open about 45°, remove the safety string (hook on the grille side). (Fig. 11-9)
 - (d) Pull the air intake grille towards you to remove it from the ceiling panel.
- (2) Pull down the two panel catches of indoor unit body. (Fig. 11-10)



0149_X_I

Fig. 11-8



0150_X_I

Fig. 11-9

11-7. Installing the Ceiling Panel

- (1) Lift the ceiling panel and position it to align the panel hook with the panel catch of the indoor unit.

NOTE

The ceiling panel must be mounted in the correct direction. Note that the 2 catches of the panel differ in size.

Be sure to confirm that the catches are correctly matched between the ceiling panel and the indoor unit body.

- (2) Next, check to see that the ceiling panel is properly aligned with the seamline of the ceiling. If it is not, remove the ceiling panel and slightly readjust the indoor unit body to the proper suspension point.
- (3) When the ceiling panel has been properly aligned, use the provided 4 mounting screws (M5) with washers to permanently fasten the ceiling panel.
- (4) Connect the wiring connector from the ceiling panel to the connector inside the indoor unit inside the electrical component box. After doing the connection, use the clamp on the indoor unit body to secure the wiring.

NOTE

If the connector is not connected, a misoperation signal ("P9" on the remote control display) will be displayed when the unit is turned on.

- (5) Install the air filter and air intake grille by performing the steps in section 11-6 in reverse.

NOTE

Be sure to rehook its safety string before closing the air intake grille.

11-8. When Removing the Ceiling Panel for Servicing

When removing the ceiling panel for servicing, remove the air intake grille and air filter, disconnect the wiring connector inside the electrical component box, and then remove the 4 mounting screws.

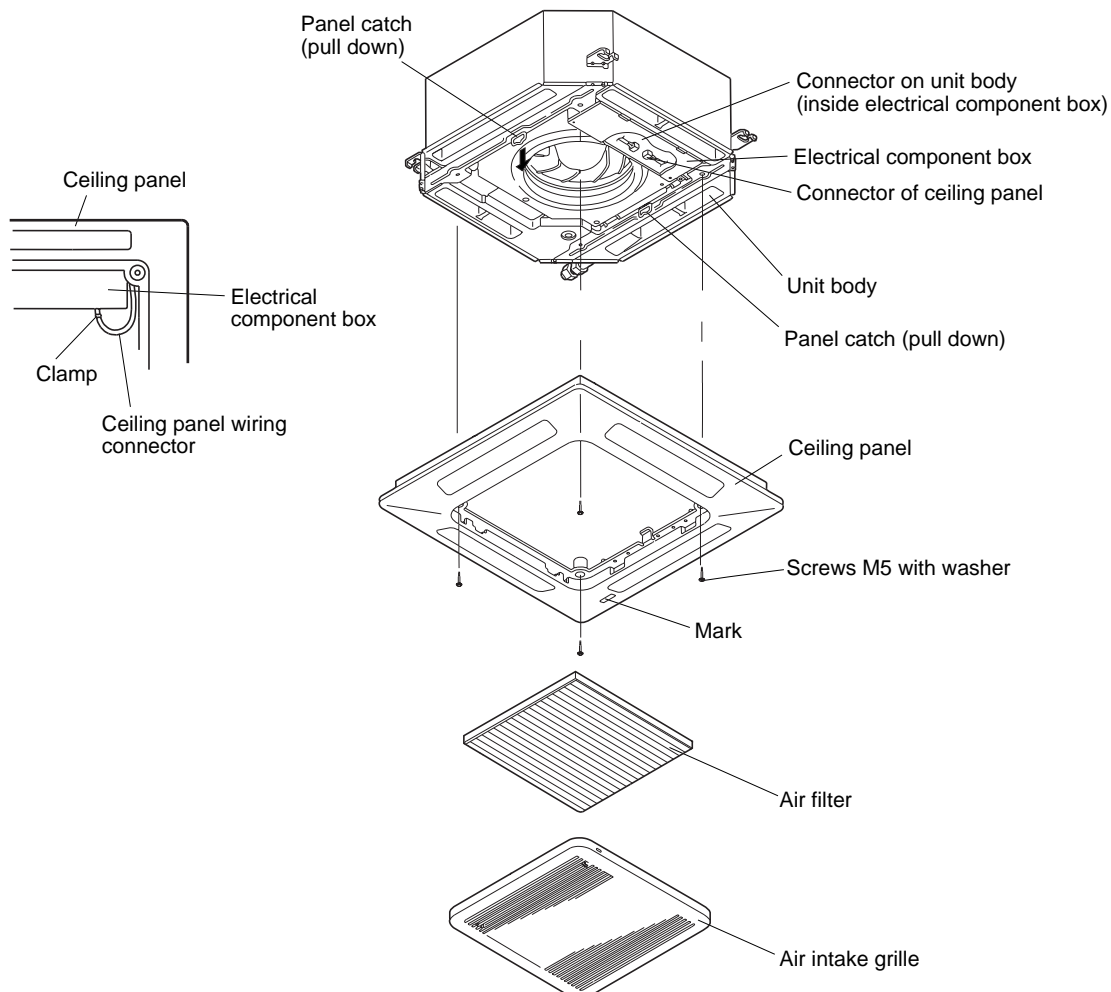


Fig. 11-10

0151_X_I

11-9. Adjusting the Motor Flap

The air direction louver on the ceiling panel outlet can be adjusted as follows.

- Adjust the louver to the desired angle using the remote controller. The louver also has an automatic air-sweeping mechanism.

NOTE

- Never attempt to move the louver by hand.
- Proper air flow depends on the location of the air conditioner, the layout of the room and furniture, etc. If cooling or heating seems inadequate, try changing the direction of the air flow.

3

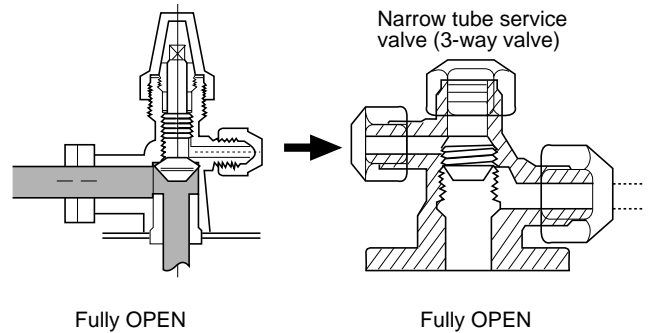
X

12. Test Run

12-1. Preparing for Test Run

● **Before attempting to start the air conditioner, check the following:**

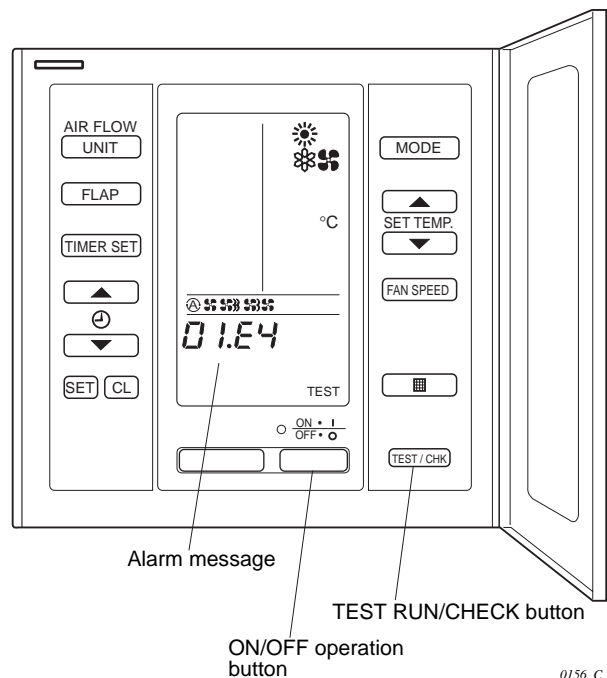
- (1) All loose matter is removed from the cabinet especially steel filings, bits of wire, and clips.
- (2) The control wiring is correctly connected and all electrical connections are tight.
- (3) The protective spacer for the compressor used for transportation has been removed. If not, remove them now.
- (4) The transportation pads for the indoor fan have been removed. If not, remove them now.
- (5) Both the wide and narrow tube service valves are open. If not, open them now.



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● **Test run procedure**

- The purpose of the test run function is to let you control the operation of the unit directly without the thermostat turning the unit on or off. As indicated in the following procedure, be sure to switch out of TEST RUN when you are finished, or the air conditioner can be damaged because it won't cycle on and off normally.
 - To protect the air conditioner from overloading, the outdoor unit will not start running for 3 minutes after power is applied or the unit is turned OFF.
- a Press the **TEST / CHK** button at the bottom right on the remote controller.
 - b Press the **ON / OFF** operation button to start the test run.
 - c Press the **MODE** button to select either COOL or HEAT mode.
 - d When the test run has started, "TEST" shows on the remote controller's display.
 - e During the test run, the air conditioner runs continuously and the thermostat does not control the system.
 - f After the test run, be sure to press the **TEST / CHK** button once again to cancel this mode and be sure "TEST" is not shown on the display.



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CAUTION

The TEST RUN button is used only for servicing the air conditioner. Do not press this button for normal operation, or the system may be damaged.

12-2. PCB Setting

● Setting of outdoor control PCB

(A) Standard control (single outdoor unit)

In case of single outdoor unit installation, even if in case of twin, triple or quartet type (2, 3 or 4 indoor units), no setting necessary.

Keep factory shipment state (R.C. address is set in "0").

In this case, auto. address operation takes place automatically for the first time when the power is switched on. This takes about a few minutes.

(B) Group control (Multiple outdoor units)

In case of group control (up to 8 indoor units can be connected with one remote controller), before turning the power supply on set the R.C. address with S2, S3 on the outdoor control PCB.

R.C. address: Refrigerant circuit address 1 ~ 30.

Regarding the example of R.C. address for group control, please refer to page 53 and sec. 12-3 (page 87).

(C) Central control (when using the system controller)

In case of central control (when using the system controller, that is, when linking outdoor units in a network),

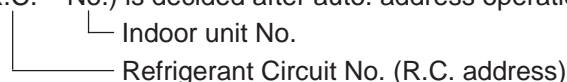
- (a) Before turning the power supply on, set the R.C. address with S2, S3 on the outdoor control PCB.
- (b) Remove the short plug (CN4, 2P Black) from all outdoor units except any one of outdoor unit.

Regarding the example of R.C. address for central control and the position of CN4, please refer to page 54 and sec. 12-3 (page 87).

● Setting of indoor control PCB

No setting necessary.

Each indoor unit address (UNIT No.: R.C. – No.) is decided after auto. address operation.

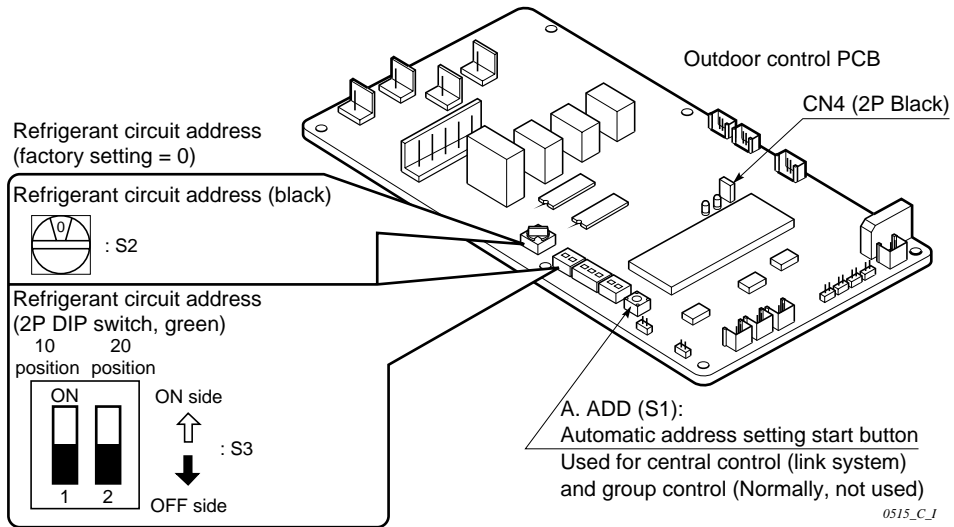


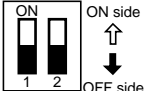

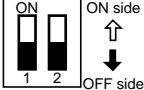



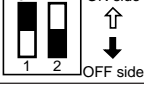

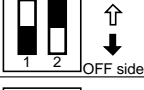



Manual setting for indoor unit address can be performed also by remote controller.

12-3. R.C. Address Setting Method

Outdoor unit R.C. address setting method

In case of group control or central control, set the R.C. address to 1, 2, 3, ... according to the No. of outdoor units.



R.C. address	R.C. address (S3 2P dip switch, green)	R.C. address (S2 Rotary switch, Black)
00 auto address ("0" when shipped from factory)	Both OFF 	 Set to 0
02 (In case of No. 2 outdoor unit)	Both OFF 	 Set to 2
03 (In case of No. 3 outdoor unit)	Both OFF 	 Set to 3
11 (In case of No. 11 outdoor unit)	10's digit ON 	 Set to 1
21 (In case of No. 21 outdoor unit)	20's digit ON 	 Set to 1
30 (In case of No. 30 outdoor unit)	10's digit and 20's digit ON 	 Set to 0

12-4. Automatic Address Setting Method

— For group control and central control with multiple outdoor units —

Carry out automatic address setting with the remote controller.

- (1) All auto. address operation
 - ① Press the **TEST / CHK** and **▲ (⊕)** buttons at the same time for more than 4 seconds.
 - ② Press the **SET** button after confirming the CODE No. AA (CODE No. AA: All Auto. address operation).

After addresses are automatically set in order for the outdoor units from No. 1 to No. 30, the system returns to the normal stopped state.
- (2) Individual auto. address operation for each refrigerant circuit
 - ① To select each refrigerant circuit individually and set addresses automatically, press the **TEST / CHK** and **▲ (⊕)** buttons at the same time for more than 4 seconds, then press the **▲** , **▼** (SET TEMP) button once to set CODE No. A1. (CODE No. A1: Auto. address operation)
 - ② Select R.C. No. which you want to execute the auto. address operation with **UNIT** button.
 - ③ Press the **SET** button. The auto. address operation will start. CODE No. changes from flashing to ON state.
 - ④ If the error is happened during the operation, the alarm message will display. Check and remove the cause. If you want to interrupt the operation, press the **CL** button then the unit stands in waiting mode (Press the **SET** button).
 - ⑤ If the auto. address operation finishes, the display will disappear.
 - ⑥ Execute the operation of the other R.C. line in the same way by following the above steps ② to ③.
 - ⑦ Complete the auto. address operation by pressing the **TEST / CHK** button.

NOTE

Required time for auto. address operation:

In case of group control : a few minutes for each R.C.

In case of central control : max. about 20 min. for each R.C.

12-5. Displaying Indoor / Outdoor Unit Combination Numbers

Display the indoor / outdoor unit address after automatic address setting.

- (1) When installing multiple units, match the indoor unit address numbers and the outdoor R.C. address numbers and display them at an easy-to-check location (near the nameplate) with an oil-based magic marker or other indelible marker so that the individual indoor and outdoor unit combinations can be checked.

Example:

Outdoor Unit 1 – Indoor Units 1-1, 1-2, 1-3,

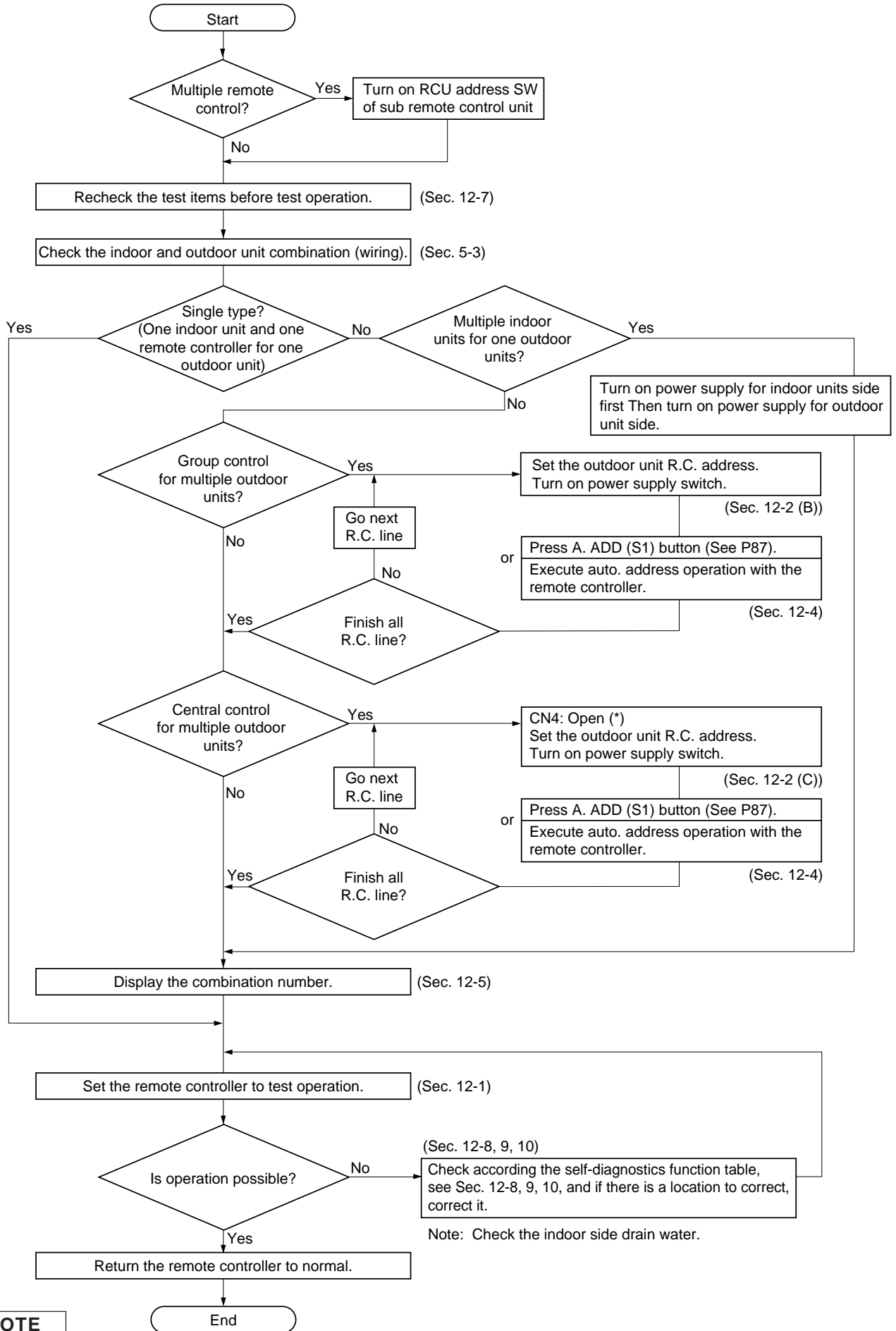
Outdoor Unit 2 – Indoor Units 2-1, 2-2, 2-3,

- (2) This is necessary for maintenance. Always label these.

*Check indoor unit address with the remote controller. Press the **TEST / CHK** button for at least 4 seconds and check the indoor unit address with the **UNIT** button. (Each time you press the **UNIT** button, the address changes 1-1, 1-2, ... 2-1, 2-2, ...) The fan for only the selected indoor unit turns on at high speed, so check which indoor unit runs and label the indoor unit address. (If there is 1 outdoor unit, the addresses are 1-1, 1-2, ...)

When you press the **TEST / CHK** button again, the system returns to normal remote control mode.

12-6. Test Run Procedure



NOTE

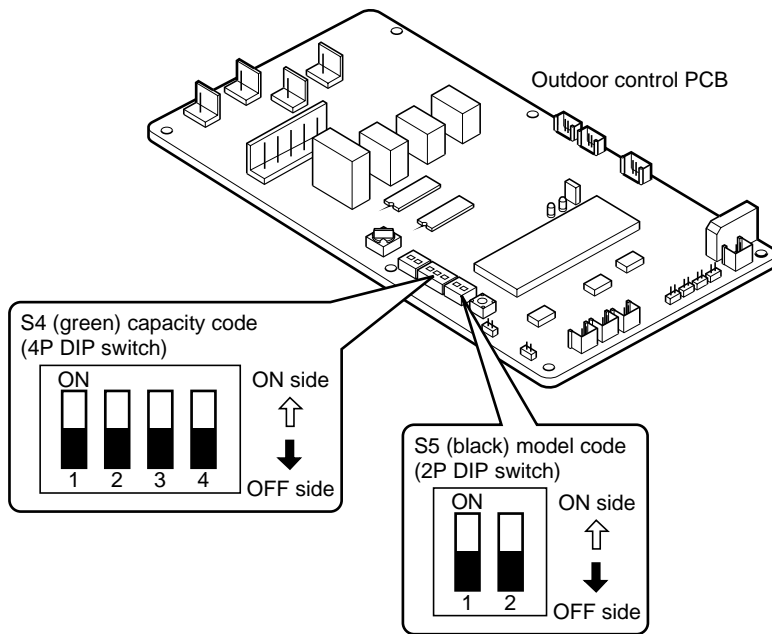
- 1) One of CN4 of all linked outdoor units should be short.
- 2) In case of using system controller, zone registration is required after finishing Test run. Regarding the zone registration, please refer to Installation Instructions attached with system controller.

0509_M_I

12-7. Items to Check Prior to Test Run

- (1) Turn on the power supply switch more than 5 hours before in order to charge the crank case heater.
- (2) Fully open the outdoor service valve after making the leak inspection of field connected tubing, vacuuming, and gas charging if necessary.
- (3) Check the capacity code and model code setting.
 - * The factory setting is as shown in the table. Double check it.
 - * The capacity code is set by S4 (green, 4P DIP switch) on outdoor control PCB.

The model code is set by S5 (black, 2P DIP switch) on outdoor control PCB.



0510_C_1

S4. Capacity code

Model No.	No.	Outdoor PCB			
		1	2	3	4
25 type (1 phase)		ON	ON	ON	OFF
25 type (3 phase)		ON	ON	ON	OFF
36 type (3 phase)		OFF	ON	OFF	ON
48 type (3 phase)		OFF	OFF	ON	ON

S5. Model code

Model No.	No.	Outdoor PCB	
		1	2
25 type (1 phase)		ON	OFF
25 type (3 phase)		OFF	OFF
36 type (3 phase)		OFF	OFF
48 type (3 phase)		OFF	ON

12-8. The Main Alarms of Mis-wiring & Mis-setting

Remote controller display	Cause		
	In case of individual remote control	In case of group control	In case of multiple remote control
Nothing displayed	<ul style="list-style-type: none"> Remote controller not properly connected. Power supply not ON. 		
E1	<ul style="list-style-type: none"> Remote controller not properly connected. 		
E4	<ul style="list-style-type: none"> Wiring connection fault of indoor/outdoor units 	<ul style="list-style-type: none"> Wiring connection fault of some indoor/outdoor units inside the group 	
	<ul style="list-style-type: none"> Power supply of outdoor unit not ON. 		
E6	<ul style="list-style-type: none"> Combination of indoor/outdoor units is wrong. * Power supply of some indoor unit is not ON. 		
E9	—	—	<ul style="list-style-type: none"> 2 main remote controllers set.
P9 (*)	<ul style="list-style-type: none"> Improper wiring connections of ceiling panel 		

* Ref: Alarm "P9" is not generated if the remote controller is set at test run.

12-9. The Main Alarms of Unit Troubles

Trouble detected		Remote controller display
Indoor protection	Fan motor protection thermostat	P1
Outdoor protection	Fan motor protection thermostat Compressor protection thermostat	P2
	Abnormal discharge temp.	P3
	High pressure switch	P4
Indoor protection	Float switch	P10
Indoor sensor	Open/or damaged	F1-F3
Outdoor sensor	Open/or damaged	F4-F9
Compressor protection	Compressor motor is overloaded.	H1
	Compressor motor is locked.	H2
	Compressor current detection circuit is abnormal.	H3

12-10. The Main Alarms of Power Supply Troubles

Cause		Remote controller display
Outdoor protection	Power supply voltage is abnormal. (More than 260 V or less than 160 V between L and N phase)	P2
	Negative phase or defective phase	P5
	Compressor contactor (Mg SW) is chattering.	H18

13. Pump Down

Pump down means collecting refrigerant gas in the system back into the outdoor unit without losing any of the gas. Pump down is used when the unit is to be moved or before servicing the refrigerant circuit.

Pump down procedure



CAUTION

Be sure to carry out pump down with the unit in cooling mode.

- (1) Connect the LO side charging hose of the manifold valve to the service port (B) on the wide tube service valve.
- (2) Using a hex wrench, turn the narrow tube service valve clockwise all the way to close the service valve.
- (3) Press the operation button and start cooling operation.
- (4) When the low pressure gauge reading falls to 1 to 0.5 kg/cm², fully close the wide tube valve stem with a standard screwdriver. Then quickly stop the unit.
- (5) Disconnect all gauges and hoses, and replace the bonnets and the valve caps as they were previously.
- (6) Purge all air remaining inside the tubing before operating the air conditioner.