

Компания Полель - официальный  
дистрибьютор **SANYO**

[www.poulel.ru](http://www.poulel.ru)  
[www.sanyo-airservice.ru](http://www.sanyo-airservice.ru)

т. (495) 101-30-99

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

## — ECO Multi System Air Conditioner —

### Model Combinations

Combine indoor and outdoor units only as listed below.

#### 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- U93GH56	SPW- U123GH56	SPW- U183GH56	SPW- U253GH56	SPW- U363GH56	SPW- U483GH56
⑦ D	Concealed-Duct High Static Pressure				SPW- D253GH56	SPW- D363GH56	SPW- D483GH56
⑧ F	Floor-Standing	SPW- F93GH56	SPW- F123GH56	SPW- F183GH56	SPW- F253GH56		
⑨ FM	Concealed Floor-Standing	SPW- FM93GH56	SPW- FM123GH56	SPW- FM183GH56	SPW- FM253GH56		
⑩ C	<b>Outdoor Units</b>	SPW - C483GYH8, SPW - C703GYH8, SPW - C903GYH8 SPW - C483GY8, SPW - C703GY8, SPW - C903GY8					
⑪	<b>Remote Controller</b>	RCS-SH80TG (Optional part)					
⑫	<b>Weekly Timer</b>	TM-WBG (Optional part)					

#### NOTE

- A maximum of 13 indoor units of various types and capacities can be connected to one indoor unit.
- Indoor units can be connected with a total maximum capacity of 130% of the outdoor unit capacity.
- The last digit(s) of the model number indicates the required power supply to the unit.

56 : 50 Hz, (single-phase), 220 - 230 - 240 V  
 8 : 50 Hz, 3N~ (3-phase), 380 - 400 - 415 V

↑  
 The last digit (s) of model number

#### OPERATING LIMITS

■ Maximum Conditions	Cooling	/	Heating
Outdoor temperature	: 43°C DB	/	15.5°C WB
Room temperature	: 25°C WB	/	27°C DB
■ Minimum Conditions			
Outdoor temperature	: -5°C DB	/	-15°C WB
Room temperature	: 14°C WB	/	15°C DB

## 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 your 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 **accidental 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

- Ventilate the room well, in the event that refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of poisonous gas.
- 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 when installation is finished. Check that no metal scraps or bits of wiring have been left inside the unit.



**CAUTION**

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

## Check of Density Limit

## Important

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

The refrigerant R-22 which is used in the air conditioner is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of R-22 is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power etc.

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

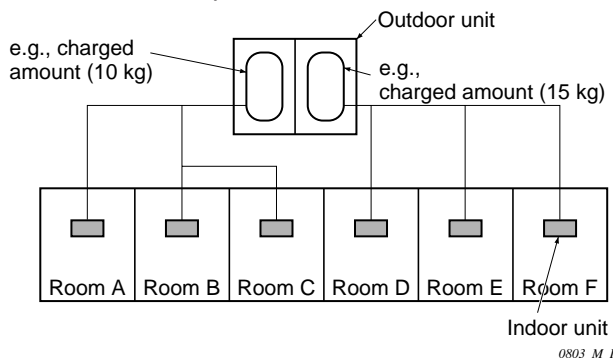
In a room where the density may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device. The density is as given below.

Total amount of refrigerant (kg)

Min. volume of the indoor unit installed room (m<sup>3</sup>)  
 $\leq$  Density limit (kg/m<sup>3</sup>)

The density limit of R-22 which is used in multi air conditioners is 0.15 kg/m<sup>3</sup>.

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



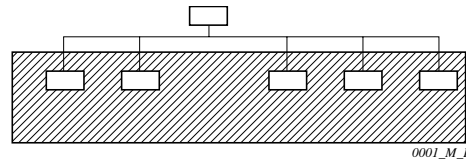
For the amount of charge in this example:

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

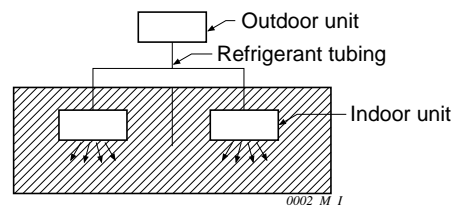
The possible amount of leaked refrigerant gas in rooms D, E and F is 15 kg.

**NOTE 2** : The standards for minimum room volume are as follows.

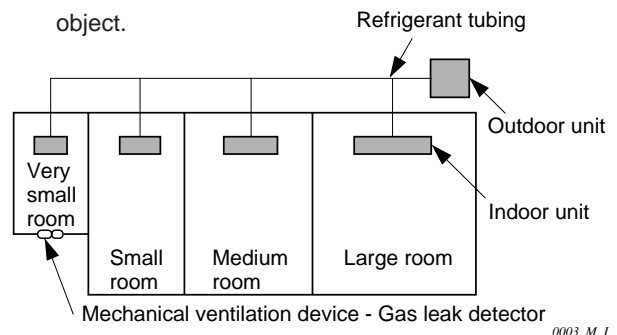
(1) No partition (shaded portion)



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

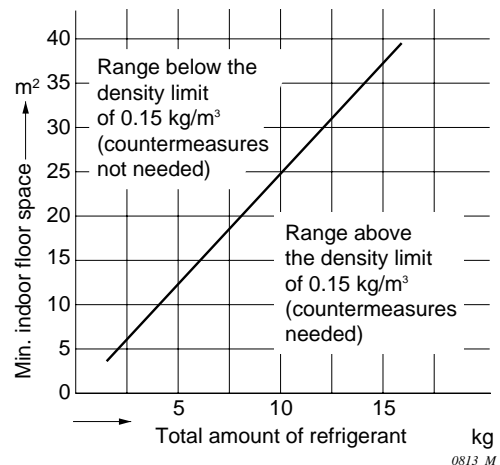


(3) If an indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest room of course becomes the object. But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the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



**NOTE 3**:

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



# CONTENTS

	Page		Page
<b>IMPORTANT</b>			
<b>Please Read Before Starting</b>			
<b>Check of Density Limit</b>			
<b>1. GENERAL .....</b>	<b>4</b>	■ 4-Way Air Discharge Semi-Concealed Type (X Type) .....	30
1-1. Tools Required for Installation (Not Supplied)		3-9. Suspending the Indoor Unit	
1-2. Accessories Supplied with Unit		3-10. Preparation for Suspending	
1-3. Type of Copper Tube and Insulation Material		3-11. Placing the Unit Inside the Ceiling	
1-4. Additional Materials Required for Installation		3-12. Installing the Drain Piping	
1-5. Tubing Length		3-13. Checking the Drainage	
1-6. Tubing Size		■ Wall-Mounted Type (K Type) .....	34
1-7. Straight Equivalent Length of Joints		3-14. Removing the Rear Panel from the Unit	
1-8. Additional Refrigerant Charge		3-15. Selecting and Making a Hole	
1-9. Installing the Distribution Joint		3-16. Installing the Rear Panel onto the Wall	
1-10. Optional Distribution Joint Kits		3-17. Removing the Grille to Install the Indoor Unit	
1-11. Selecting Refrigerant Tubing Size and Calculating the Amount of Additional Charge		3-18. Preparing the Tubing	
		3-19. Shaping the Tubing	
		3-20. Installing the Drain Hose	
<b>2. SELECTING THE INSTALLATION SITE .....</b>	<b>13</b>	■ Ceiling-Mounted Type (T Type) .....	38
Indoor Unit		3-21. Suspending the Indoor Unit	
Outdoor Unit		3-22. Partial Flush Mounting	
■ 48 Type		3-23. When Suspending Away from the Ceiling	
2-1. Air-Discharge Chamber for Top Discharge		3-24. Installing the Drain Piping	
2-2. Installing the Unit in Heavy Snow Areas		■ Concealed-Duct Type (U Type) .....	42
2-3. Precautions When Installing in Heavy Snow Areas		3-25. Required Minimum Space for Installation and Service	
2-4. Dimensions of Snow/Wind-Proof Ducting and Refrigerant Tubing Space for Installation		3-26. Suspending the Indoor Unit	
2-5. Dimensions of Snow / Wind Ducting (48 Type)		3-27. Installing the Drain Piping	
■ 70, 90 Type		3-28. Checking the Drainage	
2-6. Shield for Horizontal Exhaust Discharge		3-29. Increasing the Fan Speed	
2-7. Installing the Outdoor Unit in Heavy Snow Areas		■ Concealed-Duct High Static Pressure Type (D Type) .....	47
2-8. Precautions When Installing in Heavy Snow Areas		3-30. Required Minimum Space for Installation and Service	
2-9. Dimensions of Snow / Wind Ducting (70, 90 Type)		3-31. Suspending the Indoor Unit	
		3-32. Installing the Drain Piping	
		3-33. Caution for Ducting Work	
<b>3. HOW TO INSTALL THE INDOOR UNIT .....</b>	<b>21</b>	■ Floor-Standing Type (F Type), Concealed Floor-Standing Type (FM Type) .....	51
■ 1-Way Air Discharge Semi-Concealed Type (AS Type) .....	21	3-34. Required Minimum Space for Installation and Service	
3-1. Suspending the Indoor Unit		3-35. Dimensions and Part Names	
3-2. Placing the Unit Inside the Ceiling		3-36. Removing and Attaching the Front Panel (Floor-Standing Type)	
3-3. Installing the Drain Piping		3-37. Installing the Refrigerant Tubing	
3-4. Checking the Drainage		3-38. Installing the Drain Piping	
■ 2-Way Air Discharge Semi-Concealed Type (S Type) .....	26	3-39. Installing the Remote Controller	
3-5. Suspending the Indoor Unit			
3-6. Placing the Unit Inside the Ceiling			
3-7. Installing the Drain Piping			
3-8. Checking the Drainage			

	Page		Page
<b>4. HOW TO INSTALL THE OUTDOOR UNIT .....</b>	<b>56</b>	■ 4-Way Air Discharge Semi-Concealed Type (X Type) .....	81
4-1. Transporting		10-6. Before Installing the Ceiling Panel	
4-2. Installing the Outdoor Unit		10-7. Installing the Ceiling Panel	
<b>5. ELECTRICAL WIRING .....</b>	<b>57</b>	10-8. When Removing the Ceiling Panel for Servicing	
5-1. General Precautions on Wiring		10-9. Adjusting the Motor Flap	
5-2. Recommended Wire Length and Wire Diameter for Power Supply System		<b>11. TEST RUN .....</b>	<b>84</b>
5-3. Wiring System Diagrams		11-1. Preparing for Test Run	
<b>6. HOW TO INSTALL THE REMOTE CONTROLLER (OPTIONAL PART) .....</b>	<b>61</b>	11-2. PCB Setting & Test Run	
6-1. When Using a Wall Box for Flush Mounting		11-3. Main Alarm Messages which Indicate Mis-Wiring & Mis-Setting	
6-2. Basic Wiring Diagram		11-4. Main Alarm Messages Indicating Unit Malfunction	
6-3. Wiring System Diagram for Group Control		11-5. Alarm Messages on the Outdoor PCB	
6-4. Wiring System Diagram for Multiple Remote Control		<b>12. CAUTION FOR PUMP DOWN .....</b>	<b>89</b>
6-5. Explanation of Alarm Messages			
<b>7. HOW TO INSTALL THE WEEKLY TIMER (OPTIONAL CONTROLLER) .....</b>	<b>67</b>		
7-1. When Using a Wall Box for Flush Mounting			
7-2. Wiring Diagram			
7-3. Test Run Setting			
7-4. Memory Back Up Function for Power Failure Compensation			
7-5. Display at Power ON			
<b>8. HOW TO PROCESS TUBING .....</b>	<b>71</b>		
8-1. Connecting Narrow Tubing Side			
8-2. Connecting Wide Tubing Side			
8-3. Connecting Tubing between Indoor and Outdoor Units			
8-4. Insulating the Refrigerant Tubing			
8-5. Taping the Tubes			
8-6. Finishing the Installation			
<b>9. AIR PURGING .....</b>	<b>75</b>		
<b>10. HOW TO INSTALL THE CEILING PANEL .....</b>	<b>78</b>		
■ 1-Way Air Discharge Semi-Concealed Type (AS Type) .....	78		
10-1. Installing the Ceiling Panel			
10-2. How to Use the Stoppers			
■ 2-Way Air Discharge Semi-Concealed Type (S Type) .....	79		
10-3. Before Installing the Ceiling Panel			
10-4. Installing the Ceiling Panel			
10-5. When Removing the Ceiling Panel for Servicing			

## 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 1-9.

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
1-8	Floor-Standing, Concealed Floor-Standing
1-9	Outdoor Unit

### 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.















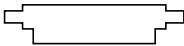
**CAUTION**

**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)	2	For wide and narrow tube flare nuts
Vinyl clamp		4	For 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	
Installation gauge		1	For measuring the clearance between the unit and the ceiling


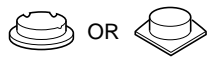

**Table 1-2 (2-Way Air Discharge Semi-Concealed)**

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)	2	For wide and narrow tube flare nuts
Vinyl clamp		4	For 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)



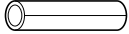
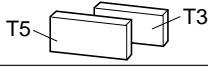







**Table 1-3 (4-Way Air Discharge Semi-Concealed)**

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	 (White)	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	 OR	1	For improved tubing appearance
Tapping screw	Truss-head Phillips 4 X 16 mm 	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	 T5 T3	2 Sets	For wide and narrow tube joints
Drain hose		1	
Drain hose clamp		4	
Insulating tape	 Black	3	For wide and narrow tube and drain hose joints
	 White	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)

**Table1-6 (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)	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)

**Table 1-8 (Floor-Standing & Concealed Floor-Standing)**

Part Name	Figure	Q'ty	Remarks
Connection Pipe		1	For connecting wide tubes
Flare Insulator		2	For wide and narrow tubes
Insulating Tape		2	For wide and narrow tubes flare nuts
Insulating Tape		2	For wide and narrow tubes
Vinyl clamp		7	For ends of flare insulator
Insulating Tape		1	For drain pipe
Drain Insulator		1	For drain hose joint
Tube connector		1	For sizing up of narrow tube from 6.35 to 9.52 (only for 25 type)

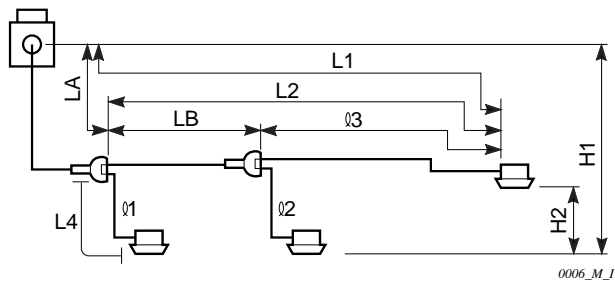
**Table 1-9 (Outdoor Unit)**

Part Name	Figure	Q'ty	Remarks
Connection pipe		1	To connect wide tube Only for C90 type
Identification label		1	Label for identifying the indoor unit, outdoor unit, and remote controller

## 1-5. Tubing Length

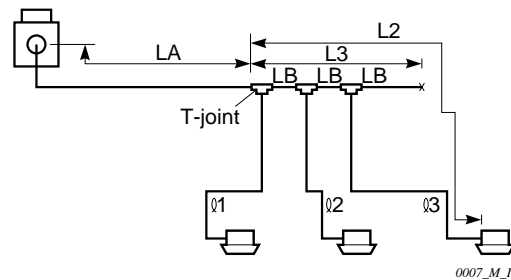
- Refrigerant tubing between the indoor and outdoor units should be kept as short as possible.

### Installation Example 1



Select and decide the installation location so that the length of the refrigerant tubing will be within the limits given in Table 1-10.

### Installation Example 2



Symbol meanings:




-  : Optional distribution joint kit (APR-DV94MB, DV64MB)
-  : T-joint (field supply)
-  : Weld solidly (pinch shut)

Table 1-10

		Model	48 Type	70, 90 Type	
Items	Marks	Contents	Length (m)		
Allowable tubing length	L1	Max. tubing length	Actual length	≤ 50	≤ 100
			Equivalent length	≤ 65	≤ 125
	L2 - L4	Difference between max. length and min. length from the No.1 distribution joint	≤ 30	≤ 30	
	$l_1, l_2, \sim l_n$	Max. length of each distribution joint	≤ 30	≤ 30	
Allowable elevation difference	H1	When outdoor unit is installed higher than indoor unit	≤ 40	≤ 50	
		When outdoor unit is installed lower than indoor unit	≤ 30	≤ 30	
	H2	Max. difference between indoor units	≤ 15	≤ 15	
Allowable length of header tube	L3	Max. tubing length between the first T-joint and terminated (weld shut) end point	≤ 2	≤ 2	

L = Length; H = Height

## 1-6. Tubing Size

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

Unit: mm (in.)

	Main tube (LA) O. D.			Main tube (LB, LC) OD			
	Outdoor unit			Total cooling capacity Q kw, (BTU/h), of the unit(s) after the main tube			
	48 type	70 type	90 type	More than 22.4 (76,400) Q > 22.4	22.4 (76,400) or less but more than 16.0 (54,600) 22.4 ≥ Q > 16.0	16.0 (54,600) or less but more than 7.3 (25,000) 16.0 ≥ Q > 7.3	Less than 7.3 (25,000) Q ≤ 7.3
Wide tube	19.05 (3/4)	25.4 (1)	28.58 (1 1/8)	28.58 (1 1/8)	25.4 (1)	19.05 (3/4)	15.88 (5/8) or 19.05 (3/4)
Narrow tube	9.52 (3/8)	12.7 (1/2)	12.7 (1/2)	12.7 (1/2)	12.7 (1/2)	9.52 (3/8)	9.52 (3/8)

**Table 1-12 Distribution Branch Size (l<sub>1</sub>, l<sub>2</sub>, l<sub>3</sub>, l<sub>4</sub>)**

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**






\* For the 25 type, use the "Tube connector" (supplied with the unit) for sizing up a narrow tube from 6.35 to 9.52.

## 1-7. Straight Equivalent Length of Joints

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

**Table 1-13 Straight Equivalent Length of Joints**

Unit: m

Wide tube (gas side)		ø12.7	ø15.88	ø19.05	ø22.22	ø25.4	ø28.58
90° elbow		0.3	0.35	0.42	0.48	0.52	0.57
45° elbow		0.23	0.26	0.32	0.36	0.39	0.43
U-bend		0.9	1.05	1.26	1.44	1.56	1.71
Trap bend (R60 - 100 mm)		2.3	2.8	3.2	3.8	4.3	4.7
Y-branch		Equivalent length conversion not needed					
Ball valve for servicing		Equivalent length conversion not needed					

## 1-8. Additional Refrigerant Charge

Additional refrigerant charge amount is calculated from the narrow tube total length as follows.

**Table 1-14 Amount of refrigerant additional charge per meter, according to narrow tube size**

Narrow tube size	Amount of refrigerant additional charge/m (g/m)
ø9.52	75
ø12.7	125

### ■ Check of density limit

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.

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

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

The density limit of R-22 which is used in this unit is  $0.15 \text{ kg/m}^3$  (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, refer to the nameplate of the unit.)

## 1-9. Installing the Distribution Joint

- The installation direction of the T-joint (not supplied) should be either horizontal or vertical. The direction of the connection port to each indoor unit must be upward ( $15^\circ$  to  $30^\circ$ ) when the main tube is horizontal and can be in any direction, but the branch tube must be upward when the main tube is vertical. (L3 indicates tubing which is 2 m or less and connected by a T-joint.)
  - 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).



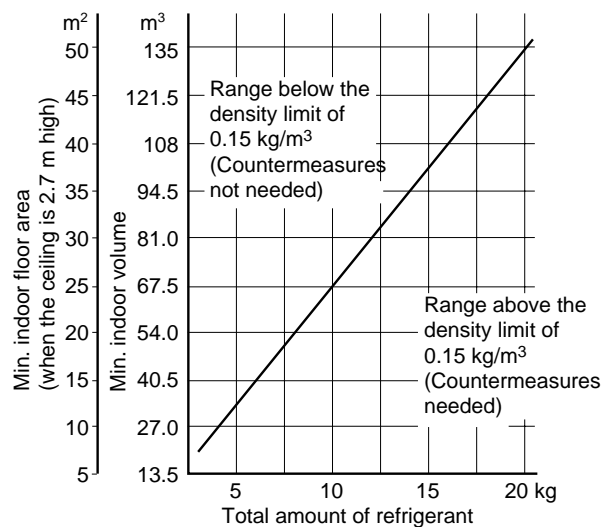
**WARNING**

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

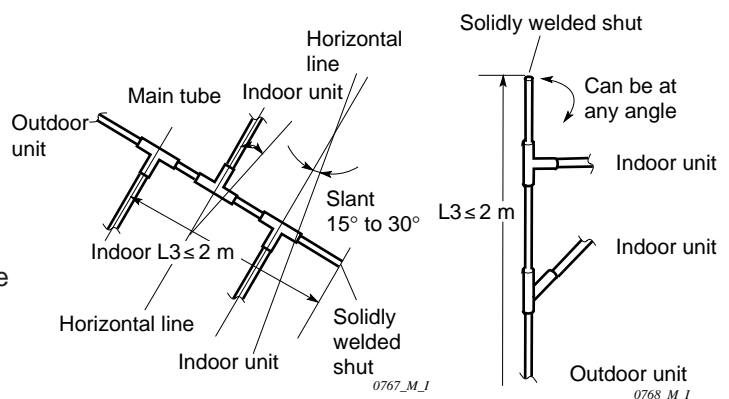
Required amount of additional charge  
 = (Amount of additional refrigerant charge per meter of each size of narrow tube x its tube length)  
 + (... ) + (... )

\* Always recharge accurately using a scale.

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



0766\_M\_I



When in horizontal use

When in vertical use

- (2) When the branch tube after the distribution joint is connected to only one indoor unit, it must have a trap. If not, when 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.

### 1-10. 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
- APR-DV94MB : Cooling capacity after distribution is more than 16.0 kw (54,600 BTU/h)

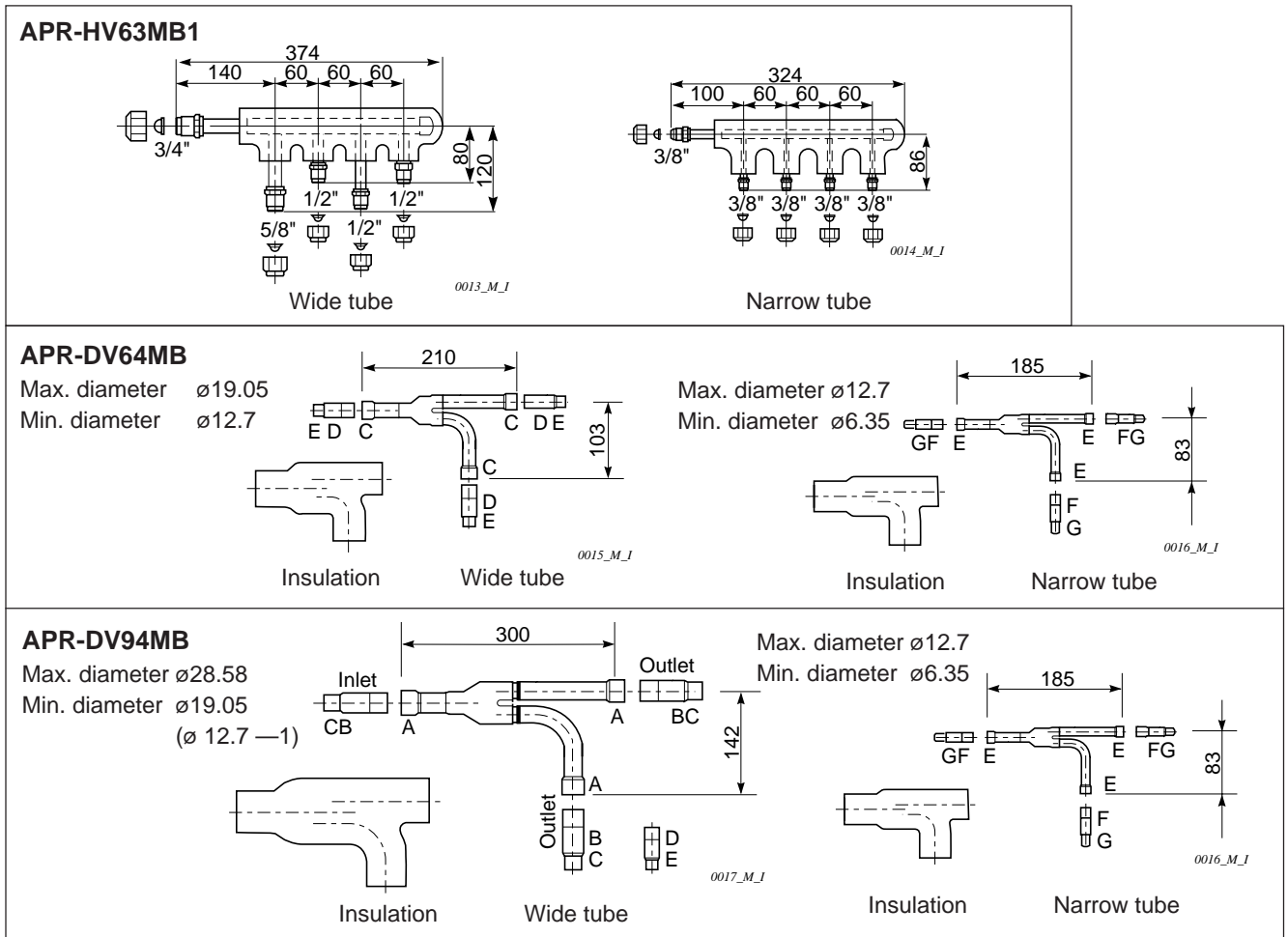
**Table 1-15 Distribution Branch Size ( 11, 12, 13, 14)**

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**

\* For the 25 type, use the "Tube connector" (supplied with the unit) for sizing up a narrow tube from 6.35 to 9.52.



**Table 1-16 Dimensions of connections (shows the inner diameter of tubing)**

Unit: mm

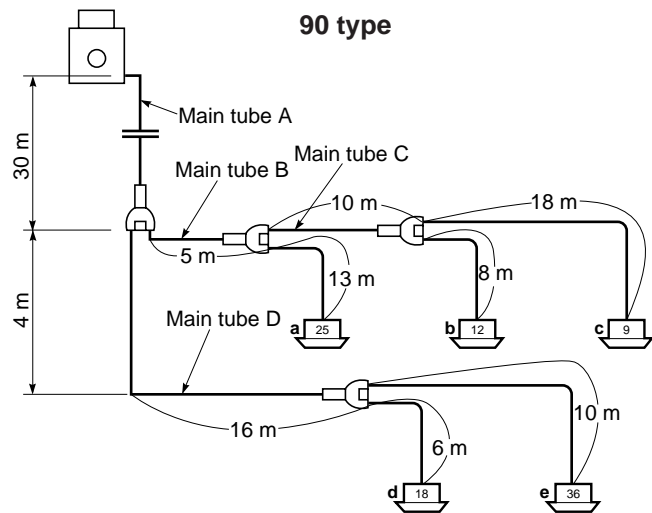
Position	A	B	C	D	E	F	G
Size	$\phi 28.58$	$\phi 25.4$	$\phi 19.05$	$\phi 15.88$	$\phi 12.7$	$\phi 9.52$	$\phi 6.35$

## 1-11. Selecting Refrigerant Tubing Size and Calculating the Amount of Additional Charge

Table 1-17

Unit: kw

Type	Rating capacity	
	Cooling	Heating
25 type: a	7.3	8.0
12 type: b	3.6	4.2
9 type: c	2.8	3.2
18 type: d	5.6	6.3
36 type: e	10.6	11.4



0019\_M\_I

- The tubing size is selected and the amount of additional charge can be found in the table of refrigerant tubing sizes using the tubing system of each indoor unit.

Refrigerant amounts must be calculated for the amount of additional charge per 1m of narrow tube size.

Table 1-18 Additional Refrigerant Charge

		Total cooling capacity of the unit after the distribution joint	Wide tube	Narrow tube	① Tubing length	② Additional refrigerant	① X ②
Main tube	A	$7.3 + 3.6 + 2.8 + 5.6 + 10.6 = 29.9$ kw	28.58 (1 1/8)	12.7 (1/2)	30 m	125 g/m	3,750 g
	B	$7.3 + 3.6 + 2.8 = 13.7$ kw	19.05(3/4)	9.52 (3/8)	5 m	75 g/m	375 g
	C	$3.6 + 2.8 = 6.4$ kw	15.88(5/8)	9.52 (3/8)	10 m	75 g/m	750 g
	D	$5.6 + 10.6 = 16.2$ kw	25.4 (1)	12.7 (1/2)	20 m	125 g/m	2,500 g
Distribution branch	25 type:a	7.3 kw (13 m)	15.88(3/8)	9.52 (3/8)	13 m	75 g/m	975 g
	12 type:b	3.6 kw ( 8 m)	12.7 (1/2)	9.52 (3/8)	8 m	75 g/m	600 g
	9 type:c	2.8 kw (18 m)	12.7 (1/2)	9.52 (3/8)	18 m	75 g/m	1,350 g
	18 type:d	5.6 kw ( 6 m)	15.88(5/8)	9.52 (3/8)	6 m	75 g/m	450 g
	36 type:e	10.6 kw (10 m)	19.05(3/4)	9.52 (3/8)	10 m	75 g/m	750 g
Total amount			—	—	—	—	11,500 g

## 2. SELECTING THE INSTALLATION SITE

### Indoor Unit

#### AVOID:

- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.
- direct sunlight.
- locations near heat sources which may affect the performance of the unit.
- locations where 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.

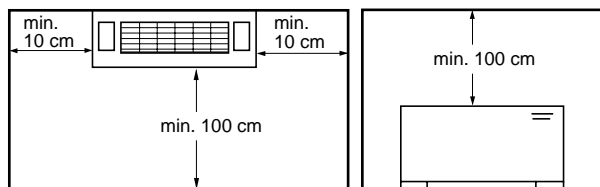
#### DO:

- 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 outdoor unit.
- allow room for operation and maintenance as well as unrestricted air flow around the unit.
- install the unit within the maximum elevation difference above or below the outdoor unit and within a total tubing length from the outdoor unit as detailed in Table 1-10.
- allow room for mounting the remote controller about 1m 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.

### Floor-Standing, Concealed Floor-Standing Type

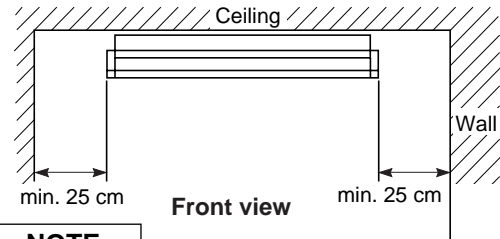


Horizontal view

Vertical view

0754\_M\_I

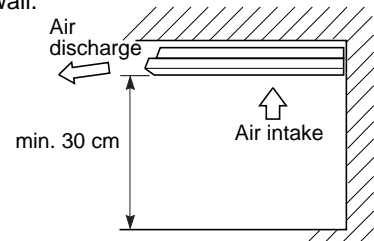
### Ceiling-Mounted Type



Front view

#### NOTE

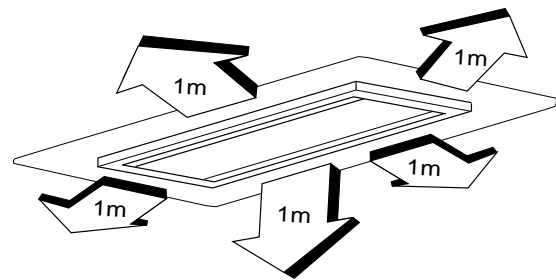
The rear of the indoor unit can be installed flush against the wall.



Side view

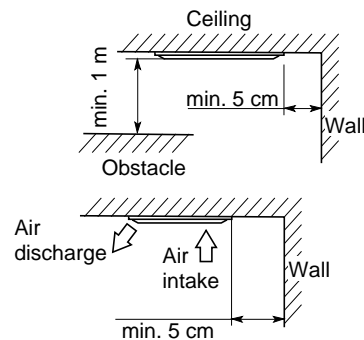
0769\_T\_I

### Concealed-Duct Type 2-Way, 4-Way Semi-Concealed Type



0021\_X\_I

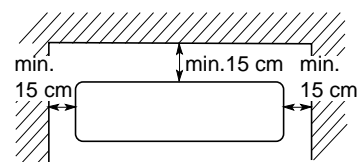
### 1-Way Semi-Concealed Type



Side view

0770\_AS\_I

### Wall-Mounted Type



Front View

0771\_K\_I

**Outdoor Unit**

**AVOID:**

- heat sources, exhaust fans, etc.
- 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 protect the unit against possible water damage and decreased service life.
- use anchor bolts or equal to bolt down the unit, reducing vibration and noise.

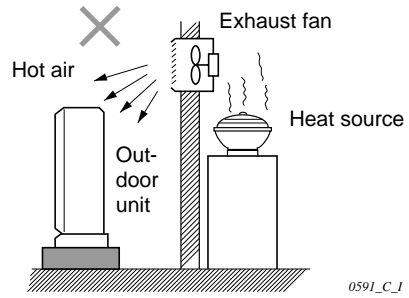
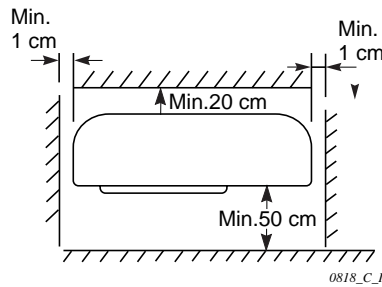


Fig. 2-1

Top view



Side view

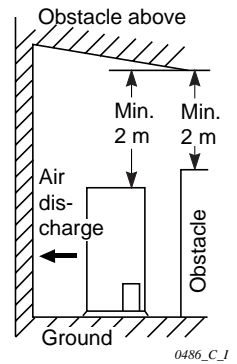
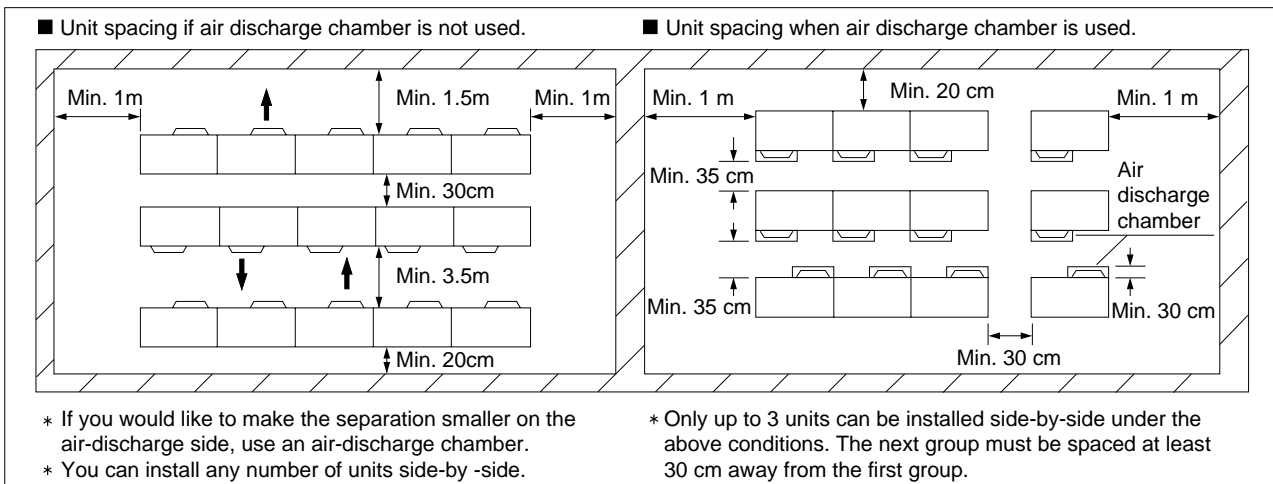


Fig. 2-2

**Multiple installation**



0816\_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.
- use anchor bolts or equal to bolt down the unit, reducing vibration and noise. (Fig. 2-3)

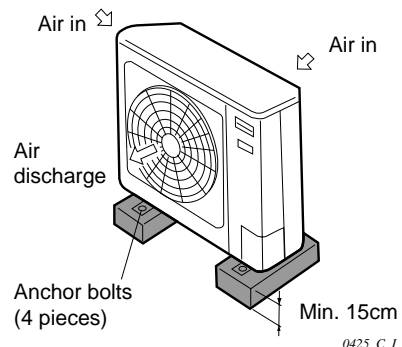


Fig. 2-3

0425\_C\_1

## 2-1. Air- Discharge Chamber for Top Discharge

Install the air-discharge chamber in the field when:

- it is difficult to keep a space of 50 cm minimum between the air-discharge outlet and the obstacle.
  - the air-discharge outlet is facing the sidewalk and discharged hot air can annoy the passers-by.
- (Fig. 2-4.)

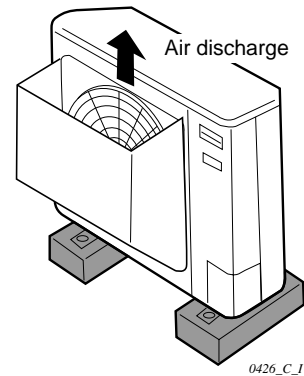


Fig. 2-4

0426\_C\_1

## 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.

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 there may be damage to the unit.
- 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.

## 2-3. Precautions When Installing in Heavy Snow Areas

- (1) The platform should be higher than the maximum snow depth. (Fig. 2-5)
- (2) The two anchoring feet of the outdoor unit should be used for the platform, and the platform should be installed beneath the air-intake side of the outdoor unit.
- (3) The platform foundation must be solid and the unit must be secured with anchor bolts.
- (4) When installing on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being overturned.

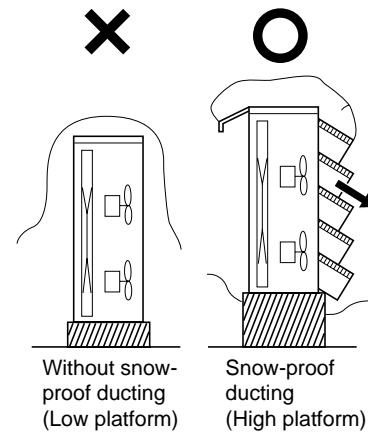
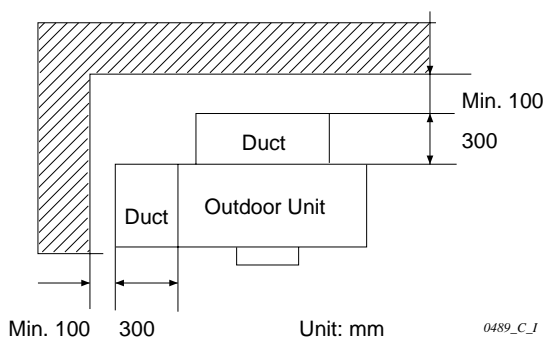


Fig. 2-5

Fig. 2-6

0819\_C\_1

## 2-4. Dimensions of Snow / Wind-Proof Ducting and Refrigerant Tubing Space for Installation



0489\_C\_1

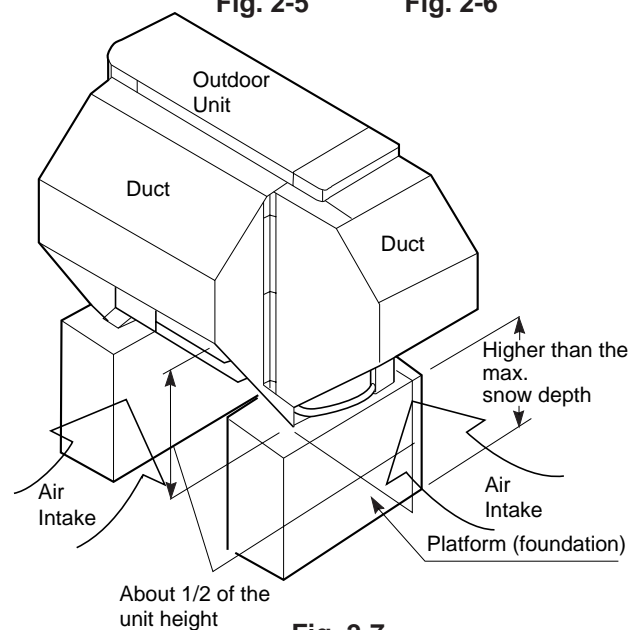


Fig. 2-7

0817\_C\_1

Example of Installation

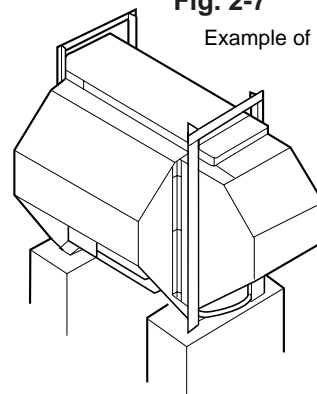
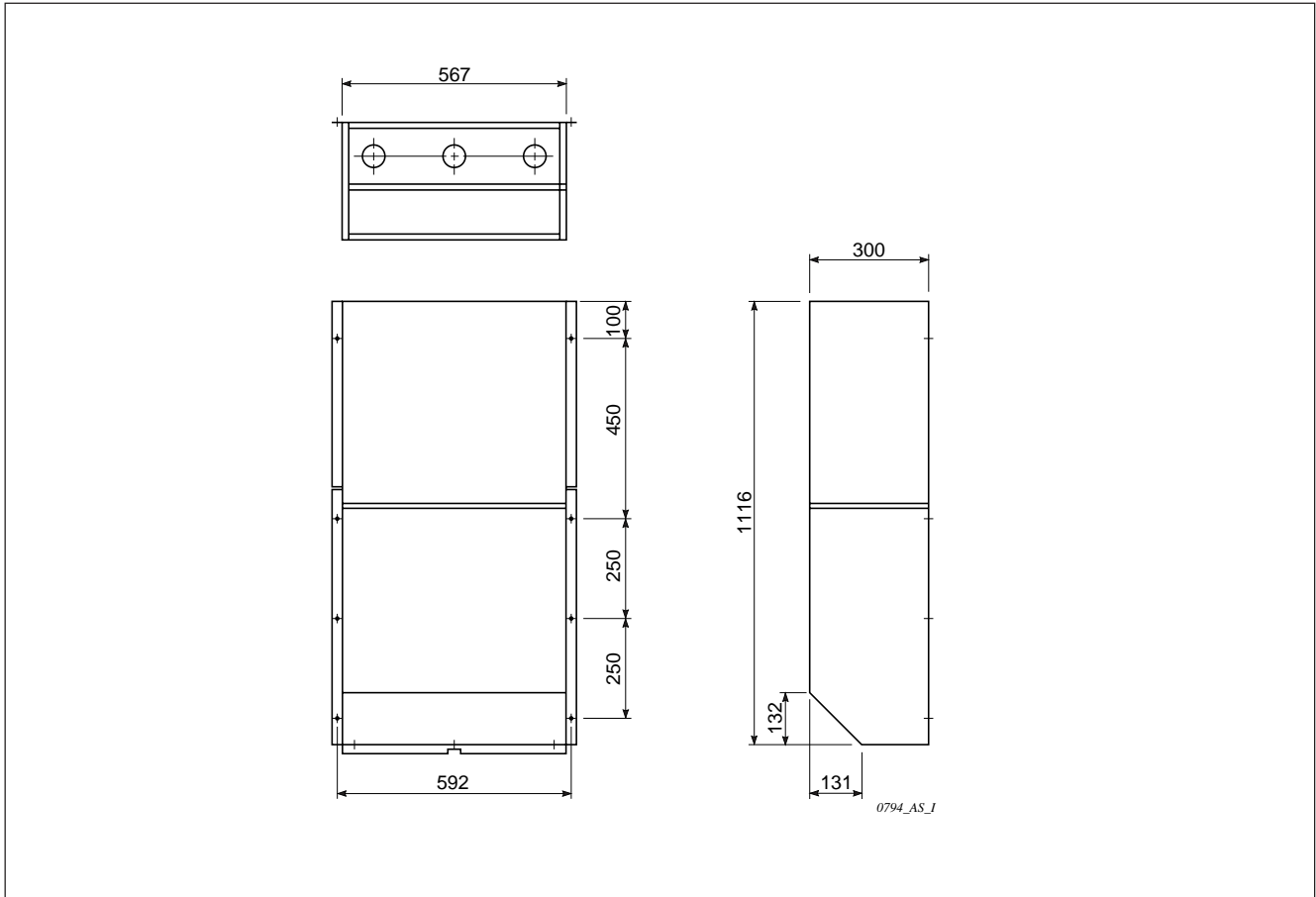


Fig. 2-8

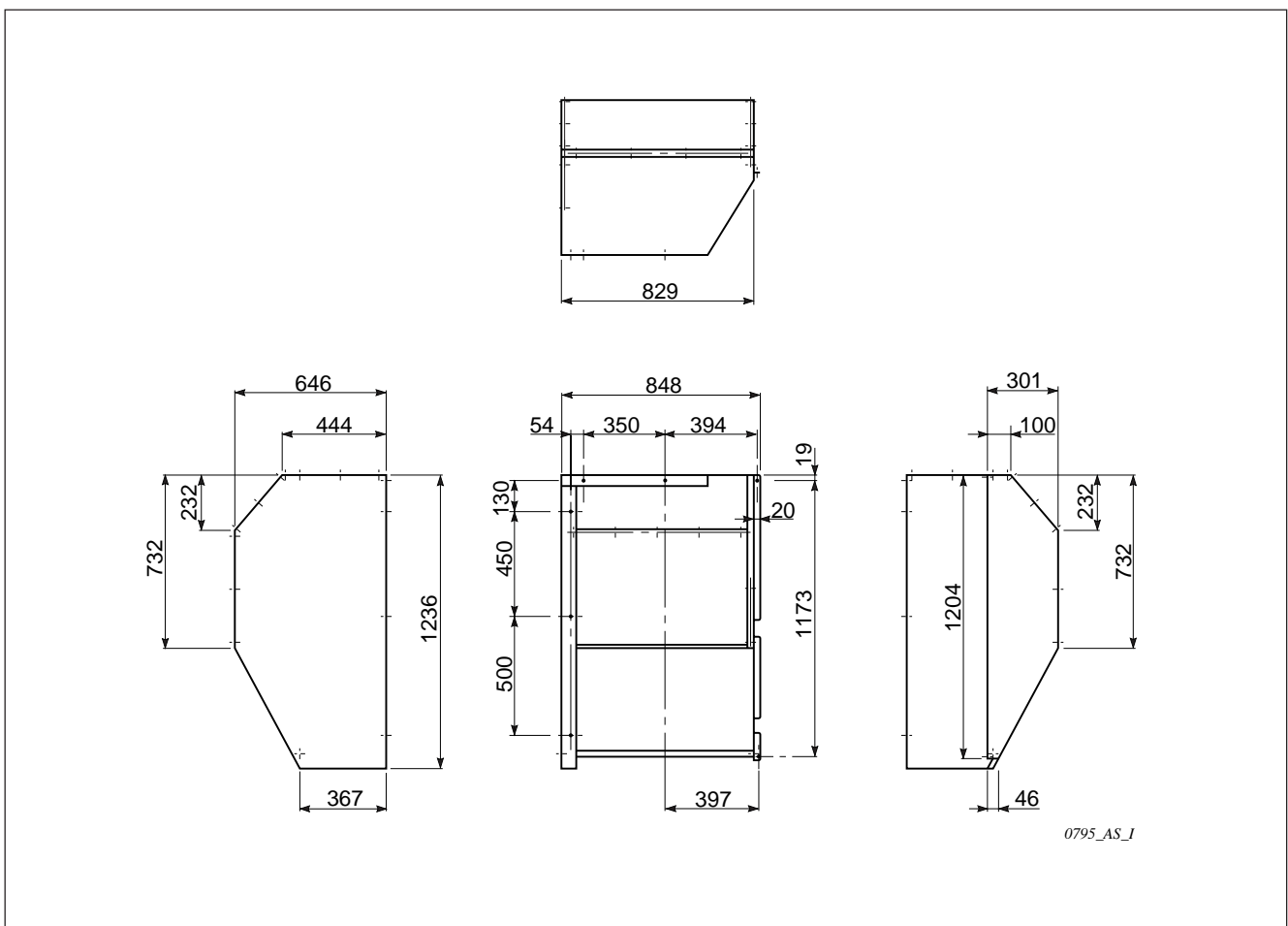
0490\_C\_1

## 2-5. Dimensions of Snow / Wind Ducting (48 Type)

### ● Reference diagram for air-discharge chamber (field supply)



### ● Reference diagram for snow-proof vents (field supply)



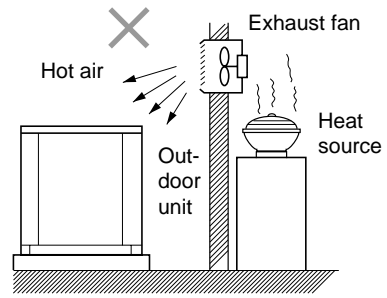
**Outdoor Unit**

**AVOID:**

- heat sources, exhaust fans, etc.
- damp, humid or uneven locations.

**DO:**

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



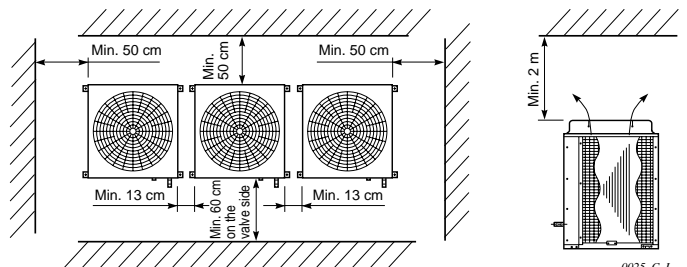
0024\_C\_I

**Fig. 2-9**

**Installation Space**

Install the outdoor unit where there is enough space for ventilation. Otherwise the unit may overheat. Refer to the figure at right for the minimum space requirements regardless of how many units are installed. The mounting base should be concrete or a similar material that allows for adequate drainage. Make provisions for anchor bolts, platform height, and other site-specific installation requirements.

**Three units placed adjacently**

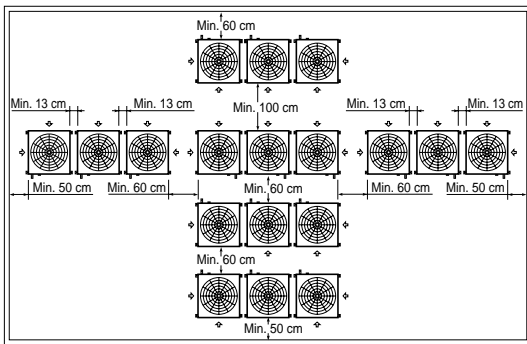


0025\_C\_I

**Fig. 2-10**

**Do not do any wiring or tubing within 60 cm of the front panel, because it is needed as a servicing space for the compressor.**

**Multiple Installation**



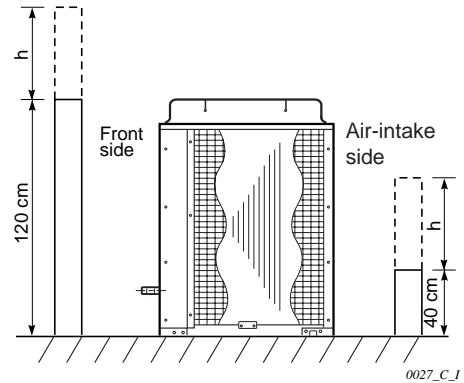
0026\_M\_I

Refer to the above diagram when installing more than 1 unit. Take into consideration nearby pedestrian walkways and ventilation requirements when installing.  
\*Consult a company that sells the unit about multiple installation.

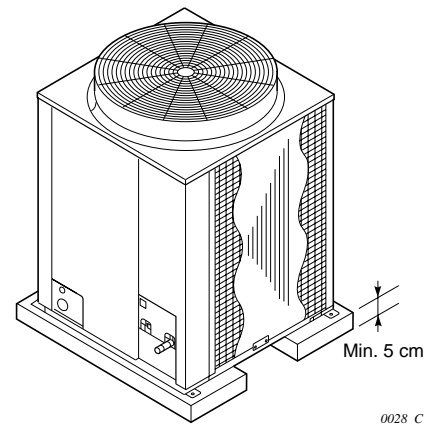


**CAUTION**

- Not more than 3 units should be installed adjacently.
- Wall height  
Front side:  
Less than 120 cm  
Air-intake side:  
Less than 40 cm  
(Fig. 2-11)
- If the wall height is more than given above, add measurement *h* to the service space. (Fig. 2-11)
- Leave space open above the unit.
- Construct louvers or other openings in the wall, if necessary, to ensure adequate ventilation.
- Provide a solid base (concrete block, beams or equal), a minimum of 5 cm above ground level to reduce humidity and protect the unit against possible water damage and decreased service life. (Fig. 2-12)
- Use anchor bolts or equivalent to bolt down the unit, reducing vibration and noise.



**Fig. 2-11**



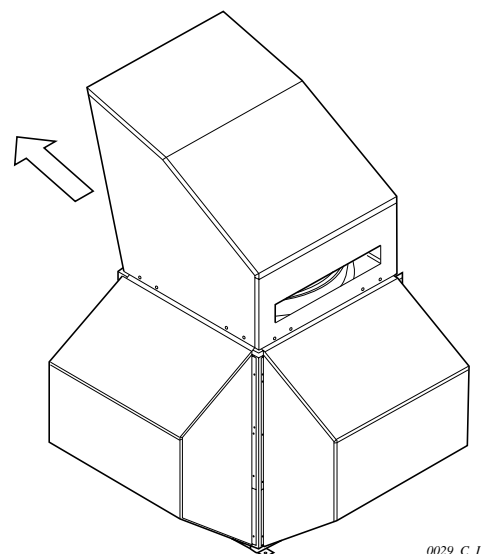
**Fig. 2-12**

## 2-6. Shield for Horizontal Exhaust Discharge

It is necessary for you to install an air-discharge chamber (field supply) to direct exhaust from the fan horizontally if it is difficult to provide a minimum space of 2 m between the air-discharge outlet and a nearby obstacle. (Fig. 2-13)

### **Important**

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



**Fig. 2-13**

## 2-7. Installing the Outdoor Unit in Heavy Snow Areas

In locations where wind-blown snow can be a problem, snow-proof vents should be fitted to the unit and direct exposure to the wind should be avoided as much as possible. The following problems may occur if proper countermeasures are not taken:

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

## 2-8. Precautions When Installing in Heavy Snow Areas

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

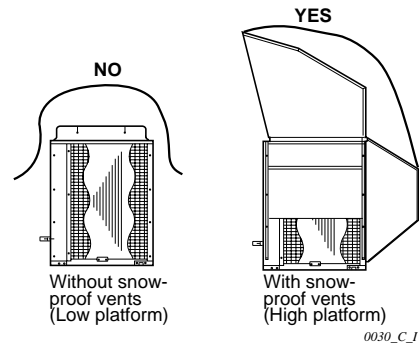
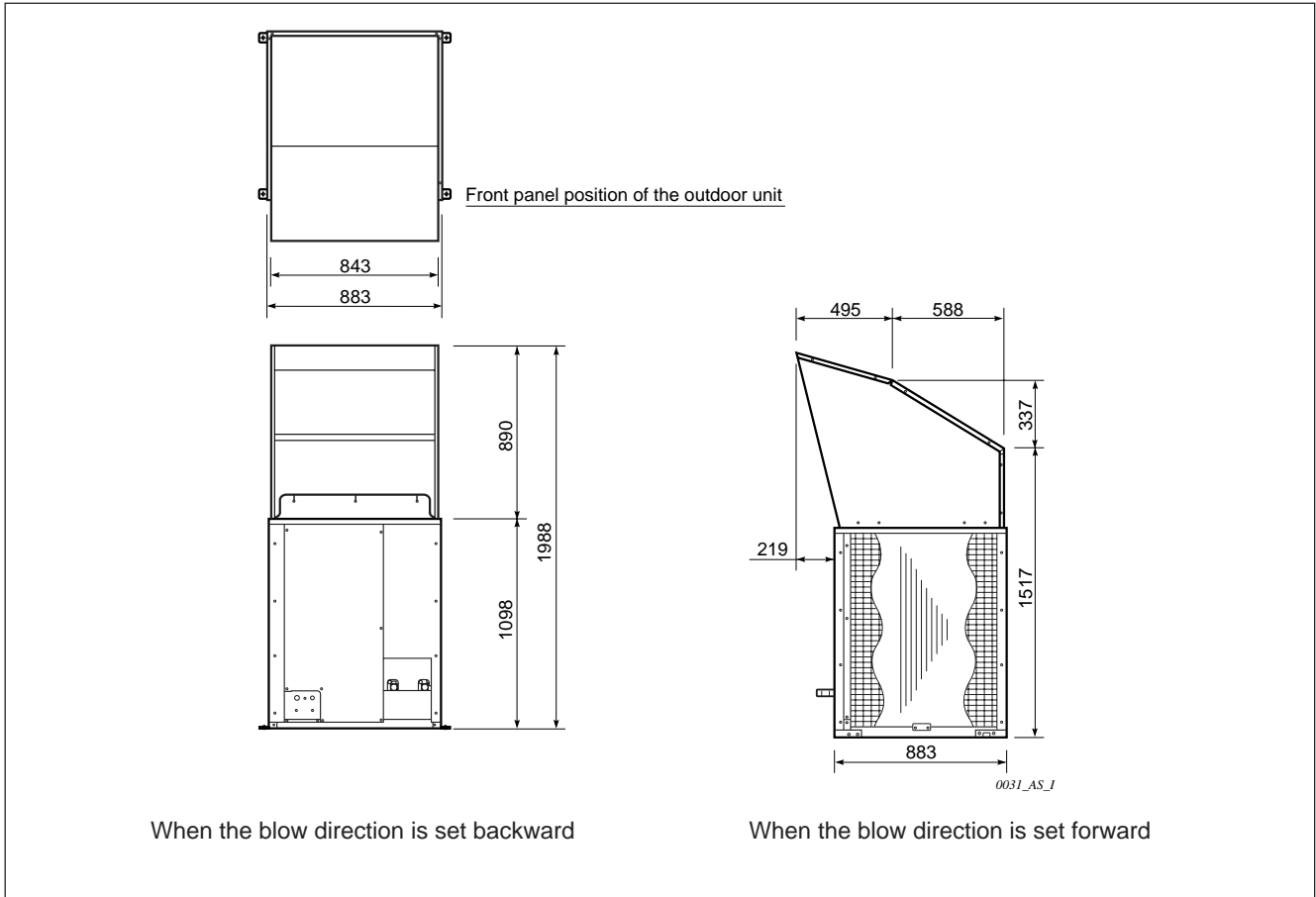


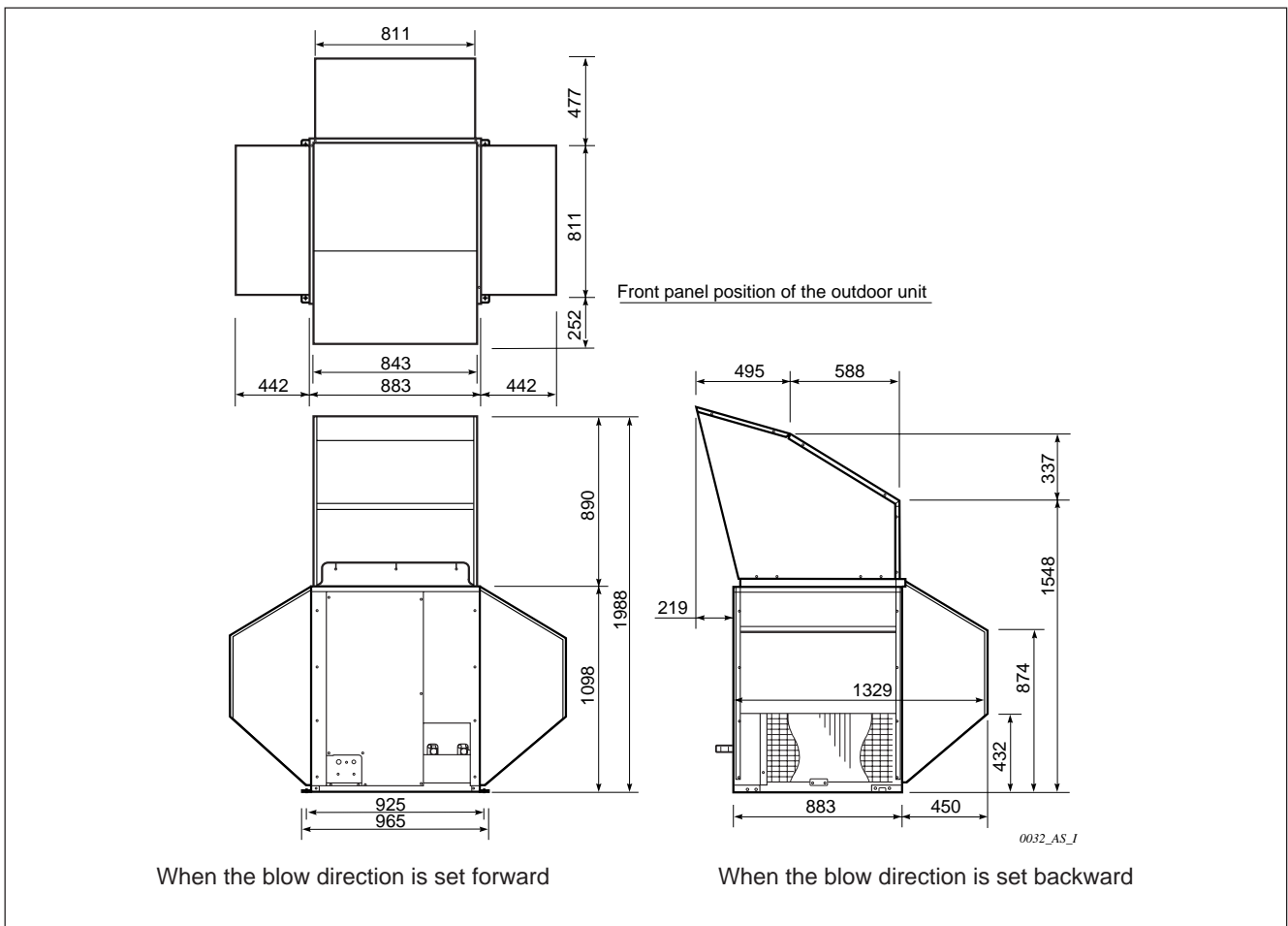
Fig. 2-14

## 2-9. Dimensions of Snow / Wind Ducting (70, 90 Type)

### ● Reference diagram for air-discharge chamber (field supply)



### ● Reference diagram for snow-proof vents (field supply)



### 3. HOW TO INSTALL THE INDOOR UNIT

#### ■ 1-Way Air Discharge Semi-Concealed Type (AS Type)

##### 3-1. Suspending the Indoor Unit

- (1) Place the full-scale diagram (supplied) 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 because of high 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 suspension bolts 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 important that you use extreme care in supporting the indoor unit from the ceiling. Ensure that the ceiling is strong enough 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).

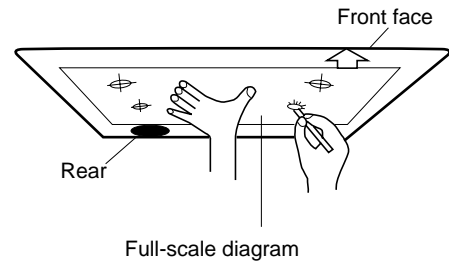


Fig. 3-1

0035\_T\_I

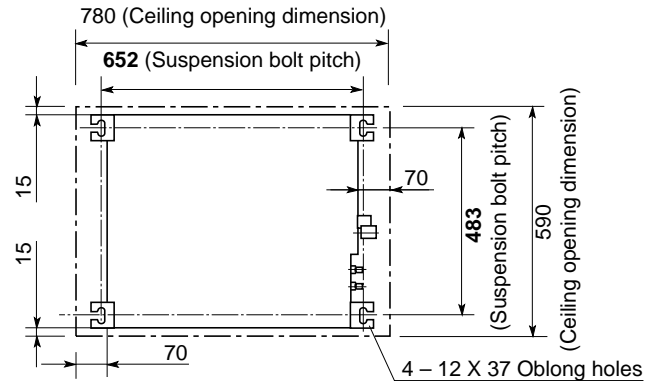


Fig. 3-2

0036\_AS\_I

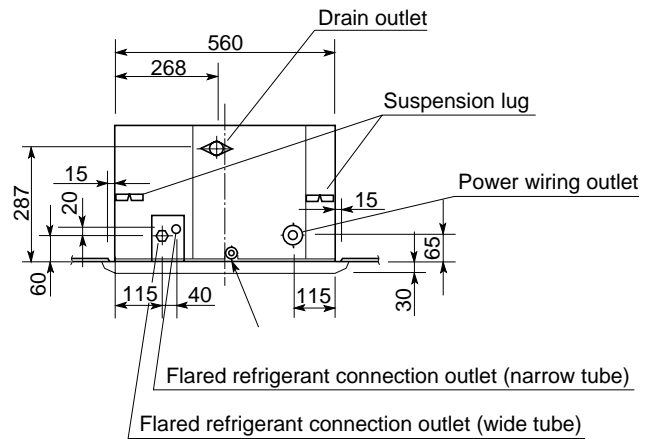


Fig. 3-3

0037\_AS\_I

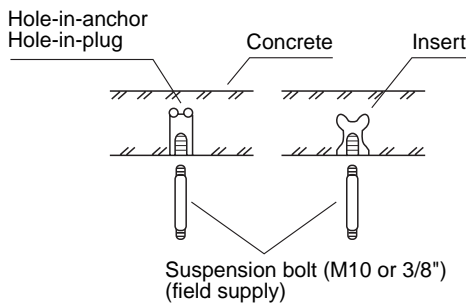


Fig. 3-4

0038\_T\_I

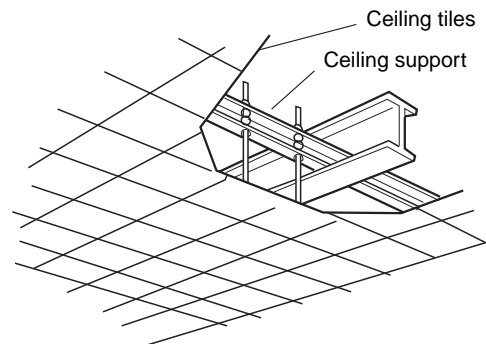


Fig. 3-5

0039\_S\_I

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

①  
AS

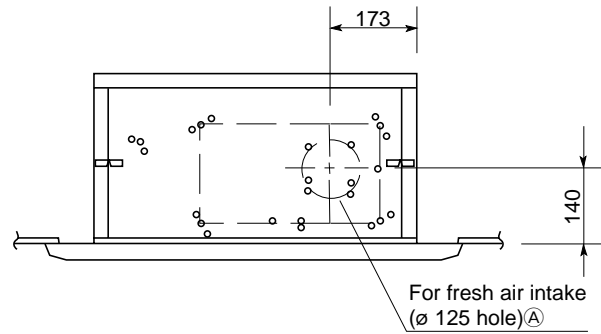


**CAUTION**

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

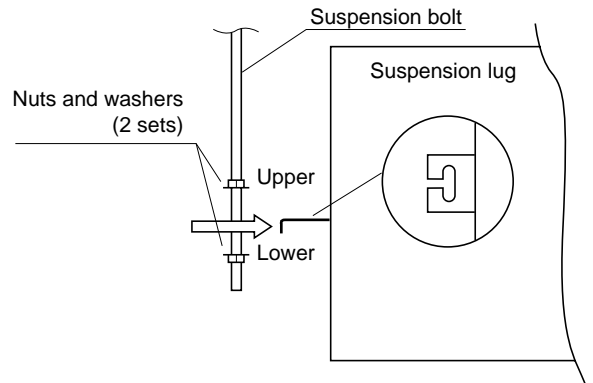
### 3-2. Placing the Unit Inside the Ceiling

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts using the supplied 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. Use 2 sets of nuts and washers (upper and lower), so that the unit will not fall off the suspension lugs.
- (3) The distance between the unit and the opening of the ceiling, and the distance between the bottom surface of the ceiling and the bottom surface of the flange of the unit should follow the dimensions given in Figs. 3-8 and 3-9.



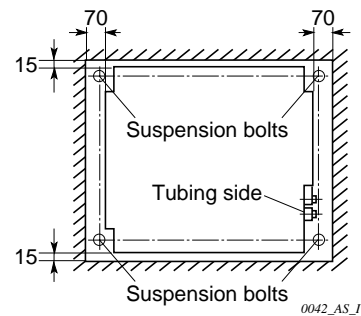
**Fig. 3-6**

0772\_AS\_I



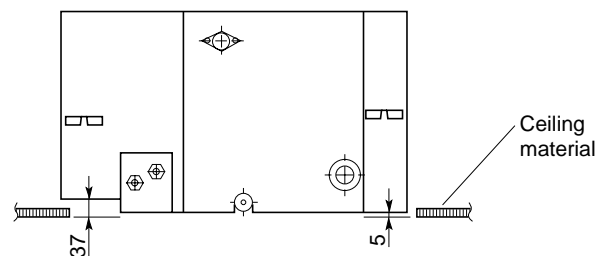
**Fig. 3-7**

0041\_X\_I



**Fig. 3-8**

0042\_AS\_I



**Fig. 3-9**

0043\_AS\_I

- (4) Adjust the distance between the unit and the opening in the ceiling to give clearances of 15 mm in the front and back directions and 70 mm in the right and left directions so that the height between the bottom surface of the flange of the unit and the bottom surface of the ceiling is 37 mm, and the air-intake side is 5 mm. To check these dimensions for positioning the unit, use the installation gauge which is taped on the unit. (Fig. 3-10)
- (5) Confirm all clearances with the installation gauge, as follows:
- Between each side of the unit and the opening of the ceiling:
    - 15 mm
    - 70 mm
  - Between bottom of unit flange and ceiling material:
    - 5 mm (2 corners)
    - 37 mm (2 corners)

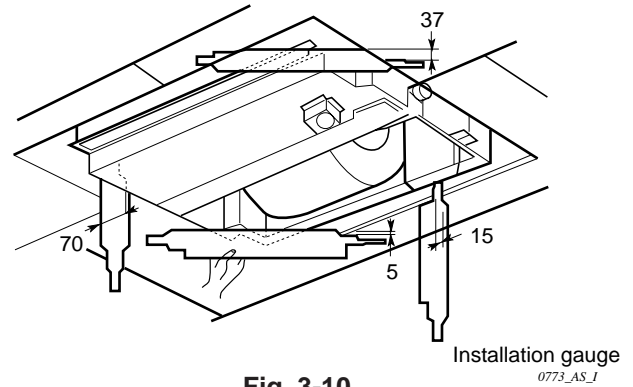


Fig. 3-10

Improper clearance can lead to poor mounting of the ceiling panel, causing condensation and dripping. (Fig. 3-10)

### 3-3. Installing the Drain Piping

- (1) Prepare a standard hard PVC pipe (O.D. 32 mm) for the drain and use the supplied drain hose and hose band to prevent water leaks. The PVC pipe must be purchased separately. The transparent drain pipe allows you to check drainage. (Fig. 3-11)

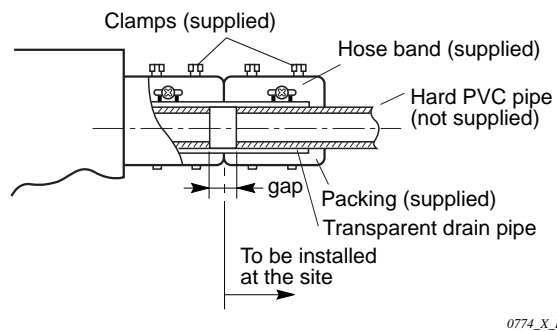


Fig. 3-11



**CAUTION**

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

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

**NOTE**

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

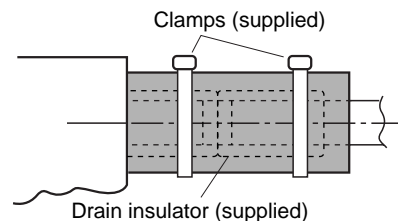


Fig. 3-12



CAUTION

1  
AS

- Do not install an air bleeder as this may cause water to spray from the drain pipe outlet. (Fig. 3-13)
- If it is necessary to increase the height of the drain pipe, the section 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 the pipe with an upward gradient from the connection port. This will cause the drain water to flow backward and leak when the unit is not operating. (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)
- Provide insulation for any pipes that are installed indoors.

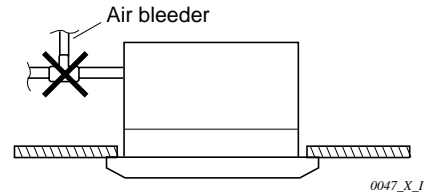


Fig. 3-13

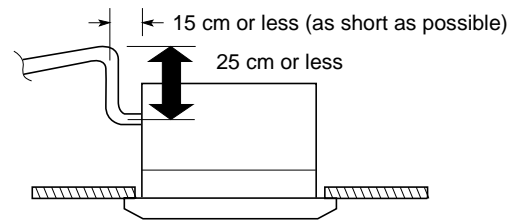


Fig. 3-14

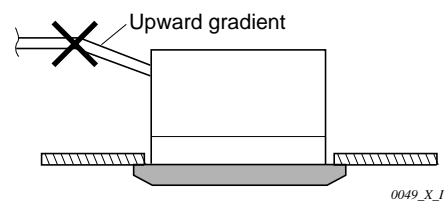


Fig. 3-15

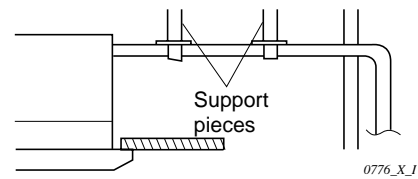


Fig. 3-16

### 3-4. Checking the Drainage

After wiring and drain piping are completed, use the following procedure to check that the water will drain smoothly. For this, prepare a bucket and wiping cloth 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 supplied elbow, and connect it using the supplied clamp (Fig. 3-17).
- (3) Pour water into the opening of the elbow up to the marked level. Excess water will be prevented by a drainage hole.
- (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.

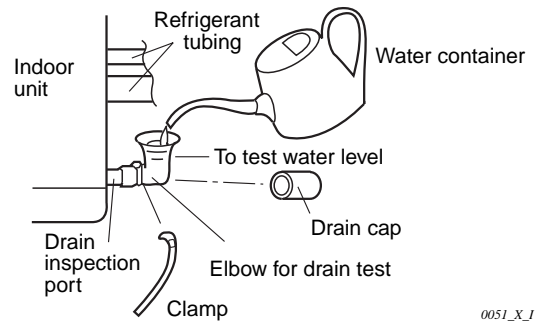


Fig. 3-17



**CAUTION**

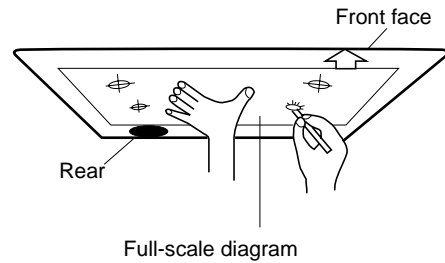
**Be careful since the fan will start when you short the pin on the indoor control board.**

- (5) Drainage is normal if the water gradually drops from the marked level.
- (6) When the check of drainage is complete, open the check pin (CN5 white) and remount the insulator and drain cap onto the drain inspection port.

■ **2-Way Air Discharge Semi-Concealed Type (S Type)**

**3-5. Suspending the Indoor Unit**

- (1) Place the full-scale diagram (supplied) 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.



**Fig. 3-18**

0035\_T\_1

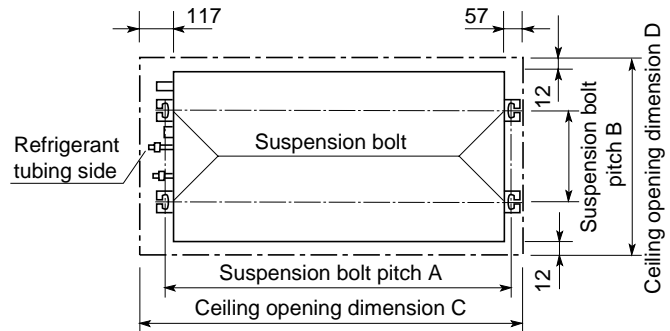
**NOTE**

Since the diagram is made of paper, it may shrink or stretch because of high 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.

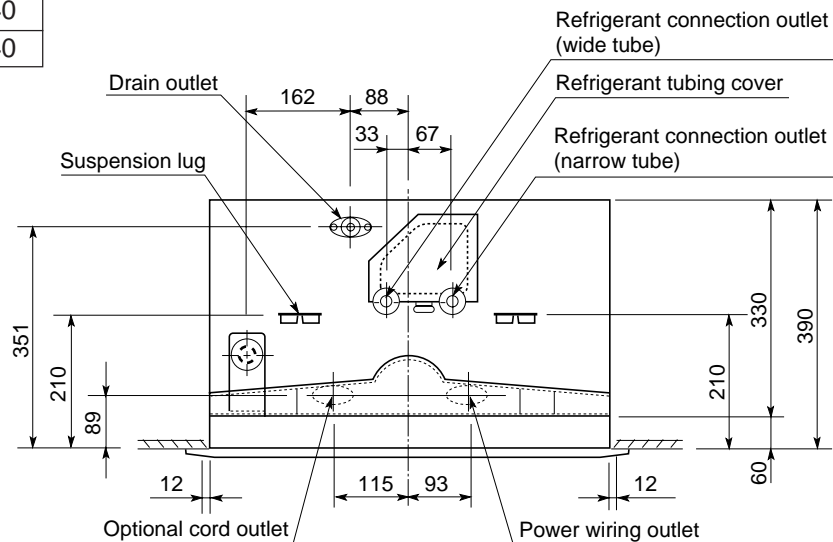
**Table 3-1** Unit : mm

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



**Fig. 3-19**

0052\_S\_1



**Fig. 3-20**

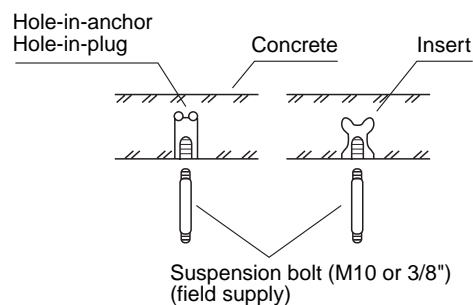
0053\_S\_1

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



**WARNING**

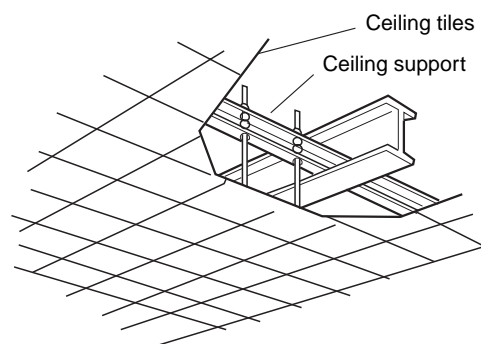
It is important that you use extreme care in supporting the indoor unit from the ceiling. Ensure that the ceiling is strong enough to support the weight of the unit. Before hanging the unit, test the strength of each attached suspension bolt.



**Fig. 3-21**

0038\_T\_1

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



**Fig. 3-22**

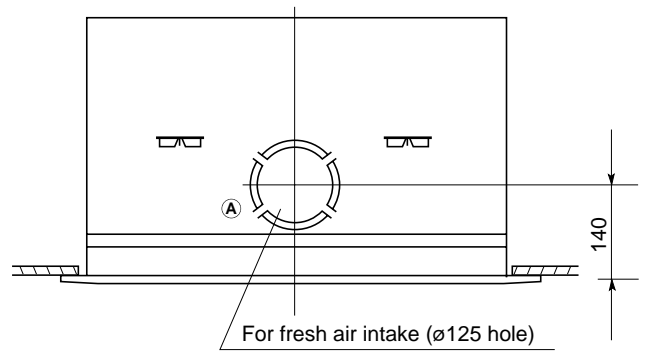
0039\_S\_1

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



**CAUTION**

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



**Fig. 3-23**

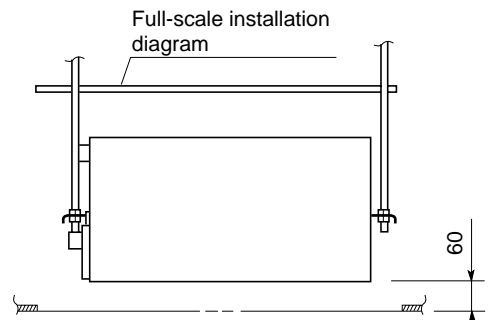
0054\_S\_I

### 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 supplied full-scale installation diagram. (Fig. 3-24)

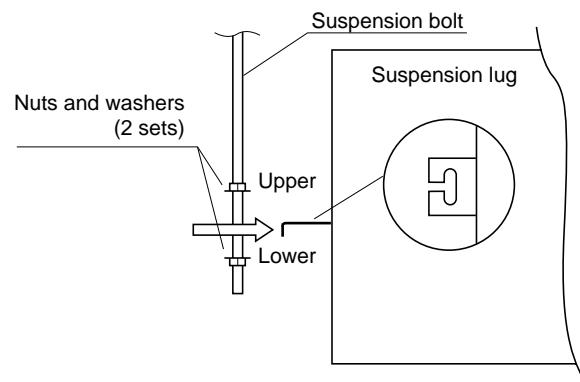
Tubing must be laid and connected inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing into position for connection to the unit before placing the unit inside the ceiling.

- (2) Thread the 2 hexagonal nuts and washers (field supply) onto the 4 suspension bolts as shown in Fig. 3-25. Use 2 sets of nuts and washers (upper and lower), so that the unit will not fall off the suspension lugs.
- (3) The distance between the unit and the opening of the ceiling, and the distance between the bottom surface of the ceiling and the bottom surface of the flange of the unit should follow the dimensions given in Fig. 3-24. Use the supplied installation gauge to check.



**Fig. 3-24**

0775\_S\_I



**Fig. 3-25**

0041\_X\_I

### 3-7. Installing the Drain Piping

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

When doing this, leave a gap between the drain socket of the unit and the PVC pipe to allow the drainage to be checked. The transparent drain pipe allows you to check drainage. (Fig. 3-26)



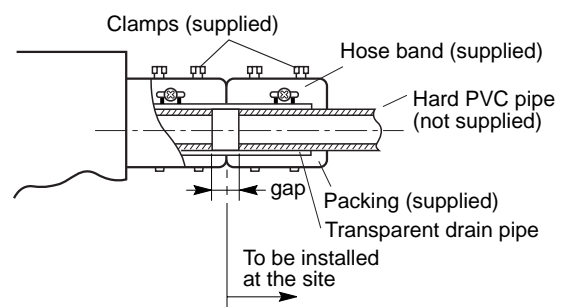
**CAUTION**

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

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

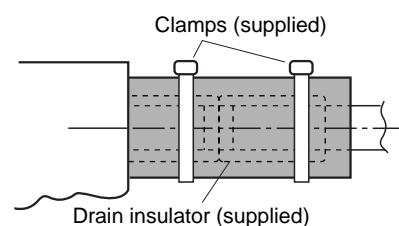
**NOTE**

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



**Fig. 3-26**

0774\_X\_I



**Fig. 3-27**

0046\_X\_I



CAUTION

- Do not install an air bleeder as this may cause water to spray from the drain pipe outlet. (Fig. 3-28)
- If it is necessary to increase the height of the drain pipe, the section 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 from the connection port. This will cause the drain water to flow backward and leak when the unit is not operating. (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)
- Provide insulation for any pipes that are installed indoors.

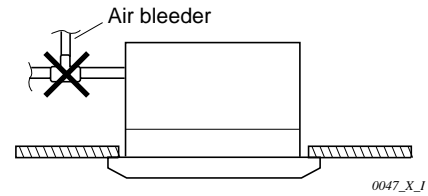


Fig. 3-28

0047\_X\_I

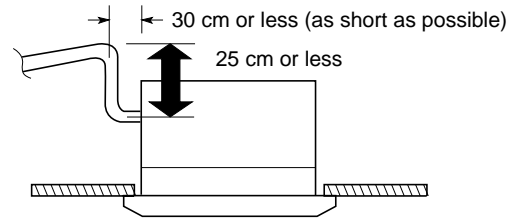


Fig. 3-29

0823\_X\_I

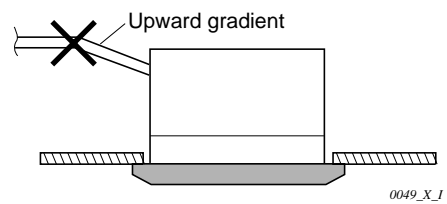


Fig. 3-30

0049\_X\_I

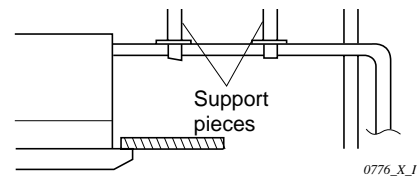


Fig. 3-31

0776\_X\_I

### 3-8. Checking the Drainage

After wiring and drain piping are completed, use the following procedure to check that the water will drain smoothly. For this, prepare a bucket and wiping cloth 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 tube cover and through the opening, slowly pour about 1,200 cc of water into the drain pan to check the drainage.
- (3) 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**

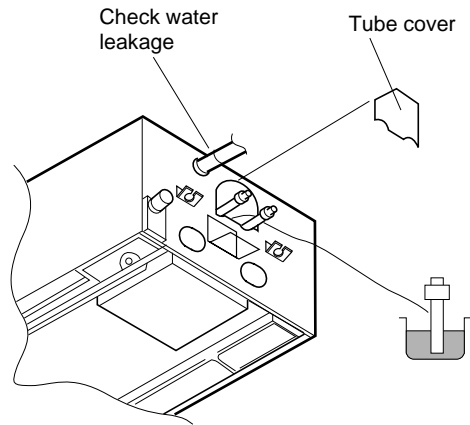
**Be careful since the fan will start when you short the pin on the indoor control board.**

- (4) When the check of drainage is complete, open the check pin (CN5 white) and remount the tube cover. (Fig. 3-32)



**CAUTION**

**To mount the tube cover, use 4 x 8 tapping screws. Do not use long screws as they may puncture the drain pan and cause water leakage.**



0056\_S-1

**Fig. 3-32**

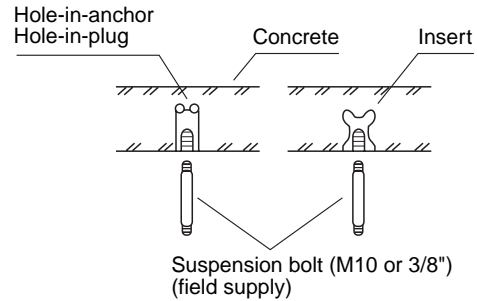
■ **4-Way Air Discharge Semi-Concealed Type (X-Type)**

**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 diagrams (Figs. 3-33 and 3-34), by attaching them to the ceiling support structure, or by any other method that ensures 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.

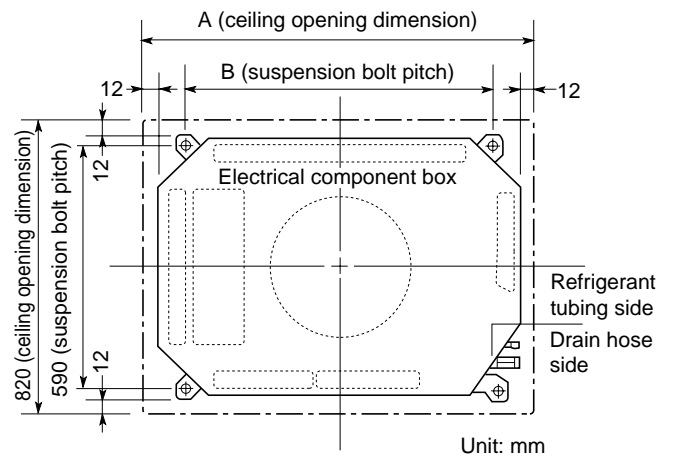


**Fig. 3-33**

0038\_T\_I

**Table 3-2** Unit : mm

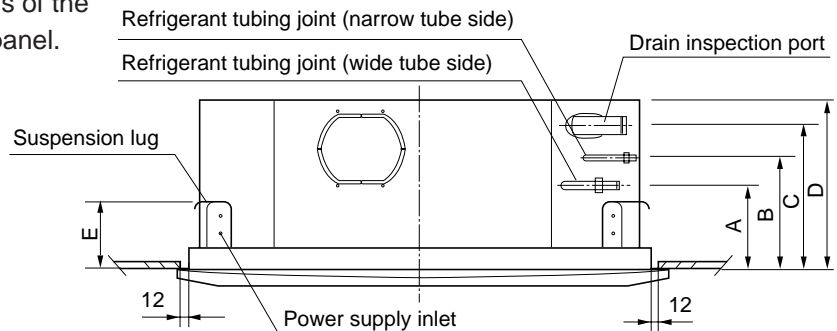
Type	Length	A	B
12, 18, 25		820	730
36, 48		1110	1020



**Fig. 3-34**

0057\_S\_I

- (3) Determine the pitch of the suspension bolts using the supplied 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

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

### 3-11. Placing the Unit Inside the Ceiling

- (1) When placing the unit inside the ceiling, determine the pitch of the suspension bolts using the supplied 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 bolts must be appropriate for a distance between the bottom of the bolt and the bottom of the ceiling of 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.

Use 2 sets of nuts and washers (upper and lower), so that the unit will not fall off the suspension lugs.

- (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 supplied installation gauge. (Fig. 3-36)

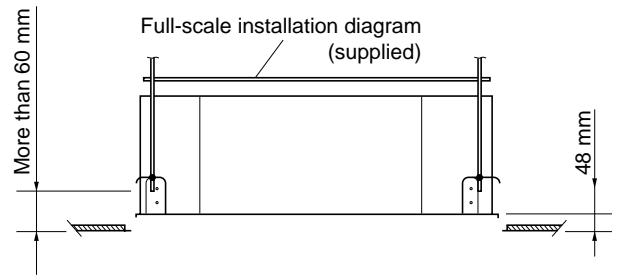


Fig. 3-36

0777\_X\_1

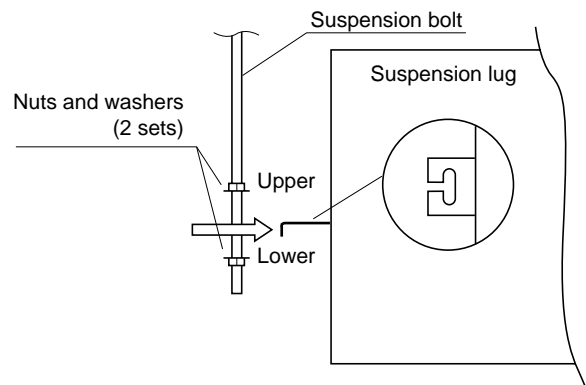


Fig. 3-37

0041\_X\_1

### 3-12. Installing the Drain Piping

- Prepare a standard hard PVC pipe (O.D. 32 mm) for the drain and use the supplied drain hose and hose band to prevent water leaks. The PVC pipe must be purchased separately. The transparent drain part allows you to check drainage. (Fig 3-38)

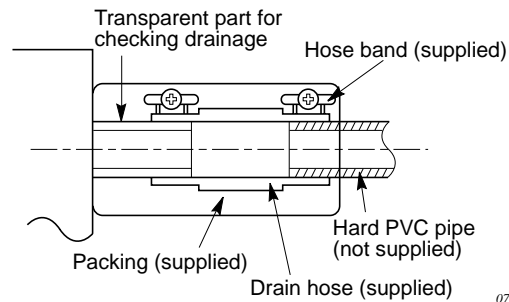


Fig. 3-38

0778\_X\_I



**CAUTION**

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

- After checking the drainage, wrap the supplied packing and drain pipe insulator around the pipe. (Fig 3-39)

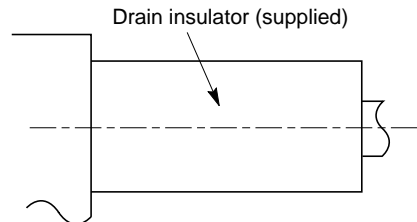


Fig. 3-39

0197\_X\_I

**NOTE**

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

- Do not install an air bleeder as this may cause water to spray from the drain pipe outlet. (Fig. 3-40)



**CAUTION**

- If it is necessary to increase the height of the drain pipe, the section 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)
- Do not install the pipe with an upward gradient from the connection port. This will cause the drain water to flow backward and leak when the unit is not operating. (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)
- Provide insulation for any pipes that are installed indoors.

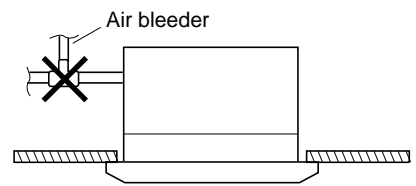


Fig. 3-40

0047\_X\_I

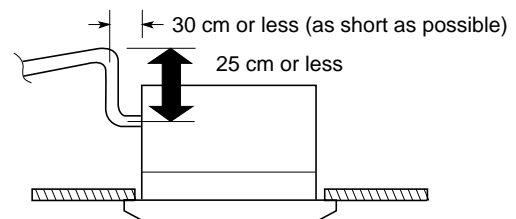


Fig. 3-41

0823\_X\_I

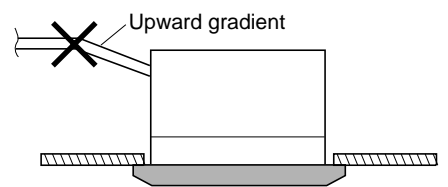


Fig. 3-42

0049\_X\_I

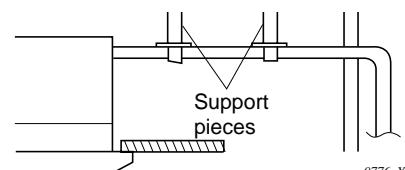


Fig. 3-43

0776\_X\_I

3  
X

### 3-13. Checking the Drainage

After wiring and drain piping are completed, use the following procedure to check that the water will drain smoothly. For this, prepare a bucket and wiping cloth 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 tube cover and through 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 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 when you short the pin on the indoor control board.**

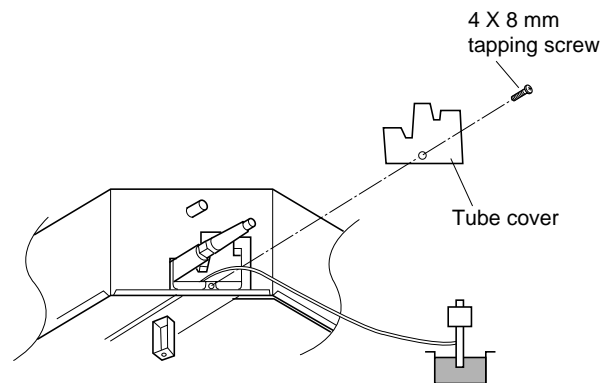
- (4) When the check of drainage is complete, open the check pin (CN5 white) and remount the tube cover.



**CAUTION**

**To mount the tube cover, use 4 x 8 tapping screws. (Fig. 3-32)**

**Do not use long screws as they may puncture the drain pan and cause water leakage.**



0062\_X\_I

**Fig. 3-44**

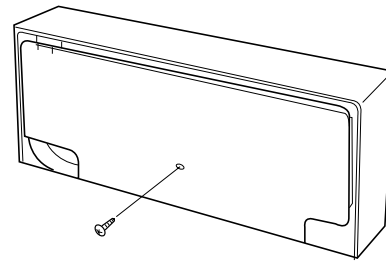
## ■ Wall-Mounted Type ( K Type)

### 3-14. Removing 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 which will provide the shortest run to the outdoor unit.



Set screw only for transportation

0063\_K\_I

Fig. 3-45

### 3-15. Selecting and Making a Hole

- (1) Remove the rear panel from the indoor unit and place it on the wall at the location selected. Fix the rear panel and hook the unit onto it temporarily. Make sure the unit is horizontal using a carpenter's level, or tape measure to measure down from the ceiling.
- (2) Determine which notch of the rear panel should be used. (Fig. 3-47)
- (3) Before drilling a hole, check that there are no studs or pipes behind the determined location. 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, make 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 the PVC pipe at a slight angle 6 mm shorter than the thickness of the wall. (Fig.3-49)

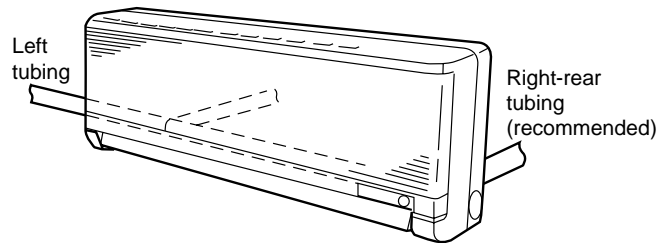
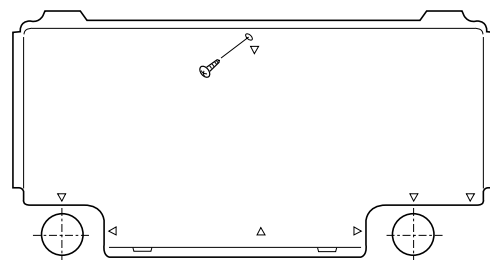


Fig. 3-46

0064\_K\_I



Center of left-rear tubing hole

Center of right-rear tubing hole

Fig. 3-47

0065\_K\_I



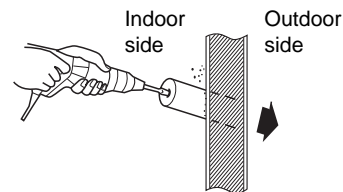
#### CAUTION

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

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



0066\_T\_I

Fig. 3-48

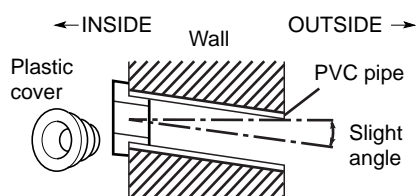
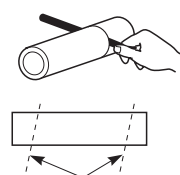


Fig. 3-50

0067\_K\_I

PVC pipe (locally purchased)



Cut at slight angle

0069\_T\_I

Fig. 3-49

### 3-16. Installing the Rear Panel onto the Wall

Confirm that the wall is strong enough to support the unit.

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

#### a) If the Wall is Wooden

- (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) Check with a tape measure or carpenter's level. This is important so that the unit is correctly installed. (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 the Wall is Brick, Concrete or Similar

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

### 3-17. Removing the Grille to Install the Indoor Unit



**CAUTION**

For preventing the movement of the air-deflector blades during transportation, a protective gasket was mounted at the air outlet of the air conditioner. Remove 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) Remove the screws. (Fig. 3-55)
- (3) Remove the grille.
- (4) When replacing the grille, push the grille at the mark (▲) as shown in Fig. 3-56 until the grille clicks back into place.

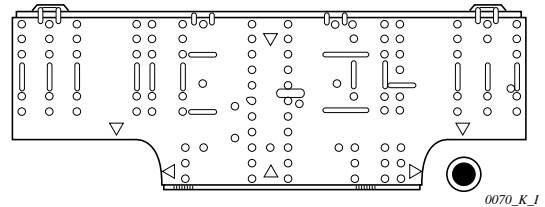


Fig. 3-51

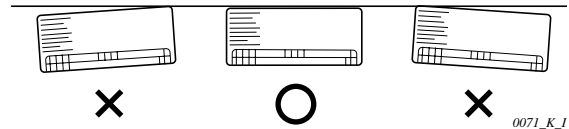


Fig. 3-52

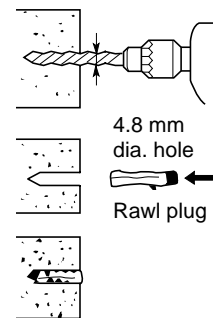


Fig. 3-53

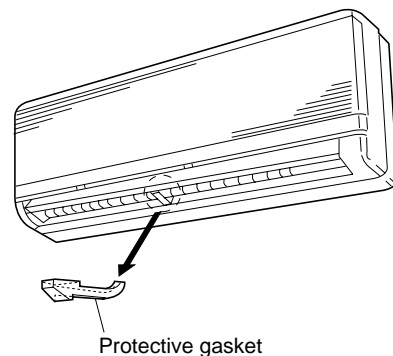


Fig. 3-54

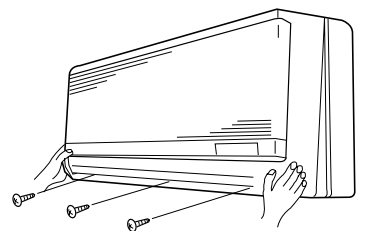


Fig. 3-55

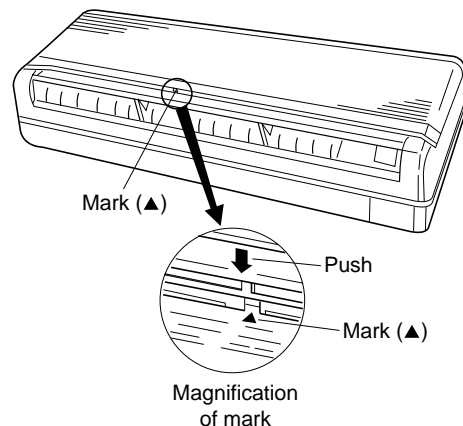


Fig. 3-56

### 3-18. Preparing the Tubing

#### (1) Arrangement of tubing by directions

##### a) Left tubing

The corner of the left frame should be cut with a hack saw or similar. Fig. (3-57)

##### b) Right-rear or left-rear tubing

In this case, the corners of the frame do not need to be cut.

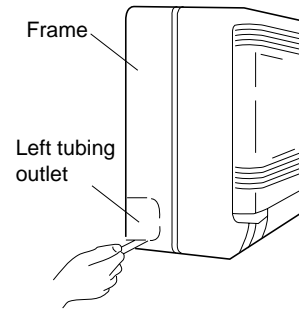


Fig. 3-57

#### (2) To mount the indoor unit on the rear panel:

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

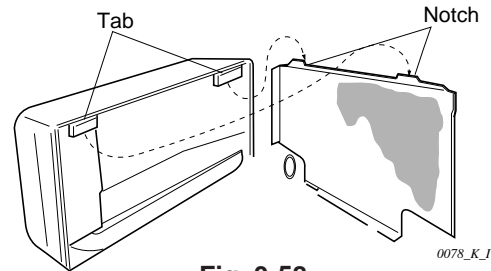


Fig. 3-58

### 3-19. Shaping the Tubing

#### (1) Shape the refrigerant tubing so that it can easily go into the 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 insulate to the end of the fittings. The drain hose should come straight down the wall to a point where water runoff will not stain the wall.

#### (4) Connect the refrigerant tubing to the outdoor unit. (After performing a leak test on the connection, insulate it with insulating. ) (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.

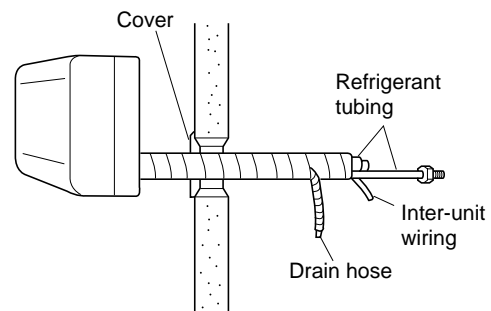


Fig. 3-59

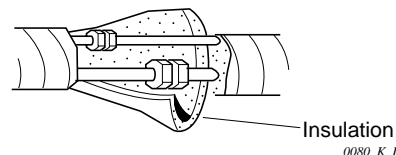


Fig. 3-60

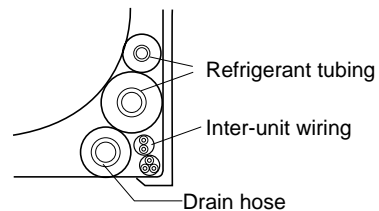


Fig. 3-61

### 3-20. Installing the Drain Hose

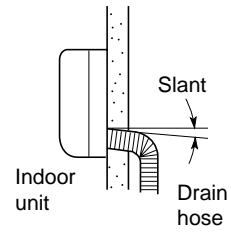
- a) The drain hose should be slanted downward to the outside. (Fig. 3-62)
- b) Never form a trap in the course of the hose.
- c) If the drain hose will run in the room, insulate the hose\* so that chilled condensation will not damage furniture or floors. (Fig. 3-63)

\* Foamed polyethylene or its equivalent is recommended.



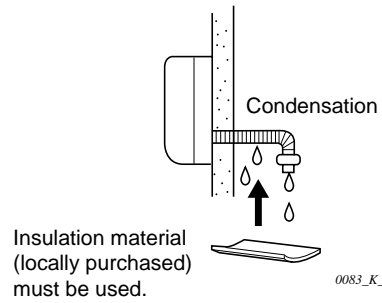
**WARNING**

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



**Fig. 3-62**

0082\_K\_I



**Fig. 3-63**

0083\_K\_I

4

K

## ■ Ceiling-Mounted Type (T Type)

### 3-21. Suspending the Indoor Unit

- (1) Place the full-scale diagram (supplied) 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 because of high 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 suspension bolts 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 important that you use extreme care in supporting the indoor unit from the ceiling. Ensure that the ceiling is strong enough 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 supplied toggle wing nuts at diagonal locations (Fig. 3-68) on the suspension bolts.

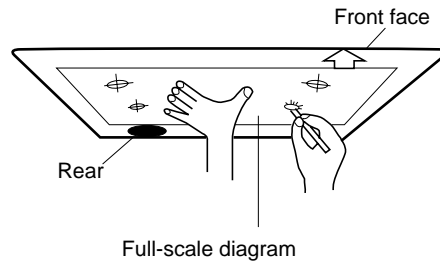


Fig. 3-64

0035\_T\_I

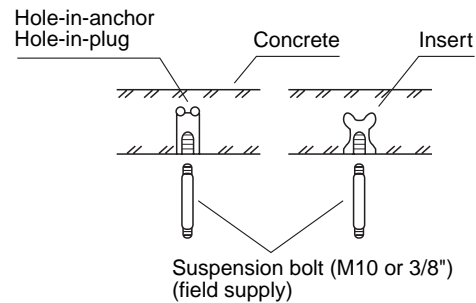


Fig. 3-65

0038\_T\_I

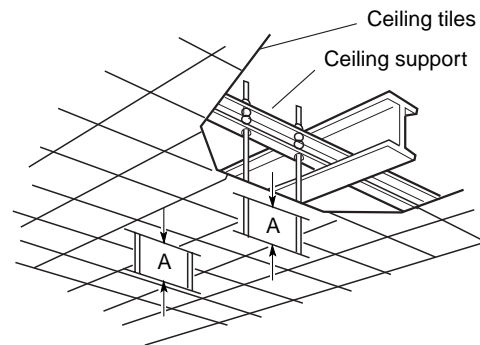


Fig. 3-66

0084\_T\_I

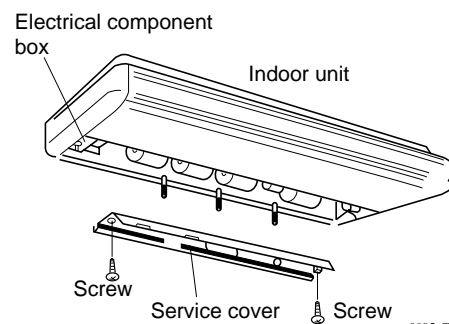


Fig. 3-67

0085\_T\_I

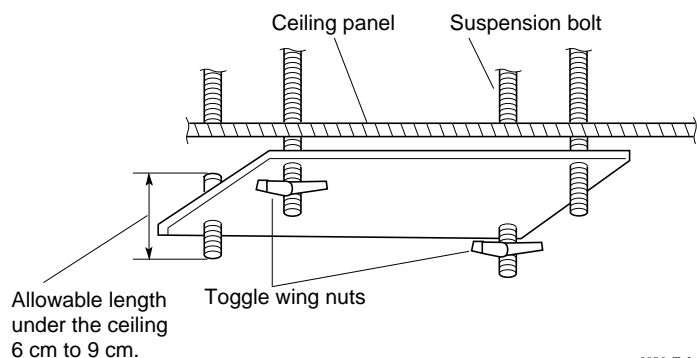


Fig. 3-68

0086\_T\_I



**CAUTION**

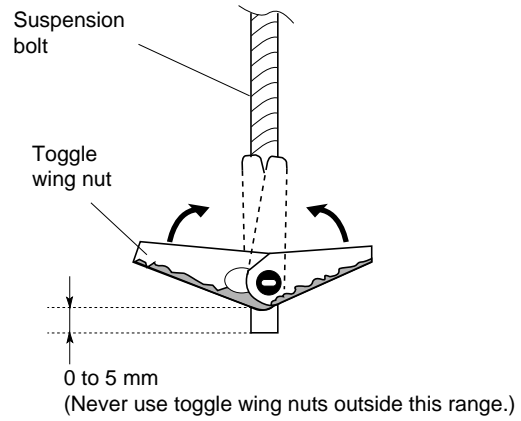
**When using toggle wing nuts**

- The 2 toggle wing nuts are used as a temporary measure when suspending the unit. Observe the tolerances shown at right. The unit cannot be installed correctly if there is more than 5 mm clearance 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 hexagonal 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 suspension holes of the unit. 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 hexagonal nuts to the remaining 2 suspension bolts. Thread on the hexagonal 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 hexagonal nut for each bolt until final adjustment (next step).
  - e) Adjust all 4 sets of washers and hexagonal nuts so that the indoor unit is evenly suspended.
  - f) Finish the suspension by adding 1 additional hexagonal nut to each suspension bolt. Tighten these nuts tightly to prevent the upper nuts from loosening. (Fig. 3-70)

**NOTE**

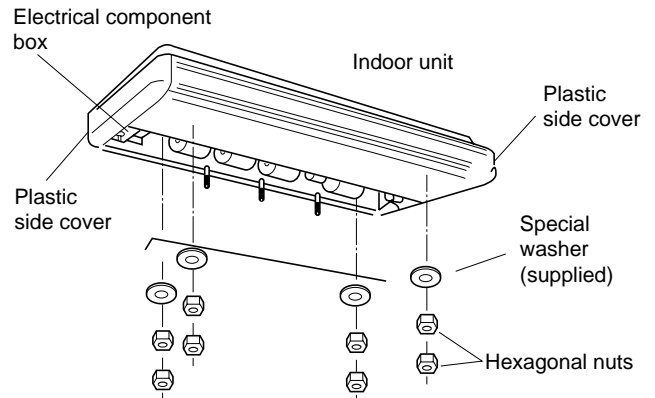
The ceiling surface is not always level. So that the installation is correct, leave a clearance of 1 cm between the ceiling panel and the ceiling surface and fill the gap with an appropriate insulation or filler material.

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



**Fig. 3-69**

0087\_T\_1

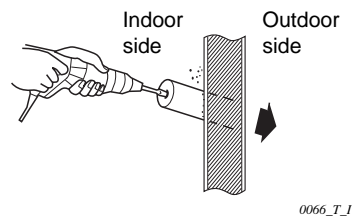


**Fig. 3-70**

0088\_T\_1

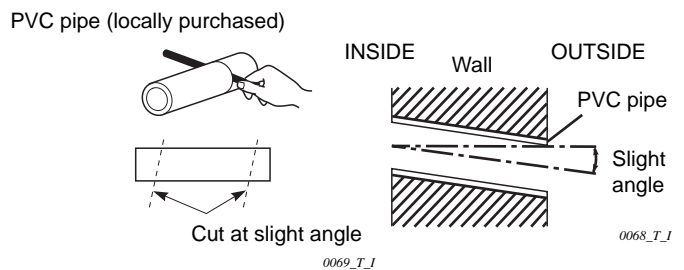
**NOTE**

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



**Fig. 3-71**

0066\_T\_1



**Fig. 3-72**

0068\_T\_1

0069\_T\_1

5  
T

### 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)

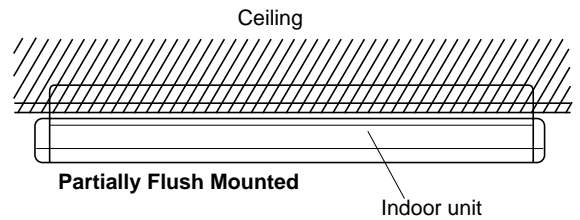
**NOTE**

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 support the indoor unit.

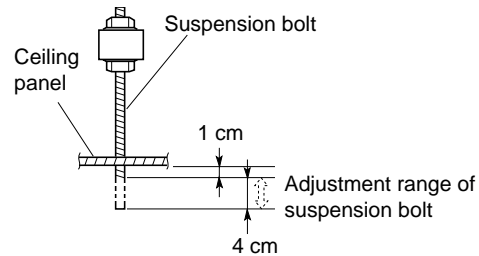
- (2) If a construction beam (or beams) is to be used to suspend the indoor unit, firmly secure the suspension bolts to the construction beam(s) and use the full-scale diagram to reconfirm the bolt mounting positions. (Fig. 3-74)
- (3) Place insulation (thickness: 10 mm minimum) around the embedded part 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 hexagonal nuts to level the unit. Then, tighten the second hexagonal 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. This can allow the entrance of humid air into the room, and thus degrade the performance of the air conditioner. To prevent this, leave a clearance of 1 cm between the ceiling and the indoor unit and fill the gap with an appropriate insulation or filler material. (Figs. 3-75 and 3-76)



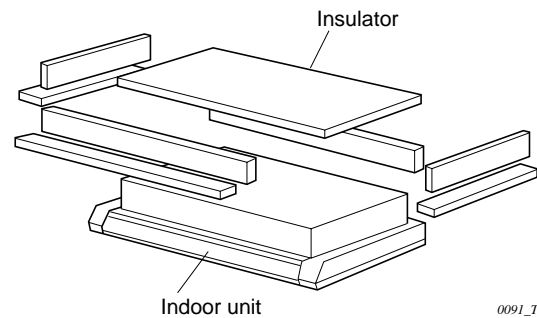
**Fig. 3-73**



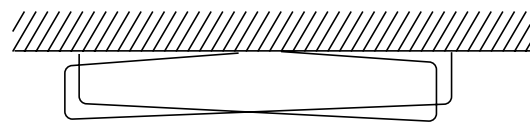
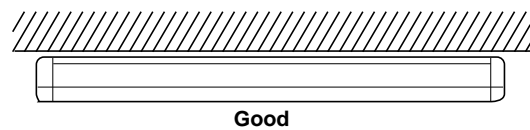
**Fig. 3-74**

**NOTE**

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



**Fig. 3-75**



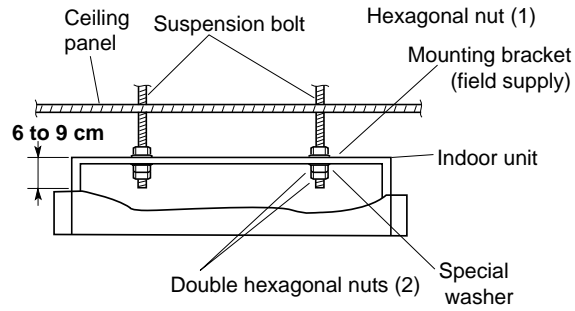
**Not good**

**Fig. 3-76**

### 3-23. When Suspending Away from the Ceiling

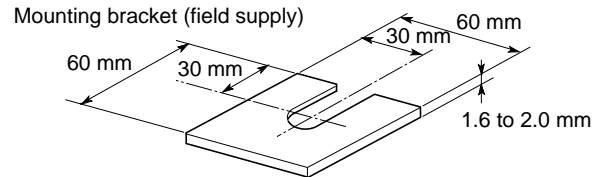
Follow the procedure given below if the indoor unit is to be suspended some distance from the ceiling surface.

- (1) Follow step (1) to (5) of Section 3-21 to affix the suspension bolts and adjust the double hexagonal nuts 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 hexagonal nuts as shown in Fig. 3-77 and 3-78.



0782\_T\_I

Fig. 3-77

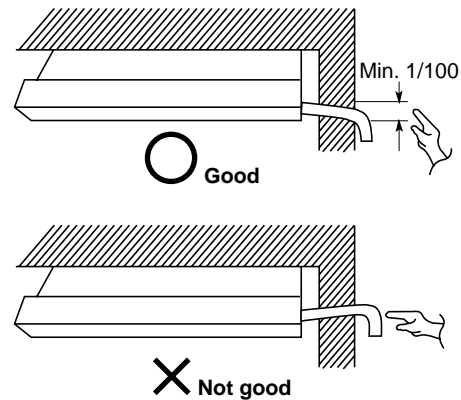


0094\_T\_I

Fig. 3-78

### 3-24. Installing the Drain Piping

- Prepare a 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.
- Insulate any piping inside the room to prevent dripping.
- Use the supplied drain pipe to connect the drain pipe with the drain outlet of the indoor unit .
- After connecting the drain pipe securely, wrap the supplied drain pipe insulator around the pipe, seal the gap at the drain socket with the supplied black insulation tape, then secure it with clamps.
- (Fig. 3-80)
- After the drain piping, pour water into the drain pan to check that the water drains smoothly.



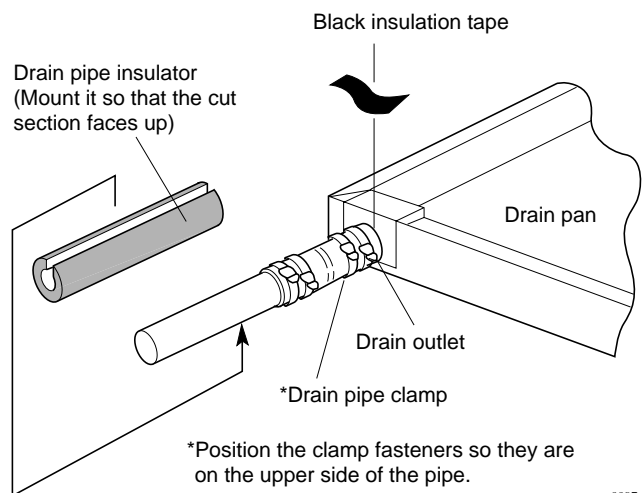
0783\_T\_I

Fig. 3-79



CAUTION

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



0097\_T\_I

Fig. 3-80

5  
T

## ■ Concealed-Duct Type ( U 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 that space is provided (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.

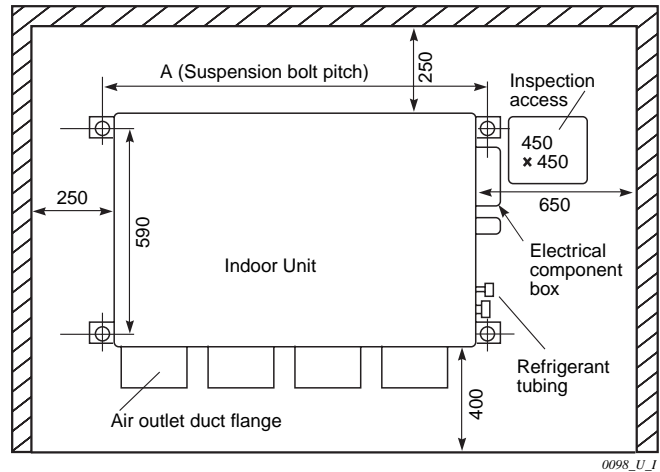


Fig. 3-81

Table 3-4

Type	9, 12, 18	25	36, 48
A (Length)	830	1,130	1,560
Number of duct flanges	2	3	4

Table 3-5

Type \ Length	A	B	C	D	E	F	G	H	I
9, 12, 18	692	600 (150 × 4)	46	280	310	750	830	220	35
25	992	900 (150 × 6)	46	290	310	1,050	1,130	240	45
36, 48	1,422	1,350 (150 × 9)	36	335	315	1,480	1,560	280	60

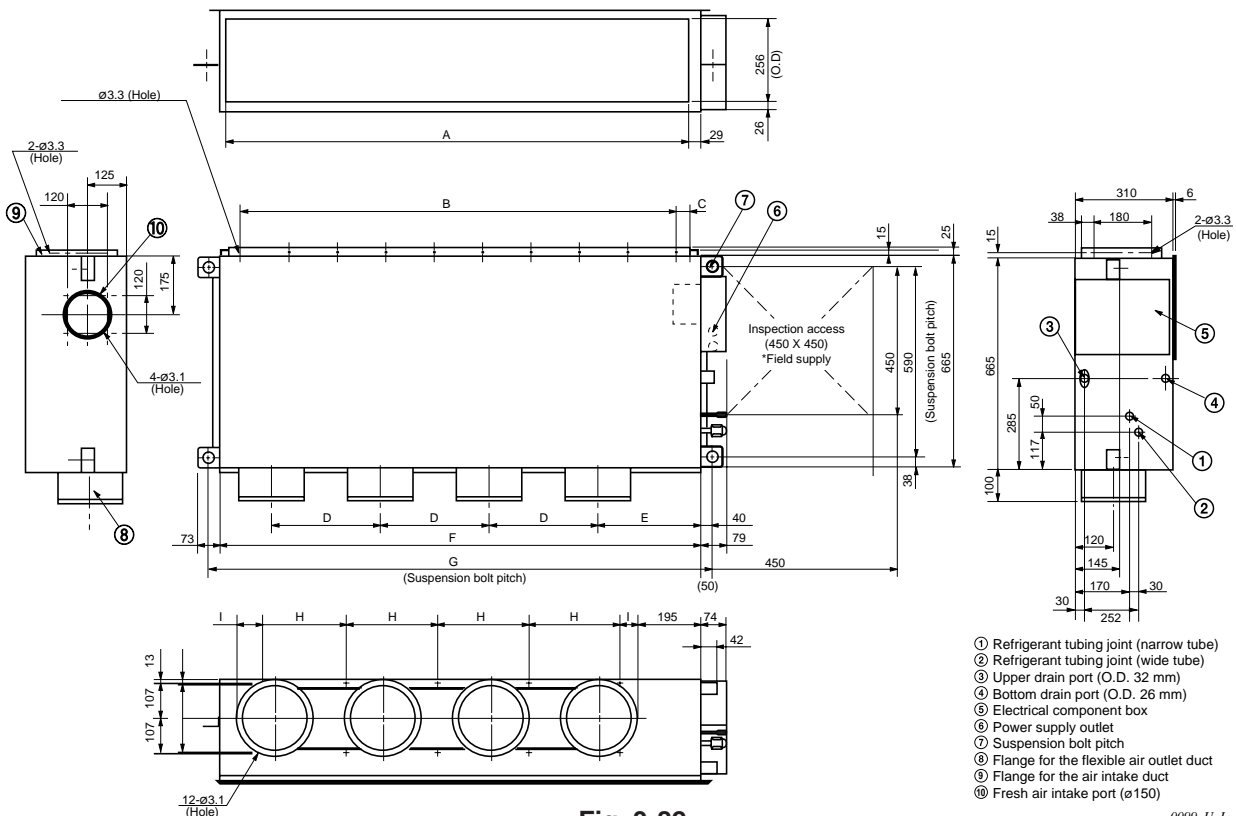


Fig. 3-82

- ① Refrigerant tubing joint (narrow tube)
- ② Refrigerant tubing joint (wide tube)
- ③ Upper drain port (O.D. 32 mm)
- ④ Bottom drain port (O.D. 26 mm)
- ⑤ Electrical component box
- ⑥ Power supply outlet
- ⑦ Suspension bolt pitch
- ⑧ Flange for the flexible air outlet duct
- ⑨ Flange for the air intake duct
- ⑩ Fresh air intake port (φ150)

0099\_U\_1

### 3-26. Suspending the Indoor Unit

Depending on the ceiling type:

- Insert suspension bolts 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 important that you use extreme care in supporting the indoor unit inside the ceiling. Ensure that the ceiling is strong enough to support 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. 3-82)  
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. Use 2 sets of nuts and washers (upper and lower), so that the unit will not fall off the suspension lugs.

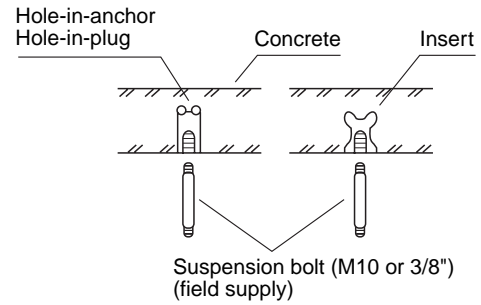


Fig. 3-83

0038\_T\_I

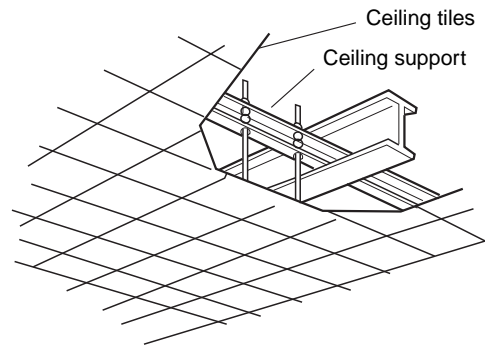


Fig. 3-84

0039\_S\_I

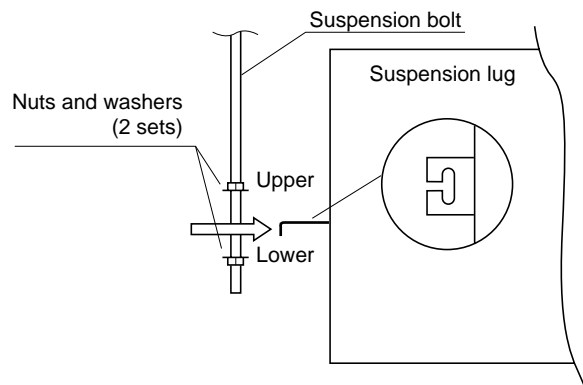


Fig. 3-85

0041\_X\_I

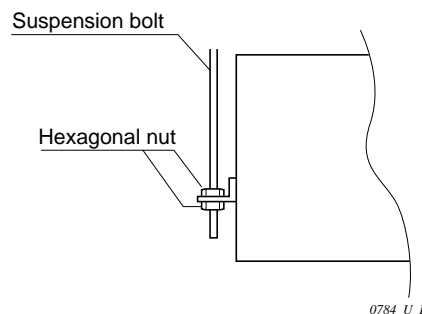


Fig. 3-86

0784\_U\_I



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

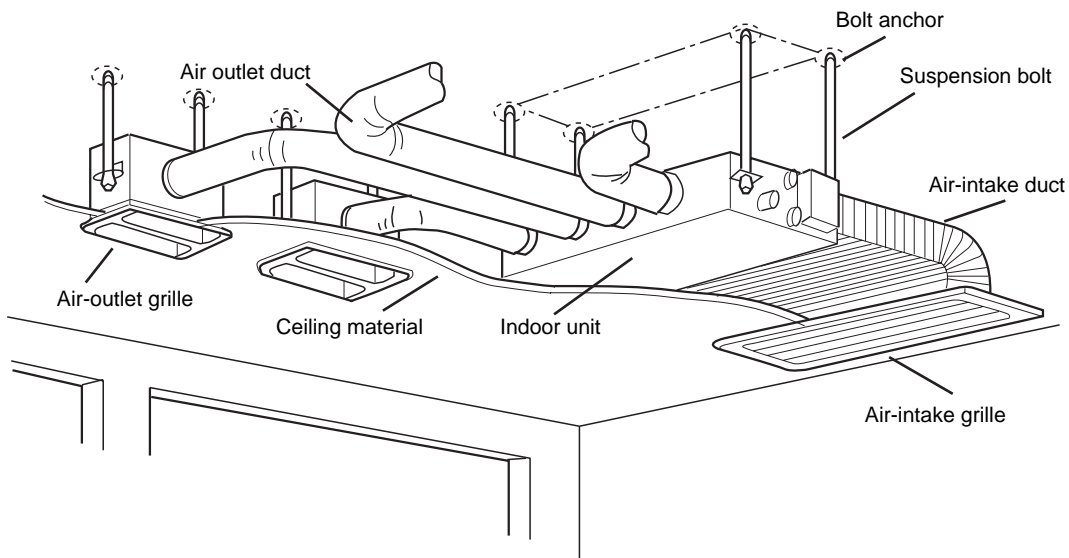


Fig. 3-87

0785\_U\_1

### 3-27. Installing the Drain Piping

- (1) Prepare a standard hard PVC pipe (O.D. 32 mm) for the drain and use the supplied hose band to prevent water leaks. The PVC pipe must be purchased separately. When doing this, leave a gap between the drain socket of the unit and the PVC pipe to allow the drainage to be checked. The transparent drain pipe allows you to check drainage. (Fig. 3-88)

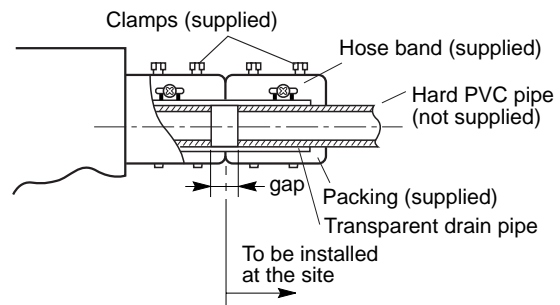


Fig. 3-88

0774\_X\_1



**CAUTION**

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

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

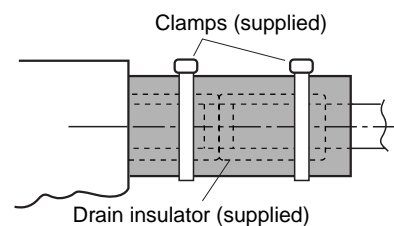


Fig. 3-89

0046\_X\_1

**NOTE**

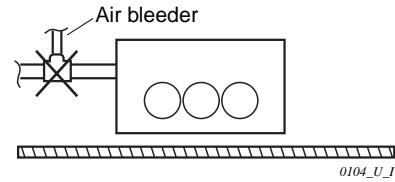
Make sure the drain pipe has a downward gradient (1/100 or more) and that there are no water traps.



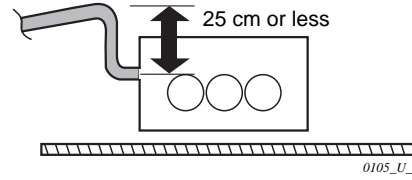
**CAUTION**

- Do not install an air bleeder as this may cause water to spray from the drain pipe outlet. (Fig. 3-90)

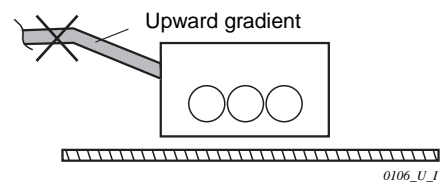
- If it is necessary to increase the height of the drain pipe, the section directly after the connection port can be raised a maximum of 25 cm. Do not raise it any higher than 25 cm, as this could result in water leaks. (Fig. 3-91)
- Do not install the pipe with an upward gradient from the connection port. This will cause the drain water to flow backward and leak when the unit is not operating. (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 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. 3-93)



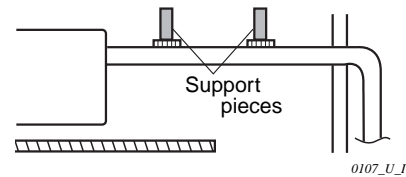
**Fig. 3-90**



**Fig. 3-91**



**Fig. 3-92**



**Fig. 3-93**

### 3-28. Checking the Drainage

After wiring and drain piping are completed, use the following procedure to check that the water will drain smoothly. For this, prepare a bucket and wiping cloth 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 tube cover and through 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 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 when you short the pin on the indoor control board.**

- (4) When the check of drainage is complete, open the check pin (CN5 white) and remount the insulator and drain cap onto the drain inspection port.



**CAUTION**

**To mount the tube cover, use 4 x 8 tapping screws. Do not use long screws as they may puncture the drain pan and cause water leakage.**



### 3-29. Increasing 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 may be 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 (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.

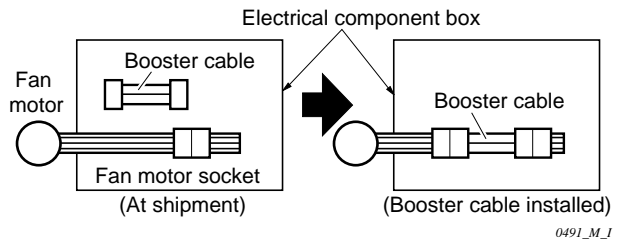
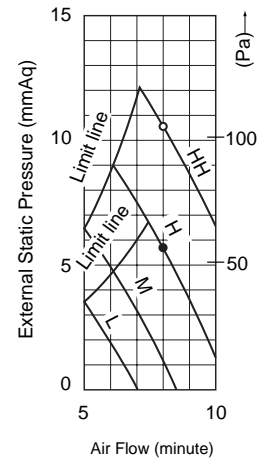


Fig. 3-94

#### 9 Type



0724\_U\_I

### Indoor Fan Performance

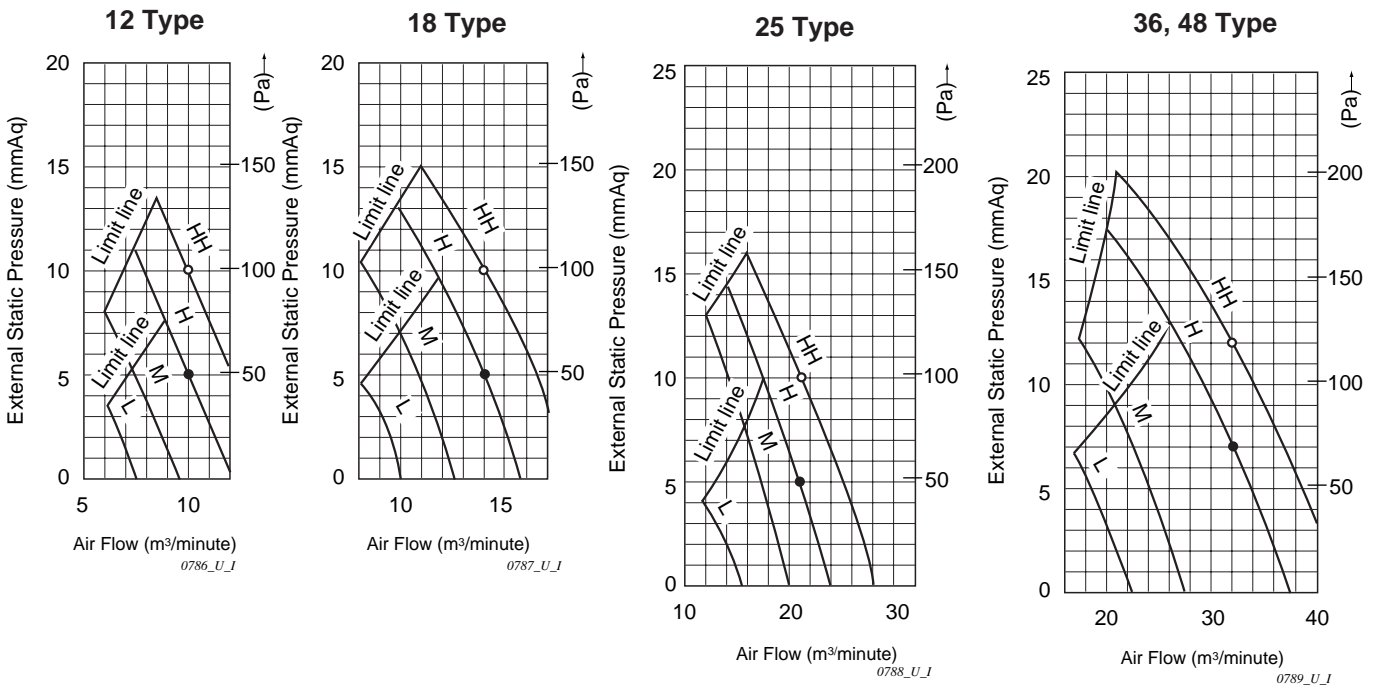




Fig. 3-95

**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 (m<sup>3</sup>/minute). The characteristic curves for “HH,” “H,” “Med,” and “Low” fan speed control are shown.

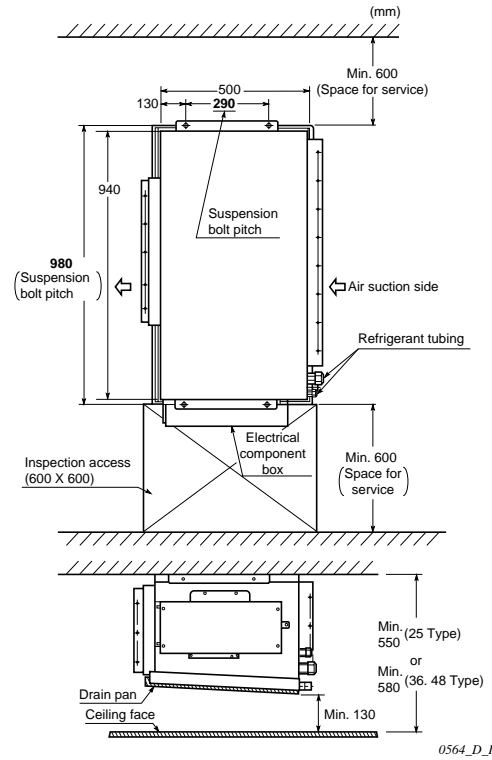
The nameplate values are shown based on the “H” air flow. For the 25 type, the air flow is 21 m<sup>3</sup>/minute, while the external static pressure is 5 mmAq at “H” position. If external static pressure is too great (due to long extension of duct, for example), the air flow volume may drop too low at each air outlet.

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

■ **Concealed-Duct High Static Pressure Type (D Type)**

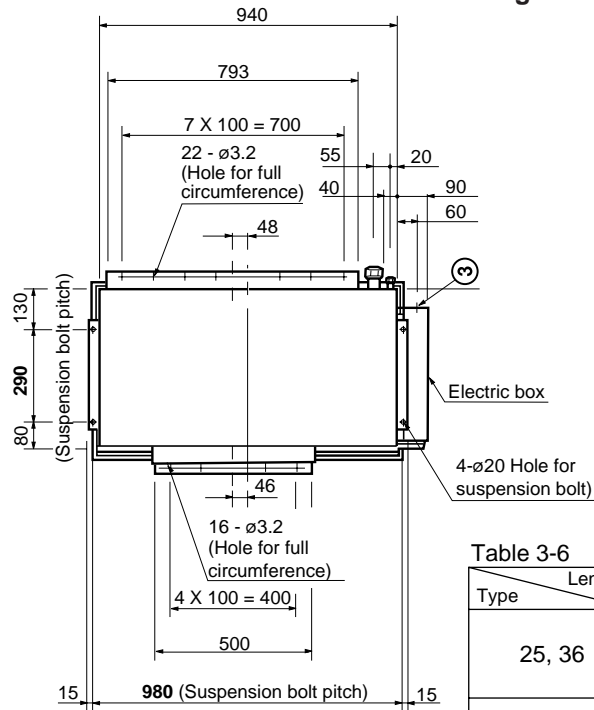
**3-30. Required Minimum Space for Installation and Service**

- 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 that space is provided (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.



0564\_D\_1

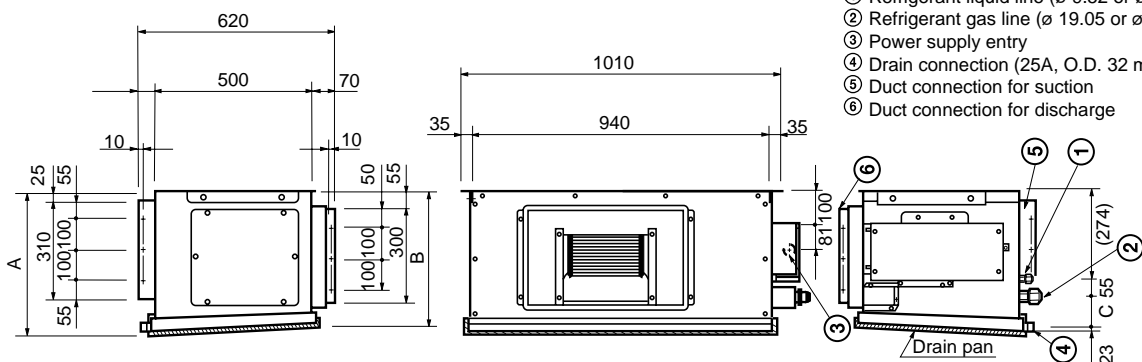
**Fig. 3-96**



**Table 3-6**

Unit : mm

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



- ① Refrigerant liquid line (ø 9.52 or ø 6.35)
- ② Refrigerant gas line (ø 19.05 or ø 15.88)
- ③ Power supply entry
- ④ Drain connection (25A, O.D. 32 mm)
- ⑤ Duct connection for suction
- ⑥ Duct connection for discharge

**Fig. 3-97**

0793\_D\_1

### 3-31. Suspending the Indoor Unit

Depending on the ceiling type:

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



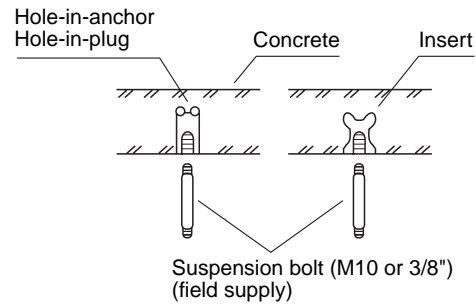
**WARNING**

**It is important that you use extreme care in supporting the indoor unit inside the ceiling. Ensure that the ceiling is strong enough to support 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. (Figs. 3-96, 3-97)

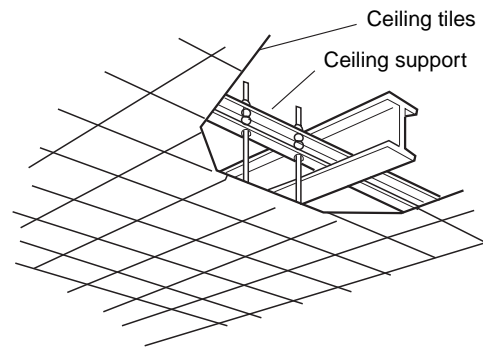
Tubing must be laid and connected inside the ceiling when suspending the unit. If the ceiling is already constructed, lay the tubing into position for connection to the unit before placing the unit inside the ceiling.

- (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 the unit) as shown in Fig. 3-100.



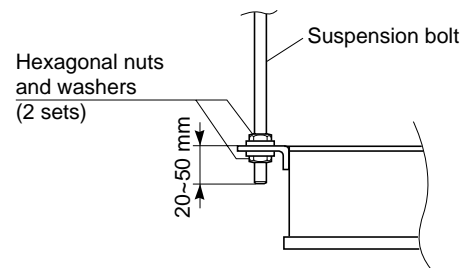
**Fig. 3-98**

0038\_T\_1



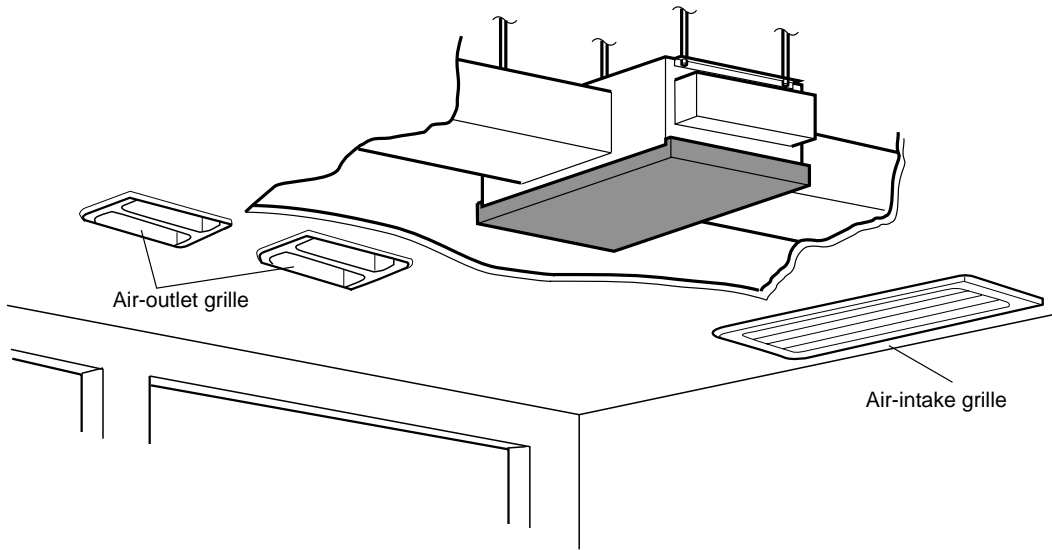
**Fig. 3-99**

0039\_S\_1



**Fig. 3-100**

0790\_D\_1



0791\_D\_1

Fig. 3-101

### 3-32. Installing the Drain Piping

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

When doing this, apply the adhesive for the PVC pipe at the connection point.

(2) After connecting the drain pipe securely, wrap the insulator (field supply) around the pipe.

(3) Ensure the drain pipe has a downward gradient (1/100 or more) and prepare traps as indicated in Fig. 3-102.

(4) Also, in another part of the pipe arrangement, prepare traps with an inspection plug to clean dust which may cause leaking of water. (Fig. 3-103)

(5) After the drain piping, slowly pour water into the drain pan to check that the water drains smoothly.

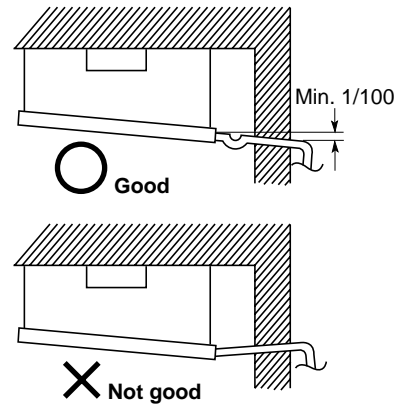


Fig. 3-102

0792\_T\_1

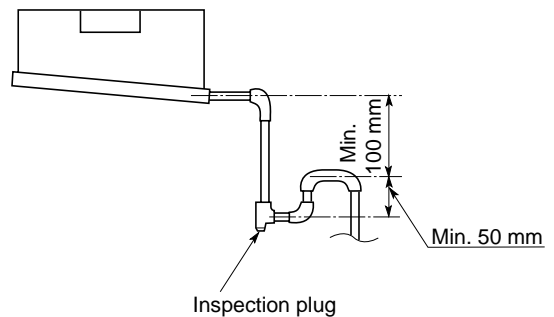


Fig. 3-103

0114\_D\_1

### 3-33. Caution for Ducting Work

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

■ Floor-Standing Type (F Type)  
 Concealed Floor-Standing Type (FM Type)

3-34. Required Minimum Space for Installation and Service

Install the unit where cooled or heated air from the unit can circulate well in the room. Do not put obstacles which may obstruct the air flow in front of the air intake and outlet grilles.

**NOTE**

Ensure that there is space for maintenance of the electrical component box, air filter and, refrigerant tubes.

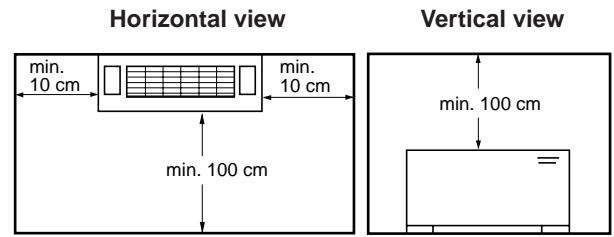


Fig. 3-104

0754\_M\_I

3-35. Dimensions and Part Names

1. Floor-Standing Type (F Type)

- ① 4- $\phi$ 12 hole (For fastening the indoor unit to the floor by screws.)
- ② Air filter
- ③ Refrigerant connection outlet (narrow tube)
- ④ Refrigerant connection outlet (wide tube)
- ⑤ Level adjusting bolt
- ⑥ Drain outlet (20 A)
- ⑦ Power cord outlet (downward, rear)
- ⑧ Refrigerant tubing outlet (downward, rear)
- ⑨ Location for mounting the remote controller (remote controller is attachable in the room)

Table 3-7

Type \ Size	A	B	C	Narrow tube	Wide tube
9, 12	1065	665	632	9.52	12.7
18, 25	1380	980	947	9.52	15.88

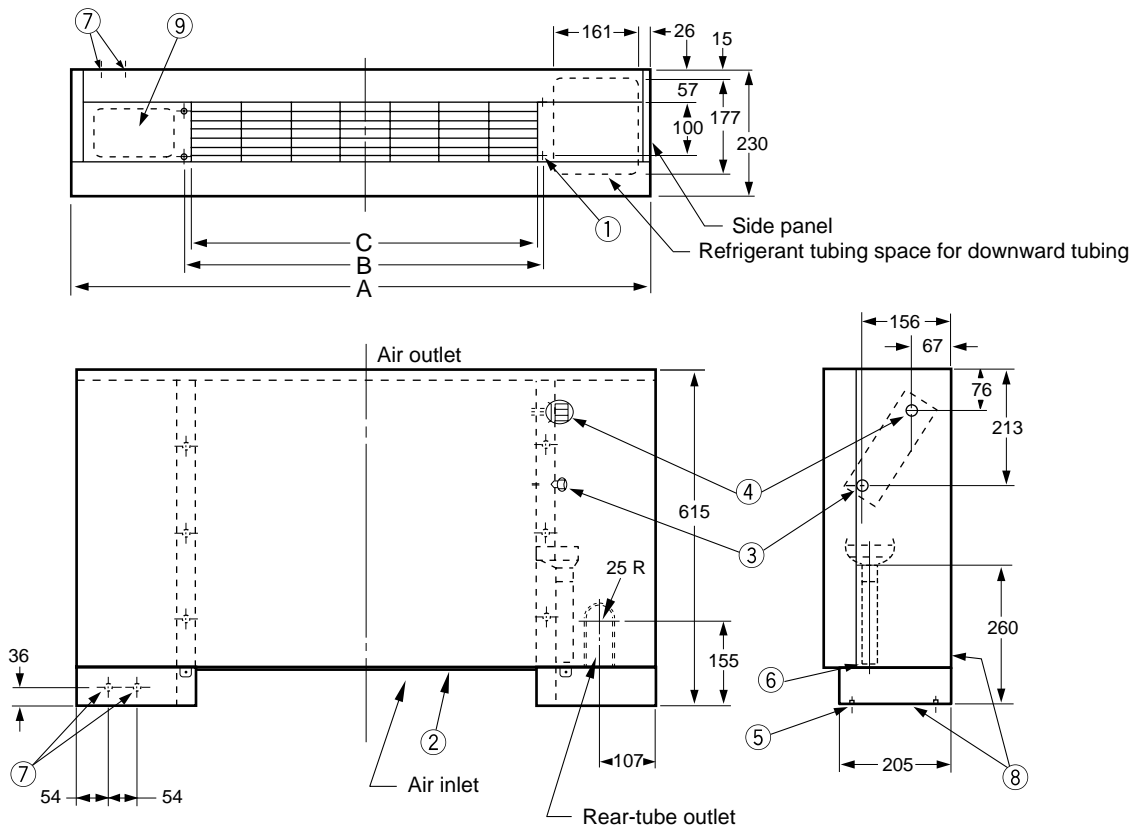


Fig. 3-105

0755\_M\_I

## 2. Concealed Floor-Standing Type (FM Type)

- ① 4- $\phi$ 12 hole (For fastening the indoor unit to the floor by screws.)
- ② Air filter
- ③ Refrigerant connection outlet (narrow tube)
- ④ Refrigerant connection outlet (wide tube)
- ⑤ Level adjusting bolt
- ⑥ Drain outlet (20 A)
- ⑦ Flange for the air-outlet duct

Table 3-8

Type \ Size	A	B	C	D	Narrow tube	Wide tube
9, 12	858	692	672	665	9.52	12.7
18, 25	1173	1007	1002	980	9.52	15.88

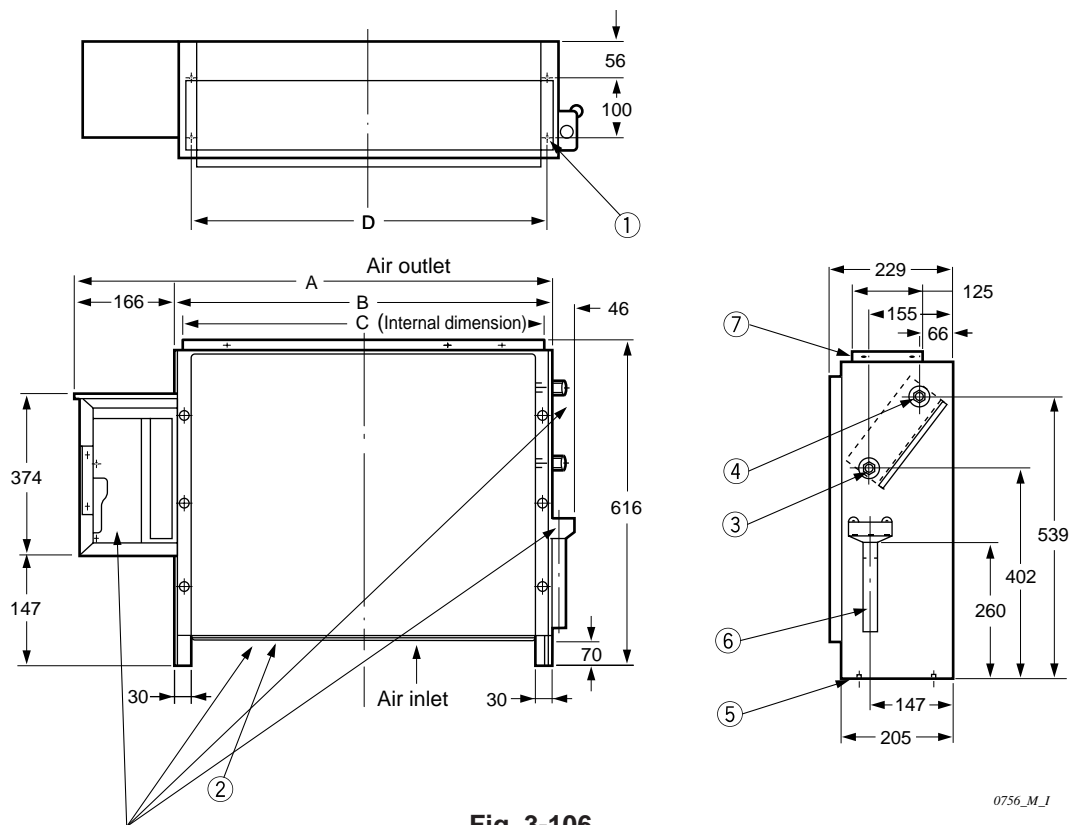


Fig. 3-106

0756\_M\_I

**NOTE**

Make an opening in the housing of the unit so that maintenance service can be performed on the electric component box, air filter, refrigerant tubing connection and drain pipe.

### 3-36. Removing and Attaching the Front Panel (Floor-Standing Type).

#### NOTE

A "dew-prevention heater" is secured behind the front panel. When removing or attaching the panel, take care not to damage the lead wire to the heater.

#### How to remove the front panel

- (1) Remove the two screws at the lower part of the front panel.
- (2) Holding A at the upper right of the unit, push up at B at the lower right of the panel. The right side of the front panel is removed. Then remove the left side of the front panel following the same procedure.
- (3) Pull apart the lead wire connector (2P red) for the dew-prevention heater
- (4) Remove the chain connecting the front panel of the unit by unhooking it from the fixture attached to the panel.

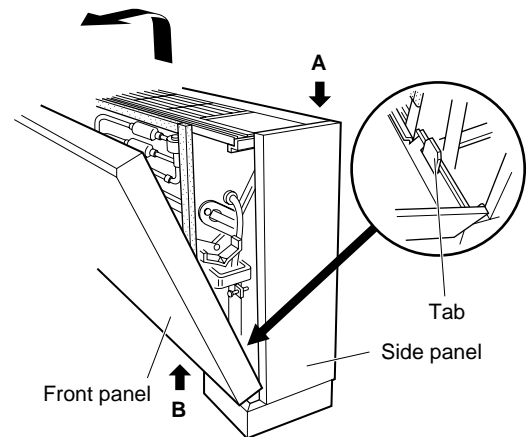


Fig. 3-107

0757\_M\_I

#### How to attach the front panel

- (1) Hook the chain to the fixture of the front panel
- (2) Connect the lead wire connector
- (3) Align the slots at the lower part of the front panel to the tabs at the lower part of the indoor unit and put the upper trim tab of the front panel on the groove of the unit. Then press down the panel.
- (4) Insert the two screws at the lower part of the front panel

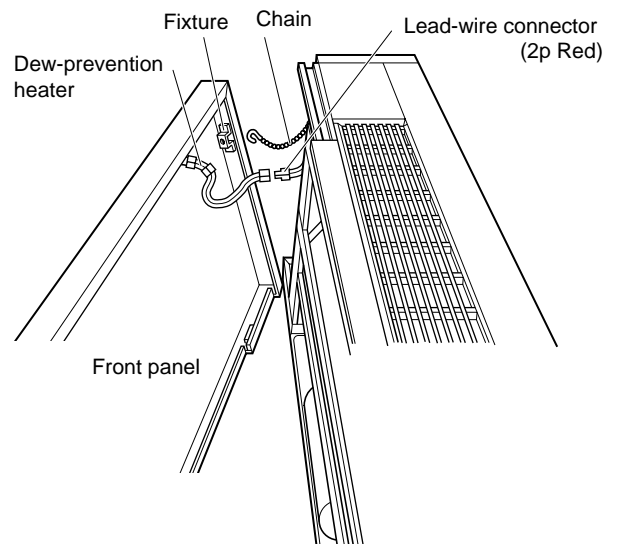


Fig. 3-108

0758\_M\_I

### 3-37. Installing the Refrigerant Tubing

- (1) When connecting the wide tube use the one supplied.
- (2) Tubes can be extended in two directions, downward and rear sides.

For floor standing type

- When a rear-side tube is required, it can run through the rear-tube outlet of the rear panel.
- When a downward tube is required refer to the opening dimensions shown in Fig. 3-109.

8  
F

9  
FM

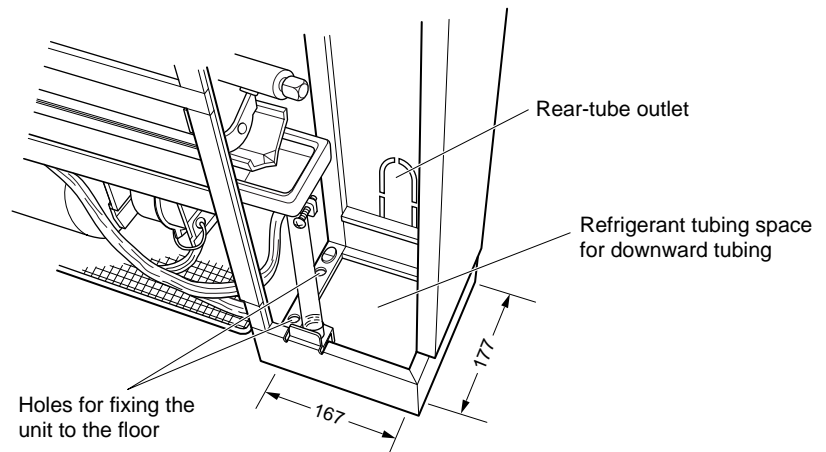


**CAUTION**

**Insulate both wide and narrow tubes.**

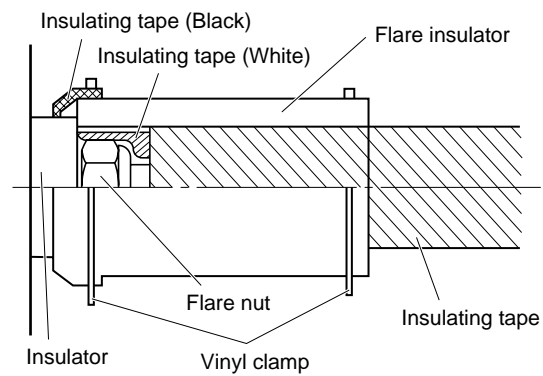
● To insulate tubes

- (1) Wrap the flare nuts with the supplied white insulating tape.
- (2) Wrap the flare nuts with the supplied flare insulator.
- (3) Fill the clearance between the union insulator and flare insulator with black insulating tape. Fasten both ends of the flare insulator with the supplied vinyl clamp.



0759\_M\_1

**Fig. 3-109**



0760\_M\_1

**Fig. 3-110**

8  
F

9  
FM

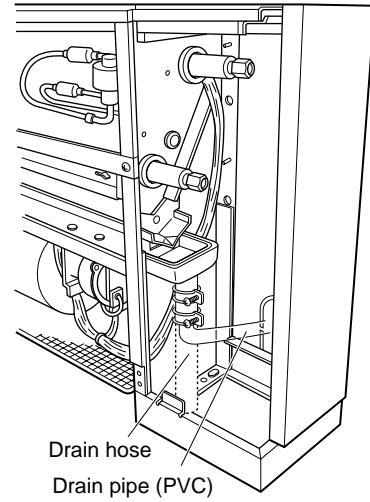
### 3-38. Installing the Drain Piping



**CAUTION**

Water leaks may occur if the drain pipes are connected inadequately.

- (1) When rear-side drain piping is required bend the drain hose attached to the indoor unit by 90°. Connect a drain pipe (field supply) to the drain hose through the rear tubing outlet in the rear panel. Use a hard PVC pipe (VP20) for the drain piping.
- (2) Ensure that the drain pipe has a downward gradient of 1/100 or more and that there are no water traps.
- (3) Provide insulation for the drain pipe.
- (4) After the drain piping is completed, pour water into the drain pan to check if the water drains smoothly.
- (5) Remove any dust in the drain pan so that the pipe is not clogged.



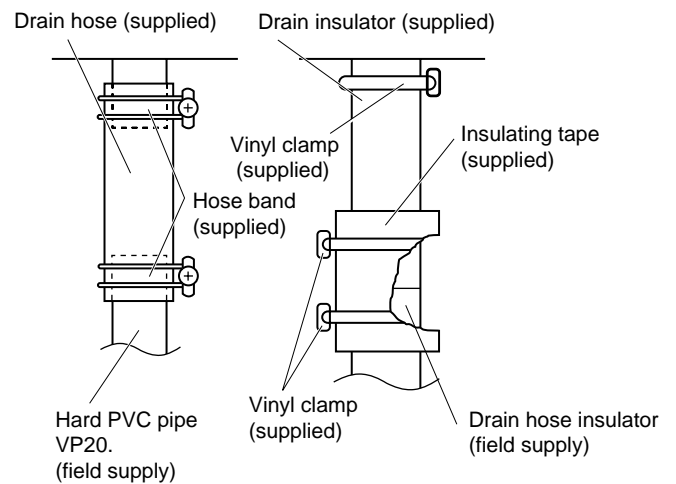
**Fig. 3-111**

0761\_M\_I

### 3-39. Installing the Remote Controller

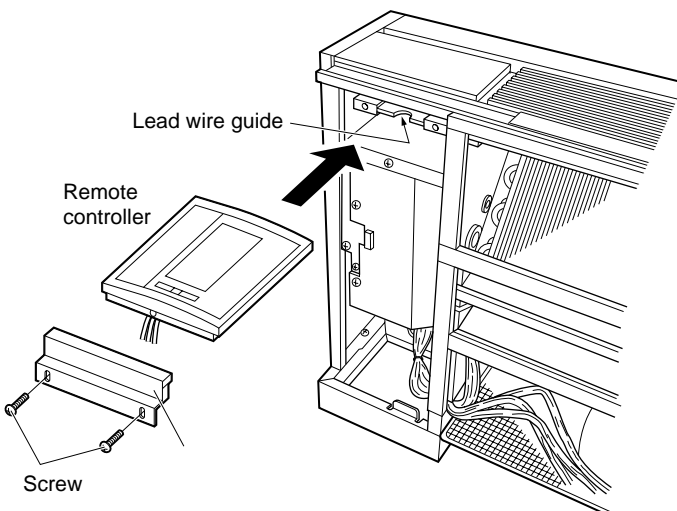
A remote controller (optional wired remote controller) can be mounted in the indoor unit (floor-standing type).

- (1) Remove the cover of the optional wired remote controller. (Fig. 3-113)
- (2) Remove the front panel. Remove the screws and fixture. (Fig. 3-114)
- (3) Place the remote controller into the space in the unit as shown in Fig 3-114. Assemble the lead wires of the remote controller to its rear side center and route them to the lead wire guide.
- (4) Secure the fixture by the screws.



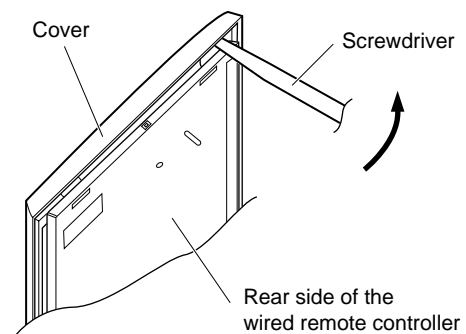
**Fig. 3-112**

0762\_M\_I



**Fig. 3-114**

0764\_M\_I



**Fig. 3-113**

0763\_M\_I

To remove the cover from the remote controller, insert a screwdriver between the cover and the controller as shown in the figure above, and turn the screwdriver in the direction indicated by the arrow.

8

F

9

FM

## 4. HOW TO INSTALL THE OUTDOOR UNIT

### 4-1. Transporting

When transporting the unit, have it delivered as close to the installation site as possible without unpacking.

Remove one of the two bolts (M8) fixing the suspension plate, and screw the Eye-Bolt (field supply) at the position indicated. In the same way, attach the Eye-Bolts in the 4 positions. (Fig. 4-1)

Put the rope or strap through the hook of the Eye-Bolt. (Fig. 4-1)

Lift the unit with its weight balanced and evenly supported. (Fig. 4-1)

To prevent damage, use protective material (such as cloth or cardboard) at all points where the lifting rope or strap touches the unit. (Fig. 4-1)

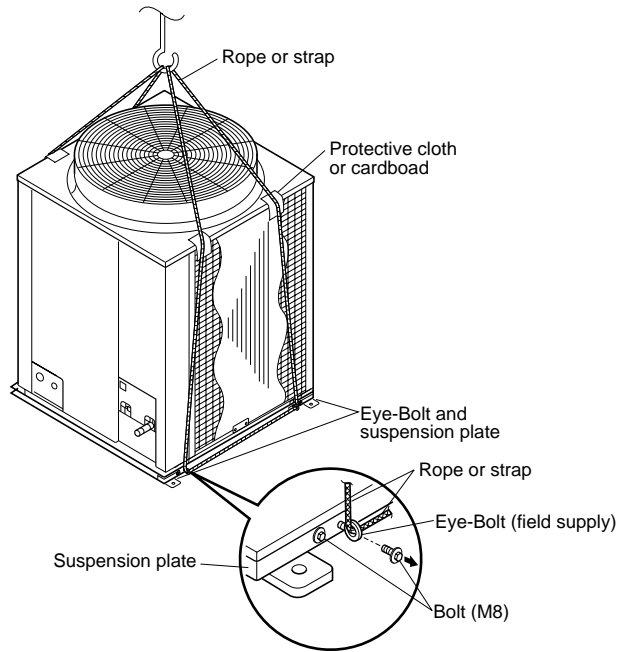


Fig. 4-1

0108\_C\_1

### 4-2. Installing the Outdoor Unit

- (1) Install a block or a solid platform under the outdoor unit which provides a minimum height of 5 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. (Fig. 4-3)

Fix the outdoor unit firmly so it will not fall during strong wind gusts.

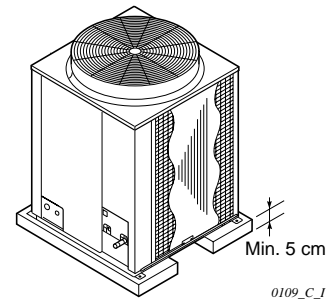


Fig. 4-2

0109\_C\_1

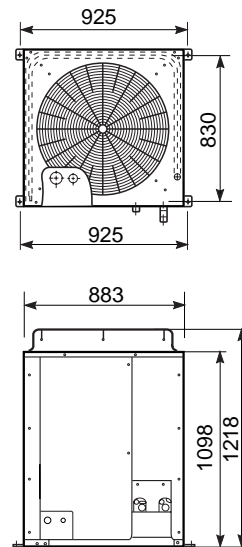


Fig. 4-3

0188\_C\_1

## 5. ELECTRICAL WIRING

### 5-1. General Precautions on Wiring

- (1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.
- (2) 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 from insulation failure, the unit must be grounded.
- (4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.
- (5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.
- (6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.
- (7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your **LOCAL ELECTRICAL CODES** before beginning. You must ensure that installation complies with all relevant rules and regulations.
- (8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:
  - The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
  - Use shielded wires for inter-unit control wiring between units and ground the shield on both sides.
- (9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop appointed by the manufacture, because special purpose tools are required.

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

#### Outdoor Unit

\* AWG = American Wire Gauge

Type	(A) Power Supply	Time Delay Fuse or Circuit Capacity	Power Supply Terminal Base	
	4 mm <sup>2</sup>		Capacity	Max. Wire Diameter
48	Max. 63 m	25 A	25 A	5.5 mm <sup>2</sup> (AWG #10)*
70	Max. 31 m	30 A	50 A	14 mm <sup>2</sup> (AWG #6)*
90	Max. 27 m	35 A	50 A	14 mm <sup>2</sup> (AWG #6)*

#### Indoor Unit

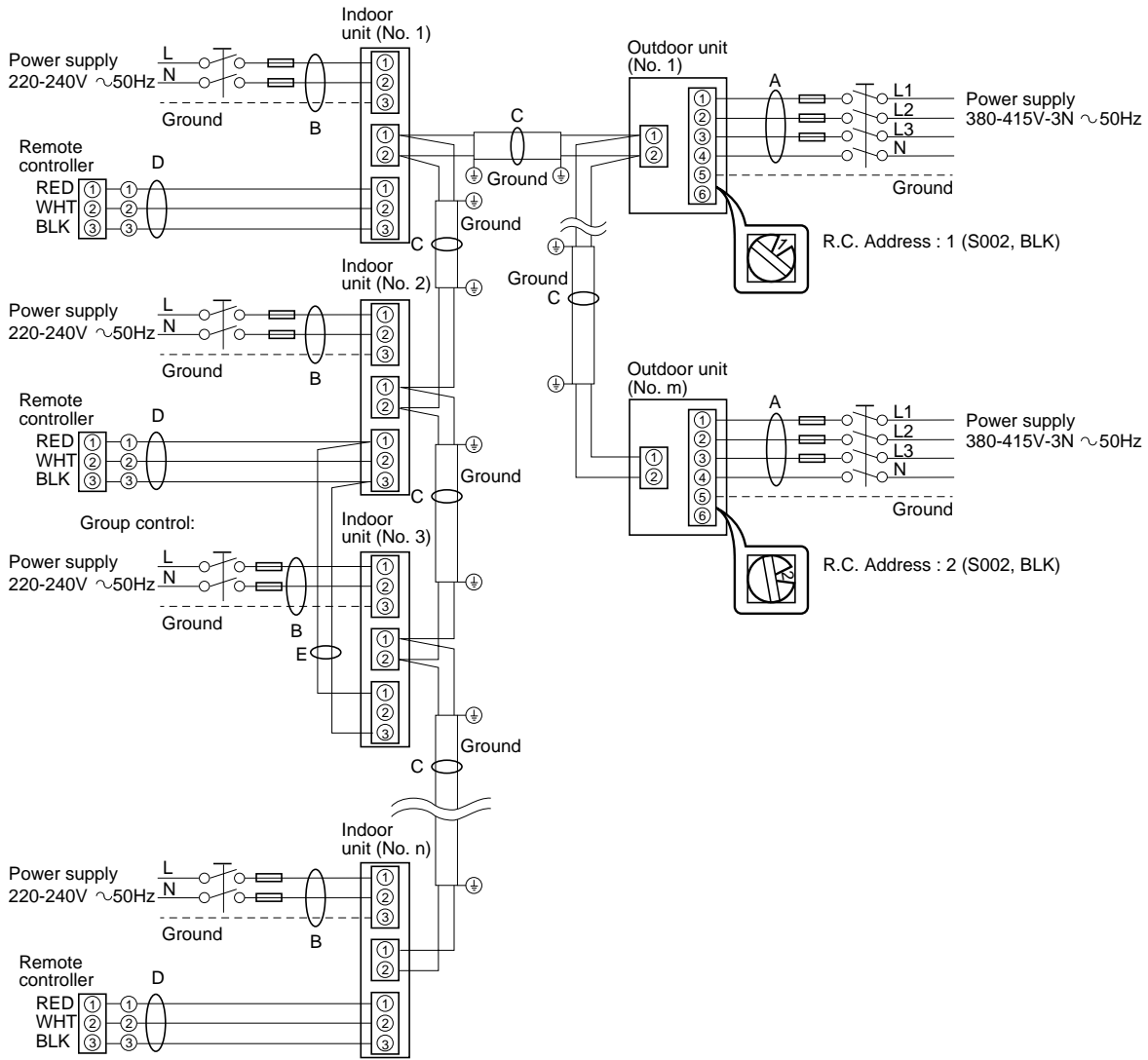
Type	(B) Power Supply	Time Delay Fuse or Circuit Capacity	Power Supply Terminal Base	
	2.5 mm <sup>2</sup>		Capacity	Max. Wire Diameter
X, S, AS, K, T, U, F, FM	Max. 100 m	10 A	25 A	5.5 mm <sup>2</sup> (AWG #10)*
D	Max. 60 m	10 A	50 A	14 mm <sup>2</sup> (AWG #6)*

#### Control Wiring

(C) Inter-Unit Control Wiring	(D) Remote Control Wiring	(E) Control Wiring For Group Control
0.75 mm <sup>2</sup> (AWG #18) Use Shielded Wiring*	0.75 mm <sup>2</sup> (AWG #18)	0.75 mm <sup>2</sup> (AWG #18)
Max. 1,000 m	Max. 1,000 m	Max. 1,000 m

**NOTE** \* With ring type wire terminal.

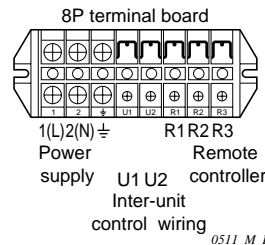
### 5-3. Wiring System Diagrams



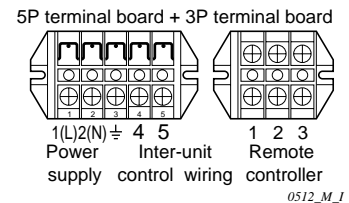
0796\_M\_I

#### NOTE

- (1) Refer to Section 5-2. "Recommended Wire Length and Wide Diameter for Power Supply System" for the explanation of "A", "B", "C", "D", and "E", in the above diagrams.
- (2) 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.
- (3) R.C. Address should be set before turning the power on.
- (4) Regarding the R.C. Address setting, refer to page 86. Auto. address setting can be executed by a remote controller automatically. Please refer to page III-25 of the ENGINEERING MANUAL & TECHNICAL DATA of the ECO MULTI SYSTEM.



AS, S, X, T, U,  
D, F, FM Type



K Type



- (1) When linking outdoor units in a network (S-net link system), remove the short plug (CN031, 2P Black, location: right bottom on the outdoor control PCB) from all outdoor units except any one of the outdoor units. Otherwise the communication of S-net link system does not perform. For a system without link (no connection wiring between outdoor units), do not remove the short plug.

- (2) Do not install the inter-unit control wiring in a loop. (Fig. 5-1)

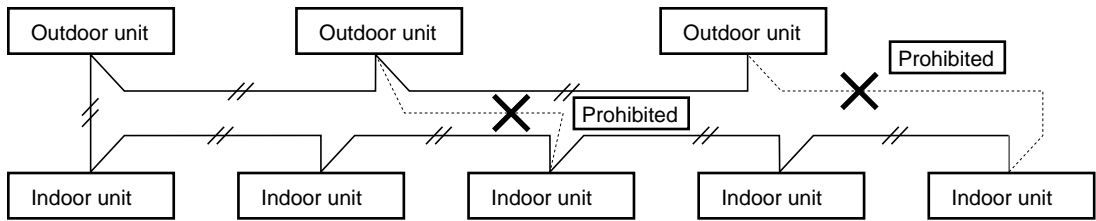


Fig. 5-1

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

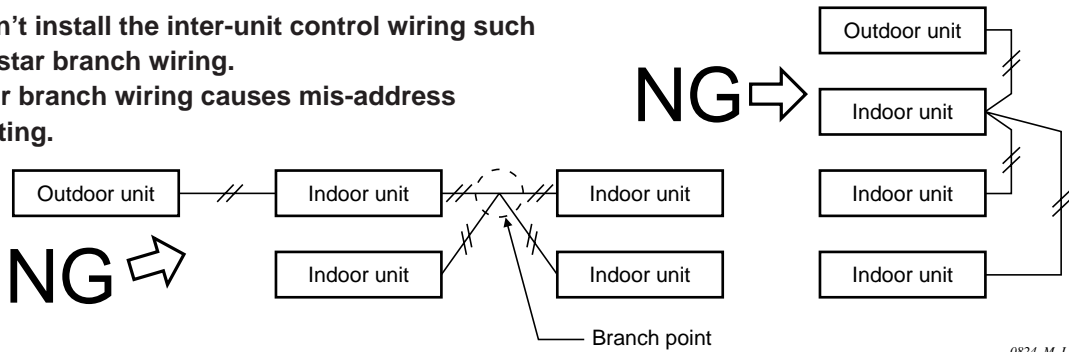


Fig. 5-2

- (4) If branching the inter-unit control wiring, the number of branch points should be 10 or less. (Branches less than 1 m are not included in the total branch number.) (Fig. 5-3)

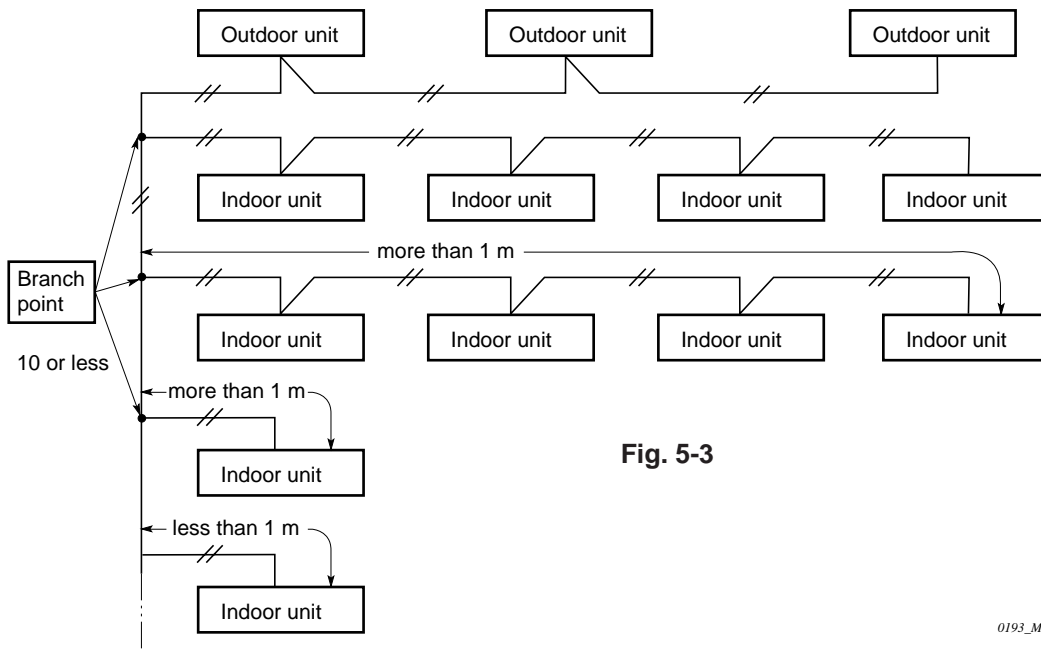


Fig. 5-3

- (5) Use shielded wires for inter-unit control wiring (c) and ground the shield on both sides, otherwise misoperation from noise may occur. (Fig. 5-4)

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

Connect wiring as shown in Section 5-3 “Wiring System Diagrams”.

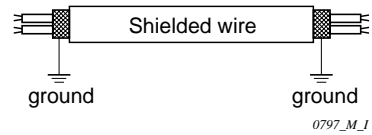


Fig. 5-4



**WARNING**

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

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

**How to connect wiring to the terminal**

■ For stranded wiring

- (1) Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wiring about 10 mm and tightly twist the wire ends. (Fig. 5-5)
- (2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal plate.
- (3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring connector.
- (4) Place the ring connector wire, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 5-6)

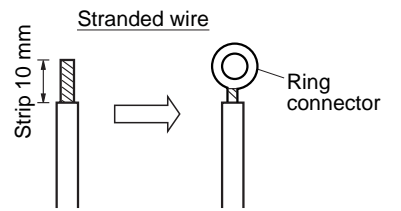


Fig. 5-5

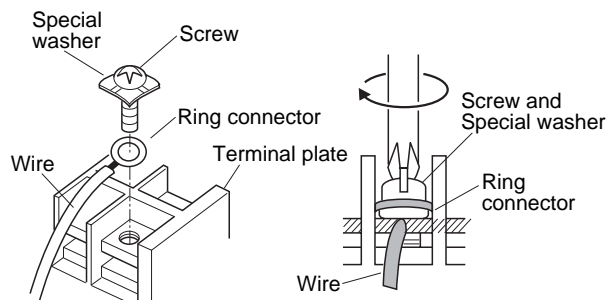


Fig. 5-6

## 6. HOW TO INSTALL THE REMOTE CONTROLLER (OPTIONAL PART)

Remote controller wiring can be extended to a maximum of 1,000 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 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. (Fig. 6-2)

#### 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. (Fig. 6-1)
  - (3) Connect the remote controller wiring (3 wires) correctly to the corresponding terminals in the electrical component box of the indoor unit.



**CAUTION**

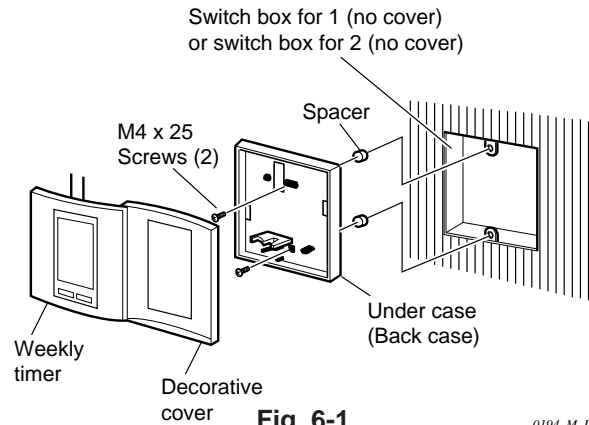
**When wiring, do not connect the remote controller wires to the adjacent terminal block for the power wiring. Otherwise, the unit will break down.**

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



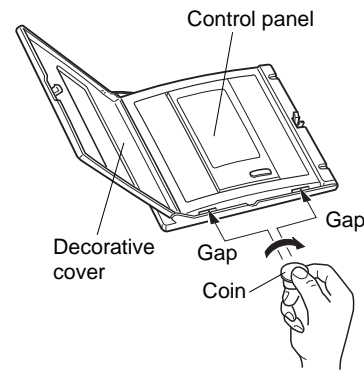
**CAUTION**

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



**Fig. 6-1**

0194\_M\_I



**Fig. 6-2**

0158\_M\_I

No.	Accompanying parts	Q'ty	No.	Accompanying parts	Q'ty
①	Remote controller (comes with 20 cm wire)	1	⑤	Clamper	2
②	Machine screws M4x25	2	⑥	Wire joints	3
③	Wood screws	2			
④	Spacers	2			

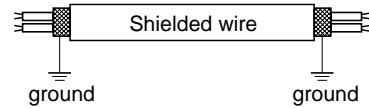
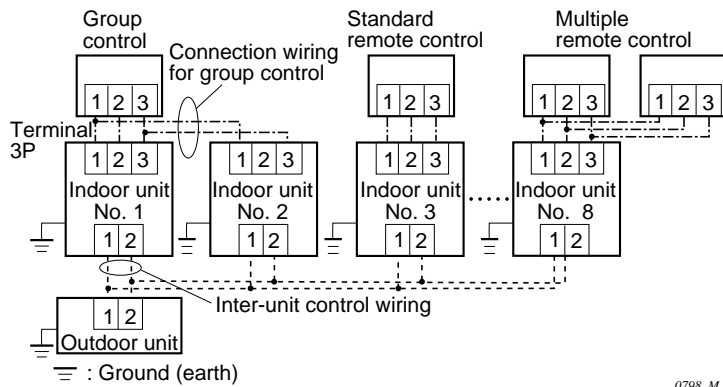
## 6-2. Basic Wiring Diagram



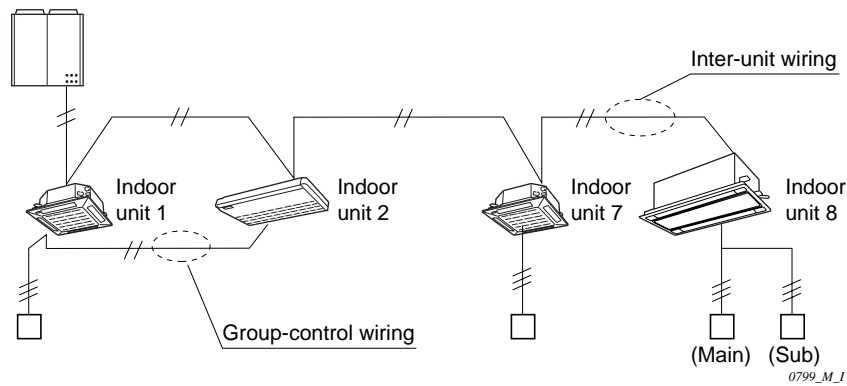
**CAUTION**

**Install wiring correctly (incorrect wiring will damage the equipment).**

- Use shielded wires for inter-unit control wiring and ground the shield on both sides. (Fig. 6-3) Otherwise misoperation because of noise may occur.



**Fig. 6-3**

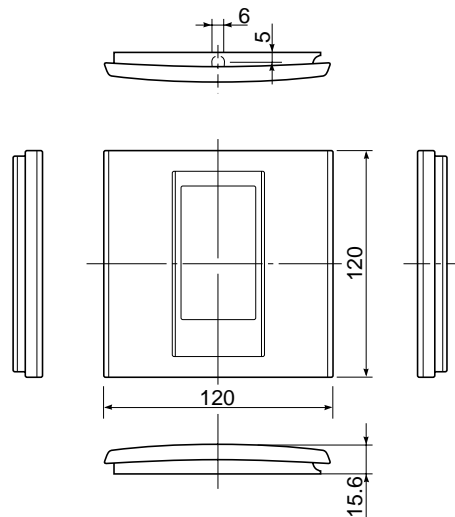


### ● Wiring procedure

Install the wiring according to the above wiring diagram.

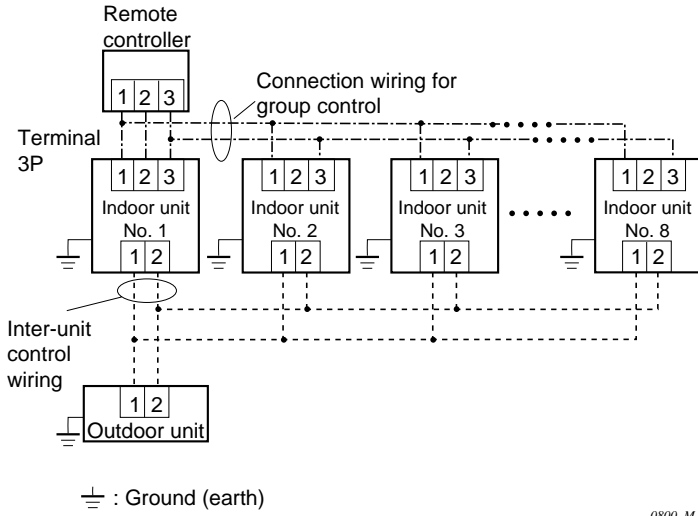
- The address setting is automatically executed after turning on the system. An indoor unit address is assigned to each indoor unit.
- Operation takes place successively at intervals of 1 second, by using combinations of the address setting of each unit.

### ● Diagram of outer dimensions



### 6-3. Wiring System Diagram for Group Control

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



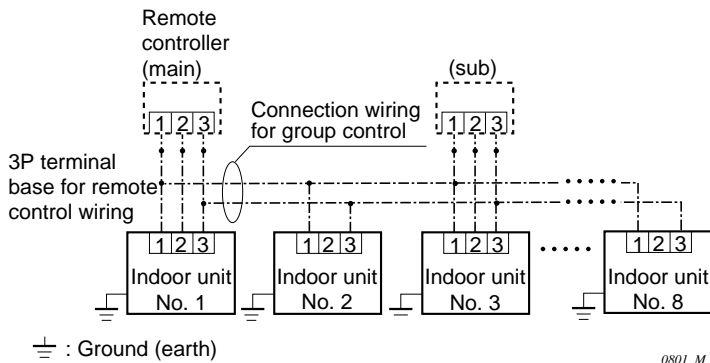
#### Wiring procedure

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), one is the main remote controller and the other is the sub-remote controller.

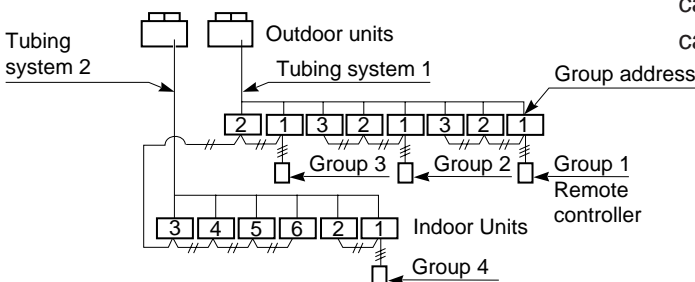
- To set up a sub-remote controller, turn its remote control address switch (RCU. ADR) located on its PCB from OFF to ON (OFF: when shipped from factory).

#### NOTE

#### Cautions on group control

- **Group control within the same refrigerant tubing system is recommended.**

[Tubing system which is not recommended]



Example.1 In the ECO multi system, group control extending over tubing systems becomes impossible to set, giving rise to indoor units which cannot operate.

While group 4 is in heating operation, if later group 3 begins cooling operation, indoor units 1, 2 of group 3 can be operated, but the indoor units 3-6 of group 4 cannot operate.



## 6-4. Wiring System Diagram for Multiple Remote Control

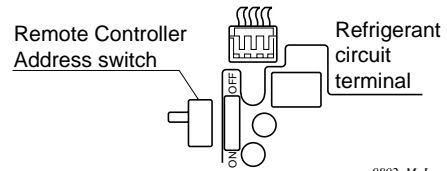
### ■ When Installing Multiple Remote Controllers

This multiple remote controller system is used for operating the unit(s) at different positions. (A maximum of 2 remote controllers can be installed.)

#### ● Setting method

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

- (1) Of the two installed remote controllers, make one the main remote controller (factory-shipped state).
- (2) On the other remote controller, turn the address switch on the PCB from OFF to ON. In this state, it functions as a sub-remote controller.



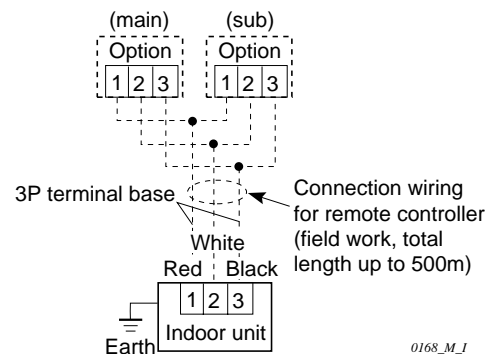
#### ● Basic wiring diagram



**CAUTION**

Install wiring correctly (incorrect wiring will damage the equipment).

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



## 6-5. Explanation of Alarm Messages

Possible Cause of Malfunction			Alarm message
<ul style="list-style-type: none"> <li>• Serial communication errors</li> <li>• Mis-setting</li> </ul>	Remote controller is detecting error signal from indoor unit.	Error in receiving serial communications signal.	E1
		Error in transmitting serial communications signal.	E2
	• Indoor unit is detecting error signal from the remote controller. (No serial communications signal)		E3
	Indoor unit is detecting error signal from outdoor unit.	Error in receiving serial communications signal.	E4
		Error in transmitting serial communications signal.	E5
	Outdoor unit is detecting error signal from indoor unit.	Error in receiving serial communications signal.	E6
	Indoor unit is not working correctly.		
	Outdoor unit is transmitting error signal.	Error in transmitting 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
		Do not press Auto. address button S001: (A. ADD) of another R.C. line during Auto. address operation.	E12
	• Error of the indoor unit in transmitting serial communications signal to remote controller.		E13
	When using group control, main indoor unit address setting is duplicated. (For single heat pump type.)		E14
	Error in Auto. address setting. (No. or capacity of judged indoor unit is small.)		E15
	Error in Auto. address setting. (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 error 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.
• Thermal protector in outdoor fan motor is activated.			P2
Protective device in outdoor unit is activated.		• PC or AC Comp. thermal protector is activated.	P3
		Incorrect discharge gas temp. of PC comp.	P4
		High-pressure switch is activated.	P5
		Incorrect power supply voltage . Negative phase, defective phase or voltage drop.	P17
		Incorrect discharge gas temp. of AC comp.	P9
Protective device in indoor unit is activated.		Improper wiring connections of ceiling panel.	P10
		Float switch is activated.	P14
Oxygen sensor (field supply) is activated.		P14	

### NOTE

- RCU : Remote Control Unit (remote controller)
- R.C. : Refrigerant Circuit
- PC : Power Control
- AC : Standard
- comp. : Compressor
- temp. : Temperature
- PCB : Printed Circuit Board



RC

Possible Cause of Malfunction			Alarm message
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
		Indoor room (air-intake) temp. can not be detected.	F10
	Outdoor thermistor is either open or damaged.	Discharge gas temp. A (PC comp. =TH0A) cannot be detected.	F4
		Discharge gas temp. B (AC comp. =TH0B) cannot be detected.	F5
		Outdoor coil gas temp. (C2 = TH0C) cannot be detected.	F25
		Outdoor coil liquid temp. (C1 = TH0D) cannot be detected.	F7
EEPROM (ICB of PCB) failure			F29
Fault with comp. and its circuit	Protective device for PC comp. is activated.	PC comp. motor is overloaded.	H1
		PC comp. motor is locked.	H2
		Current of PC comp. cannot be detected when it is turned on.	H3
		Current of PC comp. is detected when it is not operated.	F27
		PC comp. contactor (Mg SW) is chattering.	H9
	Protective device for AC comp. is activated.	Power supply voltage between phases is unbalanced.	H10
		AC comp. motor is overloaded.	H11
		AC comp. motor is locked.	H12
		Current of AC comp. cannot be detected when it is turned on.	H13
		Current of AC comp. is detected when it is not operated.	F28
AC comp. contactor (Mg SW) is chattering.	H19		

Possible cause of Malfunction	Alarm message
Main indoor unit address is not set.	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
Outdoor unit address (R.C. No.) 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

Possible Cause of Malfunction (The following messages are displayed only for the system controller.)			Alarm message
<ul style="list-style-type: none"> <li>• Serial communication errors</li> <li>• Mis-setting</li> </ul>	System controller is transmitting incorrect signal.	<ul style="list-style-type: none"> <li>• Indoor or outdoor unit is not working correctly.</li> <li>• Control lines between indoor unit, outdoor unit, and system controller are not wired correctly.</li> </ul>	C05
	System controller is detecting incorrect signal.	<ul style="list-style-type: none"> <li>• Same as for C05, above.</li> <li>• Connector CN1 is not connected correctly.</li> </ul>	C06
Activation of protective device	Protective device of the sub-indoor unit is activated in group control.	When using wireless remote controller or system controller, connect wired remote controller with the indoor unit temporarily to check the alarm message in detail.	P30

#### NOTE

- PC : Power Control
- AC : Standard
- comp. : Compressor
- temp. : Temperature





## 7. 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 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 remove the back case. (Figs. 7-1, 7-2)

### 7-1. 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 does not sit well, cut the spacers to a suitable thickness. (Fig. 7-1)
  - (3) Connect the 4 wires to the weekly timer 4P terminal base (see next page).
  - (4) To finish, fit the back tabs of the back case into the weekly timer and mount it using the flat-top screw.

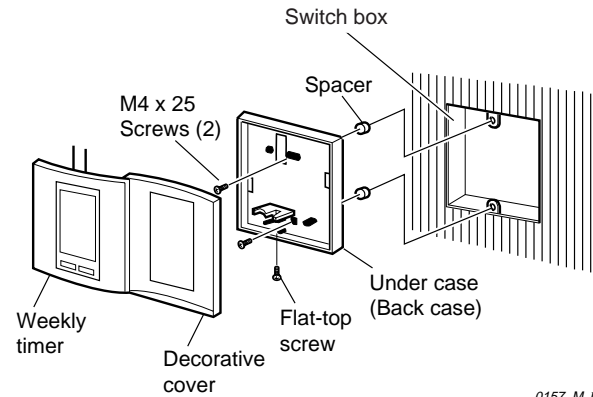


Fig. 7-1

0157\_M\_1

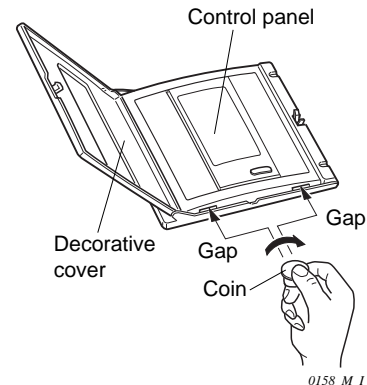
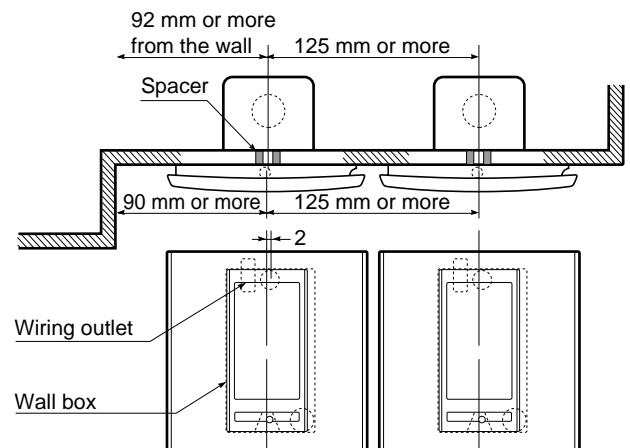


Fig. 7-2

0158\_M\_1

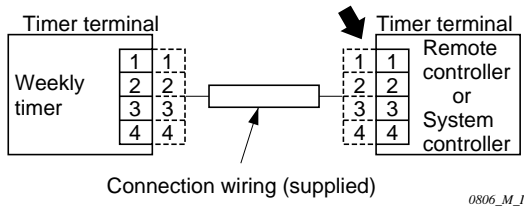
### Mounting dimensions for continuous installation



0171\_M\_1

- For vertical continuous installation, the space between the weekly timer and the remote controller must be 25 mm or more.

## 7-2. Wiring Diagram (For wiring, always use the supplied wires)



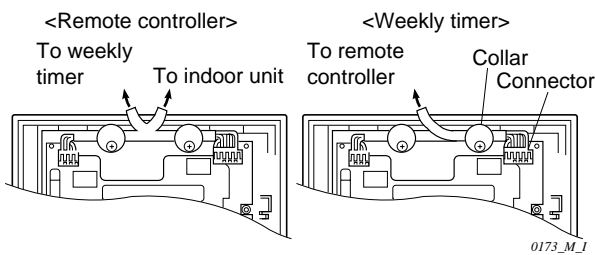
### ● Layout

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 the weekly timer, remove the collar, and connect the supplied connection wiring to the timer terminal (4P connector) of the weekly timer. Place the supplied connection wiring into the groove neatly, and then refasten the collar.



- Pass the supplied connection wiring through the lead-wire drawing-out port on the bottom case of the weekly timer, then run it behind the wall and connect it to the timer terminal (4P terminal) of the remote controller. (Fig. 7-3)  
(Use the supplied collar for fastening the wire of the remote controller.)

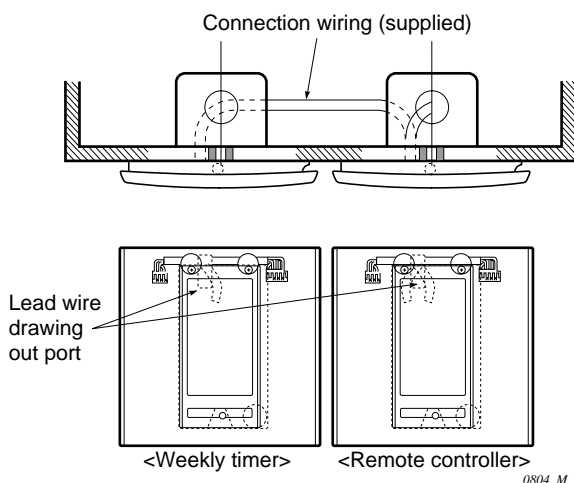


Fig. 7-3

## 7-3. Test Run Setting

- After installation, check the output state of the 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.

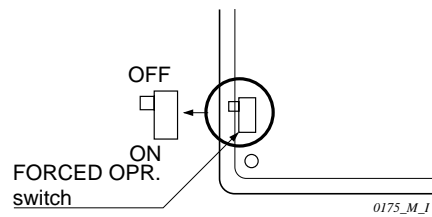


Fig. 7-4

## 7-4. 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.

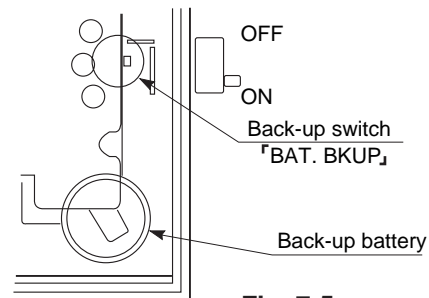


Fig. 7-5

## 7-5. Display at Power ON

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

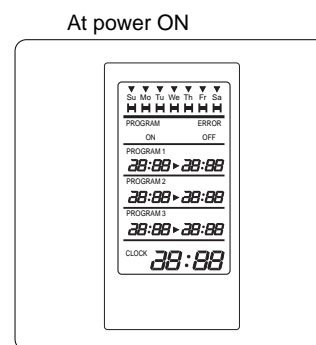
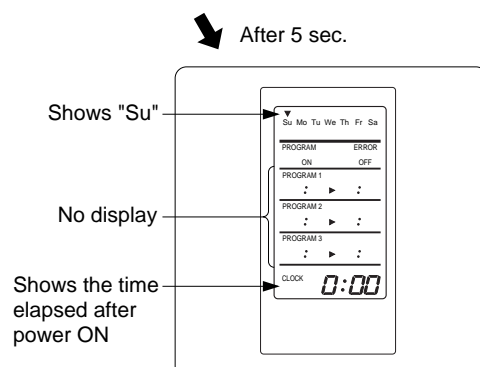
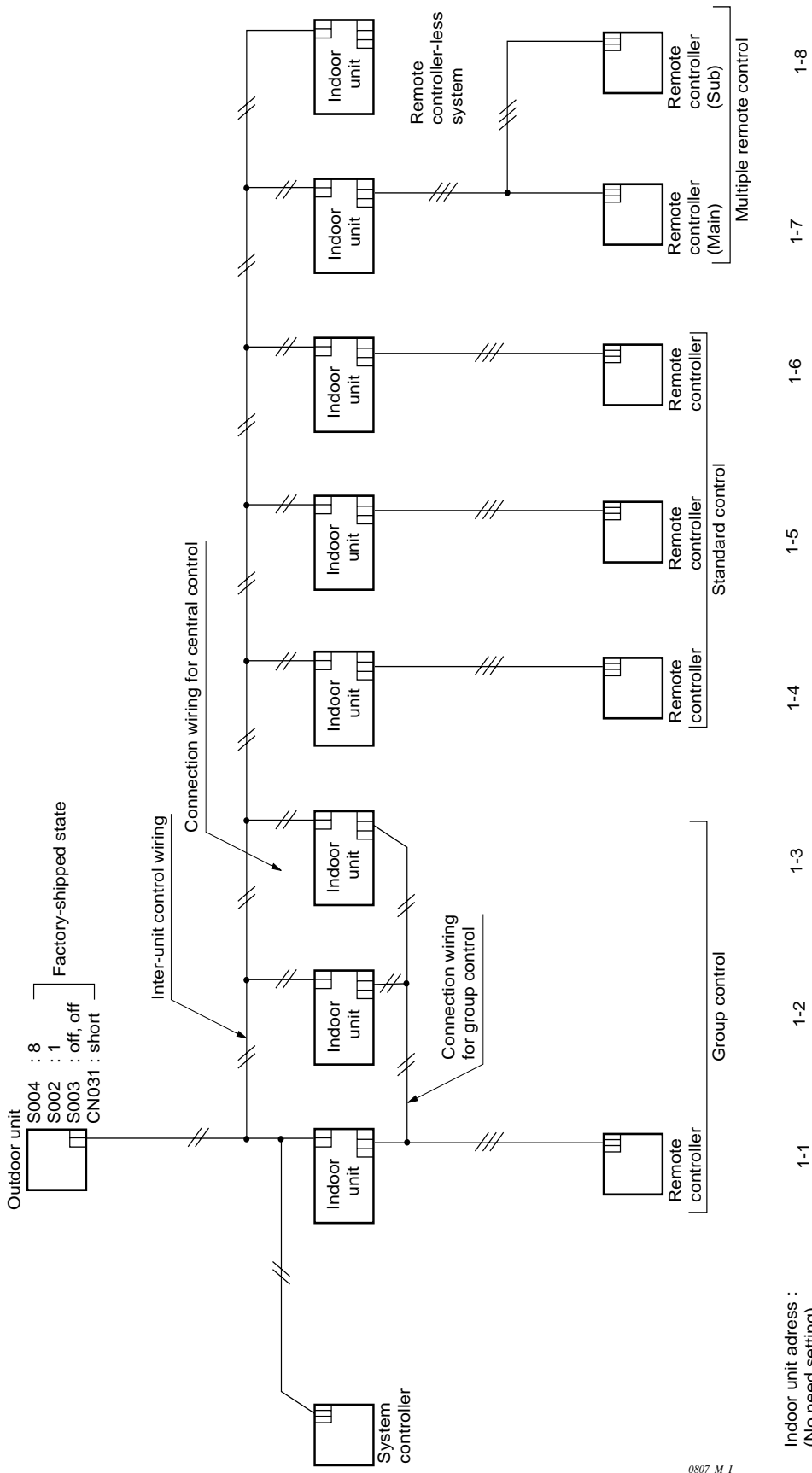


Fig. 7-6



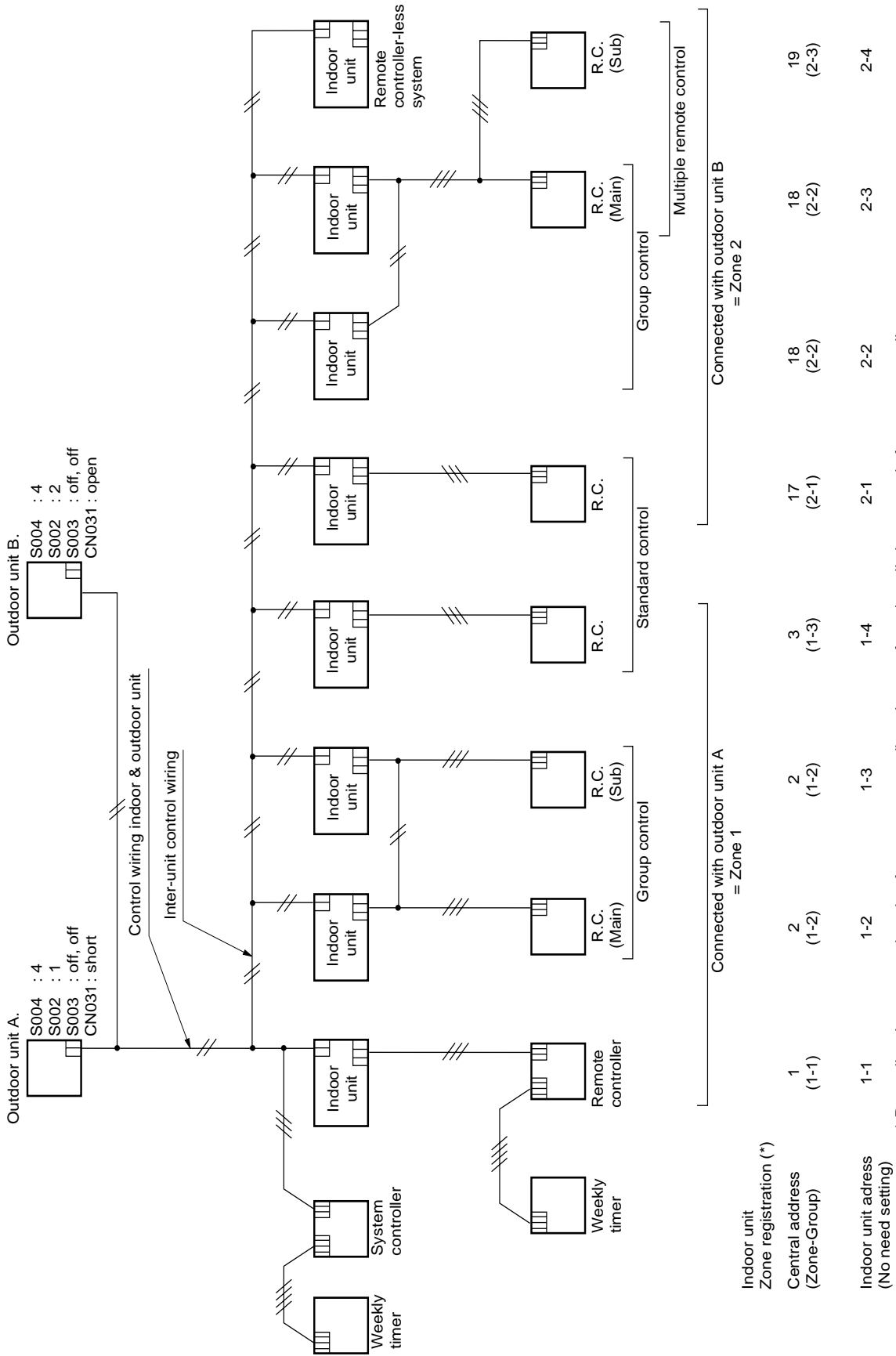
The following diagrams show system examples and the correct setting of the switches on the PCB.

(1) For a system without link



0807\_M\_I

(2) For a system with link



\* Regarding the zone registration for system controller, please refer to installation manual of system controller.

0808\_M\_I

## 8. HOW TO PROCESS TUBING

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

### 8-1. Connecting Narrow Tubing Side

#### Using 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.

#### Flaring Procedure with a Flare Tool

- (1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut about 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. (Fig. 8-1)

#### NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 8-2)

- (3) Remove the flare nut from the unit and mount it on the copper tube.
- (4) Make a flare at the end of copper tube with a flare tool.\* (Fig. 8-3)  
\*Use "RIGID" or equivalent.

#### NOTE

A good flare should have the following characteristics:

- inside surface is glossy and smooth.
- edge is smooth.
- tapered sides are of uniform length.

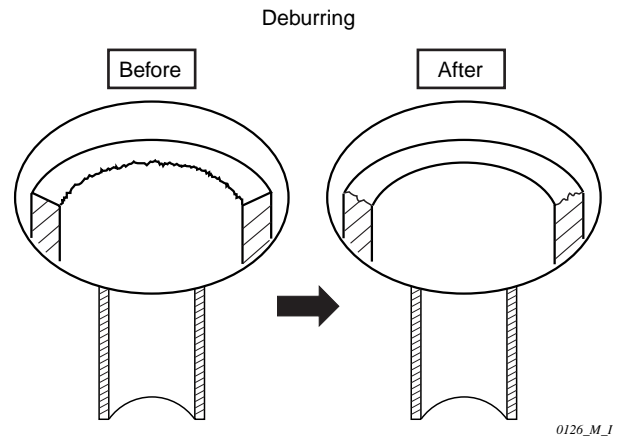


Fig. 8-1

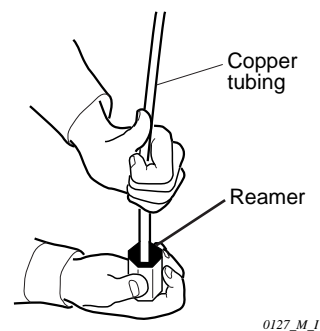


Fig. 8-2

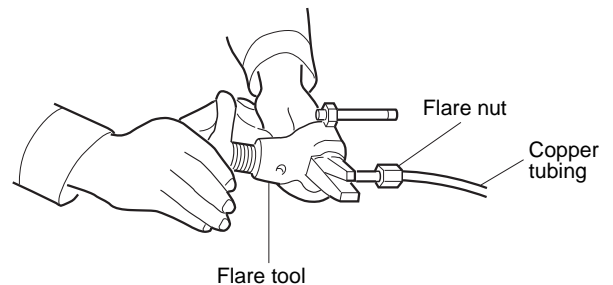


Fig. 8-3

### Caution before Connecting Tubes Tightly

- (1) Apply a sealing cap or water-proof tape to prevent dust or water from entering the tubes before they are used.
  - (2) Apply refrigerant lubricant to the matching surfaces of the flare and union before connecting them together. This helps to reduce gas leaks. (Fig. 8-4)
  - (3) For proper connection, align the union tube and flare tube with each other, then screw in the flare nut lightly at first to obtain a smooth match. (Fig. 8-5)
- Adjust the shape of the narrow tube (liquid tube) using a tube bender at the installation site and connect it to the narrow tubing side (liquid tubing side) valve using a flare.

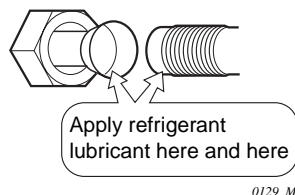


Fig. 8-4

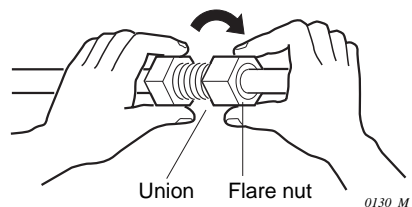


Fig. 8-5

### 8-2. 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 allow the tubing to get too hot during brazing. The nitrogen gas inside the tubing may over-heat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool between brazing.

### 8-3. 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 follows:

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

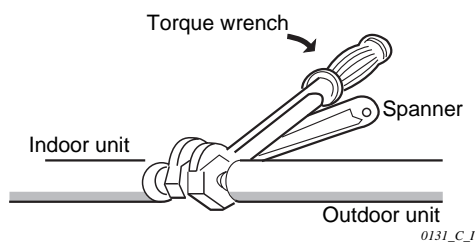


Fig. 8-6

## 8-4. Insulating the Refrigerant Tubing

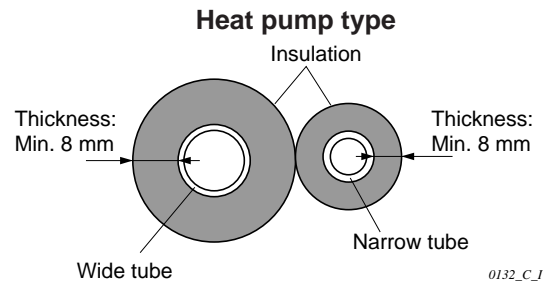


**CAUTION**

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

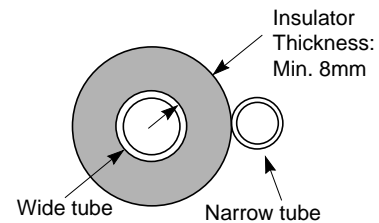
### Important

To avoid condensation and water leaks, both the wide tube and narrow tube (only for heat pump) must be insulated with the supplied insulation materials.



0132\_C\_1

### Cooling only type



**Fig. 8-7**

0133\_C\_1

### Taping the flare nuts

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

Finally, fasten the insulator at both ends with plastic clamps. (Fig. 8-8)

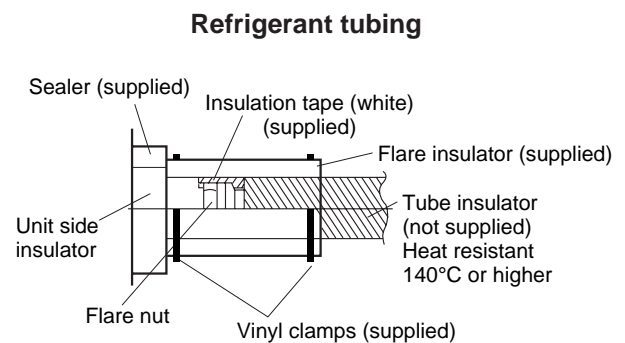
### Insulation material

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



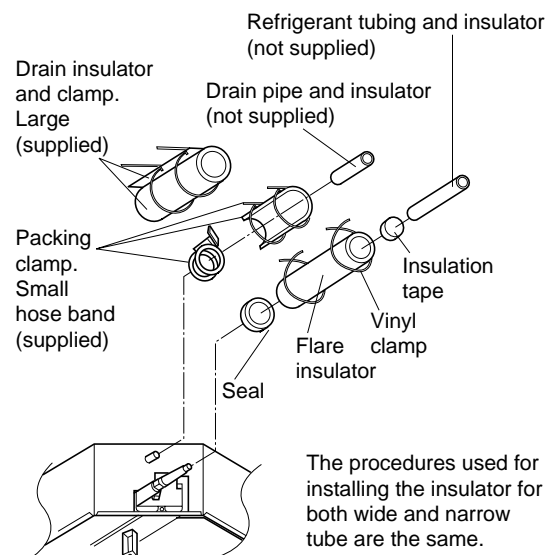
**CAUTION**

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.



0134\_X\_1

**Fig. 8-8**



0135\_X\_1

**Fig. 8-9**

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

### 8-5. Taping the Tubes

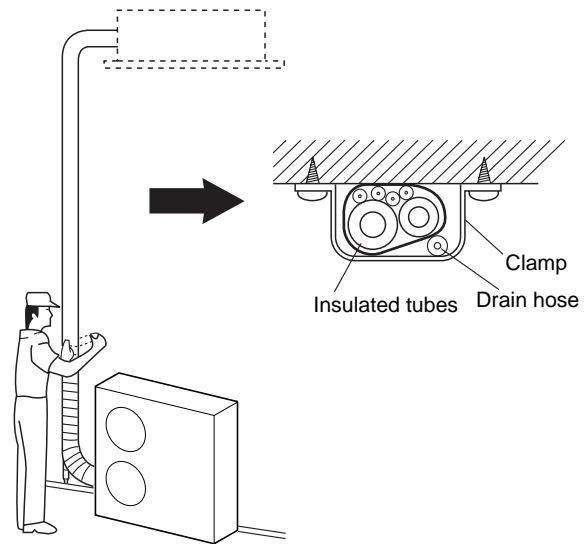
- (1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped with armoring tape in 1 bundle. To prevent the condensation from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.
- (2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall. As you wrap the tubing, overlap half of each previous tape turn.
- (3) Clamp the tubing bundle to the wall, using 1 clamp about every meter. (Fig 8-10)

#### NOTE

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

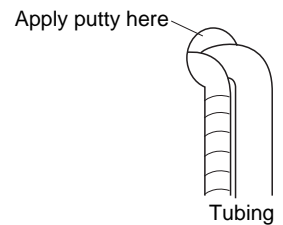
### 8-6. Finishing the Installation

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. (Fig. 8-11)



0136\_M\_1

Fig. 8-10



0137\_C\_1

Fig. 8-11

## 9. AIR PURGING

Air and moisture in the refrigerant system may 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 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**

**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/cm<sup>2</sup>G with dry nitrogen gas and close the cylinder valve when the gauge reading reaches 30 kg/cm<sup>2</sup>G. Then, test for leaks with liquid soap.

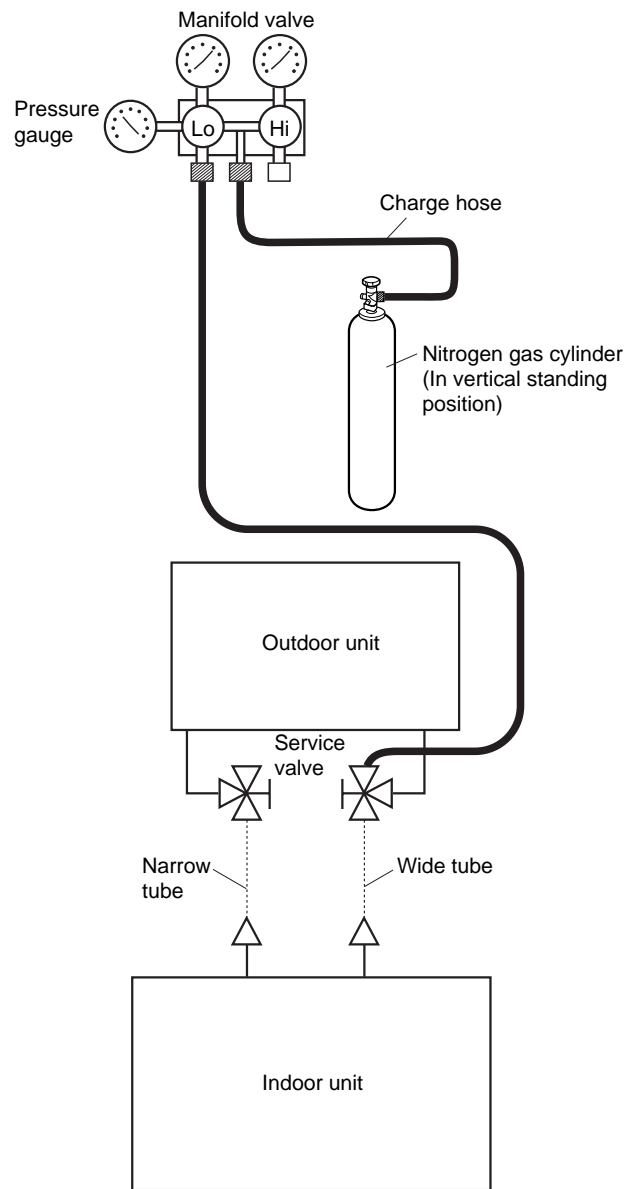


Fig. 9-1

0138\_C\_1

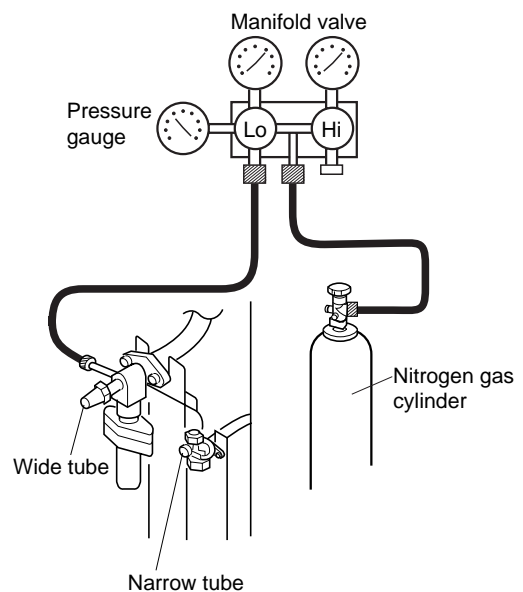


Fig. 9-2

0139\_C\_1



**CAUTION**

To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than the 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. Wipe off 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 table 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 minutes or more	90 minutes or more

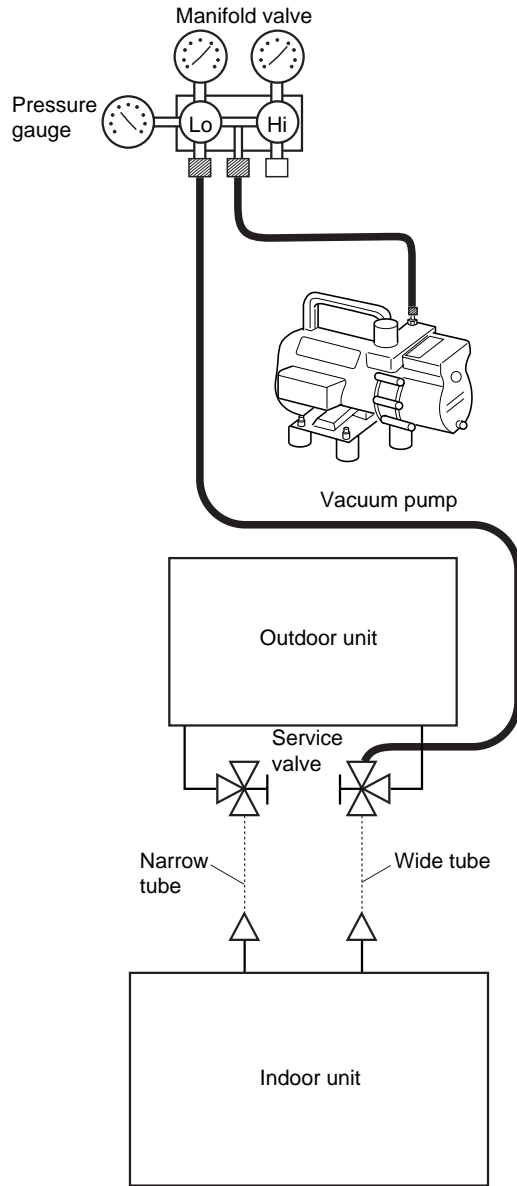
**NOTE**

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 turn off the vacuum pump.

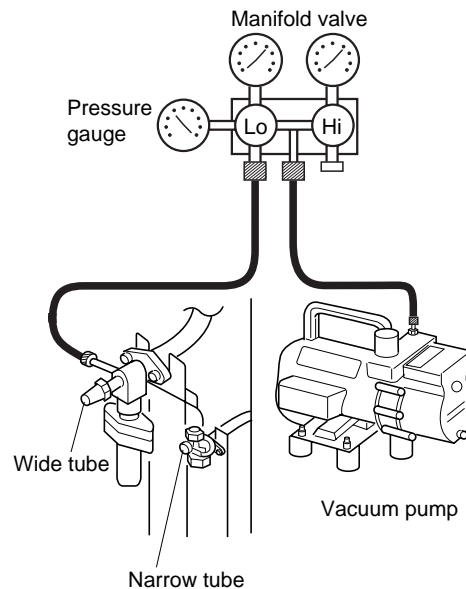
**Charging additional refrigerant**

- Charging additional refrigerant (calculated from the narrow tube length as shown in Section 1-8 “Additional Refrigerant Charge”) using the narrow tube service valve.
- Use a balance to measure the refrigerant accurately.



**Fig. 9-3**

0140\_C\_1



**Fig. 9-4**

0141\_C\_1



- If the additional refrigerant charge amount cannot be charged at once, charge the remaining refrigerant in gas form 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.

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

## 10. HOW TO INSTALL THE CEILING PANEL

### ■ 1-Way Air Discharge Semi-Concealed Type (AS Type)

#### 10-1. Installing the Ceiling Panel

- (1) Screw the M5 X 40 screws supplied (in the unit packing) into 4 points on the flange surface of the unit bolted to the ceiling. Insert the screws so that the distance between the bottom of the screw head and the bottom surface of the flange is at least 19.05 mm. (Fig. 10-1)
- (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.
- (4) Once the joining edges are properly aligned with each other, install the supplied stoppers into the key hole-shaped openings, then insert the 4 screws until the ceiling panel touches the flange surface of the unit.

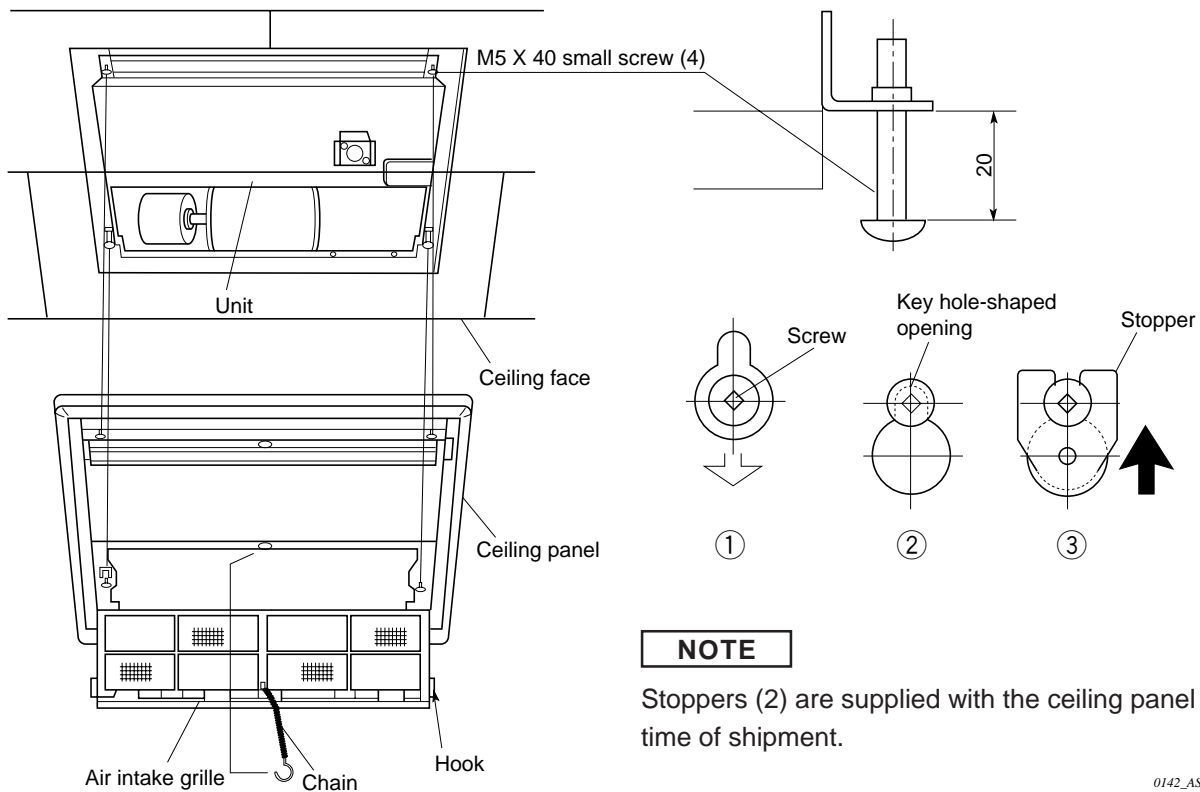


Fig. 10-1

#### 10-2. How to Use the Stoppers

- (1) Pass through screws on the unit into the key hole-shaped opening on the panel.
- (2) Then, shift the panel sideways until it is caught by the screws.
- (3) Insert the stoppers 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. 10-1)

#### NOTE

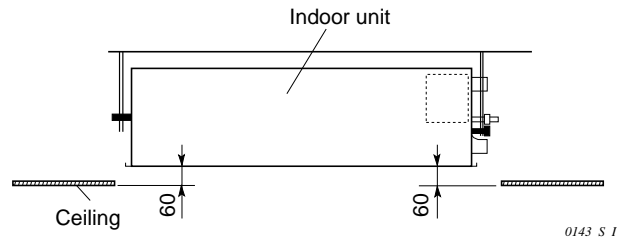
Stoppers (2) are supplied with the ceiling panel at the time of shipment.

0142\_AS\_J

■ **2-Way Air Discharge Semi-Concealed Type (S Type)**

**10-3. 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. 10-2 while following the installation gauge.
- (2) Remove the air-intake panel and the air filter from the ceiling panel as shown in Figs. 10-3 and 10-4.



**Fig. 10-2**

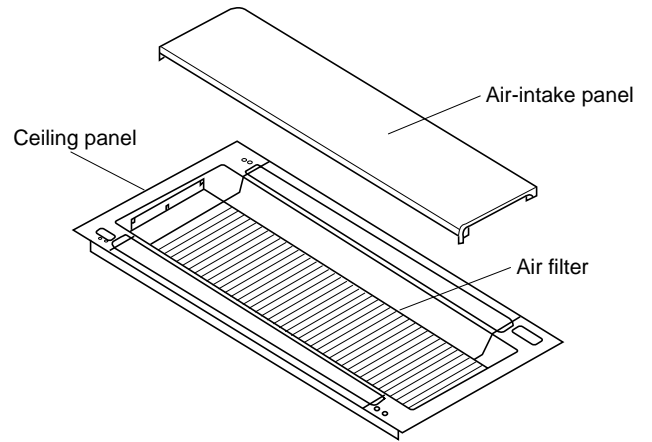


**CAUTION**

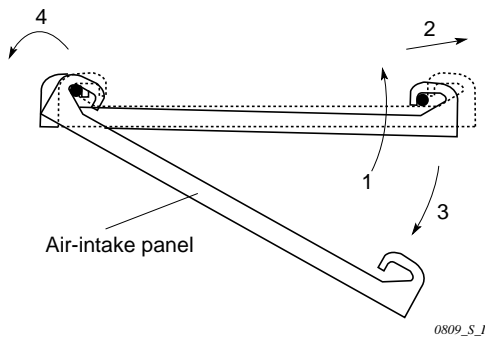
**Never touch or attempt to move the air-direction louver by hand or you may damage the unit. Instead, use the remote controller if you want to change the direction of air flow.**

**How to remove the air-intake panel (from either side). (Fig.10-4)**

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



**Fig. 10-3**



**Fig. 10-4**

2  
S

## 10-4. 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. 10-5 and 10-6.

### 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 4 supplied mounting screws (M5) with washers to permanently fasten the ceiling panel.
- (5) Install the wiring connector from the ceiling panel to the connector in the electrical component box of the indoor unit (15P connector if heat pump model). After installing the connector, use the clamp on the body of the indoor unit 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.

- (6) Install the air filter and air-intake grille by performing the steps in Figs. 10-3 and 10-4 in reverse.

## 10-5. 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. 10-6)

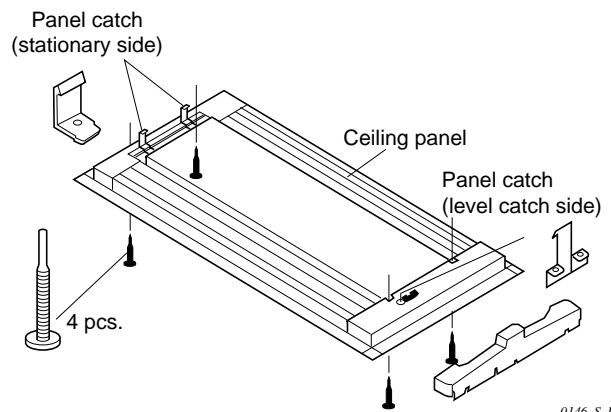


Fig. 10-5

0146\_S\_1

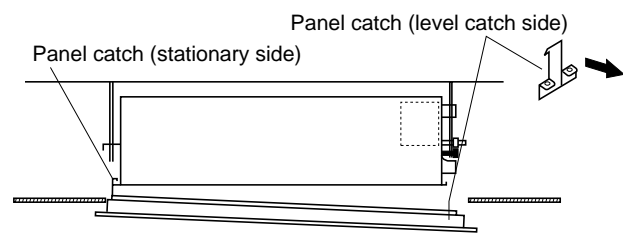


Fig. 10-6

0147\_S\_1

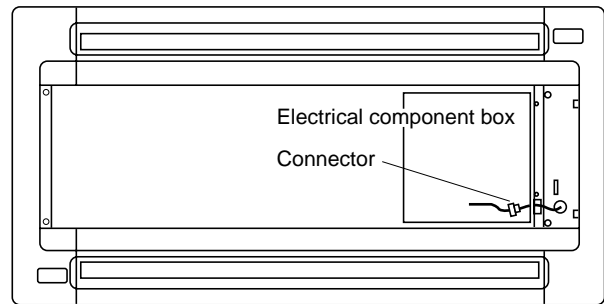


Fig. 10-7

0148\_S\_1

■ 4-Way Air Discharge Semi-Concealed Type  
(X Type)

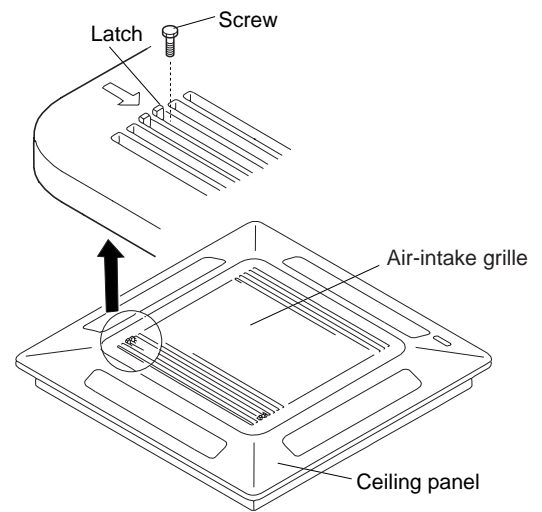


CAUTION

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

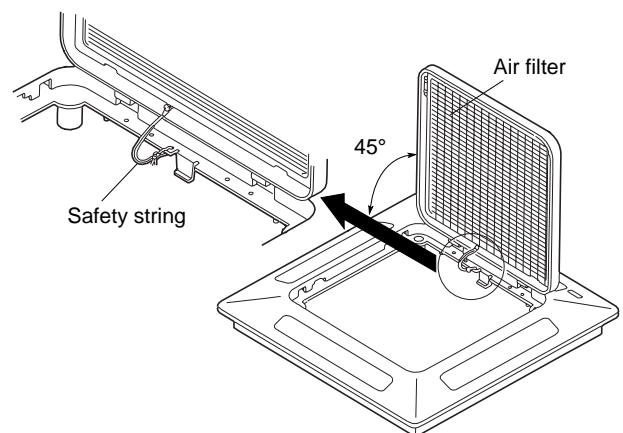
10-6. Before Installing the Ceiling Panel

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



0149\_X\_1

Fig. 10-8



0150\_X\_1

Fig. 10-9

## 10-7. 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.

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 4 supplied mounting screws (M5) with washers to permanently fasten the ceiling panel.
- (4) Install the wiring connector from the ceiling panel to the connector in the electrical component box of the indoor unit. After installing the connector, use the clamp on the body of the indoor unit 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 10-6 in reverse.

### NOTE

Rehook the safety string before closing the air-intake grille.

## 10-8. 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.

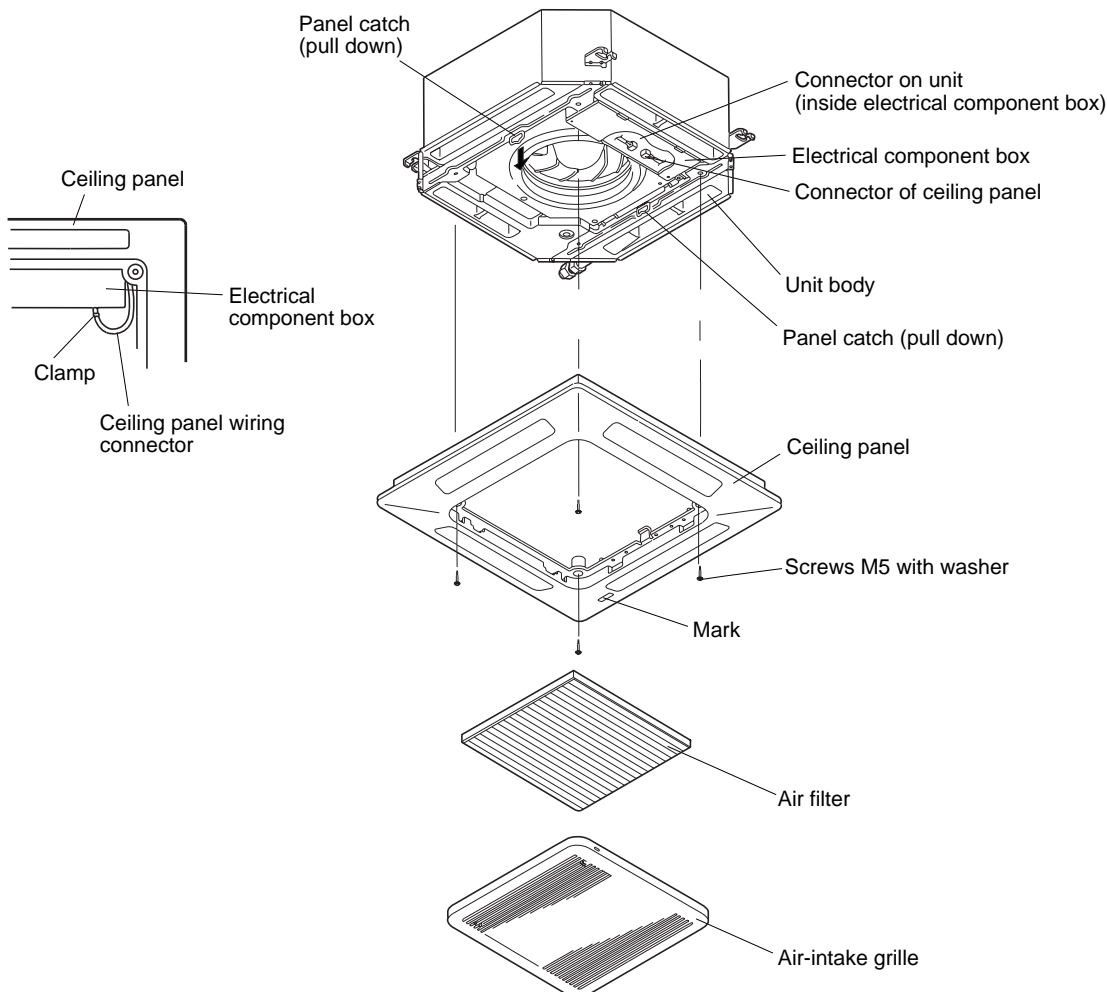


Fig. 10-10

### 10-9. 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

## 11. TEST RUN

### 11-1. 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 spacers for the compressor used for transportation have been removed. If not, remove them now.
- (4) The transportation pads for the indoor fan have been removed. If not, remove them now.
- (5) The power has been connected to the unit for at least 5 hours before starting the compressor. The bottom of the compressor should be warm to the touch and the crankcase heater around the feet of the compressor should be hot to the touch. (Fig. 11-1)
- (6) Both the wide and narrow tube service valves are open. If not, open them now. (Fig. 11-2)

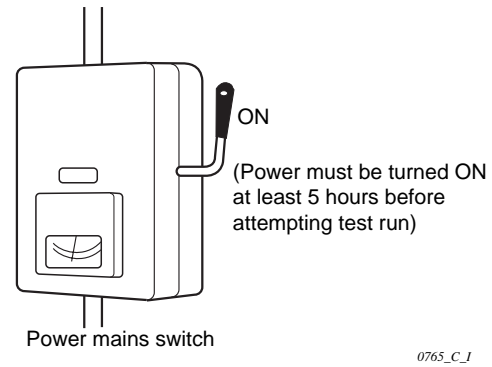


Fig. 11-1

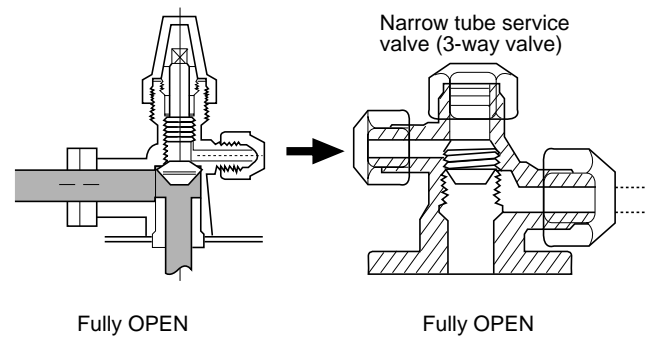


Fig. 11-2

● **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, switch out of TEST RUN when you are finished, or the air conditioner can be damaged because it will not 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. (Fig. 11-3)
  - (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 display of the remote controller.
  - (e) During the test run, the air conditioner runs continuously and the thermostat does not control the system.
  - (f) After the test run, press the **TEST / CHK** button once again to cancel this mode and check that "TEST" is not shown on the display.

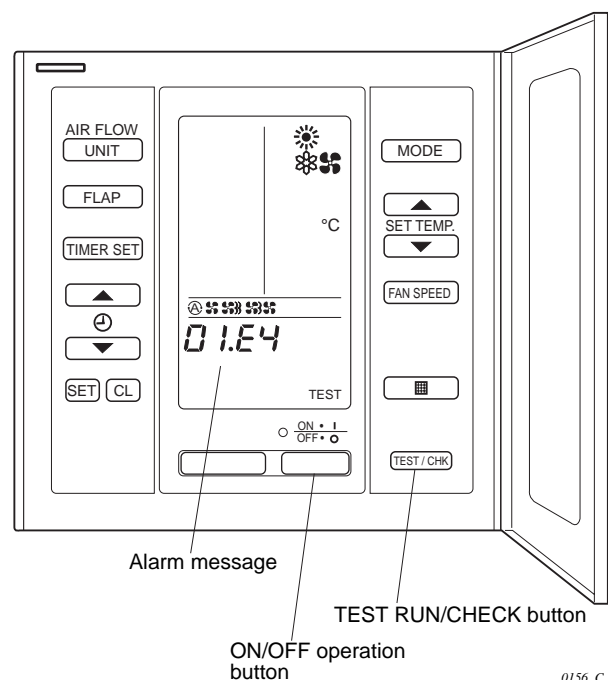


Fig. 11-3



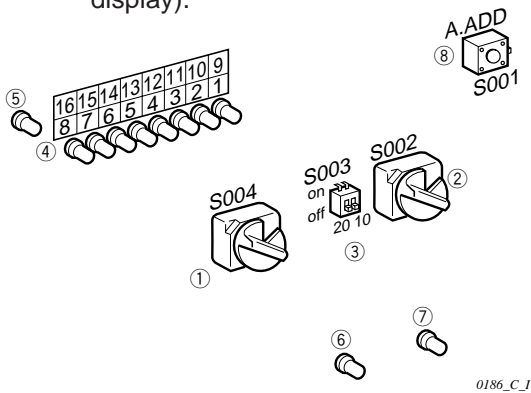
**CAUTION**

**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.**

## 11-2. PCB Setting & Test Run

### ● Setting of outdoor control PCB

- (A) Set the number of indoor units which are connected to the outdoor unit in S004.
- ① For example in the case of 13, set "D" in S004.
  - ② If the number of indoor units and the number of set switches are identical, the LED: 1 to 8 (9~16) light up matching the number of indoor units.
  - ③ If the outdoor alarm LED (yellow) and LED: 2, 3, 6 light up when operating the indoor unit, it is a combination fault. Check the number of connected indoor units.  
\*(Remote controller shows the alarm of display).



- ① S004 (RED) : Setting SW for number of indoor units (1~16 or 1~10).
- ② S002 (BLK) : Setting SW for R.C. address of the outdoor unit (0~9).
- ③ S003 : Setting SW for R.C. address of the outdoor unit (10, 20).
- ④ RED LED 1 ~ 8 : Message lamp
- ⑤ RED LED (9 ~ 10) : Message lamp (only for 70, 90 type)
- ⑥ D001 (RED) : Power lamp
- ⑦ D083 (Yellow) : Outdoor unit alarm lamp
- ⑧ S001 : A. ADD (Auto. address) button

- (B) When linking outdoor units in a network (S-net link system).

- ① Set the R.C. address number of the outdoor unit in S002 and S003.  
R.C. address : Refrigerant circuit address 1~30.
- ② Remove the short plug (CN031, 2P Black, location: right bottom on the outdoor control PCB) from all outdoor units except one.

For a system without link, set the R.C. address number to 1 and retain the short plug CN031.

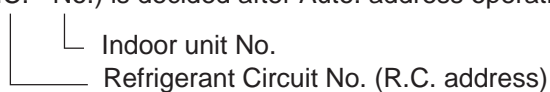
Example,

R.C. address	S002	S003		CN031
		20	10	
1	1	off	off	short (for a system without link)
12	2	off	on	open (for a system with link)
23	3	on	off	open (for a system with link)

### ● Setting of indoor control PCB

No setting necessary.

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

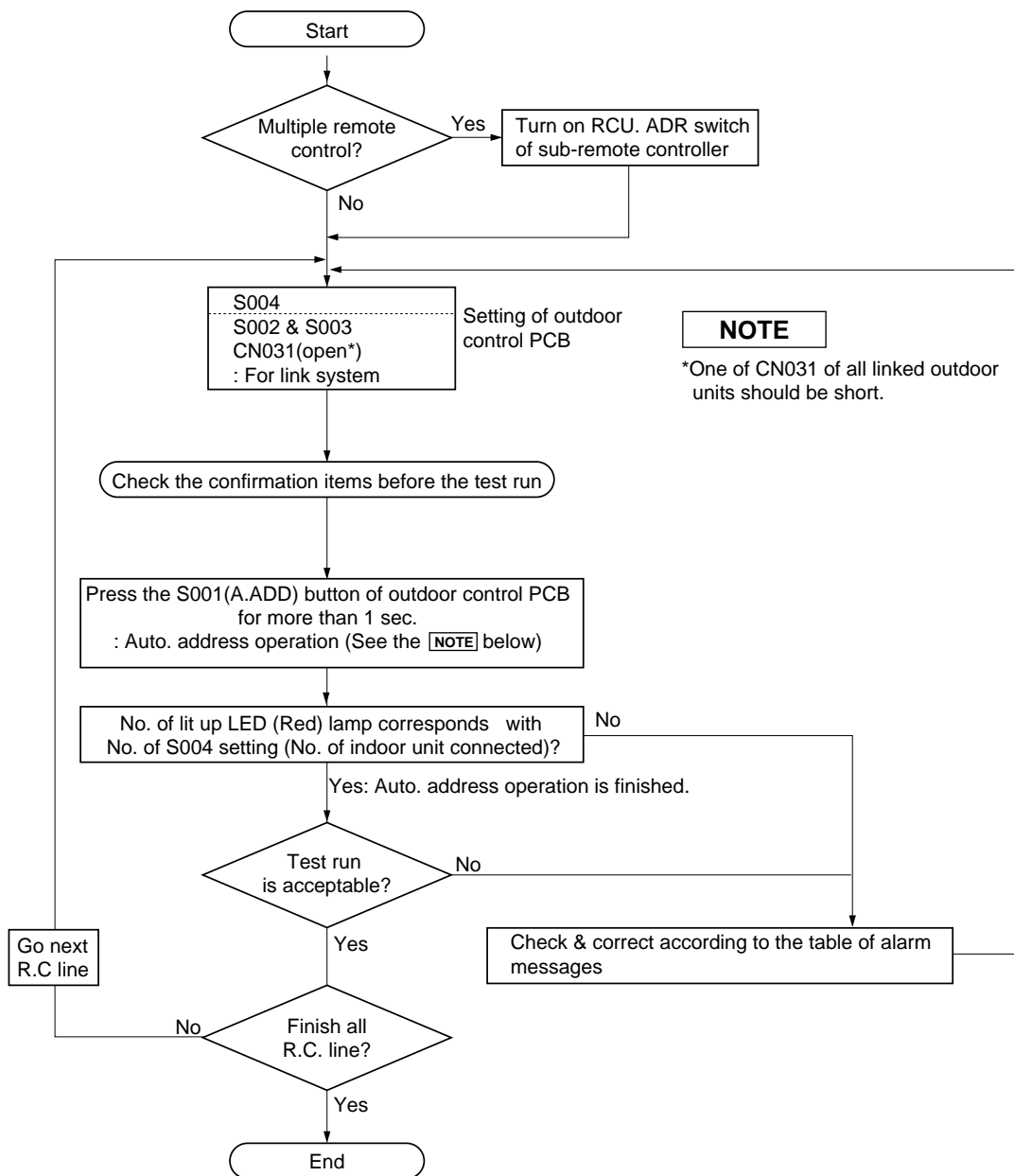


Manual setting for indoor unit address can also be performed with the remote controller.

### ● Check items before the test run

- ① Turn on all power supply switches 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.

● Test run procedure



0812\_M\_I

**NOTE**

- 1) Auto. address operation decides each indoor unit address to the indoor unit connected to the refrigerant circuit individually.  
The required time of operation depends on the temperature.  
It takes a maximum of 20 minutes for a link system.  
It takes a maximum of about 3 minutes without turning on the compressor, for a system without link.
- 2) When linking outdoor units in a network (link system), Auto. address operation should be performed by each refrigerant circuit (outdoor unit) individually. If you start Auto. address operation of another refrigerant circuit during Auto. address operation, the alarm message (E12) will be displayed.
- 3) Indoor unit address can be changed manually with the remote controller when required.
- 4) The selected indoor unit address is memorized in EEPROM even after power failure.
- 5) When using a system controller, zone registration is required after finishing the test run.

### 11-3. Main Alarm Messages which Indicate Mis-Wiring & Mis-Setting

Remote controller display	Cause		
	Individual Remote Control	Group Control	Multiple Remote Control
Nothing displayed	<ul style="list-style-type: none"> <li>Remote controller not properly connected.</li> <li>Power supply not ON.</li> </ul>		
E1	<ul style="list-style-type: none"> <li>Remote controller not properly connected.</li> </ul>		
E4	<ul style="list-style-type: none"> <li>Wiring connection fault of indoor/outdoor units</li> </ul>	<ul style="list-style-type: none"> <li>Wiring connection fault of some indoor/outdoor units inside the group</li> </ul>	
	<ul style="list-style-type: none"> <li>Power supply of outdoor unit not ON.</li> </ul>		
E6	<ul style="list-style-type: none"> <li>Combination of indoor/outdoor units is wrong.</li> <li>* Incorrect setting of No. of indoor unit on outdoor control PCB. (S004 setting)</li> <li>* Power supply of some indoor units not ON.</li> </ul>		
E9	—	—	<ul style="list-style-type: none"> <li>2 main remote controllers set.</li> </ul>
P9 (*)	<ul style="list-style-type: none"> <li>Improper wiring connections of ceiling panel</li> </ul>		

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

### 11-4. Main Alarm Messages Indicating Unit Malfunction

Fault detected		Remote controller display
Indoor protection	Fan motor protection thermostat	P1
Outdoor protection	Fan motor protection thermostat Compressor protection thermostat	P2
	Incorrect discharge temp of PC (AC) comp.	P3 (P17)
	High-pressure switch	P4
Indoor protection	Float switch	P10
Indoor sensor	Open/or damaged	F1-F3, F10
Outdoor sensor	Open/or damaged	F4, F5, F7, F25
Compressor protection	PC comp. motor is overloaded.	H1
	PC comp. motor is locked.	H2
	AC comp. motor is overloaded.	H11
	AC comp. motor is locked.	H12

#### NOTE

- comp.: Compressor
- temp.: Temperature
- PC: Power Control
- AC: Standard

### 11-5. Alarm Messages on the Outdoor PCB

(In ordinary use, the outdoor alarm LED (yellow) is off and the LED (red), which indicates the number of connected indoor units, is turned on.)

Alarm messages indicated by the LED (red) on the outdoor PCB.

- When the outdoor alarm LED (yellow) is OFF, the LED (red) lamps blink → Thermostat OFF run, with no alarm display on the remote controller.
- When the outdoor alarm LED (yellow) is ON, LED (red) lamps light up → An alarm message is also displayed on the remote controller.

☆ : light - up / blink

Remote controller display	LED (red)								Possible cause of fault	
	8	7	6	5	4	3	2	1		
E4	Connected indoor units' No. of LED (red) lamps blink or all lamps turned off								When turning on the power supply, No. of indoor units connected is not correspond with set No. of S004 (except R.C. No. setting is 0).	
E6		☆				☆	☆		Serial signal receiving	Serial signal receiving fault Indoor/outdoor unit combination fault (incorrect indoor unit count : S004 setting)
E7		☆				☆	☆	☆	Serial signal sending fault	Serial signal sending fault
E15		☆			☆	☆	☆	☆	The number of connected indoor units are less than the set number in the outdoor PCB.	During Auto. address setting, alarm LED (yellow) lamp lights up. The LED (red) lamps light up or blink when CN25 (2 pin plug, white) is shortened.
E16		☆		☆					The number of connected indoor units are more than the set number in the outdoor PCB.	
P2	☆	☆	☆					☆	Protective device activated	Fan motor protection thermostat PC comp. protection thermostat AC comp. thermostat Defective phase
P3	☆	☆	☆					☆	Incorrect discharge temp.	PC comp.
P4	☆	☆	☆			☆			High-pressure switch	PC comp. or AC comp.
P5	☆	☆	☆			☆		☆	Protective device activated	Negative phase protector or defective phase protector, or Voltage drop protector
F4		☆	☆			☆			Sensor fault	Discharge temp. A (PC comp.)
F5		☆	☆			☆		☆		Discharge temp. B (AC comp.)
F7		☆	☆			☆	☆	☆		Outdoor coil liquid temp. (C1)
F25		☆	☆	☆	☆			☆		Outdoor coil gas temp. (C2)
F17	☆	☆	☆	☆				☆	Incorrect discharge gas temp. of AC comp.	
H1	☆							☆	PC comp.	Error in Current value (overload)
H2	☆							☆	CT detection current	Error in Current value (lock)
H11	☆				☆		☆	☆	AC comp.	Error in Current value (overload)
H12	☆				☆	☆			CT detection current	Error in Current value (lock)
H9	☆				☆			☆	Comp. contactor protection	PC (AC) comp. contactor is chattering.
H10	☆				☆			☆	Voltage unbalance protection	Power supply voltage between phases is unbalanced.
H19	☆			☆				☆	Comp. contactor protection	AC comp. contactor is chattering.
L4	☆	☆						☆	Outdoor unit address (R.C. No.) is duplicated.	

#### NOTE

- PC comp. : Power Control Compressor
- AC comp. : Standard Compressor
- temp. : Temperature

## 12. CAUTION FOR PUMP DOWN

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



**CAUTION**

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