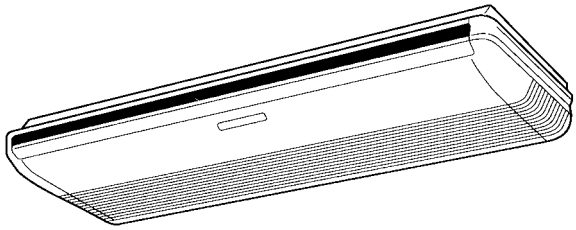
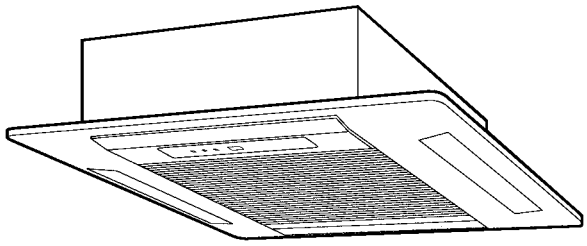
SERVICE INSTRUCTIONS

SPLIT TYPE ROOM AIR CONDITIONER WITH WIRELESS REMOTE CONTROL MODEL



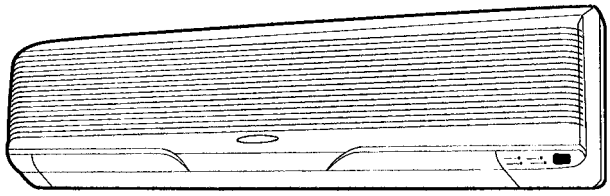
CEILING
LARGE AB-SERIES

30,000 BTU/h
36,000 BTU/h
45,000 BTU/h
54,000 BTU/h



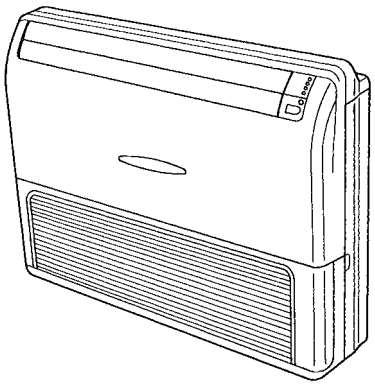
CASSETTE
COMPACT AU-SERIES

12,000 BTU/h
14,000 BTU/h
18,000 BTU/h



WALL MOUNTED
LARGE AS-SERIES

20,000 BTU/h
24,000 BTU/h
30,000 BTU/h



FLOOR/ CEILING
UNIVERSAL AB-SERIES

14,000 BTU/h
18,000 BTU/h
24,000 BTU/h

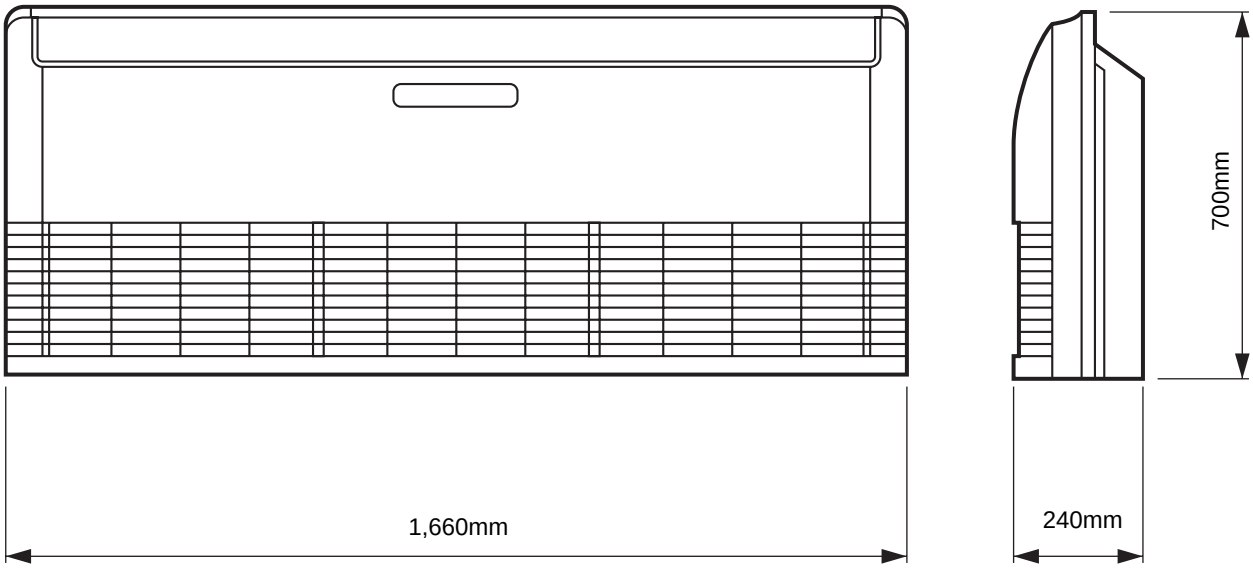
CONTENTS

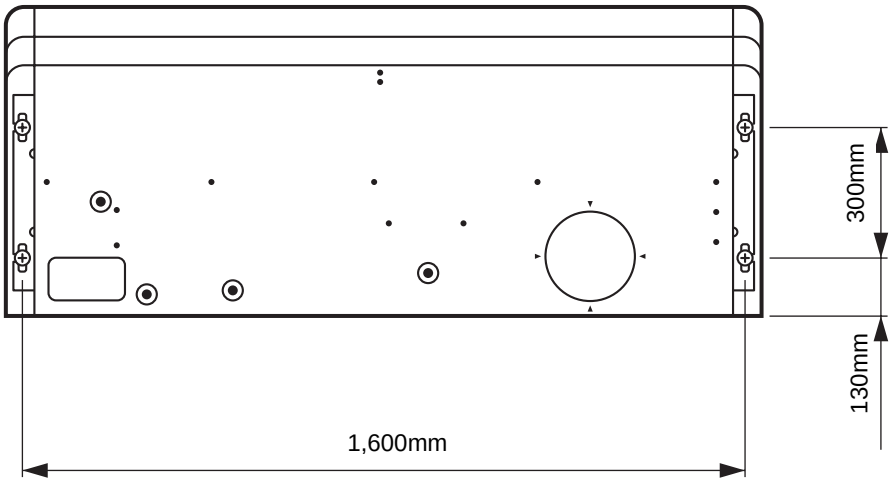
No. SI-25LW-6

1. OUTLINE AND DIMENSIONS

1.1 CEILING LARGE AB-SERIES

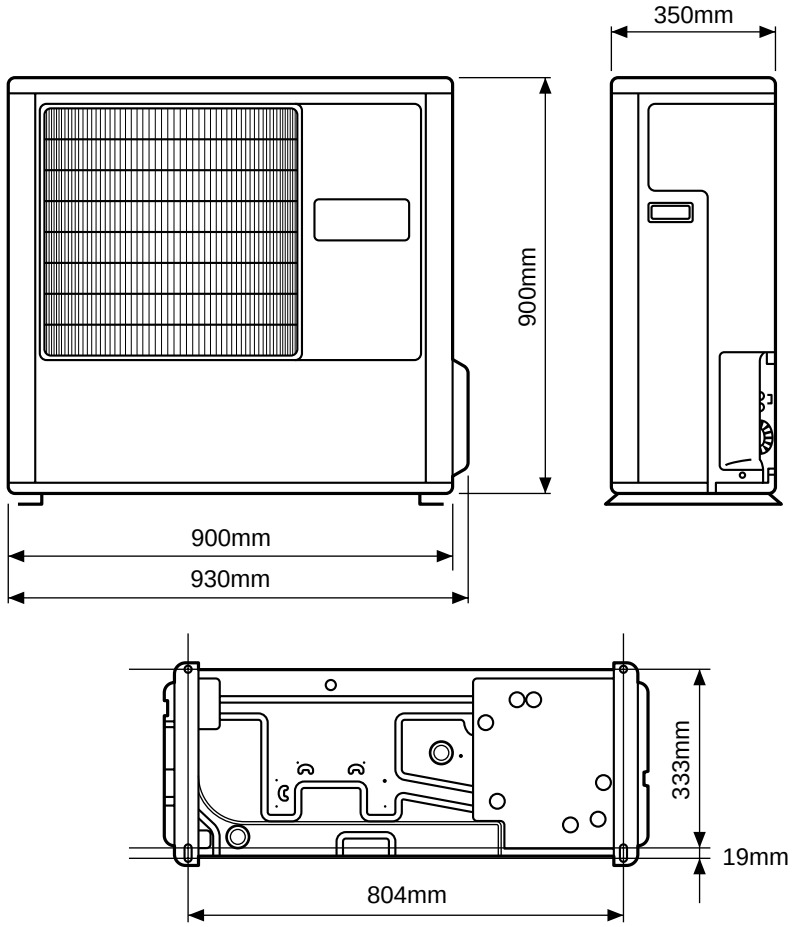
(1) INDOOR UNIT



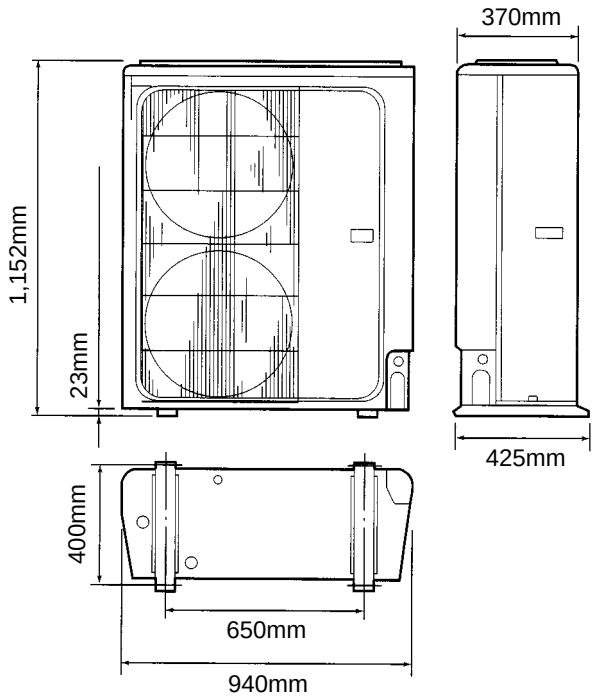


(2) OUTDOOR UNIT

30,000 BUT/h Type

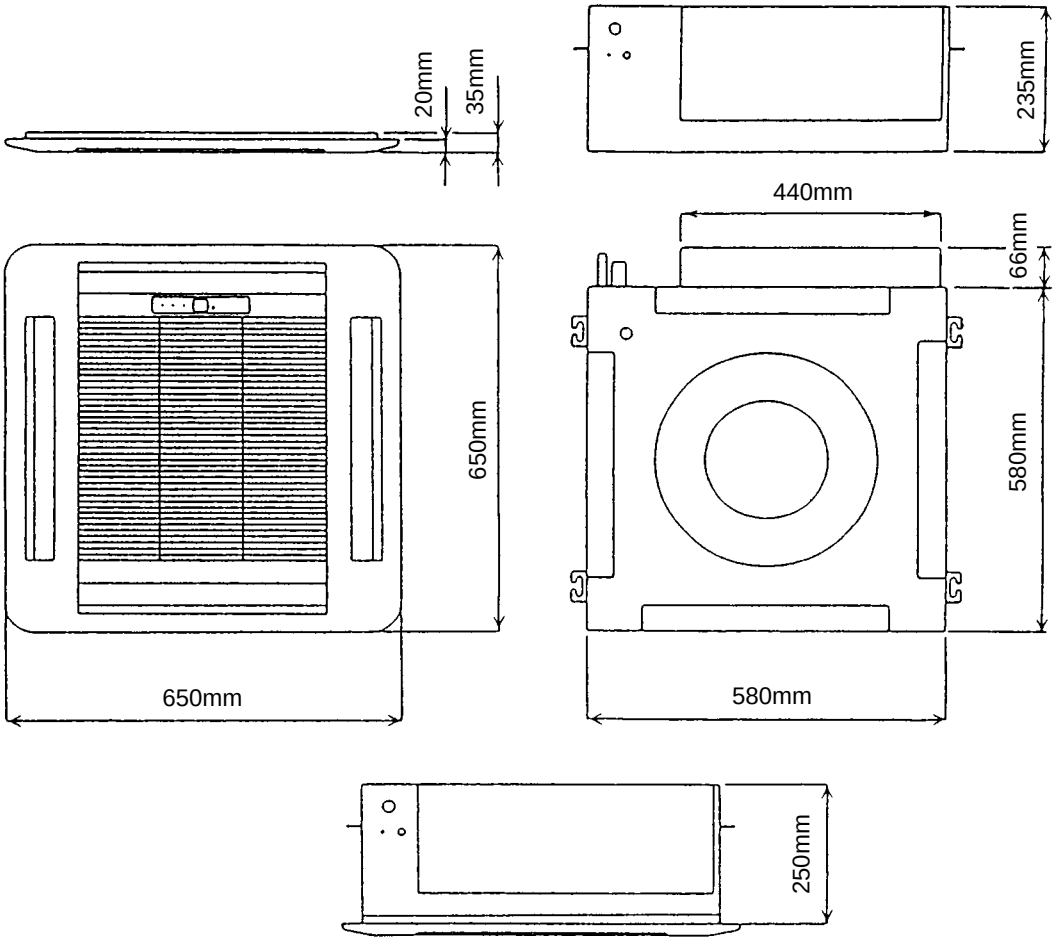


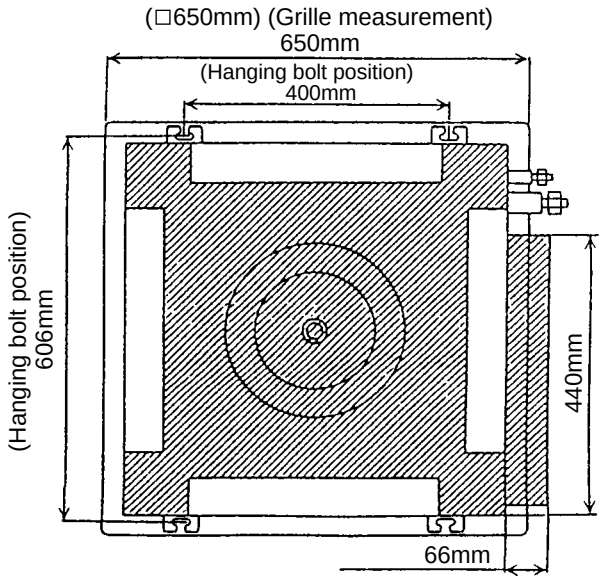
36,000 & 45,000 BTU/h Type

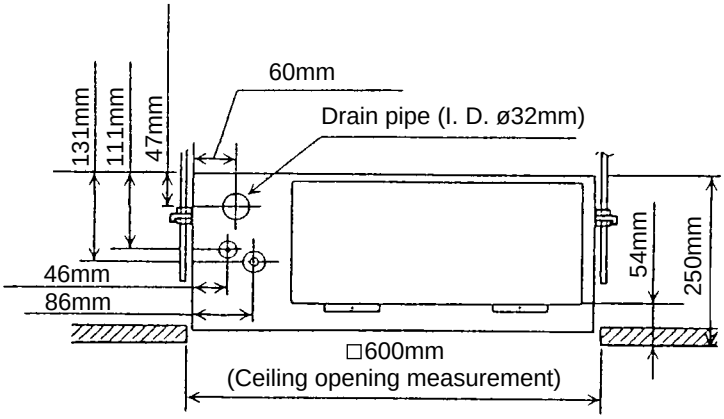


1.2 CASSETTE COMPACT AU-SERIES

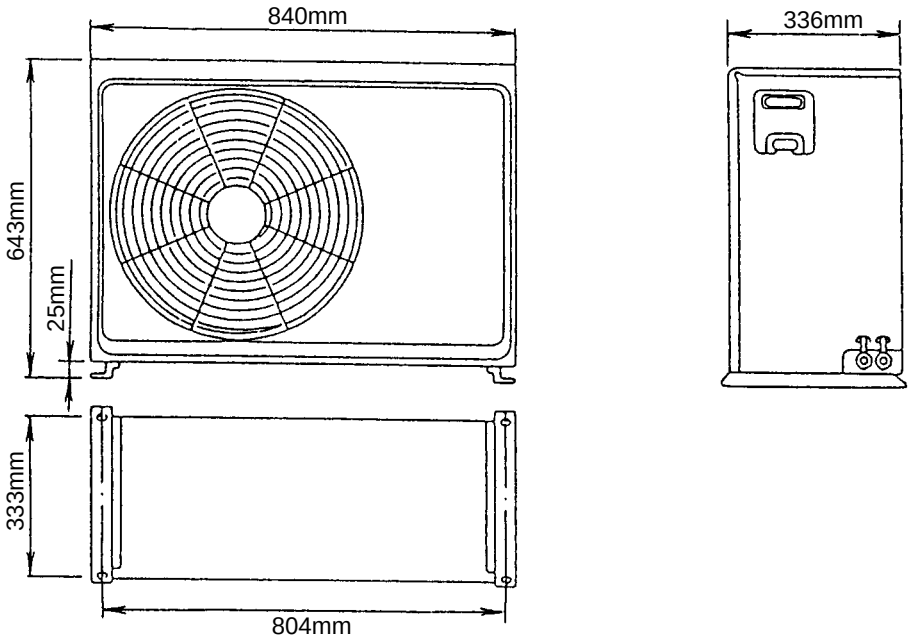
(1) INDOOR UNIT





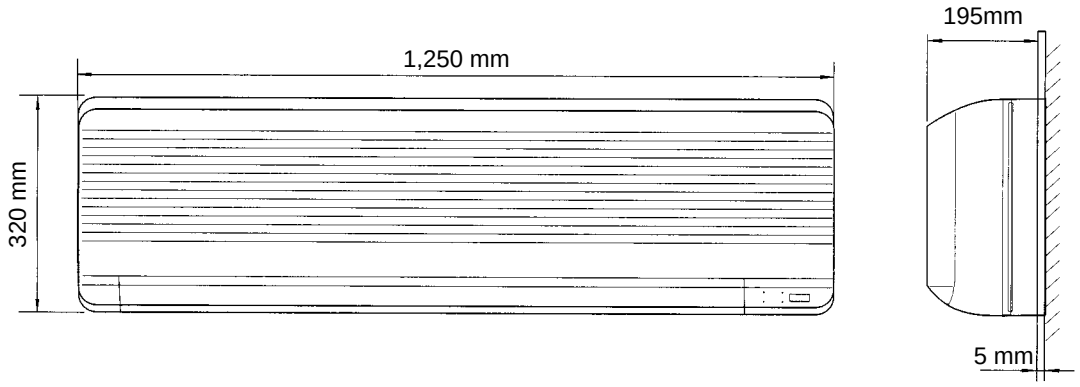


(2) OUTDOOR UNIT



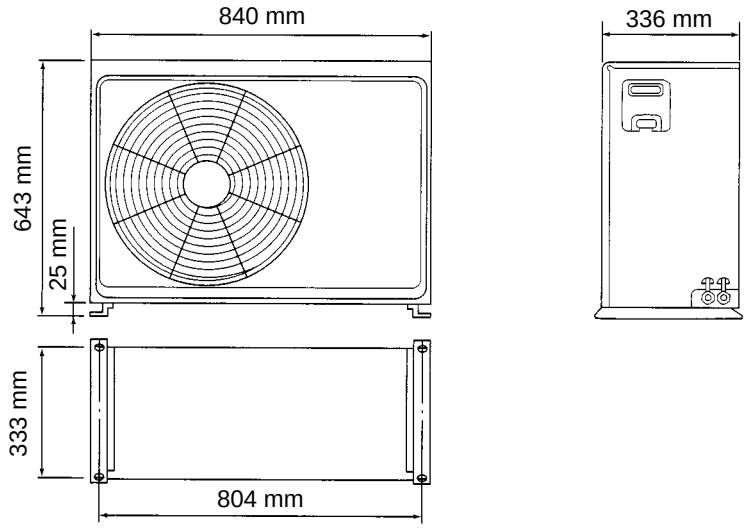
1.3 WALL MOUNTED LARGE AS-SERIES

(1) INDOOR UNIT

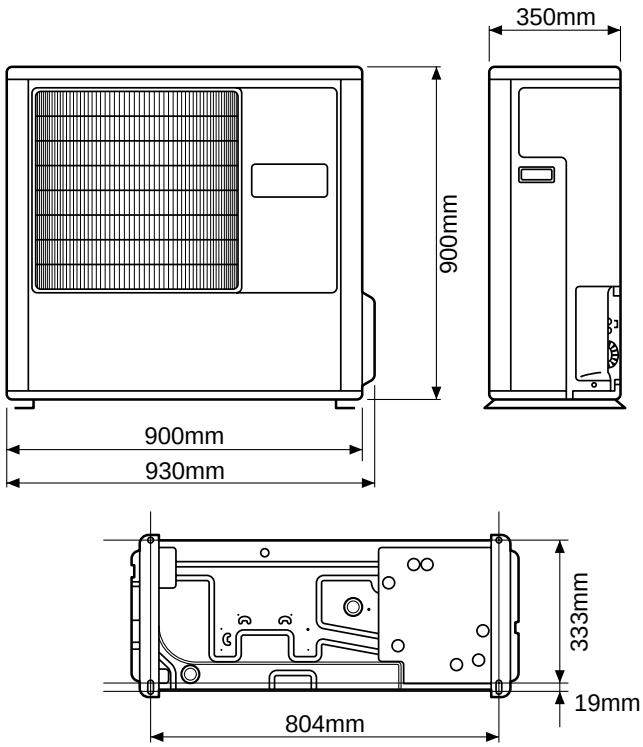


(2) OUTDOOR UNIT

20,000 & 24,000 BTU/h Type

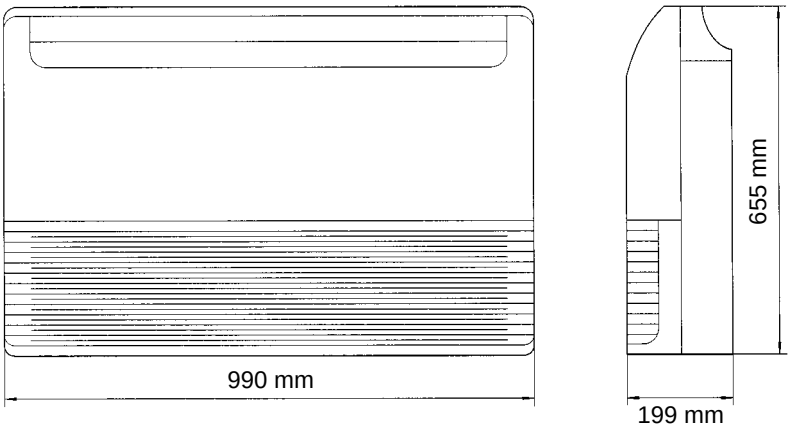


30,000 BTU/h Type



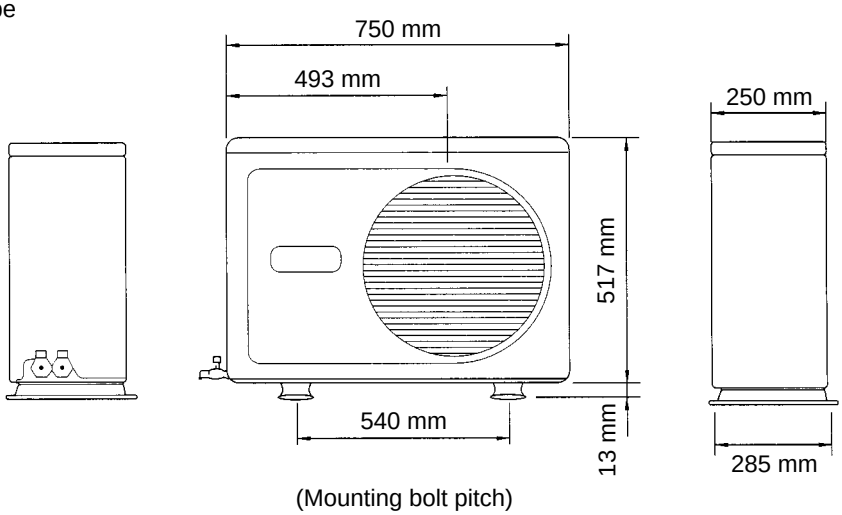
1.4 FLOOR / CEILING UNIVERSAL AB-SERIES

(1) INDOOR UNIT



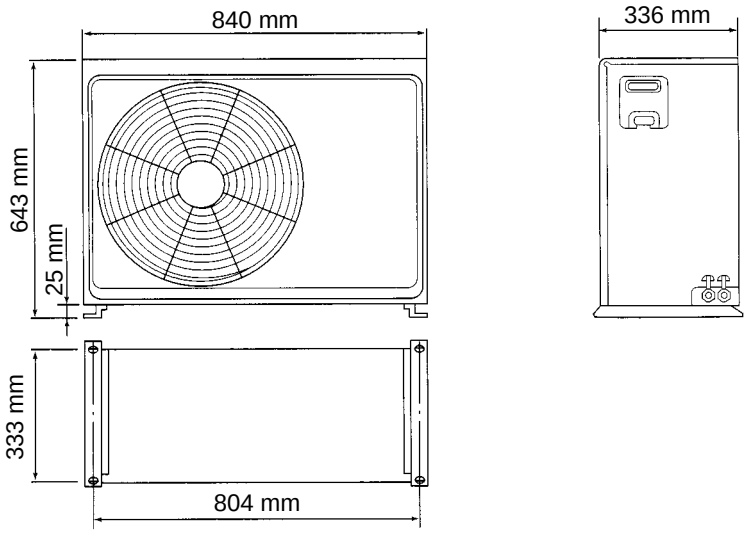
(2) OUTDOOR UNIT

14,000 BTU/h Type



(Mounting bolt pitch)

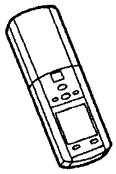
18,000 & 24,000 BTU/h Type



2. MICROPROCESSOR CONTROL GUIDE

2.1 REMOTE CONTROL UNIT

[SETTING MODE OPERATION]
- START/STOP
- TIMER/SLEEP
- FAN CONTROL
- MASTER CONTROL
- SET TEMPERATURE
- AIR FLOW DIRECTION
  VERTICAL (SET / SWING)
  HORIZONTAL (SET / SWING)
- TIME ADJUST
- TEST RUN
- ACL (Reset memory)
- CODE CHANGE



INPUT SIGNAL

OUTPUT SIGNAL → REMOTE CONTROL UNIT DISPLAY

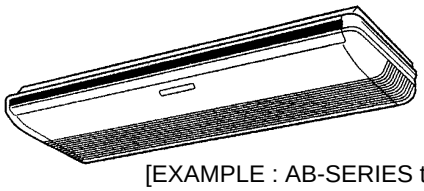
- Clock display
- Operating mode display
- Timer mode display
- Fan speed display
- Temperature set display
- Timer set indicator
- Temperature set indicator

Signal transmitter † † †

2.2 INDOOR UNIT

- Indoor room temperature sensor [T_R °C]
- Heat exchanger temperature (pipe) sensor [T_n °C]

INPUT DATA



[EXAMPLE : AB-SERIES type]

OUTPUT SIGNAL → INDICATOR LAMPS

- Operation (red)
- Timer (green)
- Vertical swing (orange)
- Horizontal swing (orange)
  TROUBLESHOOTING DISPLAY
  (Indicator lamp flashes)

• Receiving the data from the remote control and temperature data from the indoor unit

[MICROPROCESSOR CONTROL]

A : OPERATION . . . . . 1. Timer control 3. Operating control
2. Indoor fan control 4. Louver control

B : PROTECTION FUNCTION . . . . 5. Compressor protection (3ST), (3HT)
6. Indoor heat exchanger de-icing [Cooling operation]
7. Set temperature compensation at the operation start
8. 4-way valve delay switching [Heating operation]
9. Cool air discharge prevention [Heating operation]
10. Heating overload protection [Heating operation]
11. Defrosting operation [Heating operation]

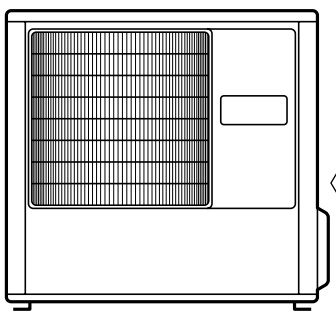
C : OTHER FUNCTION . . . . . 12. Auto-restart
13. Energy saving [Remote control unit wall fixing type only]
14. Drain pump operation
15. Abnormal operation stop
16. Outdoor fan control
17. Crankcase heater
18. Printed wiring board setting
    1) Compensation (Heating correction coefficient)
    2) Auto-restart & remote controller code

COMPRESSOR CONTROL SIGNAL
OUTDOOR FAN CONTROL SIGNAL
4-WAY VALVE CONTROL SIGNAL
[Reverse cycle model]

2.3 OUTDOOR UNIT

- Compressor and outdoor fan : ON-OFF
- 4-way valve [Reverse cycle] : ON-OFF
- Outdoor fan speed control : Low-High-Stop
- PROTECTION FUNCTION
  - Defrosting : START-STOP
  - Compressor protection device works

Signal cable connection



INPUT DATA

- Outdoor thermostat
- Outdoor heat-exchanger thermistor
- Discharge pipe thermistor
- Outdoor temperature thermistor

[EXAMPLE : 30,000 BTU/h type]

A. OPERATION

1. TIMER CONTROL

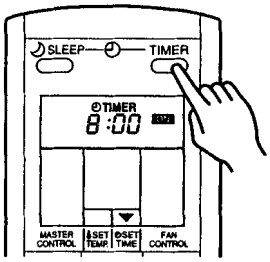
There are four timer modes: “SLEEP”, “OFF TIMER”, “ON TIMER” and “PROGRAM TIMER”.

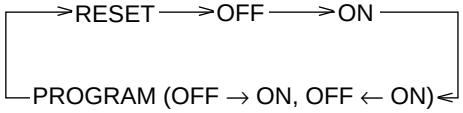
(1) Set the clock time when the unit is in the stop mode (only the current time will be shown on the remote control unit display).

(2) While adjusting the current clock time, do not use other remote control functions.

(3) Each time the TIMER button is pressed, the remote control unit display will change in the order shown below:

Fig. 1 Remote control button selected





1) SLEEP timer

When desiring to stop operation automatically after you go to bed, if the SLEEP button is pressed, operation stops while the “room temperature” is changed automatically.

* **Cooling/Drying**

When set to “SLEEP”, the set temperature is raised 1°C, then raised 1°C / 1 hour thereafter. When the temperature has been raised a total of 2°C, that temperature is held until the set time has elapsed, then operation automatically stops.

* **Heating [REVERSE CYCLE]**

When set to “SLEEP”, the set temperature is lowered 1°C, then lowered 1°C / 30 minutes thereafter.
When the temperature has been lowered a total of 4°C, that temperature is held until the set time has elapsed, then operation automatically stops.

Fig. 2 Cooling SLEEP timer setting

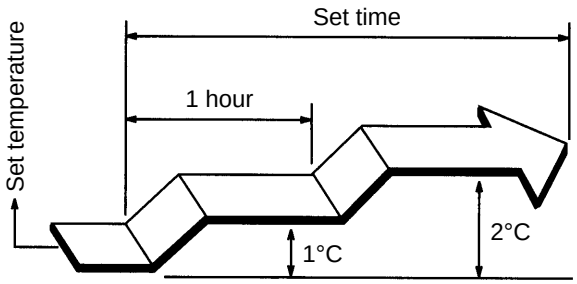
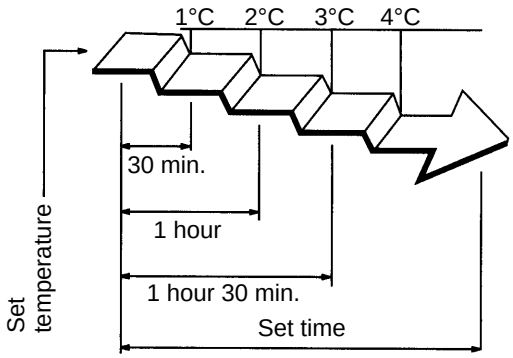


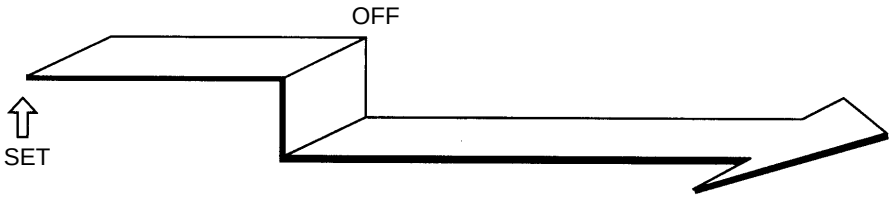
Fig. 3 Heating SLEEP timer setting



2) OFF timer

Use when going to bed or otherwise to stop operation. When the clock reaches the set time, the air conditioner will be turned off.

Fig. 4 OFF timer setting



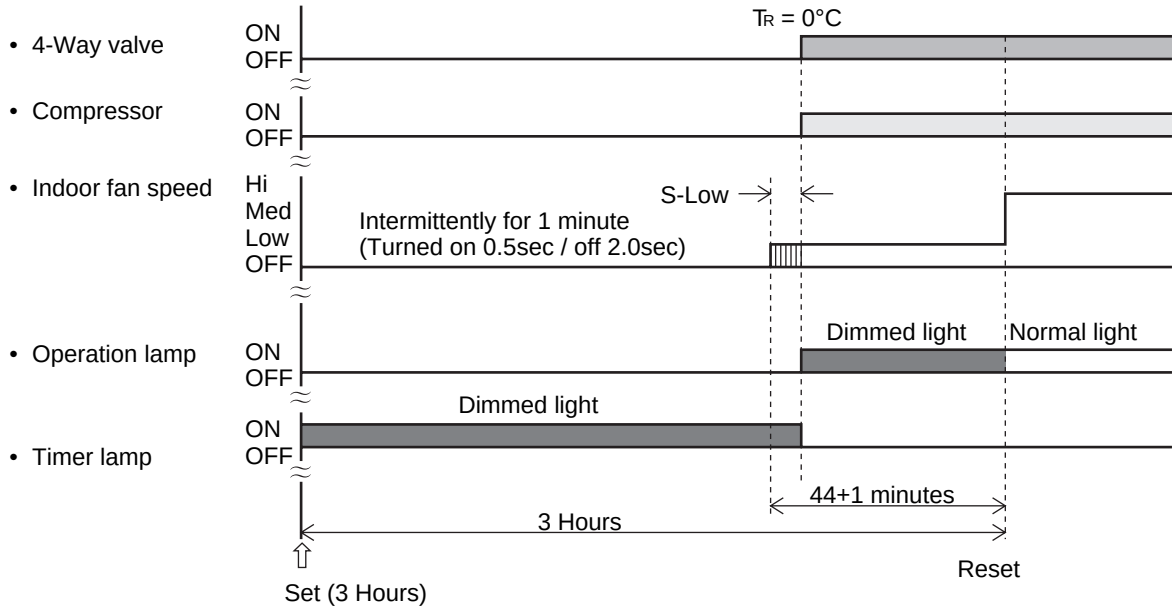
3) ON timer

When the ON timer is used, the air conditioner not only starts at the set time, but also automatically starts before the set time according to the difference between the room temperature and the set temperature so the room becomes the desired temperature at the set time. The time can be set in 5-minute steps.

OPERATION MODE	ROOM TEMPERATURE AND SET TEMPERATURE DIFFERENCE (T_S - T_R)	OPERATION START TIME
Cooling Dry	Over 10°C 5°C to 10°C Under 5°C	Started 20 minutes before set time Started 15 minutes before set time Started 10 minutes before set time
Heating	Over 20°C (Fig. 5) 15°C to 20°C 10°C to 15°C Under 5°C	Started 45 minutes before set time Started 30 minutes before set time Started 15 minutes before set time Started 10 minutes before set time

Fig. 5 ON timer for example operation

[Heating mode, T_S (Set temperature) = 23°C, T_R (Room temperature) = 0°C, Hi Fan speed]



Note : Dimmed light is of 35% of the normal light.
S-Low : The indoor fan motor runs intermittently (turned on 0.5sec / off 2.0 sec).

4) PROGRAM timer

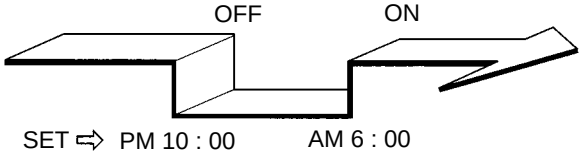
The PROGRAM timer allows you to integrate OFF timer and ON timer operations in a single sequence. The sequence can involve one transition from OFF timer to ON timer, or from ON timer to OFF timer, within a twenty four hour period.

The first timer function to operate will be the one set nearest to the current time.

The order of operation is indicated by the arrow in the Remote Control Unit display (OFF → ON, or OFF ← ON).

One example of PROGRAM timer use might be to have the air conditioner automatically stop (OFF timer set PM10:00) after you go to sleep, then start (ON timer set AM6:00) automatically in the morning before you wake up.

Fig. 6 PROGRAM timer setting



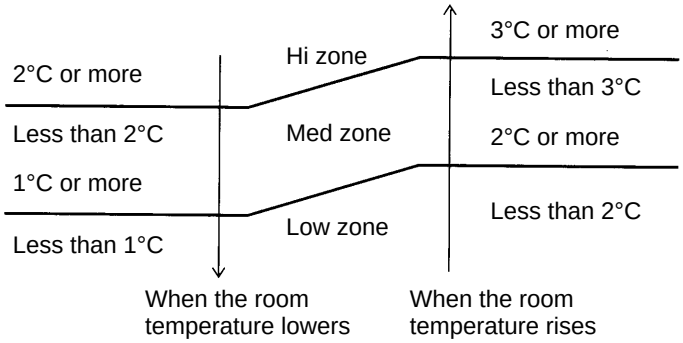
2. FAN CONTROL

A. "AUTO" position

1) COOLING OPERATION

Air flow mode is set automatically in accordance with the condition "(Room temp. — Set temp.)" as shown at the right.

Fig. 7 Fan speed zone



2) DRY OPERATION

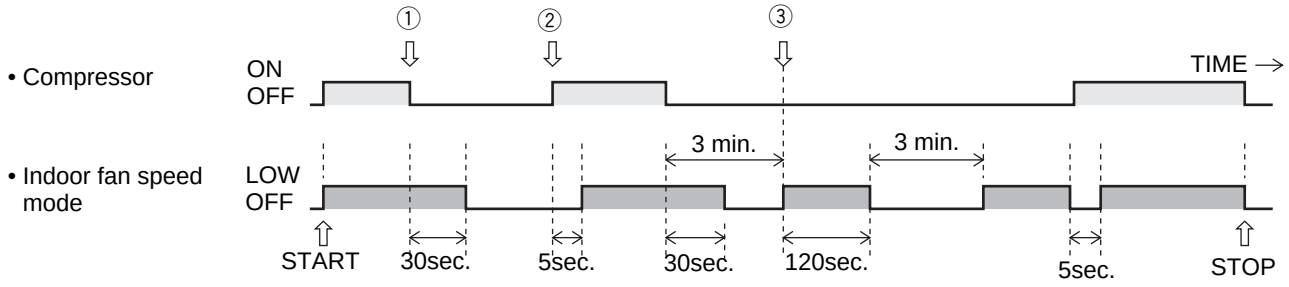
Preference will be given to remove humidity, the indoor fan motor operates at LOW speed.

① The unit starts, and the indoor fan motor stops after 30 seconds passed, since the compressor has stopped.

② The indoor fan motor starts after 5 seconds passed, since the compressor has started.

③ When the compressor continues stopping for 3 minutes, the indoor fan motor operates for 120 seconds from that point.

Fig. 8 Fan mode time chart



3) HEATING OPERATION

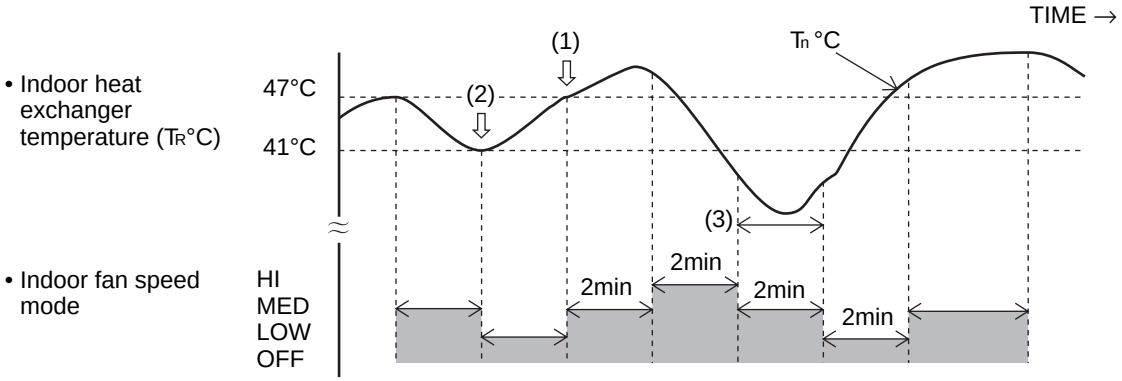
(1) When the indoor heat exchanger temperature reaches 47°C or more, the fan mode switches to the next higher position ("LOW" → "MED", "MED" → "HIGH").

(2) When the indoor heat exchanger temperature drops below 41°C while the compressor operates, the fan mode switches to the next lower position ("HIGH" → "MED", "MED" → "LOW").

(3) After switching the fan mode, it does not switch again within 2 minutes.

(4) When "FAN CONTROL" is switched to "AUTO" while the unit is operated at the "FAN CONTROL" position of "HIGH", "MED" or "LOW", the unit operation is performed in the "MED" fan mode.

Fig. 9 An example for heat operation



B) "LOW", "MED" and "HIGH" position

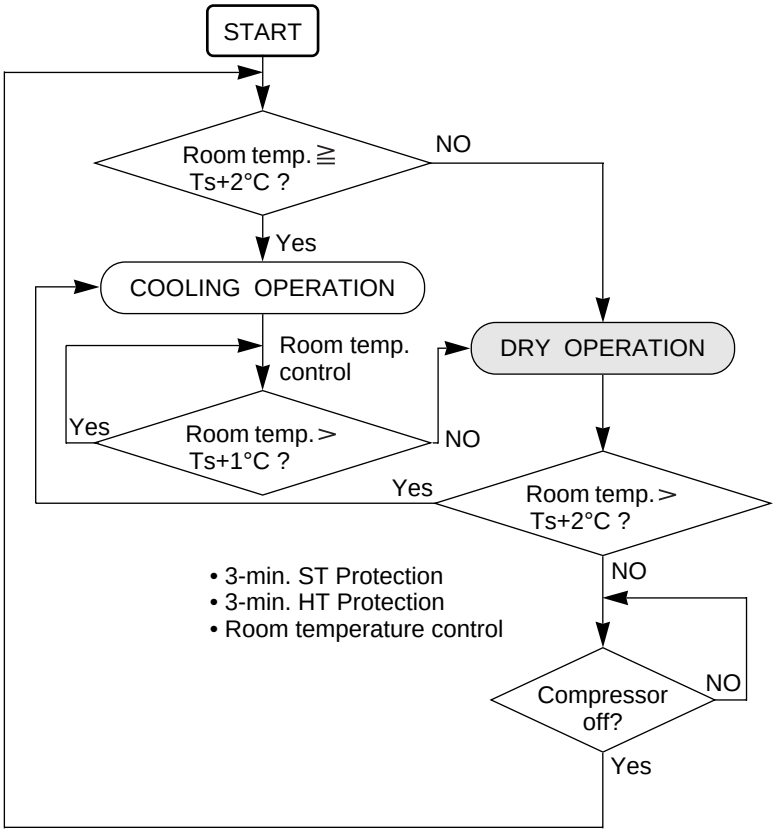
The indoor fan operates at the air flow set in the FAN CONTROL mode.

3. OPERATING CONTROL

1) "AUTO" position

A : COOLING & DRY operation (COOLING ONLY MODEL)

Fig. 10 Operation flow chart



(1) When starting the operation at "AUTO" or when switched to "AUTO" from other modes, if the room temperature is higher than the set temperature +2°C (Room temp. ≧ Set temp. (Ts) +2°C), "COOL" mode is set automatically and an air conditioner operates until the room temperature reaches the condition "Room temp. ≦ Set temp. (Ts) +1°C".

(2) When the room temperature is less than the set temperature (Ts) +2°C at the start of operation or changing into "AUTO", or after the room temperature reaches the condition "Room temp. < Set temp. (Ts) +2°C", the unit is changed into the "DRY" mode.

"Room Temp. ≦ Set Temp. (Ts) +2°C"

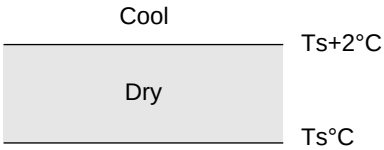
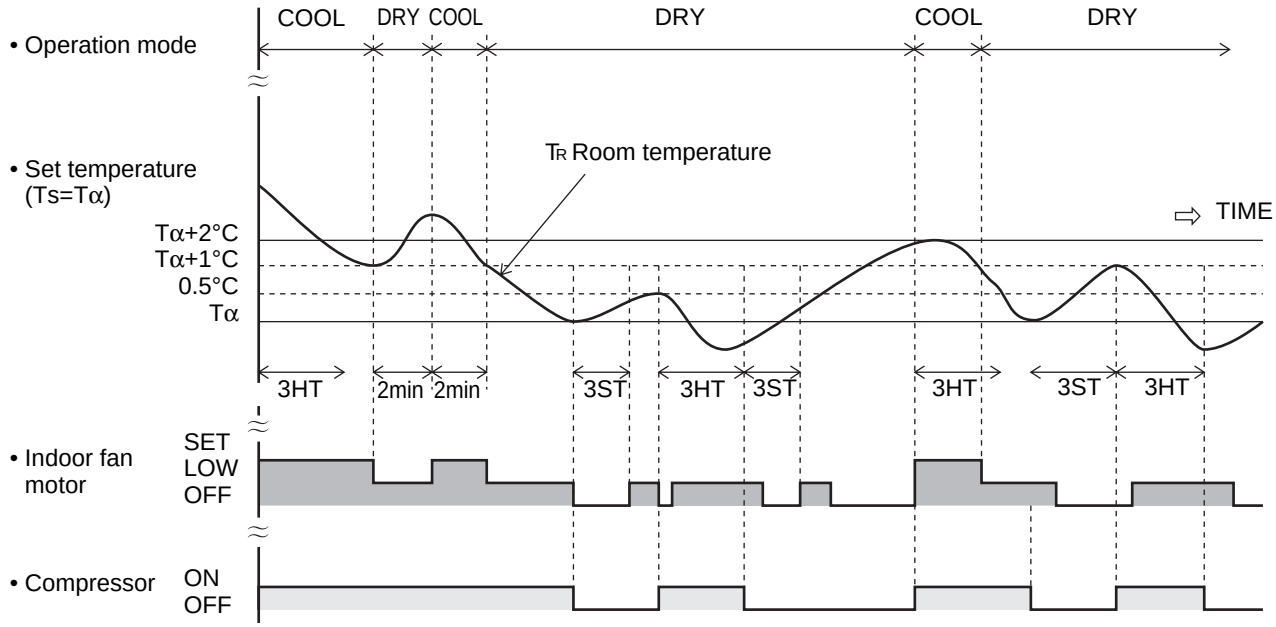


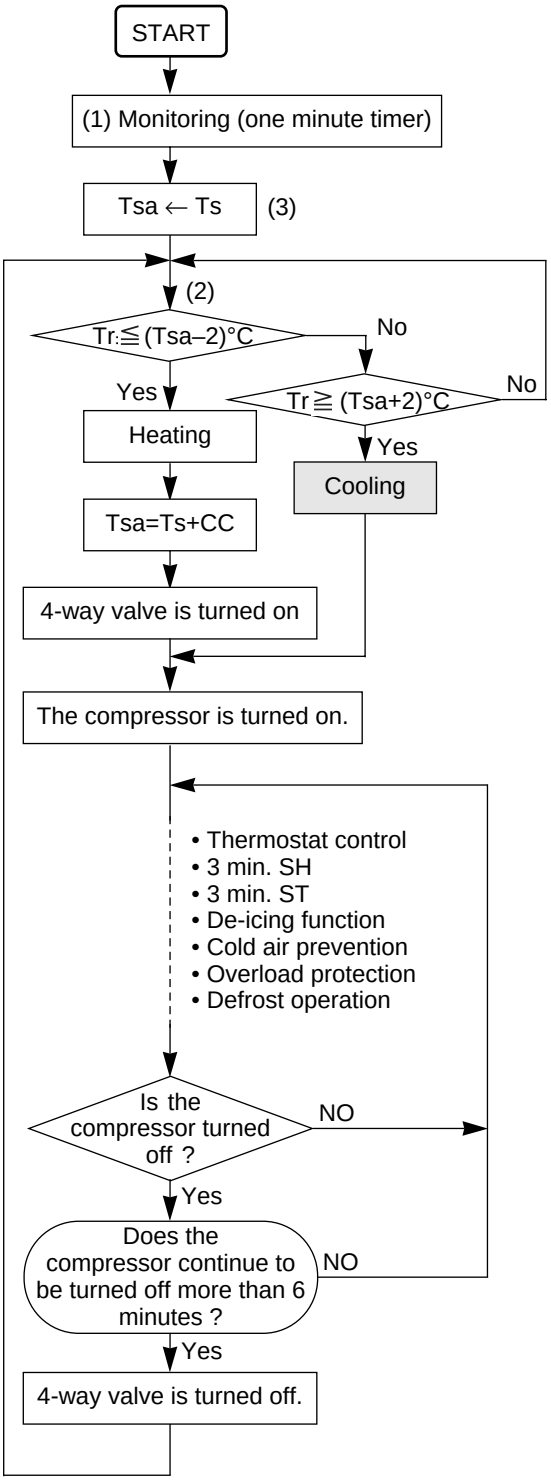
Fig. 11 Cooling or Dry temperature control operation time chart



B : AUTO CHANGEOVER operation [REVERSE CYCLE]

- When AUTO CHANGEOVER operation is selected, the air conditioner selects the appropriate operation mode (Cooling or Heating) in response to your room's temperature.
- When AUTO CHANGEOVER operation first selected, the fan will operate at very LOW speed for about one minute, during which time the unit detects the room conditions and selects the proper operating mode.

Fig. 12 Auto changeover flow chart



(1) Monitoring (Room temperature detection)

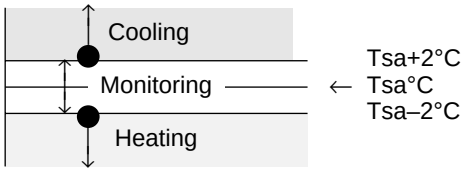
* The monitoring is that the indoor fan motor rotates intermittently (0.5sec ON at Low/2.0sec OFF) for 60 seconds to detect the room temperature (Tr) after the unit starts with the MASTER CONTROL of AUTO.
* In case that the 3-min delay function actuates or is actuating, the monitoring continues until the 3-min delay function is expired and furthermore 30 seconds elapses.
* During the monitoring, the compressor and outdoor fan motor keep the OFF state. Then, the 4-way valve keeps the previous state.

(2) Auto operation

* The cooling operation starts when the monitoring is expired and then the detected room temperature (Tr) is given in the formula [Tr ≧ (Tsa+2)°C].
* The heating operation starts when the monitoring is expired and then the detected room temperature (Tr) is given in the formula [Tr ≦ (Tsa–2)°C].
* The monitoring continues when the detected room temperature (Tr) is given in the following formula.

  [(Tsa–2)°C < Tr < (Tsa+2)°C]
* The cooling or heating operation is performed in accordance with the microcomputer functions such as thermostat control, 3-min delay function, etc.
* When the compressor continues to be in the OFF state for 6 minutes by the thermostat control in either of the cooling or heating, it is switched to the monitoring.

Room temperature (T_R) control zone

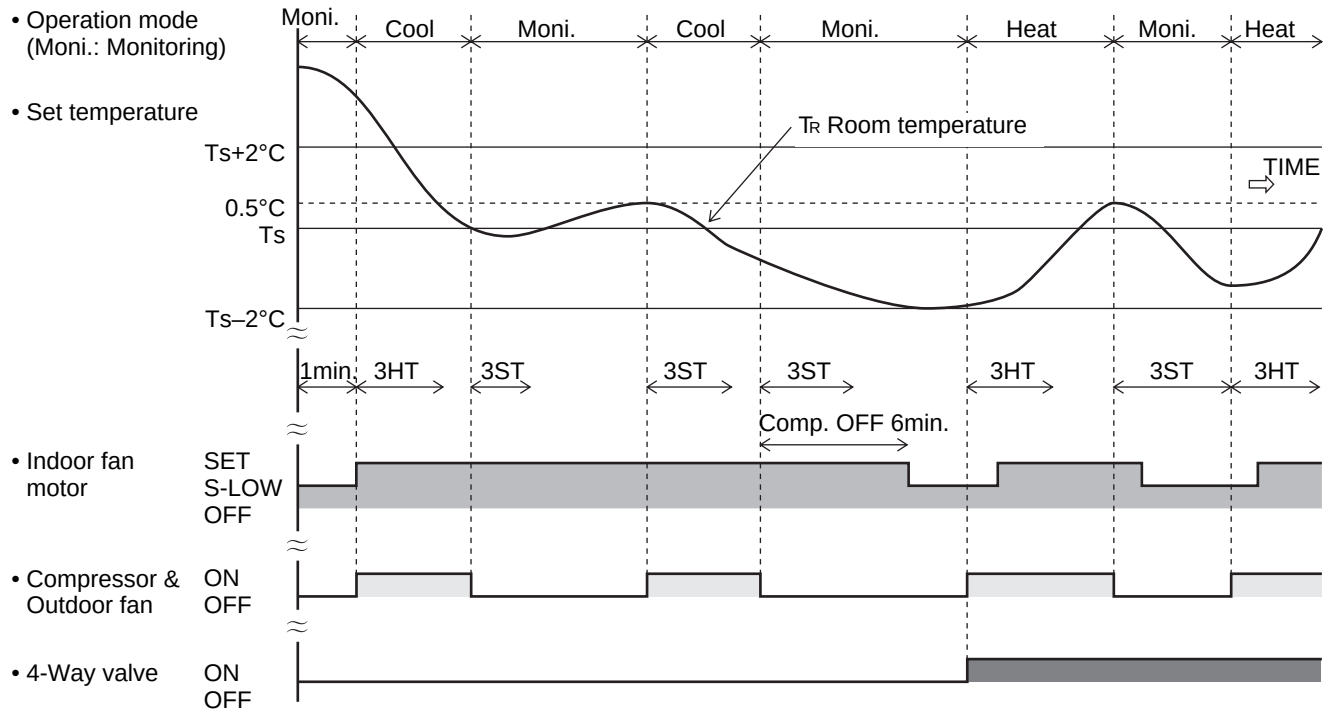


(3) Tsa : Set temperature in AUTO operation

* During cooling operation or after switching to monitoring from cooling operation, Tsa is identical to the temperature (Ts) selected out of the THERMOSTAT.

* During heating operation or after switching to monitoring from heating operation, “Tsa” is a value which the heating correction coefficient (CC) is added to the temperature (Ts) select out of the THERMOSTAT.
(Tsa=Ts+CC)
[Heating correction coefficient (CC) : See page 15]
* When the set temperature of the THERMOSTAT (Ts) is changed, the last temperature has priority over the former set temperature.
* Even though the set temperature is changed to switch from cooling to heating or from heating to cooling, such a switching is carried out after the compressor continues to be in the OFF state for 6 minutes by the thermostat control.

Fig. 13 An example for AUTO CHANGEOVER TEMPERATURE CONTROL time chart

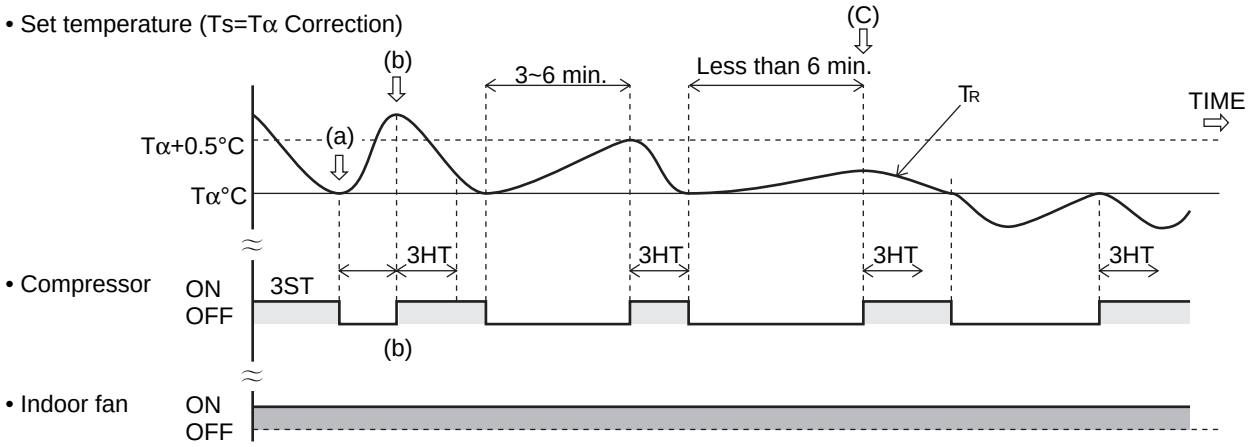


2) “COOL” position:

(1) When using the cooling mode, set the temperature to a value lower than the current room temperature.

(2) If it is set higher than the current room temperature the unit will not enter the cooling mode and only the fan will operate.

Fig. 14 An example for COOLING TEMPERATURE CONTROL time chart (Manual setting)



(a) Compressor turned OFF : $T_R < T\alpha$

(b) Compressor turned ON : $T_R \geqq T\alpha$+0.5°C (In case of 3 to 6 minutes)

(c) Compressor turned ON : $T_R \leqq T\alpha$ (In case that the compressor stops more than 6 minutes)

3) "HEAT" position:

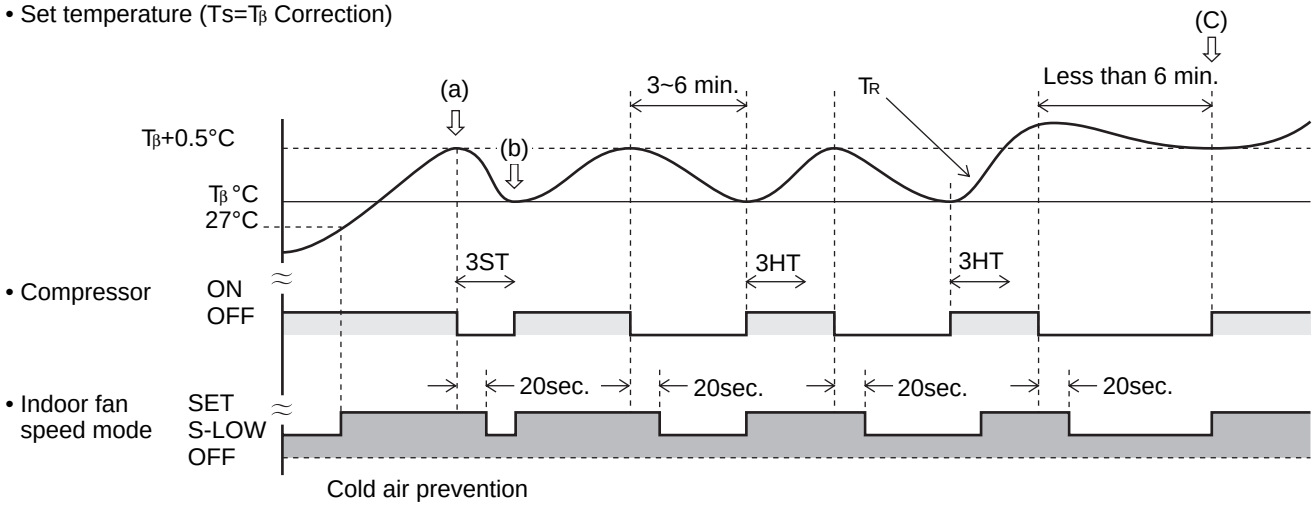
(1) Set the temperature higher than the current room temperature. If it is set to a lower temperature, heating will not start.

(2) For about 3 ~ 5 minutes after the start of heating, the fan will operate very slowly, and then switch to the selected fan setting. This period allows the indoor unit's heat exchanger to warm-up before emitting warm air.

(3) During defrosting, the OPERATION indicator lamp flashes 3 sec. ON and 1 sec. OFF, and the heating mode will be temporarily interrupted.

Fig. 15 An example for HEATING TEMPERATURE CONTROL time chart (Manual setting)

• Set temperature (Ts=Tβ Correction)



(a) Compressor OFF : $T_R \geqq T_\beta$+0.5°C

(b) Compressor ON : $T_R < T_\beta$

(c) Compressor ON : $T_R < T_\beta$+0.5°C (When the compressor stops after less than 6min.)

4) "DRY" position:

(1) In the dry mode, preference will be given to remove humidity.

(2) When using the dry mode, set the temperature to a lower value than the current room temperature. If it is set higher than the current room temperature, the unit will not enter the dry mode.

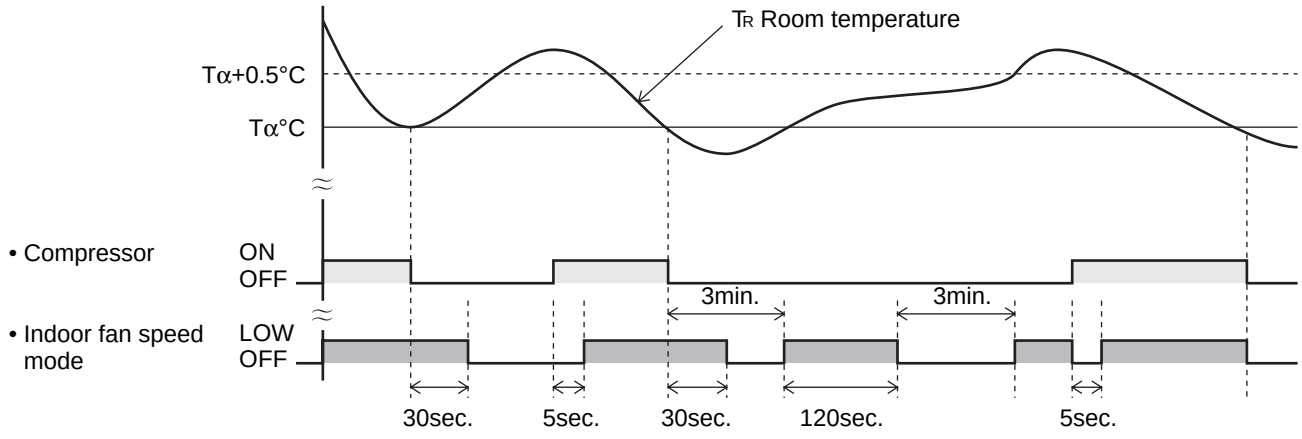
(3) Room heating cannot be performed in the dry mode.

(4) In the dry mode, the fan operates in "Low" speed. The fan will emit a very weak stream of air.

(5) In the dry mode, the room fan may occasionally stop in order to prevent the room humidity from rising.

Fig. 16 An example for DRY TEMPERATURE CONTROL time chart (Manual setting)

• Set temperature (Ts=Tα Correction)



5) "FAN" position:

(1) In this position, the fan operates alone to circulate air. The room temperature will not be changed.

(2) Operates at the air flow set in the FAN CONTROL mode.

(3) When only the "FAN" mode is being used, setting to "AUTO" is equivalent to set it at "MED".

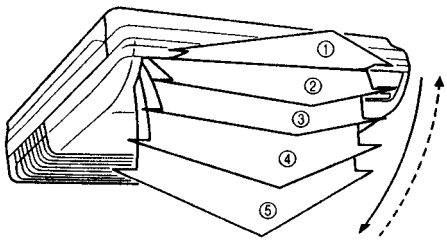
4. LOUVER CONTROL

4-1) Vertical Air Direction Adjustment (Air Flow Direction)

4-1-1 CEILING LARGE TYPE

Each time the button is pressed, the air direction range will change as follows:

① → ② → ③ → ④ → ⑤



Types of Air flow Direction Setting:

①, ②, ③ : During Cooling/Dry Modes

①, ②, ③, ④, ⑤ : *During Heating mode

The remote control unit's display does not change.

Note : Instructions relating to heating (*) are applicable only to "HEAT & COOL MODEL" (Reverse Cycle).

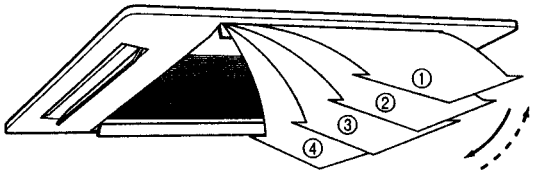
- Use the air direction adjustments within the ranges shown above.
- The vertical air flow direction is set automatically as shown, in accordance with the type of operation selected.
  Horizontal flow ① : During Cooling/Dry mode
  Downward flow ⑤ : * During Heating mode
- During AUTO mode operation, for the first minute after beginning operation, airflow will be horizontal ①; the air direction cannot be adjusted during this period.

4-1-2 CASSETTE COMPACT TYPE

Each time the button is pressed, the air direction range will change as follows:

① → ② → ③ → ④

The remote control unit's display does not change.



- Use the air direction adjustments within the ranges shown above.
- The vertical airflow direction is set automatically as shown, in accordance with the type of operation selected.

  During Cooling/Dry mode : Horizontal flow ①
  * During Heating mode : Downward flow ④

- During AUTO mode operation, for the first minute after beginning operation, airflow will be horizontal ①; the air direction cannot be adjusted during this period.

4-1-3 UNIVERSAL / WALL MOUNTED TYPE

Each time the button is pressed, the air direction range will change as follows:

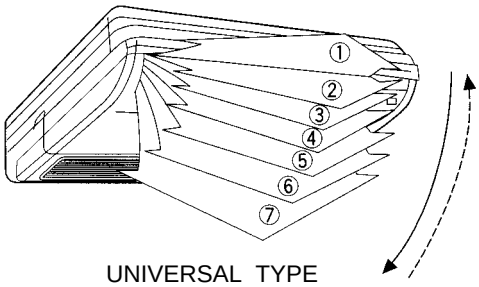
① → ② → ③ → ④ → ⑤ → ⑥ → ⑦

Types of air direction setting:

①, ②, ③, ④ During Cooling, Dry modes

⑤, ⑥, ⑦ During Heating mode

The remote control unit's display does not change.



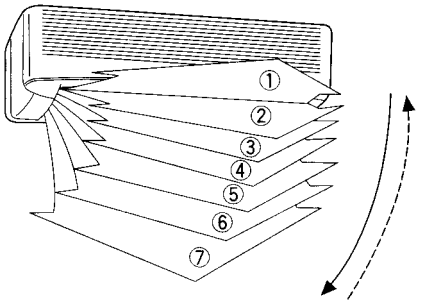
UNIVERSAL TYPE

(1) Use the air direction adjustments within the ranges shown above.

(2) The vertical airflow direction is set automatically as shown, in accordance with the type of the operation selected.

  During Cooling/Dry modes : Horizontal ①
  During Heating mode : Downward flow ⑦

(3) During AUTO mode operation, for the first minute after beginning operation, airflow will be horizontal ①; the air direction cannot be adjusted during this period.



WALL MOUNTED TYPE

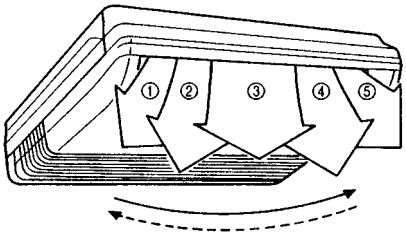
4-2) Horizontal Air Direction Adjustment (Air Flow Direction)

4-2-1 CEILING LARGE TYPE

Each time the button is pressed, the air direction range will change as follows:

① → ② → ③ → ④ → ⑤

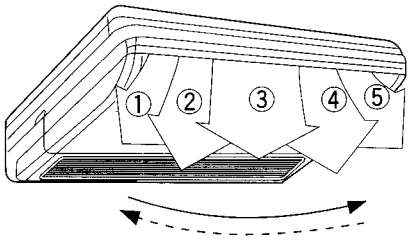
- Use the air direction adjustments within the ranges shown above.



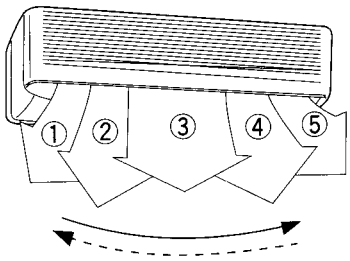
4-2-2 UNIVERSAL / WALL MOUNTED TYPE

Each time the button is pressed, the air direction range will change as follows:

① → ② → ③ → ④ → ⑤ The remote control unit's display does not change.



UNIVERSAL TYPE



WALL MOUNTED TYPE

Use the air direction adjustments within the ranges shown above.

4-3) Swing operation (Air Flow Swing)

The range of swing is relative to the currently set airflow direction.

4-3-1 CEILING LARGE TYPE

Air flow direction set	Range of swing
①	① to ③
②	① to ③
③	② to ④
④	③ to ⑤
⑤	① to ⑤ (All range)

Air direction range (See page 15, 4–1–1)

4-3-2 CASSETTE COMPACT TYPE

Air flow direction set	Range of swing
①	① to ③
②, ③	② to ④
④	① to ④ (All range)

Air direction range (See 4–1–2)

4-3-3 UNIVERSAL / WALL MOUNTED TYPE

Air flow direction set	Range of swing
①	① to ④ (All range)
②	① to ③
③	② to ④
④	③ to ⑤
⑤	① to ⑤ (All range)

Air direction range (See page 15, 4–2–1)

Vertical airflow swing operation

Air flow direction set	Range of swing
①	① to ③
②	① to ④
③	② to ⑤
④	③ to ⑥
⑤	④ to ⑦
⑥	⑤ to ⑦
⑦	＊ ① to ⑦

Horizontal airflow swing operation

Air flow direction set	Range of swing
①	＊ ① to ⑤
②	① to ③
③	② to ④
④	③ to ⑤
⑤	＊ ① to ⑤

(＊ : All range)

Note:

- Always use the remote control unit's AIR FLOW DIRECTION button to adjust the UP/DOWN air direction flaps or RIGHT/LEFT air direction louvers.
  Attempting to move them manually could result in improper operation; in this case, stop operation and restart.
  The louvers should begin to operate properly again.
- During use of the cooling and dry modes, do not set the UP/DOWN air direction flaps in the heating range (⑤ to ⑦) for long periods of time, since water vapor may condense near the outlet louvers and drops of the water may drip from the air conditioner.

B. PROTECTION FUNCTION

5. COMPRESSOR PROTECTION FUNCTION

1) THREE MINUTES DELAY FUNCTION (3ST)

The outdoor unit does not operate for three minutes after the power switch is turned on. (Compressor protection, breaker off prevention, etc.)

2) THREE MINUTES CONTINUOUS FUNCTION (3HT)

The unit continues to run for three minutes after the compressor starts.

Fig. 17 Compressor ON/OFF control

Note:

When test operation is performed during continuous heating operation, it takes some time until air blows out from the indoor unit because “Three minutes delay” and “Cold air discharge prevention” have priority over TEST operation.

6. INDOOR HEAT EXCHANGER DE-ICING FUNCTION (Cooling operation)

(1) When the temperature of the heat exchanger at the indoor side drops below 3°C during cooling operation, the outdoor fan control is switched to LOW automatically.

(2) After that, when the temperature of the indoor heat exchanger reaches 7°C or more, the outdoor fan control returns to HIGH.

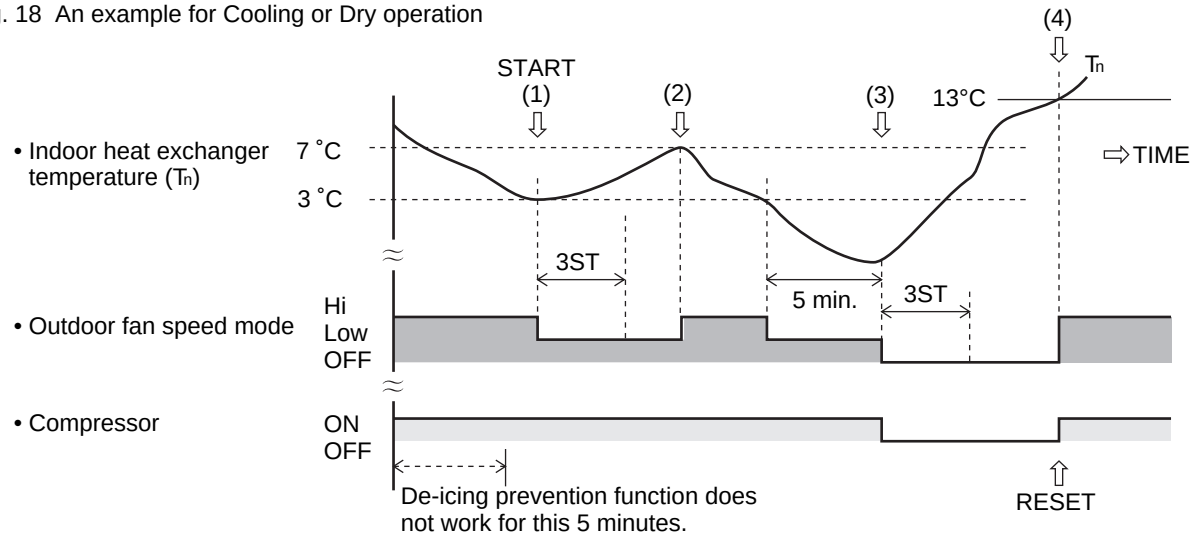
(3) When the temperature of the indoor heat exchanger remains less than 3°C for 5 minutes at LOW of the outdoor fan control, operation of the compressor stops.

(4) After that, when the temperature of the indoor heat exchanger rises above 13°C, the outdoor fan control returns to HIGH and the compressor starts.

Note :

However, when the outdoor unit fan is a single speed fan, it operates at HIGH even though it is set to LOW in the software.

Fig. 18 An example for Cooling or Dry operation



7. SET TEMPERATURE COMPENSATION AT THE OPERATION START

At the start of the operation and when MASTER CONTROL is switched to heating and cooling, the set temperature are compensated by +2°C for heating operation for 60 minutes and by -1 °C for cooling operation for 40 minutes.

8. 4-WAY VALVE DELAY SWITCHING FUNCTION [REVERSE CYCLE]

When heat operation is stopped, 4-way valve is stopped 3 minutes later.

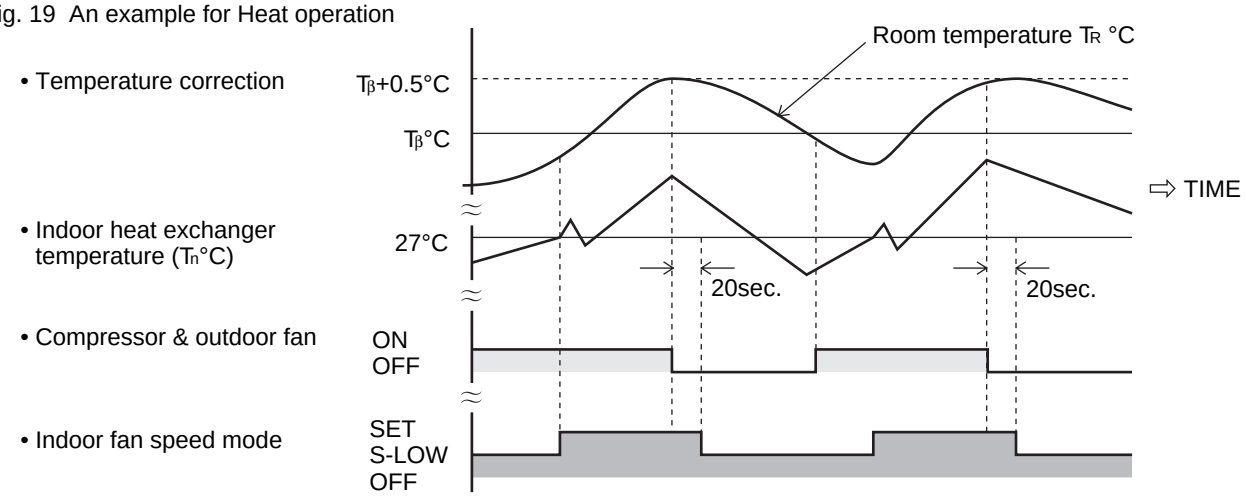
9. COLD AIR DISCHARGE PREVENTION FUNCTION [Reverse cycle]

(1) When the heating operation starts, the indoor unit fan operates intermittently in the S-LOW* (Super-Low) mode. After the temperature of the indoor heat exchanger rises above 27°C, operation enters to the specified flow mode.

(2) When the compressor is stopped by the thermostat, the indoor fan starts the intermittent operation in 20 seconds as described above.

(3) While the compressor is stopped, the indoor unit fan operates intermittently in the S-LOW mode.

Fig. 19 An example for Heat operation



* Temperature correction Tβ=Ts (Indoor setting temperature) + Ta (+4)°C
* S-LOW : The indoor fan motor runs intermittently (Turn on 5 sec / off 2.0 sec).

10. HEATING OVERLOAD PROTECTION FUNCTION [REVERSE CYCLE]

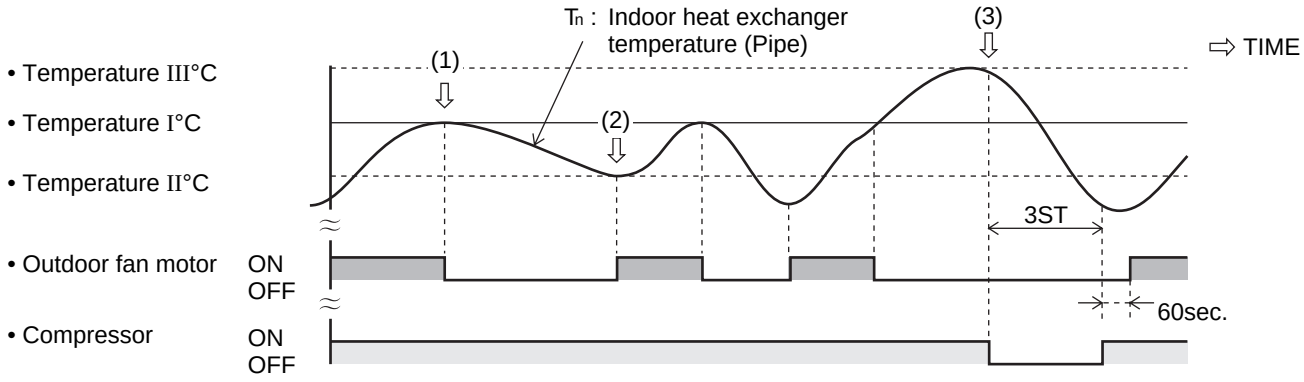
During heating operation, the compressor operates, but the outdoor fan may be stopped.
A function which suppresses the absorption of heat and protects the machine by stopping the outdoor fan when the indoor heat exchanger temperature has risen abnormally and when the outdoor temperature is high is provided.

(1) When the indoor heat exchanger temperature reaches I°C, the outdoor fan motor stops.

(2) When the indoor heat exchanger temperature has recovered to II°C, the outdoor fan motor starts.

(3) When the indoor heat exchanger temperature rises to III°C even when the outdoor fan motor is stopped, the compressor stops.

Fig. 20 An example for Heat operation



Application models	I°C	II°C	III°C
AB∗14R	54	46	60
AB∗24R	56	48	62
AB∗36R, AB∗45R, AB∗54R	56	48	62
AU∗12R, AU∗14R, AU∗18R	52	44	58
AS∗20R	48	40	54
AS∗24R, AS∗30R	52	44	58

11. DEFROSTING OPERATION [REVERSE CYCLE] (See Defrosting Flow Chart on page 23.)

(1) The defrosting operation is performed when frost is produced on the outdoor heat exchanger and may also be performed if it is not warm indoors.

(2) The defrosting operation time differs with such conditions as temperature, humidity, etc. (Approximately 8 ~ 9 to 12 minutes)

(3) During defrosting, both the indoor and outdoor fans are stopped and the indoor unit operation lamp (red) flashes.

(4) “Bushhhh”, “goh, goh, goh”, and other sounds will be heard during defrosting. These sounds are normal. (Four-way valve switching sound, refrigerant sound)

C. OTHER FUNCTION

12. AUTO RE-START

(1) The air conditioner restarts with the previous setting operation.

(2) At the restarting of air conditioner, “THREE MINUTE DELAY FUNCTION” operates.

(3) At the restarting of air conditioner for heating operation, “COLD AIR DISCHARGE PREVENTION FUNCTION” operates.

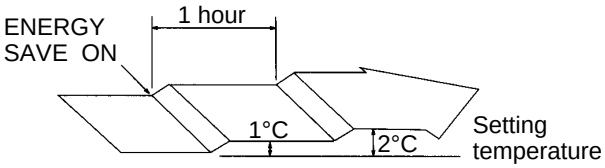
(4) When the power of the timer is interrupted during operation and resets later, the timer display lamp flashes on and off (turned on 3 sec. / off 1 sec.).

13. ENERGY SAVE FUNCTION [Wall fixing type remote controller unit only]

(1) During cooling/dry operation:

The thermostat temperature setting increases by 1°C as soon as the ENERGY SAVE button is pressed, and then increases by 1°C after one hour passed. afterwards, energy consumption is saved by continuing to cool or dry at a thermostat temperature of 2°C more than that set.

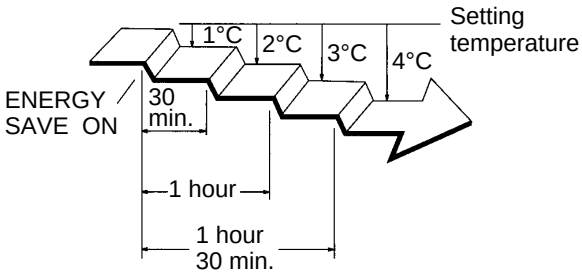
Fig. 22 ENERGY SAVE setting



(2) During heating operation [REVERSE CYCLE]:

The thermostat temperature setting decreases by 1°C as soon as the ENERGY SAVE button is pressed, and then decreases by another 1°C every thirty minutes.
Afterwards, energy consumption is saved by continuing to heat at a thermostat temperature of 4°C less than that set.

Fig. 23 ENERGY SAVE setting



14. DRAIN PUMP OPERATION

1) When a compressor starts, the drain pump starts simultaneously.

2) The drain pump operates continuously for 3 minutes after the compressor is turned off.

3) When the compressor stops by the “Indoor heat exchanger de-icing function”, the drain pump is turned off in 1 hour after the compressor stops.

4) When the water level in the drain pan rises up and then the float switch functions:

① Microcomputer stops the compressor and indoor and outdoor fan motor operation.

② Drain pump operates continuously for 3 minutes after the float switch is turned off. (Almost condensing water may be drained)

5) When the foat switch turns ON continuously for 3 min., “FAILURE INDICATION” operates.

6) When the foat switch turns OFF within 3 min., the unit starts cooling operation.

15. ABNORMAL OPERATION STOP [Ceiling large type only]

When the discharge temperature is over 130°C, abnormal operation stop device activates and operation stops.

☐ Thermistor for discharge pipe : 130°C OFF
100°C ON

16. OUTDOOR FAN CONTROL [Ceiling large type only]

Outdoor fan operation is controlled with an outdoor thermostat.

∗ **30,000 BTU/h MODELS**

1) Cooling operation : outdoor fan speed

Hi speed
24°C ——————————
Low speed

2) Heating operation : outdoor fan speed

Low speed
14°C ——————————
Hi speed

∗ **36,000 BTU/h and 45,000 BTU/h MODELS**

3) Cooling operation : outdoor fan speed

Upper fan : Hi speed
Lower fan : Hi speed
24°C ——————————
Upper fan : Low speed
Lower fan : Low speed
14°C ——————————
Upper fan : Stop
Lower fan : Low speed

4) Heating operation : outdoor fan speed

Upper fan : Stop
Lower fan : Low speed
24°C ——————————
Upper fan : Low speed
Lower fan : Low speed
14°C ——————————
Upper fan : Hi speed
Lower fan : Hi speed

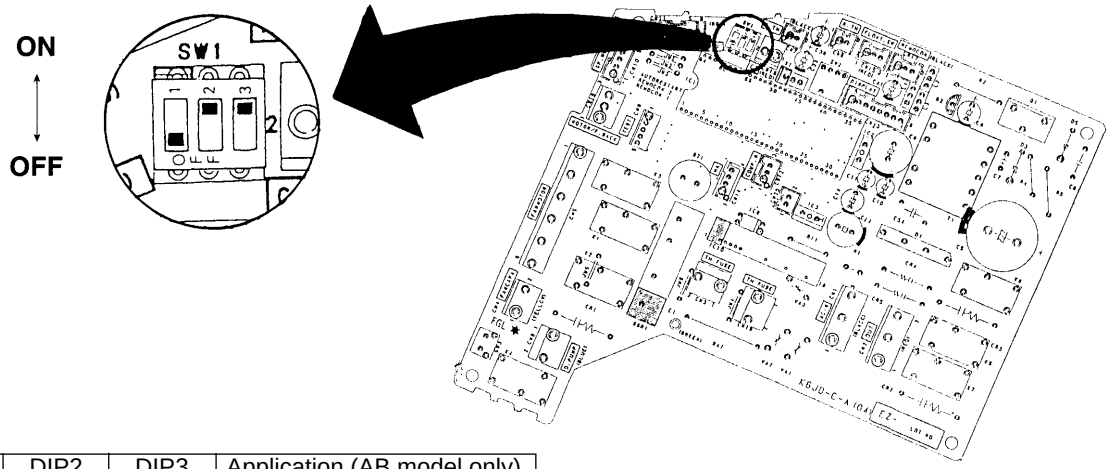
17. CRANK CASE HEATER [Ceiling large type only]

Crank case heater is installed around the compressor.
When the outdoor temperature is less than 21°C, oil is fallen in the compressor and the refrigerant is melted into oil and oil may be diluted, then the bearing metal etc. of the compressor motor is easy to damage when starting the compressor.

To prevent the above, the crank case heater is installed. The heater operates under the compressor halt.

18. PRINTED WIRING BOARD SETTING FUNCTION

(1) COMPENSATION (HEATING CORRECTION COEFFICIENT)

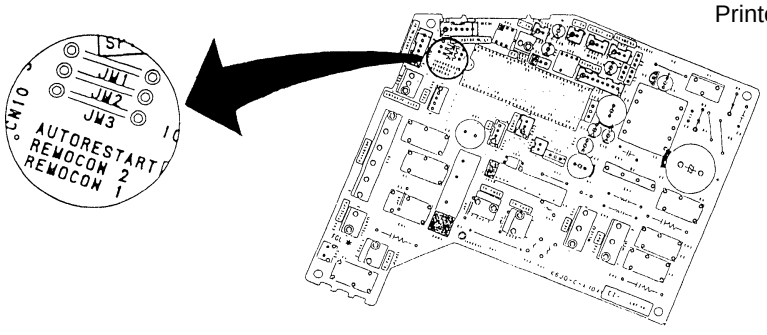


Compensation	DIP2	DIP3	Application (AB model only)
–2°C	ON	OFF	
±0°C	OFF	ON	for floor console
+2°C	OFF	OFF	
+4°C (default)	ON	ON	for under ceiling

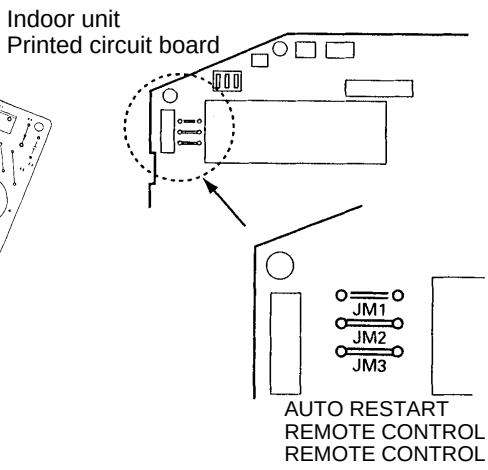
☆ The function of DIP1 does not work on AS and AB models.
Turn the DIP1 off anytime.

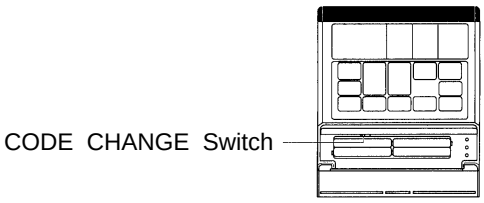
(2) AUTO-RESTART AND REMOTE CONTROLLER SIGNAL CHANGEABLE CODE

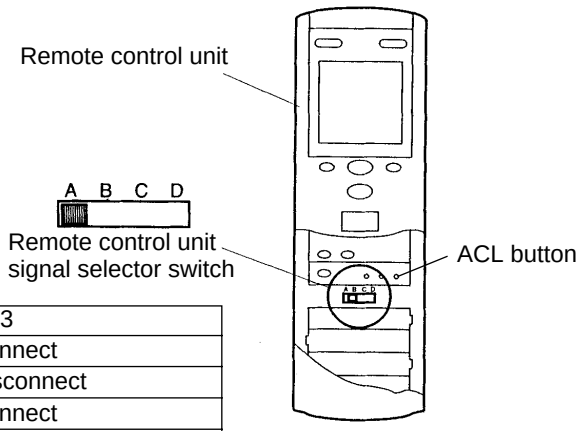
[WALL FIXING TYPE]



[WALL FIXING / HANDY TYPE]







	JM1
Auto-Restart Enable (default)	Disconnect
Auto-Restart Disable	Connect

☆	JM2	JM3
Remote-Controller Code-A (default)	Connect	Connect
Remote-Controller Code-B	Connect	Disconnect
Remote-Controller Code-C	Disconnect	Connect
Remote-Controller Code-D	Disconnect	Disconnect

After setting the remote control unit signal selector switch, press the ACL button.

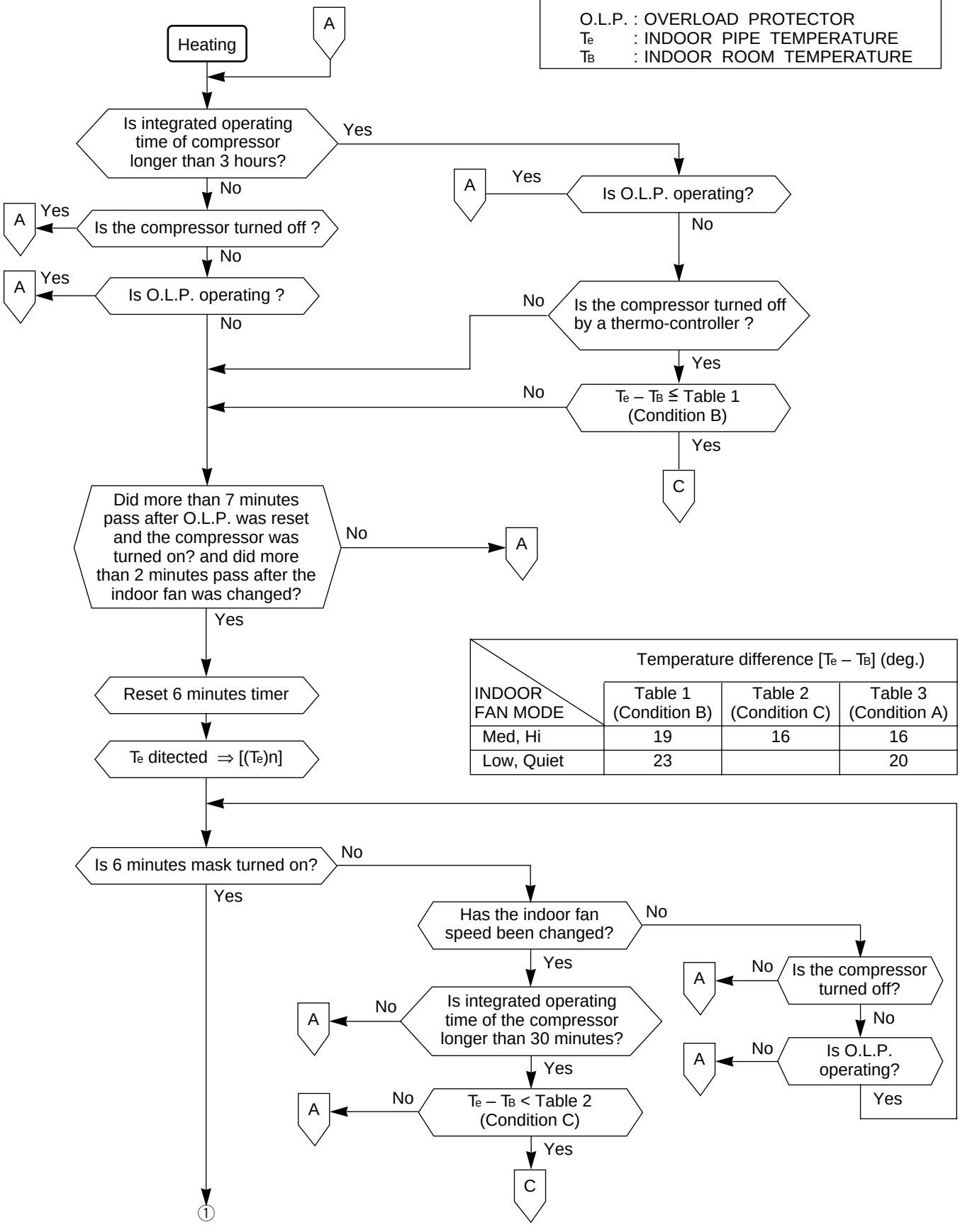
☆ Confirm the remote controller's "CODE CHANGE Switch" selection and printed wiring board setting.
If these are not confirmed, the remote controller cannot be operated for the air conditioner.

DEFROSTING OPERATION FLOWCHART

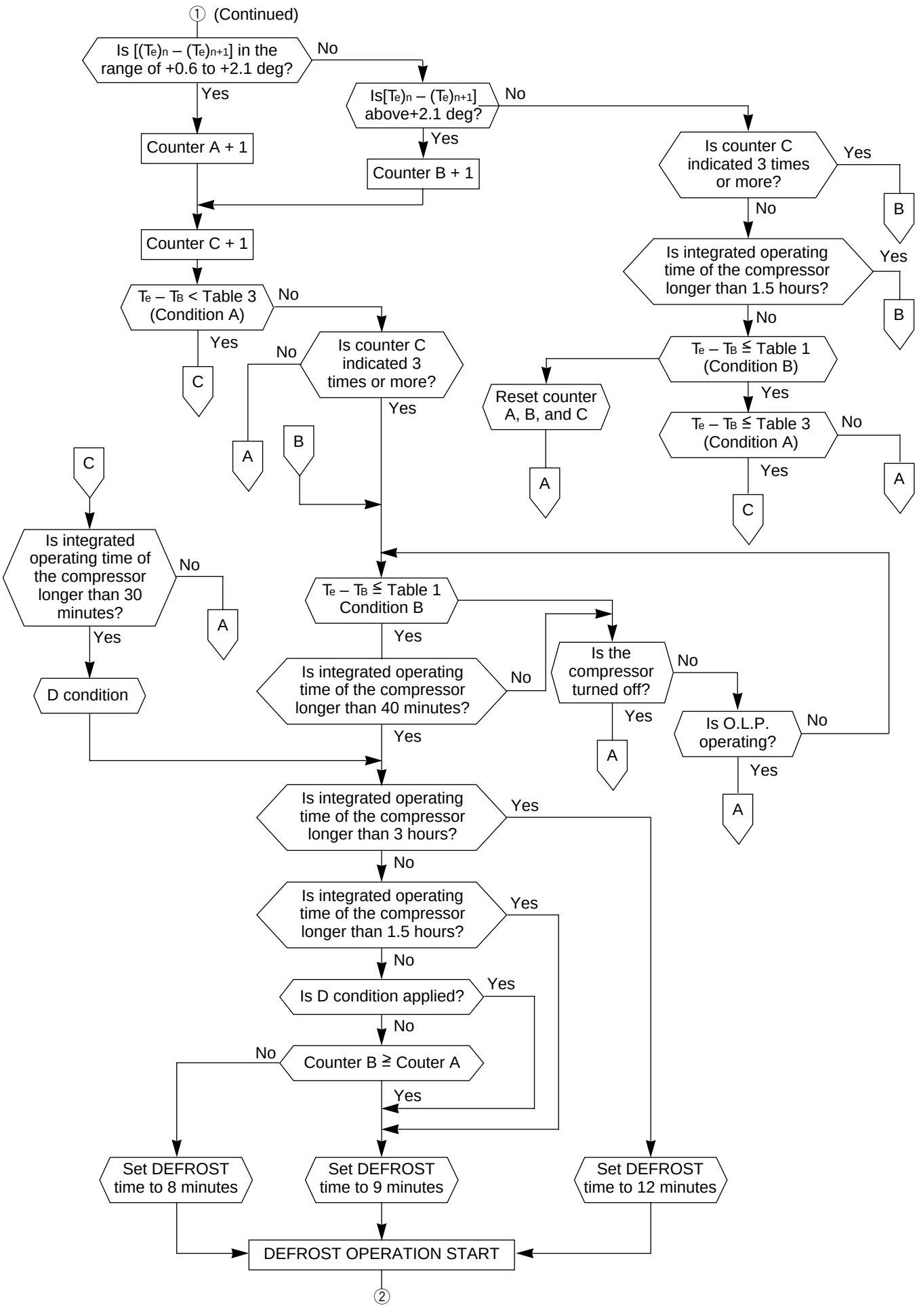
REVERSE CYCLE (HEAT & COOL MODEL) ONLY

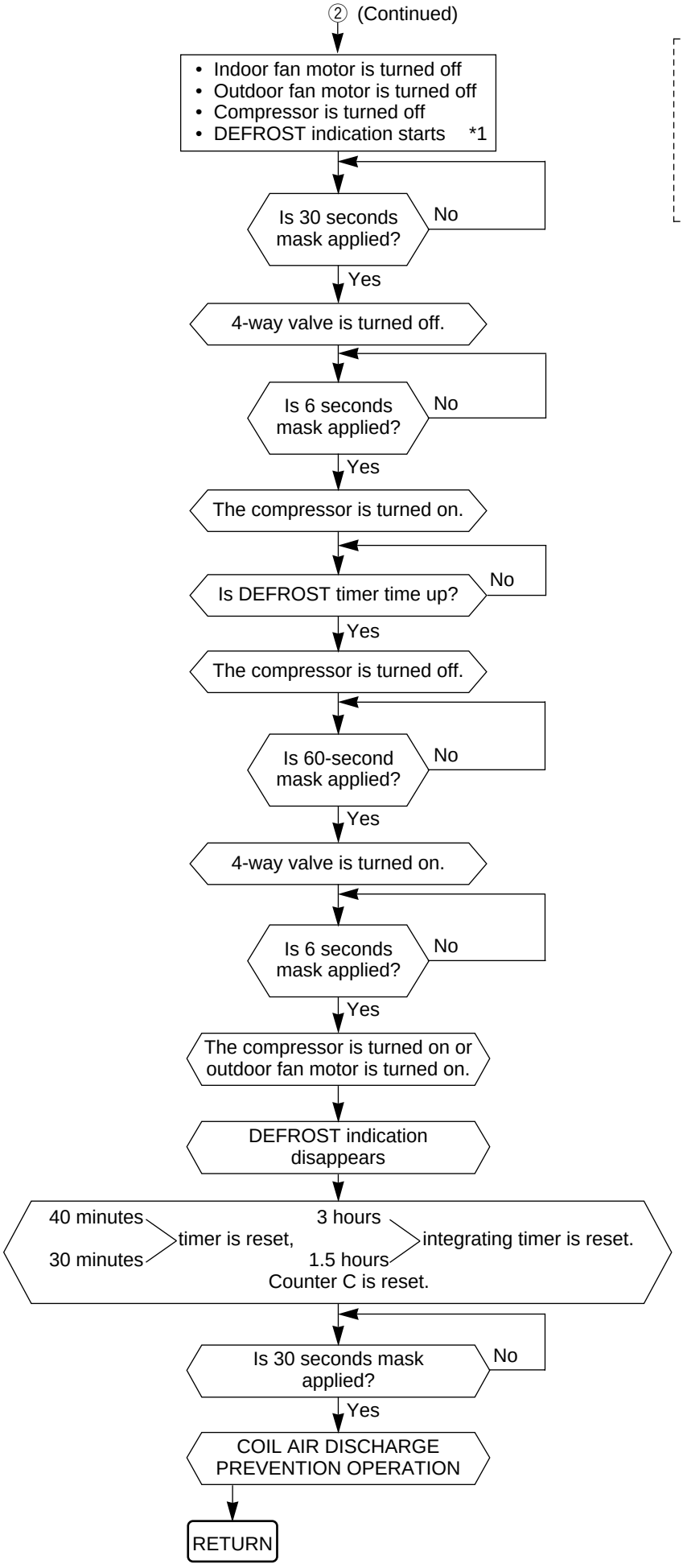
MEANING OF SYMBOLS

O.L.P. : OVERLOAD PROTECTOR
T_e : INDOOR PIPE TEMPERATURE
T_B : INDOOR ROOM TEMPERATURE



INDOOR FAN MODE	Temperature difference [T_e – T_B] (deg.) Table 1 (Condition B)	Table 2 (Condition C)	Table 3 (Condition A)
Med, Hi	19	16	16
Low, Quiet	23		20


① (Continued)
Is [(Te)n – (Te)n+1] in the range of +0.6 to +2.1 deg?
No
Yes
Is[Te)n – (Te)n+1] above+2.1 deg?
No
Yes
Counter A + 1
Counter B + 1
Counter C + 1
Te – TB < Table 3 (Condition A)
No
Yes
C
No
Is counter C indicated 3 times or more?
A
B
Yes
Is counter C indicated 3 times or more?
Yes
No
B
Is integrated operating time of the compressor longer than 1.5 hours?
Yes
No
B
Te – TB ≦ Table 1 (Condition B)
Reset counter A, B, and C
A
Yes
Te – TB ≦ Table 3 (Condition A)
No
A
Yes
C
C
Is integrated operating time of the compressor longer than 30 minutes?
No
A
Yes
D condition
Te – TB ≦ Table 1 Condition B
Yes
Is integrated operating time of the compressor longer than 40 minutes?
No
Yes
Is the compressor turned off?
No
Yes
A
Is O.L.P. operating?
No
Yes
A
Is integrated operating time of the compressor longer than 3 hours?
Yes
No
Is integrated operating time of the compressor longer than 1.5 hours?
Yes
No
Is D condition applied?
Yes
No
No
Counter B ≧ Couter A
Yes
Set DEFROST time to 8 minutes
Set DEFROST time to 9 minutes
Set DEFROST time to 12 minutes
DEFROST OPERATION START
②



*1. Indication lamp operation

While the indoor fan motor stops, the operation lamp flashes on and off.

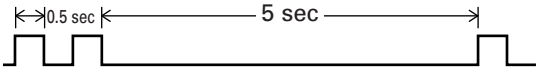
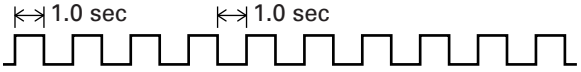
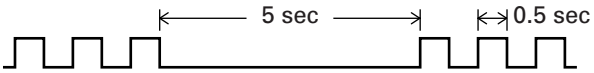
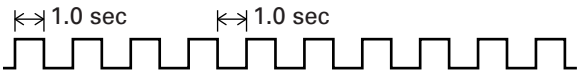
LED ON	1 second
LED OFF	3 seconds

3. TROUBLESHOOTING

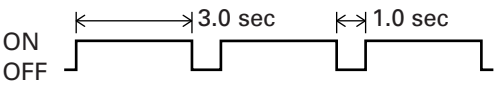
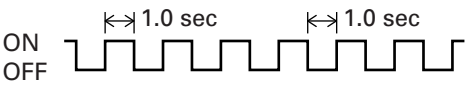
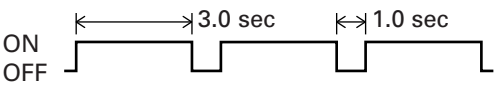
3.1 TROUBLESHOOTING DISPLAY TABLE

1) THERMISTOR ABNORMAL INDICATION

During operation or non-operation, when the room temperature thermistor or heat exchanger thermistor is opened or short-circuited, operation is immediately stopped and failure indication is displayed.

OPERATION FACTOR	INDICATOR LAMP	FLASH / TIME (SEC)
Room thermistor fault (Thermistor open or short-circuited)	Operation lamp (red)	
	Timer lamp (green)	
Heat exchanger (Pipe) thermistor fault (Thermistor open or short-circuited)	Operation lamp (red)	
	Timer lamp (green)	

2) NORMAL OPERATION

OPERATION FACTOR	INDICATOR LAMP	FLASH / TIME (SEC)
① Test operation	Operation lamp (red)	
	Timer lamp (green)	
② Power failure *1 Auto-restart enable (JM1 : Disconnect)	Timer lamp (green)	
*2 Auto-restart disable (JM1 : Connect)	Operation lamp (red)	
	Timer lamp (green)	
③ Defrost operation *3 (Heating operation)	Operation lamp (red)	

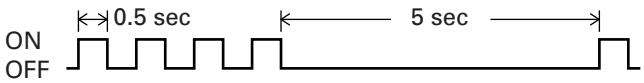
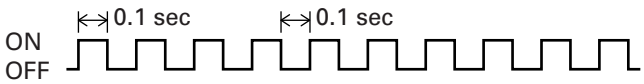
Note: Display lamps light on the front panel of the indoor unit.

*1: The power is failed during timer operation, then the timer lamp flashes on and off when the power returns.

*2: The power is failed during operation, then both lamps flash on and off when the power returns.

*3: While the indoor fan motor stops, the operation lamp flashes on and off.

(OPTIONAL PARTS FOR INDOOR UNIT)

OPERATION FACTOR	INDICATOR LAMP	FLASH / TIME (SEC)
Float switch fault (When the Float switch operates and it does not return within 3 minutes, the indicator lamp flashes on and off.)	Operation lamp (red)	
	Timer lamp (green)	

3.2 WORKING INSPECTION (In cooling operation)

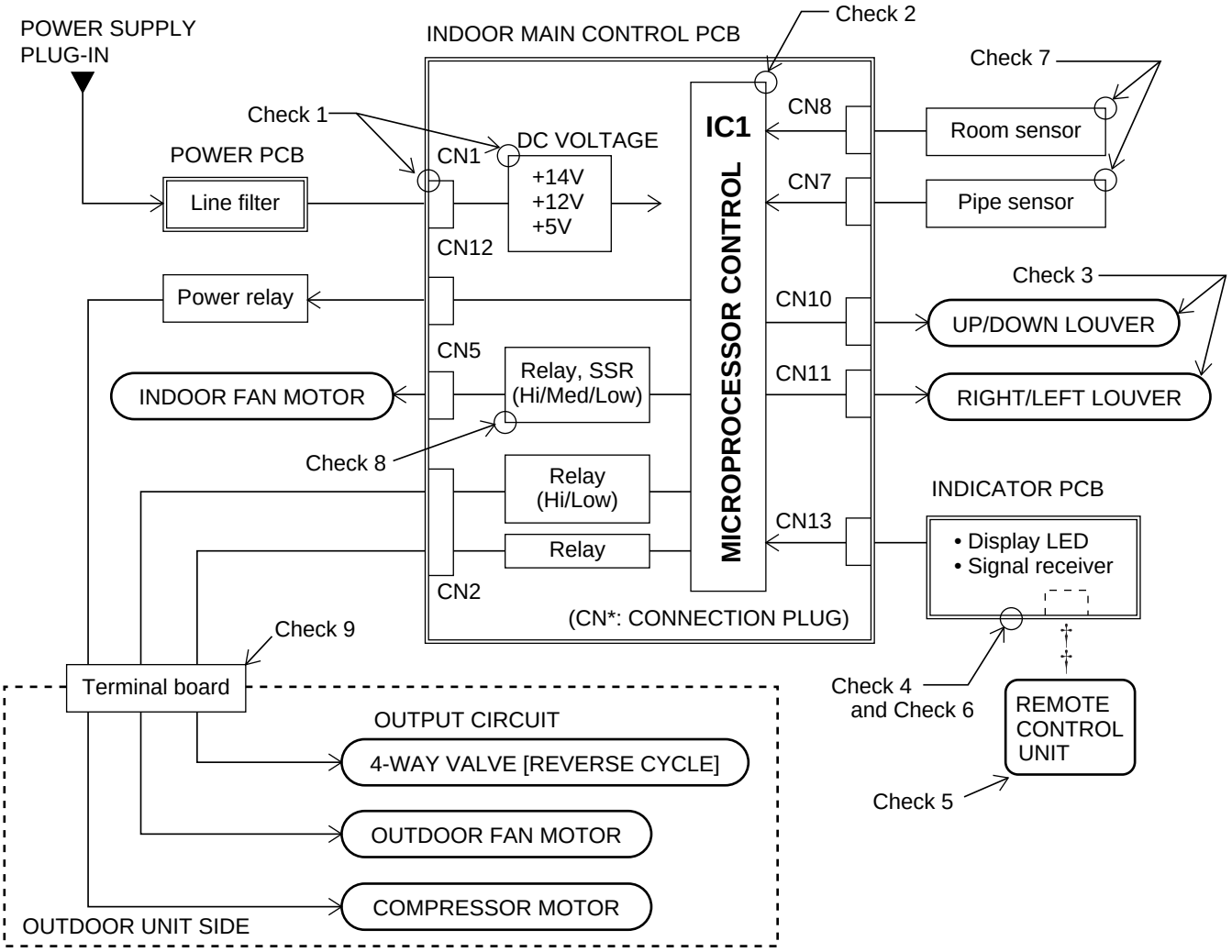
Symptom	Possible causes	Remedy
(1) Indoor unit evaporator is covered with frost. a: Frost near inlet. b: Frost all over.	Gas leakage Clogged filter Low ambient temperature (less than 20°C)	Check the leaking part, and charge gas. Clean the filter. Check the ambient temperature.
(2) Compressor operates, but does not cool.	Dirty condenser	Clean.
(3) Water does not come out of drain hose.	When the compressor operates normally, the gas leaks.	Charge gas and replace the parts.
(4) Compressor return pipe (low pressure) is not cold.	Gas leakage	Charge gas. Replace the parts.
(5) Compressor outlet pipe (high pressure) is not hot.	Gas leakage	Charge gas.
(6) Compressor operates, but does not cool. a: Indoor unit evaporator is cold. b: Outdoor unit condenser is hot, but it does not cool.	Overload operation Dirty condenser	Eliminate overload. Clean.
(7) Indoor unit air outlet temperature is low, but it does not cool.	Clogged filter The cooled air is shortcircuited. Overload operation	Clean. Isolate the problem and correct. Eliminate the overload.

Note: Display lamps light on the front panel of the indoor unit.

3.3 SYMPTOMS AND CHECK ITEMS

Symptom	Possible causes	Check item	Check points
No operation	Power supply circuit section	Check 1 (Check 4) (Check 5)	• Microcomputer input signal • DC output voltage • Switching transformer • Remote control signal receiver unit • Remote control unit
Erroneous operation	Reset section	Check 2	• Reset circuit
Auto louver control faulty	Auto louver control section	Check 3	• Auto louver control circuit
Display faulty	Indicator PC board LED display control section	Check 4	• Display LED • Microcomputer output signal
Remote control input faulty	Remote control unit Signal receiving section	Check 5 Check 6	• Remote control unit • Microcomputer input / output signal
Temperature control faulty	Room temperature thermistor Indoor pipe temperature thermistor A/D converter input section	Check 7	• Room temperature thermistor • Indoor pipe temperature thermistor • Microcomputer input signal
Indoor fan motor control faulty	Indoor fan motor control output section	Check 8 (Check 5)	• Fan motor control circuit • Remote control unit
Indoor unit to outdoor unit control faulty	Output to the indoor unit	Check 9	• Output circuit to the indoor unit

INDOOR CONTROLLER CIRCUIT BLOCK DIAGRAM



3.4 CHECK POINTS

CHECK 1

Symptom . . . . . No operation
Remote control is not received.

<Preliminary checks>

* Is the power cord plugged in?
* Is power present at the plug socked?

(1) Power connection check

* Is power received at main PC board CN1?
* Has the fuse (F101) blown?

(2) Switching regulator circuit check

Q1, D3, T1 faulty and R1 open at the same time.

(3) Power supply circuit check

①14V line

0V . . . . . D6 fault, R8 open
D6, C9 short-circuited

②12V line

0V . . . . . IC2 fault
C10, C11 short-circuited

③5V line

0V . . . . . D7, IC3 fault
C12, C13 and C14 short-circuited

(4) Power interrupt signal faulty

(INTP2 input)

- IC9, Q3 fault
- D8, R9, R10, R11, R12 and R13 open
- C16, C17 and C18 short-circuited

(5) Reset circuit faulty

- IC8, D12 fault
- R55 open
- C44 short-circuited

(6) Microcomputer oscillator faulty

- Is the oscillator waveform (8.38MHz) output at microcomputer pins 49 and 50? If the oscillation waveform is not output, X1 or the microcomputer is faulty.
- Microcomputer IC1 fault

CHECK 2

Symptom . . . . . Erroneous operation (runaway)

<Preliminary check>

* Set the wall outlet to OFF and wait at least 30 seconds. Then, set the wall outlet to ON again. If remote control is received normally, there is no trouble.

(1) Reset circuit faulty

IC8, D12 fault R55 open C44, C45 short-circuited

CHECK 3

Symptom . . . . . Auto louver control faulty
UP/DOWN step motor or
RIGHT/LEFT step motor does
not operate.

<Preliminary checks>

* Are the connectors CN10, CN11 firmly inserted?
* Is the voltage (DC14V) across CN10-1 (or CN11-1) on the main control PCB normal?
* Is the louver lamp on the indicator PCB lighted?

(1) Auto louver is not turned off.

Auto louver is not turned on.

- Microcomputer IC1 fault
- Driver output IC4 or IC5 fault
- Step motor fault

CHECK 4

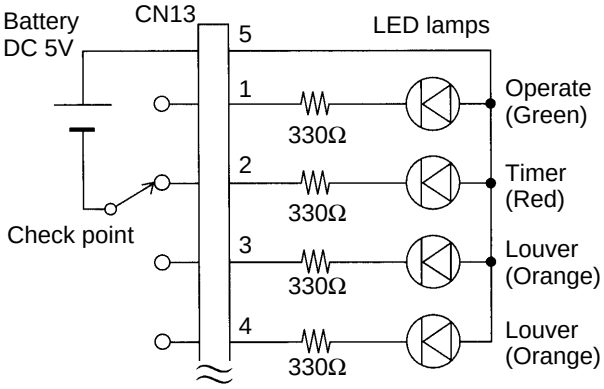
Symptom . . . . . Display faulty

<Preliminary check>

* Is indicator board connectors CN13 inserted firmly?

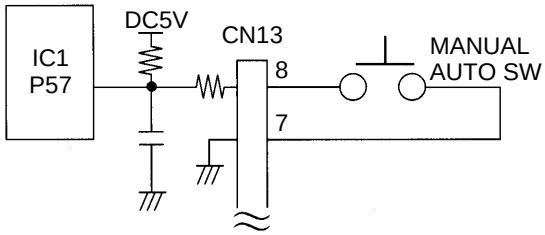
(1) Display LED does not light correctly.

Check lighting of LEDs by using a 5V DC power source as shown below.



(2) LED display control section check
Microcomputer output port connected to LED to display “L (2.5V or less)” level. If not “L” level, the microcomputer is faulty.

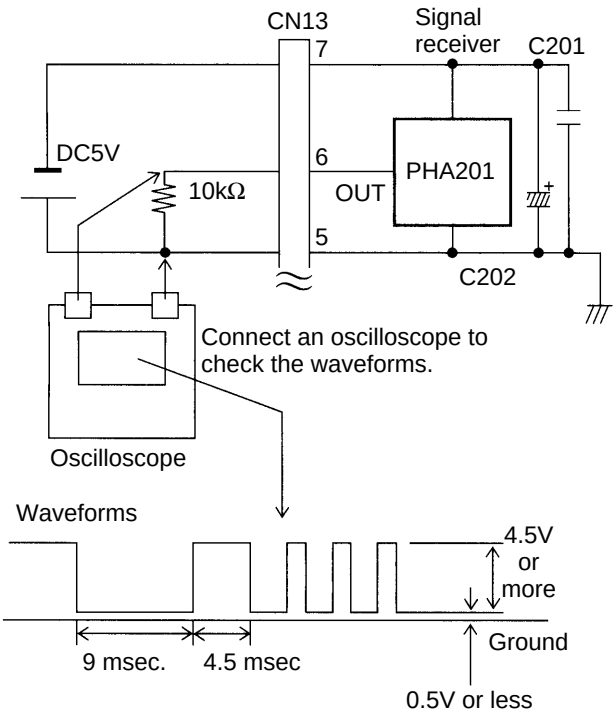
(3) Switch check
Check the switch continuity with a circuit tester as shown below.



[FLOOR/CEILING UNIVERSAL TYPE only]

(4) Signal receiver unit check

Check the output of signal receiver unit with a 5V DC power source and a 10kΩ resistor as shown below.



4.5V or more . . . . . When no infrared signal inputted.
0.5V or less . . . . . When infrared signal inputted.

CHECK 5

Symptom . . . . . Remote control input faulty

<Preliminary checks>

* If the air conditioner operates when the remote control battery is changed, there are no problem. (The battery has a life of six months to one year.)
* When the signal receiving part of the indoor unit is exposed to direct sunlight, the remote control signal may not be received.
* When the infrared signal between the remote control unit and receiver is blocked, the remote control does not work.

(1) Remote control check

If the signal tone is heard when a transistor radio is turned to an unused frequency in the medium wave band and the remote control button is pressed within 5 cm of the radio, the remote control unit is normal.

(2) When the remote control unit is normal, is CN13 disconnected?

The receiver at the air conditioner indicator board is faulty or the main PC board is faulty.

CHECK 6

Symptom . . . . . Remote control signal faulty

<Preliminary checks>

* Does the remote controller operate normally? (Is signal emitted?)
* Does the signal receiver unit (Indicator board) operate normally?

(Refer to CHECK 4.)

(1) Remote control signal input circuit faulty

- C202 open
- C201, C202 short-circuited

CHECK 7

Symptom . . . . . Room temperature cannot be controlled.

<Preliminary checks>

* Is the MODE switch in the TEST position? (within remote controller)
* Are the room temperature thermistor and pipe temperature thermistor connectors (CN7 and CN8) inserted firmly?
* Is the set temperature correct?

(1) Thermistor faulty

The room temperature thermistor resistance and pipe temperature thermistor resistance values are shown on page 24.

When there is a large error, the thermistor is faulty.

(2) A/D input circuit faulty

- Room temperature thermistor circuit
  R43 open or short-circuited, R44 open, C32, C33 and C34 shortcircuited.
- Pipe temperature thermistor circuit
  R45 open or short-circuited, R46 open, C35, C36 and C37 shortcircuited.

If all of the above are normal, advance to Check 9.

CHECK 8

Symptom . . . . . Indoor fan does not run.

<Preliminary checks>

* At dehumidification operation, the indoor fan is stopped while the compressor is stopped.
* Turn the fan one or two times by hand.

If the fan does not turn easily, the fan motor is faulty.

(1) Fan motor faulty

Fan motor winding open (Check between all windings)

(2) Fan motor capacitor faulty

(3) Relay drive circuit faulty
IC5, IC6 faulty, SSR1, K1 and K3 relays faulty

Microcomputer output signal check

Check at the fan speed stated below.

Hi : P30 (Pin9) . . . . . Hi (5V)

Med : P30 (Pin 19), P42 (Pin20) . . . . . Hi (5V)

Low : P30 (Pin19), P42 (Pin20), P40 (Pin18) . . . . . Hi (5V)

CHECK 9

Symptom . . . . . Indoor unit to outdoor unit control faulty

<Preliminary check>

* Check if the terminal wire is normal.

[COOLING MODEL only]

* Compressor and outdoor fan motor do not operate or stop.
* Is the 14VDC applied to the power relay coil?
  - Microcomputer IC1 faulty [P47 (Pin25) output signal check]
  - Drive IC6 faulty
  - D9 short-circuited
  - Power relay faulty

[REVERSE CYCLE]

(1) Compressor does not operate or does not stop.

- 14VDC is not output between signal wire connector pins 1-3 of CN12
- Microcomputer IC1 faulty [P47 (Pin25) output signal]
- Drive IC6 faulty
- Power relay faulty

(2) 4-Way valve is not operated.

- AC voltage is not output between signal wire connector pin 2-1 of CN12.
- Microcomputer faulty [P46 (Pin24) output faulty]
  Drive IC6 faulty
  K7 relay faulty

(3) Outdoor fan does not rotate.

- AC voltage is not output between signal wire connector pin 2-2 or 2-3 of CN12.
- Microcomputer faulty [P44 (Pin22) or P45 (Pin23) output faulty)
  Drive IC6 fault
  K5 or K6 relay fault

Thermistor resistance values

1) Room temperature thermistor

Room temperature (°C)	3	5	8	10	15	20	25	29	31	33	36	40	44
Resistance value (kΩ)	28.7	25.9	22.3	20.1	15.8	12.5	10.0	8.4	7.7	7.0	6.2	5.3	4.5

2) Indoor unit pipe temperature thermistor

Room temperature (°C)	0	2	6	10	14	18	22	26
Resistance value (kΩ)	176.0	157.8	127.3	103.3	84.4	69.3	57.2	47.5

Room temperature (°C)	30	34	38	44	50	56	60
Resistance value (kΩ)	39.6	33.2	27.9	21.7	17.0	13.5	11.6

3.5 OUTDOOR UNIT CHECK POINTS [Ceiling large type only]

(1) Primary circuit of the power supply

Is there 220/240V between terminals 2 and 3 on the terminal board?

- No → The power is not supplied to the unit or wiring is wrong.
- Yes ↓

Is 220/240V applied to both ends of the varistor (VA1)?

- Yes
- No → The fuse has blown.

* Remove the connector from the power transformer to measure the resistance across the primary side of the transformer.

Is the resistance value infinite (∞)?

- Yes
- No → The power primary circuit is working normally.

The voltage selector socket has been removed or the thermal fuse has blown.

(2) Secondary circuit of the power supply

Is there about 20V between the pins 1 and 2 of CN3?

- Yes
- No → The power transformer is faulty.

Is there 12 to 14V at both ends of C5?

- Yes
- No → D1 (D2SB20) faulty.

Is there about 12V at both ends of C7?

- Yes
- No → D2 is disconnected.

Is the 5V output from IC4?

- Yes
- No → IC4 may be faulty.

The voltage at the secondary circuit of the power supply is normal.

(3) Reset circuit

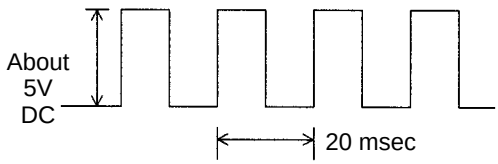
Measure the output voltage of pin 16 of the microcomputer.

If it is 5V, the reset circuit is working normally.
If it is not 5V, reinsert the power plug to measure the output voltage again.

If the voltmeter does not read 5V, C36 or C19 may be short-circuited, or R13 may be disconnected.

(4) Power interrupt circuit failure

Use an oscilloscope to check the output waveform of pin 2 of IC2
If the waveform does not match that shown in the following figure, IC2 may be faulty, R26 disconnected, or C9 short-circuited.

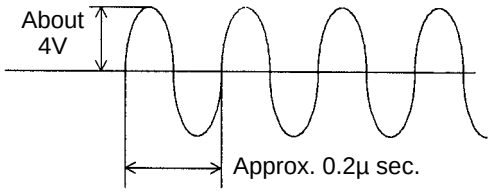


If the output waveform of pin 13 of the microcomputer does not match that shown in the above figure, Q2 may be faulty, R4 may be disconnected, or C10 may be short-circuited.

(5) Ceramic resonator

Use an oscilloscope to check the output waveform between pins 26 and 27 of the microcomputer.

If the waveform does not match that shown in the following figure, the ceramic resonator (X1) is faulty.



(6) Power relay output circuit
(The compressor does not operate)

Is 5V output from pin 37 of the microcomputer when the compressor on condition?

- Yes
- No → The microcomputer IC1 is faulty.

Is there about 12V between pin 10 and 8 of IC6?

- Yes
- No → IC6 is faulty.

Check the power relay, electromagnetic switch and the compressor OCR.

(7) Fan motor output circuit.
(The outdoor unit fan does not rotate)

Is 5V output from pin 39 of the microcomputer when the fan motor on condition?

Yes → Is there about 12V between pins 12 and 8 of IC6?

No → The microcomputer is faulty.

Yes → Check K2, outdoor temperature thermistor, fan motor capacitor, and relay.

No → IC 6 is faulty.

(8) Four-way valve circuit
(The heating does not work)

Is 5V output from pin 38 of the microcomputer when the four-way valve on condition?

Yes → Is there about 12V between pins 11 and 8 of IC6?

No → The microcomputer is faulty.

Yes → Check K1, and solenoid coil for the four-way valve.

No → IC6 is faulty.

(9) The defrost does not work.

If the outdoor heat exchanger temperature thermistor is working normally, microcomputer may be faulty, or C21 may be short-circuited.

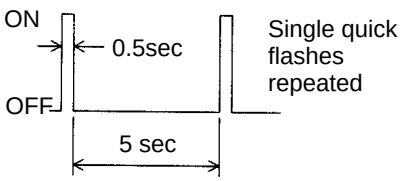
(10) Outdoor unit self diagnosis

The LED lamps operate as follows according to the error contents.
The LED lamps are on the outdoor unit board.

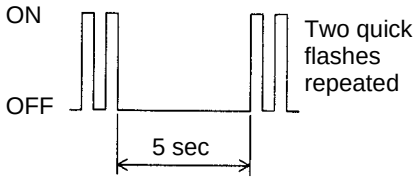
(a) LED1 lamp error display

① Discharge pipe temperature abnormal

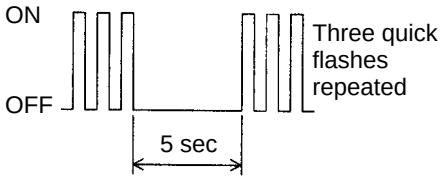
② Outdoor heat exchanger temperature sensor abnormal



③ Outdoor temperature sensor abnormal

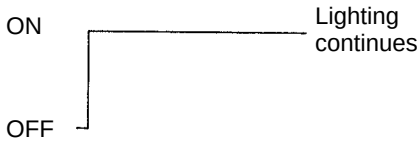


④ Discharge pipe temperature sensor abnormal



(b) LED2 lamp error display

⑤ High pressure abnormal



When the fault is cleared, the LED lamp goes off. However, for discharge pipe temperature abnormal and high pressure abnormal, the LED lamp lights continuously for 24 hours, as long as the power is not turned off.

Note: Thermistor resistance values <Outdoor unit side>

1) Outdoor heat exchanger temperature thermistor

Pipe temperature (°C)	–8	–4	0	5	8	10	15	20	25	29	33	36	40
Resistance value (kΩ)	24.4	19.7	16.0	12.5	10.8	9.8	7.8	6.2	5.0	4.2	3.6	3.2	2.7

2) Discharge pipe temperature thermistor

Pipe temperature (°C)	10	15	20	25	30	35	40	50	60	70	80	90	100
Resistance value (kΩ)	646	503	395	313	250	201	163	109	74.4	52.1	37.2	27.1	20.0

3) Outdoor temperature thermistor

Room temperature (°C)	3	5	8	10	15	20	25	29	31	33	36	40	44
Resistance value (kΩ)	28.7	25.9	22.3	20.1	15.8	12.5	10.0	8.4	7.7	7.0	6.2	5.3	4.5

4. INSTALLATION MANUAL

4.1 CEILING LARGE AB-SERIES TYPE

SPLIT TYPE AIR CONDITIONER

For authorized service personnel only.

⚠ WARNING	
(1)	For the air conditioner operating satisfactorily, install it as outlined in this installation manual.
(2)	Installation work must be performed in accordance with national wiring standards by authorized personnel only.
(3)	Do not turn on the power until all installation work is complete.

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.

SELECTING THE INSTALLING POSITION

⚠ WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

⚠ CAUTION

(1) Do not install where there is the danger of combustible gas leakage.

(2) Do not install near heat sources.

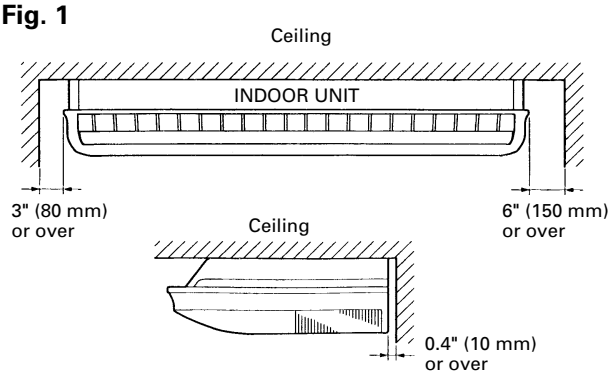
(3) If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

Decide the installing position with the customer as follows:

1. INDOOR UNIT

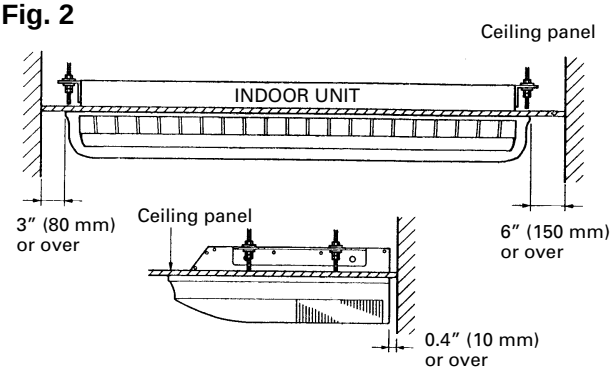
(1) Install the indoor unit level on a strong wall and ceiling which is not subject to vibration.
(2) The inlet and outlet ports should not be obstructed : the air should be able to blow all over the room.
(3) Do not install the unit where it will be exposed to direct sunlight.
(4) Install the unit where connection to the outdoor unit is easy.
(5) Install the unit where the drain pipe can be easily installed.
(6) Take servicing, etc. into consideration and leave the spaces shown in (Fig. 1 or 2). Also install the unit where the filter can be removed.

Fig. 1



[FOR HALF CONCEALED INSTALLATION]

Fig. 2



2. OUTDOOR UNIT

(1) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
(2) Do not install the unit where a strong wind blows or where it is very dusty.
(3) Do not install the unit where people pass.
(4) Take your neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise.
(5) Provide the space shown in (Fig. 3) so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

Fig. 3

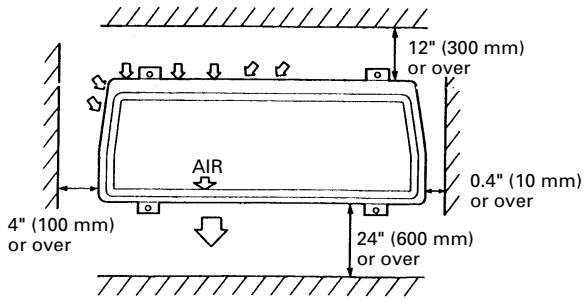
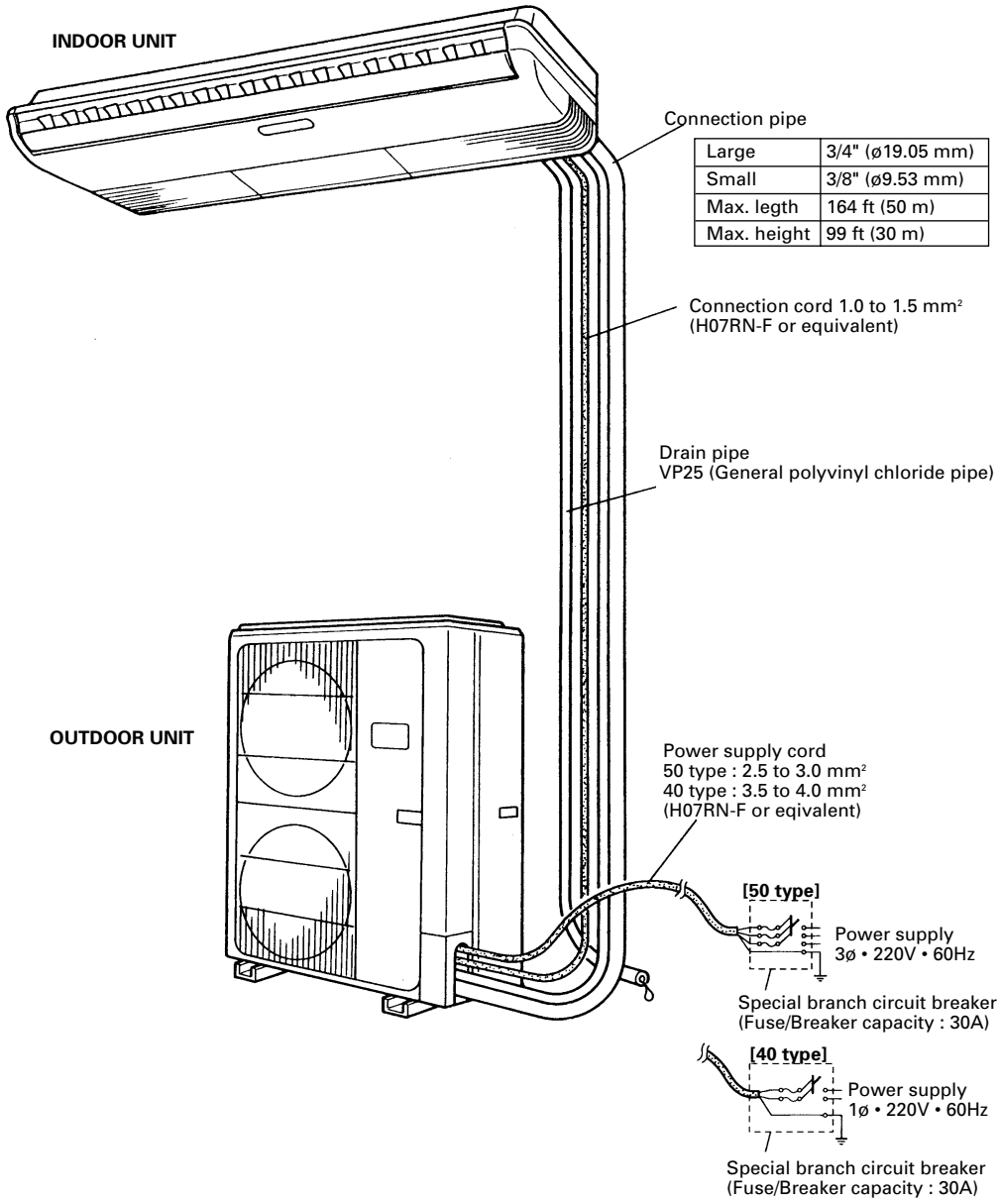


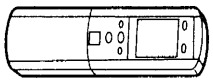
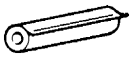
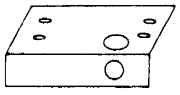
Fig. 4


INDOOR UNIT
Connection pipe
Large 3/4" (ø19.05 mm)
Small 3/8" (ø9.53 mm)
Max. legth 164 ft (50 m)
Max. height 99 ft (30 m)
Connection cord 1.0 to 1.5 mm²
(H07RN-F or equivalent)
Drain pipe
VP25 (General polyvinyl chloride pipe)
OUTDOOR UNIT
Power supply cord
50 type : 2.5 to 3.0 mm²
40 type : 3.5 to 4.0 mm²
(H07RN-F or eqivalent)
[50 type]
Power supply
3ø • 220V • 60Hz
Special branch circuit breaker
(Fuse/Breaker capacity : 30A)
[40 type]
Power supply
1ø • 220V • 60Hz
Special branch circuit breaker
(Fuse/Breaker capacity : 30A)

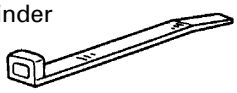
STANDARD PARTS

The following installation parts are furnished.
Use them as required.

INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Remote control unit 	1	Use for air conditioner operation
Battery (penlight) 	4	For remote control unit
Remote control unit holder 	1	For mounting the remote control unit
Tapping screw (ø3 x 12) 	3	For remote control unit holder installation
Drain hose insulation 	1	Adhesive type 70 x 230
VT wire 	1	For fixing the drain hose L 280 mm
Coupler heat insulator (large) 	2	For indoor side pipe joint (large pipe)
Coupler heat insulator (small) 	1	For indoor side pipe joint (small pipe)
Nylon fastener 	Large 4 Small 4	For fixing the coupler heat insulator
Special nut A (large flange) 	4	For installing indoor unit
Special nut B (small flange) 	4	For installing indoor unit
Installation template 	1	For positioning the indoor unit
Auxiliary pipe assembly 	1	For connecting the piping

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
power cap 	1	For power cord installation
Auxiliary pipe assembly 	4	For connecting the piping
Edge cover 	1	For edge protection
Tapping screw 	3	• For cabinet A and cabinet D mounting (1) • Spare (1)
Binder 	1	For power supply cord binding
Putty 	1	For sealing
Coupler heat insulation 	2	For outdoor side pipe joint

CONNECTION PIPE REQUIREMENT

Table 1

Diameter		Maximum length	Maximum height (between indoor and outdoor)
Small	Large		
3/8″ (9.53 mm)	3/4″ (19.05 mm)	164 ft (50 m)	99 ft (30 m)

- Use 0.7 mm to 1.2 mm thick pipe.
- Use pipe with water-resistant heat insulation.

ELECTRICAL REQUIREMENT

- Electric wire size and fuse capacity:

Table 2

		40 Type	50 Type
Power supply cord (mm^2)	MAX	4.0	3.0
	MIN	3.5	2.5
Connection cord (mm^2)	MAX	1.5	1.5
	MIN	1.0	1.0
Fuse capacity (A)		30	30

- Always use H07RN-F or equivalent as the cord.
- Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)

INSTALLATION PROCEDURE

Install the air conditioner as follows:

1. PREPARING INDOOR UNIT INSTALLATION

1. REMOVE THE INTAKE GRILLE AND SIDE COVER.

(1) Remove the two Air filters. (Fig.5)

(2) Remove the two Intake grills. (Fig.5)

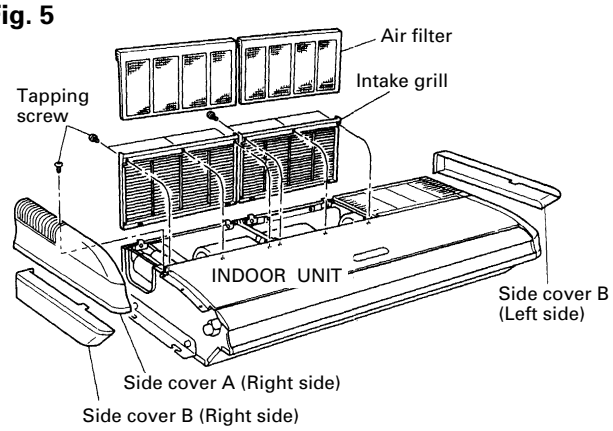
- For ④ Left rear drain and ⑤ Left drain: Remove air filters and intake grilles at three places. (Refer to "2. INDOOR UNIT INSTALLATION".)

(3) Remove the Side cover A (Right side) and Side cover B (Right and Left side).

- For ⑤ Left drain : Remove both the Side cover A (Right and Left side). (Refer to "2. INDOOR UNIT INSTALLATION".)

(4) This air conditioner can be set up to intake fresh air. For information about how to install for fresh-air intake, refer to "15. FRESH-AIR INTAKE".

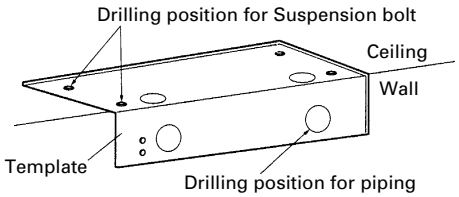
Fig. 5



2. INDOOR UNIT INSTALLATION

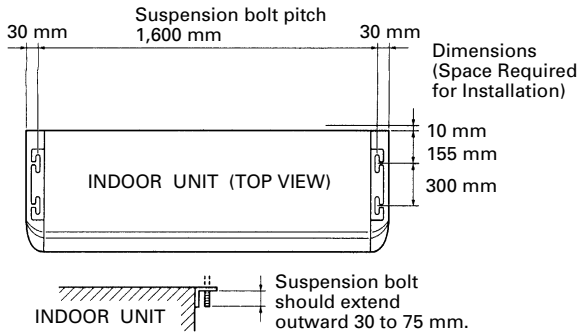
You can use the accessory template to help you install the indoor unit. The template helps you determine the appropriate locations for suspension bolts and pipe openings (drain pipe and connection cord).

Fig. 6



1. LOCATION OF CEILING SUSPENSION BOLTS

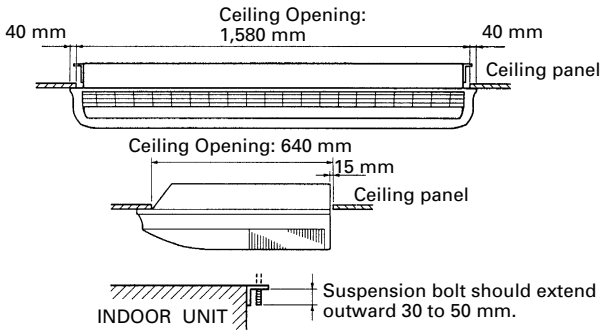
Fig. 7



[For Half-Concealed Installation]

- Suspension-bolt pitch should be as shown in Fig. 7.

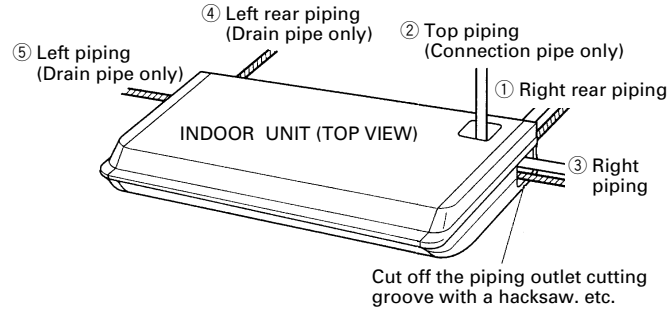
Fig. 8



2. SELECT PIPING DIRECTION

Select connection piping and drain piping directions. (Fig.9)

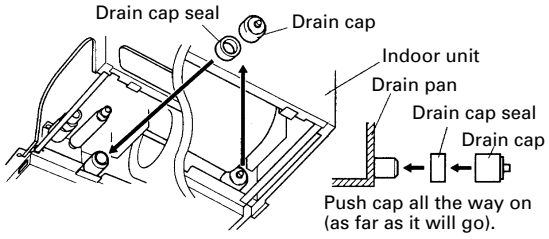
Fig. 9



[For ④ Left rear piping, ⑤ Left piping]

- Transfer the Drain cap and Drain cap seal.

Fig. 10



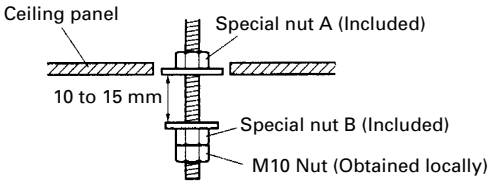
3. DRILLING THE HOLES AND ATTACHING THE SUSPENSION BOLTS

(1) Drill ø25mm holes at the suspension-bolt locations.

(2) Install the bolts, then temporarily attach Special nuts A and B and a normal M10 nut to each bolt. (The two special nuts are provided with the unit. The M10 nut must be obtained locally.) Refer to Fig. 11.

Bolt Strength	980 to 1,470 N (100 to 150 kgf)

Fig. 11



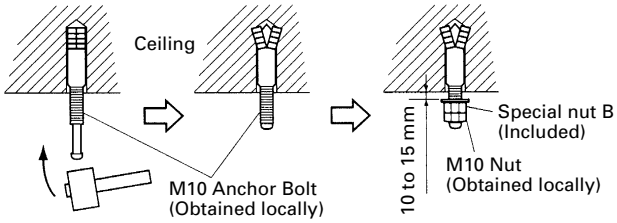
[If using anchor bolts]

(1) Drill holes for anchor bolts at the locations at which you will set the suspension bolts. Note that anchor bolts are M10 bolts (to be obtained locally).

(2) Install the anchor bolts, then temporarily attach special nut "B" (included) and a locally-procured M10 nut to each of the bolts. (See Fig. 12.)

Anchor-Bolt Strength	980 to 1,470 N (100 to 150 kgf)

Fig. 12



4. INSTALLING THE INDOOR UNIT

(1) Lift unit so that suspension bolts pass through the suspension fittings at the sides (four places), and slide the unit back. (See Fig. 14.)

Fig. 13

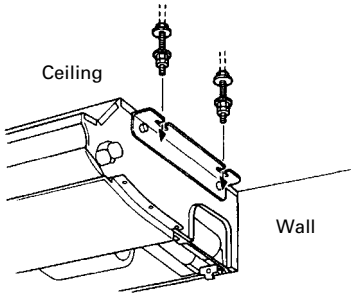
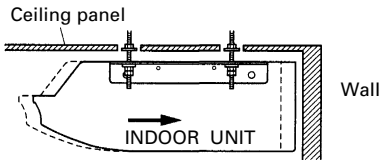


Fig. 14

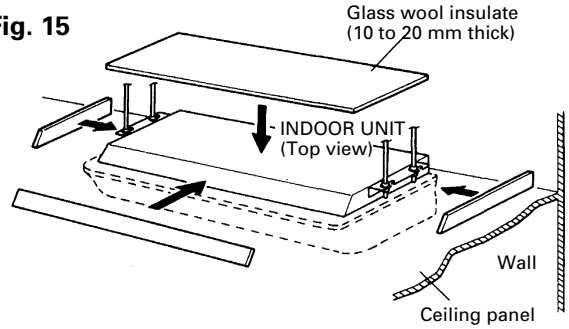


(2) Fasten the indoor unit into place by tightening-up the special "B" bolts and the M10 nuts. Make sure that unit is secure and will not shift back and forth.

[For Half-Concealed Installation]

When installing the indoor unit in a semi-concealed shape, make sure to reinforce the insulation of the unit on all sides. Drops of water may fall from the unit if it is not thoroughly insulated. The insulation should be obtained locally.

Fig. 15



⚠ CAUTION

In order to check the drainage, be sure to check a level during installation of the indoor unit. If the installation site of the indoor unit is not level, water leakage may occur.

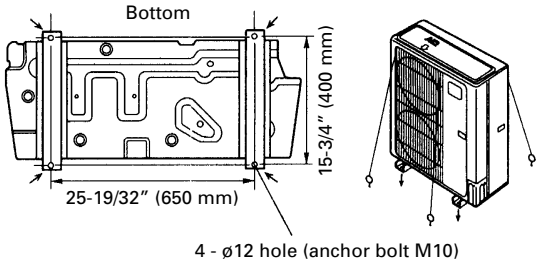
Right side drain piping	horizontal or to the lower right and lower back
Left side drain piping	horizontal or to the lower left and lower back

3. OUTDOOR UNIT INSTALLATION

1. OUTDOOR UNIT PROCESSING

When the outdoor unit will be exposed to strong wind, fasten it with bolts or wire at the four places indicated by the arrows. (Fig. 16)

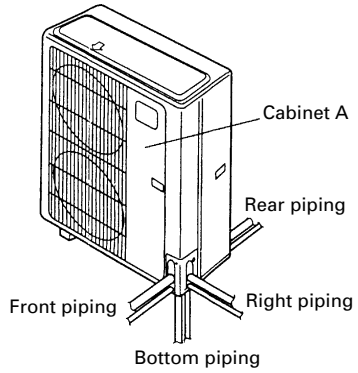
Fig. 16



2. OUTDOOR UNIT CONNECTION CORD AND PIPE CONNECTION PREPARATION

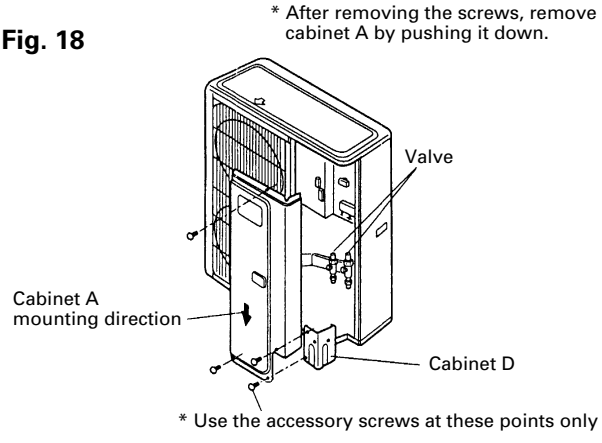
(1) Piping and connection cord mounting direction (4-way mounting possible).

Fig. 17



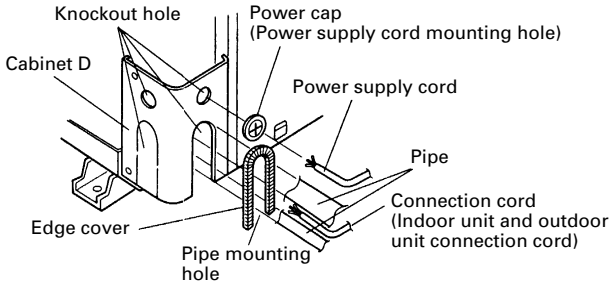
(2) Remove outdoor unit cabinet A and cabinet D.

Fig. 18



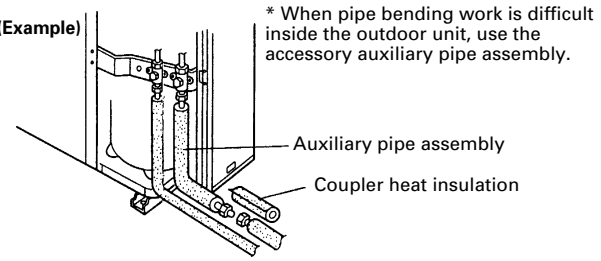
(3) Open the piping and connection knockout holes of the desired direction with nippers, etc. After opening the knockout holes, install the accessory edge cover and power cap to protect the opened places.

Fig. 19



(4) Connect the piping and power supply cord from the mounting holes.

Fig. 20



4. CONNECTING THE PIPING

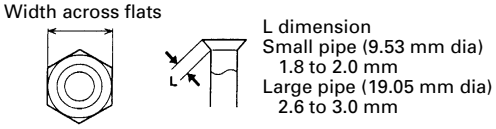
1. FLARE PROCESSING

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.
(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 3) and insert the flare nut onto the pipe, and flare with a flaring tool.
(4) Check if the flared part "L" (Fig. 21) is spread uniformly and that there are no cracks.

Table 3

Pipe	Flare nut
Small pipe	Small (width across flats 22 mm)
Large pipe	Large (width across flats 36 mm)

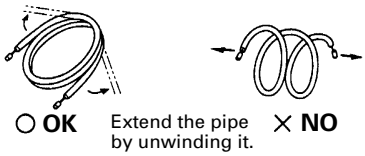
Fig. 21



2. BENDING PIPES

The pipes are shaped by your hands. Be careful not to collapse them.

Fig. 22

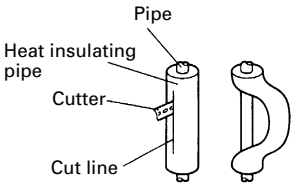


Do not bend the pipes in an angle less than 90°.

When the pipes are bent and stretched repeatedly, the material will be hardened, causing the pipes no longer be sent or stretched. Be sure to limit number of bending and stretchings to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig. 23, and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

Fig. 23

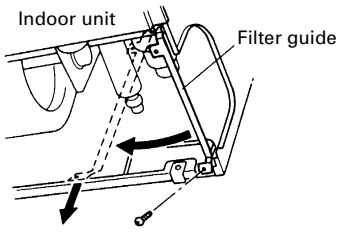


3. CONNECTION PIPES

[Indoor unit side]

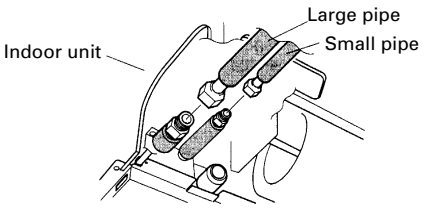
(1) Remove the filter guide. (Fig. 24)

Fig. 24



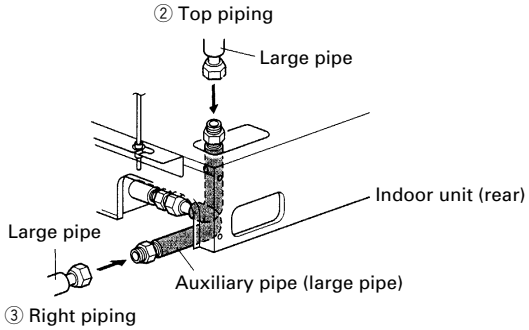
(2) Attach the connection pipe. (Fig. 25)

Fig. 25



- For ② Top piping and ③ Right piping connections, use the Auxiliary pipe (large pipe) provided.

Fig. 26

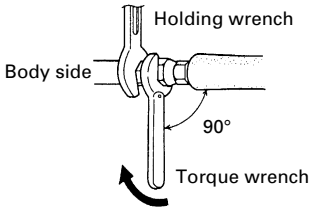


⚠ CAUTION

Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

When the flare nut is tightened properly by your hand, hold the body side coupling with a separate spanner, then tighten with a torque wrench. (Fig. 27)

Fig. 27



⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 27, in order to tighten the flare nut correctly.

Table 4 : Flare nut tightening torque

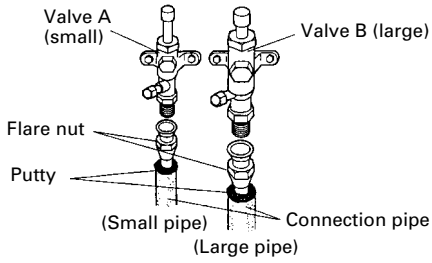
Pipe	Tightening torque
Small pipe	310 to 350 kgf · cm (30.4 to 34.3 N · m)
Large pipe	800 to 1,000 kgf · cm (78.4 to 98 N · m)

[Outdoor unit side]

(1) Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.

(2) Seal with the accessory putty so that water does not enter at the top of the pipe insulation installed to the connection pipe (large pipe and small pipe).

Fig. 28



5. AIR PURGE

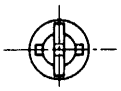
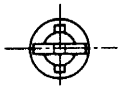
1. AIR PURGE

(1) Purge the air inside the indoor unit and the piping to a pressure of 1.5 mmHg abs or less from the charging valve with a vacuum pump.
(2) After purging the air inside the indoor unit and the piping, remove the cap of the two valves.
(3) Open the handle of the two valves from the closed state. (Table 6)
(4) Tighten the cap of the two valves to the specified torque.

Table 5

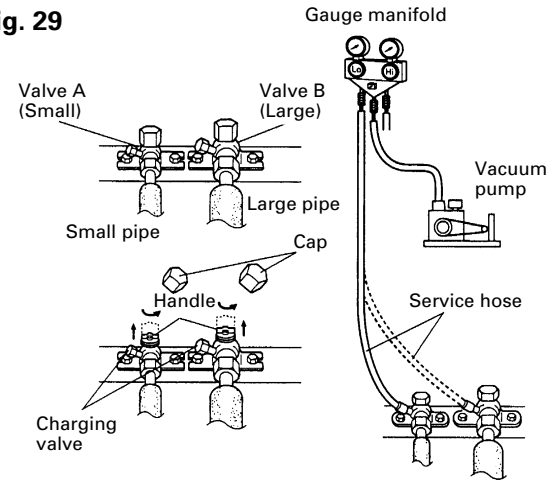
	Tightening torque	
	Large valve	Small valve
Handle	15 kgf·cm (1.47 N·m)	
Cap	150 to 200 kgf·cm (14.7 to 19.6 N·m)	

Table 6

Large valve	Small valve
	

* If the handle is not fully open, performance will drop and an abnormal sound will be generated.

Fig. 29



2. ADDITIONAL CHARGE

Refrigerant suitable for a piping length of 5 m [40 type (Cooling model)] or 20 m for other models is charged in the outdoor unit at the factory.

When the piping is longer than 5 m [40 type (Cooling model)] or 20 m for other models, additional charging is necessary.

For the additional amount, see the table below.

Table 7

Model type \ Pipe length		33 ft (10 m)	66 ft (20m)	99 ft (30m)	132 ft (40m)	164 ft (50m)	oz / ft (g / m)
40 type	Cooling model	4.8 oz (135 g)	14.3 oz (405 g)	23.8 oz (675g)	33.3 oz (945g)	42.9 oz (1215g)	0.95 oz / 3.3 ft (27 g / m)
	Reverse cycle model	None					
50 type	Cooling model			14.1 oz (400 g)	28.2 oz (800 g)	42.3 oz (1200g)	1.41 oz / 3.3 ft (40 g / m)
	Reverse cycle model						

⚠ CAUTION

(1) When charging the refrigerant, always use a measuring cylinder.

(2) Add refrigerant from the charging valve after the completion of the work.

6. GAS LEAKAGE INSPECTION

⚠ CAUTION

After connecting the piping, check the joints for gas leakage with gas leak detector.

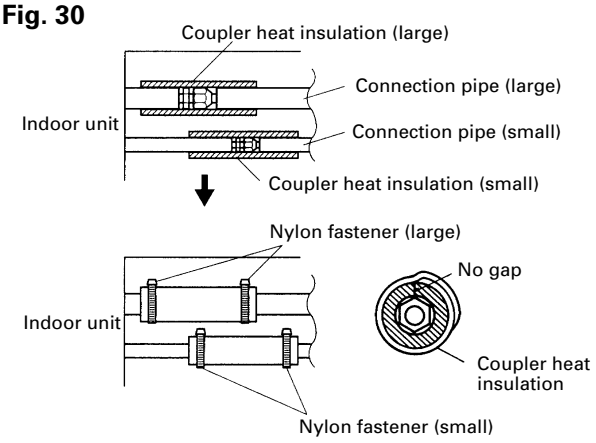
7. INSTALLING THE COUPLER HEAT INSULATION

After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.

After installing the coupler heat insulation, wrap both ends with vinyl tape so that there is no gap.

Secure both ends of the heat insulation material using nylon fasteners.

Fig. 30

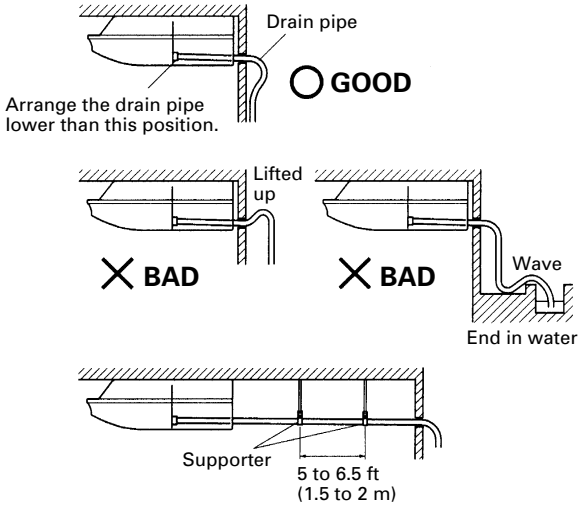


- When using an auxiliary pipe, make sure that the fastener used is insulated in the same way.

8. DRAIN PIPING

- Install the drain pipe with downward gradient (1/50 to 1/100) and there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 38 mm].
- During installation of the drain pipe, be careful to avoid applying pressure to the drain port of the indoor unit.
- When the pipe is long, install supporters. (Fig. 31)
- Do not perform air bleeding.
- Always heat insulate (8 mm or over thick) the indoor side of the drain pipe.

Fig. 31



(1) Install insulation for the drain pipe. (See Figs. 32 and 33.)
Cut the included insulation material to an appropriate size and adhere it to the pipe.

Fig. 32

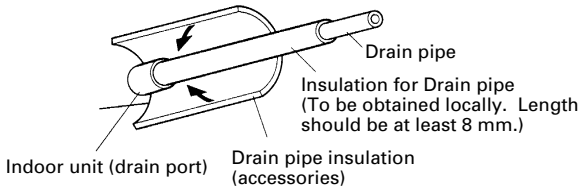
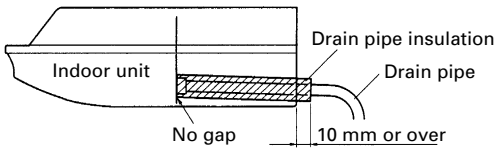
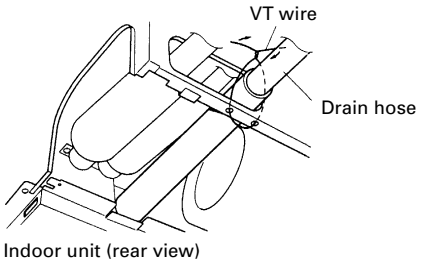


Fig. 33



(2) If " ① Right rear piping ": fasten the drain pipe with VT wire so that the pipe slopes correctly within the indoor unit. (Fig. 34)

Fig. 34



9. ELECTRICAL WIRING

HOW TO CONNECT WIRING TO THE TERMINALS

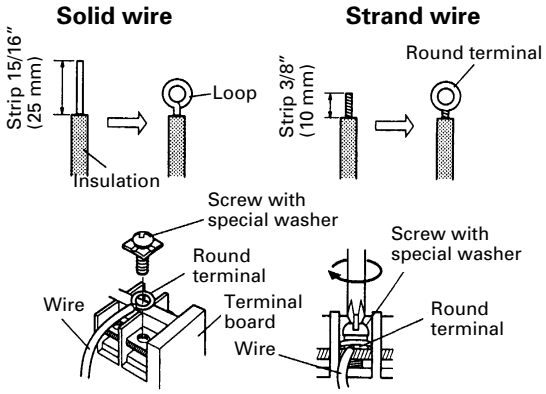
A. For solid core wiring (or F-cable)

(1) Cut the wire with a wire cutter or wire-cutting pliers, then strip the insulation to expose the solid wire about 15/16" (25 mm).
(2) Using a screwdriver, remove the terminal screw (s) on the terminal board.
(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

B. For strand wiring

(1) Cut the wire with a wire cutter or wire-cutting pliers, then strip the insulation to expose the strand wiring about 3/8" (10 mm).
(2) Using a screwdriver, remove the terminal screw (s) on the terminal board.
(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
(4) Position the round terminal wire, and replace and tighten the terminal screw with a screwdriver.

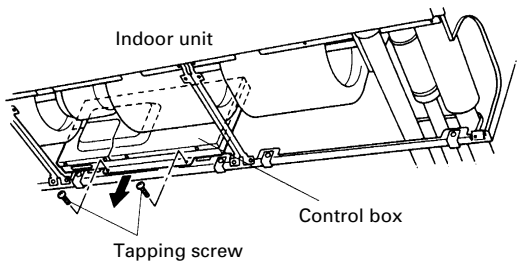
Fig. 35



1. INDOOR UNIT SIDE

(1) Remove the two tapping screws and pull the control box downward. (Fig. 36)

Fig. 36



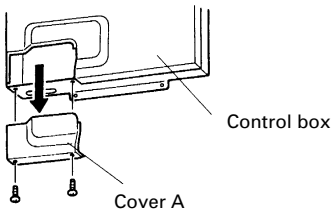
(2) Remove the Cover A and install the Connection cord. (Fig.37)

(3) After wiring is complete, clamp the Connection cord with the Cord clamp. (Fig.38)

(4) Reattach Cover A. Then fasten the control box back into its original position with the two tapping screws.

(5) Attach the connection cord and cable clips. Make sure that they are positioned so that they will not interfere with opening and closing of the intake grille or with removal and installation of the air filters. (Fig. 38)

Fig. 37



⚠WARNING

(1) Before starting work, check that power is not being supplied to the outdoor unit.

(2) Match the terminal board numbers and connection cord colors with those of the outdoor unit.

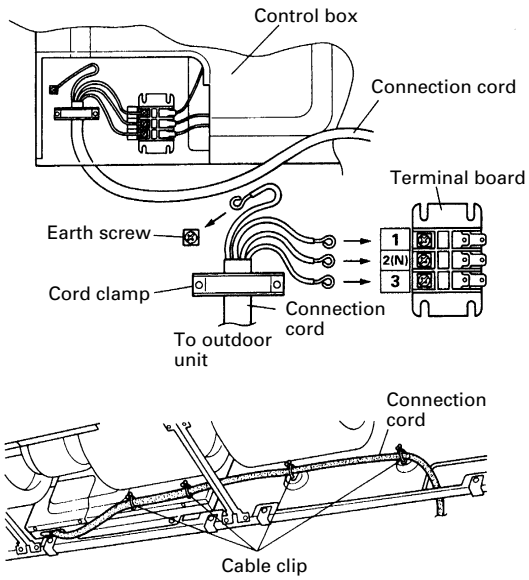
Erroneous wiring may cause burning of the electric parts.

(3) Connect the connection cord firmly to the terminal board. Imperfect installation may cause a fire.

(4) Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)

(5) Always connect the ground wire.

Fig. 38



2. OUTDOOR UNIT SIDE

(1) Remove outdoor unit cabinet A and connect the power supply cord and the outdoor unit connection cord wired at the indoor unit.

(2) Fasten the power supply cord and connection cord with cable clip and binders as shown in (Fig. 40).

⚠WARNING

(1) Before starting work, check that power is not being supplied to the outdoor unit.

(2) Match the terminal board numbers and connection cord colors with those of the outdoor unit.

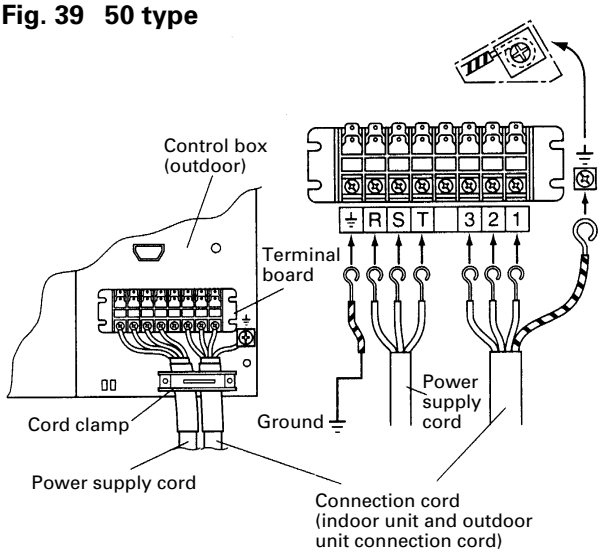
Erroneous wiring may cause burning of the electric parts.

(3) Connect the connection cord firmly to the terminal board. Imperfect installation may cause a fire.

(4) Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)

(5) Always connect the ground wire.

Fig. 39 50 type



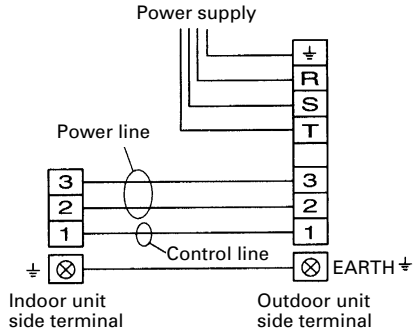
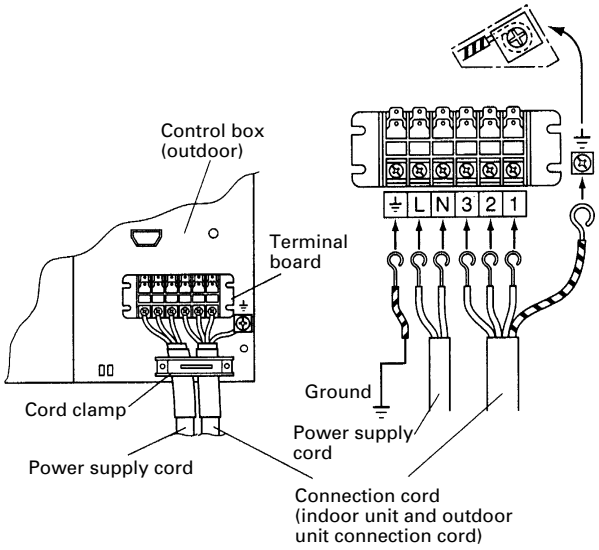


Fig. 40 40 type



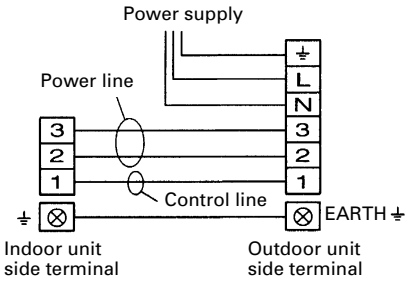
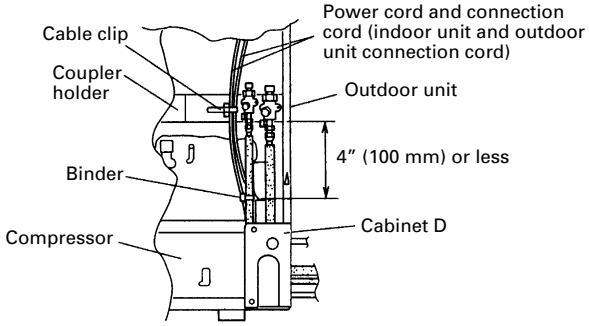


Fig.41



10. POWER

⚠ WARNING

(1) The rated voltage of this product is 3ø 220V 60Hz (50 type) or 1ø 220V 60Hz (40 type).

(2) Before turning on verify that the voltage is within the 198 to 242V range.

(3) Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.

(4) Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Fuse/Breaker capacity : 30A)

(5) The special branch circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.

(6) Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.

(7) Install a leakage special branch circuit breaker in accordance with the related laws and regulations and electric company standards.

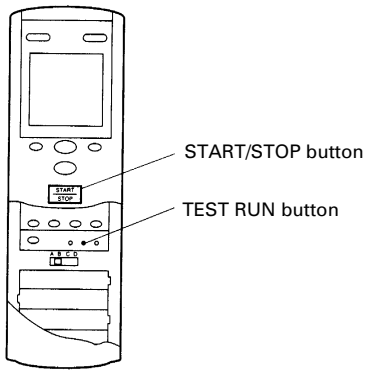
⚠ CAUTION

When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.

11. TEST RUNNING

- Perform test operation and check items 1 and 2 below.
- For the operation method, refer to the operating manual.
- The outdoor unit may not run, depending on the room temperature. In this case, press the TEST RUN button while the air conditioner is running.
  (With the transmit section of the remote control unit facing the body, press the TEST RUN button with the tip of a ball point pen.)

Fig. 42



- To end test operation, press the remote control unit START/STOP button.
  (When the air conditioner is run by pressing the remote control unit TEST RUN button, the OPERATION and TIMER lamps will simultaneously flash slowly.)

1. INDOOR UNIT

(1) Is operation of each button on the remote control unit normal?
(2) Does each lamp light normally?
(3) Do not air flow direction flap and louvers operate normally?
(4) Is the drain normal?

2. OUTDOOR UNIT

(1) Is there any abnormal noise and vibration during operation?
(2) Will noise, wind, or drain water from the unit disturb the neighbors?
(3) Is there any gas leakage?

12. FINISHING

(1) Install the filter guide.
(2) Install the intake grills.
(3) Install side covers A and B (if the unit is installed in a half-concealed shape, only install side cover A). (Fig. 5)
(4) Install the air filters.

13. CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual:

(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow adjustment, and other remote control unit operations.
(2) Air filter removal and cleaning.
(3) Give the operating and installation manuals to the customer.

14. REMOTE CONTROL UNIT INSTALLATION

⚠ CAUTION

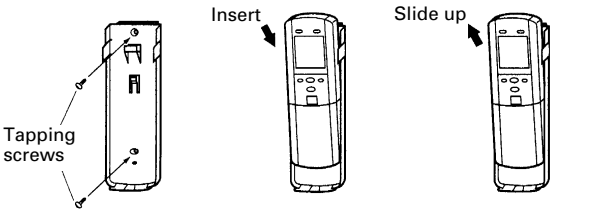
(1) Check that the indoor unit correctly receives the signal from the remote control unit, then install the remote control unit holder.

(2) Select the remote control unit holder selection site by paying careful attention to the following:
Avoid places in direct sunlight.
Select a place that will not be affected by the heat from a stove, etc.

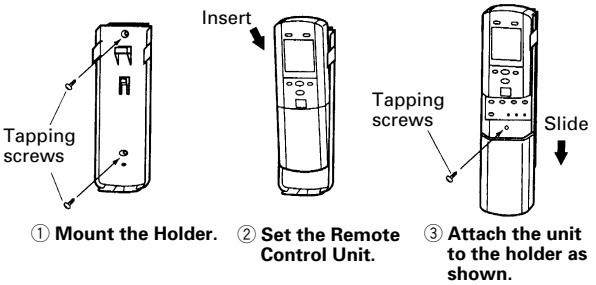
Install the remote control unit holder to a wall or pillar with the tapping screws.

Fig. 43

For use as Handy Type



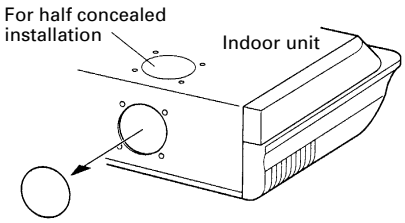
For use as Wall Fixing Type



15. FRESH-AIR INTAKE

(1) Open up the knockout hole for the fresh-air intake, as shown in Fig. 43. (If using half-concealed installation, open up the top knockout hole instead.)

Fig. 44



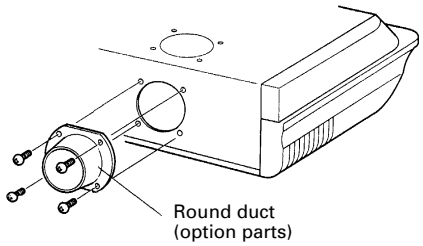
⚠ CAUTION

(1) When removing the cabinet (iron plate), be careful not to damage the indoor unit internal parts and surrounding area (outer case).

(2) When processing the cabinet (iron plate), be careful not to injure yourself with burrs. etc.

(2) Fasten the round flange (optional) to the fresh-air intake, as shown in Fig. 44. (If using half-concealed installation, attach to the top.)

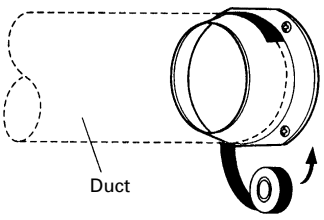
Fig. 45



[After completing "2. INDOOR UNIT INSTALLATION"...]

(3) Connect the duct to the round flange.
(4) Seal with a band and vinyl tape, etc. so that air does not leak from the connection.

Fig. 46



4.2 CASSETTE COMPACT AU-SERIES TYPE

SPLIT TYPE ROOM AIR CONDITIONER

For authorized service personnel only.

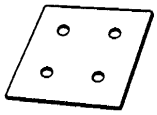
⚠ WARNING	
(1)	For the room air conditioner to operate satisfactorily, install it as outlined in this installation manual.
(2)	Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available from our standard parts. This installation manual describes the correct connections using the installation set available from our standard parts.
(3)	Installation work must be performed in accordance with national wiring standards by authorized personnel only.
(4)	Do not turn on the power until all installation work is complete.

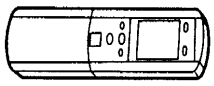
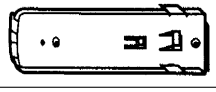
- **Be careful not to scratch the air conditioner when handling it.**
- **After installation, explain correct operation to the customer, using the operating manual.**
- **Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.**
- **The maximum length of the piping is shown in Table 1. If the units are further apart than this, correct operation cannot be guaranteed.**

STANDARD PARTS

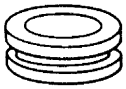
The following installation parts are furnished. Use them as required.

INDOOR UNIT ACCESSORIES

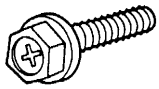
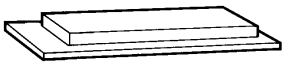
Name and Shape	Q'ty	Application
Coupler heat insulation 	2	For indoor side pipe joint
Special nut A (large flange) 	4	For installing indoor unit
Special nut B (small flange) 	4	For installing indoor unit
Template 	1	For ceiling hole cutting

Name and Shape	Q'ty	Application
Remote control unit 	1	Use for air conditioner operation
Battery (penlight) 	4	For remote control unit
Remote control unit holder 	1	For mounting the remote control unit
Tapping screw (ø3 x 12) 	3	For remote control unit holder installation

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Hexagon wrench 	1	For air purge
Pipe (drain) 	1	For outdoor unit drain piping work (Heat & Cool model only)
Flexible tube 	1	For outdoor unit drain piping work (Heat & Cool model only)
Cap (drain) 	2	For outdoor unit drain piping work (Heat & Cool model only)

GRILLE ACCESSORIES

Name and Shape	Q'ty	Application
Bolt 	4	For mounting grille
Washer 	4	For mounting grille
Spring washer 	4	For mounting grille
Blower cover insulation 	2	For discharged air

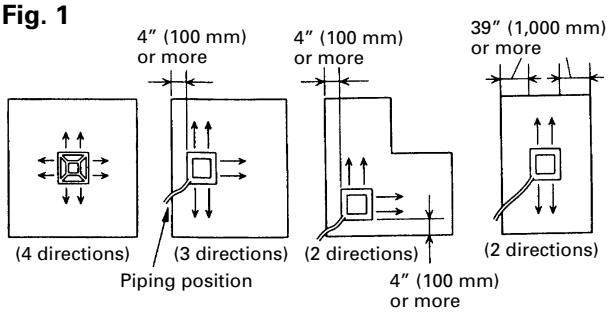
SELECTING THE MOUNTING POSITION

Especially, the installation place is very important for the split type air conditioner because it is very difficult to move from place after the first installation.

Decide the mounting position together with the customer as follows:

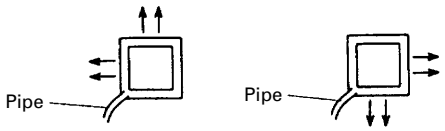
The discharge direction can be selected as shown below.

Fig. 1



⚠ CAUTION

Since 2-way outlet as shown below causes performance problems, do not set it.



INDOOR UNIT

(1) Install the indoor unit on a place having a sufficient strength so that it withstands against the weight of the indoor unit.

(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.

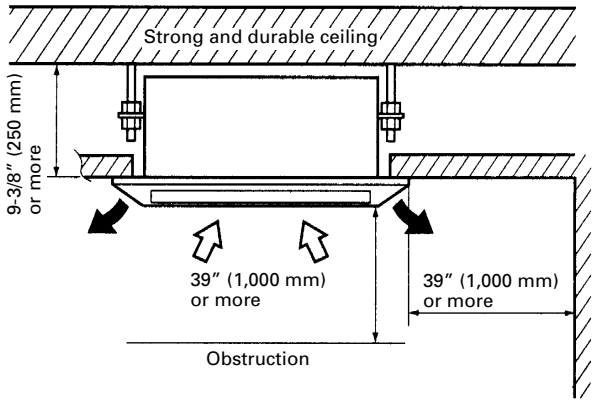
(3) Leave the space required to service the air conditioner. (Fig. 2)

(4) The ceiling rear height is 9-3/8" inches (250 mm) or more.

(5) A place from where the air can be distributed evenly throughout the room by the unit.

(6) A place from where drainage can be extracted outdoors easily.

Fig. 2



OUTDOOR UNIT

⚠ WARNING

(1) Install the unit where it will not be tilted by more than 5°.

(2) When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

(1) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)

(2) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.

(3) Install the unit when connection to the indoor unit is easy.

(4) Do not place animals and plants in the path of the warm air.

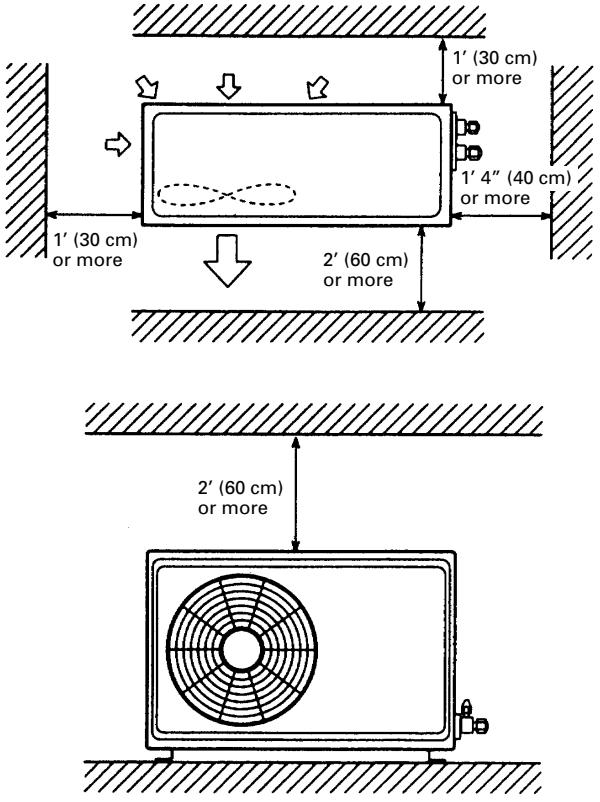
(5) Take the air conditioner weight into account and select a place where noise and vibration are small.

(6) Select a place so that the warm air and noise from the air conditioner do not disturb neighbors.

(7) Provide the space shown in Fig. 3 so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

(8) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. (Reverse cycle model only)

Fig. 3



CONNECTION PIPE REQUIREMENT

Table 1

Diameter		Maximum length	Maximum height (between indoor and outdoor)
Small	Large		
6.35 mm (1/4 in)	12.7 mm (1/2 in)	20 m (66 ft)	8m (26 ft)

- Use 0.7 mm to 1.2 mm thick pipe.
- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 3,040 kPa.

ELECTRICAL PIPE REQUIREMENT

- Electric wire size and fuse capacity;

Table 2

		12,000/14,000 BTU/h class	18,000 BTU/h class
Power cord (mm^2)	MAX	3.0	3.0
	MIN	1.5	2.5
Connection cord (mm^2)	MAX	3.0	3.0
	MIN	1.5	2.5
Fuse capacity (A)		15	20

- Always use H07RN-F or equivalent as the connection cord.
- Install the circuit breaker nearby the units. (Both indoor unit and outdoor unit)

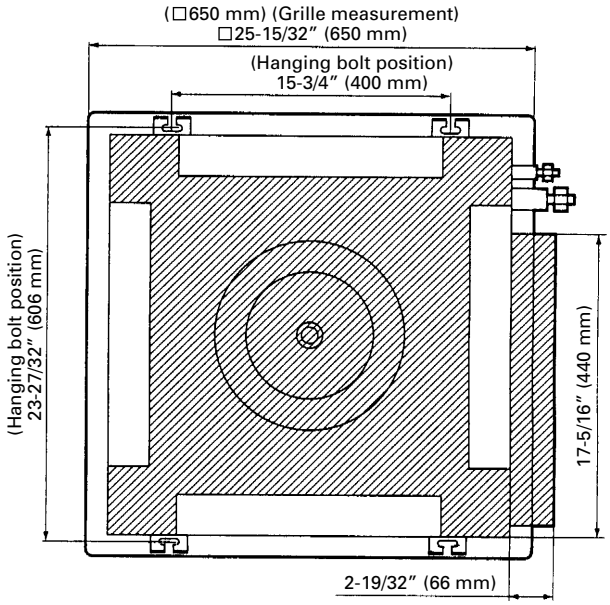
INSTALLATION PROCEDURE

Install the room air conditioner as follows:

1. INDOOR UNIT INSTALLATION

1. Position the ceiling hole and hanging bolts as shown in Fig. 4.

Fig. 4



2. Hanging preparations

Firmly fasten the hanging bolts as shown in Fig.5 or by another method.

Fig. 5

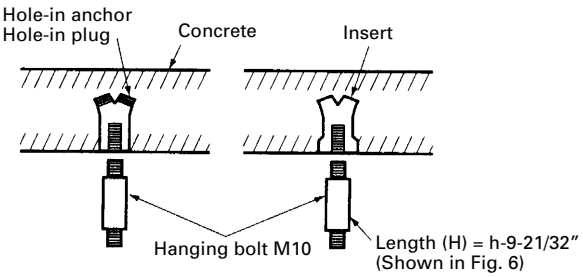
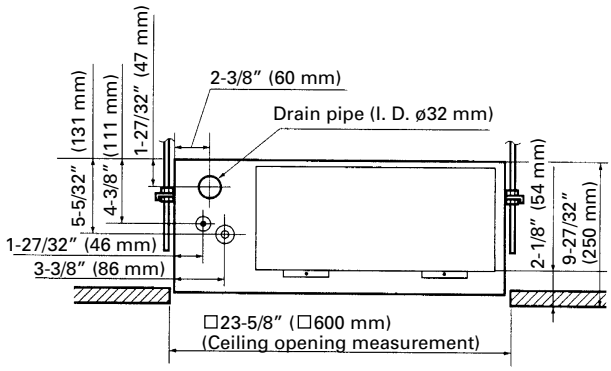


Fig. 6



3. Body installation

(1) Install special nut A, then special nut B onto the hanging bolt. (Fig. 7)
(2) Raise the body and mount its hooks onto the hanging bolt between the special nuts. (Fig. 7)
(3) Turn special nut B to adjust the height of the body. (Fig. 7)
(4) Leveling
Using a level, or vinyl hose filled with water, fine adjust so that the body is level.

⚠ WARNING

Perform final tightening by tightening the double nut firmly.

Fig.7

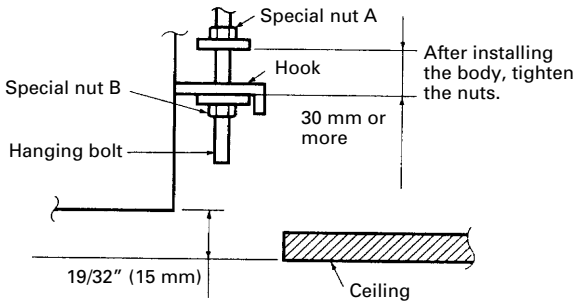
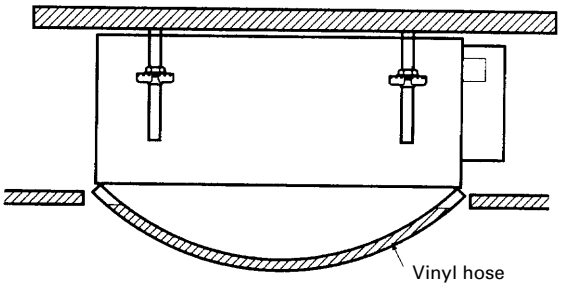


Fig.8



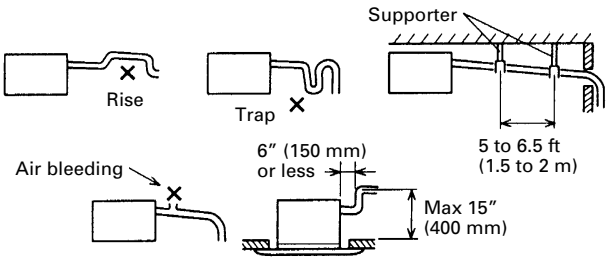
2. INSTALLING DRAIN PIPE

Note: Install the drain pipe.

- Install the drain pipe with downward gradient (1/50 to 1/100) and so there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 1-1/4″ (32 mm)] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the pipe is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain pipe.

- When desiring a high drain pipe height, raise it up to 15" (400 mm) or less from the ceiling within a range of 6" (150 mm) from the body. A rise dimension over this range will cause leakage.

Fig. 9



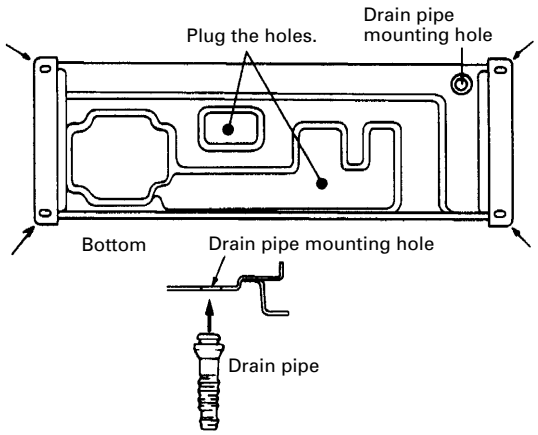
3. OUTDOOR UNIT INSTALLATION

(1) When the outdoor unit will be exposed to strong wind, fasten it with bolts at the places indicated by the arrows. (Fig. 10)

(2) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to an commercial 16 mm hose.

(3) When installing the drain pipe, plug all the holes (● holes at two places) other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Fig. 10)

Fig. 10



NOTE:

Installation in cold regions. Do not use the accessory drain pipe. (If the drain pipe is used, the drain water in the pipe may freeze in extremely cold weather.)

4. CONNECTING THE PIPING

1. Flare processing

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.

(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.

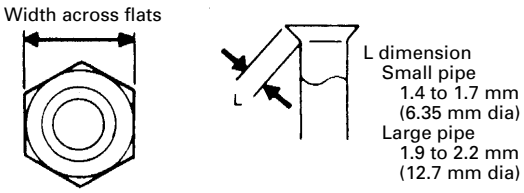
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 3) and insert the flare nut onto the pipe, and flare with a flaring tool.

(4) Check if the flared part "L" (Fig. 11) is spread uniformly and that there are no cracks.

Table 3

Pipe	Flare nut
Small pipe	Small (width across flats 17 mm)
Large pipe	Large (width across flats 24 mm)

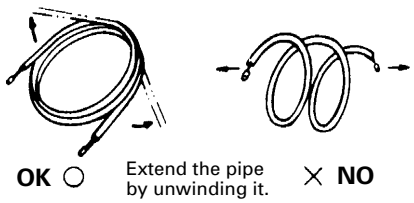
Fig.11



2. Bending pipes

The pipes are snapped by your hands. Be careful not to collapse them.

Fig.12

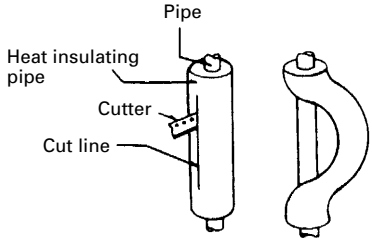


Do not bend the pipes in an angle less than 90°.

When the pipes are bent and stretched repeatedly, the material will be hardened, causing the pipes no longer be bent or stretched. Be sure to limit number of bendings and stretchings to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig. 13, and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

Fig.13



⚠ CAUTION

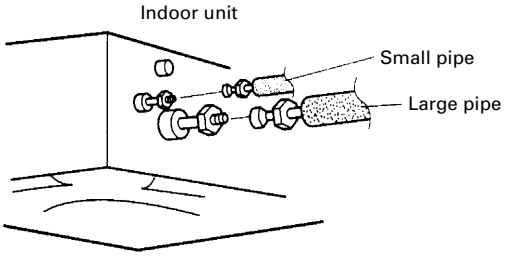
(1) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.

(2) If the pipe is bent repeatedly at the same place, it will break.

3. Connection pipes

(1) Indoor unit side

Fig.14



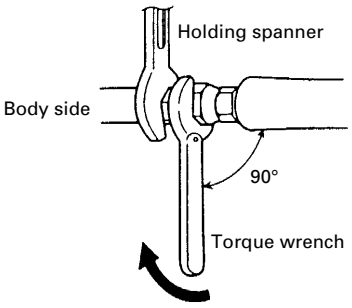
⚠ CAUTION

(1) Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

(2) Do not remove the flare nut from the indoor unit pipe unit immediately before connecting the connection pipe.

When the flare nut is tightened properly by your hand, hold the body side coupling with a separate spanner, then tighten with a torque wrench. (Fig. 15)

Fig.15



⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe as shown in Fig. 15, in order to tighten the flare nut correctly.

Table 4 Flare nut tightening torque

Flare nut	Tightening torque
Small pipe 6.35 mm dia.	14.7 to 19.6 N · m (150 to 200 kgf · cm)
Large pipe 12.7 mm dia.	49.0 to 53.9 N · m (500 to 550 kgf · cm)

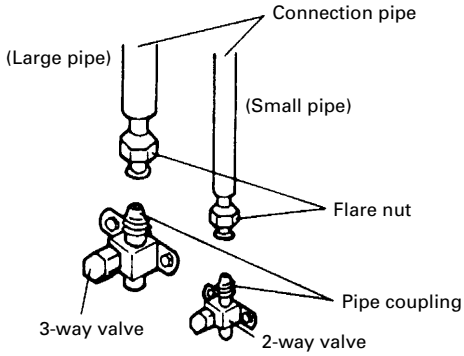
⚠ CAUTION

Be sure to connect the large pipe after connecting the small pipe completely.

(2) Outdoor unit side

Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.

Fig.16



5. AIR PURGE

1. Air purge

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.

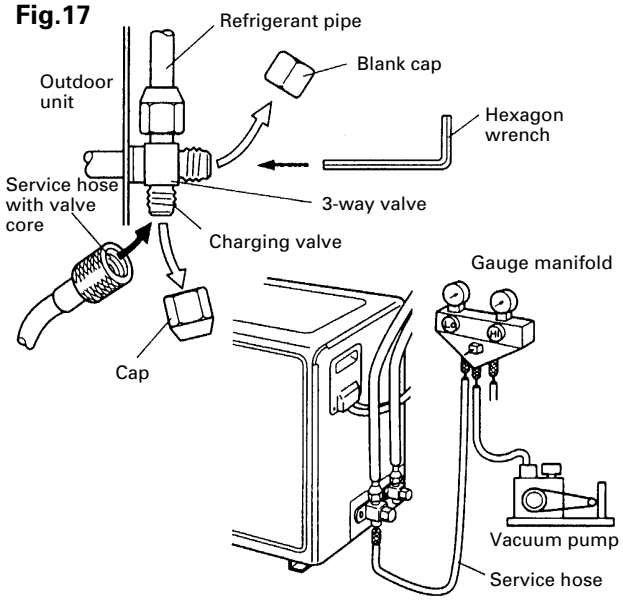
(2) Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 1.5 mmHg.

(3) Disconnect the service hoses and fit the cap to the charging valve (Tightening torque : 70 to 90 kgf · cm).

(4) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque : 2-way valve: 70 to 90 kgf · cm, 3-way valve: 100 to 120 kgf · cm).

(5) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (200 to 250 kgf · cm).

Fig.17



2. Additional charge

Refrigerant suitable for a piping length of 5 m is charged in the outdoor unit at the factory. When the piping is longer than 5 m, additional charging is necessary.

For the additional amount, see the table below.

Table 5

Additional refrigerant \ Pipe length		16 ft (5 m)	23 ft (7m)	33 ft (10m)	49 ft (15m)	66 ft (20m)	oz / ft (g / m)
Cooling model	12,000 BTU/h class 14,000 BTU/h class	None	0.7 oz (20 g)	1.8 oz (50 g)	3.5 oz (100 g)	5.3 oz (150 g)	0.35 oz / 3.3 ft (10 g / m)
	18,000 BTU/h class	None	1.1 oz (30 g)	2.6 oz (75 g)	5.3 oz (150 g)	7.9 oz (225 g)	0.53 oz / 3.3 ft (15 g / m)
Heat & Cool model (Reverse cycle)	12,000 BTU/h class 14,000 BTU/h class	None	1.1 oz (30 g)	2.6 oz (75 g)	5.3 oz (150 g)	7.9 oz (225 g)	0.53 oz / 3.3 ft (15 g / m)
	18,000 BTU/h class	None	2.1 oz (60 g)	5.3 oz (150 g)	10.6 oz (300 g)	15.9 oz (450 g)	1.06 oz / 3.3 ft (30 g / m)

Between 5 m and 20 m, when using a connection pipe other than that in the table, charge additional refrigerant with

Reverse cycle model 0.53 oz (15 g)/3.3 ft (1 m)

Cooling model 0.35 oz (10 g)/3.3 ft (1 m)

as the criteria.

⚠ CAUTION

(1) When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R22) inside the refrigerant cycle.

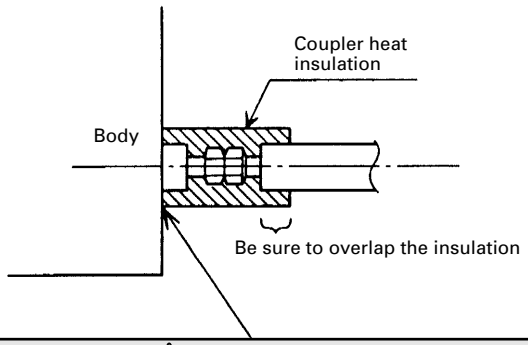
(2) When adding refrigerant, add the refrigerant from the charging valve at the completion of work.

(3) The maximum length of the piping is 20 m. If the units are further apart than this, correct operation can not be guaranteed.

6. INSTALLING THE COUPLER HEAT INSULATION

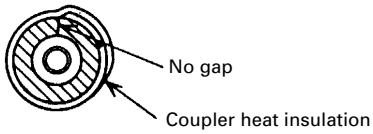
After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.

Fig.18



⚠ CAUTION

Must fit tightly against body without any gap.



7. ELECTRICAL WIRING

HOW TO CONNECT WIRING TO THE TERMINALS

A. For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 15/16" (25 mm) to expose the solid wire.

(2) Using a screwdriver, remove the terminal screw (s) on the terminal board.

(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.

(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

B. For strand wiring

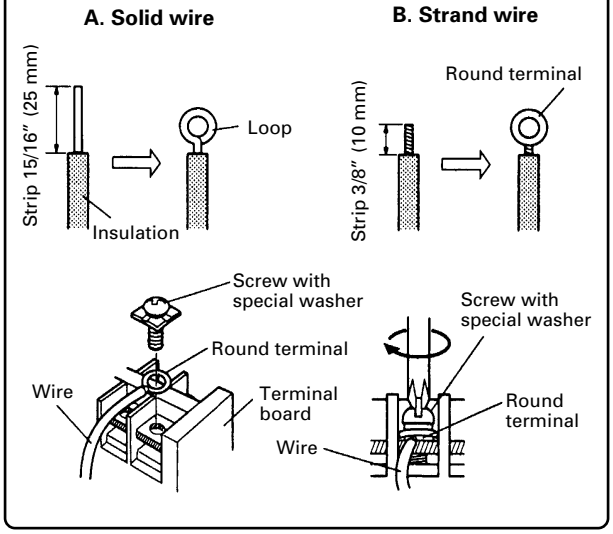
(1) Cut the wire and with a wire cutter or wire-cutting pliers, then strip the insulation to about 3/8" (10 mm) to expose the strand wiring.

(2) Using a screwdriver, remove the terminal screw (s) on the terminal board.

(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.

(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

Fig.19



1. Indoor unit side

(1) Remove the control box cover and install the connection cord. (Fig. 20 and 21)

Fig. 20

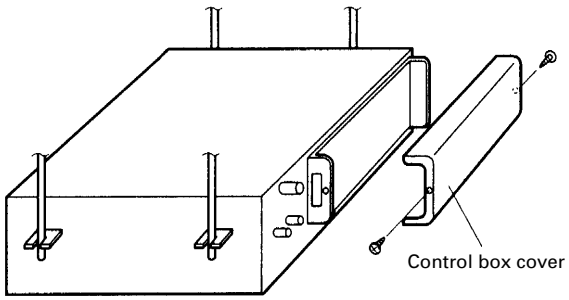
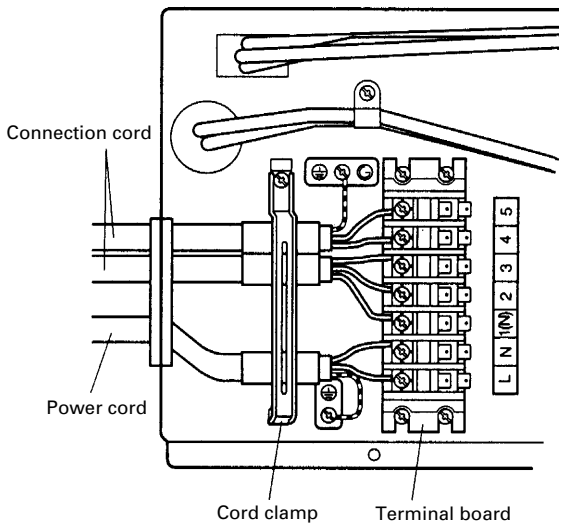
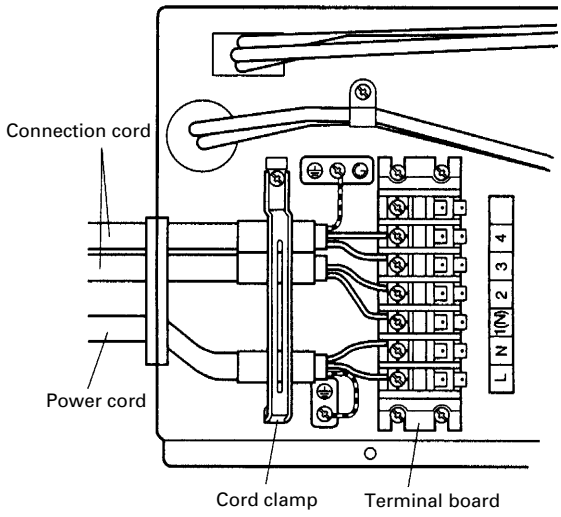


Fig. 21

Heat and cool model (Reverse cycle)



Cooling model



2. Outdoor unit side

(1) Remove the terminal cover of the outdoor unit, and insert the end of the connection cord and the power cord into the terminal board.

(2) Fasten the connection cord with the cord clamps, and install the terminal cover.

Fig. 22

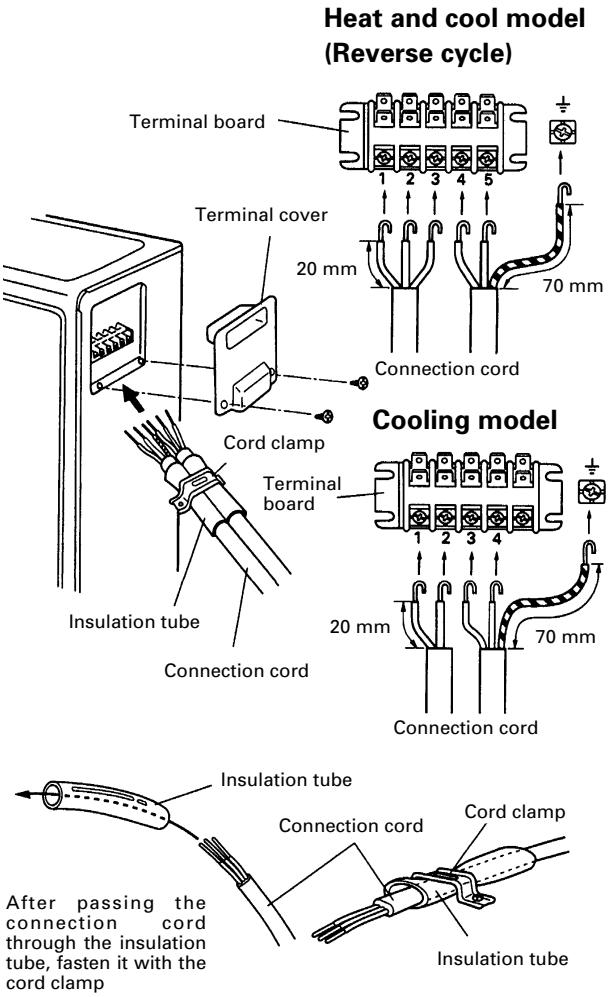
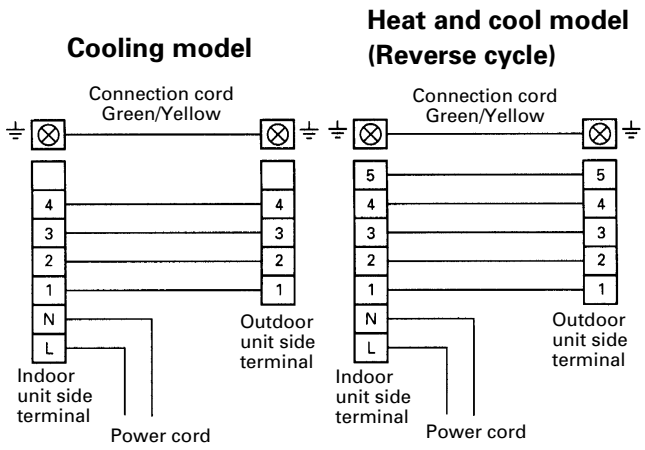


Fig. 23



8. GRILLE INSTALLATION

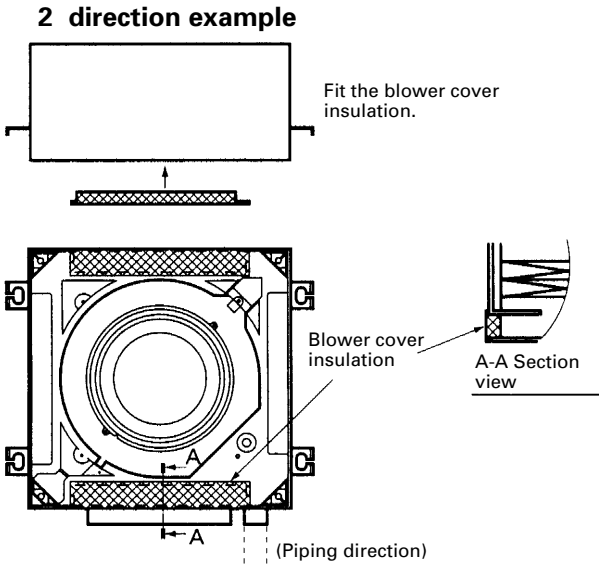
1. Blower cover insulation

Install the blower cover insulation only when the outlet direction is not specified.

Two blower cover insulations are packed with the grille assembly.

Install the blower cover insulation at the diffuser position shown in Fig. 24. At the time, use the piping position as the criteria.

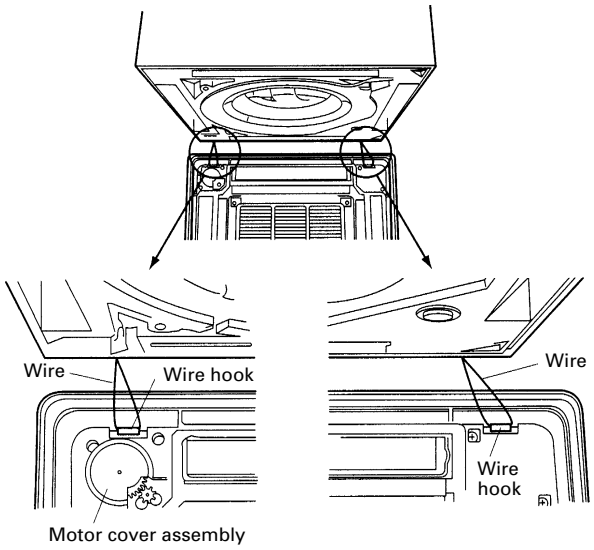
Fig. 24



2. Installing grille assembly to body

Hang the grille assembly on the wires attached to the indoor unit as shown in Fig. 25.

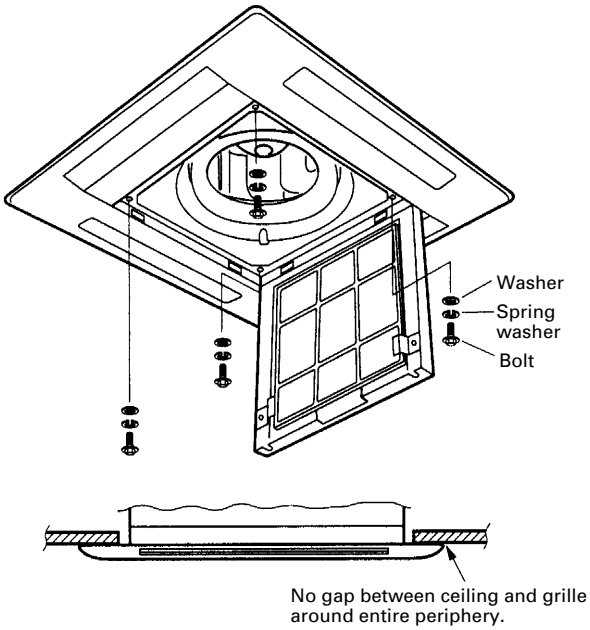
Fig.25



Bolting the grille assembly to the body

Install the grille assembly to the body with the four bolts, spring washers, and washers.

Fig.26



Wireless unit connection wire wiring

Connect the connector in accordance part A detail view.

Then clamp the lead wire with clamp so that it does not touch the rotating parts.

Fig.27

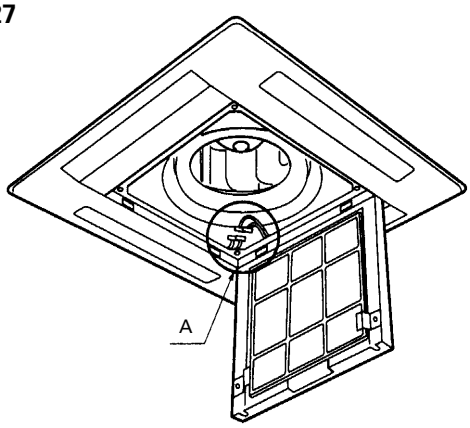
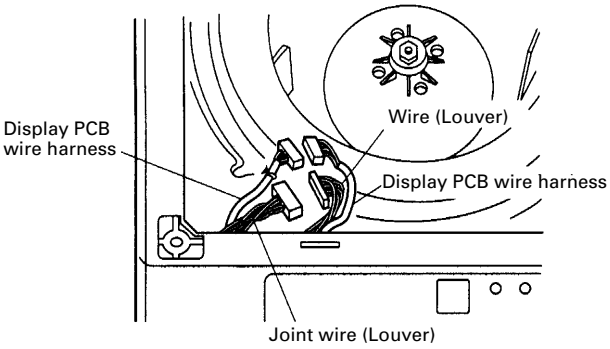


Fig. 28 Part A detail view

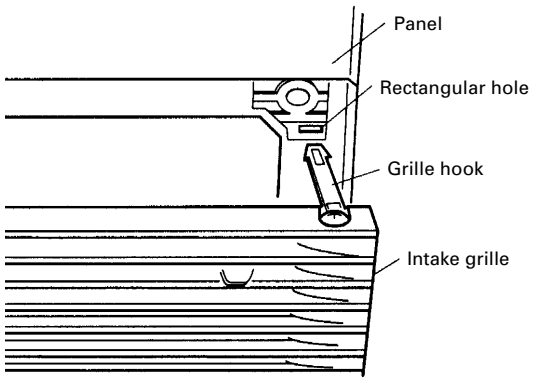


INSTALLING/REMOVING THE INTAKE GRILLE

1. Installing the intake grille

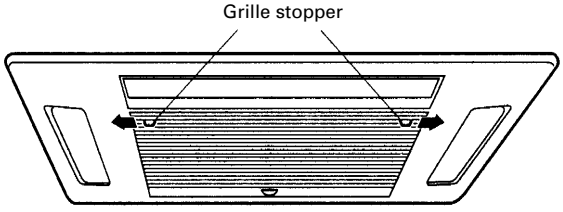
(1) Fully insert the intake grille hooks into the rectangular holes in the panel.

Fig. 29



(2) Close the intake grille, then slide the two grille stoppers outward .

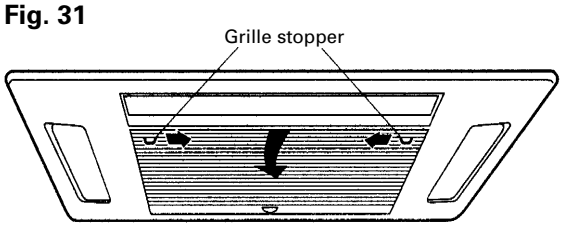
Fig. 30



2. Removing the intake grille

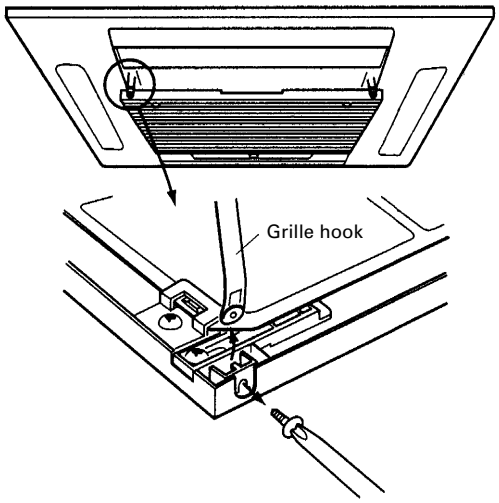
(1) Slide the two grille stoppers inward, then open the intake grille.

Fig. 31



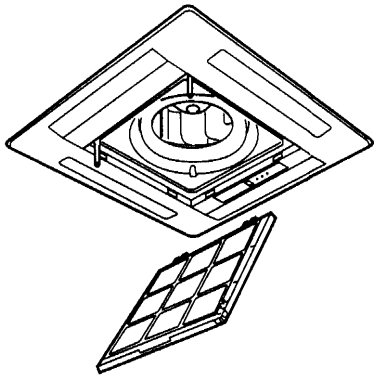
(2) Remove the grille hook screws, then open the intake grille.

Fig. 32



(3) Open the intake grille so that it is at an angle of 20° to 40°, then remove the grille.

Fig. 33



⚠ CAUTION

(1) The louver angle cannot be changed if the power is not on, (If moved by hand, it may be damaged.)

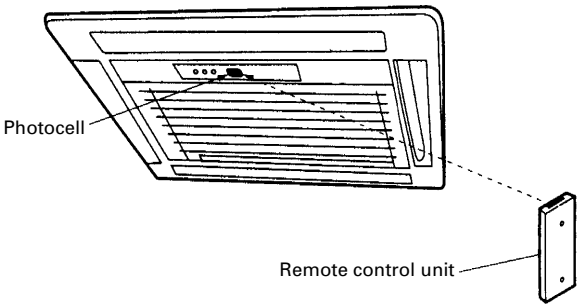
(2) The grille assembly is directional relative to the air conditioner body.

(3) Install so that there is no gap between the grille assembly and the air conditioner body.

9. REMOTE CONTROL UNIT INSTALLATION

- Install the remote control unit so that the front is facing the photocell. (Fig. 34)

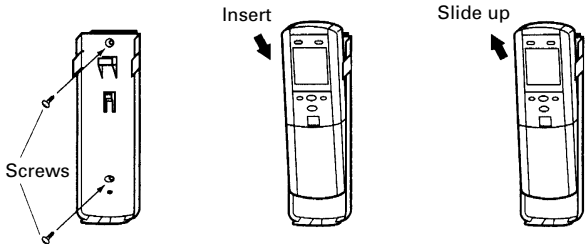
Fig. 34



- Install the remote control unit with a distance of 5 m between the remote control unit and the grille photocell as the criteria. However, when installing the remote control unit, check that it operates positively.
- Install the remote control unit holder to a wall, pillar, etc. with the tapping screw (Fig.35).

Fig. 35

For use as Handy Type

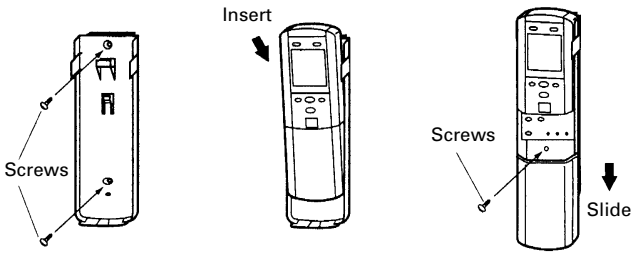


① **Mount the Holder.**

② **Set the Remote Control Unit.**

③ **To remove the Remote Control Unit (when use at hand.)**

For use as Wall Fixing Type



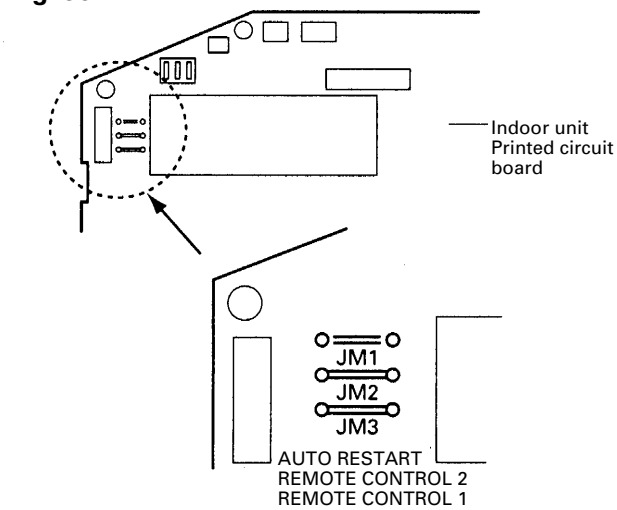
① **Mount the Holder.**

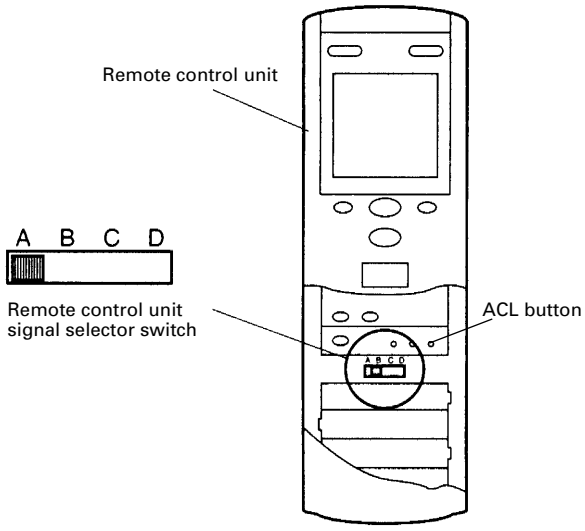
② **Set the Remote Control Unit.**

③ **Attach the unit to the holder as shown.**

Remote control unit code switching.

Fig. 36





Confirm the remote control unit signal selector switch selection and printed circuit board setting.

If these are not confirmed, the remote control unit cannot be operated for the air conditioner.

Table 6

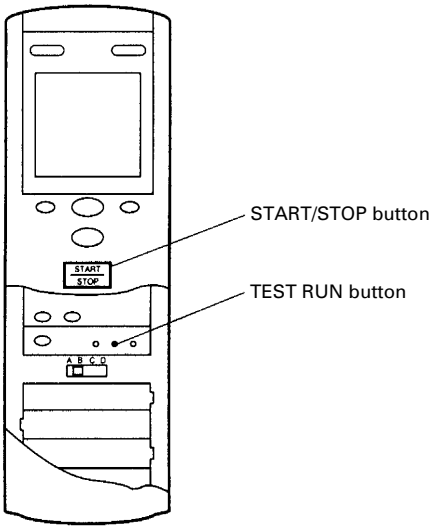
Jumper wire		Remote control unit signal selector switch
JM 2	JM 3	
Connect	Connect	A (Primary setting)
Connect	Disconnect	B
Disconnect	Connect	C
Disconnect	Disconnect	D

After setting the remote control unit signal selector switch, press the ACL button.

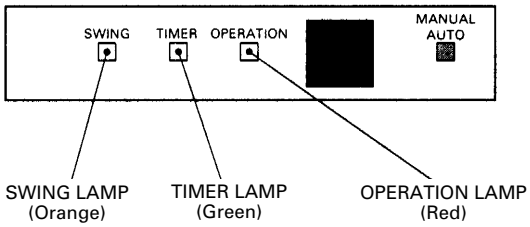
10. TEST RUNNING

- Press the remote control unit test run button while the air conditioner is running.
- At the end of test running, press the remote control unit start/stop button. (Fig. 37)

Fig. 37



- Run the air conditioner in accordance with the operating manual.



Operation can be checked by lighting and flashing of the grille display section OPERATION and TIMER lamps.
Perform judegment in accordance with the following.

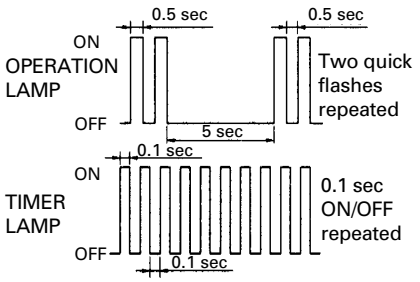
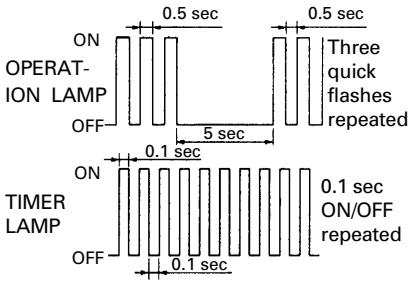
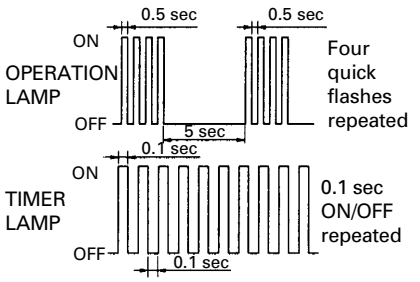
- Test running

When the air conditioner is run by pressing the remote control unit test run button, the OPERATION and TIMER lamps flash slowly at the same time.

- Error

The OPERATION and TIMER lamps operate as follows (Table 7) according to the error contents.

Table 7

Error display	Error contents
	Room temperature thermistor abnormal temperature detected
	Piping thermistor abnormal temperature detected
	Float switch ON for 3 minutes or longer

CHECK ITEMS

(1) INDOOR UNIT

(1) Is operation of each button on the remote control unit normal?
(2) Does each lamp light normally?
(3) Do not air flow direction louvers operate normally?
(4) Is the drain normal?
(5) Is there any abnormal noise and vibration during operation?

(2) OUTDOOR UNIT

(1) Is there any abnormal noise and vibration during operation?
(2) Will noise, wind or drain water from the unit disturb the neighbors?
(3) Is there any gas leakage?

- Do not operate the air conditioner in the test running state for a long time.
- For the operation method, refer to the operating manual and perform operation check.

4.3 WALL MOUNTED LARGE AS-SERIES TYPE

SPLIT TYPE ROOM AIR CONDITIONER

For authorized service personnel only.

⚠ WARNING	
(1)	For the room air conditioner to operate satisfactory, install it as outlined in this installation manual.
(2)	Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available standards parts. This installation manual describes the correct connections using the installation set available from our standard parts.
(3)	Installation work must be performed in accordance with national wiring standards by authorized personnel only.
(4)	Never cut the power cord, lengthen or shorten the cord, or change the plug.
(5)	Also do not use an extension cord.
(6)	Plug in the power cord plug firmly. If the receptacle is loose, repair it before using the room air conditioner.
(7)	Do not turn on the power until all installation work is complete.

- Be careful not to scratch the room air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the room air conditioner is serviced or moved.

SELECTING THE MOUNTING POSITION

⚠ WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

⚠ CAUTION

(1) Do not install where there is the danger of combustible gas leakage.

(2) Do not install near heat sources.

(3) If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

Decide the mounting position with the customer as follows:

1. INDOOR UNIT

(1) Install the indoor unit level on a strong wall which is not subject to vibration.
(2) The inlet and outlet ports should not be obstructed : the air should be able to blow all over the room.
(3) Install the unit near an electric outlet or special branch circuit.
(4) Do not install the unit where it will be exposed to direct sunlight.
(5) Install the unit where connection to the outdoor unit is easy.
(6) Install the unit where the drain pipe can be easily installed.
(7) Take servicing, etc. into consideration and leave the spaces shown in Fig.1. Also install the unit where the filter can be removed .

2. OUTDOOR UNIT

⚠ WARNING

(1) Install the unit where it will not be tilted by more than 5°

(2) When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

(1) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
(2) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(3) Install the unit when connection to the indoor unit is easy.
(4) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. [Heat & Cool model (Reverse cycle) only]
(5) Do not place animals and plants in the path of the warm air.
(6) Take the air conditioner weight into account and select a place where noise and vibration are small.
(7) Select a place so that the warm air and noise from the air conditioner do not disturb neighbors.
(8) Provide the space shown in Fig. 2 so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

Fig. 1

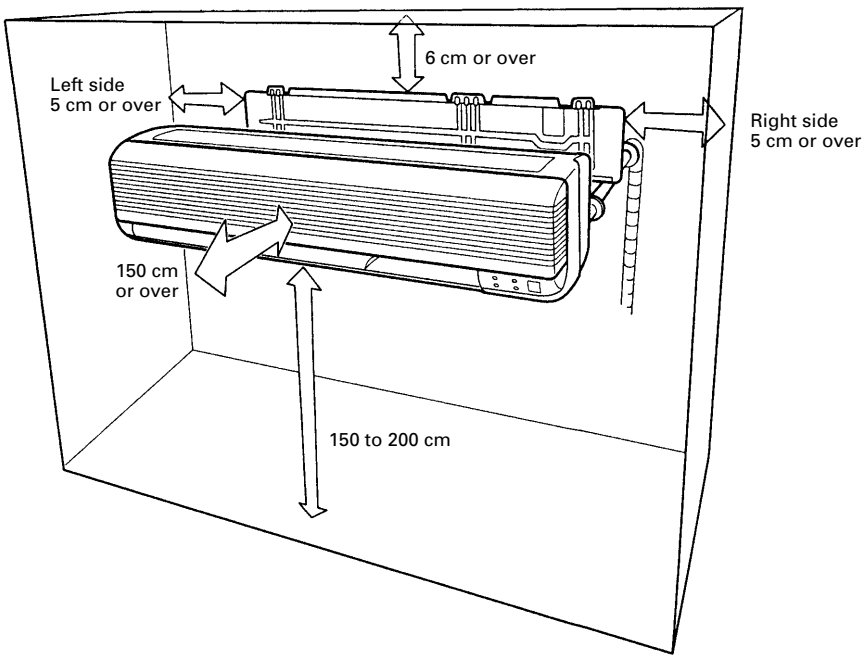


Fig. 2-A 20,000 & 24,000 BTU/h type only

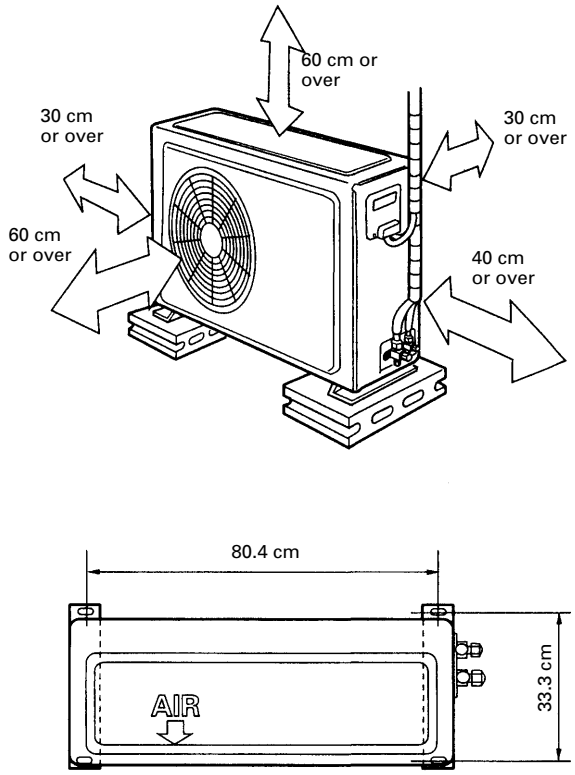


Fig. 2-B 30,000 BTU/h type only

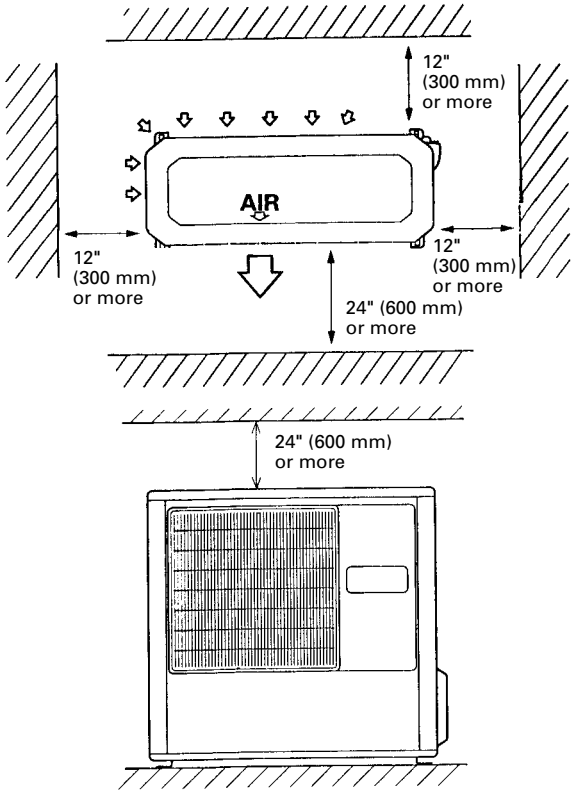


Fig. 3-A 20,000 & 24,000 BTU/h type only

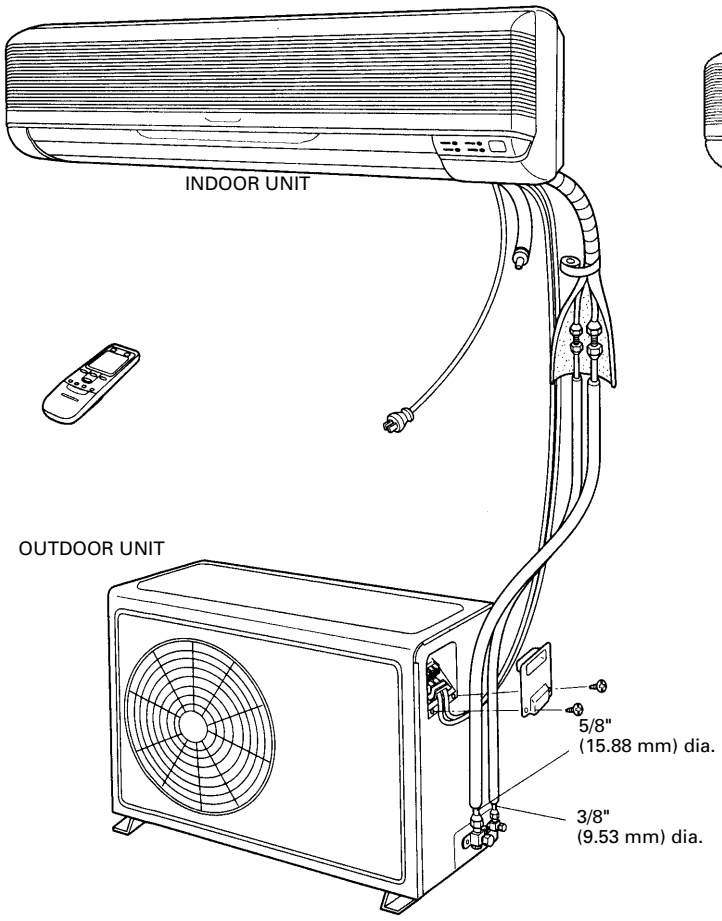
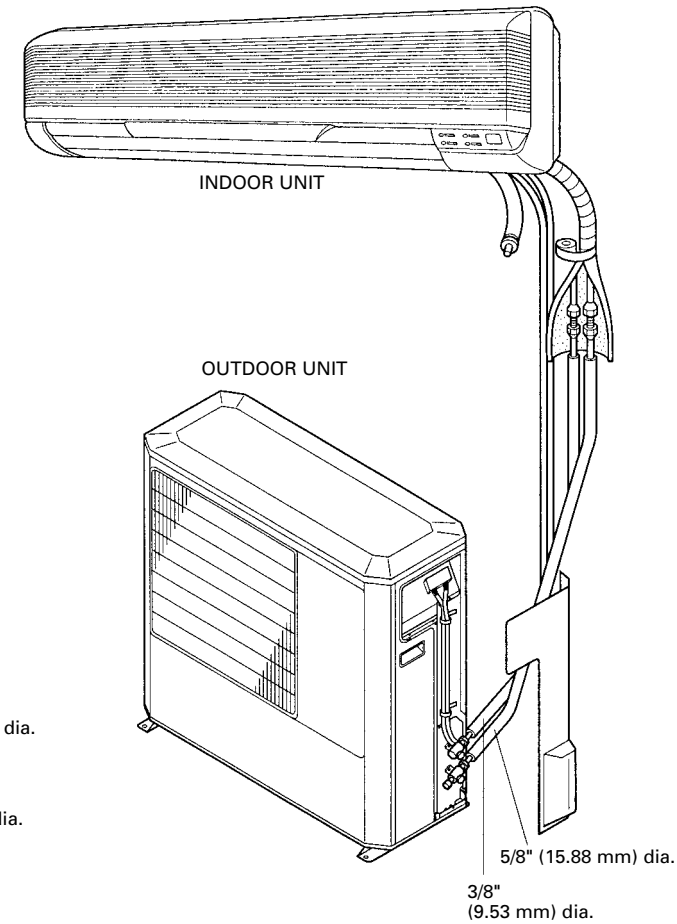


Fig. 3-B 30,000 BTU/h type only



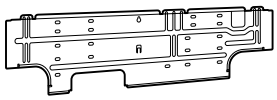
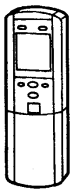
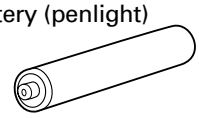
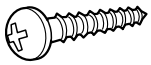
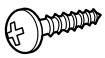
ELECTRICAL REQUIREMENT

Always make the air conditioner power supply a special branch circuit and provide a special switch and receptacle.
Do not extend the power cord.

STANDARD ACCESSORIES

The following installation accessories are supplied.
Use them as required.

INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Use
Wall hook bracket 	1	For indoor unit installation
Remote control unit 	1	Use for air conditioner operation
Battery (penlight) 	2	For remote control unit
Remote control unit holder 	1	Use as remote control unit holder
Tapping screw (big) (ø4 x 20) 	12	For wall hook bracket installation
Tapping screw (small) (ø3 x 12) 	2	For remote control unit holder installation

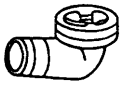
OUTDOOR UNIT ACCESSORIES

● **20,000 & 24,000 BTU/h Type only**

Name and Shape	Q'ty	Use
Hexagon wrench 	1	For air purge
Drain pipe 	1	For outdoor unit drain piping work (Heat & Cool model [Reverse cycle] only)
Flexible tube 	1	
Drain cap 	2	

OUTDOOR UNIT ACCESSORIES

● **30,000 BTU/h Type only**

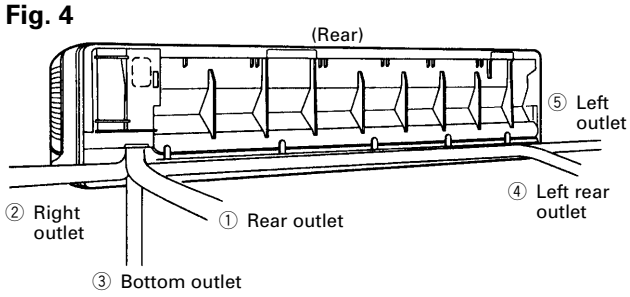
Name and Shape	Q'ty	Use
Hexagon wrench 	1	For opening the refrigerant valve on the outdoor unit
Cable clip 	1	For power cord binding
Tapping screw (painted) 	2	For fixing the valve cover
Drain pipe 	1	For outdoor unit drain piping work [Heat & Cool (Reverse cycle) model only]
Drain cap 	2	

INSTALLATION PROCEDURE

1. INDOOR UNIT INSTALLATION

The piping can be connected in the five directions indicated by ①,②,③,④ and ⑤ in Fig.4. When the piping is connected in direction ② or ⑤, cut along the piping groove in the side of the under cover with a hacksaw. When connecting the piping in direction ③, cut a notch in the thin wall at the front bottom of the under cover.

Fig. 4



1. INSTALLING THE WALL HOOK BRACKET

Removing the wall hook bracket

Remove the wall hook bracket in the following order:

① Remove one side of under cover B by pulling it forward (arrow direction in Fig.5).

② Remove the other side of under cover B by pulling it forward (arrow direction in Fig.5).

③ Remove the tapping screw installed to under cover A. (Fig.6)

④ White pulling the right side of under cover A forward (releasing the inside stopper), slide under cover A to the left and unhook the two inside hooks. (Fig.6)

⑤ Next, remove under cover A by pulling the left side forward (arrow direction in Fig.6).

⑥ Remove the four tapping screws holding the wall hook bracket. (Fig.7)

Fig.5

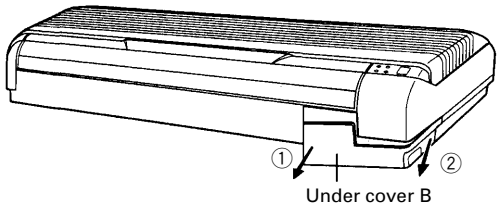


Fig.6

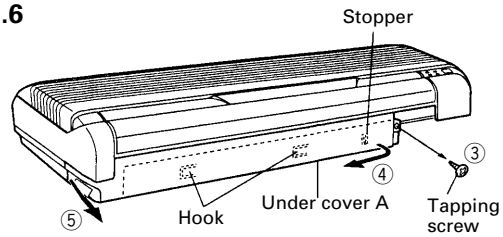
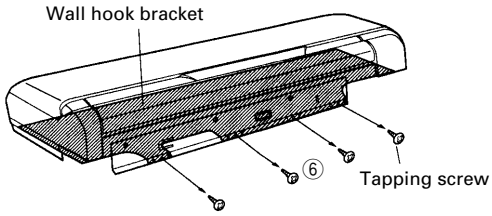


Fig.7



(1) Install the wall hook bracket so that it is correctly positioned horizontally and vertically. If the wall hook bracket is tilted, water will drip to the floor.

(2) As the weight of the indoor unit is 37 to 44 lbs(17 to 20 kg), it should be installed after properly examining the place where it is intended to be installed. If the place is not strong enough, a plank or girder should be used to make the place sufficiently strong so that the wall can support the weight.

[Installation directly to a wall]

Before fastening the wall hook bracket to the wall with the screws, level it by tapping the hook at the center of bracket to the wall with the handle of a screwdriver.

- Fasten the wall hook bracket to the wall with 6 or more screws and anchor bolts through the holes near the outer edge of the bracket.
- Do not install the wall hook bracket at only one place or at an angle. For a concrete wall, embed anchor bolts (10 mm dia.) into the wall at the wall hook bracket holes (12x18 mm dia.). Allow the anchor bolts to stick out at least 18 mm from the wall. (Fig.8) Install the unit to the anchor bolts with nuts through the wall hook bracket. Use 2 bolts for concrete wall and 4 bolts for blister concrete wall.
- Finally tighten the bolts and wood screws after confirming, using the level indicator, that the clamp is horizontal.

⚠ CAUTION

Install the wall hook bracket horizontally and perpendicularly. If the wall hook bracket is tilted, water will drip to the floor.

Fig.8

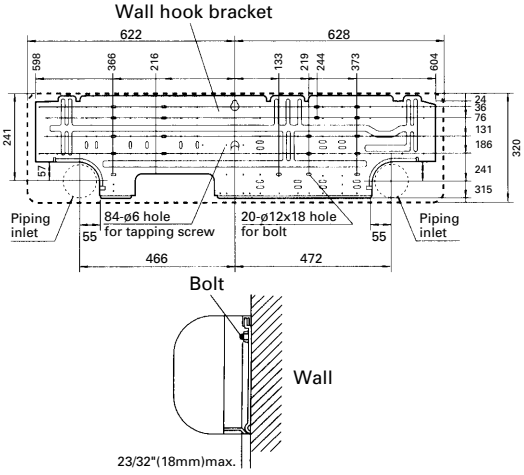
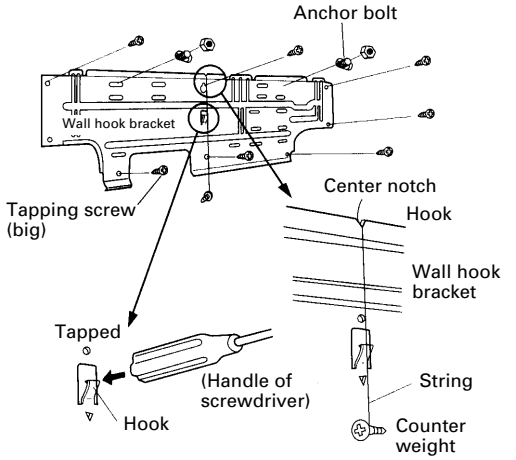


Fig.9



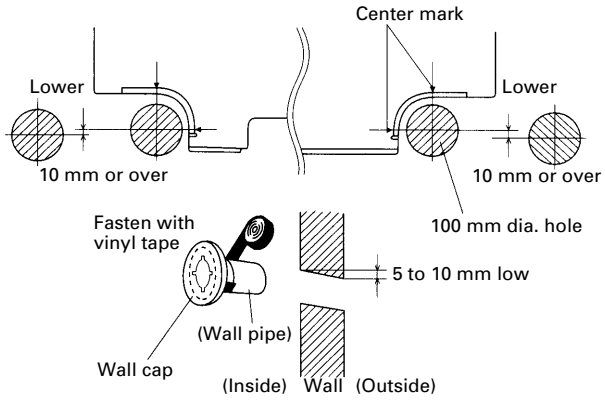
2. CUTTING THE HOLE IN THE WALL FOR THE CONNECTING PIPING

⚠ WARNING

If the wall pipe is not used, the cord interconnecting the indoor and outdoor units may touch metal and cause electric leakage.

(1) Cut a 100 mm diameter hole in the wall at the position shown in Fig.10.
(2) When cutting the wall hole at the inside of the installation frame, cut the hole to a point of intersection of center marks. When cutting the wall hole at the outside of the installation frame, cut the hole at least 10 mm below less.
(3) Cut the hole so that the outside end is lower (5 to 10 mm) than the inside end.
(4) Always align the center of the wall hole. If misaligned, water leakage will occur.
(5) Cut the wall pipe to match the wall thickness, stick it into the wall cap, fasten the cap with vinyl tape, and stick the pipe through the hole. (The connection pipe is supplied in the installation set.) (Fig.10)

Fig.10



(6) For ⑤ Left piping and ② right piping, cut the hole a little lower so that drain water will flow freely. (Fig.10)

3. FORMING THE DRAIN HOSE AND PIPE

⚠ CAUTION

(1) Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.

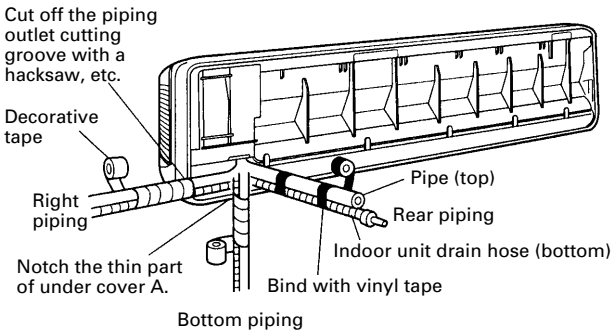
(2) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 100 mm or over.

(3) If the pipe is bent repeatedly at the same place, it will break.

[① Rear piping, ② Right piping, ③ Bottom piping]

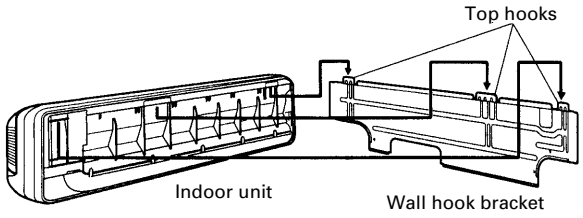
- Install the indoor unit piping in the direction of the wall hole and bind the drain hose and pipe together with vinyl tape. (Fig.11)
- Install the piping so that the drain hose is at the bottom.

Fig.11



- Perform "❷ INDOOR UNIT WIRING" before performing this piping.
- Wrap the pipes of the indoor unit that are visible from the outside with decorative tape.
- After passing the indoor piping and drain hose, through the wall hole, hang the indoor unit on the hooks at the top of the wall hook bracket.

Fig.12



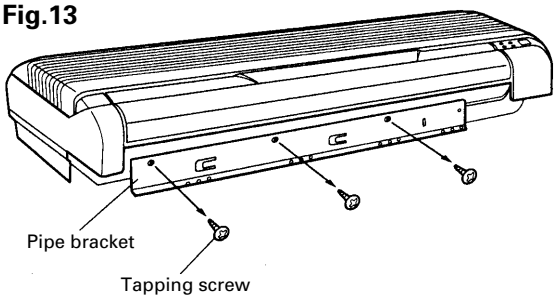
[For ④ Left rear piping, ⑤ Left piping]

- Left piping and left rear piping can be easily installed by removing the pipe bracket.

Removing the pipe bracket

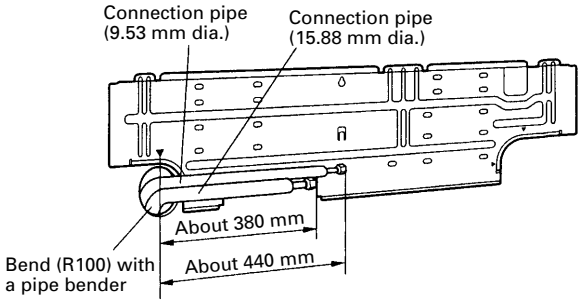
Remove the three tapping screws holding the pipe bracket as shown below.

Fig.13



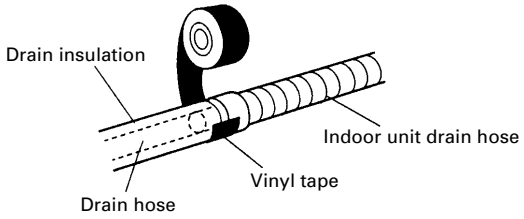
- For left piping and left rear piping, preset the end of the pipe to the dimensions shown in Fig.14 from the mark on the wall hook bracket and form the connection pipe.
- Bend the connection piping at a bend radius of at least 100 mm and position it no more than 50 mm from the wall.

Fig.14



- When extending the drain hose at the indoor unit, install the accessory drain insulation.

Fig.15

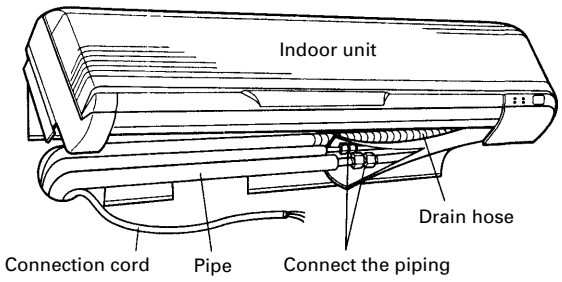


- Place the indoor unit drain hose behind the piping.

[Installing the indoor unit]

- Piping work can be made easier by laying out, shaping, and temporarily fastening the connection pipe, drain hose, and connection cord as shown in Fig.16 beforehand.

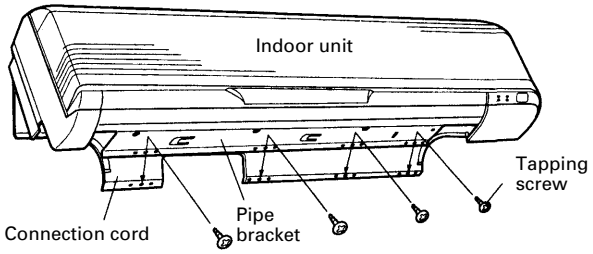
Fig.16 (Left piping)



4. INSTALLING THE INDOOR UNIT

After connecting the piping, fasten the bottom of the indoor unit and the wall hook bracket with the tapping screws.

Fig.17



2. INDOOR UNIT WIRING

⚠ CAUTION

(1) Match the terminal block numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.

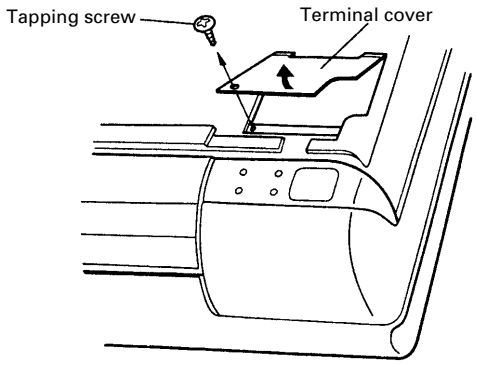
(2) Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.

(3) Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)

(4) Always connect the ground wire.

(1) Remove the intake grille.
(2) Remove the terminal cover. (Fig.18)

Fig.18 Removing the terminal cover



[Heat & Cool model (Reverse cycle)]

(3) Remove the cord clamp.
(4) Process the end of the connection cords to the dimensions shown in Fig.19.
(5) Connect the end of the connection cord fully into the terminal block.

Fig.19 20,000 & 24,000 BTU/h Type only

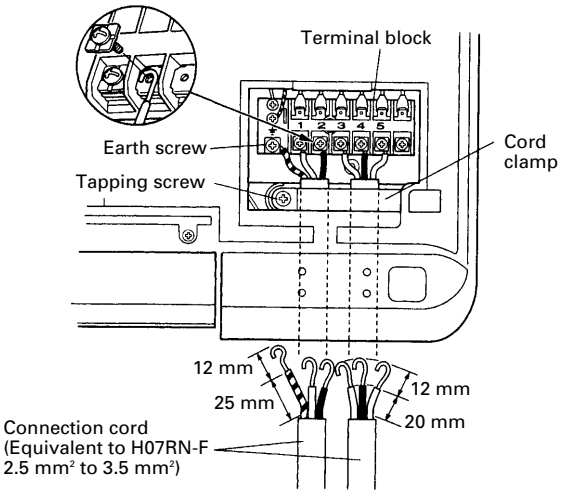
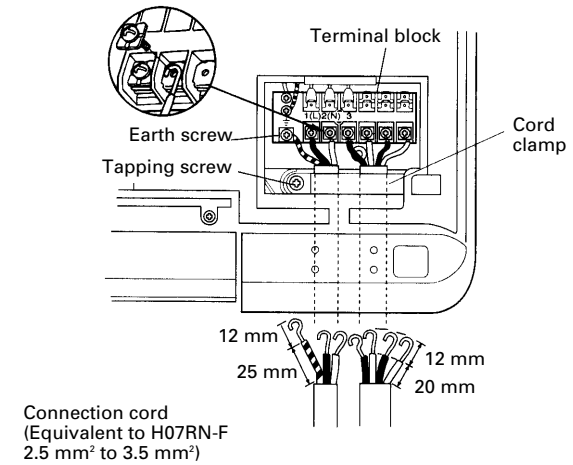


Fig.20 30,000 BTU/h Type only

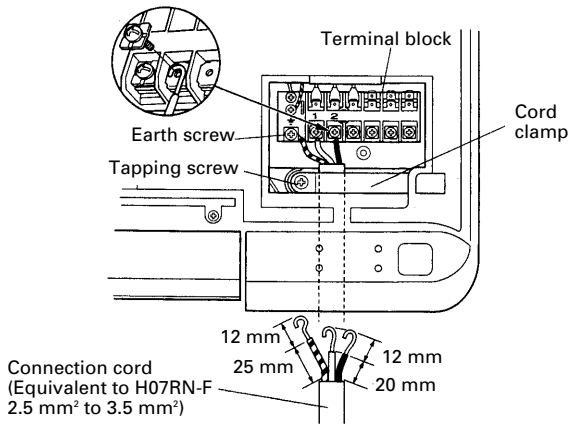


(6) Fasten the connection cord with a cord clamp.
(7) Fasten the terminal cover with the screw.

[Cooling model]

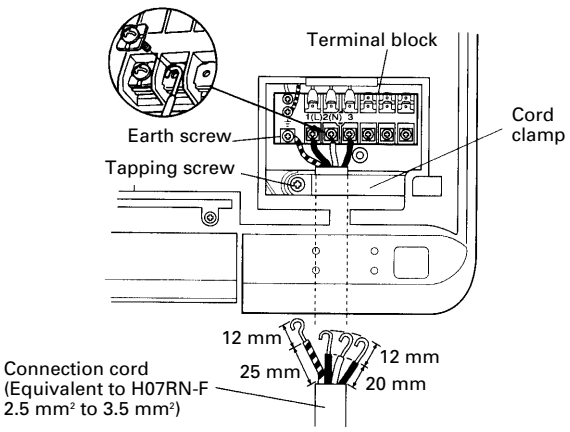
(3) Remove the cord clamp.
(4) Process the end of the connection cords to the dimensions shown in Fig.20.
(5) Connect the end of the connection cord fully into the terminal block.

Fig.21 20,000 & 24,000 BTU/h Type only



(6) Fasten the connection cord with a cord clamp.
(7) Fasten the terminal cover with the screw.

Fig.22 30,000 BTU/h Type only



3. OUTDOOR UNIT INSTALLATION

⚠ WARNING

(1) Install the unit where it will not be tilted by more than 5°.

(2) When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

- Set the unit on a strong stand, such as one made of concrete blocks to minimize shock and vibration.
- Do not set the unit directly on the ground because it will cause trouble.

✻ 30,000 BTU/h Type only

1. Outdoor unit processing

When the outdoor unit will be exposed to strong wind, fasten it with bolts at the places indicated by the arrows. (Fig.23)

Fig.23

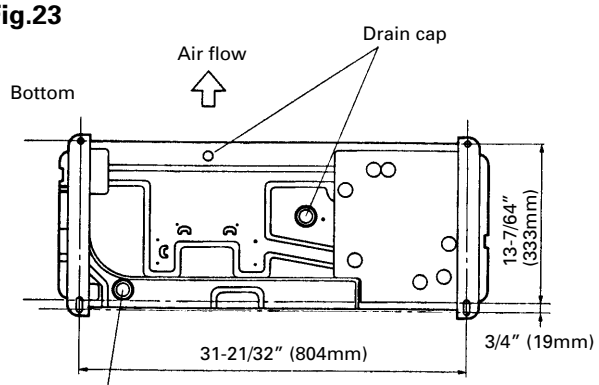


Fig.24

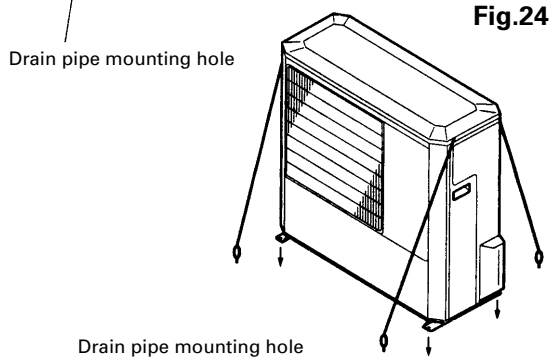
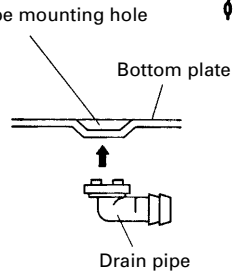


Fig.25



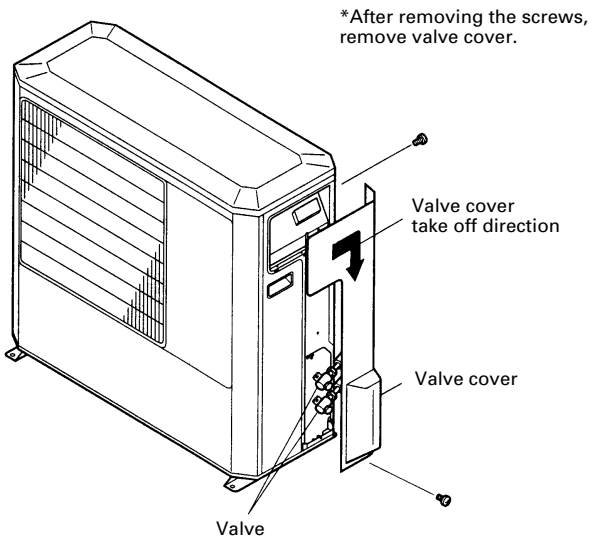
⚠ CAUTION

If this product is used in an area where the temperature falls below freezing for long periods of time, do not connect the drain pipe. Instead, allow the water to drain into a drain pan.

2. Outdoor unit connection cord and pipe connection preparations

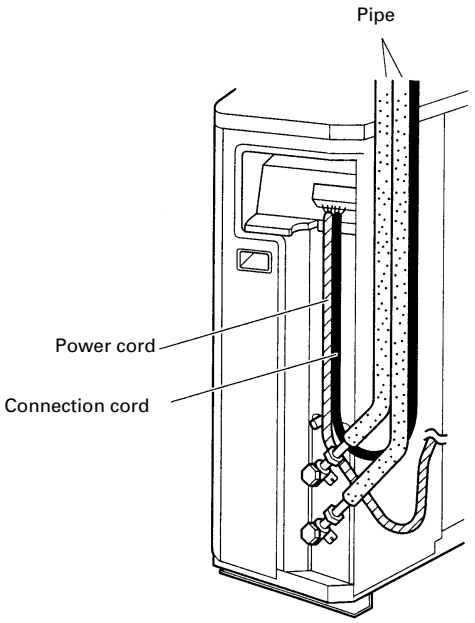
(1) Remove outdoor unit valve cover.

Fig.26



(2) Connect the piping, connection cord and power cord.

Fig.27



4. CONNECTING THE PIPING

⚠ CAUTION

The maximum lengths of this product are shown in Table 1. If the units are further apart than this, correct operation can not be guaranteed.

1. LIMITATION OF REFRIGERANT PIPING LENGTH

Table 1

Max length (L)	20 m (66 ft)
Max height difference (H)	8 m (20 ft)

Fig.28

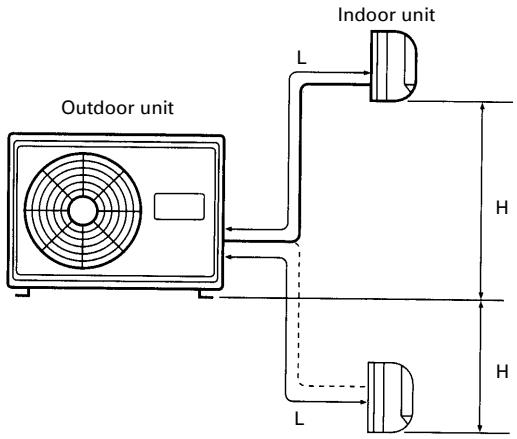
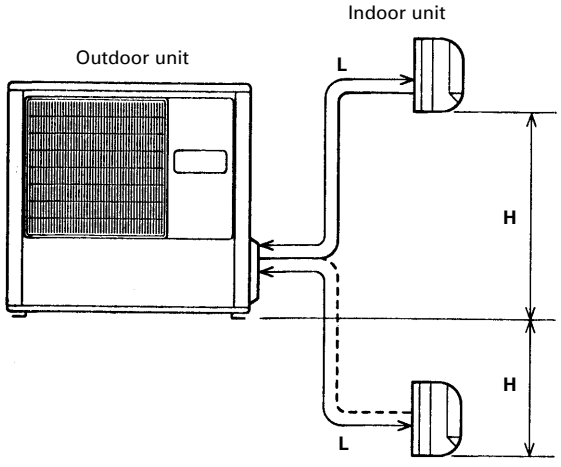


Table 2

Max length (L)	Cooling model	30 m (99 ft)
	Heat & Cool model (Reverse cycle)	20 m (82 ft)
Max height difference (H)		15 m (49 ft)

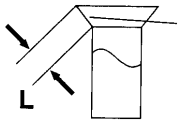
Fig.29



2. FLARING

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
(3) Insert the flare nut onto the pipe and flare the pipe with a flaring tool.

Fig.30



Check if [L] is flared uniformly and is not cracked or scratched.
L dimension Thin pipe 1.8 to 2.0 mm (9.52 mm dia.)
Thick pipe 2.2 to 2.4 mm (15.88 mm dia.)

3. BENDING

(1) When bending the pipe, be careful not to crush it.
(2) To prevent crushing of the pipe, do not bend the pipe at a radius curvature of 100 mm or more.
(3) If the copper pipe is bent or pulled to often, it will become stiff. Do not bend the pipe more than three at one place.

4. CONNECTION

(1) Install the outdoor unit wall cap (supplied with the optional installation set or procured at the site) to the wall pipe.
(2) Connect the outdoor unit and indoor unit piping.
(3) After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified tightening torque with a torque wrench. (Tighten the flare nut of the outdoor unit 3-way valve after air purging.)

Fig.31

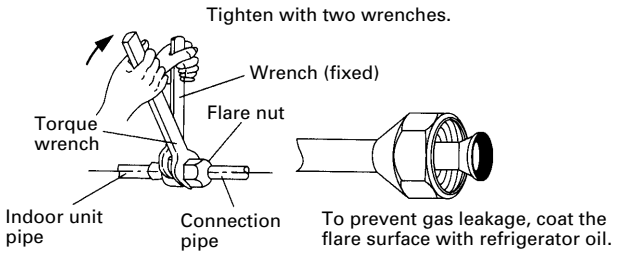


Table 3 Flare nut tightening torque

Flare nut	Tightening torque
9.52 mm dia.	30.4 to 34.3 N·m (310 to 350 kgf·cm)
15.88 mm dia.	73.6 to 78.5 N·m (750 to 800 kgf·cm)

Do not remove the cap from the connection pipe before connecting the pipe.

5. AIR PURGE

⚠ WARNING

(1) When moving and installing the room air conditioner, do not mix gas other than the specified refrigerant (R22) inside the refrigerant cycle.

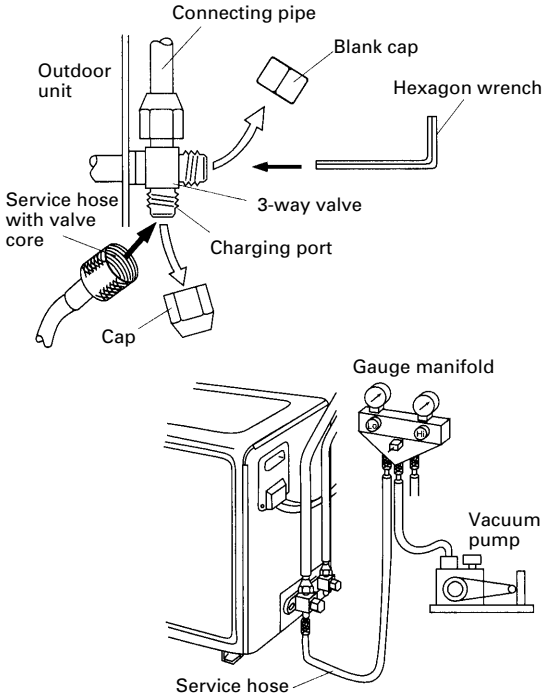
(2) Charging of additional refrigerant (R22) according to the piping length is unnecessary.

1. AIR PURGE

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 1.5 mmHg.
(3) Disconnect the service hoses and fit the cap to the charging valve (Tightening torque : 70 to 90 kgf·cm).
(4) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque : 2-way valve : 70 to 90 kgf·cm, 3-way valve : 100 to 120 kgf·cm).
(5) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (200 to 250 kgf·cm).

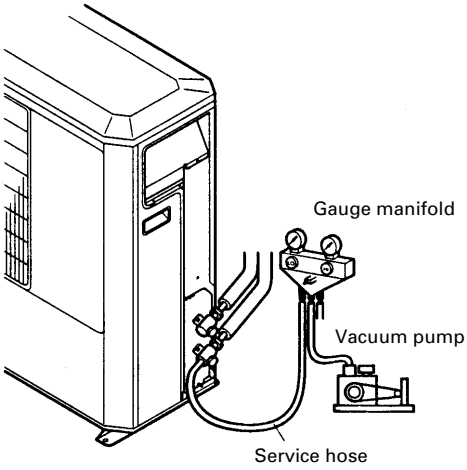
● **20,000 & 24,000 BTU/h Type only**

Fig.32



● **30,000 BTU/h Type only**

Fig.33



2. ADDITIONAL CHARGE

Refrigerant suitable for a piping length of 5 m is charged in the outdoor unit at the factory. When the piping is longer than 5 m, additional charging is necessary. For the additional amount, see the table below.

● **20,000 & 24,000 BTU/h Type only**

Table 4

Pipe length		16 ft (5 m)	33 ft (10 m)	49 ft (15 m)	66 ft (20 m)
Additional refrigerant	Heat & Cool model (Reverse cycle)	None	8.8 oz (250 g)	17.6 oz (500 g)	26.5 oz (750g)
	Cooling model	None	2.1 oz (60 g)	4.2 oz (120 g)	6.3 oz (180g)

Between 5 m and 20 m, when using a connection pipe other than that in the table, charge additional refrigerant with 1.76 oz. (50 g) 3.3 ft (1 m) [Heat & Cool model (Reverse cycle)], 0.42 oz (12 g) / 3.3 ft (1 m) (Cooling model) as the criteria.

● **30,000 BTU/h Type only**

Table 5

Pipe length		16 ft (5 m)	33 ft (10m)	49 ft (15m)	66 ft (20m)	82 ft (25m)	99 ft (30m)
Additional refrigerant	Heat & Cool model (Reverse cycle)	None	8.8 oz (250g)	17.6 oz (500g)	26.5 oz (750g)	35.3 oz (1000g)	—
	Cooling model	None	3.0 oz (85g)	6.0 oz (170g)	9.0 oz (255g)	12.0 oz (340g)	15.0 oz (425g)

Between 5 m and 30 m, when using a connection pipe other than that in the table, charge additional refrigerant with 1.8 oz (50 g) / 3.3 ft (1 m) (Reverse cycle model), 0.6 oz (17 g) / 3.3 ft (1 m) (Cooling model) as the criteria.

6. GAS LEAKAGE INSPECTION

⚠ CAUTION

After connecting the piping check the joints for gas leakage with gas leak detector.

7. OUTDOOR UNIT WIRING

⚠ WARNING

(1) Before starting work, check that power is not being supplied to the indoor unit and the outdoor unit.

(2) Match the terminal block numbers and connection cord colors with those of the indoor unit side. Erroneous wiring may cause burning of the electric parts.

(3) Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.

(4) Always fasten the outside covering of the connection cord with cord clamps. (If the insulator is clamped, electric leakage may occur.)

(5) Always connect the ground wire.

⚠ CAUTION

(1) The power cord is not supplied with the outdoor unit. Use 2.5 mm² to 3.5 mm² H07RN-F or equivalent as the connection cord.

(2) Use VW-1, 12 mm diameter, 0.5 to 1.0 mm thick, PVC tube as the insulation tube.

(1) Remove the outdoor unit terminal cover.

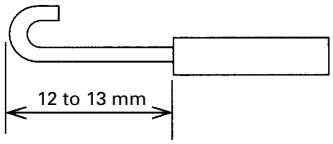
(2) Process the end of the connection cords to the dimensions shown in Fig.35 and bend the end of each cord as shown in Fig.34.

(3) Connect the end of the connection cord fully into the terminal block and fasten with the screws.

(4) Fasten the sheath with a cord clamp.

(5) Install the terminal cover.

Fig.34 Stripped length



● **20,000 & 24,000 BTU/h Type only**

Fig.35

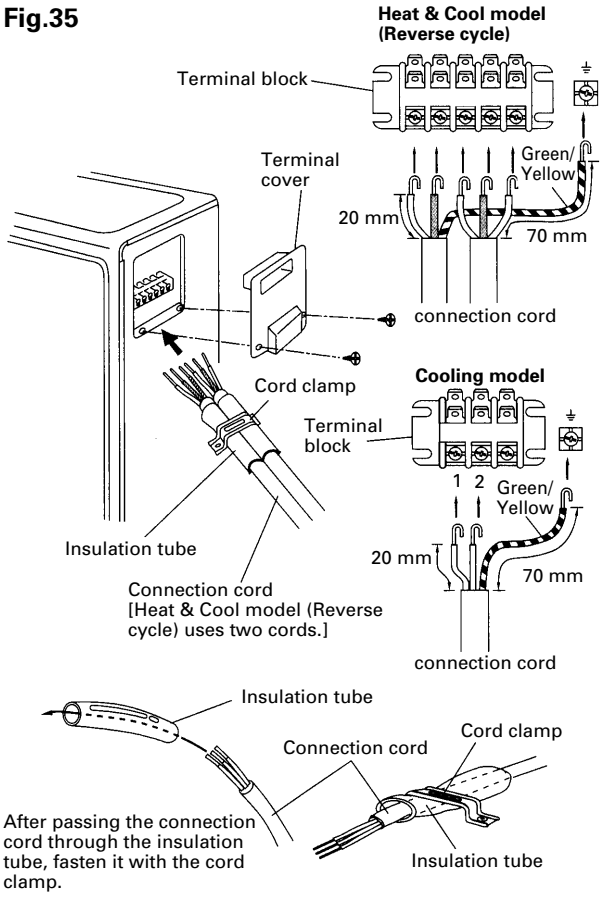
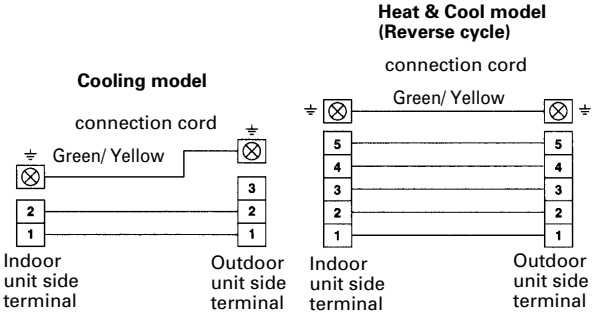


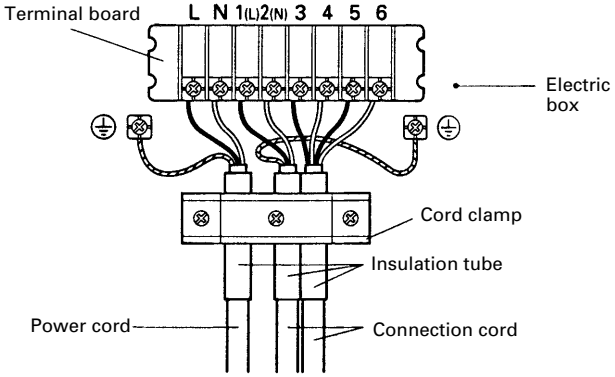
Fig.36



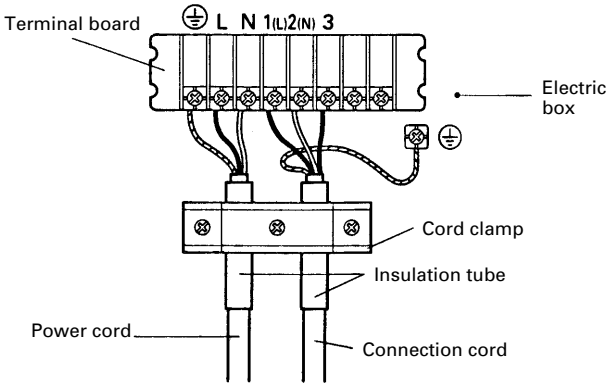
● **30,000 BTU/h Type only**

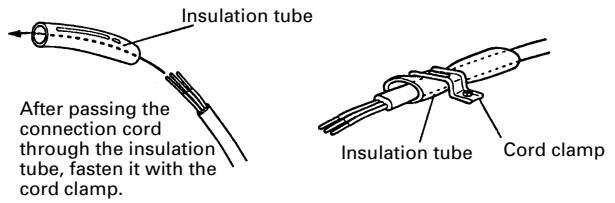
Fig.37

Heat & Cool model
(Reverse cycle)

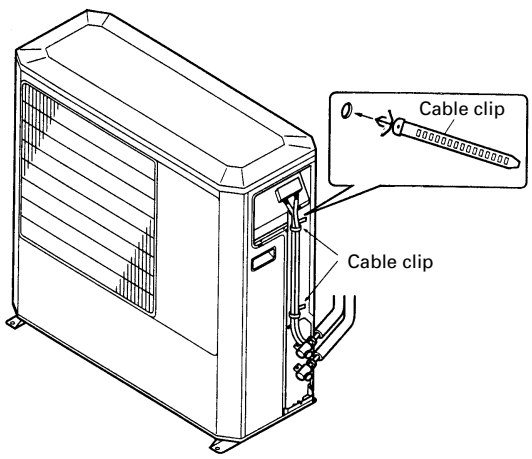


Cooling model





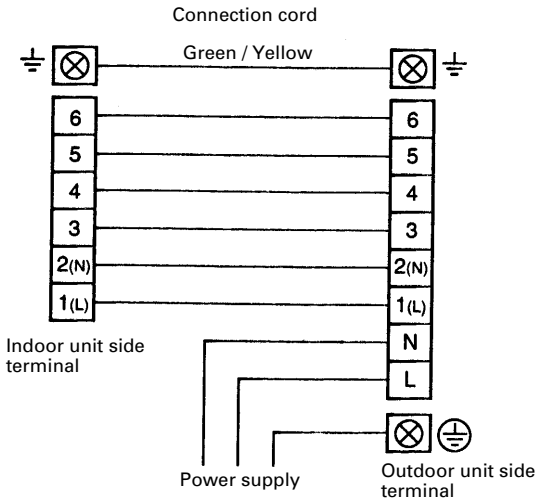
Use VW-1, 12mm diameter, 0.5 to 1.0 mm thick, PVC tube as the insulation tube.



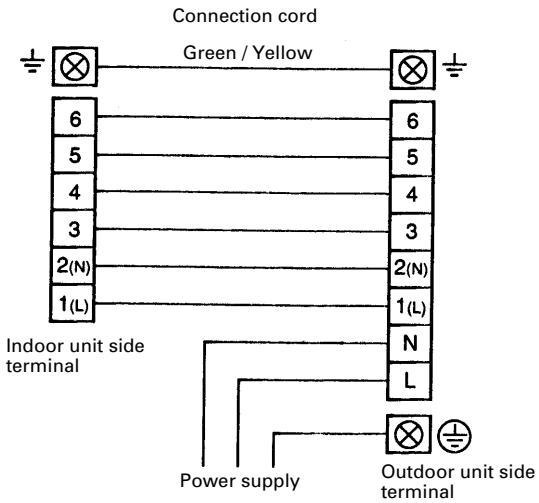
1. CONNECTION DIAGRAM

Fig.38

Heat & Cool model
(Reverse cycle)

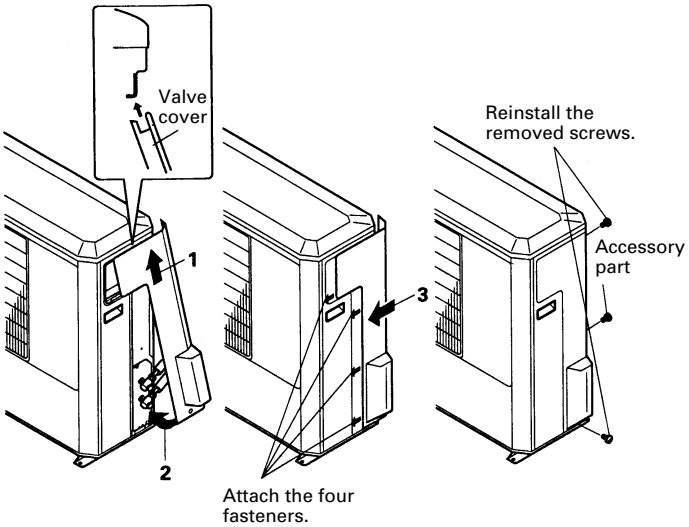


Cooling model



2. INSTALL THE VALVE COVER

Fig.39

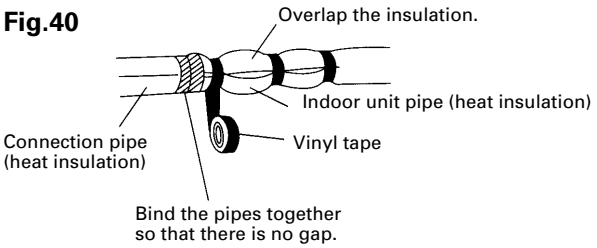


8. FINISHING

(1) Insulate between pipes.

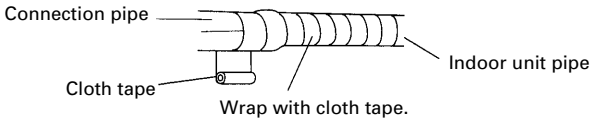
- For rear, right, and bottom piping, overlap the connection pipe heat insulation and indoor unit pipe heat insulation and bind them with vinyl tape so that there is no gap.
- For left and left rear piping, butt the connection pipe heat insulation and indoor unit pipe heat insulation together and bind them with a vinyl tape so that there is no gap.

Fig.40



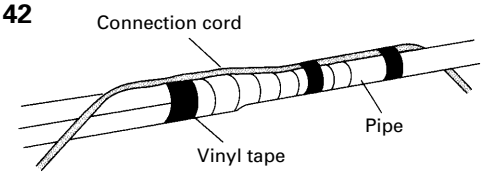
- For left and left rear piping, wrap the area which accommodates the rear piping housing section with cloth tape.

Fig.41



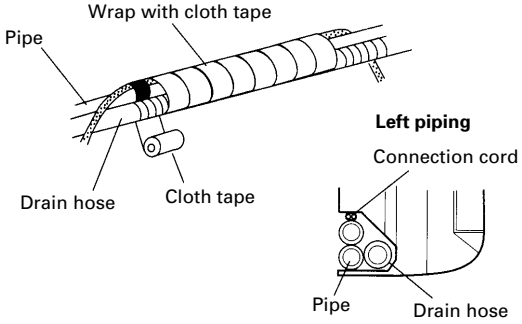
- For left and left rear piping, bind the connection cord to the top of the pipe with vinyl tape.

Fig. 42



- For left and left rear piping, bundle the piping and drain hose together by wrapping them with cloth tape over the range within which they fit into the rear piping housing section.

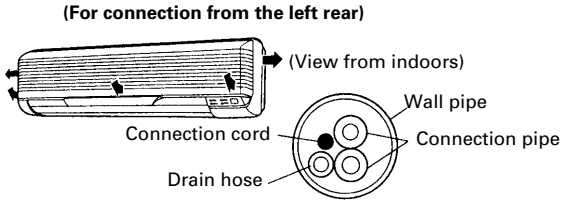
Fig. 43



Check that:

- The top and bottom hooks are hooked firmly and the indoor unit does not move to the front and rear or left and right.
- The indoor unit is accurately positioned horizontally and vertically.
- When connected from the left rear, the drain hose is at the bottom left of the wall pipe.

Fig.44

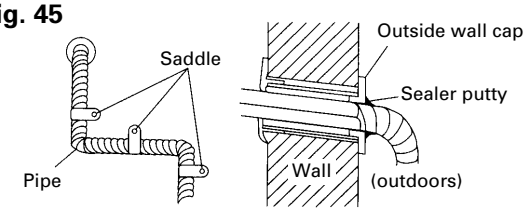


(2) Temporarily fasten the connection cord along the connection pipe with vinyl tape. (Wrap to about 1/3 the width of the tape from the bottom of the pipe so that water does not enter.)

(3) Fasten the connection pipe to the outside wall with a saddle, etc.

(4) Fill the gap between the outside wall pipe hole and the pipe with sealer so that rain water and wind cannot blow in.

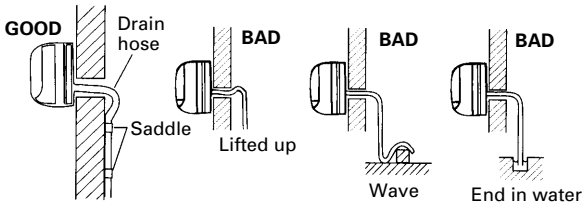
Fig. 45



(5) Fasten the drain hose to the outside wall, etc.

Fig. 46

Check the following:



Installing the under covers

(1) Installing under cover A (Fig.47)

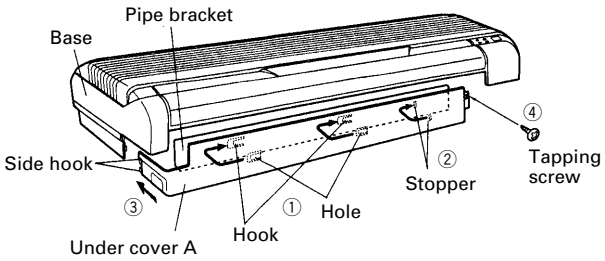
① Hook the two pipe bracket hooks to the two holes in the back of under cover A

② While pulling the left side of under cover A forward about I cm (at this time, hold hook ① so that it does not come unhooked), slide under cover A to the right and hook the hook.

③ Push the left side of under cover A in the arrow direction and hook the two side hooks to the base.

④ Install under cover A to the pipe bracket with the tapping screw.

Fig. 47

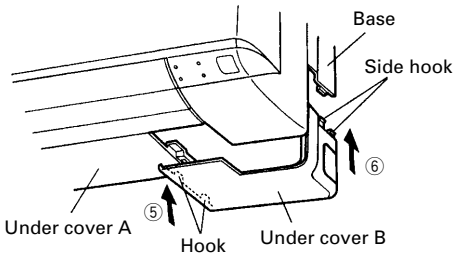


(2) Installing under cover B (Fig.48)

⑤ Push the left side of under cover B in the arrow direction and hook the two hooks to under cover A.

⑥ Push the right side of under cover B in the arrow direction and hook the two side hooks to the base.

Fig. 48



9. POWER

⚠ WARNING

(1) The rated voltage of this product is 220-240V A.C. 50Hz.

(2) Before turning on the power verify that the voltage is within the 198V to 264V range.

(3) Always use a special branch circuit and install a special receptacle to supply power to the room air conditioner.

(4) Use a circuit breaker and receptacle matched to the capacity of the room air conditioner. (Fuse • breaker rating : 20A) (※ 30,000 BTU/h Type : 30A)

(5) The circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.

(6) Perform wiring work in accordance with standards so that the room air conditioner can be operated safely and positively.

(7) Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.

⚠ CAUTION

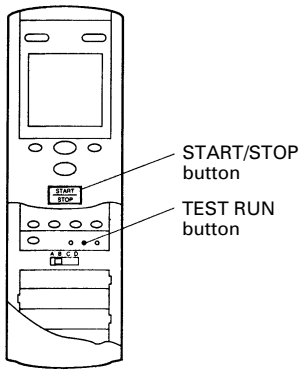
(1) The power source capacity must be the sum of the room air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.

(2) When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.

10. TEST RUNNING

- Press the remote control unit test run button while the air conditioner is running.
- At the end of test running, press the remote control unit start-stop button. (Fig.49)

Fig. 49



Operation can be checked by lighting and flashing of the display section OPERATION and TIMER lamps.
Perform judgement in accordance with the following.

- Test running

When the air conditioner is run by pressing the remote control unit test run button, the OPERATION and TIMER lamps flash slowly at the same time.

- Error

The OPERATION and TIMER lamps operate as follows (Table 6) according to the error contents.

Table 6

Error display	Error contents
OPERATION LAMP: ON 0.5 sec / OFF 0.5 sec / 5 sec — Two quick flashes repeated TIMER LAMP: ON 0.5 sec / OFF 0.1 sec — 0.1sec ON/OFF repeated	Room temperature thermistor abnormal temperature detected
OPERATION LAMP: ON 0.5 sec / OFF 0.5 sec / 5 sec — Two quick flashes repeated TIMER LAMP: ON 0.5 sec / OFF 0.1 sec — 0.1sec ON/OFF repeated	Piping thermistor abnormal temperature detected

CHECK ITEMS

1. INDOOR UNIT

(1) Is operation of each button on the remote control unit normal?
(2) Does each lamp light normally?
(3) Do not air flow direction louvers operate normally?
(4) Is the drain normally?
(5) Is there any abnormal noise and vibration during operation?

2. OUTDOOR UNIT

(1) Is there any abnormal noise and vibration during operation?
(2) Will noise, wind, or drain water from the unit disturb the neighbors?
(3) Is there any gas leakage?

- Do not operate the air conditioner in the test running state for a long time.
- For the operation method, refer to the operating manual and perform operation check.

11. CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual:
(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow switching, and other remote control unit operations.
(2) Air filter removal and cleaning, and how to use the air louvers.
(3) Give the operating and installation manuals to the customer.

12. FRONT PANEL REMOVAL

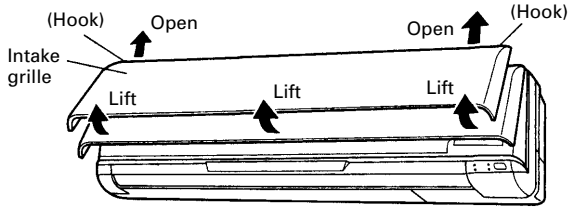
⚠ CAUTION

Install the front panel and intake grille securely. If installation is imperfect, the front panel or intake grille may fall off and cause injury.

1. INTAKE GRILLE REMOVAL

(1) Open the intake grille.
(2) Open the intake grille and lift the intake grille upward until the hook at the top of the intake grille is unhooked.

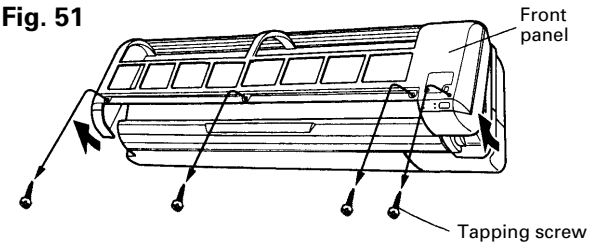
Fig. 50



2. FRONT PANEL REMOVAL

(1) Remove the four tapping screws.
(2) Remove the front panel by lifting the bottom of the front panel upward.

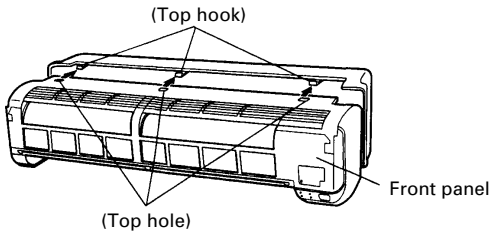
Fig. 51



3. FRONT PANEL INSTALLATION

(1) Hook the top hole of the front panel to the hook of the base.
(2) Fasten the front panel with the screw.

Fig. 52



Be sure that the top hole of the front panel is hooked securely to the hook of the base.

13. REMOTE CONTROL UNIT HOLDER INSTALLATION

⚠ CAUTION

(1) Check that the indoor unit correctly receives the signal from the remote control unit, then install the remote control unit holder.

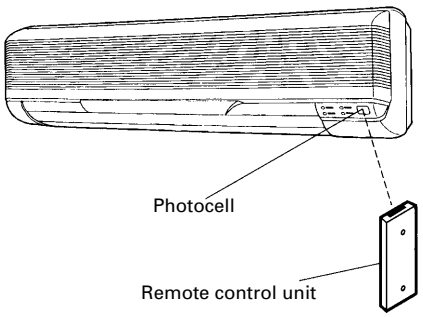
(2) Select the remote control unit holder selection site by paying careful attention to the following:

Avoid places in direct sunlight. Select a place that will not be affected by the heat from a stove, etc.

1. REMOTE CONTROL UNIT HOLDER INSTALLATION

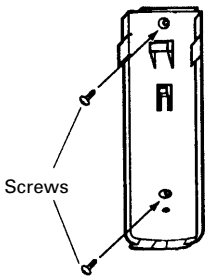
- Install the remote control unit so that the front is facing the photocell. (Fig.53)

Fig. 53

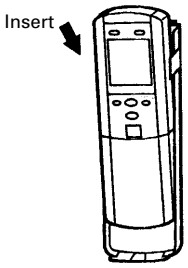


- Install the remote control unit with a distance of 7m between the remote control unit and the photocell as the criteria. However, when installing the remote control unit, check that it operates positively.
- Install the remote control unit holder to a wall, pillar, etc. with the tapping screw. (Fig.54)

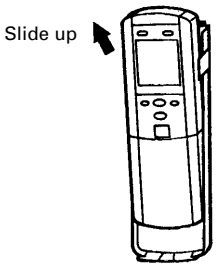
Fig. 54 For use as Handy Type



① **Mount the Holder.**

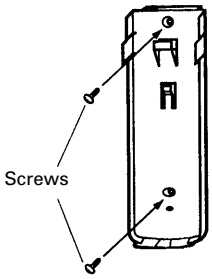


② **Set the Remote Control Unit.**

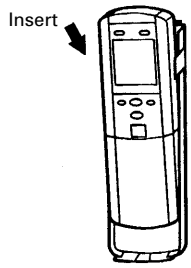


③ **To remove the Remote Control Unit. (when use at hand)**

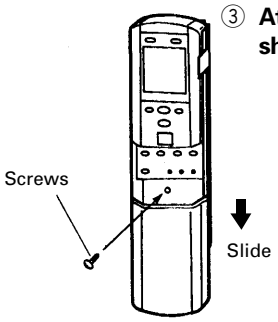
For use as Wall Fixing Type



① **Mount the Holder.**



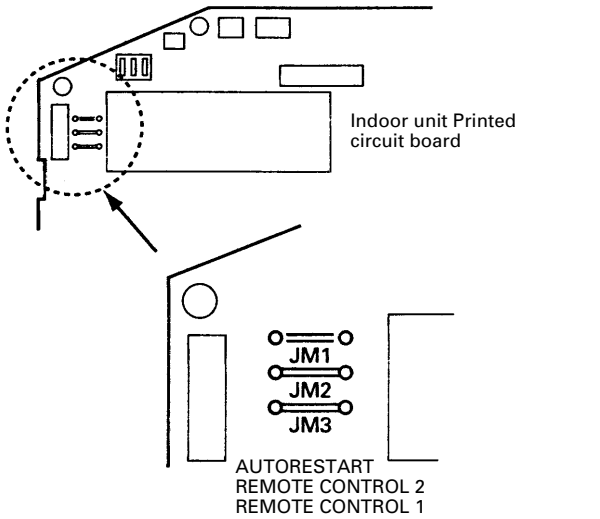
② **Set the Remote Control Unit.**

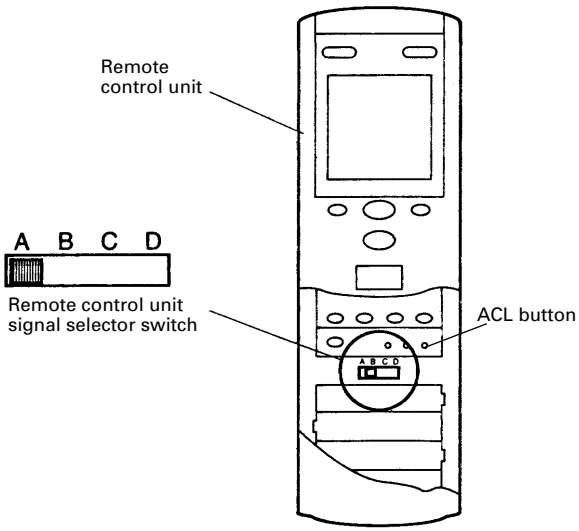


③ **Attach the unit to the holder as shown.**

2. REMOTE CONTROL UNIT CODE SWITCHING

Fig. 55





Confirm the remote control unit signal selector switch selection and printed circuit board setting.

If these are not confirmed, the remote control unit cannot be operated for the air conditioner.

Table 7

Jumper wire		Remote control unit signal selector switch
JM 2	JM 3	
Connect	Connect	A (Primary setting)
Connect	Disconnect	B
Disconnect	Connect	C
Disconnect	Disconnect	D

After setting the remote control unit signal selector switch, press the ACL button.

4.4 FLOOR / CEILING UNIVERSAL AB-SERIES TYPE

SPLIT TYPE ROOM AIR CONDITIONER

For authorized service personnel only.

⚠ WARNING	
(1)	For the room air conditioner to operate satisfactorily, install it as outlined in this installation manual.
(2)	Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available standards parts. This installation manual describes the correct connections using the installation set available from our standard parts.
(3)	Installation work must be performed in accordance with national wiring standards by authorized personnel only.
(4)	Never cut the power cord, lengthen or shorten the cord, or change the plug.
(5)	Also, do not use an extension cord.
(6)	Plug in the power cord plug firmly. If the receptacle is loose, repair it before using the room air conditioner.
(7)	Do not turn on the power until all installation work is complete.

- **Be careful not to scratch the room air conditioner when handling it.**
- **After installation, explain correct operation to the customer, using the operating manual.**
- **Let the customer keep this installation manual because it is used when the room air conditioner is serviced or moved.**

SELECTING THE MOUNTING POSITION

⚠ WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

⚠ CAUTION

(1) Do not install where there is the danger of combustible gas leakage.

(2) Do not install near heat sources.

(3) If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

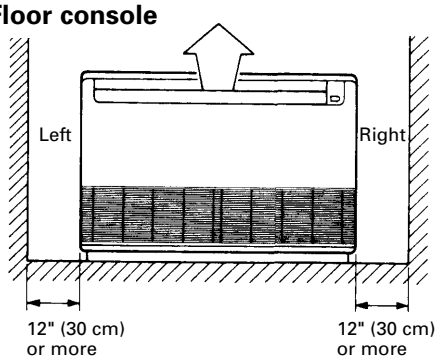
Decide the mounting position with the customer as follows:

1. INDOOR UNIT

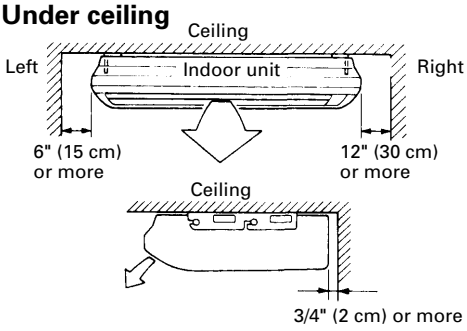
(1) Install the indoor unit level on a strong wall, floor, ceiling which is not subject to vibration.
(2) The inlet and outlet ports should not be obstructed : the air should be able to blow all over the room.
(3) Install the unit near an electric outlet or special branch circuit.
(4) Do not install the unit where it will be exposed to direct sunlight.
(5) Install the unit where connection to the outdoor unit is easy.
(6) Install the unit where the drain pipe can be easily installed.
(7) Take servicing, etc. into consideration and leave the spaces shown in Fig.1. Also install the unit where the filter can be removed.

Fig. 1

● **Floor console**



● **Under ceiling**



2. OUTDOOR UNIT

⚠ WARNING

(1) Install the unit where it will not be tilted by more than 5°

(2) When installing the outdoor unit where it may be exposed to strong wind, fasten it securely.

(1) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
(2) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(3) Install the unit when connection to the indoor unit is easy.
(4) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. [Heat & Cool model (Reverse cycle) only]
(5) Do not place animals and plants in the path of the warm air.
(6) Take the air conditioner weight into account and select a place where noise and vibration are small.
(7) Select a place so that the warm air and noise from the air conditioner do not disturb neighbors.
(8) Provide the space shown in Fig.2 so that the air flow is not blocked. Also for efficient operation, Leave open three of the four directions front, rear and both sides.

Fig. 2-1 (14,000 BTU/h Type)

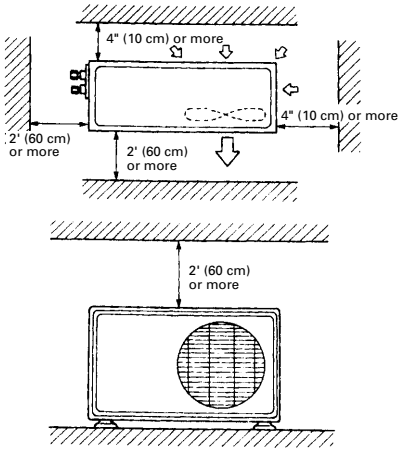
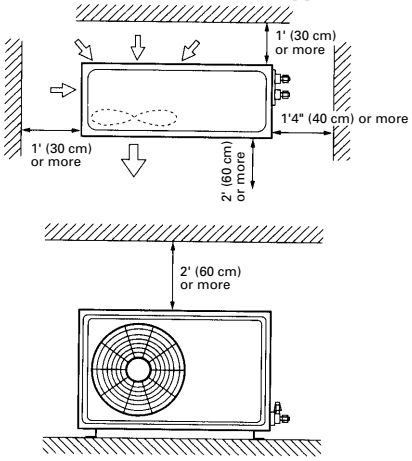
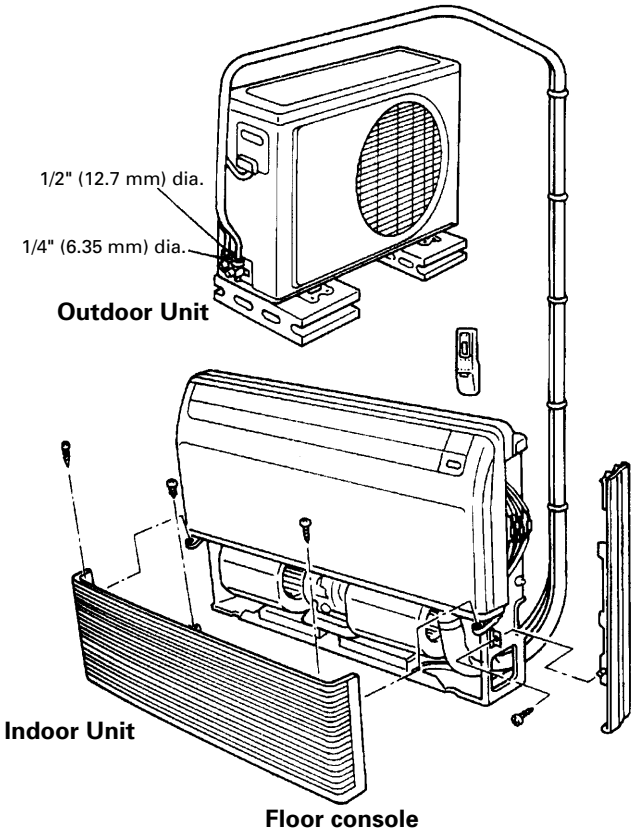
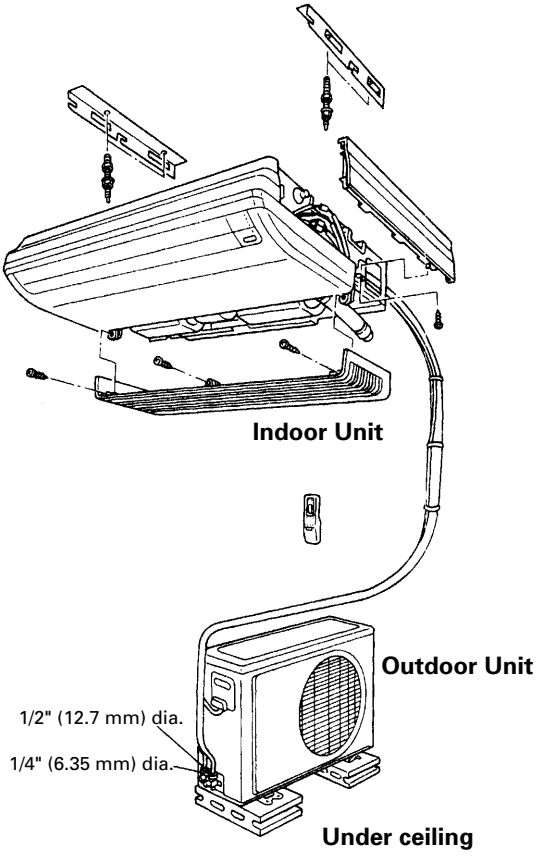


Fig. 2-2 (18,000 & 24,000 BTU/h Type)

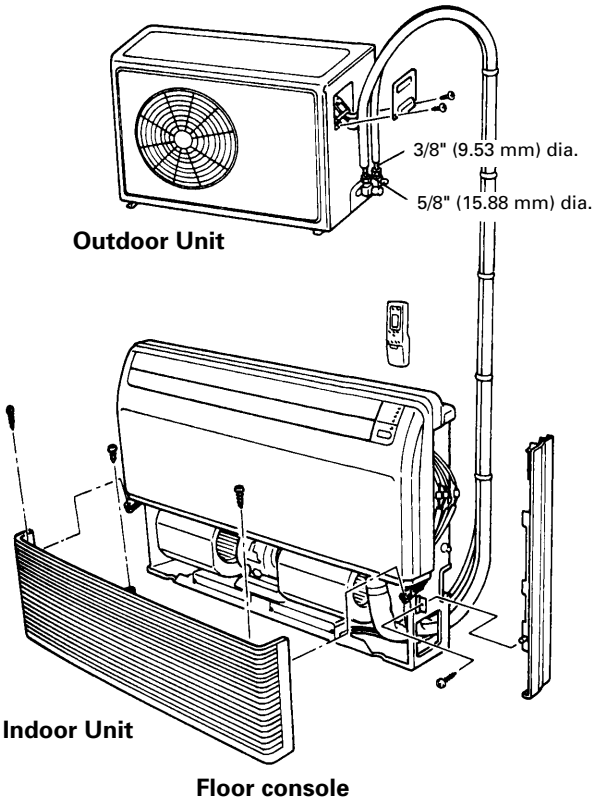


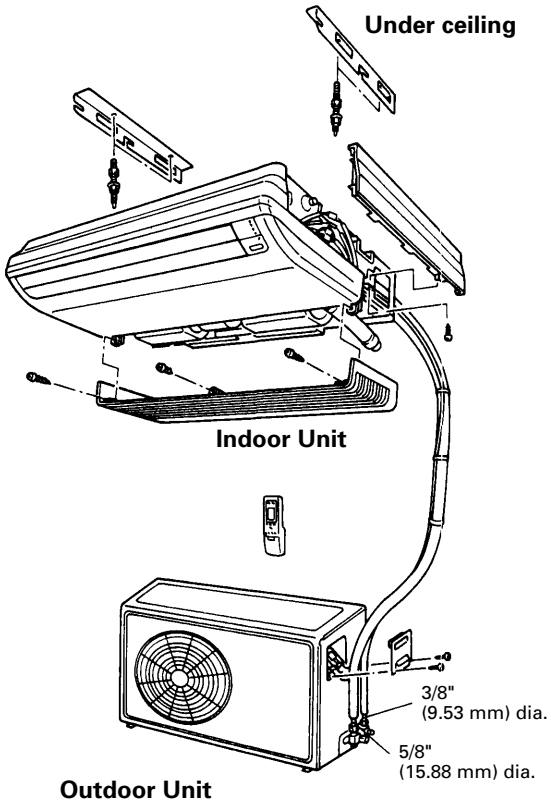
Models : AB□14R / AB□14A





Models : AB□24R / AB□24A, AB□18R, AB□18A

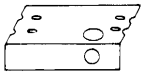
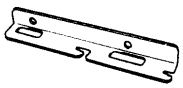
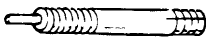
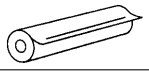
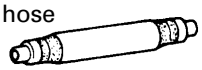
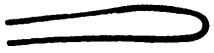




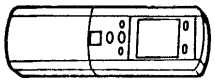
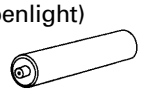
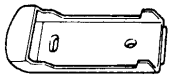
STANDARD PARTS

The following installation parts are furnished. Use them as required.

INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Cover plate (left) 	1	
Cover plate (right) 	1	
Tapping screw (ø4 x 10) 	2	
Installation template 	1	For positioning the indoor unit For under ceiling type.
Bracket (left) 	1	For suspending the indoor unit from ceiling
Bracket (right) 	1	
Anchor bolt (M12) 	4	
Spring washer 	4	
Spring nut 	4	
Wall bracket 	2	For suspending the indoor unit on the wall.
Tapping screw (ø4 x 20) 	6	For fixing the wall bracket.
Coupler heat insulator 	1	For indoor side pipe joint
Nylon fastener 	1	For fixing the drain hose
Drain hose 	1	
Insulation (drain hose) 	1	Adhesive type 70 x 230
VT wire 	1	For fixing the drain hose L 280 mm

Remote control (Wall fixing / Handy type)

Name and Shape	Q'ty	Application
Remote controller 	1	Use for air conditioner operation
Battery (penlight) 	2	For remote control unit
Remote controller unit holder 	1	For mounting remote controller
Tapping screw (ø3 x 12) 	2	For remote control unit holder installation

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Hexagon wrench 	1	For air purge
Drain pipe 	(1)	For outdoor unit drain piping work (May not be supplied, depending on the model)
Flexible tube 	(1)	For outdoor unit drain piping work (May not be supplied, depending on the model)
Drain cap 	(2)	For outdoor unit drain piping work (May not be supplied, depending on the model)

OPTIONAL PARTS FOR INDOOR UNIT

Name and Shape	Part No.	Application
Joint pipe-A 	9302812021	For indoor side pipe joint

CONNECTION PIPE REQUIREMENT

Table 1

Diameter		Maximum length	Maximum height (between indoor and outdoor)
Small	Large		
6.35 mm (1/4 in)	12.7 mm (1/2 in)	10 m (33 ft)	5 m (16 ft)
9.53 mm (3/8 in)	15.88 mm (5/8 in)	20 m (66 ft)	8 m (26 ft)

- Use 0.7 mm to 1.2 mm thick pipe.
- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 3,040 kPa.

INSTALLATION PROCEDURE

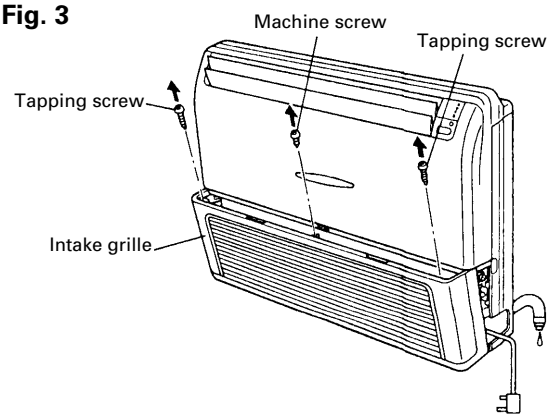
Install the room air conditioner as follows:

1. PREPARING INDOOR UNIT INSTALLATION

1. REMOVE THE INTAKE GRILLE

Open the intake grille and remove the three screws. (Fig.3)

Fig. 3



Remark : The main unit can be wired before the indoor unit is installed. Select the most appropriate Installation order.

2. INDOOR UNIT INSTALLATION

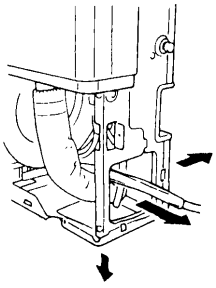
A. FLOOR CONSOLE TYPE

1. DRILLING FOR PIPING

Select piping and drain directions.(Fig.4)

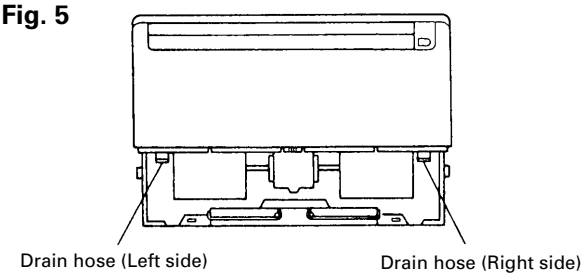
The piping and drain can be made in three directions a shown below.

Fig. 4



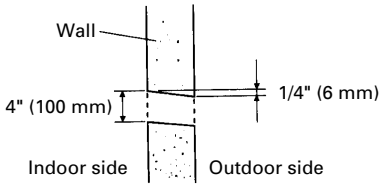
The drain hose can be connected to either the left or right side. (Fig.5)

Fig. 5



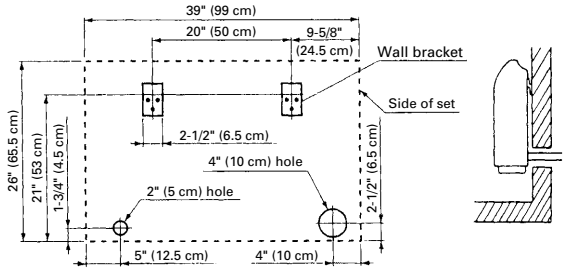
When the directions are selected, drill a 4" (10cm) dia. hole on the wall so that the hole is tilted downward toward the outdoor for smooth water flow. When the pipe is led out from the rear, make a hole in Fig.6, at the position shown.

Fig.6



When installing the set to wall, install the accessory wall bracket at the position shown in Fig.7, and mount the set to it.

Fig. 7



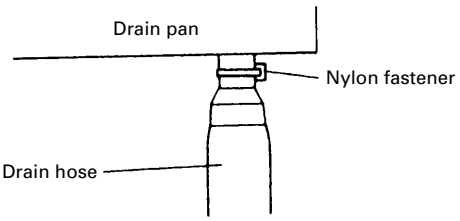
2. INSTALLING DRAIN HOSE

INSTALL THE DRAIN HOSE

Select whether the drain hose will be connected to the left or right side. (Fig.5)

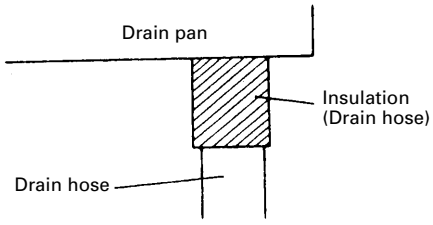
Insert the drain hose into drain pan, then secure the drain hose with a nylon fastener. (Fig.8)

Fig.8



Wrap the insulation(drain hose)around the drain hose connection. (Fig.9)

Fig.9



Be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port of the indoor unit.

Fig. 10

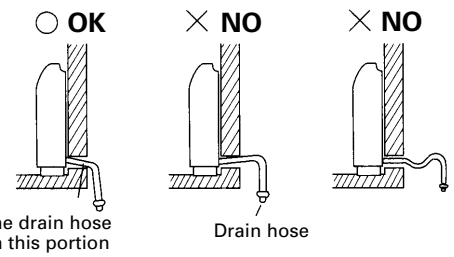
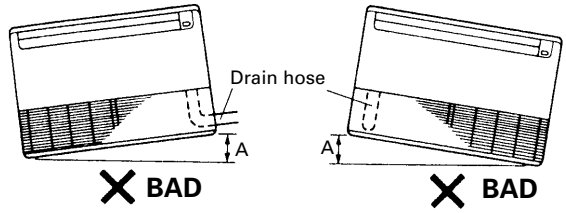


Fig. 11



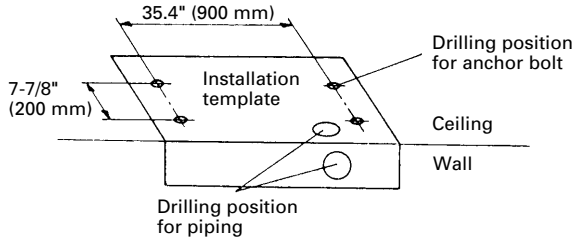
⚠ CAUTION

Do not Install the unit so that the drain hose side is too high. Height A should be less than 5 mm. (Fig.11)

B. UNDER CEILING TYPE

Using the installation template, drill holes for piping and anchor bolts(for holes). (Fig. 12)

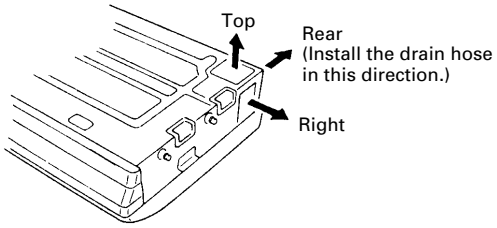
Fig.12



1. DRILLING FOR PIPING

Select piping and drain directions.(Fig.13)

Fig.13

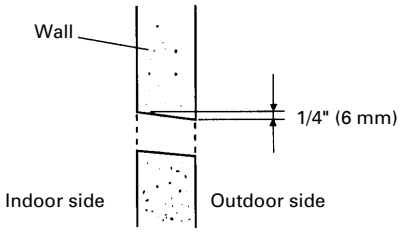


⚠ CAUTION

Install the drain hose at the rear; it should not be installed on the top or right side.

When the directions are selected, drill 3-1 / 8" (80 mm) and 2"(50 mm) or 6"(150 mm) dia. hole on the wall so that the hole is tilted downward toward the outdoor for smooth water flow.

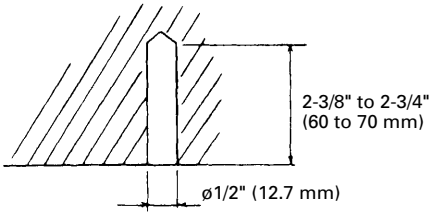
Fig.14



2. DRILLING HOLES FOR ANCHOR BOLTS AND INSTALLING THE ANCHOR BOLTS.

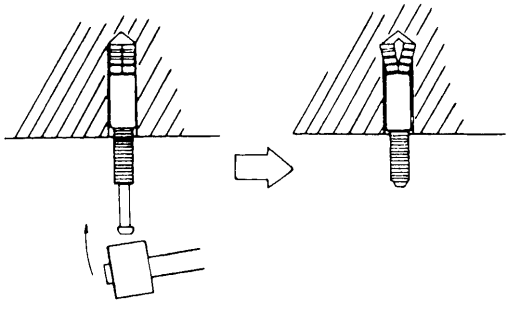
With a concrete drill, drill four 1/2 "(12.7 mm)dia holes. (Fig. 15)

Fig.15



Insert the anchor bolts into the drilled holes, and drive the pins completely into the anchor bolts with a hammer. (Fig. 16)

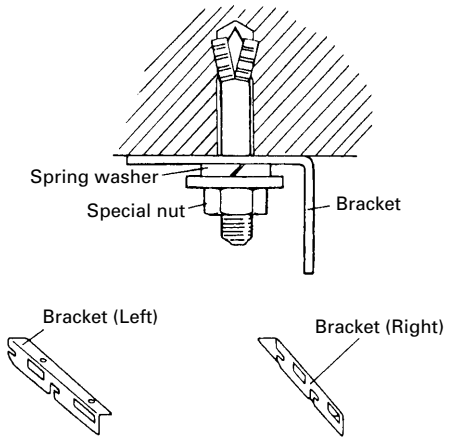
Fig.16



3. INSTALLING BRACKETS

Install the brackets with nuts, washers and spring washers. (Fig. 17)

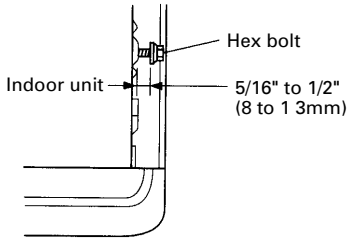
Fig.17



4. INSTALLING INDOOR UNIT

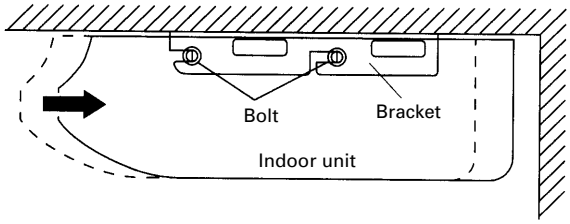
Reset the hex bolts as shown in Fig.18.

Fig.18



Apply the indoor unit to the brackets.(Fig.19)

Fig.19



Now, securely tighten the hex bolts in both sides.

5. INSTALL THE DRAIN HOSE

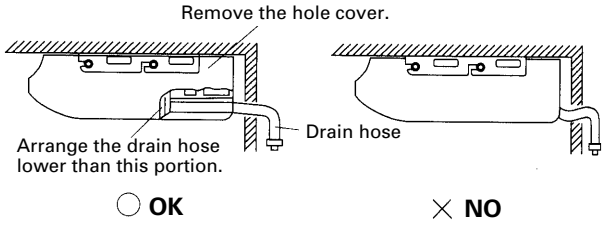
Select whether the drain hose will be connected to the left or right side. (Fig. 5)

Insert the drain hose into the drain pan, then secure the drain hose with a nylon fastener. (Fig. 8)

Wrap the insulation (drain hose) around the drain hose connection. (Fig. 9)

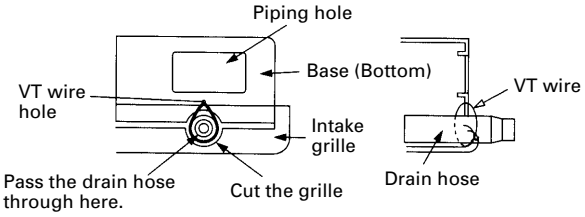
Be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port to the indoor unit. (Fig. 20)

Fig. 20



When drain hose is arranged backward, secure the drain hose with the VT wire. (Fig.21)

Fig.21



3. OUTDOOR UNIT INSTALLATION

- When the outdoor unit will be exposed to strong wind, fasten it with bolts at the places indicated by the arrows. (Fig.22)
- Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe sold separately and connect it to an commercial 16mm hose. (Reverse model only)
- When installing the drain pipe, plug all the holes (• holes at two places) other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Fig.22) (Reverse model only)

Fig. 22-1 (14,000 BTU/h Type)

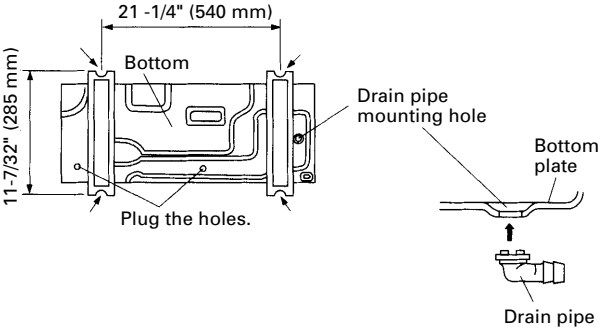
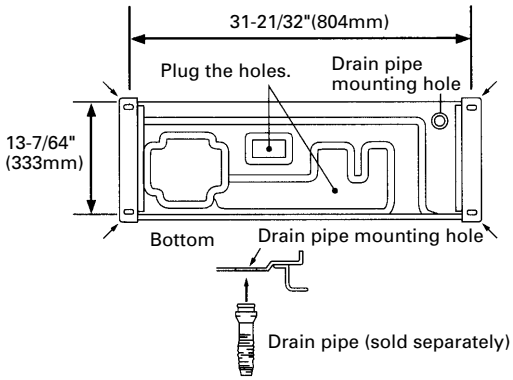


Fig. 22-2 (18,000 & 24,000 BTU/h Type)



4. CONNECTING THE PIPING

1. FLARE PROCESSING

(1) Cut the connection pipe with pipe cutters so that the pipe is not deformed.
(2) Holding the pipe downward so that cuttings cannot enter the pipe, remove the burrs.
(3) Remove the flare nut from the indoor unit pipe and outdoor unit and assemble as shown in (Table 1) and insert the flare nut onto the pipe, and flare with a flaring tool.
(4) Check if the flared part "L"(Fig. 23)is spread uniformly and that there are no cracks.

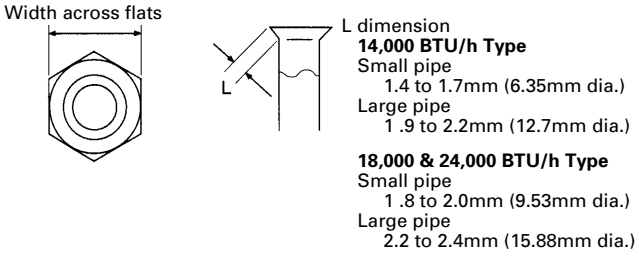
Table 2-A (14,000 BTU/h Type)

Pipe	Flare nut
Small pipe	Small (width across flats 17 mm)
Large pipe	Large (width across flats 24 mm)

Table 2-B (18,000 & 24,000 BTU/h Type)

Pipe	Flare nut
Small pipe	Small (width across flats 22 mm)
Large pipe	Large (width across flats 24 mm)

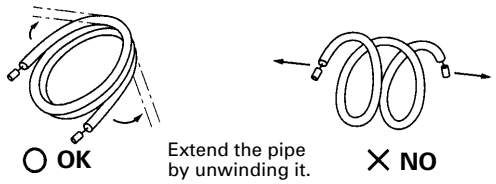
Fig. 23



2. BENDING PIPES

The pipes are shaped by your hands. Be careful not to collapse them.

Fig. 24

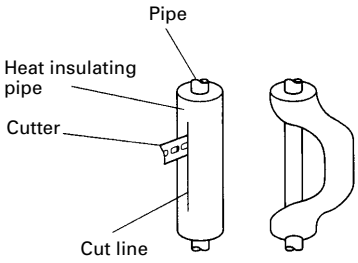


Do not bend the pipes in an angle less than 90.

When the pipes are bent stretched repeatedly, the material will be hardened, causing the pipes no longer be bent or stretched. Be sure to limit number of bendings and stretchings to three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. In this case, cut the heat insulating pipe with a sharp cutter as shown in Fig.25, and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.

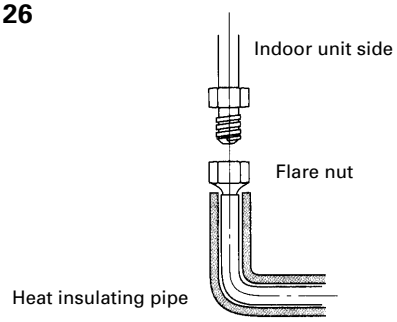
Fig. 25



3. CONNECTION PIPES

(1) Indoor unit side
Centering the pipe against port on the indoor unit, turn the flare nut with your hand. (Fig. 26)
Be sure that the small pipe is completely installed before connecting the large the pipe.

Fig. 26



⚠ CAUTION

Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.

When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.

Fig. 27

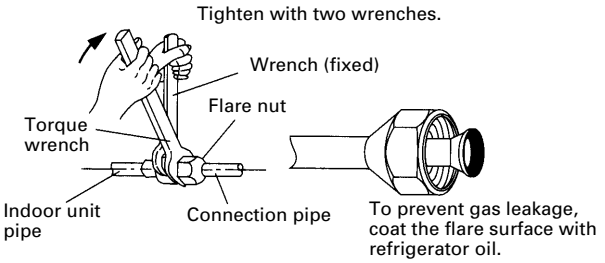


Table 3-A Flare nut tightening torque (14,000 BTU/h Type)

Flare nut	Tightening torque
Small pipe 6.35 mm dia.	14.7 to 19.6 N · m (150 to 200 kgf · cm)
Large pipe 12.7 mm dia.	49.0 to 53.9 N · m (500 to 550 kgf · cm)

Table 3-B Flare nut tightening torque (18,000 & 24,000 BTU/h Type)

Flare nut	Tightening torque
Small pipe 9.52 mm dia.	30.4 to 34.3 N · m (310 to 350 kgf · cm)
Large pipe 15.88 mm dia.	73.6 to 78.5 N · m (750 to 800 kgf · cm)

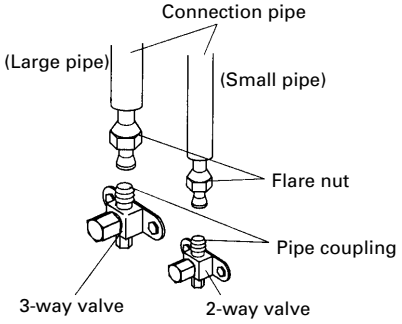
Do not remove the cap from the connection pipe before connecting the pipe.

⚠ CAUTION

Be sure to connect the large pipe after connecting the small pipe completely.

(2) Outdoor unit side
Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side

Fig. 28



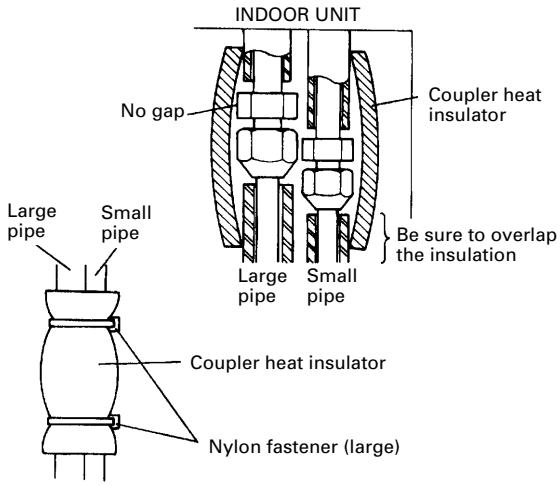
4. Checking the pipe connections for gas leaking

For both the indoor and outdoor unit sides, check the joints for gas leaking by the use of a gas leakage detector without fail when the pipes are connected.

5. Heat insulation on the pipe joints (Indoor side only)

Put coupler heat insulator on the joints (indoor side only) (Fig.29) Secure the coupler heat insulator with the nylon fastener (large). (Fig.29)

Fig.29

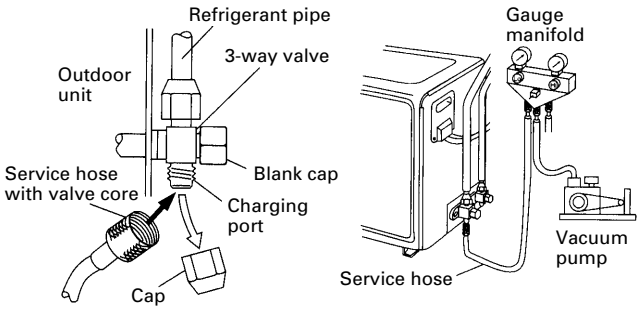


5. AIR PURGE

1. AIR PURGE

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure in them lowers to below 1.5 mmHg.
(3) Disconnect the service hoses and fit the cap to the charging valve (Tightening torque : 70 to 90 kgf·cm).
(4) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque : 2-way valve : 70 to 90 kgf · cm, 3-way valve : 100 to 120 kgf · cm).
(5) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque (200 to 250 kgf · cm).

Fig. 30



2. ADDITIONAL CHARGE

Refrigerant suitable for a piping length of 5 m is charged in the outdoor unit at the factory.

When the piping is longer than 5 m, additional charging is necessary.

For the additional amount, see the table below.

Table 4-A (14,000 BTU/h Type)

Pipe length		16 ft (5 m)	23 ft (7 m)	33 ft (10 m)
Additional refrigerant	Reverse model	None	2.1 oz (60 g)	5.3 oz (150 g)
	Cooling model	None	2.1 oz (60 g)	5.3 oz (150 g)

Between 5m and 10m, when using a connection pipe other than that shown in the table, charge additional refrigerant with 1.1 oz (30 g) / 3.3 ft (1 m) as the criteria.

Table 4-B (18,000 & 24,000 BTU/h Type)

Pipe length		16 ft (5 m)	33 ft (10 m)	49 ft (15 m)	66 ft (20 m)
Additional refrigerant	Reverse model	None	8.8 oz (250 g)	17.6 oz (500 g)	26.5 oz (750g)
	Cooling model	None	2.1 oz (60 g)	4.2 oz (120 g)	6.3 oz (180g)

Between 5m and 20m, when using a connection pipe other than that shown in the table, charge additional refrigerant with

Reverse model 1.76 oz (50g) / 3.3 ft (1 m)

Cooling model 0.42 oz (12g) / 3.3 ft (1 m)

as the criteria.

⚠ CAUTION

(1) Always pump down the piping before use.

(2) Add refrigerant from the charging valve after the completion of the work.

6. GAS LEAKAGE INSPECTION

⚠ CAUTION

After connecting the piping, check the joints for gas leakage with gas leak detector.

7. HOW TO CONNECT WIRING TO THE TERMINALS

A. For solid core wiring (or F-cable)

(1) Cut the wire and with a wire cutter or wire-cutting pliers, then strip the insulation to about 15/16"(25 mm) to expose the solid wire.

(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.

(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.

(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screw driver.

B. For strand wiring

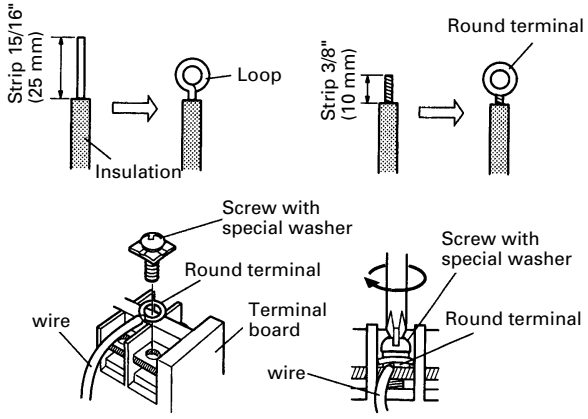
(1) Cut the wire and with a wire cutter or wire-cutting pliers, then strip the insulation to about 3/8"(10 mm) to expose the strand wiring.

(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.

(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.

(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

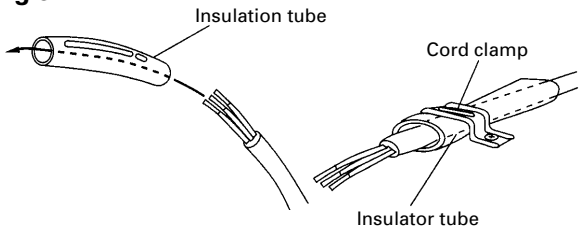
Fig.31



HOW TO FIXED CONNECTION CORD AND POWER CABLE AT THE CORD CLAMP

After passing the connection cord and power cable through the insulation tube, fasten it with the cord clamp.

Fig.32



Use VW-1, 0.5 to 1.0 mm thick, PVC tube as the insulation

8. ELECTRICAL REQUIREMENT

- Electric wire size and fuse capacity :

Table 5

		14,000 BTU/h class	18,000 BTU/h class	24,000 BTU/h class
Connection cord (mm^2)	MAX	2.0	3.5	3.5
	MIN	1.5	2.5	2.5
Fuse capacity (A)		15	20	30

- Always use H07RNF or equivalent as the connection cord.

9. ELECTRICAL WIRING

⚠ CAUTION

(1) Match the terminal block numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.

(2) Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.

(3) Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)

(4) Always connect the ground wire.

1. INDOOR UNIT SIDE

(1) Remove the electric component box.

Fig.33

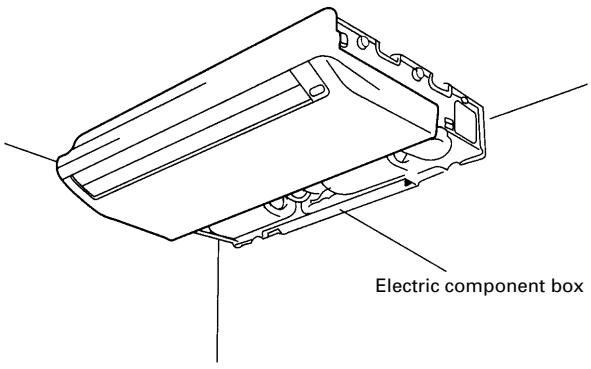
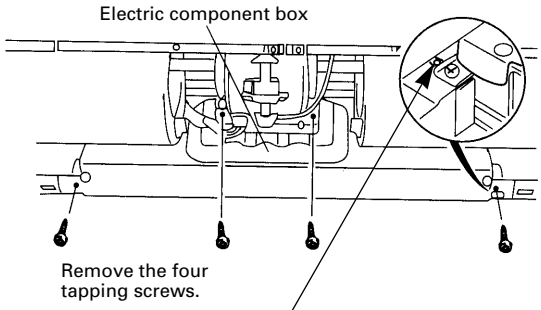


Fig. 34

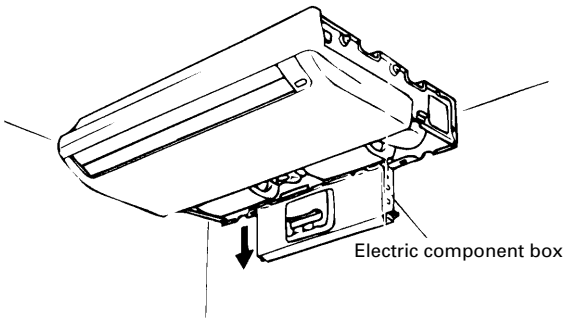


⚠ CAUTION

Do not remove the screws. If the stays are removed, the electric component box will fall.

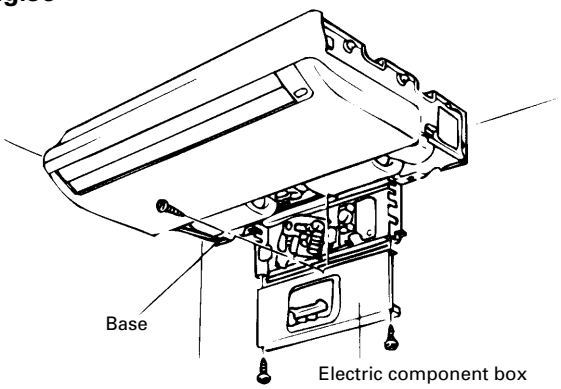
(2) Pull out the electric component box.

Fig.35



(3) Remove the electric component box cover.

Fig.36



Remove the three tapping screws.

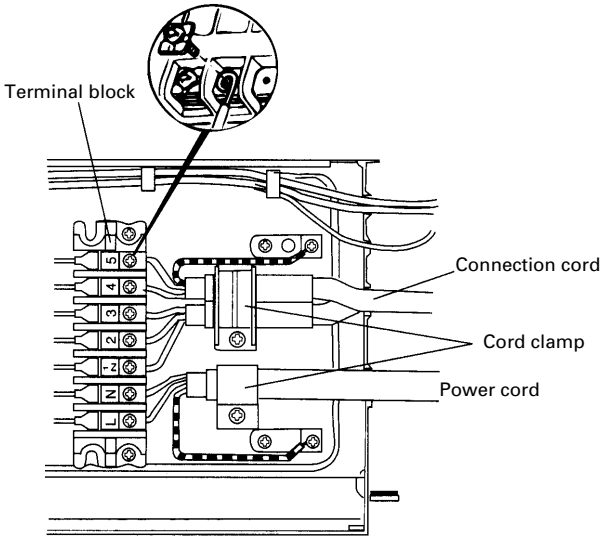
> **⚠ CAUTION**
>
> **Be careful not to pinch the lead wires between the electric component box and base.**

(4) Wiring

[Heat & Cool model(Reverse cycle)]

① Remove the cord clamp.
② Process the end of the connection cords to the dimensions shown in Fig. 37.
③ Connect the end of the connection cord fully into the terminal block.

Fig. 37

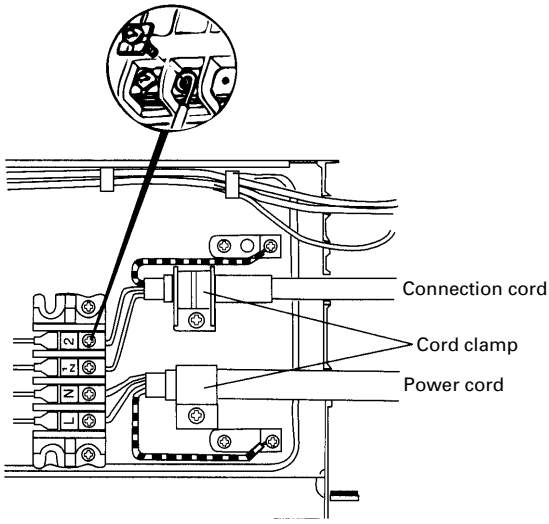


④ Fasten the connection cord with a cord clamp.
⑤ Fasten the end of the connection cord with the screw.

[Cooling model]

① Remove the cord clamp.
② Process the end of the connection cords to the dimensions shown in Fig. 38.
③ Connect the end of the connection cord fully into the terminal block.

Fig. 38

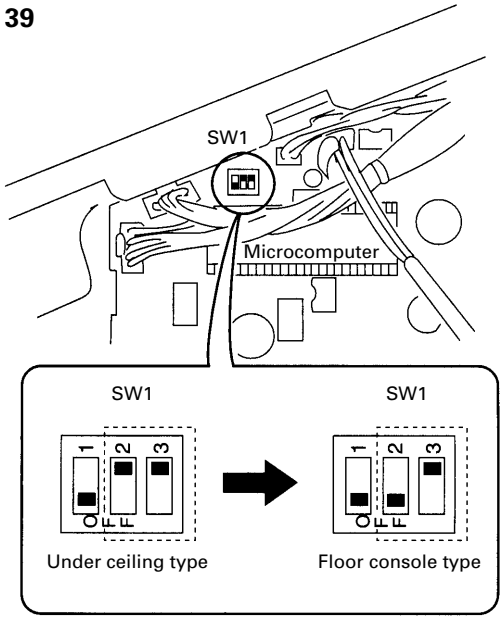


④ Fasten the connection cord with a cord clamp.
⑤ Fasten the end of the connection cord with the screw.

(5) Floor console / Under ceiling select switch

① The electrical circuits for this were set for use as a ceiling type at the factory.
② The following changes must be made to the settings if the unit is to be used as a floor type.
③ Changing the settings for the electrical circuits. Switch 1 (SW1) on the printed circuit board inside the electric component box must be set as follows.

Fig. 39



2. OUTDOOR UNIT SIDE

Fig.40-A

14,000 BTU/h Type only

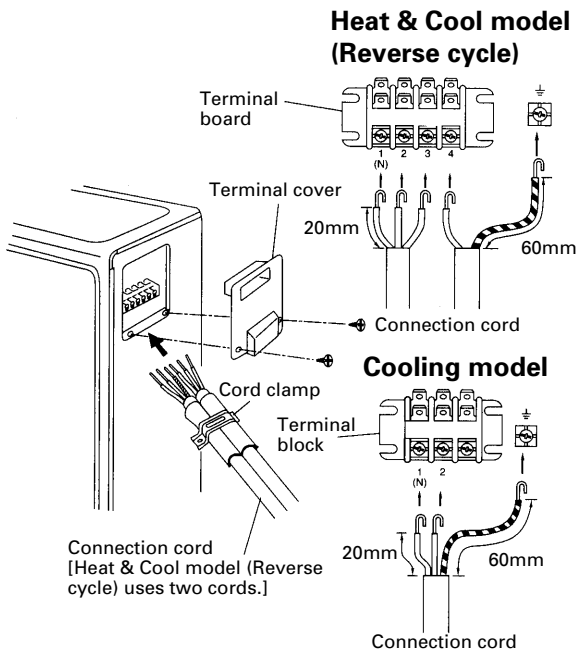


Fig.40-B

14,000 BTU/h Type only

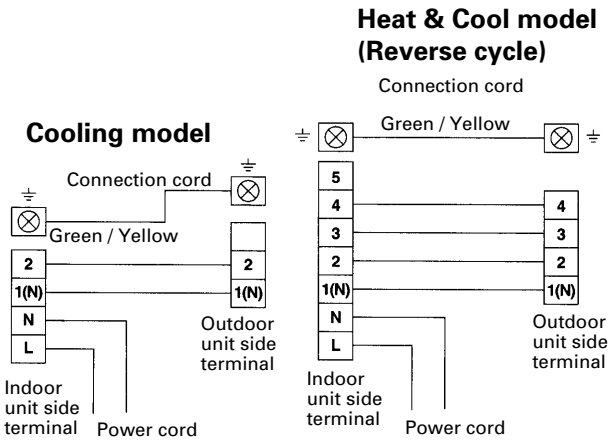


Fig.40-A

18,000 & 24,000 BTU/h Type only

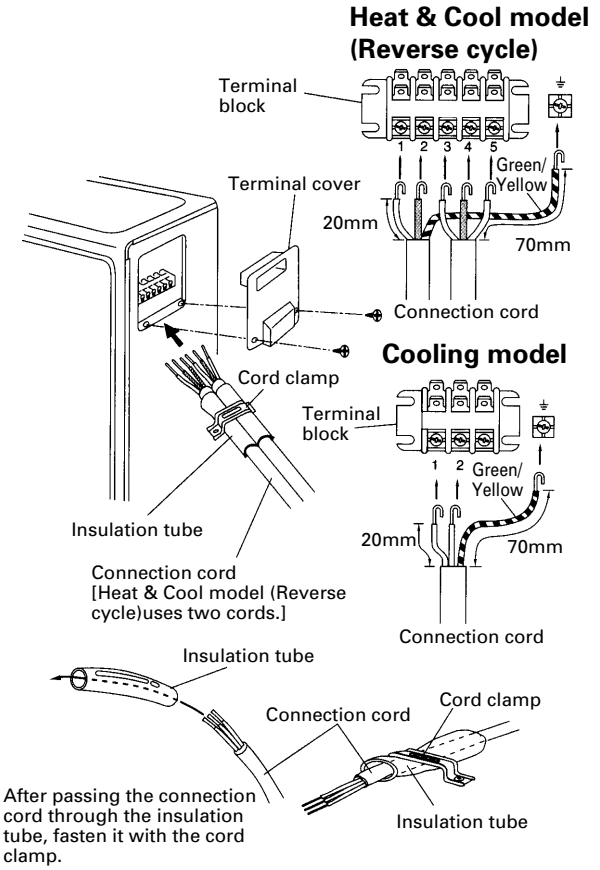
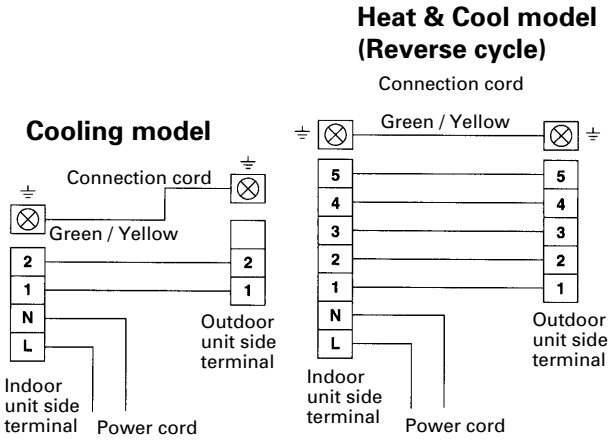


Fig.40-B

18,000 & 24,000 BTU/h Type only



10. POWER

⚠ WARNING

(1) The rated voltage of this product is 220-240V A.C. 50Hz.

(2) Before turning on, verify that the voltage is within the 198V to 264V range.

(3) Always use a special branch circuit and install a special receptacle to supply power to the room air conditioner.

(4) Use a circuit breaker and receptacle matched to the capacity of the room air conditioner.

(5) The circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.

(6) Perform wiring work in accordance with standards so that the room air conditioner can be operated safely and positively.

(7) Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.

⚠ CAUTION

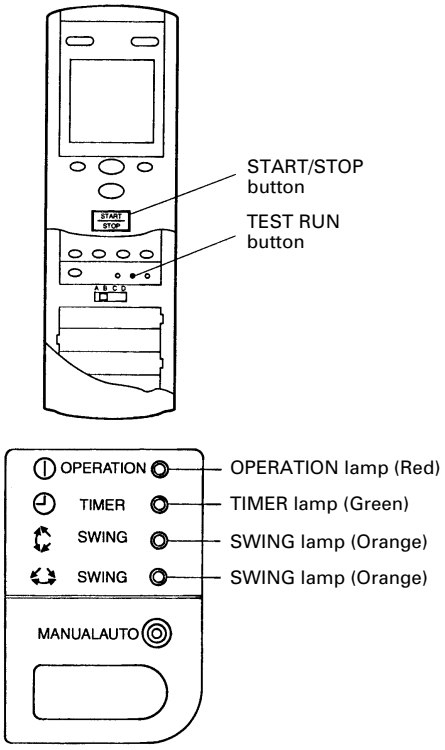
(1) The power source capacity must be the sum of the room air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.

(2) When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.

11. TEST RUNNING

- Press the remote control unit test run button while the air conditioner is running.
- At the end of test running, press the remote control unit start-stop button. (Fig.41)

Fig. 41



Operation can be checked by lighting and flashing of the display section OPETATION and TIMER lamps. Perform judgement in accordance with the following.

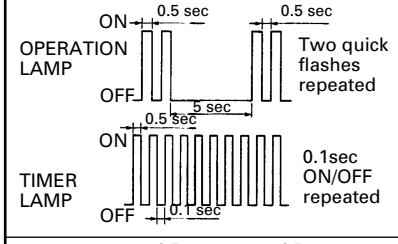
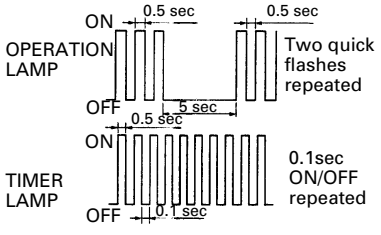
- Test running

When the air conditioner is run by pressing the remote control unit test run button, the OPERATION and TIMER lamps flash slowly at the same time.

- Error

The OPERATION and TIMER lamps operate as follows (Table 6) according to the error contents.

Table 6

Error display	Error contents
	Room temperature thermistor abnormal temperature detected
	Piping thermistor abnormal temperature detected

CHECK ITEMS

1. INDOOR UNIT

(1) Is operation of each button on the remote control unit normal?
(2) Does each lamp light normally?
(3) Do not air flow direction louvers operate normally?
(4) Is the drain normal?
(5) Is there any abnormal noise and vibration during operation?

2.OUTDOOR UNIT

(1) Is there any abnormal noise and vibration during operation?
(2) Will noise, wind, or drain water from the unit disturb the neighbors?
(3) Is there any gas leakage?

- Do not operate the air conditioner in the test running state for a long time.
- For the operation method, refer to the operating manual and perform operation check.

12. CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual :

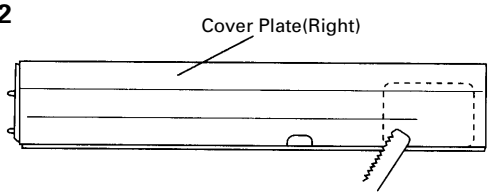
(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow switching, and other remote control unit operations.
(2) Air filter removal and cleaning, and how to use the air louvers.
(3) Give the operating and installation manuals to the customer.

13. MOUNT THE COVER PLATE AND THE INTAKE GRILLE

1. Mount the cover plate. (Right)

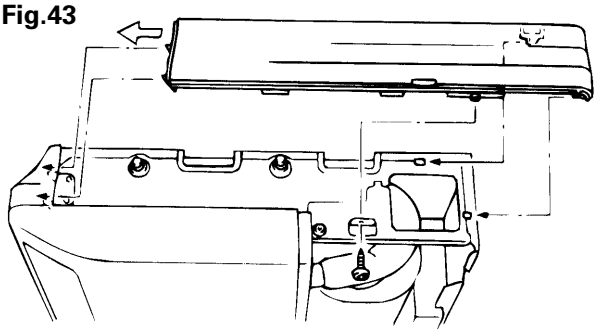
(1) Cut a pipe exit hole in the right plate. This is only when the pipe exits from the right side.(This operation is not required when the protrusion is on the top or rear.)

Fig.42



(2) Join the cover plates (right) and mount with screws. (Fig.43)

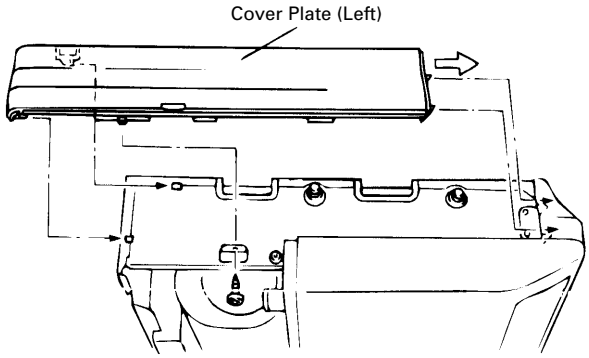
Fig.43



2. Mount the cover plate. (Left)

(1) Join the cover plates (left) and mount with screws.

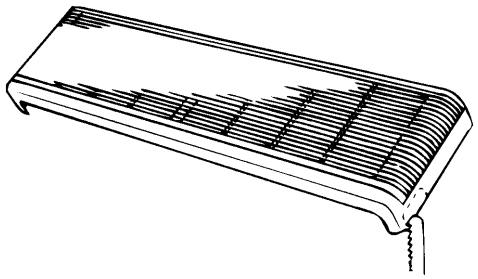
Fig.44



3. Mount the intake grille.

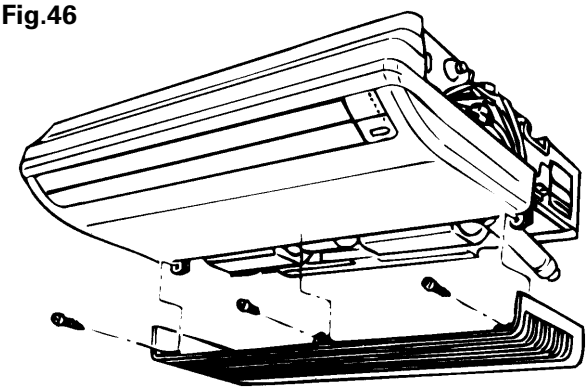
(1) Cut the right side of the intake grille. This is only when the pipe exits from the right side. (Fig.45)

Fig.45



(2) Insert the hinges on the bottom of the intake grille into the holes in the base assembly. Then mount the arms to the three areas on the top of the intake grille. (Fig.46)

Fig.46



14. REMOTE CONTROL UNIT INSTALLATION

⚠ CAUTION

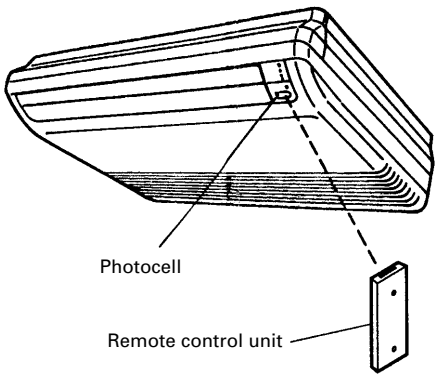
(1) Check that the indoor unit correctly receives the signal from the remote control unit, then install the remote control unit holder.

(2) Select the remote control unit holder selection site by paying careful attention to the following: Avoid places in direct sunlight. Select a place that will not be affected by the heat from a stove, etc.

1. REMOTE CONTROL UNIT HOLDER INSTALLATION

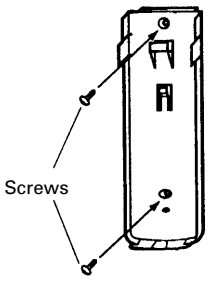
- Install the remote control unit so that the front is facing the photocell. (Fig.47)

Fig. 47

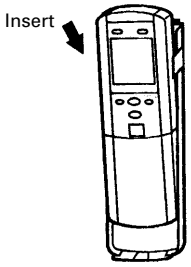


- Install the remote control unit with a distance of 7m between the remote control unit and the photocell as the criteria. However, when installing the remote control unit, check that it operates positively.
- Install the remote control unit holder to a wall, pillar, etc. with the tapping screw. (Fig.48)

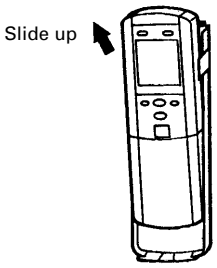
Fig. 48 For use as Handy Type



① **Mount the Holder.**

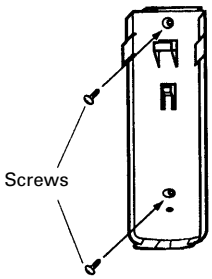


② **Set the Remote Control Unit.**

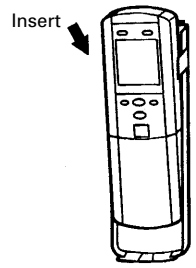


③ **To remove the Remote Control Unit. (when use at hand)**

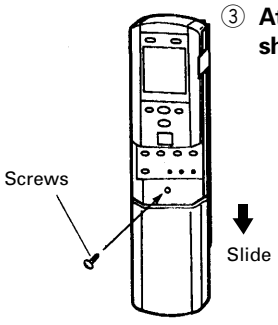
For use as Wall Fixing Type



① **Mount the Holder.**



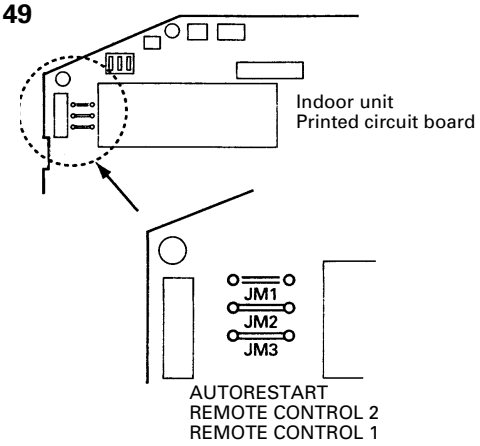
② **Set the Remote Control Unit.**

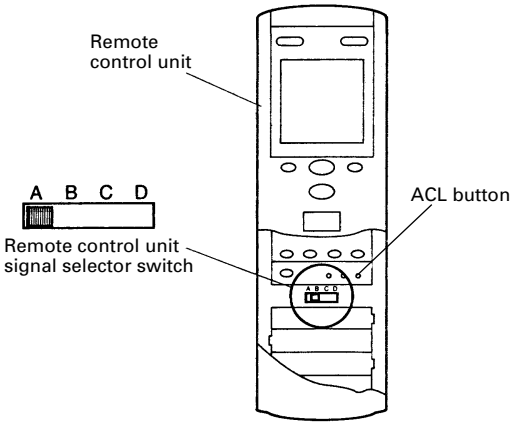


③ **Attach the unit to the holder as shown.**

2. REMOTE CONTROL UNIT CODE SWITCHING

Fig. 49





Confirm the remote control unit signal selector switch selection and printed circuit board setting.

If these are not confirmed, the remote control unit cannot be operated for the air conditioner.

Table 7

Jumper wire		Remote control unit signal selector switch
JM 2	JM 3	
Connect	Connect	A (Primary setting)
Connect	Disconnect	B
Disconnect	Connect	C
Disconnect	Disconnect	D

After setting the remote control unit signal selector switch, press the ACL button.

05M11H00021– 6792

May 1999 Printed in Japan