SERVICE INSTRUCTIONS

SPLIT TYPE ROOM
AIR CONDITIONER

WALL MOUNTED
COMPACT type

7000 BTU/H
9000 BTU/H
12000 BTU/H
14000 BTU/H
17000 BTU/H

2-ROOM MULTI(9000 BTU/H×2 UNIT)
3-ROOM MULTI(9000 BTU/H×3 UNIT)

WIRELESS REMOTE
CONTROL MODEL

CONTENTS

No. SI-18AW-1

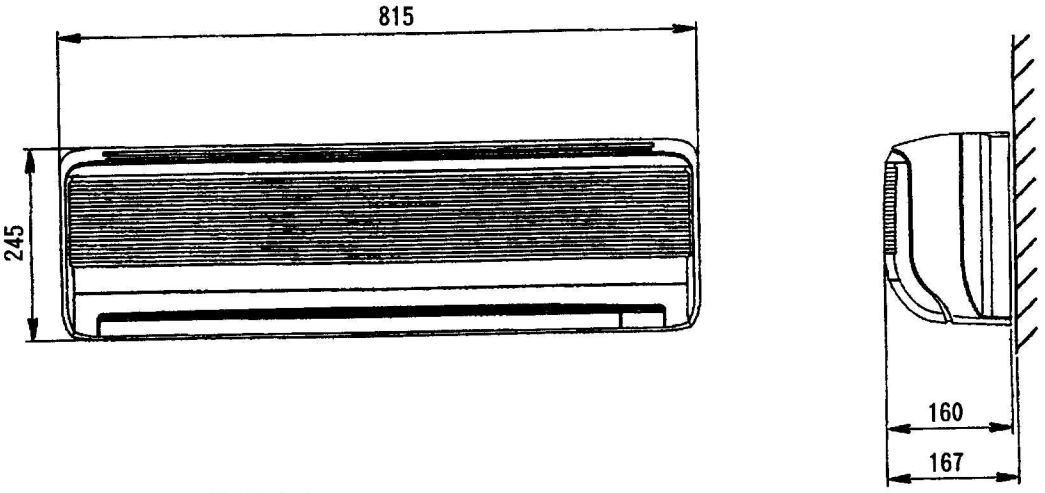
DIMENSIONS

1. INDOOR UNIT

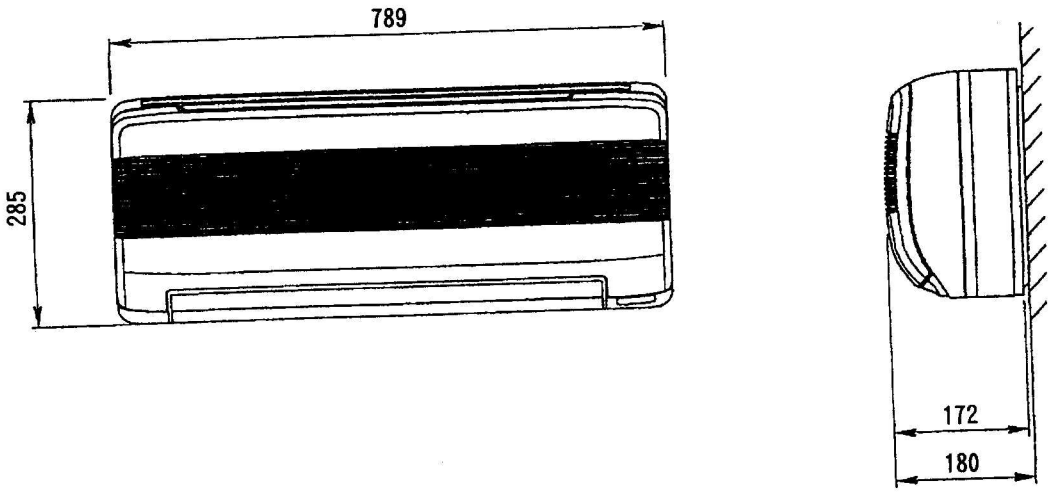
WIRELESS REMOTE CONTROL MODEL

Unit: mm

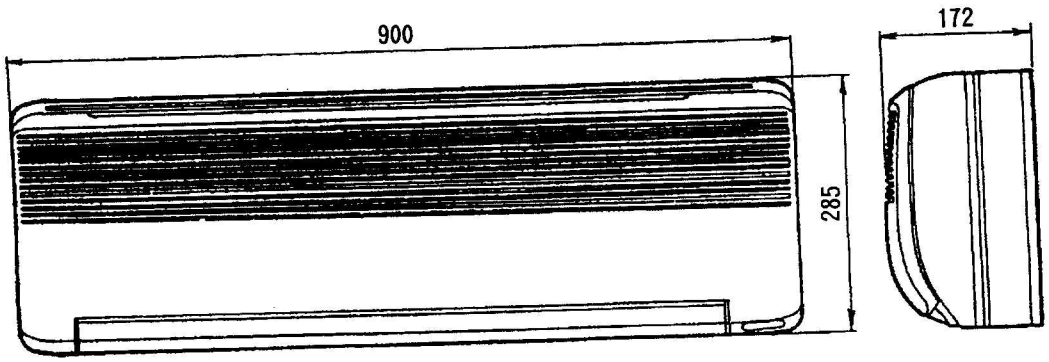
1-1. 7000 BTU/H Model



1-2. 9000, 12000 BTU/H Models



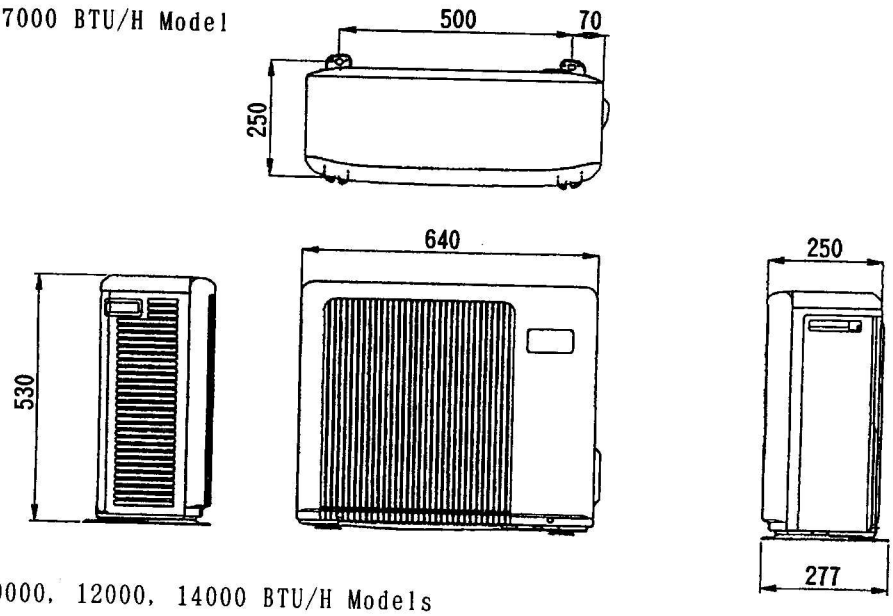
1-3. 14000, 17000 BTU/H Models



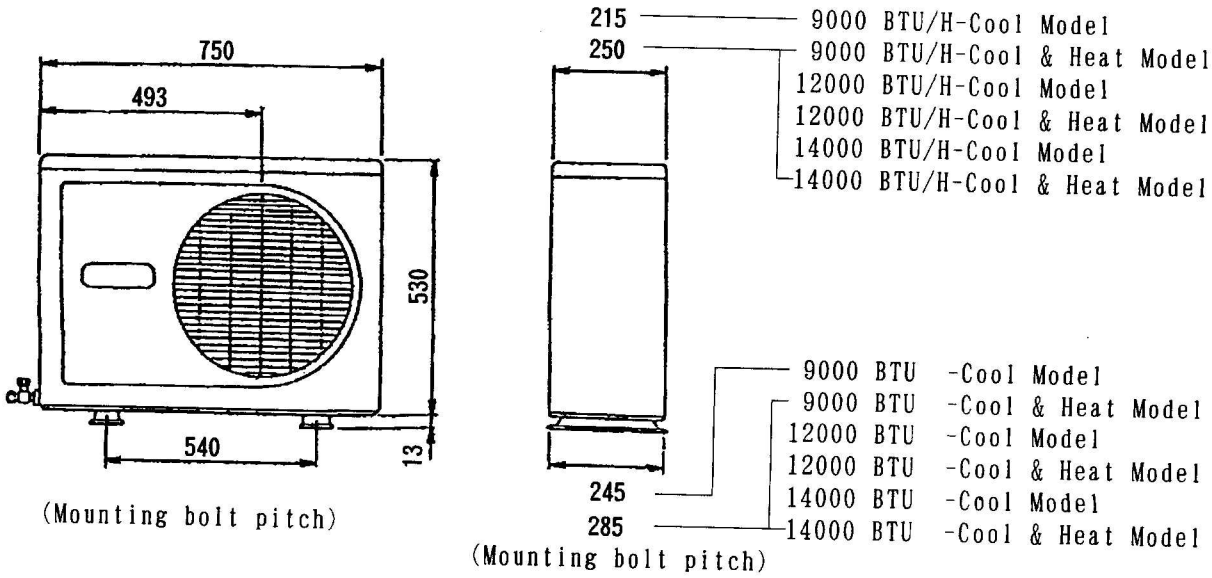
2. OUTDOOR UNIT

2-1. 7000 BTU/H Model

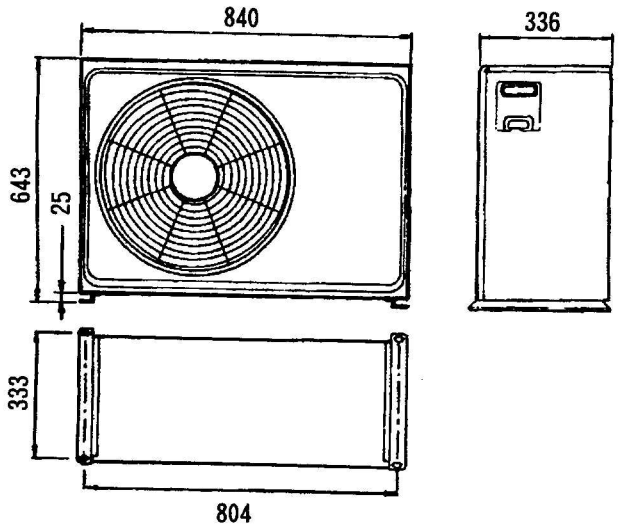
Unit: mm



2-2. 9000, 12000, 14000 BTU/H Models



2-3. 9000 BTU/H (2-Room and 3-Room Multi type), 17000 BTU/H Models



DESCRIPTION OF FUNCTIONS

1. THREE MINUTES DELAY FUNCTION (3ST)

1)The outdoor unit is not operated for three minutes after the power plug is inserted into the socket. (Compressor protection, breaker off prevention, etc.)
2)When test operation was performed in heating during continuous operation, it takes some time until an air blows out from the indoor unit because "Three minutes delay" and "Cold air prevention" have priority over TEST operation.

2. THREE MINUTES CONTINUOUS OPERATION TIMER (3HT)

Operation continues without halting for three minutes after the compressor is starts.

3. INDOOR HEAT EXCHANGER DE-ICING FUNCTION (When cooling & dry operation)

- Cooing operation
When the temperature of the heat exchanger on the indoor side becomes less than 3℃ during cooling operation, FAN CONTROL is switched to HIGH flow automatically.
After that, when the temperature of the indoor heat exchanger becomes 7℃ or more, fan control returns to the air flow specified.
When the temperature of the indoor heat exchanger is kept less than 3℃ for 3 minutes at HIGH flow, operation of the compressor stops.
- Dry operation
When the temperature of the heat exchanger is under 13℃ at the time of the operation start, the compressor starts once.
But, the heat exchanger becomes more than 13℃, and the compressor does not start before the THREE MINUTES DELAY (3ST) function finishes.
When the temperature of the heat exchanger is under 13℃ at the time of the compressor stop, the indoor fan motor continues to operate until the THREE MINUTES DELAY (3ST) function finishes.

4. DEFROSTING OPERATION [REVERSE CYCLE MODEL] See Defrosting Flow Chart on pages 9 to 11.

1)The defrosting operation is performed when frost is produced on the outdoor heat exchanger. At this time, the heating mode will stop temporarily.
2)The defrosting operation time differs from the conditions (temperature, humidity, etc.). (Approximately 6 ~ 9 to 13 minutes)

3)During the defrosting operation, the indoor and outdoor fans are stopped and the operation lamp flashes (7000BTU ---- defrost lamp turned on).
4)"Bushhhh", "goh, goh, goh", and other sounds will be heard during the defrosting operation. These sounds are normal. (Four-way valve switching sound, refrigerant sound)

5. 4-WAY VALVE DELAY SWITCHING FUNCTION [REVERSE CYCLE MODEL]

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

6. COLD AIR DISCHARGE PREVENTION FUNCTION [REVERSE CYCLE MODEL]

1)When heat operation is started, the fan of the indoor unit operates continuous by " S-Lo" mode. After the temperature of the indoor heat exchanger becomes more than 27℃, operation enters into the air flow mode specified.

2)When the compressor is stopped by the thermostat, the indoor fan stops about 20 seconds later.

7. HEATING OVERLOAD PROTECTION FUNCTION [REVERSE CYCLE MODEL]

During heating operation, the compressor is operated, 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 the outdoor temperature is high is provided.

1)When the indoor heat exchanger temperature reaches 54℃ for 12000BTU/H & 14000BTU/H models (7000BTU/H ---- 55℃, 9000BTU/H ---- 51℃), the outdoor fan motor stops.

2)When the indoor heat exchanger temperature has recovered to 48℃ for 12000BTU/H & 14000 BTU/H models (7000BTU/H ---- 50 ℃, 9000BTU/H ---- 45℃), the outdoor fan motor starts.

3)When the indoor heat exchanger temperature rises to 58℃ for 12000BTU/H & 14000BTU/H models (7000BTU/H ---- 59℃, 9000BTU/H ---- 56℃) even when the outdoor fan motor is stopped the compressor stops.

8. SET TEMPERATURE COMPENSATION AT OPERATION START

At the time of operation start and since when MASTER CONTROL is switched to cooling and heating, set temperatures are compensated by +2 ℃ for heat operation for 60 min. and by -1℃ for cool operation for 40 min.

9. TEST BUTTON AND OTHER OPERATION KNOBS

1)"TEST" BUTTON(TEST position)
(1)When switched to the "TEST" position, only the thermostat is shorted.
(2)Set to this position when testing after installation.
(3)If the air conditioner is used in the "TEST" state, since the compressor, heat exchanger, etc. will be damaged because temperature control can not be performed, always switched to "NORMAL" operation.
(4)If the microcomputer or other electronic circuit is faulty, the air conditioner can not be operated even by test run.

2)OTHER OPERATION KNOBS
①POWER SWITCH
ON : During normal operation, leave in this position.
OFF: Set to this position when not using the unit for an extended period of time.

②MANUAL AUTO BUTTON
Use this button for temporary manual operation in the event that the remote control unit's batteries die, or the remote control unit is lost. The operation is the same as MASTER CONTROL "AUTO" position. In order to halt operation, either push the forcing automatic button again or turn POWER SWITCH off.

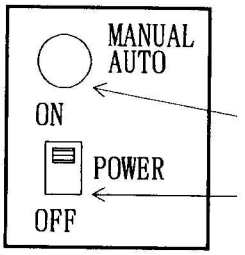
③POWERFUL BUTTON (7000 BTU/H COOLING MODEL ONLY)
Provided the powerful button is pressed, a set temperature lowers by 1℃ (lower limit 18℃), and indoor fan airflow UP to "S-Hi" mode, the fan operation continues to run for 25 minutes.
- The powerful operation is automatically cleared in 25 minutes after the powerful button is pressed, and it returns to usual operation.
- Even if the airflow is changed during powerful operation, it does not change, and returns to the airflow set after powerful operation.
- Powerful operation and super quiet operation can not be performed simultaneously.

④SUPER QUIET BUTTON
(7000 BTU/H COOLING MODEL ONLY)
In this mode, the indoor unit's fan speed is lowered to produce silent operation. Press the super quiet button during operation to start, and the super quiet lamp will be lit, Then, set as follows.

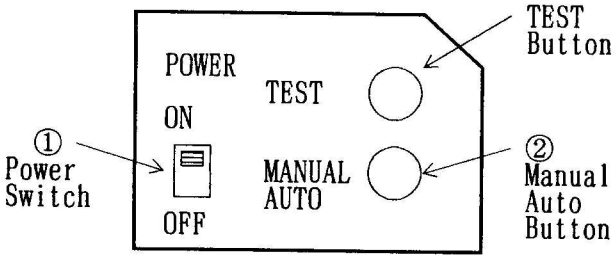
Indoor fan : Airflow down to SQ mode.

- In the dry operation, super quiet operation can not be performed.
- During the super quiet operation, if the fan control mode is changed, the super quiet operation will be cleared.
- If the super quiet operation lasts for many

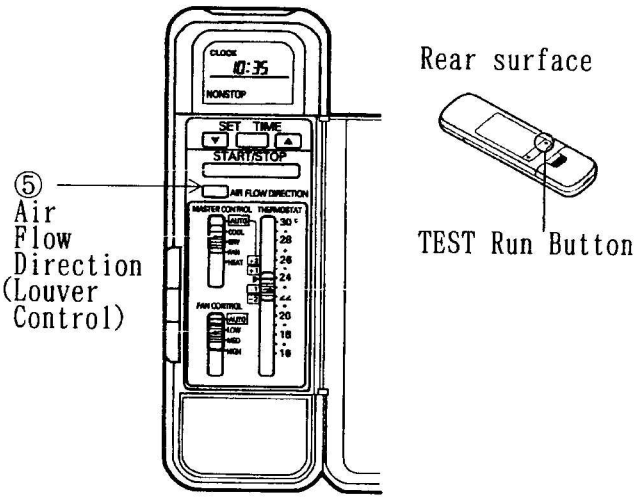
—— Operation Control Panel ——
• 9000 & 12000 & 14000 & 17000 BTU/H MODELS
Controls are located under the front panel.



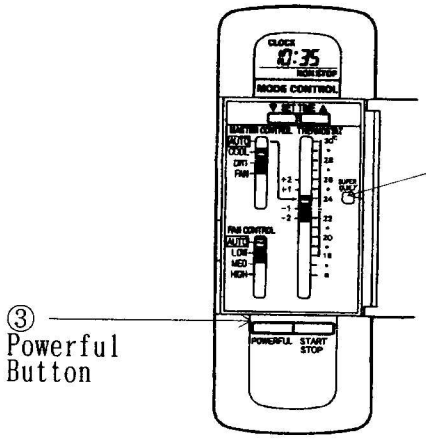
• 7000 BTU/H MODEL



—— Remote control unit ——
• 9000 & 12000 & 14000 & 17000 BTU/H MODELS



• 7000 BTU/H MODEL



hours, the room may not be often cooling.

⑤ AIR FLOW DIRECTION (LOUVER CONTROL)
When the indoor control interface device receives a control signal (infrared rays) light from the remote control, it will actuate the step motor (for louver up/down action) according to the control signal, and set the louver to each position.
In addition, if the air conditioner is stopped, the louver will be closed automatically.

⑤-1. AUTOMATIC AIRFLOW-DIRECTION ADJUSTMENT

(a) The airflow-direction louvers (double flap) is set automatically in accordance with the operating mode (heating, cooling, etc.)

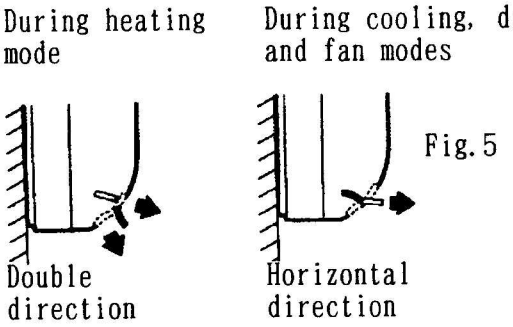


Fig. 5

(b) During automatic operation mode, the airflow-direction louvers (Double flap) will switch automatically in the following way :
Heating: At the beginning of operation the louvers will direct the airflow downward to the floor area; as the room is gradually warmed, the flaps will change to permit double direction heating.

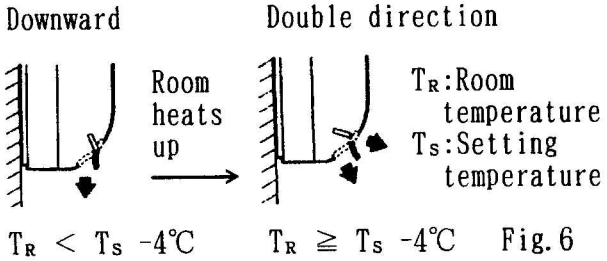


Fig. 6

Cooling: For four minutes after operation begins, the louvers direction is at a slight downward diagonal; thereafter, the direction switches to horizontal.

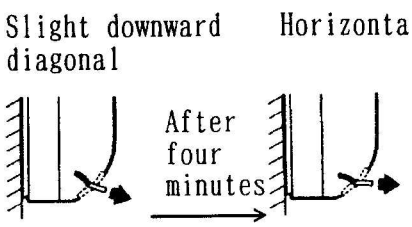


Fig. 7

Dry, monitor mode: Horizonral direction.

(c) If you wish to select a different airflow direction, you may use the remote control unit's airflow direction button to choose a different setting.

⑤-2. ADJUSTING THE AIRFLOW DIRECTION

(a) Press the SET LOUVER button
This control allows you to select a desired airflow direction.

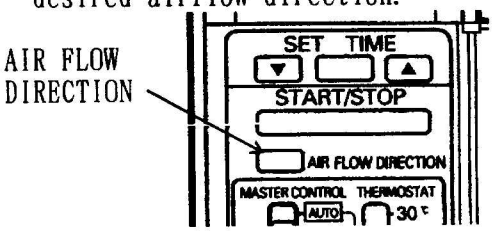
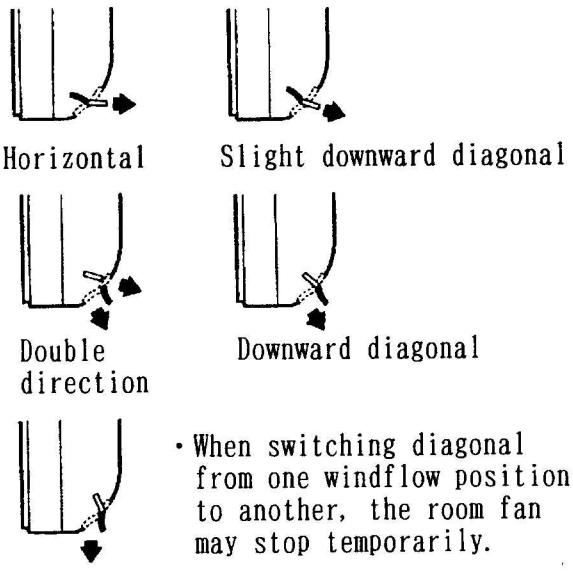


Fig. 8
Remote control unit

(b) Type of airflow: Fig. 9



・When switching diagonal from one windflow position to another, the room fan may stop temporarily.

In order to heighten the efficiency of heating, cooling and drying modes, the airflow-direction louvers should be set within the following ranges:

For heating: Double direction
Downward diagonal, Downward
For cooling: Horizontal
Slight downward diagonal

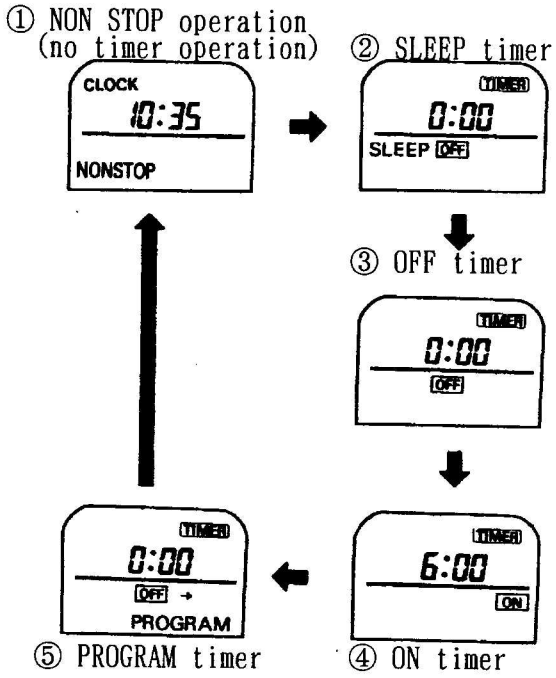
10. TIMER

There are five timer modes: "NON STOP", "SLEEP", "OFF TIMER" , "ON TIMER" and "PROGRAM TIMER".

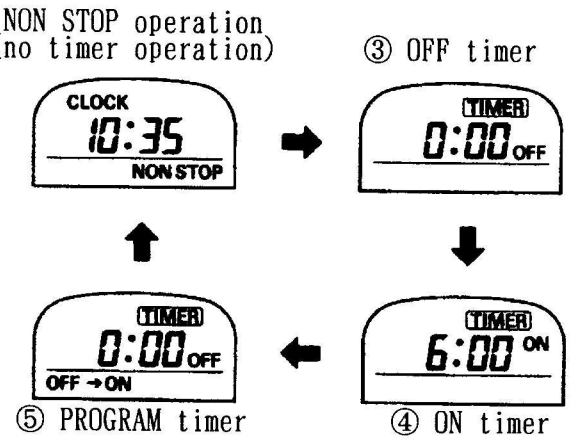
(1)Set the clock time when the unit is in the stop mode. (only the current time will be shown on the remote control unit display)
(2)While adjusting the current clock time, do not use other remote control functions.

(3)Each time the timer MODE CONTROL button is pressed, the remote control unit's display will change in order as shown below :

- 9000 & 12000 & 14000 & 17000 BTU/H MODELS



- 7000 BTU/H MODEL



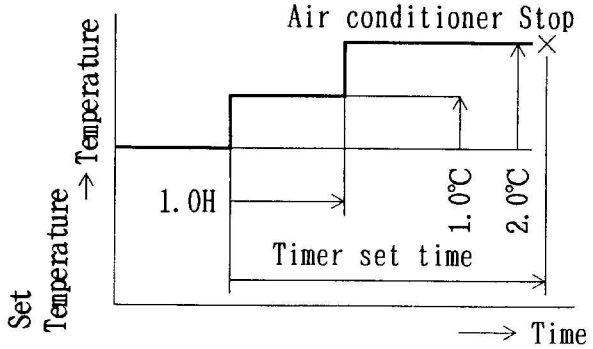
(Example: When the OFF timer is set to 0:00 and the ON timer is set to 6:00)

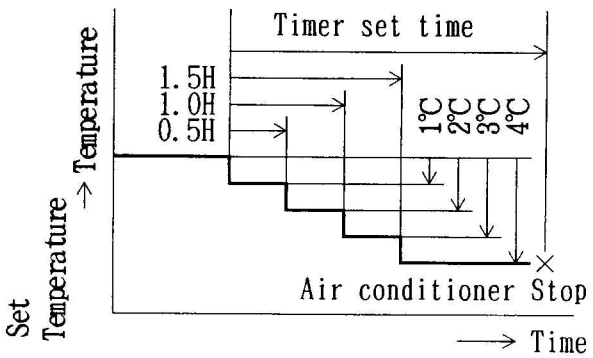
①NON STOP
When "cooling", "heating" and "fan" are performed continuously, set the timer knob to "NON STOP".

②SLEEP timer
When desiring to stop operation automatically after you go to bed, if the timer knob is set to the "SLEEP" position, operation stops while the "room temperature" is changed automatically.

*Cooling
When set to the "SLEEP", the set temperature is raised 1.0℃, then raised 1.0℃/ 1 hour thereafter. When the temperature has been raised a total of 2℃, that temperature is held until the set time has elapsed, then operation automatically stops.

*Heating (REVERSE CYCLE Model)
When set to the "SLEEP", the set temperature is lowered 1℃, then lowered 1℃/30 minutes thereafter. When the temperature has been lowered at a total of 4℃, that temperature is held until the set time has elapsed, then operation automatically stops.





③OFF 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.

④ON TIMER

For wake up operation or otherwise to start operation. Depending on the difference between the actual room temperature and the set temperature value, the unit will start operation automatically in order to bring the room temperature to the desired set temperature value by the time previously set.

The higher or lower the room temperature is (relative to the set temperature), the earlier the unit will start its operation. ON-timer operation will start: For heating : 45 ~ 10 minutes before the set time For cooling : 20 ~ 10 minutes before the set time

In the case of FAN mode, the operation will start precisely at the set time.

⑤PROGRAM TIMER

Use for OFF→ON operation, etc., to stop the air conditioner when going to bed and adjust the room temperature to the optimum temperature upon arising.

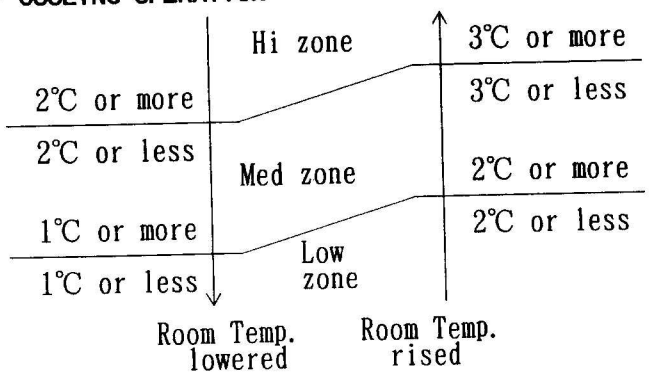
(1)The program timer allows the OFF timer and ON timer to be used in combination one time (OFF→ON or OFF←ON).

(2)Operation will start from the timer setting (either OFF timer or ON timer) whichever is closest to the clock's current time setting.

11. 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 in the left.

2) HEATING OPERATION

(1)When the indoor heat exchanger temperature becomes 47 ℃ or more, the fan mode switches to higher position for one step("LOW"→ "MED", "MED" → "HIGH").

(2)When the indoor heat exchanger temperature lowers less than 41 ℃ while the compressor operates, the fan mode switches to lower position for one step("HIGH" → "MED", "MED" → "LOW").

(3)After switching the fan mode, it does not switch 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 "MED" fan mode.

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

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

12. OPERATING MODE

(1)"AUTO" position:

Depending on the room temperature at the time operation begins, the operating mode will be switched automatically as shown in the accompanying table. Also, depending on the operating mode, the room temperature setting will cause the "normal" (→) temperature to be set as shown.

Room Temperature		Operating Mode		Temperature Setting("normal →" setting)
30℃ or more	⇨	Cool	⇨	27℃
27℃ to 30℃	⇨	Cool	⇨	26℃
24℃ to 27℃	⇨	Dry	⇨	24℃
22℃ to 24℃	⇨	Monitor		
Less than 22℃	⇨	Heat	⇨	23℃

①Once the operating mode has been set, the mode will not change even if the room temperature changes. However, during the monitor operation mode, if the room temperature changes to below 22℃, the mode will automatically switch to heating, and when it rises above 24℃ the mode will automatically switch to drying.

Thermostat temperature setting range:
* Heating mode----- 16 ~ 30℃
* Cooling mode----- 18 ~ 30℃

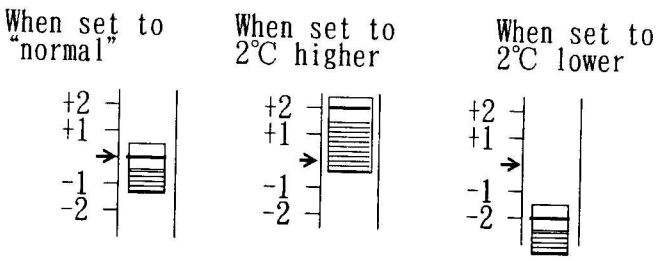
②When in the monitor mode, the fan will operate very slowly (S-Low mode).

③In the dry mode, the fan will operate slowly to prevent room humidity from rising, and the room fan may stop.

④During defrosting operation in the heating mode, the OPERATION indicator lamp will flash slowly and the heating mode will stop temporarily.

⑤THERMOSTAT position

The temperature can be set within 2℃ higher or 2℃ lower than the "normal"(→) setting.



(2)"FAN" position:

①In this position, the fan operates alone to circulate air. The room temperature will not be changed.
②Operates at an air flow set in FAN CONTROL mode.

(3)"DRY" position:

①In the dry mode, since preference will be given to remove humidity, the room temperature may not be lowered to the selected value.

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

③Room heating cannot be performed in the dry mode.

④In the dry mode, the optimum fan speed will be set automatically and cannot be changed. The fan will emit a very weak stream of air.

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

(4)"COOL" position:

When using the cooling mode, set the temperature to a value lower than the actual current room temperature. If it is set higher than the current room temperature, the unit will not enter the cooling mode and only the fan will operate.

(5)"HEAT" position: [REVERSE CYCLE MODEL]

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

②For about 3 ~5 minutes after starting heating, the fan will operate very slowly, then switch to the selected fan setting. This period is to allow the indoor unit's heat-exchanger to prewarm before emitting warm air.

③During defrosting, the OPERATION indicator lamp will flash slowly, and the heating mode will be temporarily interrupted.

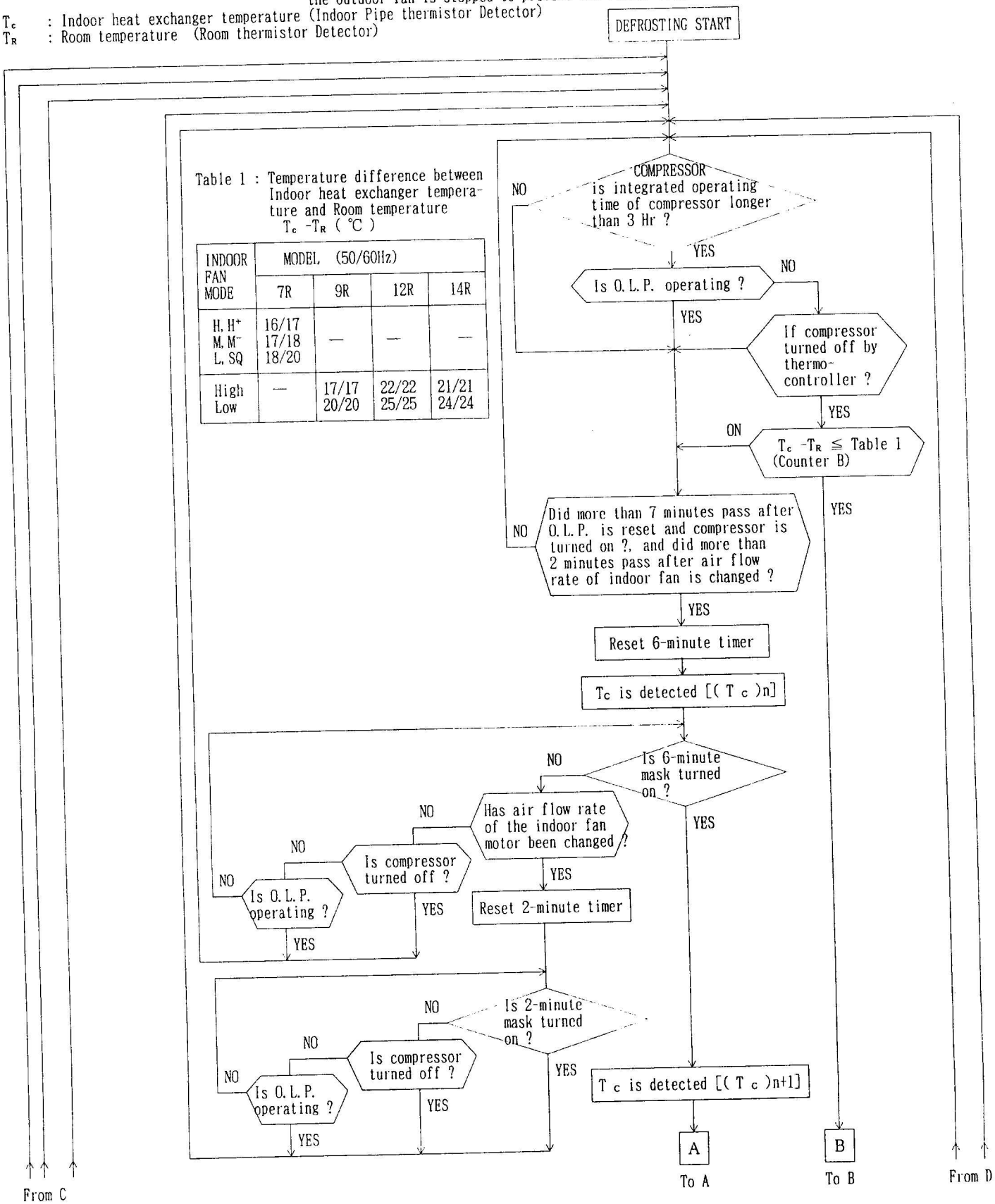
DEFROSTING OPERATION FLOW CHART
(REVERSE CYCLE MODEL)
DEFROSTING (Only at "Heating" flow chart)

——— Meaning of symbols ———
O. L. P. (Overload Protector) is operating : If the indoor heat exchanger temperature is too high, the outdoor fan is stopped to prevent the former from rising.

T_c : Indoor heat exchanger temperature (Indoor Pipe thermistor Detector)
T_R : Room temperature (Room thermistor Detector)

Table 1 : Temperature difference between Indoor heat exchanger temperature and Room temperature
$T_c - T_R$ (℃)

INDOOR FAN MODE	MODEL (50/60Hz)			
	7R	9R	12R	14R
H, H+ M, M- L, SQ	16/17 17/18 18/20	—	—	—
High Low	—	17/17 20/20	22/22 25/25	21/21 24/24



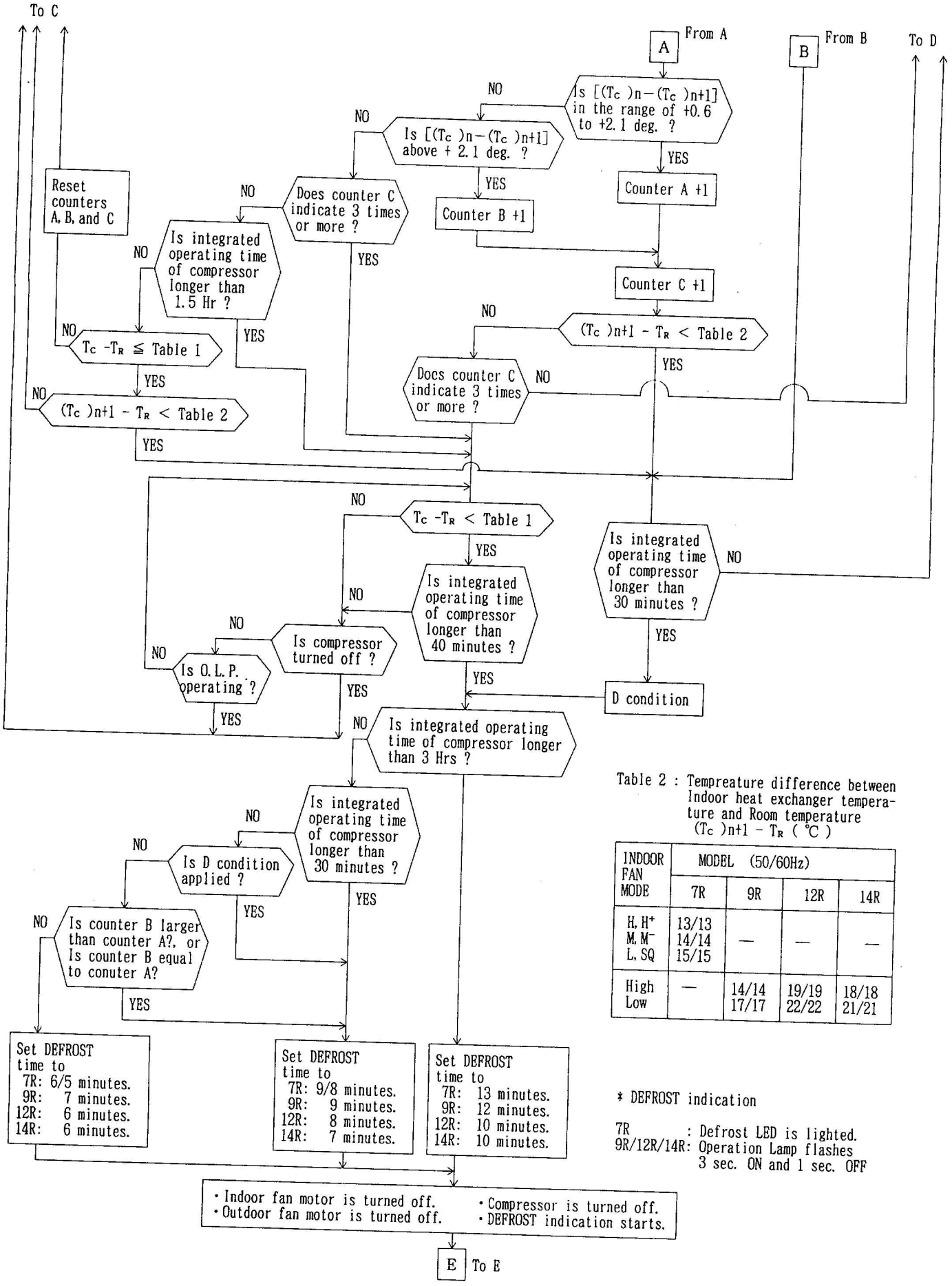
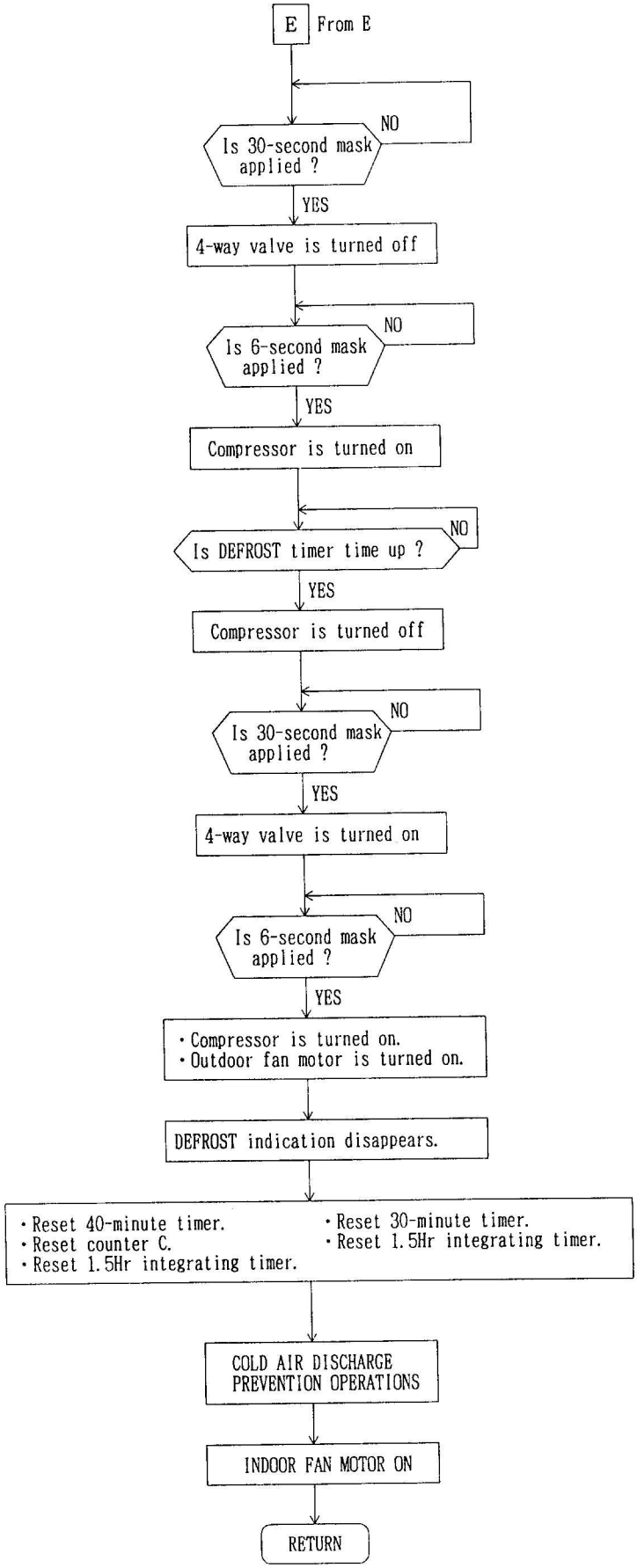


Table 2 : Tempreature difference between Indoor heat exchanger temperature and Room temperature (Tc)n+1 - TR (℃)

INDOOR FAN MODE	MODEL (50/60Hz)			
	7R	9R	12R	14R
H, H+ M, M− L, SQ	13/13 14/14 15/15	—	—	—
High Low	—	14/14 17/17	19/19 22/22	18/18 21/21

* DEFROST indication

7R : Defrost LED is lighted.
9R/12R/14R: Operation Lamp flashes 3 sec. ON and 1 sec. OFF


E
From E
Is 30-second mask applied ?
NO
YES
4-way valve is turned off
Is 6-second mask applied ?
NO
YES
Compressor is turned on
Is DEFROST timer time up ?
NO
YES
Compressor is turned off
Is 30-second mask applied ?
NO
YES
4-way valve is turned on
Is 6-second mask applied ?
NO
YES
• Compressor is turned on.
• Outdoor fan motor is turned on.
DEFROST indication disappears.
• Reset 40-minute timer.
• Reset counter C.
• Reset 1.5Hr integrating timer.
• Reset 30-minute timer.
• Reset 1.5Hr integrating timer.
COLD AIR DISCHARGE PREVENTION OPERATIONS
INDOOR FAN MOTOR ON
RETURN

TROUBLESHOOTING

1. WORKING INSPECTION(When cooling)

Symptom	Possible cause	Remedy
(1)Indoor unit evaporator is coated with frost. a. Frost near inlet. b. Frost all over.	Gas leakage. Clogged filter. Low ambient temperature (less than 20℃)	Check the leaked part, and charge gas. Clean the filter. Check the ambient temperature
(2)Compressor operates, but it does not cool.	Stained condenser.	Clean.
(3)Water does not come out of the drain hose.	When the compressor operates normally, the gas leaks.	Charge gas and replace the parts.
(4)Return pipe(low pressure) of the compressor is not cold.	Gas leakage.	Charge gas. Replace parts.
(5)Outlet pipe(high pressure) of the compressor 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. Stained condenser.	Eliminate overload. Clean.
(7)Indoor unit air outlet temperature is low; but it does not cool.	Clogged filter. The cooled air is short-circuited. Overload operation.	Clean. Isolate the problem and correct. Eliminate the overload.

2. SYMPTOMS AND CHECK ITEMS

Symptom	Cause	Check item	Check point
No operation	Power supply circuit faulty Microcomputer reset circuit faulty Remote control faulty External wiring receiving section faulty	Check 1 Check 2	Power supply circuit Microcomputer input signal Remote control trouble-shooting
Erroneous operation (runaway)	Microcomputer runaway	Check 3	Reset circuit
Display does not light correctly.	Display unit faulty LED driver faulty	Check 4	Display unit Microcomputer output signal Driver output signal
Room temperature cannot be controlled.	Room thermistor faulty Pipe temperature thermistor faulty A/D converter input section faulty Compressor relay circuit faulty	Check 5 Check 8 Check 6	Thermistor resistance value Microcomputer input signal Relay output
Room fan does not run and wind speed cannot be switched.	Wind speed relay faulty	Check 7	Microcomputer output signal Driver output signal
Indication panel abnormal	Thermistor shortcircuited or opened	Check 9	Thermistor resistance value

Note : [ ] Ref. No. of 7000 BTU/H Model

CHECK 1
Symptom----- No operation.
Remote control not received.
Preliminary checks
* Is the power cord plugged in ?
* Is power present at the plug socket ?
* Is power turned off ?
(1)Power connection check
* Is power received at main PC board terminal K101/W101 (220 or 240V AC)
* Is the fuse(3A) blown ?
(2)Power transformer check
* Are CN103[CN101] and CN102[CN103] inserted firmly ?
* Is 15 to 20V AC output at CN102 [CN103] ?
(3)Power supply circuit check
① 12V line
0V---- D101, Q101 faulty
D104[D102], C104[C106] shorted, R101 open
② 5V line
0V---- D5 open, IC2 faulty. C9, C10 shorted, other parts shorted
(4)Power interrupt signal faulty
R3, R5 open, C12 shorted. IC3-1 faulty
(5)Reset IC faulty
IC4 faulty.
(6)Microcomputer oscillator faulty
Is the oscillator waveform (8.0 MHz) output at microcomputer pins 30 and 31 ? If the oscillation waveform is not output, X1 or the microcomputer is faulty.
(7)Microcomputer faulty

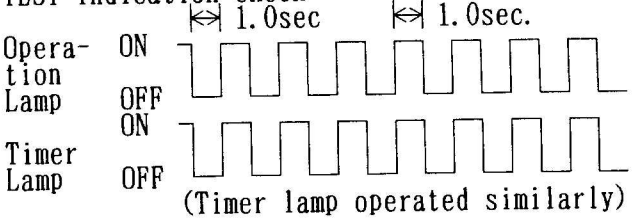
CHECK 2
Preliminary checks
* If the air conditioner operates when the remote control battery is changed, there are not problems. (The battery life is six months to one year)
* When the receiving part of the remote control unit is exposed to direct sunlight, remote control may not be received.
* When the infrared signal between the remote control unit and receiver is blocked, remote control is not received.
(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 5cm of the radio, the remote control unit is normal.
(2)When remote control unit is normal
Is CN9 disconnected ?
The receiver at the air conditioner indicator PC board is faulty, or the main PC board is faulty.

CHECK 3
Symptom----- Erroneous operation. (runaway)
Preliminary checks
* 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
IC4 faulty, C14 shorted

CHECK 4
Symptom----- Display does not light correctly
Preliminary checks
* Is display PC board connectors CN9 inserted firmly ?
* Is the display unit cable open ?
(1)LED driver faulty
IC6 faulty, R16 to R18 open. If all of the above are normal, the display unit is faulty

CHECK 5
Symptom----- Room temperature cannot be controlled. (Compressor does not run or does not stop.)
Preliminary checks
* Is the TEST-MANUAL AUTO switch in the TEST position ?

TEST indication check



(Timer lamp operated similarly)

* Is room temperature or thermistor connector CN12 inserted firmly ?
* Is the set temperature correct ?
(1)Thermistor faulty
The room temperature thermistor resistance values are shown on page 14.
When there is a large error, the thermistor is faulty.
(2)A/D input circuit faulty
R32 open or shorted, R30 open, C26 and C32 shorted. If all of the above are normal, advance to Check 6.

CHECK 6
Symptom----- Room temperature cannot be controlled.
Preliminary checks
* Is each Faston terminal CN16-CN107 of the power relay inserted firmly ?
* Is the indoor unit and outdoor unit connection wiring open or loose ?
(1)IC5[IC6] faulty
IC5-5 [IC6-4] output port shortcircuited, K101 Power relay faulty

CHECK 7
Symptom----- Room fan does not run.
Preliminary checks
* At dehumidification operation, the room fan is stopped while the compressor is stopped.
* Turn the fan once or twice 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, C101[C105] open
(3)Relay drive circuit faulty
IC5[IC6] faulty
IC5-2 [IC6-7] output port shortcircuited
SSR101 faulty, L101 open

CHECK 8
Room temperature thermistor
* CN12 disconnected. CN12 No. 1-2 short-circuited.
* Thermistor faulty
* R32 open, shortcircuited.
C26, C32 shortcircuited
R14, R15 open.
* See CHECK 9 for LED abnormal indications.

Heat exchanger (Pipe) thermistor
* CN13 disconnected. CN13 No. 1-2 short-circuited.
* Thermistor faulty
* R33 open, shortcircuited.
C27, C33 shortcircuited.
R31 open.
* See CHECK 9 for LED abnormal indications.

CHECK 9
Thermistor Abnormal Indication

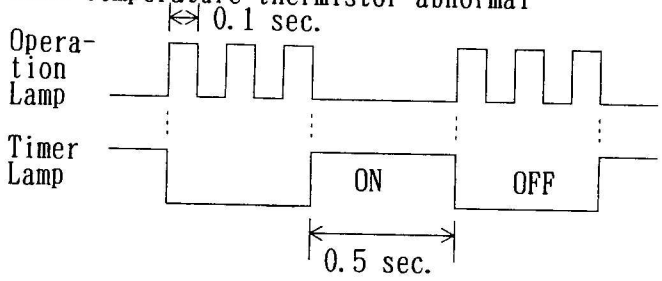
(1) Whether during operation or non-operation, when the room temperature thermistor or heat exchanger thermistor is opened or shorted, operation is immediately stopped and failure indication (see item (3) described below) is displayed.

(2) In the case where this function stops the operation, any operation instruction cannot resume the operation.

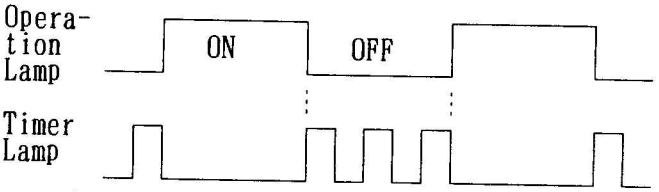
(3) Failure indications stated in (1) are shown in the right figures.

• 9000 & 12000 & 14000 & 17000 BTU/H MODELS

* Room temperature thermistor abnormal

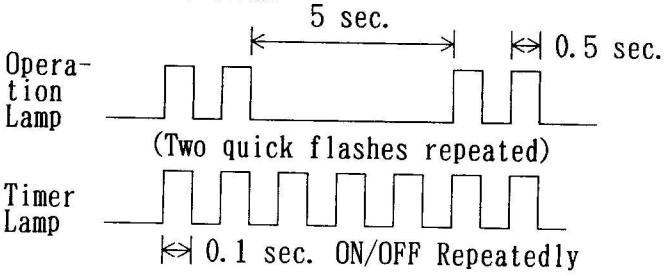


* Heat exchanger (Pipe) thermistor abnormal



• 7000 BTU/H MODEL

* Room temperature and heat exchanger (Pipe) thermistor abnormal



3. Thermistor resistance values

1) Room temperature thermistor

Room temperature(℃)	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) Heat exchanger (pipe) temperature thermistor

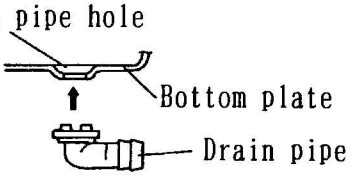
Pipe temperature(℃)	0	2	6	10	14	18	22	26
Resistance value(KΩ)	176.0	157.8	127.3	103.3	84.4	69.3	57.2	47.5
Pipe temperature(℃)	30	34	38	44	50	56	60	
Resistance value(KΩ)	39.6	33.2	27.9	21.7	17.0	13.5	11.6	

PRECAUTIONS ON INSTALLATION

1. DRAIN PIPE INSTALLATION [REVERSE CYCLE MODEL]

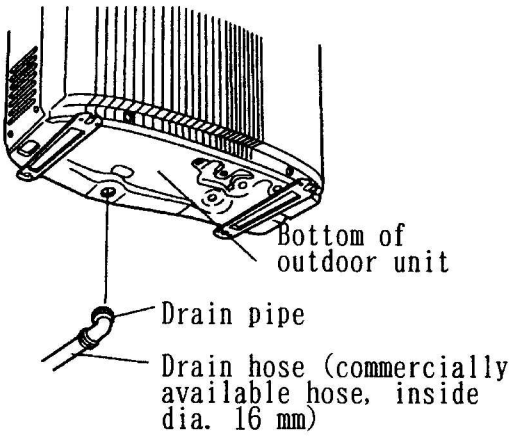
Since the drain water flows from the outdoor unit during heating and cooling operation, when it is installed at a high place, install the drain pipe as shown in Fig. 1 and connect it to a 16mm(inside diameter) hose available anywhere. When installing the drain pipe, fill the holes indicated by ● mark other than the hole for the drain pipe in the bottom of the outdoor unit with drain cap to prevent water leakage. (Fig. 2 and 3)

Fig. 1



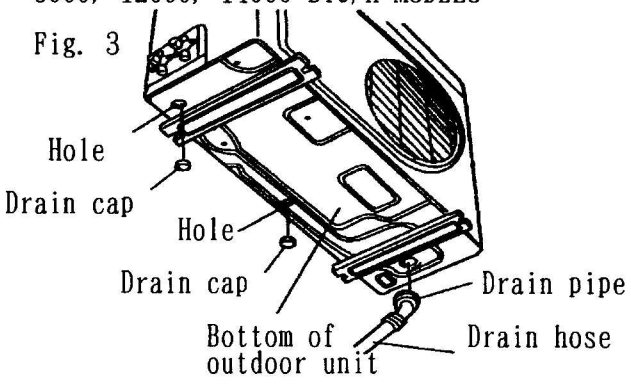
• 7000 BTU/H MODEL

Fig. 2



• 9000, 12000, 14000 BTU/H MODELS

Fig. 3



2. 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.

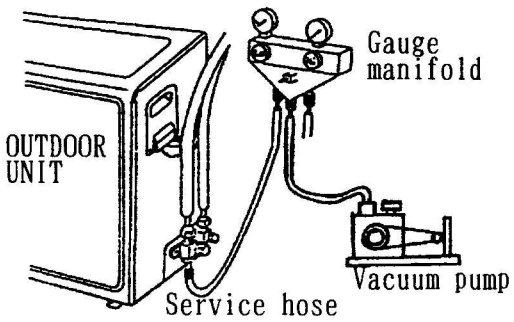
3) Open the spindle of the two valves from the closed state.

4) Tighten the cap of the two valves to the specified torque.

	Tightening torque kg-cm	
	2-way valve	3-way valve
Spindle	70 ~ 90	100~120
Cap	200~250	

5) Tightening torque of flare nut.

Flare nut tightening torque	
1/4" (6.35mm)	150 ~ 200 kgf-cm
3/8" (9.53mm)	310 ~ 350 kgf-cm
1/2" (12.70mm)	500 ~ 550 kgf-cm



3. PUMP DOWN

(Draining outdoor unit refrigerant)

When the connection pipe must be disconnected or the unit is moved to an another place, the refrigerant in the indoor unit and pipes should be drained into the outdoor unit. This procedure is called "Pump down".

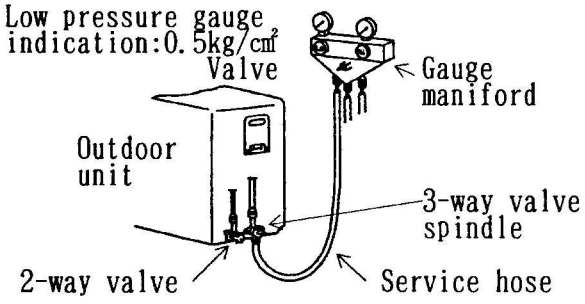
1) Fully close the valve spindle of the two-way valve. (Turn clockwise.)

2) Connect the charging valve of the three-way valve to the low pressure gauge manifold with a charge hose.

3) Set the three-way valve to its middle position, slightly open the low pressure valve of the gauge manifold to discharge the air from the charge hose and close the valve.

4) While running the air conditioner, close the three-way valve (turn the valve spindle clockwise) when the low pressure gauge reads 0.5kg/ cm², and stop the air conditioner.

5) After disconnecting the pipes, attach the screw caps and tighten securely the flare nut.



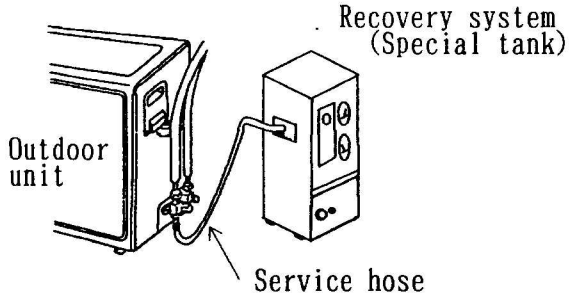
4. COLLECTING AND CHARGING REFRIGERANT

1) Collecting
When the pipe must be unbrazed to repair the refrigeration cycle, carefully collect the refrigerant as follows.

Note: Since there is the danger of frostbite if the refrigerant is touched directly, perform this work carefully.

(1) Remove the cap, and connect the refrigerant collecting device to the charging valve.
(2) Collect the refrigerant in the unit into the collecting device or a special tank. (The collected refrigerant cannot be used unless it is refined.)

【CAUTION】
When collecting the refrigerant, observe the environment protection regulations and laws in each district.



2) Charging.
To charge the refrigerant, proceed as described below.

(1) Check that the refrigeration cycle is connected perfectly.
(2) Evacuate the cycle to a vacuum from the charging valves connection to the outdoor unit.
(3) After evacuation, charge the refrigerant from the large pipe charging valve.

• Additional refrigerant charge
Refrigerant suitable for a piping length of 5m is charged in the outdoor unit at the factory. When the piping is 5m or more long, it is necessary to additional refrigerant.
For the additional amount, see the table below.

(a) 7000, 9000, 12000 BTU/H MODELS

Pipe length	16 ft (5 m)	23 ft (7 m)	33 ft (10 m)
Additional refrigerant	None	1.1 oz. (32 g)	2.8 oz. (80 g)

Between 5m and 10m, when using a connection pipe other than that in the table, charge additional refrigerant with 0.56 oz. (16g)/ 3.3 ft(1 m) as the criteria.

(b) 14000 BTU/H MODEL

Pipe length	16 ft (5 m)	23 ft (7 m)	33 ft (10 m)
Additional refrigerant	None	1.1 oz. (32 g)	2.8 oz. (80 g)

Between 5m and 10m, when using a connection pipe other than that in the table, charge additional refrigerant with 0.7 oz. (20g)/ 3.3 ft(1 m) as the criteria.

(c) 17000 BTU/H MODEL

Pipe length	16 ft (5 m)	33 ft (10 m)	49 ft (15 m)	66 ft (20 m)
Additional refrigerant	None	2.5oz. (70 g)	4.9oz. (140g)	7.4oz. (210g)

Between 5m and 20m, when using a connection pipe other than that in the table, charge additional refrigerant with 0.49 oz. (14g)/ 3.3 ft(1 m) as the criteria.

—— Multi type model ——

(a) 2-Room Multi type : (9000 BTU/H) x 2 unit
(b) 3-Room Multi type : (9000 BTU/H) x 3 unit

Additional charging is not needed

Caution:
* Always pump down the piping before use.
* When charging the refrigerant, always use a measuring cylinder.
* Add refrigerant from the charging valve after the completion of the work.
* Do not operate the compressor at the first of the charging.
* However, the compressor can be operated if no more refrigerant will enter the cycle.

5. HEIGHT DIFFERENCE

Limit the height difference between the indoor unit and outdoor unit as stated below.
: Within 5 m (16 ft)

If the units are further apart than this, correct operation cannot be guaranteed.

6. ALLOWABLE LENGTH OF CONNECTING PIPE

The maximum length of the piping are as follows.

(a) 7000, 9000, 12000 BTU/H MODELS
: Within 10 m (33 ft)
(b) 17000 BTU/H MODEL
: Within 20 m (66 ft)
(c) 2-Room Multi type MODELS
: Within 15 m (49 ft)
(d) 3-Room Multi type :
: Within 35 m (115 ft)

If the units are further apart than this, correct operation cannot be guaranteed.

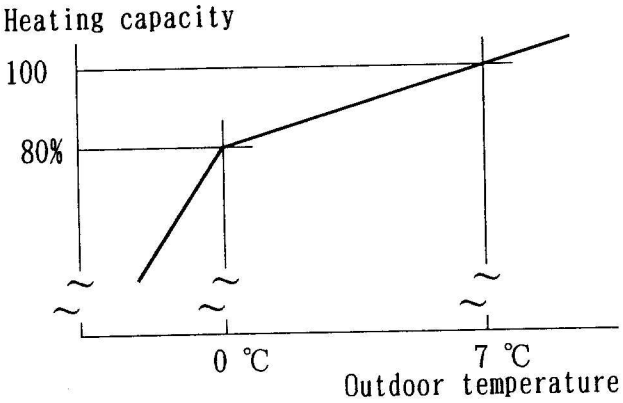
7. AREA LIMIT ON USE BY HEATING OPERATION (REVERSE CYCLE MODEL)

*These models are not designed to use in the area where the temperature in winter is less than 0°C

*Do not perform "Heating" operation when the outdoor temperature is below 0°C otherwise the compressor may be damaged due to the Defrosting performance drop.

*Heating capacity also lowers extremely when the outdoor temperature is below 0°C. Relation between outdoor temperature and heating capacity is shown in the right figure. (Mean value)

* Indoor temperature: 20°C



8. TEMPERATURE INDICATION

The temperature set on the remote controller may differ from the temperature at the installation place, distribution of the room temperature and sun-light approaching condition etc..

9. WIRING CONNECTION BETWEEN THE INDOOR UNIT AND OUTDOOR UNIT

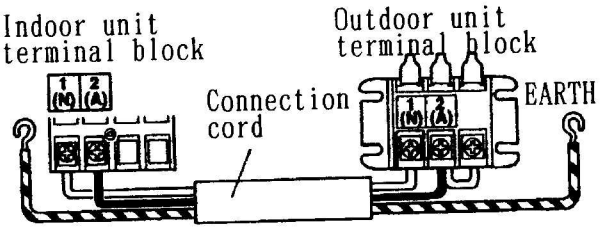
* Match the terminal block numbers and connection cord colors with those of the indoor unit.

* Erroneous wiring may cause burning of the electric parts.

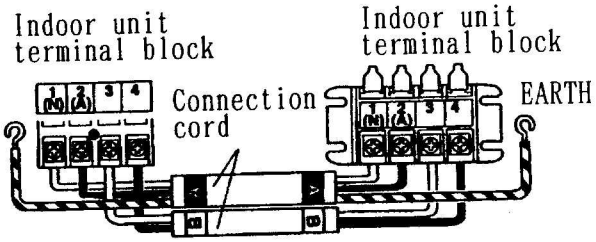
* Always fasten the outside covering of the connection cord with cable clamps. (If the insulator is clamped, electric leakage may occur.)

— Wiring connection

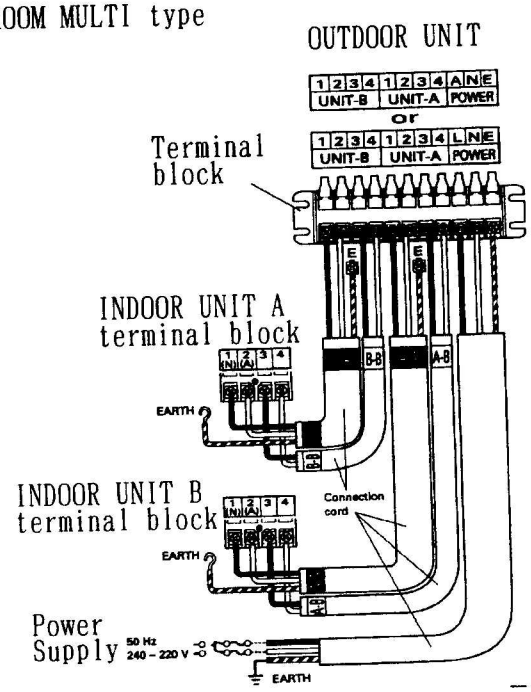
(1) COOLING MODEL type



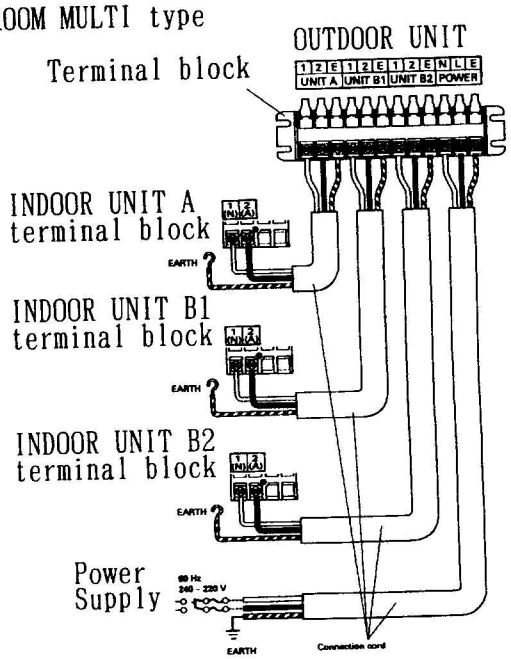
(2) REVERSE CYCLE MODEL type



(3) 2-ROOM MULTI type

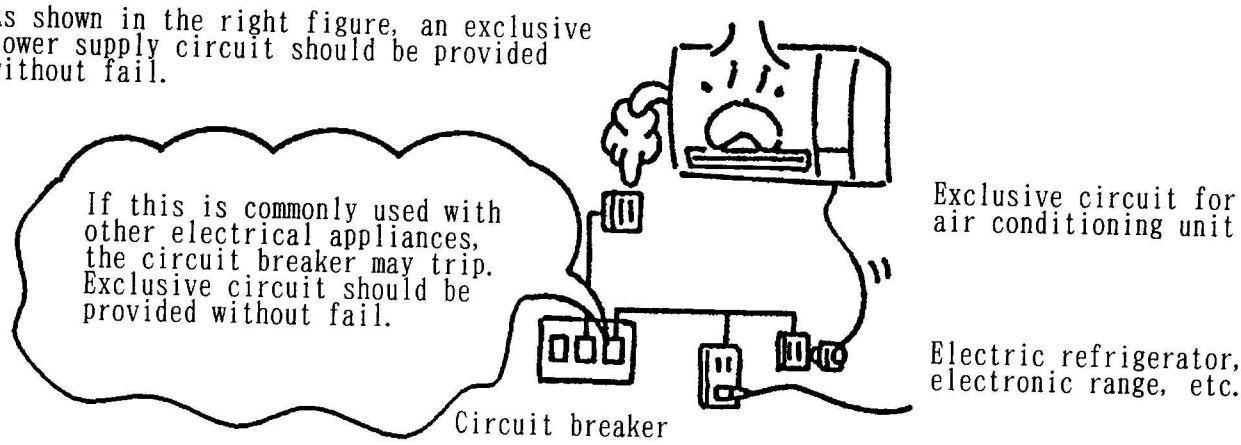


(4) 3-ROOM MULTI type



10. ELECTRICAL WORK (POWER SUPPLY)

As shown in the right figure, an exclusive power supply circuit should be provided without fail.

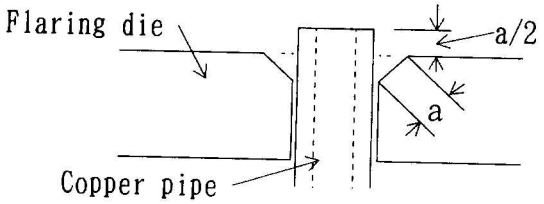


Note. For the reason that the power cord or the connection cord between the indoor unit and outdoor unit is too short, connecting another extension cord may be caused by a trouble. Never connect the additional cord on the way to extend the power cord or the connection cord.

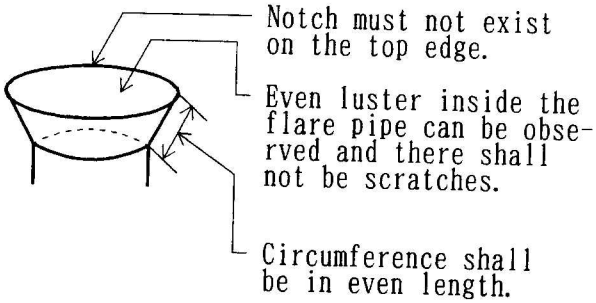
11. PIPING

1) Flaring of Pipe

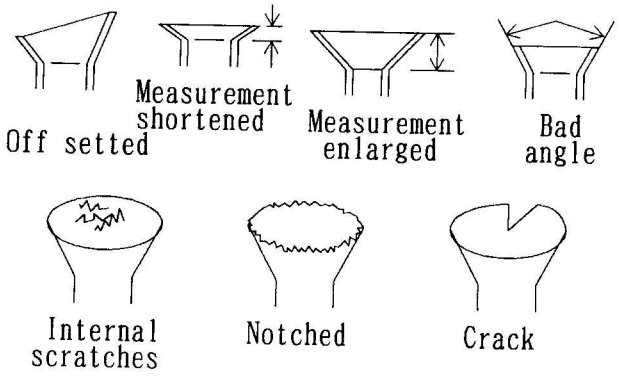
The following figure shows the optimum pipe position to make flare.



Flare part shall be as shown below.



* Poor Flaring
The figures shown below bring gas leakage.



2) Flare Nut Tightening

①As shown in Fig. 1, adjust the pipe so that the center line of the pipe sets to that of the valve, and then tighten the flare nut by hands. (Tightening the nut with a spanner initially causes the thread to damage and gas leakage.)

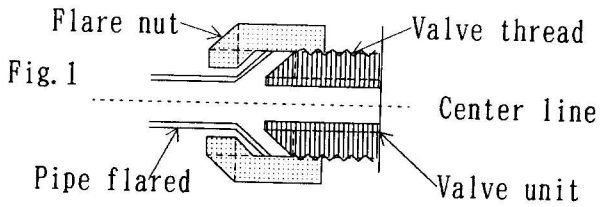


Fig. 1

②To tighten the flare nut, use a torque wrench.

③The flare part is extended and gas leakage may occur, if excessive force is applied to tighten the flare nut as shown in Fig. 2.

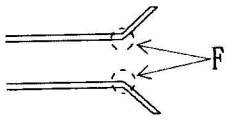


Fig. 2

④Tightening the flare nut on the indoor unit side should be done with 2 spanners as shown in Fig. 3.

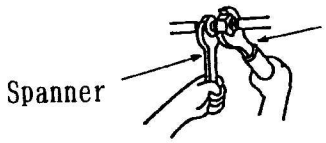


Fig. 3

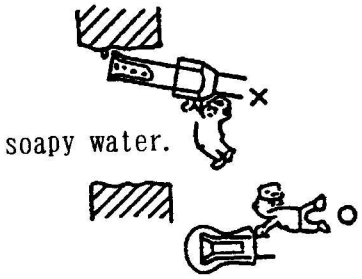
3) When installing, take care of the following points.

A. Drying:
Never allow water and air to enter the unit.

(1) Do not install piping on a rainy day.
(2) To store copper pipe, cap the pipe.
(3) Always perform air purge.

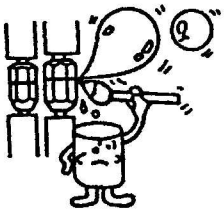
B. Cleaning:
Never allow dust or dirt to enter the unit.

(1) When removing burrs from the flare nuts, point the pipe opening downward.
(2) When passing the copper pipe through a through-hole, cover the opening with a cap or vinyl tape.



C. Air tighteness:
The coolant refrigerant should not leak.

(1) Connect the flare pipe so that it is tight.
(2) Use 2 spanners to tighten the flare nuts.
(3) Securely cover with caps.
(4) Carefully check for air-tightness with soapy water.



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