

**SPLIT TYPE
ROOM AIR CONDITIONER**

**FLOOR type
INVERTER**

SERVICE INSTRUCTION

Models	Indoor unit	Outdoor unit
	AG * V09LAC	AO * V09LAC
	AG * V12LAC	AO * V12LAC
	AG * V14LAC	AO * V14LAC

Refrigerant
R410A

The model that describes in the text includes the following model.

Description model	Included model
AG * V09LAC	AG * V09LAC
AO * V09LAC	AO * V09LAC
AG * V12LAC	AG * V12LAC
AO * V12LAC	AO * V12LAC
AG * V14LAC	AG * V14LAC
AO * V14LAC	AO * V14LAC AO * V14LAL

FUJITSU GENERAL LIMITED

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FLOOR type INVERTER

1 . SPECIFICATIONS

SPECIFICATIONS

TYPE	COOL & HEAT INVERTER		
INDOOR UNIT	AG*V09LAC	AG*V12LAC	AG*V14LAC
OUTDOOR UNIT	AO*V09LAC	AO*V12LAC	AO*V14LAC
COOLING CAPACITY (kW)	2.6 (0.9~3.5)	3.5 (0.9~4.0)	4.2 (0.9~5.0)
HEATING CAPACITY (kW)	3.5 (0.9~5.5)	4.5 (0.9~6.6)	5.2 (0.9~8.0)

ELECTRICAL DATA

POWER SOURCE (V)		230		
FREQUENCY (Hz)		50		
RUNNING CURRENT (A)	COOLING	2.6	4.4	5.2
	HEATING	3.8	5.5	6.4
INPUT WATTS (kW)	COOLING	0.53 (0.25~1.35)	0.94 (0.25~1.40)	1.14(0.25~1.90)
	HEATING	0.79 (0.25~2.10)	1.19 (0.25~2.15)	1.44(0.25~2.95)
E.E.R. (kW/kW)	COOLING	4.91	3.72	3.68
COP (kW/kW)	HEATING	4.43	3.78	3.61
MOISTURE REMOVAL (ℓ /hr)		1.3	1.8	2.1
AIR CIRCULATION-Hi (m³ /hr)		C:570 H:600	C:570 H:600	C:650 H:650

COMPRESSOR

TYPE	Hermetic type, 4 pole, 3 phase, DC inverter motor, Rotary		
DISCRIMINATION	DA89X1C-20FZ		DA130A1F-25F
REFRIGERANT R410A (g)	1,050	1,050	1,150

FAN MOTOR

POWER SOURCE (V)		230		
INDOOR UNIT (r.p.m.)	HI-SPEED (UP/ LO)	C:1,190/ 1,000 H:1,240/ 1,040	C:1,190/ 1,000 H:1,240/ 1,040	C:1,330/ 1,120 H:1,330/ 1,120
	MED-SPEED (UP/ LO)	C:1,000/ 850 H:1,040/ 880	C:1,000/ 850 H:1,040/ 880	C:1,100/ 930 H:1,100/ 930
	LO-SPEED (UP/ LO)	C: 820/ 690 H: 840/ 700	C: 820/ 690 H: 840/ 700	C: 890/ 750 H: 860/ 730
	QUIET (UP/ LO)	C: 660/ 560 H: 660/ 560	C: 660/ 560 H: 660/ 560	C: 660/ 560 H: 660/ 560
OUTDOOR UNIT		C:760 H:680	C:760 H:760	C:820 H:750

DIMENSIONS

INDOOR UNIT H x W x D (mm)	600 x 740 x 200		
OUTDOOR UNIT H x W x D (mm)	540 x 790 x 290		578 x 790 x 300

WEIGHT

INDOOR UNIT GROSS / NET(kg)	17 / 14		
OUTDOOR UNIT GROSS / NET(kg)	40 / 36		44 / 40

NOISE LEVEL

INDOOR UNIT (dB)	HI-SPEED	C:40 H:40	C:40 H:40	C:44 H:43
	MED-SPEED	C:35 H:35	C:35 H:35	C:38 H:37
	LO-SPEED	C:29 H:29	C:29 H:29	C:31 H:29
	QUIET	C:22 H:22	C:22 H:22	C:22 H:22
OUTDOOR UNIT (dB)	C:47 H:48		C:48 H:49	C:50 H:50

Note : Noise was measured in accordance with JIS standards, Japan.

MAX PIPE LENGTH	20 m
ADDITIONAL REFRIGERANT	15m chargeless, 20g/m (>15m)

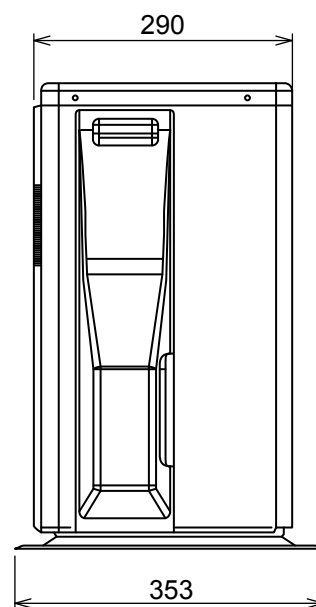
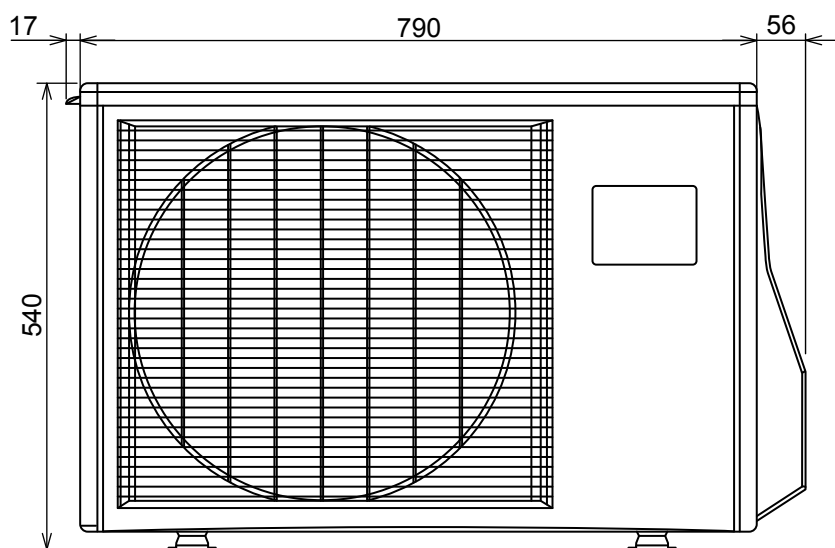
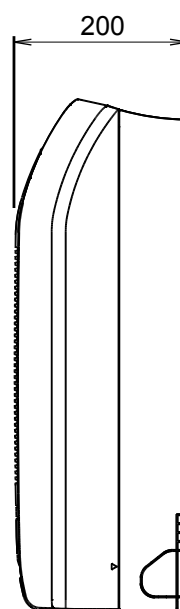
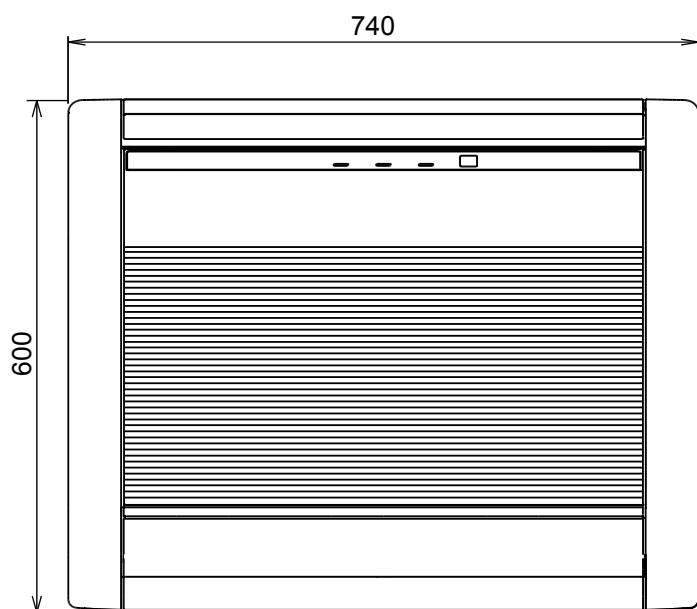
FLOOR type INVERTER

2 . DIMENSIONS

DIMENSIONS

Models : AG*V09LAC / AO*V09LAC
AG*V12LAC / AO*V12LAC

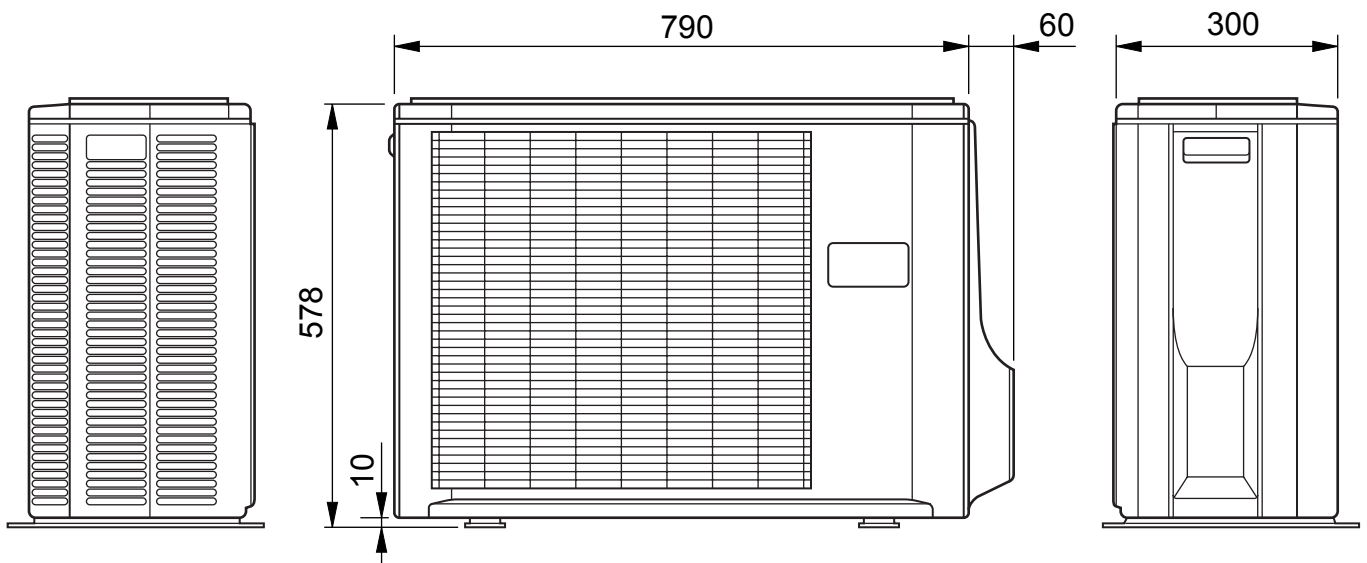
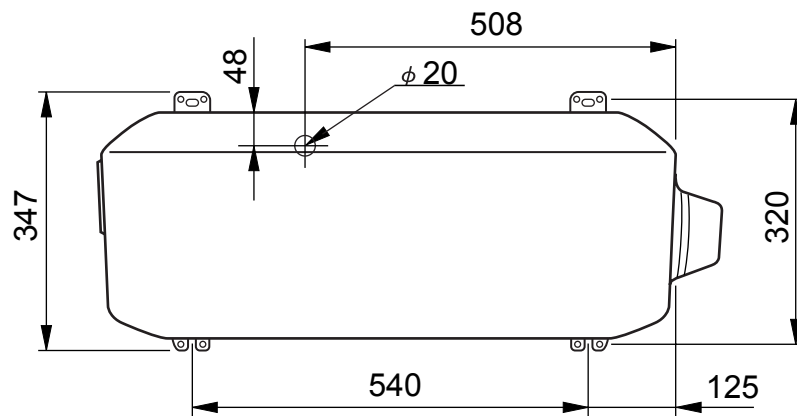
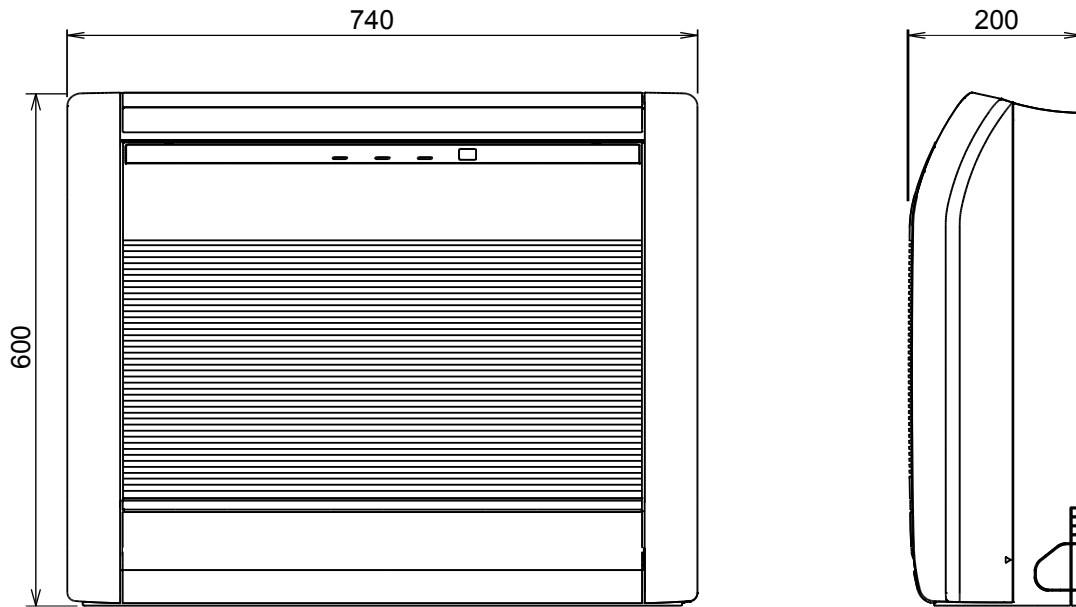
(unit : mm)



DIMENSIONS

Models : AG*V14LAC / AO*V14LAC

(unit : mm)

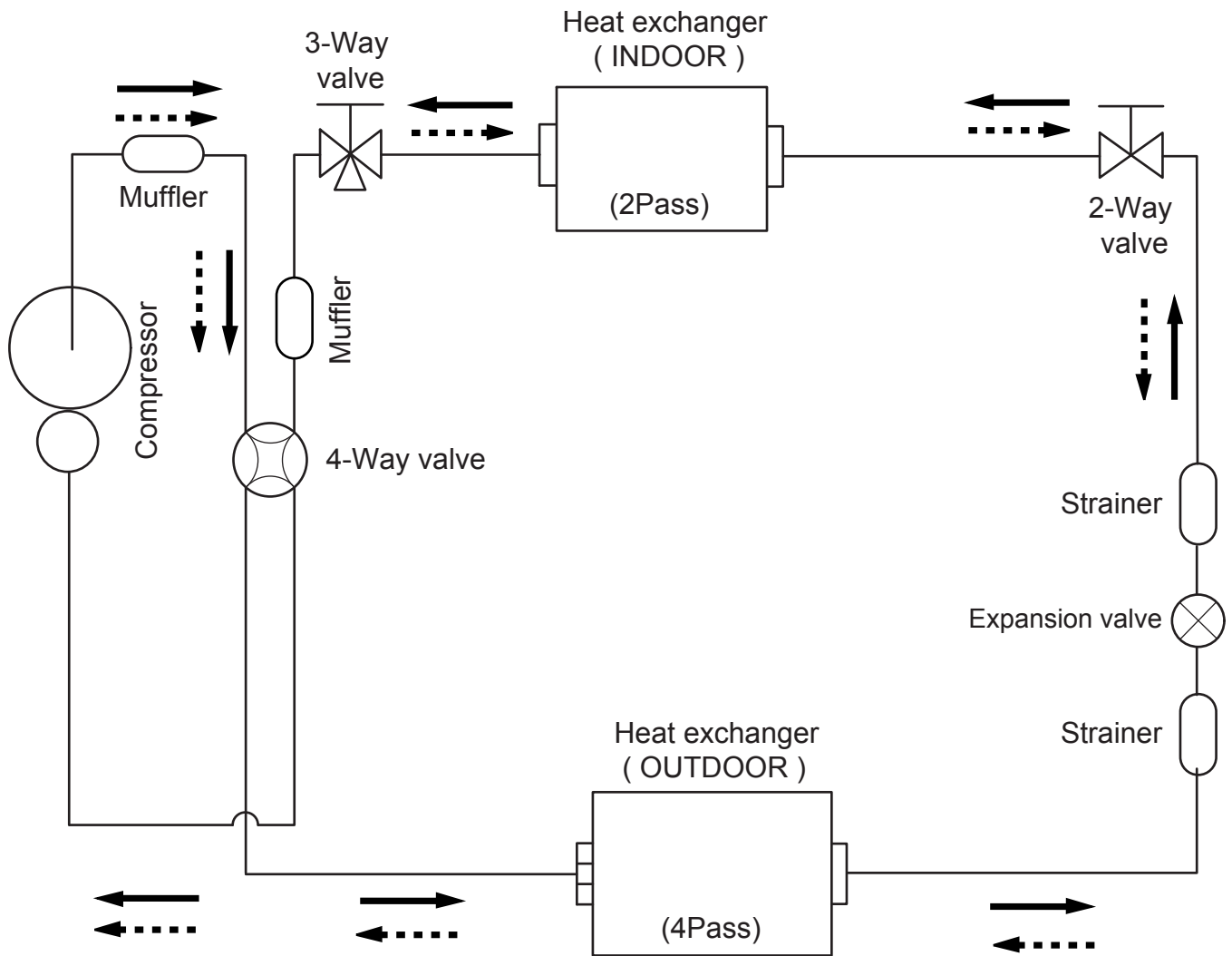


FLOOR type INVERTER

3 . REFRIGERANT SYSTEM DIAGRAM

REFRIGERANT SYSTEM DIAGRAM

Models : AG*V09LAC / AO*V09LAC
 AG*V12LAC / AO*V12LAC
 AG*V14LAC / AO*V14LAC



→ Cooling
 - - - - - Heating

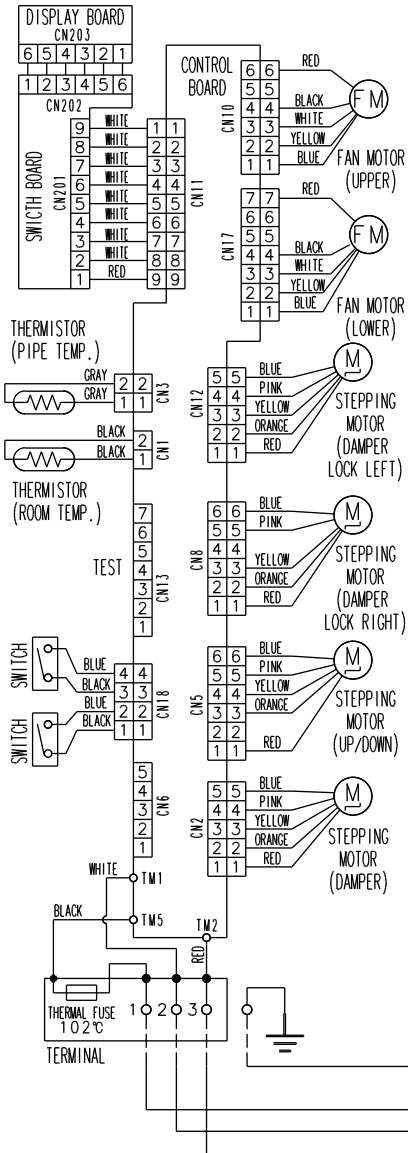
FLOOR type INVERTER

4 . CIRCUIT DIAGRAM

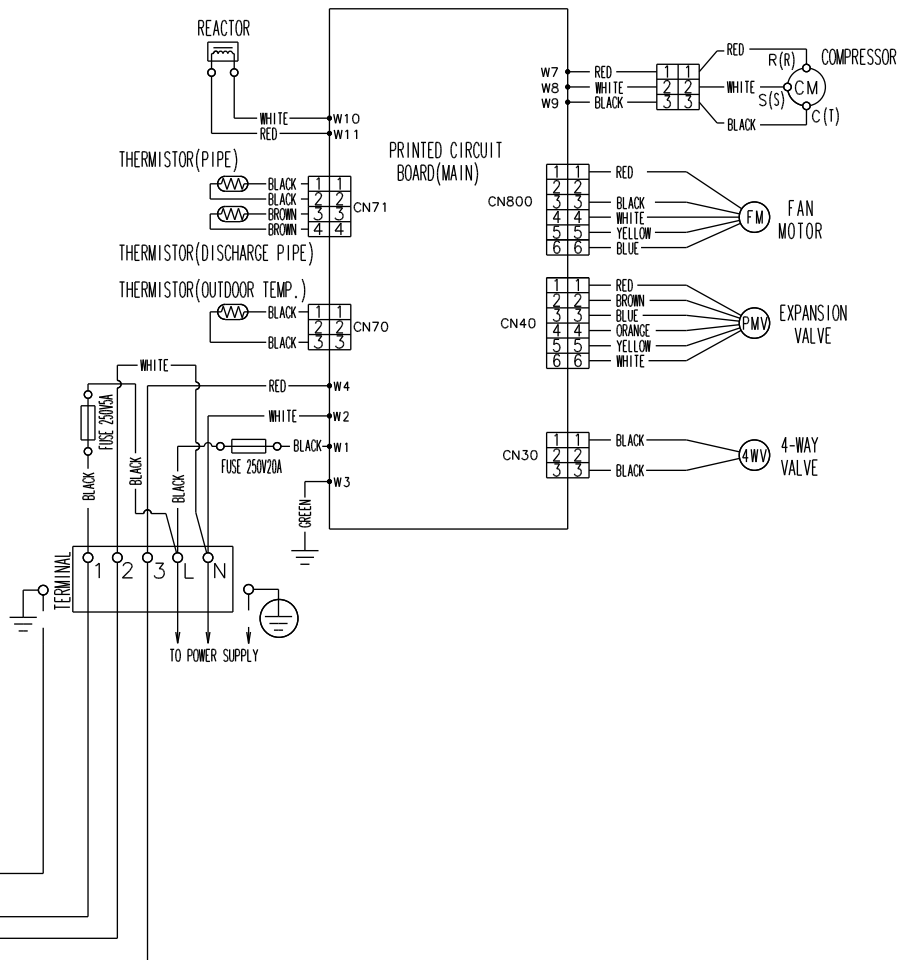
CIRCUIT DIAGRAM

Models : AG*V09LAC / AO*V09LAC
AG*V12LAC / AO*V12LAC

INDOOR UNIT



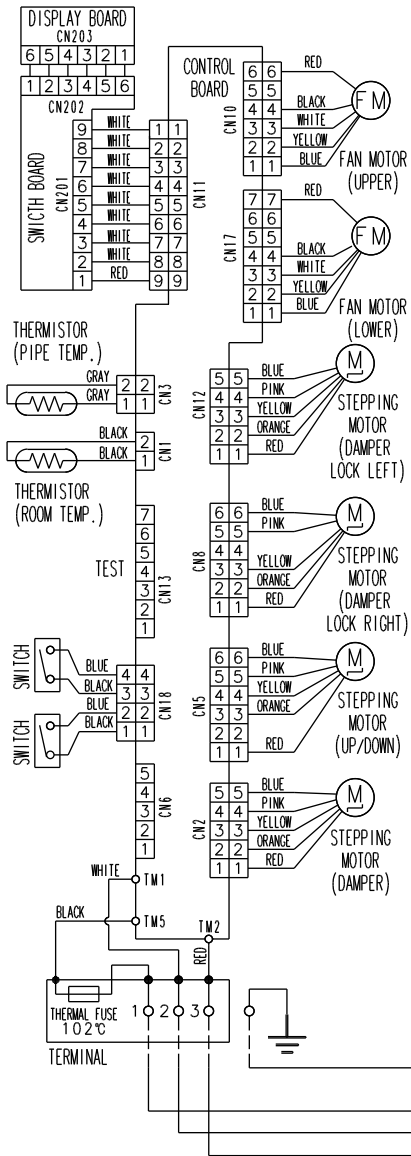
OUTDOOR UNIT



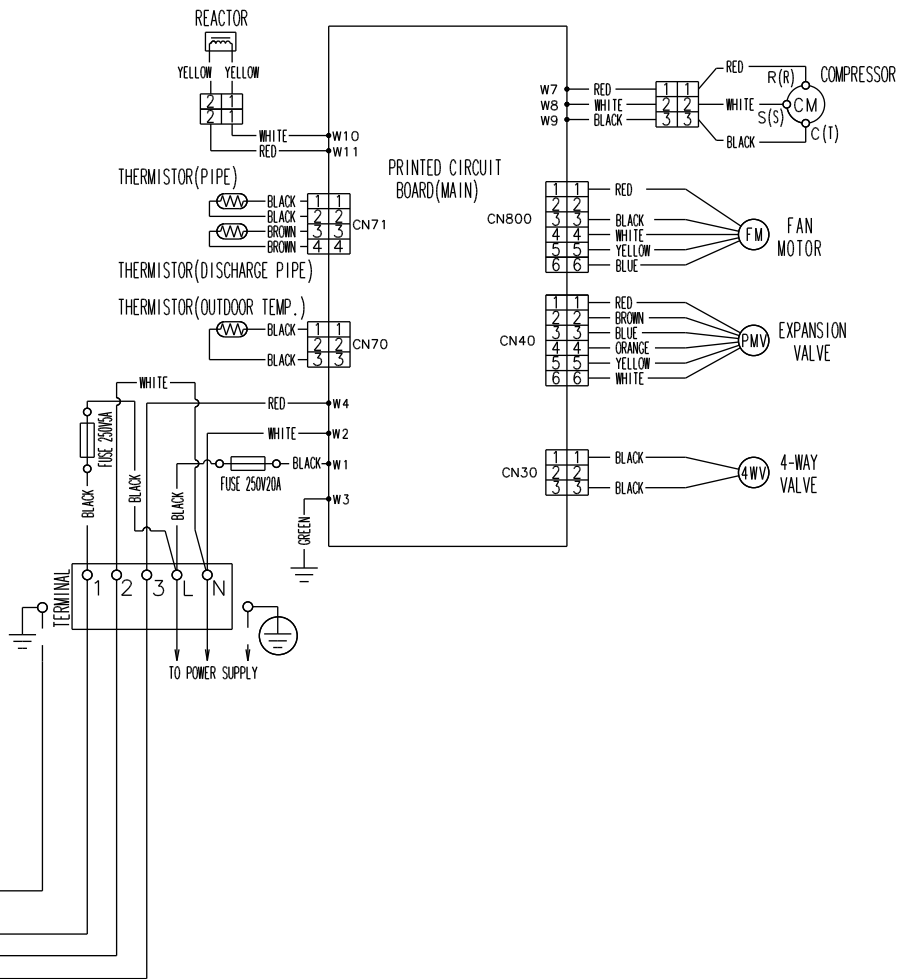
CIRCUIT DIAGRAM

Models : AG*V14LAC / AO*V14LAC

INDOOR UNIT



OUTDOOR UNIT



FLOOR type INVERTER

5 . DESCRIPTION OF EACH CONTROL OPERATION

1. COOLING OPERATION

1-1 COOLING CAPACITY CONTROL

A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

* If the room temperature is 2°C higher than a set temperature, the compressor operation frequency will attain to maximum performance.

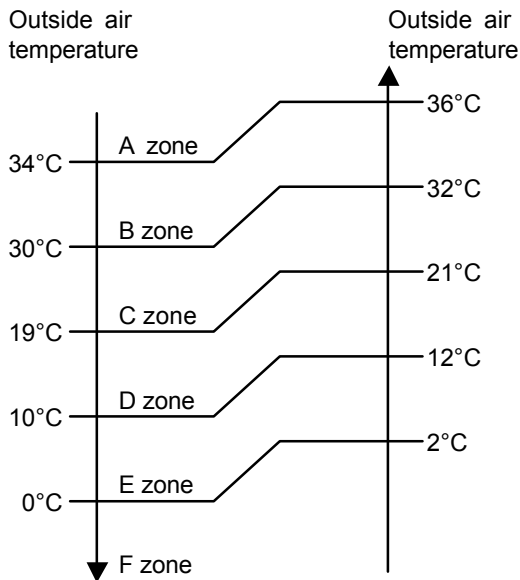
* If the room temperature is 2.5°C lower than a set temperature, the compressor will be stopped.

* When the room temperature is between +2°C to -2.5°C of the setting temperature, the compressor frequency is controlled within the range shown in Table1. However, the maximum frequency is limited in the range shown in Figure 1 based on the fan speed mode and the outdoor temperature.

(Table 1 : Compressor Frequency Range)

	air flow	minimum frequency	maximum frequency II	maximum frequency I
AG*V09LAC AG*V12LAC	Upper & Lower	18Hz	80Hz	96Hz
	Upper			
AG*V14LAC	Upper & Lower	18Hz	70Hz	90Hz
	Upper	18Hz	58Hz	90Hz

(Fig. 1 : Limit of Maximum Frequency based on Outdoor Temperature)



AG*V09/ 12LAC

		Hi	Me	Lo	Quiet
Upper & Lower air flow	A zone	96Hz	61Hz	51Hz	33Hz
	B zone	96Hz	61Hz	51Hz	33Hz
	C zone	96Hz	61Hz	51Hz	33Hz
	D zone	64Hz	42Hz	36Hz	27Hz
	E zone	64Hz	42Hz	36Hz	27Hz
	F zone	64Hz	42Hz	36Hz	27Hz
Upper air flow	A zone	96Hz	61Hz	45Hz	33Hz
	B zone	96Hz	61Hz	45Hz	33Hz
	C zone	96Hz	61Hz	45Hz	33Hz
	D zone	64Hz	36Hz	36Hz	27Hz
	E zone	64Hz	36Hz	36Hz	27Hz
	F zone	64Hz	36Hz	36Hz	27Hz

AG*V14LAC

		Hi	Me	Lo	Quiet
Upper & Lower air flow	A zone	90Hz	45Hz	42Hz	30Hz
	B zone	90Hz	45Hz	42Hz	30Hz
	C zone	90Hz	45Hz	42Hz	30Hz
	D zone	58Hz	38Hz	34Hz	24Hz
	E zone	58Hz	38Hz	34Hz	24Hz
	F zone	58Hz	38Hz	34Hz	24Hz
Upper air flow	A zone	90Hz	45Hz	34Hz	24Hz
	B zone	90Hz	45Hz	34Hz	21Hz
	C zone	90Hz	45Hz	34Hz	21Hz
	D zone	58Hz	34Hz	30Hz	21Hz
	E zone	54Hz	34Hz	30Hz	21Hz
	F zone	54Hz	34Hz	30Hz	21Hz

When the compressor operates for 30 minutes continuously at over the maximum frequency II, the maximum frequency is changed from Maximum Frequency I to Maximum Frequency II.

2. HEATING OPERATION

2-1 HEATING CAPACITY CONTROL

A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation frequency of the compressor.

* If the room temperature is lower by 3°C than a set temperature, the compressor operation frequency will attain to maximum performance.

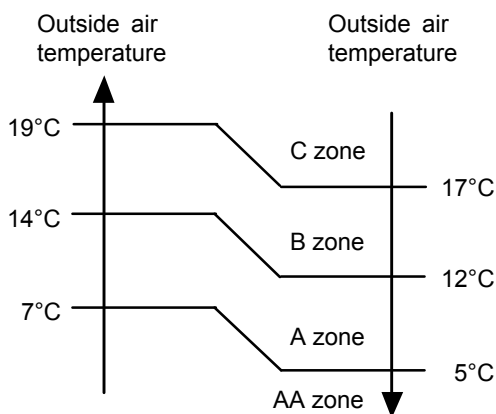
* If the room temperature is higher 2.5°C than a set temperature, the compressor will be stopped.

* When the room temperature is between +2°C to -3°C of the setting temperature, the compressor frequency is controlled within the range shown in Table2.
However, the maximum frequency is limited in the range shown in Figure 2 based on the fan speed mode and the outdoor temperature.

(Table 2 : Compressor Frequency Range)

	air flow	minimum frequency	maximum frequency
AG*V09LAC AG*V12LAC	Upper & Lower	18Hz	130Hz
	Upper		
AG*V14LAC	Upper & Lower	18Hz	119Hz
	Upper		

(Fig.2 : Limit of Maximum Frequency based on Outdoor Temperature)



AG*V09/ 12LAC

		Hi	Me	Lo	Quiet
Upper& Lower air flow	AA zone	130Hz	96Hz	57Hz	45Hz
	A zone	130Hz	96Hz	64Hz	51Hz
	B zone	130Hz	96Hz	80Hz	68Hz
	C zone	130Hz	96Hz	80Hz	68Hz
Upper air flow	AA zone	130Hz	96Hz	48Hz	33Hz
	A zone	130Hz	96Hz	64Hz	45Hz
	B zone	130Hz	96Hz	80Hz	51Hz
	C zone	130Hz	96Hz	80Hz	68Hz

AG*V14LAC

		Hi	Me	Lo	Quiet
Upper& Lower air flow	AA zone	119Hz	90Hz	54Hz	30Hz
	A zone	119Hz	90Hz	70Hz	38Hz
	B zone	119Hz	90Hz	70Hz	45Hz
	C zone	119Hz	90Hz	70Hz	54Hz
Upper air flow	AA zone	119Hz	90Hz	38Hz	30Hz
	A zone	119Hz	90Hz	42Hz	38Hz
	B zone	119Hz	90Hz	49Hz	38Hz
	C zone	119Hz	90Hz	54Hz	45Hz

* The room temperature is controlled 2°C higher than the setting temperature for 60 minutes after starting the operation.

After 60 minutes, it is controlled based on the normal setting temperature.

3. DRY OPERATION

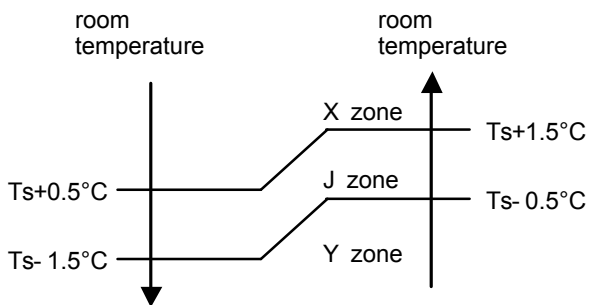
3-1 INDOOR UNIT CONTROL

The compressor rotation frequency shall change according to the temperature, set temperature, and room temperature variation which the room temperature sensor of the indoor unit body has detected as shown in the Fig 3. However, after the compressor is driven, the outdoor unit shall run at INITIAL frequency I as shown in the Table 3 for a minute.

(Table 3 : Compressor frequency)

	INITIAL frequency I
AG*V09LAC AG*V12LAC	56Hz
AG*V14LAC	40Hz

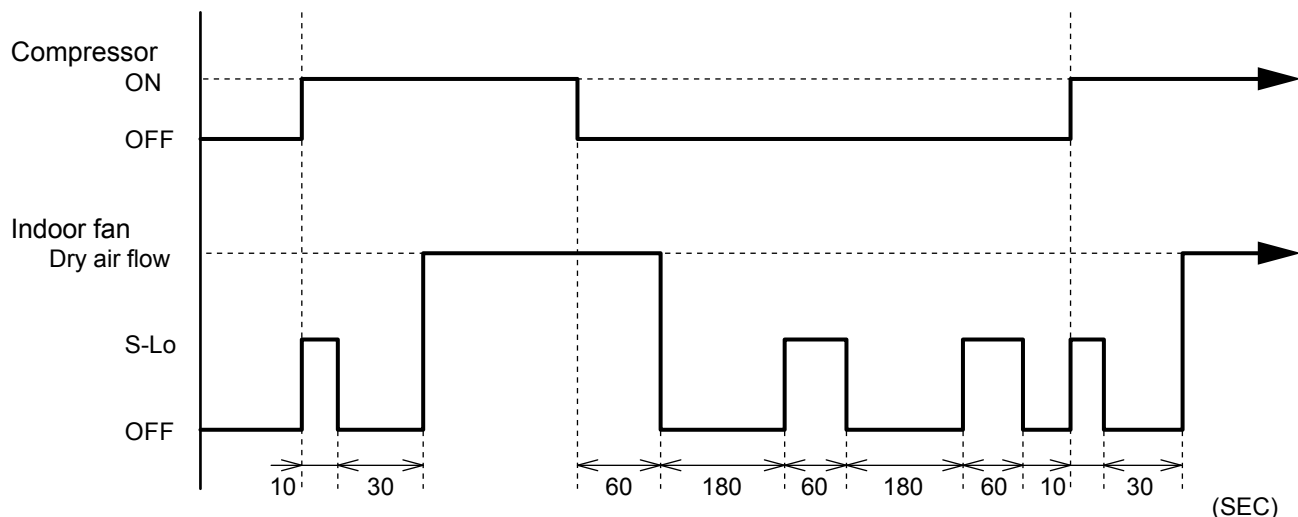
(Fig.3 : Compressor Control based on Room Temperature)



	air flow	*Outdoor zone	Indoor zone		
			X zone	J zone	Y zone
AG*V09LAC	Upper air flow	A,B,C	33Hz	25Hz	0Hz
AG*V12LAC		D,E,F	27Hz	25Hz	0Hz
AG*V14LAC	Upper air flow	A,B,C	21Hz	18Hz	0Hz
		D,E,F			

*Refer to Fig.1 for "outdoor zone".

(Fig.4 : Indoor Fan Control)

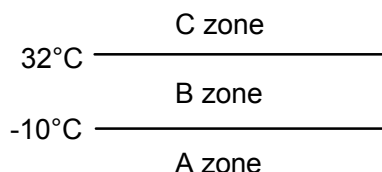


4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the AUTO mode by remote control, operation starts in the optimum mode from among the HEATING, COOLING, DRY and MONITORING modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 18°C and 30°C in 1°C steps.

- ①. When operation starts, only the indoor upper fan and outdoor fans are operated for 1 minute. After 1 minute, the room temperature and outside air temperature are sensed and the operation mode is selected in accordance with the table below.

(Fig.5 : Outside air temperature zone selection)



(Table.4 Operation mode selection table)

Outside air temperature (TO) Room temperature (TB)	A zone	B zone	C zone
$TB > TS + 2^{\circ}\text{C}$	Monitoring	Cooling (automatic dry)	Cooling (automatic dry)
$TS + 2^{\circ}\text{C} \geq TB \geq TS - 2^{\circ}\text{C}$	Monitoring	Monitoring	Monitoring
$TB < TS - 2^{\circ}\text{C}$	Heating	Heating	Monitoring

- ②. When COOLING was selected at ①, the air conditioner operates as follow:
- The same operation as COOLING OPERATION of item 1 above is performed.
 - When the room temperature has remained at (set temperature -1°C) for 8 minutes, operation is automatically switched to DRY and the same operation as DRY OPERATION of item 3 above is performed.
 - If the room temperature reaches (set temperature +2°C during DRY operation, operation returns to COOLING operation.
- ③. When HEATING was selected at ①, the same operation as HEATING OPERATION of item 2 above is performed.
- ④ When the compressor was stopped for 6 consecutive minutes by the temperature control function after the COOLING or HEATING operation mode was selected at ① above, operation is switched to MONITORING and the operation mode is selected again.

5. INDOOR FAN CONTROL

(1).Fan speed

(Table 5 : Indoor Fan Speed)

• AG*V09/ 12LAC

Operation mode	Air flow mode		Speed (rpm)	
			Upper& Lower air flow mode	Upper air flow mode
Heating	Hi	(Upper/ Lower)	1240/ 1040	1280/ ---
	Me	(Upper/ Lower)	1040/ 880	1080/ ---
	Lo	(Upper/ Lower)	840/ 700	870/ ---
	Quiet	(Upper/ Lower)	660/ 560	680/ ---
	Cool air prevention	(Upper/ Lower)	660/ 560	680/ ---
	S-Lo	(Upper/ Lower)	660/ 560	680/ ---
Cooling Fan	Hi	(Upper/ Lower)	1190/ 1000	1230/ ---
	Me	(Upper/ Lower)	1000/ 850	1030/ ---
	Lo	(Upper/ Lower)	820/ 690	850/ ---
	Quiet	(Upper/ Lower)	660/ 560	680/ ---
Dry		(Upper/ Lower)	---- / ----	680/ ---

• AG*V14LAC

Operation mode	Air flow mode		Speed (rpm)	
			Upper& Lower air flow mode	Upper air flow mode
Heating	Hi	(Upper/ Lower)	1330/ 1120	1370/ ---
	Me	(Upper/ Lower)	1100/ 930	1130/ ---
	Lo	(Upper/ Lower)	860/ 730	890/ ---
	Quiet	(Upper/ Lower)	660/ 560	680/ ---
	Cool air prevention	(Upper/ Lower)	660/ 560	680/ ---
	S-Lo	(Upper/ Lower)	660/ 560	680/ ---
Cooling Fan	Hi	(Upper/ Lower)	1330/ 1120	1370/ ---
	Me	(Upper/ Lower)	1100/ 930	1130/ ---
	Lo	(Upper/ Lower)	890/ 750	890/ ---
	Quiet	(Upper/ Lower)	660/ 560	680/ ---
Dry		(Upper/ Lower)	---- / ----	680/ ---

(2).FAN OPERATION

The airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH, while the indoor fan only runs.

When Fan mode is set at (Auto), it operates on (MED) Fan Speed.

(3).COOLING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 6.

On the other hand, if switched in [HIGH] ~ [QUIET], the indoor motor will run at a constant airflow of [COOL] operation modes QUIET, LOW, MED, HIGH, as shown in Table 5.

(4).DRY OPERATION

Refer to the table 4.

Durring the dry mode operation, the fan speed setting can not be changed.

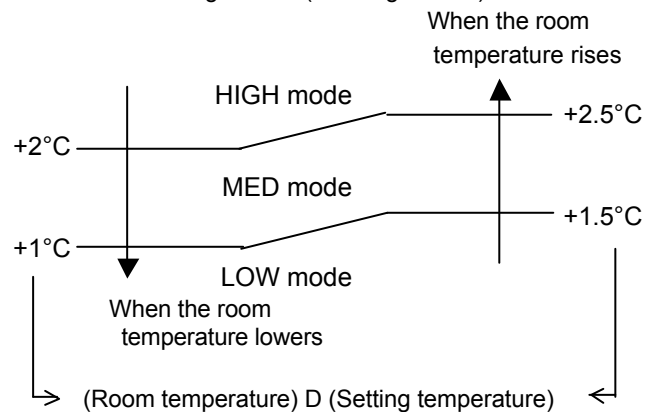
(5).HEATING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 7.

On the other hand, if switched [HIGH] ~ [QUIET], the indoor motor will run at a constant airflow of [HEAT] operation modes QUIET, LOW, MED, HIGH, as shown in Table 5.

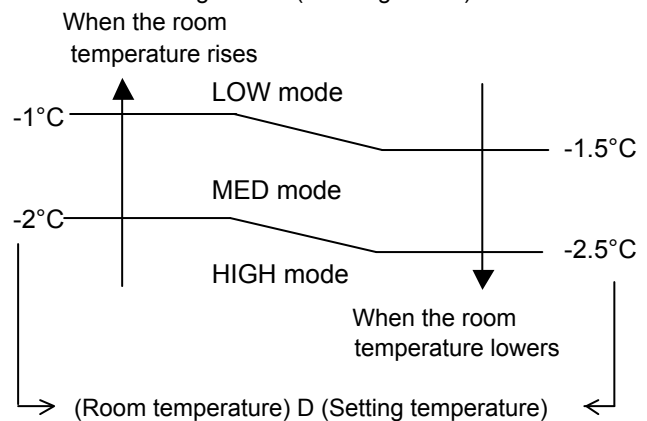
(Fig.6)

airflow change - over (Cooling:AUTO)



(Fig.7)

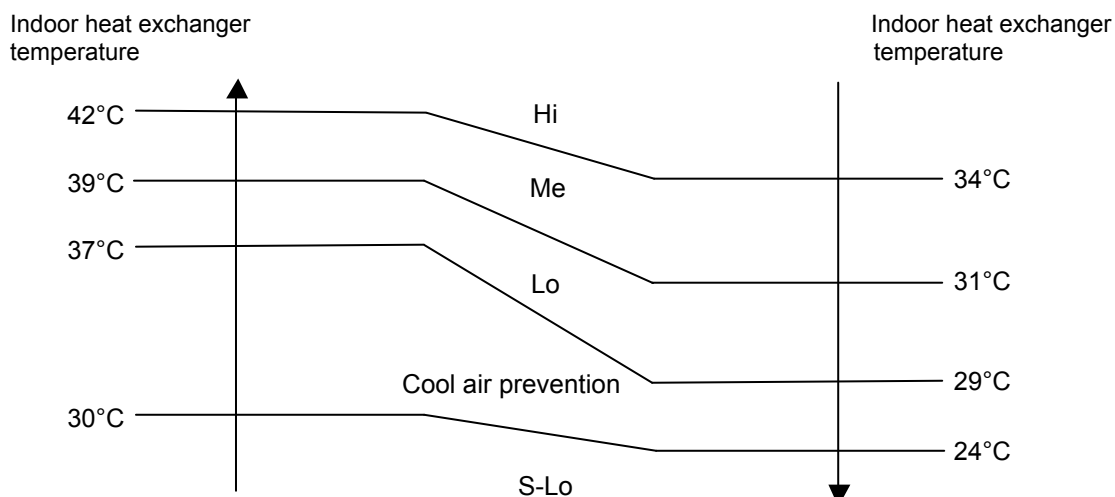
airflow change - over (Heating:AUTO)



(6).COOL AIR PREVENTION CONTROL (Heating mode)

The maximum value of the indoor fan speed is set as shown in Figure 8, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

(Fig.8 : Cool Air Prevention Control)



6. OUTDOOR FAN CONTROL

(1). Fan Speed

(Table 6 : Outdoor fan speed)

(rpm)

	ZONE※	Cooling	Dry	Heating
AG*V09LAC AG*V12LAC	A - C	800/ 760/ 470	760/ 470	760/ 680/ 470
	D	470/ 250	760/ 470	
	E	500 ~ 150 (by 1rpm or more)		
	F	300 ~ 150 (by 1rpm or more)		
AG*V14LAC	A - C	860/ 820/ 670/ 500	500	820/ 750/ 670/ 550/ 450
	D	500/ 280	500	
	E	470 ~ 150 (by 1rpm or more)		
	F	300 ~ 150 (by 1rpm or more)		

※ Refer to Fig1.

- * It runs at 500(A-D ZONE)/200(E,F ZONE) rpm for 20 seconds after starting up the outdoor fan.
- * The outdoor fan speed mentioned above depends on the compressor frequency.
(When the compressor frequency increases, the outdoor fan speed also changes to the higher speed. When the compressor frequency decreases, the outdoor fan speed also changes to the lower speed.)
- * Outdoor temperature falls, and if it becomes E and F zone(Refer to Fig1), rotations of fan speed will fall.
- * After the defrost control is operated on the heating mode, the fan speed keeps at the higher speed as table 7 without relating to the compressor frequency.

(Table 7 : Outdoor fan speed after the defrost)

	Min
AG*V09/ 12LAC	900rpm
AG*V14LAC	950rpm

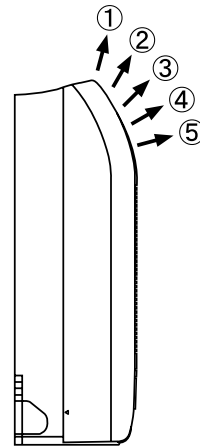
7. LOUVER CONTROL

(1). VERTICAL LOUVER CONTROL

(Function and Operation Range)

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

① → ② → ③ → ④ → ⑤



(Fig 9: Air Direction Range)

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.
 - Cooling / Dry mode : Horizontal flow ①
 - Heating mode : Downward flow ④
- When the temperature of the air being blown out is low at the start of heating operation or during defrosting, the airflow direction temporarily becomes ① to prevent cold air being blown onto the body.
- During Monitor operation in AUTO CHANGEOVER mode, the airflow direction automatically becomes ①, and it cannot be adjusted.

(2). SWING OPERATION

When the swing signal is received from the remote controller, the vertical louver starts to swing.

(Swinging Range)

① ⇄ ⑤

- When the indoor fan is either at S-lo or Stop mode, the swinging operation is interrupted and the louver stops at the memorized position.

8. COMPRESSOR CONTROL

(1). OPEARTION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode as shown in the table 8.

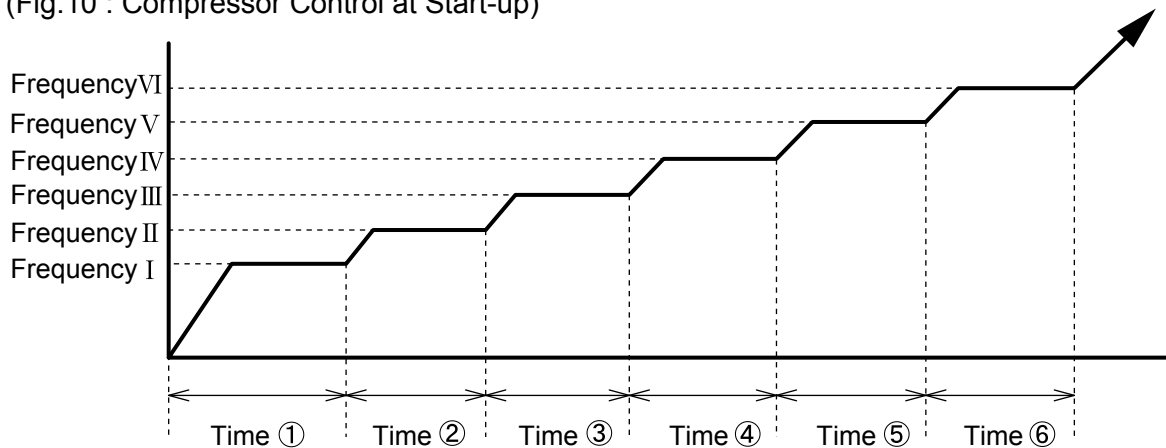
(Table 8 : Compressor Operation Frequency Range)

	Cooling		Heating		Dry
	Min	Max	Min	Max	
AG*V09/ 12LAC	18Hz	96Hz	18Hz	130Hz	33Hz
AG*V14LAC	18Hz	90Hz	18Hz	119Hz	24Hz

(2). OPEARTION FREQUENCY CONTROL AT START UP

The compressor frequency soon after the start-up is controlled as shown in the figure 10.

(Fig.10 : Compressor Control at Start-up)



(Frequency)

	Frequency I	Frequency II	Frequency III	Frequency IV	Frequency V	Frequency VI
AG*V09/ 12LAC	56Hz	74Hz	87Hz	97Hz	108Hz	119Hz
AG*V14LAC	40Hz	59Hz	72Hz	80Hz	101Hz	110Hz

(Time)

	Time ①	Time ②	Time ③	Time ④	Time ⑤	Time ⑥
AG*V09/ 12LAC	80sec	60sec	60sec	180sec	60sec	60sec
AG*V14LAC	60sec	40sec	40sec	60sec	150sec	60sec

9. TIMER OPEARTION CONTROL

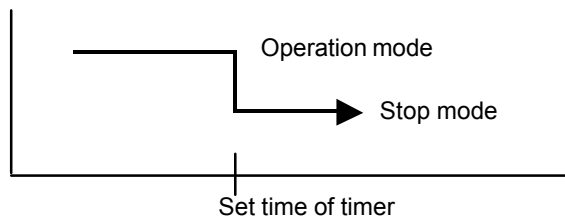
The table 9 shows the available timer setting based on the product model.

(Table 9 : Timer Setting)

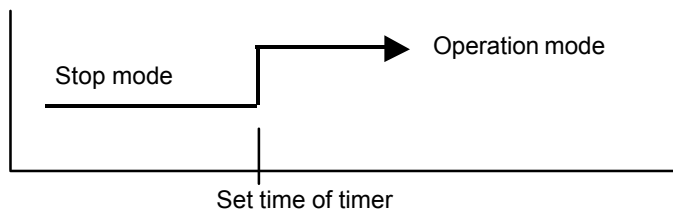
	ON TIMER / OFF TIMER	PROGRAM TIMER	SLEEP TIMER
AG*V09/ 12/ 14LAC	○	○	○

(1). OPEARTION FREQUENCY RANGE

- OFF timer : When the clock reaches the set time, the air conditioner will be turned off.

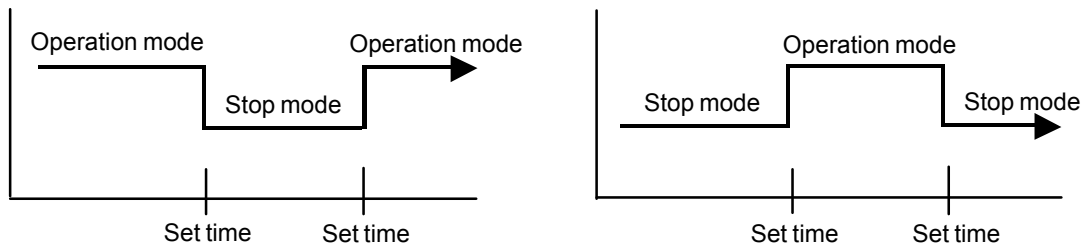


- ON timer : When the clock reaches the set time, the air conditioner will be turned on.



(2). PROGRAM TIMER

- The program timer allows the OFF timer and ON timer to be used in combination one time.



- Operation will start from the timer setting (either OFF timer or ON timer) whichever is closest to the clock's current timer setting. The order of operations is indicated by the arrow in the remote control unit's display.
- SLEEP timer operation cannot be combined with ON timer operation.

(3). SLEEP TIMER

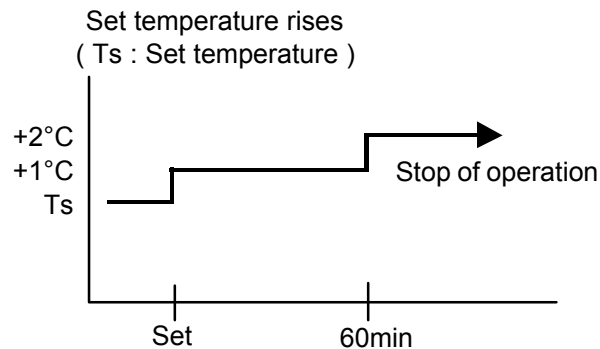
If the sleep is set, the room temperature is monitored and the operation is stopped automatically. If the operation mode or the set temperature is change after the sleep timer is set, the operation is continued according to the changed setting of the sleep timer from that time ON.

In the cooling operation mode

When the sleep timer is set, the setting temperature is increased 1°C.

It increases the setting temperature another 1°C after 1 hour.

After that, the setting temperature is not changed and the operation is stopped at the time of timer setting.

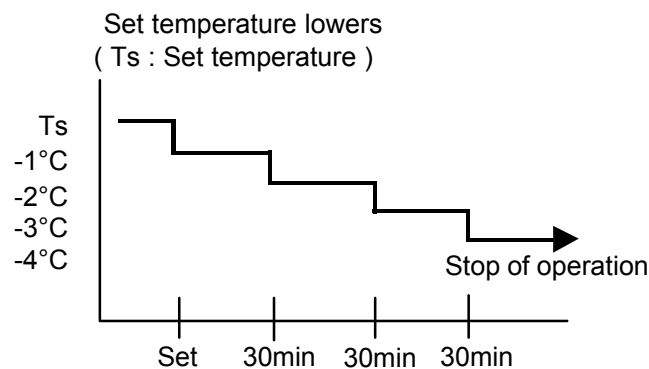


In the heating operation mode

When the sleep timer is set, the setting temperature is decreased 1°C.

It decreases the setting temperature another 1°C every 30 minutes.

Upon lowering 4°C, the setting temperature is not changed and the operation stops at the time of timer setting.



10. ELECTRONIC EXPANSION VALVE CONTROL

The most proper opening of the electronic expansion valve is calculated and controlled under the present operating condition based on the following values.

The compressor frequency, the temperatures detected by the discharge temperature sensor, the indoor heat exchanger sensor, the outdoor heat exchanger sensor, and the outdoor temperature sensor.

- * The pulse range of the electronic expansion valve control is between 60 to 480 pulses.
- * The expansion valve is set at 480 pulses after 110 seconds of stopping compressor.
- * At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (528 pulses are input to the closing direction).

11. TEST OPERATION CONTROL

Under the condition where the air conditioner runs, press the test operation button of the remote control, and the test operation control mode will appear. During test running, the operation lamp and timer lamp of the air conditioner body twinkle simultaneously. Set the test operation mode, and the compressor will continue to run regardless of whether the room temperature sensor detects. The test operation mode is released if 60 minutes have passed after setting up the test operation.

12. PREVENT TO RESTART FOR 3 MINUTES (3 MINUTES ST)

The compressor won't enter operation status for 2 minutes and 20 seconds after the compressor is stopped, even if any operation is given.

13. FOUR-WAY VALVE EXTENSION SELECT

At the time when the air conditioner is switched from the cooling mode to heating mode, the compressor is stopped, and the four-way valve is switched in 2 minutes and 20 seconds later after the compressor stopped.

14. AUTO RESTART

When the power was interrupted by a power failure, etc. during operation, the operation contents at that time are memorized and when power is recovered, operation is automatically started with the memorized operation contents.

When the power is interrupted and recovered during timer operation, since the timer operation time is shifted by the time the power was interrupted, an alarm is given by blinking (7 sec ON/2 sec OFF) the indoor unit body timer lamp.

[Operation contents memorized when the power is interrupted]

- Operation mode
- Set temperature
- Set air flow
- Timer mode and timer time
- Set air flow Direction
- Swing
- 10°C HEAT

15. MANUAL AUTO OPERATION (Indoor unit body operation)

If MANUAL AUTO Button is set, the operation is controlled as shown in Table 10.
If the remote control is lost or battery power dissipated, this function will work without the remote control.

(Table 10)

	Manual auto operation	Forced cooling operation
OPERATION MODE	Auto changeover	Cooling
FAN CONT. MODE	Auto	Hi
TIMER MODE	Continuous (No timer setting available)	-
SETTING TEMP.	24°C	Room Temp is not controlled
SETTING LOUVER	Standard	Horizontal
SWING	OFF	OFF

16. FORCED COOLING OPERATION

Forced cooling operation is started when pressing MANUAL AUTO button for 10 seconds or more.
During the forced cooling operation, it operates regardless of room temperature sensor.
Operation LED and timer LED blink during the forced cooling operation. They blink for 1 second ON and 1 second OFF on both operation LED and timer LED (same as test operation).
Forced cooling operation is released after 60 minutes of starting operation.
The FORCED COOLING OPERATION will start as shown in Table11.

17. COMPRESSOR PREHEATING

When the outdoor heat exchanger temperature is lower than temperature and the heating operation has been stopped for 30 minutes, power is applied to the compressor and the compressor is heated.
(By heating the compressor, warm air is quickly discharged when operation is started.)
When operation was started, and when the outdoor temperature rises to temperature or greater, preheating is ended.

(Table 11 : Preheating Operation / Release Temperature)

	Temperature I	Temperature II
AG*V09/ 12/ 14LAC	5°C	7°C

18. COIL DRY OPERATION CONTROL

The coil-dry operation functions by pressing COIL DRY button on the remote controller.
The coil-dry operation is consisted of 3 cycles of [Fan operation 3 minutes / Heating operation 2 minutes], and Fan operates for 33 minutes at last before ending the air conditioner operation.
(It takes 48 minutes to complete the coil-dry operation.)

(Table 12 : COIL-DRY Operating Functions)

	Indoor Fan Speed (Upper air flow only)	Compressor Frequency	Louver Position	Main Unit Indication
AG*V09/ 12LAC	870 rpm	36Hz	①	OPERATION : ON Other indication : OFF
AG*V14LAC	890 rpm	24Hz		

19. DEFROST OPERATION CONTROL

(1). CONDITION OF STARTING THE DEFROST OPERATION

The defrost operation starts when the outdoor heat exchanger temperature sensor detects the temperature lower than the values shown in Table 13.

(Table 13 : Condition of starting Defrost Operation)

1 ST time defrosting after starting operation		Compressor operating time			
		Less than 20 minutes	20 to 60 minutes	60 minutes to 4 hours	After 4 hours
	AG*V09/12/14LAC	Does not operate	- 9°C	- 5°C	- 3°C
Defrosting after 2 time upon starting operation		Compressor operating time			
		Less than 35 minutes	35 minutes to 4 hours	X	After 4 hours
	AG*V09/12/14LAC	Does not operate	- 6°C		- 3°C

(2). CONDITION OF THE DEFROST OPERATION COMPLETION

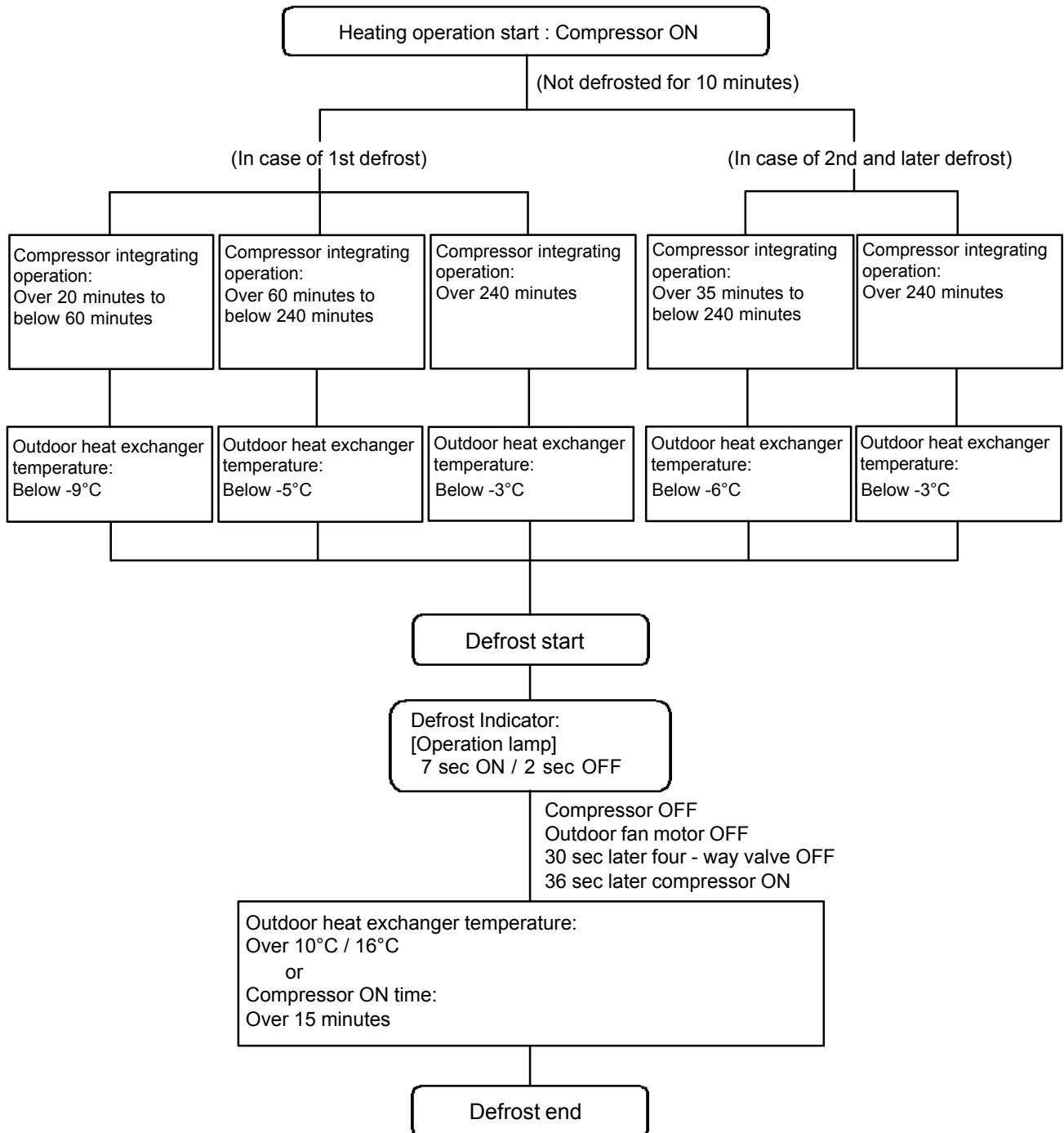
Defrost operation is released when the conditions become as shown in Table 14.

(Table 14 : Defrost Release Condition)

	Release Condition
AG*V09/ 12LAC	Outdoor heat exchanger temperature sensor value is higher than 16°C or Compressor operation time has passed 15 minutes.
AG*V14LAC	Outdoor heat exchanger temperature sensor value is higher than 10°C or Compressor operation time has passed 15 minutes.

Defrost Flow Chart

The defrosting shall proceed by the integrating operation time and outdoor heat exchanger temperature as follows.



20. OFF DEFROST OPEARTION CONTROL

When operation stops in the [Heating operation] mode, if frost is adhered to the outdoor unit heat exchanger, the defrost operation will proceed automatically. In this time, if indoor unit operation lamp flashes slowly (7 sec ON / 2 sec OFF), the outdoor unit will allow the heat exchanger to defrost, and then stop.

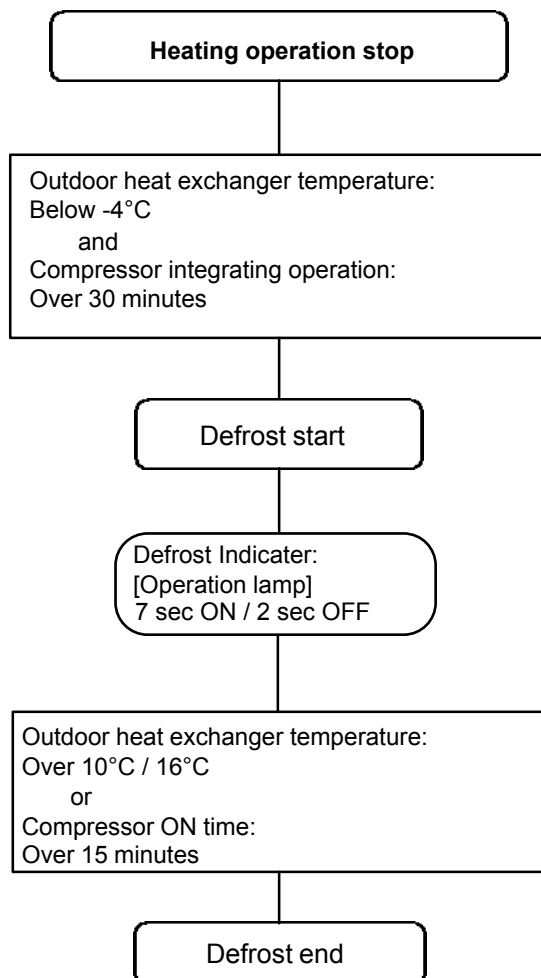
(1). OFF DEFROST OPERATION CONDITION

In heating operation, the outdoor heat exchanger temperature is less than -4°C , and compressor operation integrating time lasts for more than 30 minutes.

(2). OFF DEFROST END CONDITION

	Release Condition
AG*V09/ 12LAC	Outdoor heat exchanger temperature sensor value is higher than 16°C or Compressor operation time has passed 15 minutes.
AG*V14LAC	Outdoor heat exchanger temperature sensor value is higher than 10°C or Compressor operation time has passed 15 minutes.

OFF Defrost Flow Chart



21. AIR OUTLET SELECTION (DAMPER CONTROL)

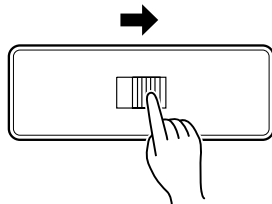
With this function , air come out simultaneously from the upper and lower air outlets so that the room can be cooled or heated effectively.

This function is set using the switch behind the front grille of the Indoor unit.

(This function is available in cooling and heating operation.)

(1). How to set to blow out air from the upper and lower air outlets

Set the air outlet selection switch to



Air blows out automatically from the upper and lower air outlets as shown in the table 15 below.






NOTE:


Set the air outlet selection switch to the end.

Otherwise, air outlet cannot be selected as intended.

(2). Description of operation

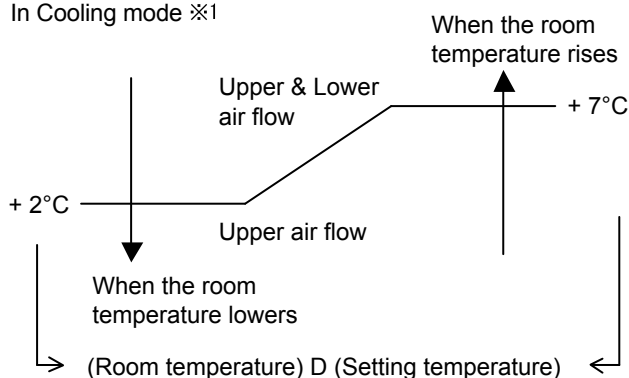
(Table 15 : Damper control)

Operation	COOLING Mode		DRY Mode	HEATING Mode	
Air flow	 Upper and lower air flow	 Upper air flow	 Upper air flow only	 Upper and lower air flow	 Upper air flow
Conditions	Room temperature and set temperature are different.	Room temperature is close to set temperature,* ¹ or the air conditioner has operated for 1 hour.	—	Air flow temperature is high.	Air flow temperature is low.* ² (During defrosting operation, start of operation, etc.)

- Make sure the lower air outlet is not choked with foreign matters, causing abnormal operation to damper.
- When the OPERATION Indicator Lamp and the 10°C HEAT Indicator Lamp flashes, the operation can be maintained temporary by changing of air outlet selection switch to , closing the damper completely and press the START/ STOP button.
(If the damper does not close automatically, close the damper manually and fix the position by an adhesive tape etc.)
The unit operates almost the same as upper air flow operation, however the indicator lamp flashes continuously if same symptom is detected again.

(Fig.11)

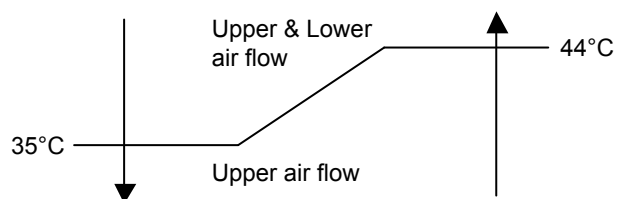
In Cooling mode ※1



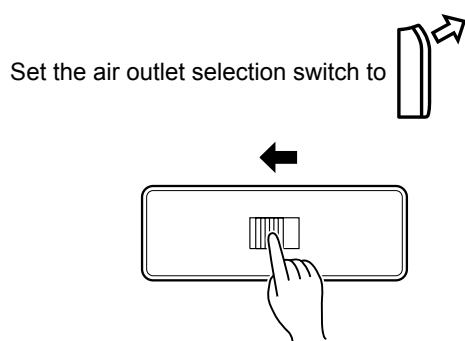
(Fig.12)

In Heating mode ※ 2

Indoor heat exchanger
temperature



(3). How to set to blow out air from the upper air outlet only



22. 10°C HEAT OPERATION

The 10°C HEAT operation functions by pressing 10°C HEAT button on the remote controller. The 10°C HEAT operation is almost the same operation as below settings.

(Table 16)

mode	HEAT
setting temperature	10°C
louver position	⑤ (refer to 7.LOUVER CONTROLL)
fan mode	AUTO ※

※ After 48hours of 10°C HEAT operation without Monitor operation, fan mode will be fixed at HIGH speed.

23. VARIOUS PROTECTIONS

(1). DISCHARGE GAS TEMPERATURE OVERRISE PREVENION CONTROL

The discharge gas thermosensor (discharge thermistor : Outdoor side) will detect discharge gas temperature.

When the discharge temperature becomes higher than Temperature I ,the compressor frequency is decreased 20 Hz, and it continues to decrease the frequency for 20 Hz every 120 seconds until the temperature becomes lower than Temperature I.

When the discharge temperature becomes lower than Temperature II,the control of the control of the compressor frequency is released.

When the discharge temperature becomes higher than Temperature III ,the compressor is stopped and the indoor unit LED starts blinking.

(Table 17 : Discharge Temperature Over Rise Prevension Control / Release Temperature)

	Temperature I	Temperature II	Temperature III
AG*V09/ 12/ 14LAC	104°C	101°C	110°C

(2). CURRENT RELEASE CONTROL

The compressor frequency is controlled so that the outdoor unit input current does not exceeds the current limit value that was set up with the outdoor temperature.

The compressor frequency returns to the designated frequency of the indoor unit at the time when the frequency becomes lower than the release value.

(Table 18 : Current Release Operation Value / Release Value)

[Heating] OT : Outdoor Temperature

09/ 12LAC	14LAC
OT (Control / Release)	OT (Control / Release)
17°C $\frac{6.5A}{8.0A}$ / 6.0A / 7.5A	17°C $\frac{7.0A}{9.0A}$ / 6.5A / 8.5A
12°C $\frac{8.5A}{9.5A}$ / 8.0A / 9.0A	12°C $\frac{10.5A}{13.0A}$ / 10.0A / 12.5A
5°C	5°C

[Cooling / Dry] OT : Outdoor Temperature

09/ 12LAC	14LAC
OT (Control / Release)	OT (Control / Release)
46°C $\frac{4.0A}{5.0A}$ / 3.5A / 4.5A	46°C $\frac{4.5A}{6.0A}$ / 4.0A / 5.5A
40°C $\frac{6.5A}{6.5A}$ / 6.0A / 6.0A	40°C $\frac{8.5A}{8.5A}$ / 8.0A / 8.0A

(3). ANTIFREEZING CONTROL (Cooling and Dry mode)

The compressor frequency is decrease on cooling & dry mode when the indoor heat exchanger temperature sensor detects the temperature lower than Temperature I.

Then, the anti-freezing control is released when it becomes higher than Temperature II .

(Table 19 : Anti-freezing Protection Operation / Release Temperature)

	Temperature I	Temperature II
A - D	4°C	7°C
E, F	4°C	13°C

(4). COOLING PRESSURE OVERRISE PROTECTION

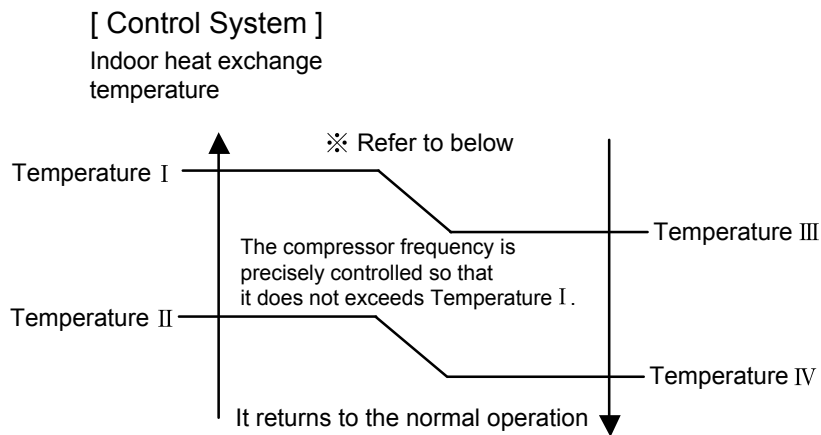
When the outdoor unit heat exchange sensor temperature rises to temperature I or greater, the compressor is stopped and trouble display is performed.

(Table 20 : Cooling Pressure Over Rise Protection Function Temperature)

	Temperature I
AG*V09/ 12/ 14LAC	67°C

(5). HIGH TEMPERATURE RELEASE CONTROL (HEATING MODE)

On heating mode, the compressor frequency is controlled as following based on the detection value of the indoor heat exchanger temperature sensor.



	Temp I	Temp II	Temp III	Temp IV
AG*V09/ 12/ 14LAC	55°C	53°C	52°C	50°C

※ Compressor Operation

[AG*V09/ 12LAC]

46Hz or greater → 45Hz
39~45Hz → Frequency down every 120 sec
26~38Hz → 25Hz
18~25Hz → OFF

[AG*V14LAC]

39Hz or greater → 38Hz
30~38Hz → Frequency down every 120 sec
19~29Hz → 18Hz
18Hz → OFF

FLOOR type INVERTER

6 . REFRIGERANT CAUTION -R410A-

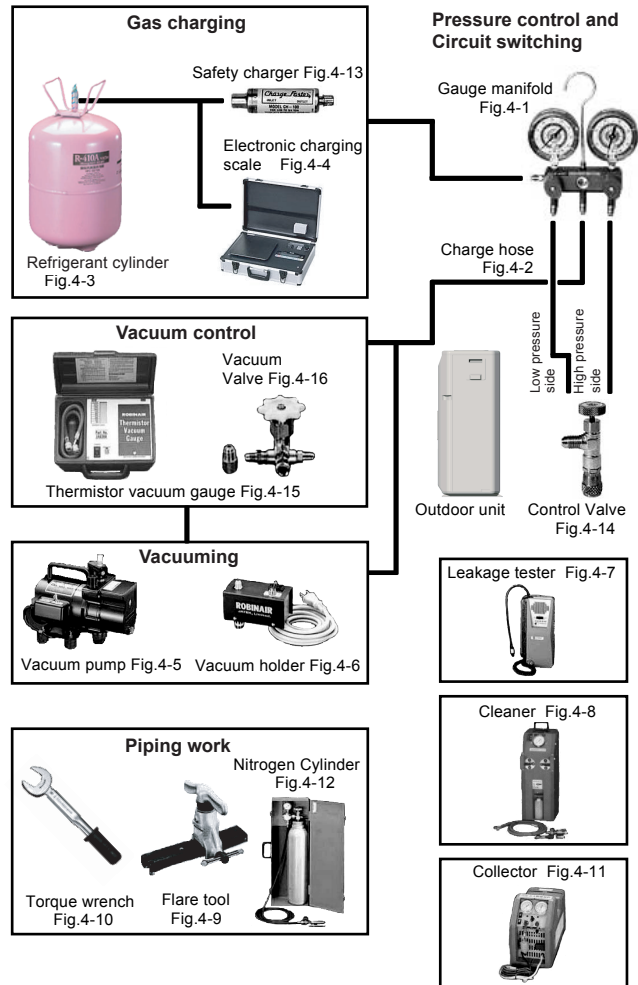
1. R410A TOOLS

This air conditioner used R410A.

For installation and servicing, it is necessary to prepare the tools and machines that are different from the previous refrigerant.

- ◎ **Mark shows the exclusive use for R410A.**
- ◎ **Gauge manifold** (Fig.4-1)
The specification of the gauge is different due to higher pressure.
The size of connection pipe is also different to prevent mis-use.
- ◎ **Charge hose** (Fig.4-2)
Since the normal pressure is high, the connection pipe size is also different.
- ◎ **Refrigerant cylinder** (Fig.4-3)
Confirm the refrigerant type before charging. Always charge liquid-phase refrigerant.
- Electronic balance for refrigerant charging** (Fig.4-4)
Electronic balance is recommended as in the case of R410A.
- ◎ **Vacuum pump with adapter to prevent reverse flow** (Fig.4-5)
Conventional pump can be used.
- Vacuum holder** (Fig.4-6)
Conventional pump can be used if adapter for preventing vacuum pump oil from flowing back is used.
- ◎ **Gas leakage tester** (Fig.4-7)
Exclusive for HFC
- Refrigerant cleaner** (Fig.4-8)
Brown paint as designated by the ARI, USA
- ◎ **Flare tool** (Fig.4-9)
The shape of flare is different for high pressure condition.
- ◎ **Torque wrench** (Fig.4-10)
- ◎ **Refrigerant recovering equipment (Collector)** (Fig.4-11)
The type which can be used for any refrigerant is available
- Nitrogen cylinder** (Fig.4-12)
This prevents an oxide film from forming in the pipe silver-alloy brazing work by turning the air out of the pipe and preventing the inside combustion.
- ◎ **Safety charger** (Fig.4-13)
It is always compulsory to change the liquid, because R410A is a mixed refrigerant and there is some fear that a mixing ratio changes. In order to avoid the refrigerant from returning to the compressor in a liquid state, the refrigerant can be charged instead of giving a load to the compressor with a safety charger.
- Control valve** (Fig.4-14)
The control valve prevents the refrigerant from spouting when it is removed, as the charging hose side and the service port side are possible to open and close at the same time.
- Thermistor vacuum gauge** (Fig.4-15)
To remove moisture from the refrigerating cycle completely, it is necessary to perform appropriate vacuum drying. For that reason, vacuum conditions can be confirmed certainly.
- Vacuum valve** (Fig.4-16)
This valve builds in a check valve, and it is easily possible to vacuum a refrigerating cycle or check for degree of vacuum with it.

TOOLS AND EQUIPMENT (R410A)



* 1 Gauge Manifold

	R410A	R22, R407C
High pressure gauge	-0.1~5.3 Mpa	-0.1~3.5 Mpa
Compound gauge	-0.1~3.8 Mpa	-0.1~1.7 Mpa
Port size	1/2UNF 5/16"	7/16UNF 1/4"

* 2 Charge hose

	R410A	R22, R407C
Normal pressure	5.1 Mpa	3.4 Mpa
Breaking pressure	27.4 Mpa	17.2 Mpa
Port size	1/2UNF	7/16UNF

2. PRECAUTION FOR INSTALLATION

Precaution for installation

Pipe diameter, recommended material and wall thickness

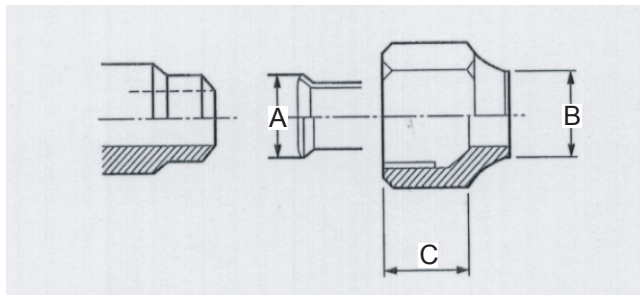
Nominal diameter (in)	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"
Outside diameter (mm)	6.35	9.52	12.70	15.88	19.05	22.22	25.40	28.58	31.75	34.92	38.10
Material	COPPER JIS H3300-C1220T-O or equivalent ¹⁾					COPPER JIS H3300-C1220T-H or equivalent ²⁾					
Wall thickness ³⁾ (mm)	0.8	0.8	0.8	1.0	1.2	1.0	1.0	1.0	1.1	1.2	1.3

1) Allowable tensile stress ≥ 33 (N/mm²); 2) Allowable tensile stress ≥ 61 (N/mm²); 3) Design pressure 4.2MPa.

The pipe must be properly pressure rated for R410A
The pipe must be an air-conditioning refrigerant pipe.

Flare and flare nuts

Diameter	1/4" (6.35mm)		3/8" (9.52mm)		1/2" (12.7mm)		3/8" (15.88mm)		3/4" (19.05mm)	
Refrigerant	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C
A	9.1	9.0	13.2	13.0	16.6	16.2	19.7	19.4	24	23.7
B	13	12	20	15	13	20	25	23	29	29
C	12	11	16	12.5	19	16	22	20	24	24
Nut width	17		22		26	24	29	27	36	

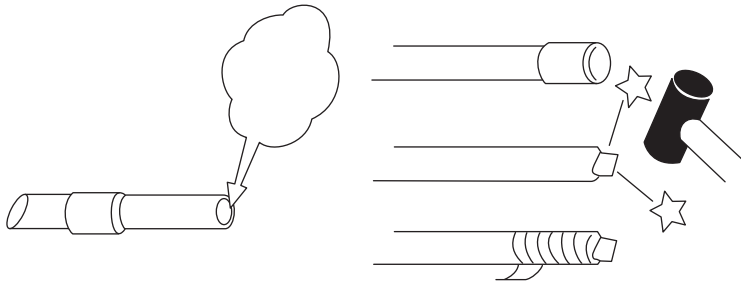


Always use the flare nut that is packed with the product.

Do not use existing (for R22) pipes

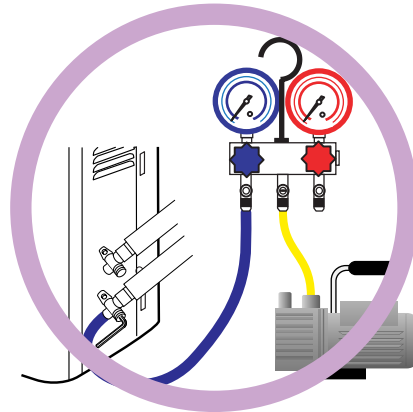
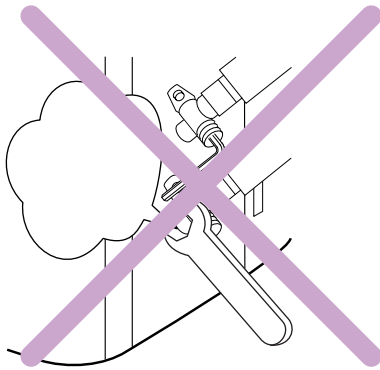
- Be sure to use new pipes when replacing conventional (R22) model with HFC (R407C, R410A) model.
- If you use existing pipes, it may cause resolution of compressor oil by remaining mineral oil.

Be careful not to mix moisture and contamination into the pipe



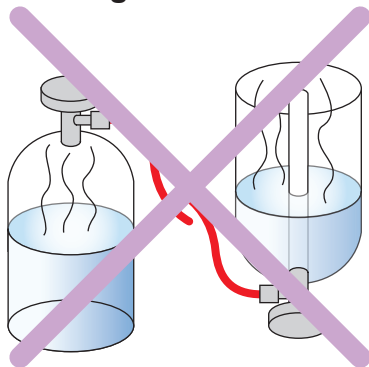
Moisture and **contamination**
in the pipe is a cause of
trouble.

Air purge

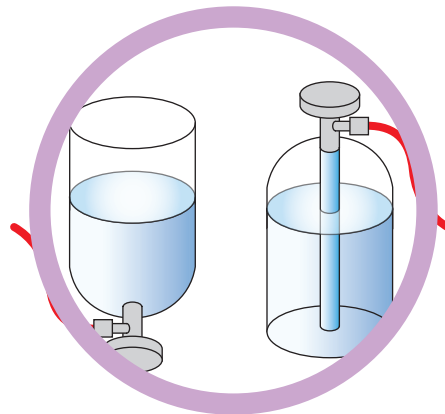


Always use a **vacuum pump** to purge air.

Refrigerant charge



Don't charge from the **gas** phase side.



Do it always from the **liquid** phase
side.

Compressor oil is changed

- We developed new synthetic oil, since HFC refrigerant doesn't dissolve in mineral (for R22) oil.
- Be careful to handle synthetic oil, since it resolves easily by moisture and contamination.
- Don't mix new synthetic oil and mineral oil. It may cause trouble.

3. PRECAUTION FOR SERVICING

Feature 1 Refrigerant oil is different from before.

Refrigerant oil for
New Refrigerant

Synthetic oil
Ether
Esther

※ Previously it was
mineral oil.

Different point from
previous one

- Absorbent character is high.
- Contamination occurs when mixed with the other kind of oil.

Precaution on Tools

- Use the gauge manifold and charge hose for New Refrigerant(HFC), which shall be segregated from those of R22.
- Attach the stop valve on the vacuum pump and avoid the oil from reverse flow.
- It is necessary to use the vacuum pump which can obtain the high vacuum condition.

Feature 2 New Refrigerant has Approx 1.6 times higher pressure than previous refrigerant.

R410A

High Pressure

※ 1.6 times of R22.

Different point from
previous one

- Diameter of Service port has been changed from 1/4 Flare to 5/16 Flare.
- JIS standard of flare process It became larger
- To keep the thickness of copper tube.
(1/4, 3/8 = more than 0.8mm)

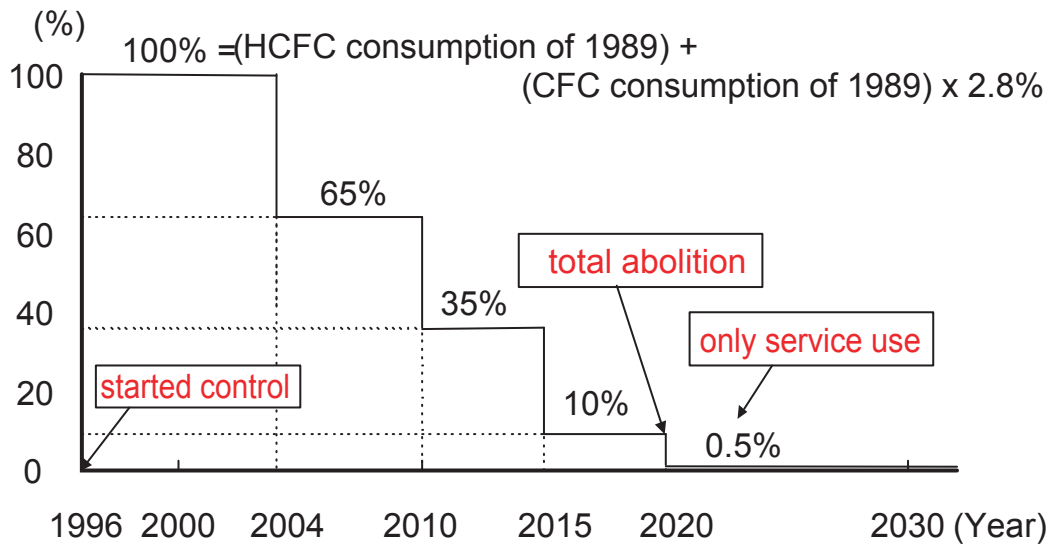
Precaution on Tools

- It requires the gauge manifold and charge hose exclusively for R410A.
 - It requires the flare tool and torque wrench that satisfies New JIS standard.
- ※ Previous flare tool + flare adapter can be used as well.

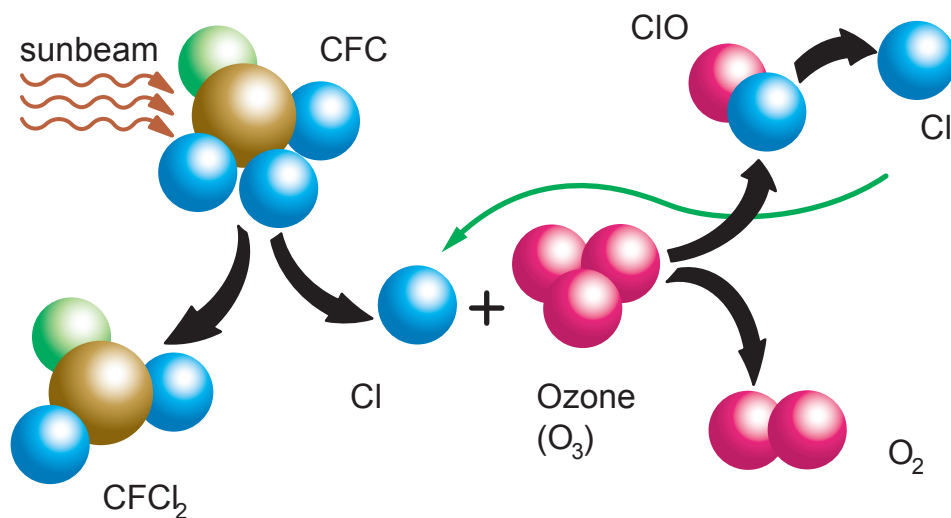
4. NEW REFRIGERANT R410A

* What is HFC ?

Phase-out schedule of HCFC according to Montreal protocol



Ozone Layer depleting mechanism



What is CFC and HCFC?

CFC : Chloro-Fluoro-Carbon

High ODP(ozone depletion potential) chemical compound, including chlorine. (ODP:0.6-1.0)
For example : R12 (for refrigerator and car air-conditioner)

HCFC : Hydro-Chloro-Fluoro-Carbon

Low ODP chemical compound, including chlorine and hydrogen. (ODP:0.02-01)
For example : R22 (for air-conditioner)

HFC₃ : Hydro-Fluoro-Carbon

R134a (for Car air conditioner)
R407C (for air conditioner)

Refrigerant characteristics

	R410A	R407C	R22
Composition (wt%)	R32/R125 (50/50)	R32/R125/R134a (23/25/52)	R22 (100)
Boiling Point	- 51.4	- 43.6	- 40.8
Behavior	near azeotrope	zeotrope	---
Pressure at 54.5 °C (kPa)	3,406	2,262	2,151
Temperature Glide (deg)	0.11	5.4	0
ODP	0	0	0.055

Summary of R407C and R410A characteristics

	R410A	R407C
Advantage	<ul style="list-style-type: none"> • higher system performance • Near-Azeotropic refrigerant 	<ul style="list-style-type: none"> • similar pressure as R22 (possible to design large equipment)
Disadvantage	<ul style="list-style-type: none"> • 1.6 times higher pressure than R22 (difficult to design against pressure resistance) 	<ul style="list-style-type: none"> • Zeotropic refrigerant (handle with care)
Suitable for	<ul style="list-style-type: none"> • Small Air-Conditioners 	<ul style="list-style-type: none"> • Large Air-Conditioners

* Designed pressure of R410A refrigerant

Relation between R410A condensing temperature and saturated pressure.

< Pressure → Temp >

Pressure (Mpa)	Temp (°C)
2.20	37.9
2.25	38.7
2.30	39.6
2.35	40.5
2.40	41.3
2.45	42.1
2.55	43.8
2.60	44.6
2.65	45.3
2.70	46.1
2.75	46.8
2.80	47.6
2.85	48.3
2.90	49.0
2.95	49.8
3.00	50.5
3.05	51.2
3.10	51.9
3.15	52.6
3.20	53.2
3.25	53.9
3.30	54.6
3.35	55.3
3.40	55.9
3.45	56.5
3.50	57.1
2.55	57.8
3.60	58.4
3.65	59.0
3.70	59.6
3.75	60.2
3.80	60.8
3.85	61.4
3.90	62.0
3.95	62.5
4.00	63.1
4.05	63.6
4.10	64.2
4.15	64.8

< Temp → Pressure >

Temp (°C)	Pressure (Mpa)
39	2.27
40	2.32
41	2.38
42	2.44
44	2.57
45	2.63
46	2.69
47	2.76
48	2.83
49	2.90
51	3.04
52	3.11
53	3.18
54	3.26
56	3.41
57	3.49
58	3.57
59	3.65
61	3.82
62	3.90
63	3.99
64	4.08

5. DIFFERENCE FROM CONVENTIONAL MODEL (R22) AND PRECAUTIONS

OIL

- Use new synthetic oils such as ester because HFC series refrigerant has less solubility with mineral oils conventionally used for R22.
- As these new synthetic oils are easily influenced by moisture and dusts, they must be treated more carefully than the conventional lubricating oils.

CAUTION

For installation/servicing, take more precautions than the case of conventional refrigerants to avoid moisture and dusts entering the refrigerant circuit. Also, for storing parts, more precautions must be taken.

COMPRESSOR

- Use better grade of material for sliding parts for securing good lubrication of sliding part as HFC refrigerant does not contain chloride.
- Review insulating materials
- Increase pressure resistance strength

CAUTION

Check if the compressor is suitable for the refrigerant (model) when replacing. Complete welding within 15 minutes after opening the cap when replacing.

HEAT EXCHANGER

- Review the water, contaminants controlling level
- Use thinner tube to increase pressure Increase capacity for resistance strength (only outdoor unit) improving performance

CAUTION

During storage, due care must be taken so that foreign matters such as dust and water do not enter.

4-WAY VALVE

- Review materials

CAUTION

Check if the valve is suitable for the refrigerant (model) when replacing.

2, 3-WAY VALVE

- Review material O-ring, valve core seal for securing suitability with oil.

CAUTION

Check if the valve is suitable for the refrigerant (model) when replacing.

FLOOR type INVERTER

7 . TROUBLE SHOOTING

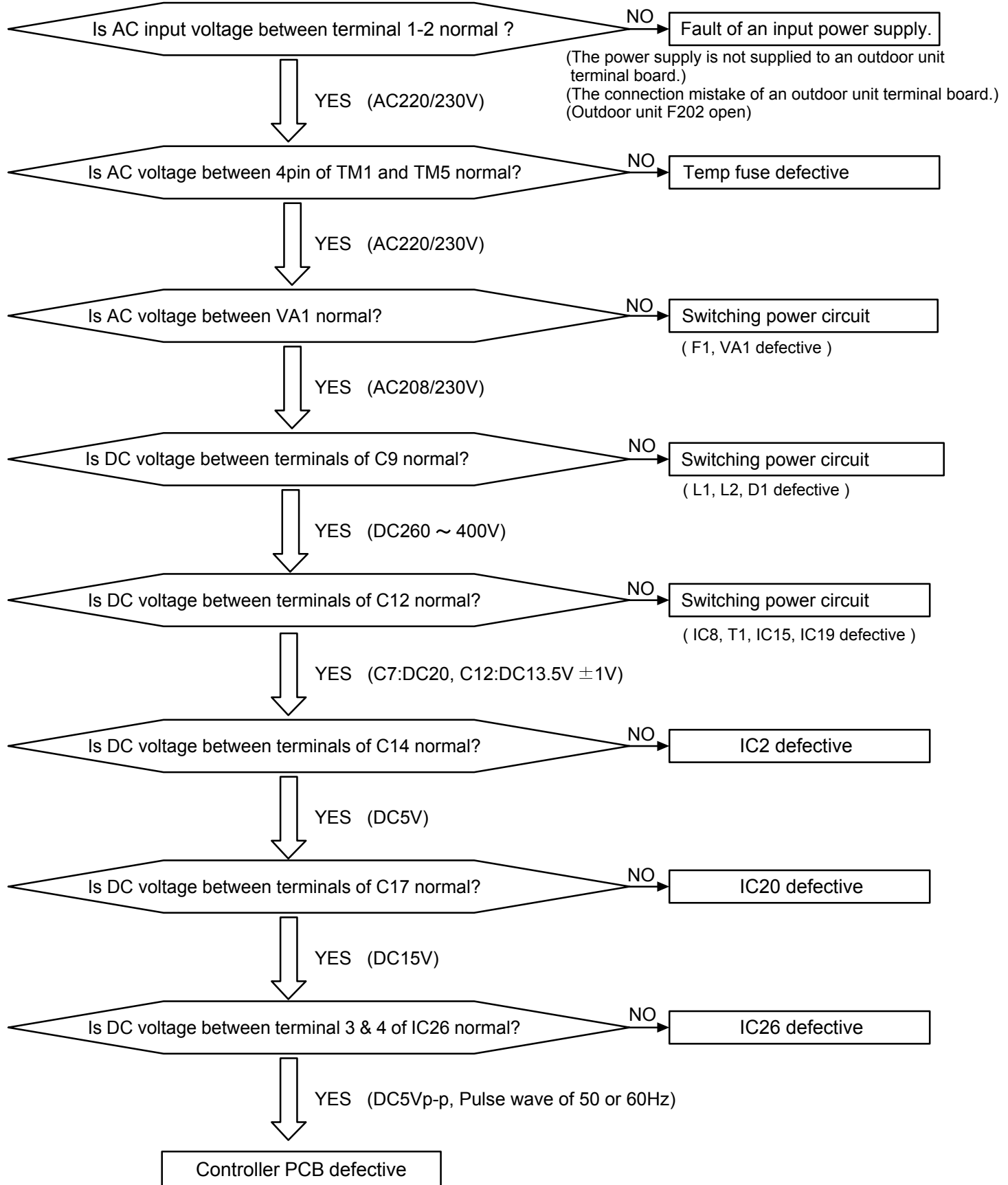
1. When the unit does not operate at all (Operation lamp and Timer lamp do not light up)
2. Self Diagnosis Function (Either Operation lamp or Timer lamp is blinking)
 - * How to operate the self-diagnosis function
 - * Self- diagnosis table and Check points
3. Trouble shooting method
 - * Serial signal check
 - * IPM protection check
 - * Refrigeration cycle diagnosis

When does not operate at all (Operation Lamp and Timer Lamp do not light up)

[Check Point]

- (1) Is the input power voltage from the exclusive circuit AC outlet normal?
- (2) Is the AC plug inserted to the AC outlet securely and not loose?
- (3) Does not connected cable do wrong wiring?
- (4) Check if each connector is inserted securely.

[Checking Flow Chart]



SELF-DIAGNOSIS FUNCTION

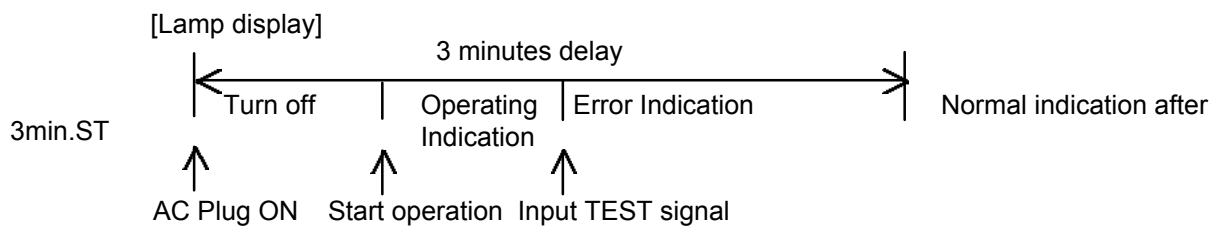
This function memorizes the self-diagnosis function (lamp display) in the in door control P.C.Board when trouble occurs.

(The memory contents are not destroyed even when the power cord is unplugged from the AC outlet.)

The self-diagnosis function (lamp display) can also be switched between major classification display and minor classification display and precise diagnosis can be made.

Self-diagnosis function [lamp display] (memory reading)

- (1) When error occurs, it is indicated by blinking [Operation lamp] and [Timer lamp].
- (2) Upon pulling out and inserting the AC plug, the starts to operates from remote control.
(At this state, a normal operation indication is performed.)
- (3) By pressing [TEST] button of remote control, [Error Indication] is indicated only during [3 minutes ST].
(3 minutes ST : 2 minutes 20 seconds from the timing AC plug is ON)



How to erase Memory

- (1) While [Error indication] is ON by the self-diagnosis function, the memorized contents can be erased by pressing [Forced Auto Button] on the main unit.
(Indoor unit buzzer beeps 3 seconds.)

Self - diagnosis function and Checking points

Error Indication			Wired remote controller	Error (Protection)	Diagnosis Method
Operation	Timer	10°C HEAT			
OFF	0.5 sec 2 times	OFF	01	Serial reverse transfer error at starting up operation	At the start up, the indoor unit does not receive the signal for 10 consecutive seconds from the time when the power relay was ON. >Permanent stop after 30 seconds. [Diagnosis Point] • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location. (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)
	0.5 sec 3 times	OFF	01	Serial reverse transfer error during the operation	When the indoor unit does not receive the signal for 10 consecutive seconds during the operation >Permanent stop after 30 seconds. [Diagnosis Point] • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location. (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)
	0.5 sec 4 times	OFF	13	Serial forward transfer error at starting up operation	The outdoor unit does not receive the signal for 10 consecutive seconds from the time when the power relay was ON. >Outdoor unit stops. [Diagnosis Point] • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location. (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)
	0.5 sec 5 times	OFF	13	Serial forward transfer error during the operation	When the outdoor unit does not receive the signal for 10 consecutive seconds during the operation > Outdoor unit stops. [Diagnosis Point] • Check the indoor /outdoor cable connection (in order). If the cable wiring is not abnormal, measure the voltage of the outdoor unit terminals and diagnose the defective location. (Refer to the after mentioned [Serial Signal Diagnosis] for the voltage measuring method and diagnosis method.)
	0.5 sec 8 times	OFF	00	Wired remote controller error	When the communication is cut off longer than 1 minutes upon connection. > Compressor , Outdoor fan : OFF (If the communication becomes normal, they automatically resume operation. [Diagnosis Point] • Check wiring • Controller PCB failure
0.5 sec 2 times	0.5 sec 2 times	OFF	02	Room temperature thermistor defective	The room temperature thermistor detective a abnormal temperature when the power was turned on. > Remote control does not operate. [Diagnosis Point] • Check thermistor resistance value (Refer to "Themistor characteristics table"). • Controller PCB defective.
	0.5 sec 3 times	OFF	04	Indoor heat exchanger thermistor error	The detection value of the indoor heat exchanger thermistor is either open or shoted when the power is ON. > Remote control dose not operate. [Diagnosis Point] • Check thermistor resistance value (Refer to "Themistor characteristics table"). • Controller PCB defective.

Self - diagnosis function and Checking points


Error Indication			Wired remote controller	Error (Protection)	Diagnosis Method
Operation	Timer	10°C HEAT			
0.5 sec 3 times	0.5 sec 2 times	OFF	0C	Discharge thermistor error	<p>The detection value of the discharge thermistor is either open or shorted. > Compressor, outdoor fan : OFF (It automatically releases when the normal value is detected.)</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check thermistor resistance value (Refer to "Themistor characteristics table"). • Controller PCB defective.
	0.5 sec 3 times	OFF	06	Outdoor heat exchanger thermistor error	<p>The detection value of the outdoor heat exchanger thermistor is either open or shorted. > Compressor, outdoor fan : OFF (It automatically releases when the normal value is detected.)</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check thermistor resistance value (Refer to "Themistor characteristics table"). • Controller PCB defective.
	0.5 sec 4 times	OFF	0A	Outdoor temperature thermistor error	<p>The detection value of the outdoor temperature thermistor is either open or shorted. > Compressor, outdoor fan : OFF (It automatically releases when the normal value is detected.)</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check thermistor resistance value (Refer to "Themistor characteristics table"). • Controller PCB defective.
	0.5 sec 8 times	OFF	15	Compressor temperature thermistor error	<p>The detection value of the compressor thermistor is either open or shorted > Compressor, Outdoor Fan : OFF (It automatically releases when the normal value is detected.)</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check Thermistor resistance value (Refer to "Themistor characteristics table"). • Controller PCB defective
0.5 sec 4 times	0.5 sec 2 times	OFF	20	MANUAL AUTO switch error	<p>MANUAL AUTO switch becomes ON for 30 consecutive seconds. > It indicates the error but the operation continues.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check if forced auto switch is kept pressed. • Forced auto switch defective. • Controller PCB defective.

Self - diagnosis function and Checking points

Error Indication			Wired remote controller	Error (Protection)	Diagnosis Method
Operation	Timer	10°C HEAT			
0.5 sec 5 times	0.5 sec 2 times	OFF	17	IPM protection	<p>Abnormal current value of IPM is detected. > Permanent stop.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Heat radiation is blocked (inlet/outlet). • Check if outdoor fan is defective (does not rotate). • Controller PCB defective (Refer to after mentioned "IPM diagnosis"). • Refrigeration cycle defective (Refer to after mentioned "refrigeration cycle diagnosis").
	0.5 sec 3 times	OFF	18	CT error	<p>The current value during the operation after 1 minute from starting up the compressor is 0A. > permanent stop.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Controller PCB defective.
	0.5 sec 5 times	OFF	1A	Compressor location error	<p>The compressor speed does not synchronize with the control signal. (Including start up failure of the compressor). > permanent stop.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check if 2-way valve or 3-way valve is left open. • Check the compressor (Winding resistance value, loose lead wire). • Refrigeration cycle defective (Refer to after mentioned "refrigerant cycle diagnosis")
	0.5 sec 6 times	OFF	1b	Outdoor fan error (DC motor)	<p>Either the outdoor fan motor abnormal current or location error was detected. > Permanent stop.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Fan motor connector loose/ defective contact. • Fan motor defective. • Controller PCB defective.
0.5 sec 6 times	0.5 sec 2 times	OFF	12	Indoor fan lock error	<p>The indoor fan speed is 0 rpm after 56 seconds from starting operation or from the time the fan mode was changed. > Operation stop. (It releases by sending the operation stop signal from the remote controller).</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Fan motor connector loose /defective contact. • Fan motor defective. (UPPER or LOWER) • Controller PCB defective.

Self - diagnosis function and Checking points

Error Indication			Wired remote controller	Error (Protection)	Diagnosis Method
Operation	Timer	10°C HEAT			
0.5 sec 6 times	0.5 sec 3 times	OFF	12	Indoor UPPER fan speed error	The indoor fan speed is 1/3 of the target frequency after 56 seconds from starting operation or from the time the fan mode was changed. > Operation stop. (It releases by sending the operation stop signal from the remote controller). [Diagnosis Point] • Fan motor connector loose /defective contact. • Fan motor defective. • Controller PCB defective.
	OFF	0.5 sec 2 times	12	Indoor LOWER fan lock error	The indoor fan speed is 0 rpm after 56 seconds from starting operation or from the time the fan mode was changed. > Operation stop. (It releases by sending the operation stop signal from the remote controller). [Diagnosis Point] • Fan motor connector loose /defective contact. • Fan motor defective. • Controller PCB defective.
	OFF	0.5 sec 3 times	12	Indoor LOWER fan speed error	The indoor fan speed is 1/3 of the target frequency after 56 seconds from starting operation or from the time the fan mode was changed. > Operation stop. (It releases by sending the operation stop signal from the remote controller). [Diagnosis Point] • Fan motor connector loose /defective contact. • Fan motor defective. • Controller PCB defective.
	OFF	0.5 sec 4 times	2E	Damper error UPPER & LOWER air flow	When damper opening recovery operation repeats 6 times. > Operation stop. (It releases by sending the operation stop signal from the remote controller). [Diagnosis Point] • Obstruction of damper movement. • Check if the switch wire(CN18) is open.
	0.5 sec 5 times	OFF	2E	Damper error UPPER air flow	When damper closing recovery operation repeats 6 times. > Operation stop. (It releases by sending the operation stop signal from the remote controller). [Diagnosis Point] • Obstruction of damper movement. • Check if the switch wire(CN18) is open.
	OFF	0.5 sec 5 times	2E	Damper error	When close detecting sw and open detecting sw operates simultaneously. > Operation stop. (It releases by sending the operation stop signal from the remote controller). [Diagnosis Point] • Check if the switch wire(CN18) is short.

- When the OPERATION Indicator Lamp and the 10°C HEAT Indicator Lamp flashes, the operation can be maintained temporary by changing of air outlet selection switch to , closing the damper completely and press the START/ STOP button.

(If the damper does not close automatically, close the damper manually and fix the position by an adhesive tape etc.)

The unit operates almost the same as upper air flow operation, however the indicator lamp flashes continuously if same symptom is detected again.

Self - diagnosis function and Checking points

Error Indication			Wired remote controller	Error (Protection)	Diagnosis Method
Operation	Timer	10°C HEAT			
0.5 sec 7 times	0.5 sec 2 times	OFF	0F	Discharge temperature error	<p>The discharge temperature error is activated. > Permanent stop.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Check if 2 way valve or 3 way valve is left open. • Heat radiation is blocked (Inlet/Outlet) • Check if Outdoor Fan is defective (does not rotate). • Refrigeration cycle defective. (Refer to after mentioned "Refrigerant cycle diagnosis").
	0.5 sec 3 times	OFF	24	Excessive High Pressure Protection on Cooling	<p>Excessive high pressure protection on cooling mode has been activated. > Compressor, Outdoor Fan : OFF (It releases after 3 minute ST)</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Heat radiation is blocked (Inlet/Outlet) • Check if Outdoor Fan is defective (does not rotate). • Refrigeration cycle defective. (Refer to after mentioned "Refrigerant cycle diagnosis").
0.5 sec 8 times	0.5 sec 4 times	OFF	25	PFC circuit Error	<p>Excessive voltage of DC voltage on PFC circuit in Inverter PCB is detected, or the excessive current in the circuit is detected. > Permanent stop.</p> <p>[Diagnosis Point]</p> <ul style="list-style-type: none"> • Controller PCB defective. (Refer to after mentioned "PFC circuit diagnosis")

Serial Signal Diagnosis

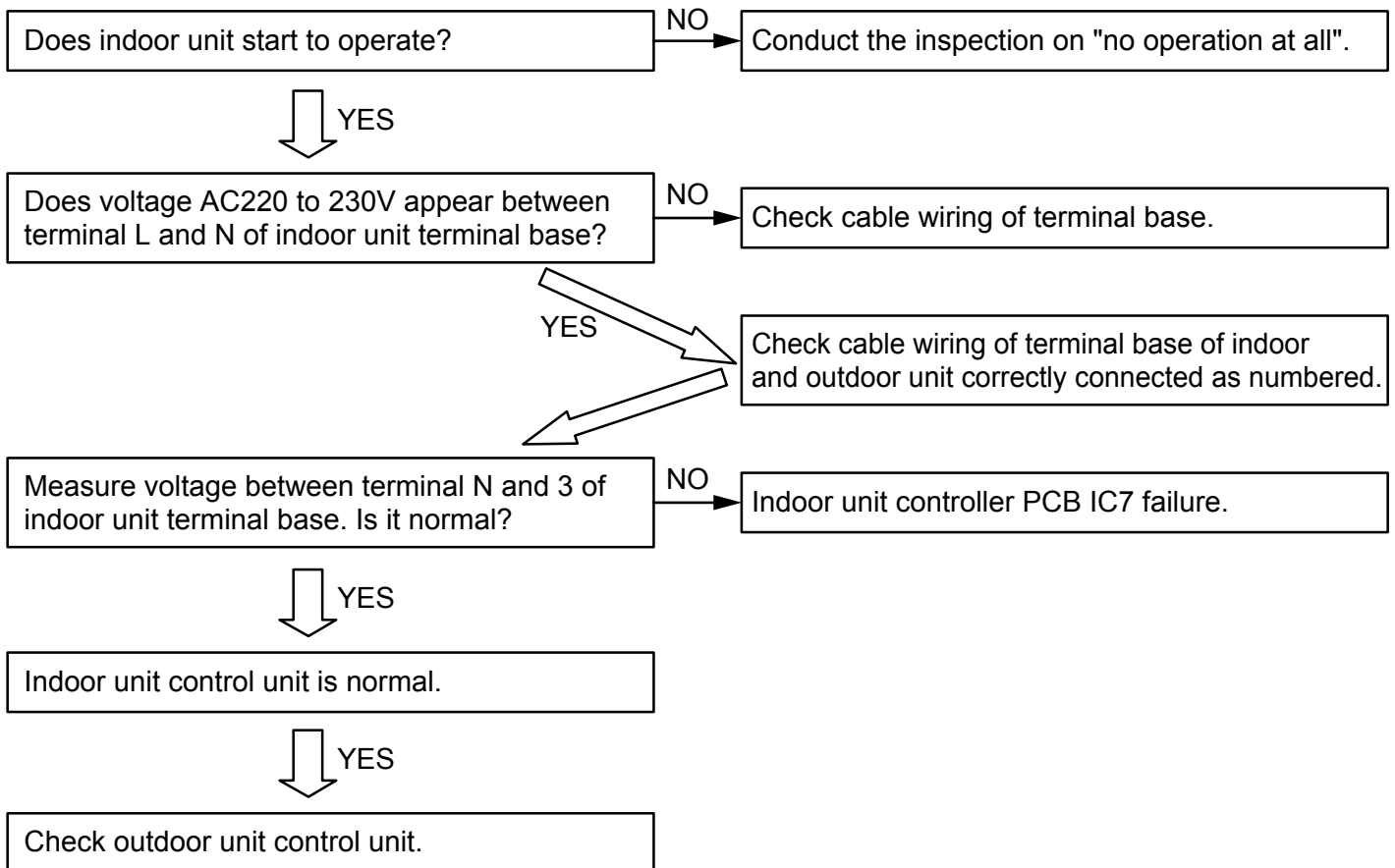
[Check Point] Check which has a cause of error, either Indoor unit or Outdoor unit.

- * Remove indoor unit front panel and cable xlampers and keep the terminal block clear so that it can be measured with a meter.
- * Remove AC power and reset the power, and press Test Operation switch on remote control.

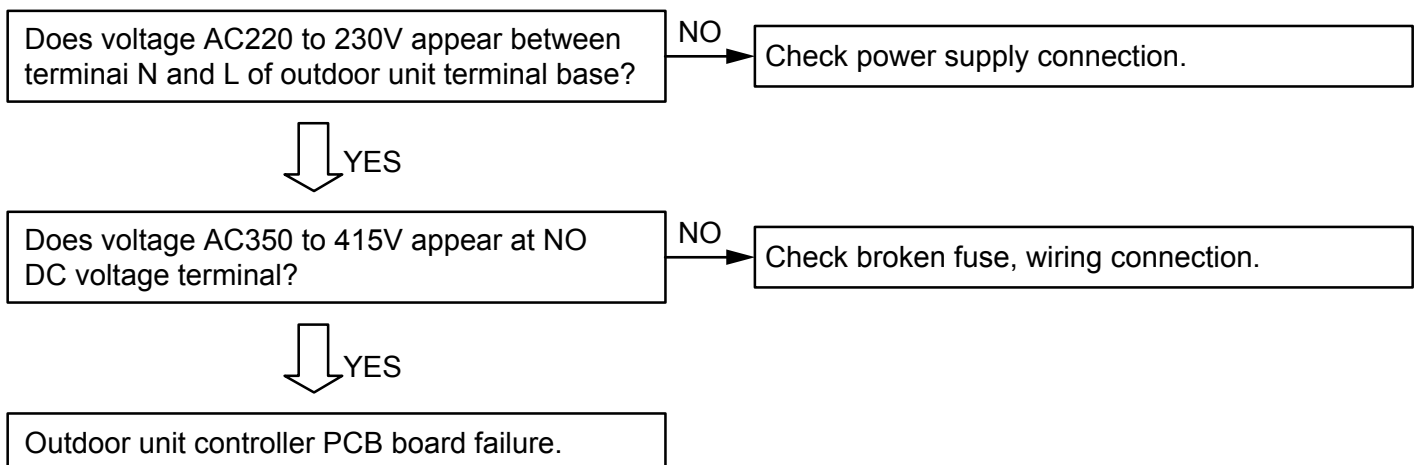
[Check Procedure]

CAUTION: Keep out hands from terminal base and electrical components. Voltage is applied on them and you may get electric shock.

[Indoor Unit Check]



[Outdoor Unit Check]



IPM Protection

[Checking Points]

Check the following points and locate the cause in the outdoor unit.

[Cause]

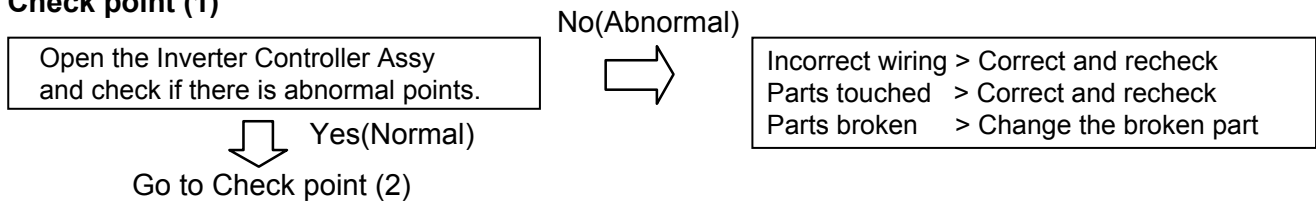
- (1) Compressor failure
- (2) Refrigeration cycle failure
- (3) PC Board defective
- (4) IPM defective
- (5) Incorrect wiring

[First step]

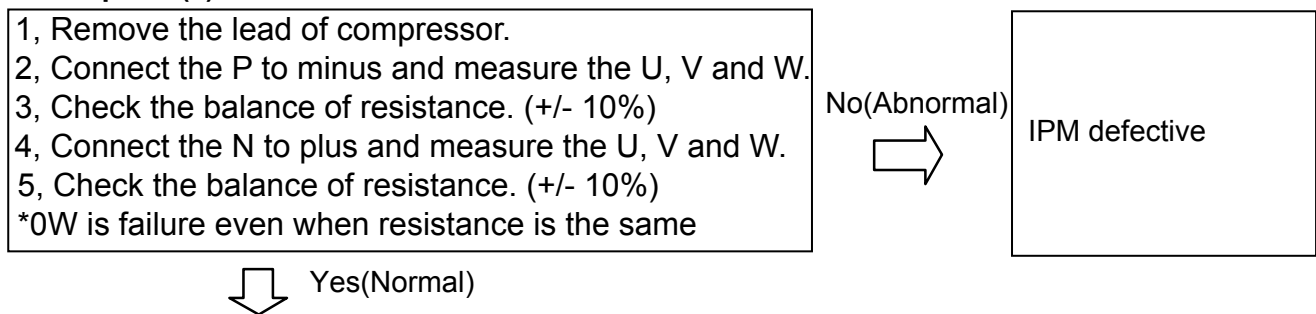
Measure the DC voltage at terminals (between Electrolytic Capacitor and discharge resistance) in the Inverter Controller Assy, and make sure it is lower than DC5V.

If it is higher than 5V, wait until the discharging is over.

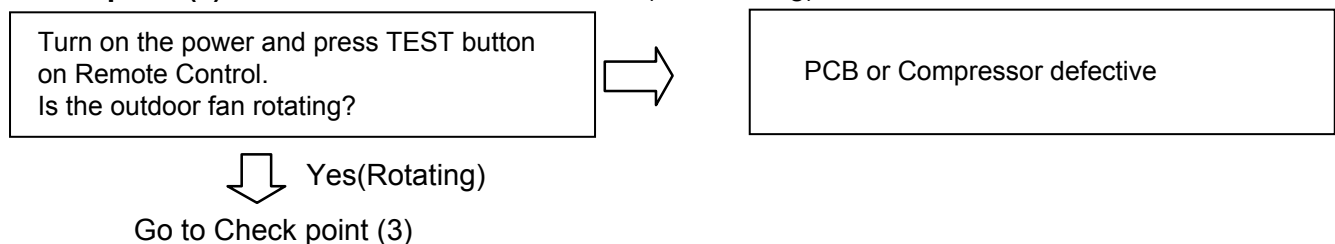
Check point (1)



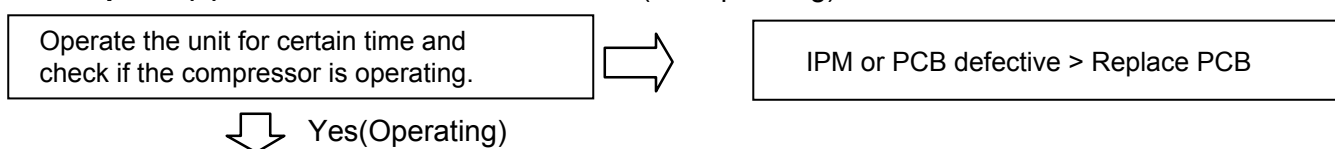
Check point (2)



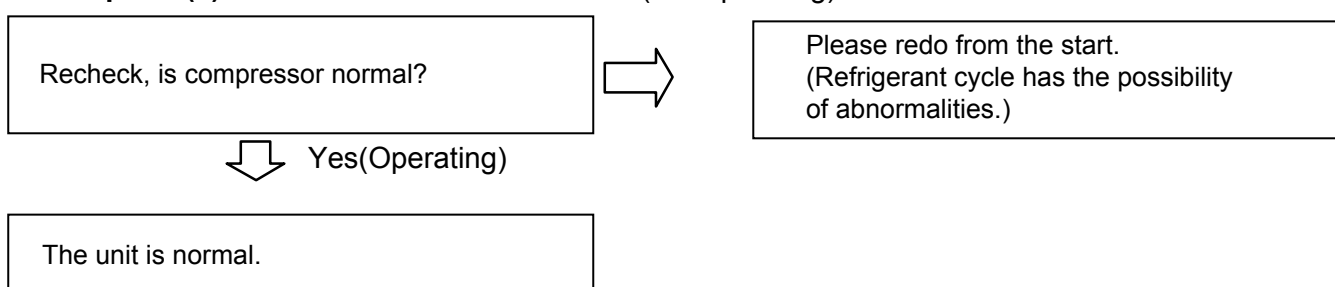
Check point (3)



Check point (4)



Check point (5)



Trouble Shooting of Refrigerant Cycle

[Diagnosis Table for Defective Component]

○ : Item of most possible cause

	IPM Protection	Compressor Location error	Discharge Temperature Error	Cooling High Pressure Protection
Refrigerant leak			○	
Compressor failure(*)	○	○		
EEV failure (*)	○	○	○	○
Thermistor failure (*)	○	○	○	○

(*) Trouble Shooting Method

(1) Checking method of the compressor failure

Insert the AC plug and start up the cooling operation. Input Test operation signal and check if the compressor operates.

If it does not operate, measure the resistance value of compressor windings between U-V, V-W, W-U.

If any of the resistance value between U-V, V-W, W-U is not same as others, the compressor is defective.

Compressor Failure

	NORMAL
AG*V09/ 12LAC	Compressor Case Temperature at 20°C: 0.710 ohm
AG*V14LAC	Compressor Case Temperature at 20°C: 0.730 ohm

(The above resistance value is a typical value. There is some distribution. As it also changes by the compressor temperature, the measured value may be much different from the above table when measured right after stopping operation.)

(2) Checking method of EEV failure

- Insert the AC plug and start up the operation. Check if the EEV operates just before compressor is turned on. (Touch EEV by hand and check it.)

If it does not operate, check if the coil or connector of EEV is removed or loose.

If it operates, check the discharge thermistor / outdoor heat exchanger thermistor / indoor heat exchanger thermistor. (Refer to (3) for checking method.)

(3) Checking method of Thermistor

- Check each thermistor if it is removed or the connector is loose.

If there is no problem, remove the connector of the thermistor from the PCB and check the resistance value. (refer to the thermistor characteristics table).

FLOOR type INVERTER

8 . APPENDING DATA

1. Jumper setting of Indoor unit and Outdoor unit
2. Outdoor unit Pressure Value and Total Electric Current Curve
3. Thermistor Resistance Values

JP (Jumper) Setting

[Indoor Unit]

AG*V09/ 12/ 14LAC

- Remote control custom code

When multiple number of indoor units are installed in the same room, erroneous receipt of the signal can be avoided by setting up the remote control custom code separately.

To set up the remote control custom code, always set up the same code on both indoor unit PCB and remote control PCB.

(When the indoor unit PCB is changed to Code B, it can not receive the signal unless remote control PCB is also changed to Code B.)

	Indoor Unit	Remote Control
	JM1 (JP)	J4 (JP)
Code A (Default)	○	○
Code B	×	×

- Auto Restart

It is possible to disengage Auto Restart function if it is not needed.

	Indoor Unit
	JM2 (JP)
With Auto Restart function (Default)	○
Without Auto Restart function	×

[Outdoor Unit]

AO*V09/ 12/ 14LAC

		JP			
		JM500	JM103	JM102	JM101
09LAC	Normal Preheat	○	×	×	×
	Higher Preheat	×	×	×	×
12LAC	Normal Preheat	○	×	×	○
	Higher Preheat	×	×	×	○
14LAC	Normal Preheat	○	×	○	×
	Higher Preheat	×	×	○	×

- it is possible to select the higher or standard level of preheating function.

- When it is set up at the higher level of preheat, the magnetic noise of the compressor becomes higher.

Outdoor Unit Low Pressure Value and Outdoor Total Electric Current Curve (Cooling)

Model Name : AG*V09/ 12LAC

[Condition]

Ambient temperature : Indoor / Outdoor - Same temperature

Amount of refrigerant : Regulation amount

Piping length : 5m (Difference of elevation 1m)

Power voltage : 50Hz - 230V

Operating condition : TEST mode (Cooling), Hi-speed Fan, Upward blowoff position, Front blowoff, 1 fan operating, With deodorizing filter

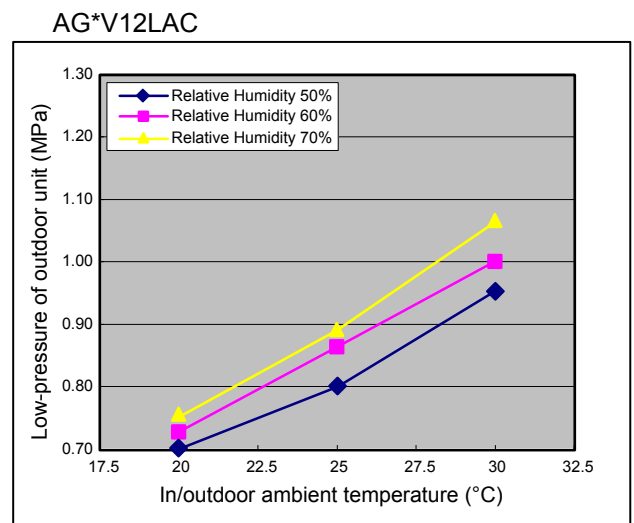
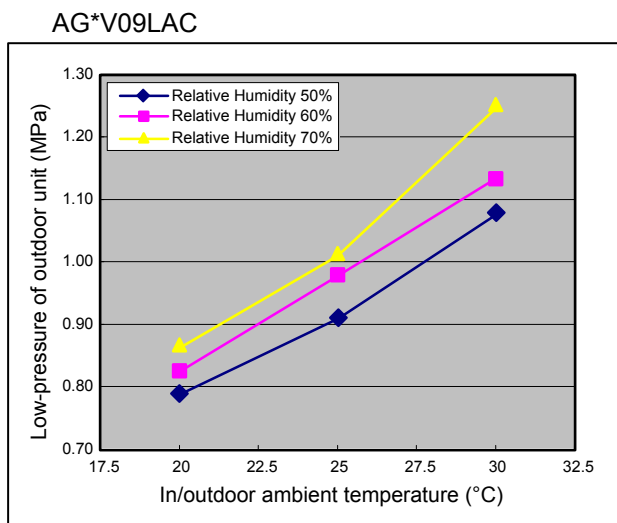
Measurement method : Low side pressure shall be measured with a pressure gauge from service valve.
Total outdoor electric current shall be measured with a clamp meter from connection cord.

Caution : Start operation with the condition of the Indoor Unit air filter clean.

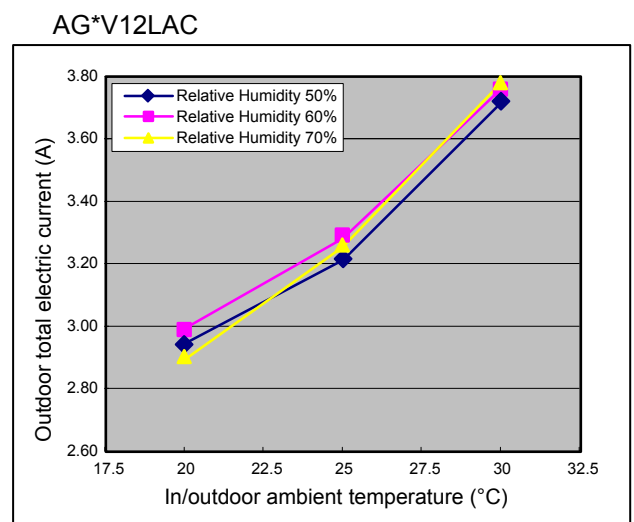
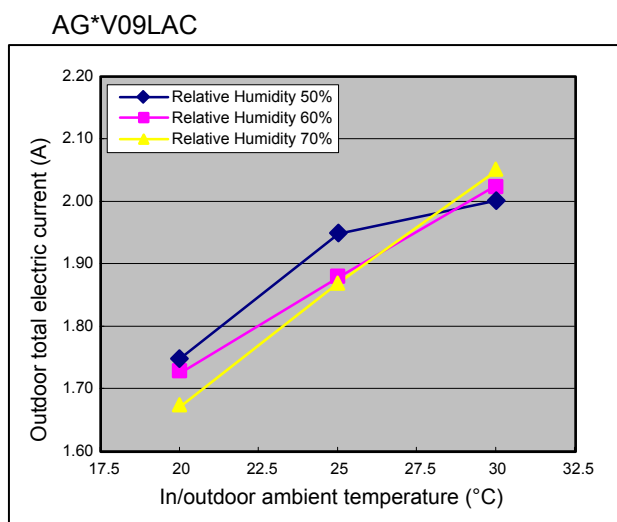
[Constant Frequency Operation Method (Test mode)]

1. Operate on Colling mode, and press TEST button of remote control.
2. Operate continuously for 30 minutes. (After 60 minutes of operation, Test mode is released automatically.)

(1) Indoor/Outdoor Temperature - Outdoor Low Pressure Curve



(2) Indoor/Outdoor Temperature - Outdoor Total Electric Current Curve



Outdoor Unit Low Pressure Value and Outdoor Total Electric Current Curve (Cooling)

Model Name : AG*V14LAC

[Condition]

Ambient temperature : Indoor / Outdoor - Same temperature

Amount of refrigerant : Regulation amount

Piping length : 5m (Difference of elevation 1m)

Power voltage : 50Hz - 230V

Operating condition : TEST mode (Cooling), Hi-speed Fan, Upward blowoff position, Front blowoff, 1 fan operating, With deodorizing filter

Measurement method : Low side pressure shall be measured with a pressure gauge from service valve.
Total outdoor electric current shall be measured with a clamp meter from connection cord.

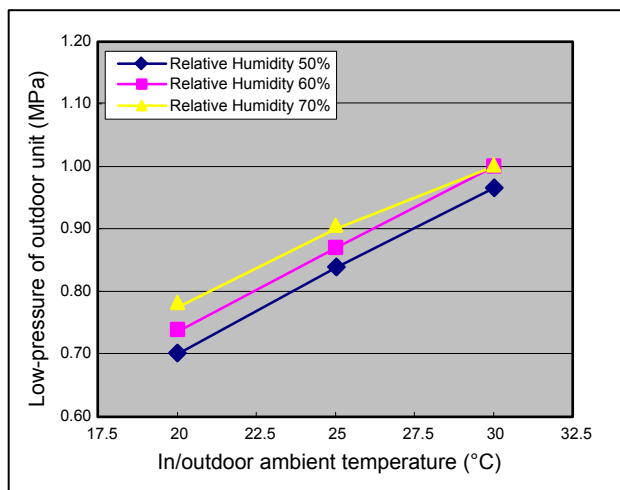
Caution : Start operation with the condition of the Indoor Unit air filter clean.

[Constant Frequency Operation Method (Test mode)]

1. Operate on Colling mode, and press TEST button of remote control.
2. Operate continuously for 30 minutes. (After 60 minutes of operation, Test mode is released automatically.)

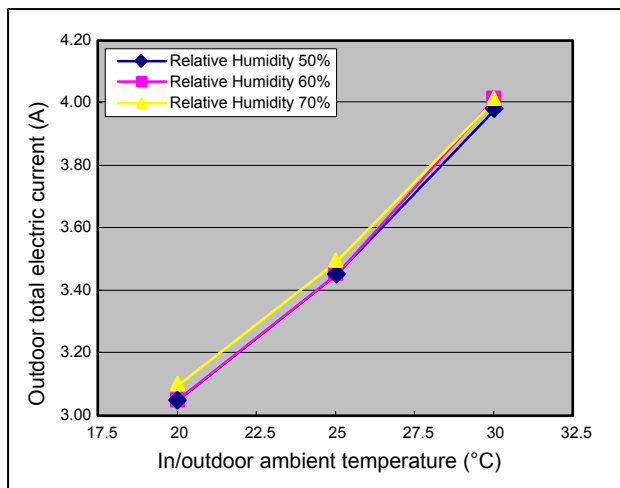
(1) Indoor/Outdoor Temperature - Outdoor Low Pressure Curve

AG*V14LAC



(2) Indoor/Outdoor Temperature - Outdoor Total Electric Current Curve

AG*V14LAC



Outdoor Unit High Pressure Value and Outdoor Total Electric Current Curve (Heating)

Model Name : AG*V09/ 12LAC

[Condition]

Ambient temperature : Indoor 15 - 23degC, Outdoor 2 - 12degC

Amount of refrigerant : Regulation amount

Piping length : 5m (Difference of elevation 1m)

Power voltage : 50Hz - 230V

Operating condition : TEST mode (Heating), Hi-speed Fan, Upward blowoff position, Front blowoff, 1 fan operating, With deodorizing filter

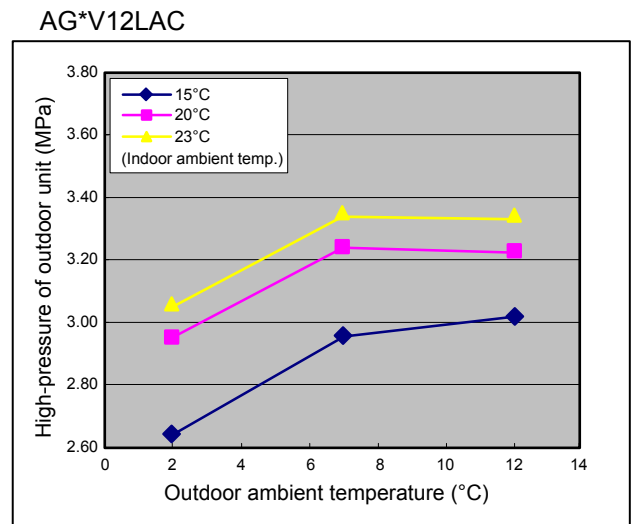
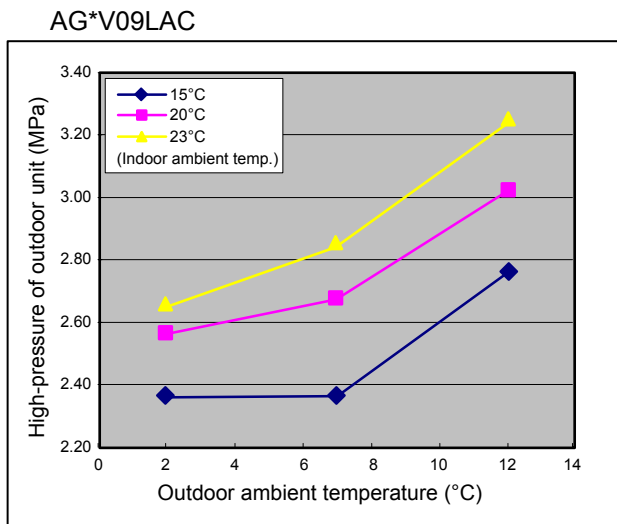
Measurement method : High side pressure shall be measured with a pressure gauge from service valve.
Total outdoor electric current shall be measured with a clamp meter from connection cord.

Caution : Start operation with the condition of the Indoor Unit air filter clean.

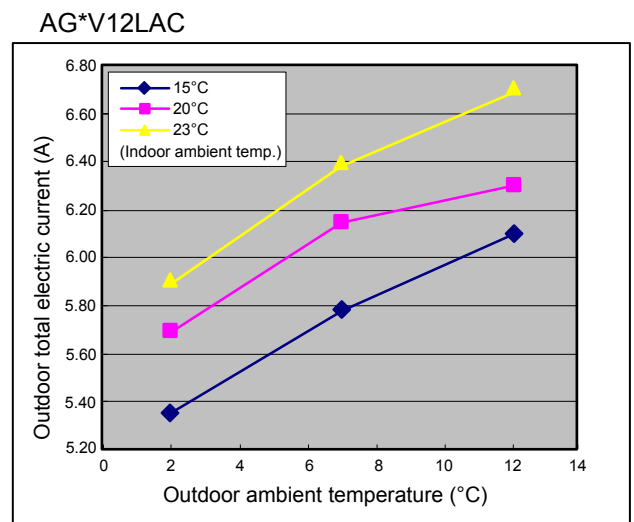
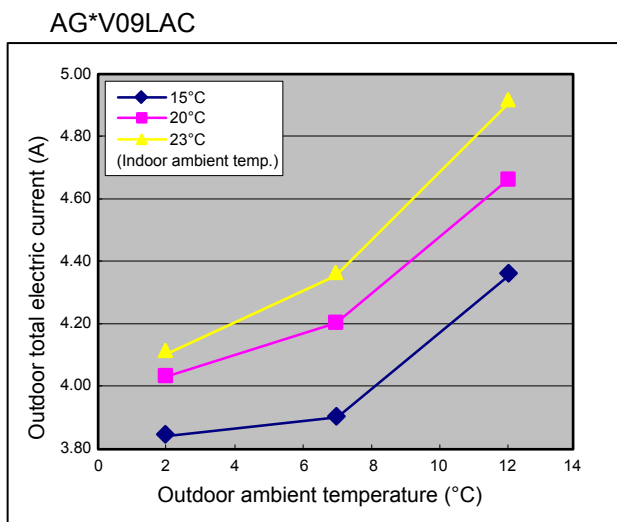
[Constant Frequency Operation Method (Test mode)]

1. Operate on Heating mode, and press TEST button of remote control.
2. Operate continuously for 30 minutes. (After 60 minutes of operation, Test mode is released automatically.)

(1) Indoor/Outdoor Temperature - Outdoor High Pressure Curve



(2) Indoor/Outdoor Temperature - Outdoor Total Electric Current Curve



Outdoor Unit High Pressure Value and Outdoor Total Electric Current Curve (Heating)

Model Name : AG*V14LAC

[Condition]

Ambient temperature : Indoor 15 - 23degC, Outdoor 2 - 12degC

Amount of refrigerant : Regulation amount

Piping length : 5m (Difference of elevation 1m)

Power voltage : 50Hz - 230V

Operating condition : TEST mode (Heating), Hi-speed Fan, Upward blowoff position, Front blowoff,
1 fan operating, With deodorizing filter

Measurement method : High side pressure shall be measured with a pressure gauge from service valve.
Total outdoor electric current shall be measured with a clamp meter from connection cord.

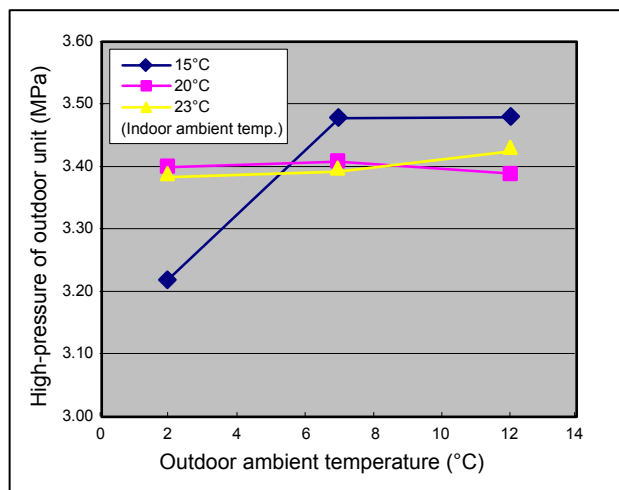
Caution : Start operation with the condition of the Indoor Unit air filter clean.

[Constant Frequency Operation Method (Test mode)]

1. Operate on Heating mode, and press TEST button of remote control.
2. Operate continuously for 30 minutes. (After 60 minutes of operation, Test mode is released automatically.)

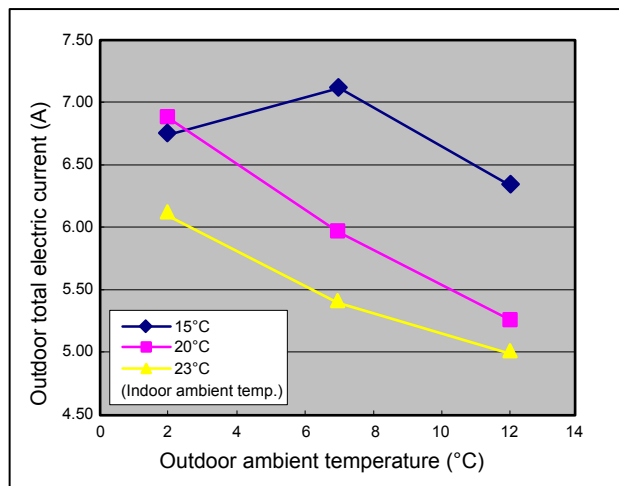
(1) Indoor/Outdoor Temperature - Outdoor High Pressure Curve

AG*V14LAC



(2) Indoor/Outdoor Temperature - Outdoor Total Electric Current Curve

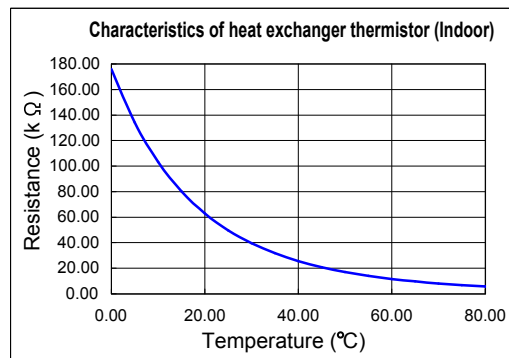
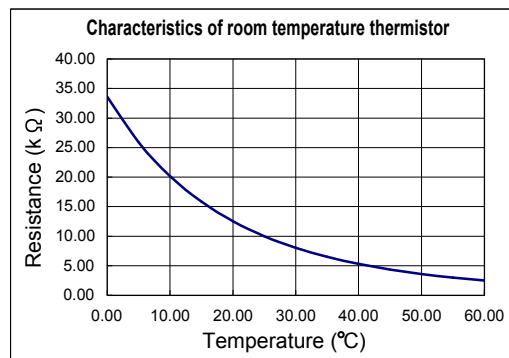
AG*V14LAC



Thermistor resistance values

Room temperature thermistor		
Temp (°C)	Resistance(k Ω)	Voltage(V)
0.00	33.62	1.15
5.00	25.93	1.39
10.00	20.18	1.66
15.00	15.84	1.94
20.00	12.54	2.22
25.00	10.00	2.50
30.00	8.04	2.77
35.00	6.51	3.03
40.00	5.30	3.27
45.00	4.35	3.48
50.00	3.59	3.68
55.00	2.98	3.85
60.00	2.47	4.00
65.00	2.09	4.14
70.00	1.76	4.25
75.00	1.49	4.35
80.00	1.27	4.44
85.00	1.09	4.51
90.00	0.93	4.57
95.00	0.81	4.63
100.00	0.70	4.67

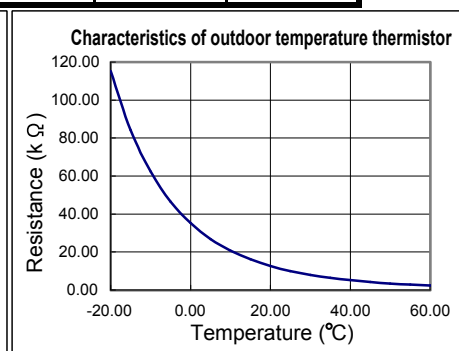
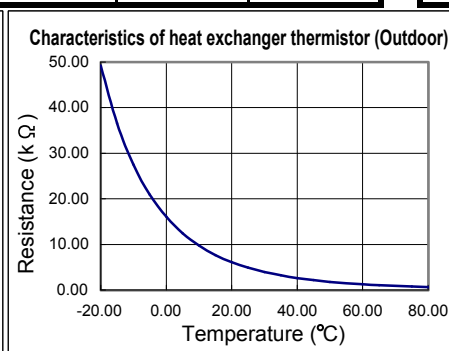
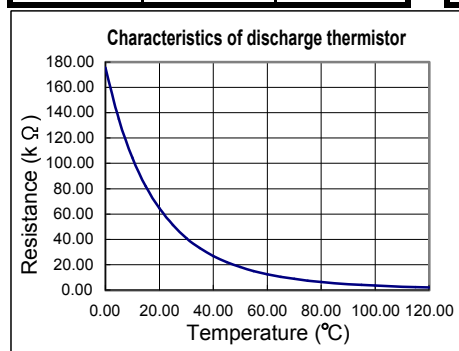
Indoor heat exchanger thermistor		
Temp (°C)	Resistance(k Ω)	Voltage(V)
0.00	176.03	1.10
5.00	134.23	1.36
10.00	103.34	1.63
15.00	80.28	1.92
20.00	62.91	2.21
25.00	49.70	2.51
30.00	39.57	2.79
35.00	31.74	3.06
40.00	25.64	3.30
45.00	20.85	3.53
50.00	17.06	3.73
55.00	14.10	3.90
60.00	11.64	4.55
65.00	9.69	4.19
70.00	8.12	4.30
75.00	6.83	4.40
80.00	5.78	4.48
85.00	4.91	4.55
90.00	4.19	4.61
95.00	3.59	4.66
100.00	3.09	4.71



Discharge thermistor		
Temp (°C)	Resistance(k Ω)	Voltage(V)
0.00	168.60	0.36
5.00	130.70	0.45
10.00	102.20	0.56
15.00	80.51	0.70
20.00	63.89	0.85
25.00	51.05	1.01
30.00	41.07	1.20
35.00	33.26	1.41
40.00	27.09	1.62
45.00	22.20	1.85
50.00	18.29	2.08
55.00	15.15	2.31
60.00	12.62	2.54
65.00	10.56	2.76
70.00	8.88	2.97
75.00	7.50	3.17
80.00	6.36	3.36
85.00	5.42	3.53
90.00	4.64	3.69
95.00	3.98	3.83
100.00	3.43	3.96
105.00	2.97	4.07
110.00	2.58	4.17
115.00	2.24	4.26
120.00	1.96	4.34

Outdoor heat exchanger thermistor		
Temp (°C)	Resistance(k Ω)	Voltage(V)
-20.00	48.13	0.45
-15.00	36.07	0.58
-10.00	27.29	0.74
-5.00	20.84	0.93
0.00	16.05	1.14
5.00	12.45	1.38
10.00	9.74	1.64
15.00	7.67	1.91
20.00	6.09	2.19
25.00	4.87	2.47
30.00	3.92	2.74
35.00	3.17	3.00
40.00	2.59	3.24
45.00	2.12	3.46
50.00	1.75	3.66
55.00	1.45	3.83
60.00	1.21	3.99
65.00	1.01	4.12
70.00	0.85	4.24
75.00	0.72	4.34
80.00	0.61	4.43
85.00	0.52	4.51
90.00	0.44	4.57
95.00	0.38	4.63
100.00	0.33	4.68

Outdoor temperature thermistor		
Temp (°C)	Resistance(k Ω)	Voltage(V)
-20.00	115.24	1.25
-15.00	84.21	1.56
-10.00	62.28	1.90
-5.00	46.58	2.26
0.00	35.21	2.61
5.00	26.88	2.94
10.00	20.72	3.25
15.00	16.12	3.52
20.00	12.64	3.76
25.00	10.00	3.97
30.00	7.97	4.14
35.00	6.40	4.28
40.00	5.18	4.41
45.00	4.21	4.51
50.00	3.45	4.59
55.00	2.85	4.65
60.00	2.36	4.71
65.00	1.97	4.76
70.00	1.65	4.79
75.00	1.39	4.83
80.00	1.18	4.85
85.00	1.00	4.87
90.00	0.85	4.89
95.00	0.73	4.91
100.00	0.63	4.92

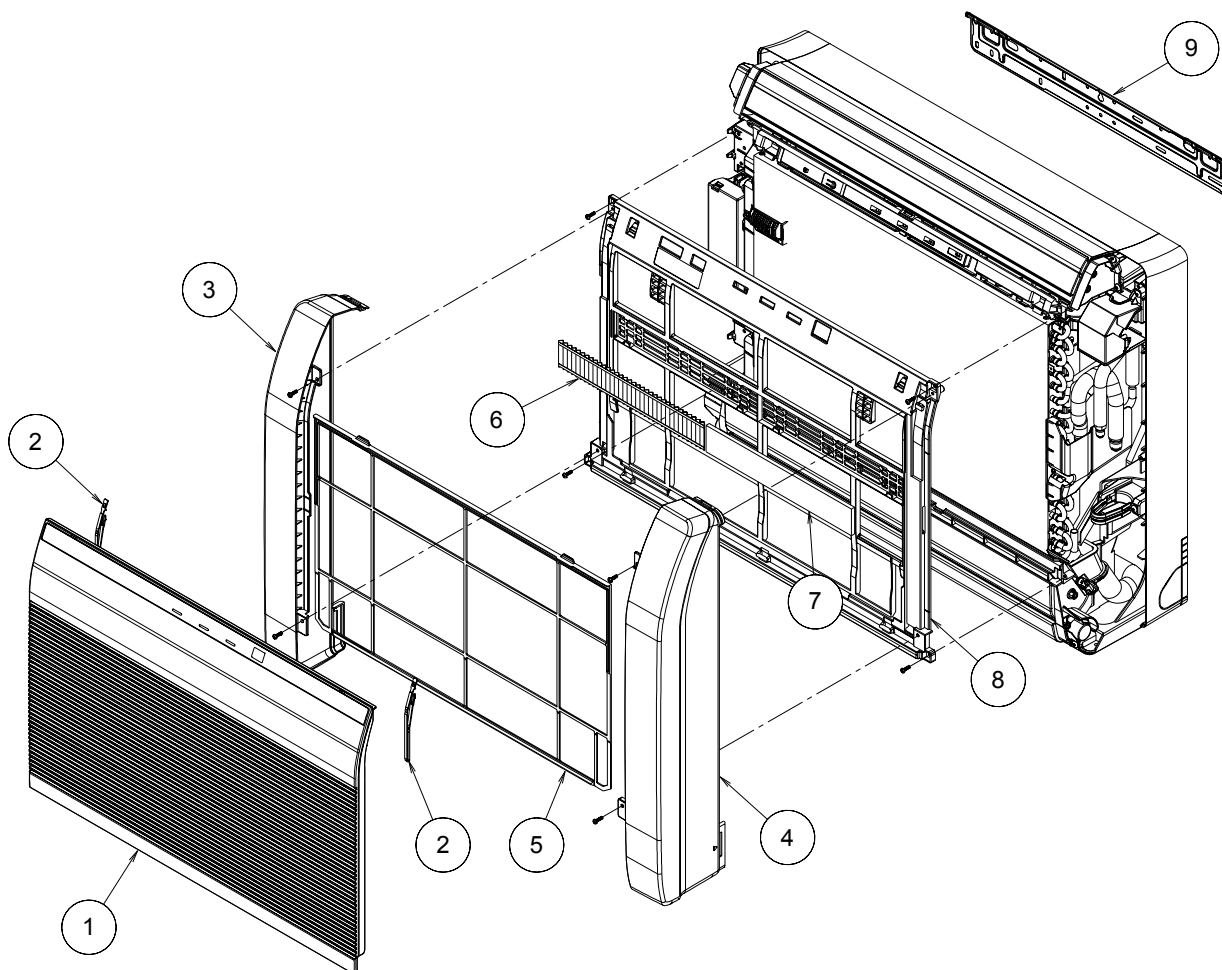


FLOOR type INVERTER

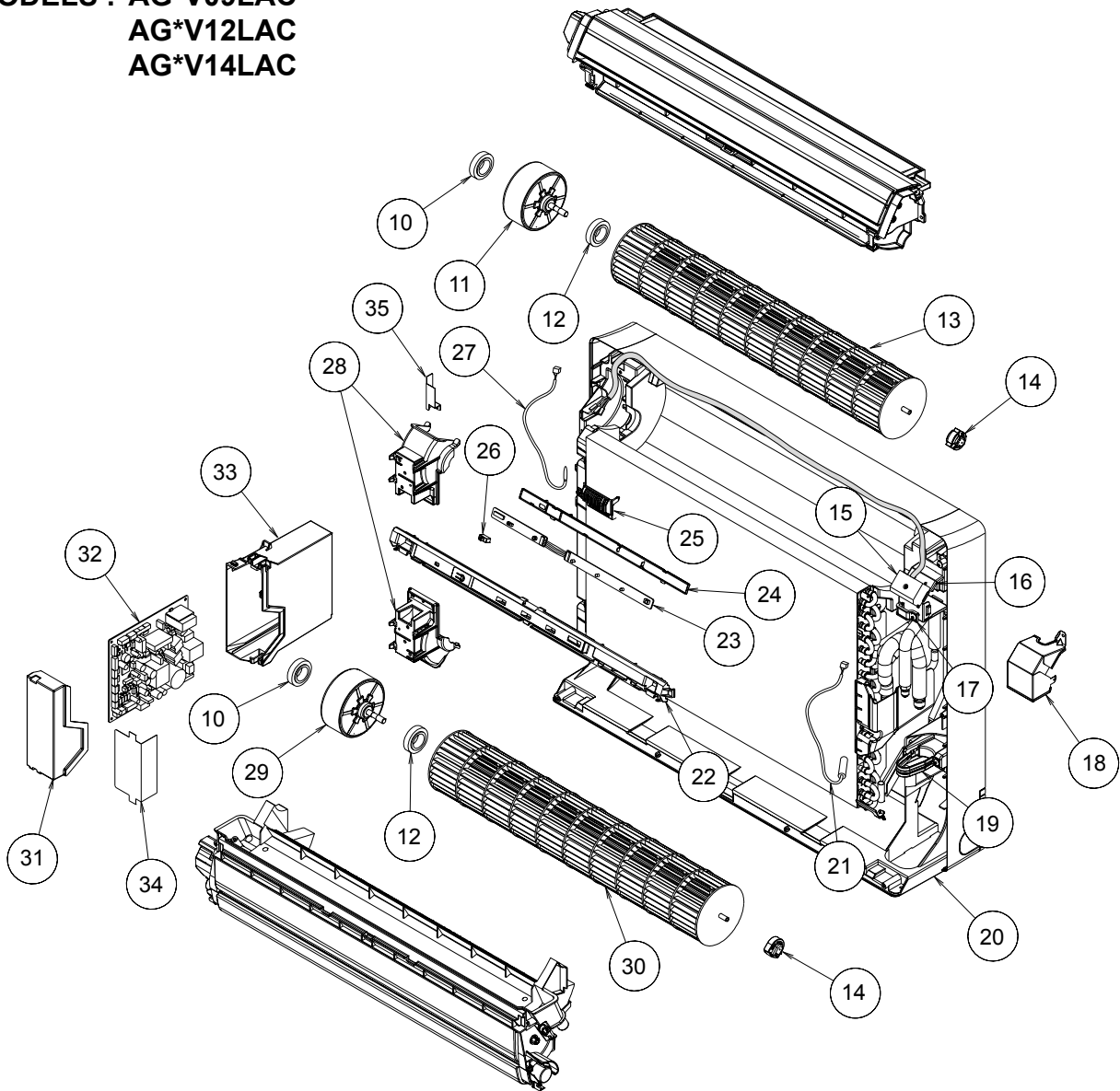
9 . REPLACEMENT PARTS

1. DISASSEMBLY ILLUSTRATION & PARTS LIST

**MODELS : AG*V09LAC
AG*V12LAC
AG*V14LAC**

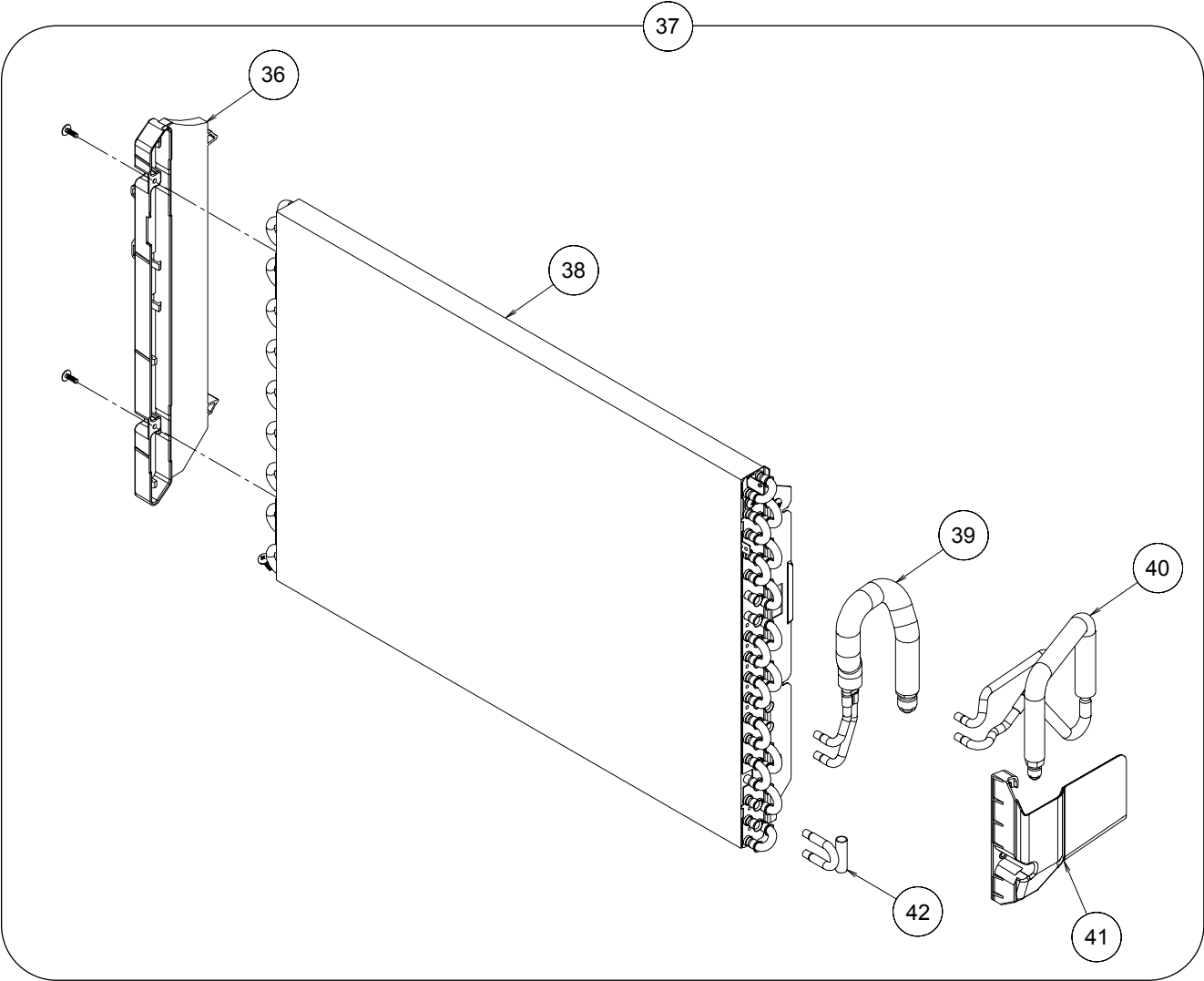
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**MODELS : AG*V09LAC
AG*V12LAC
AG*V14LAC**

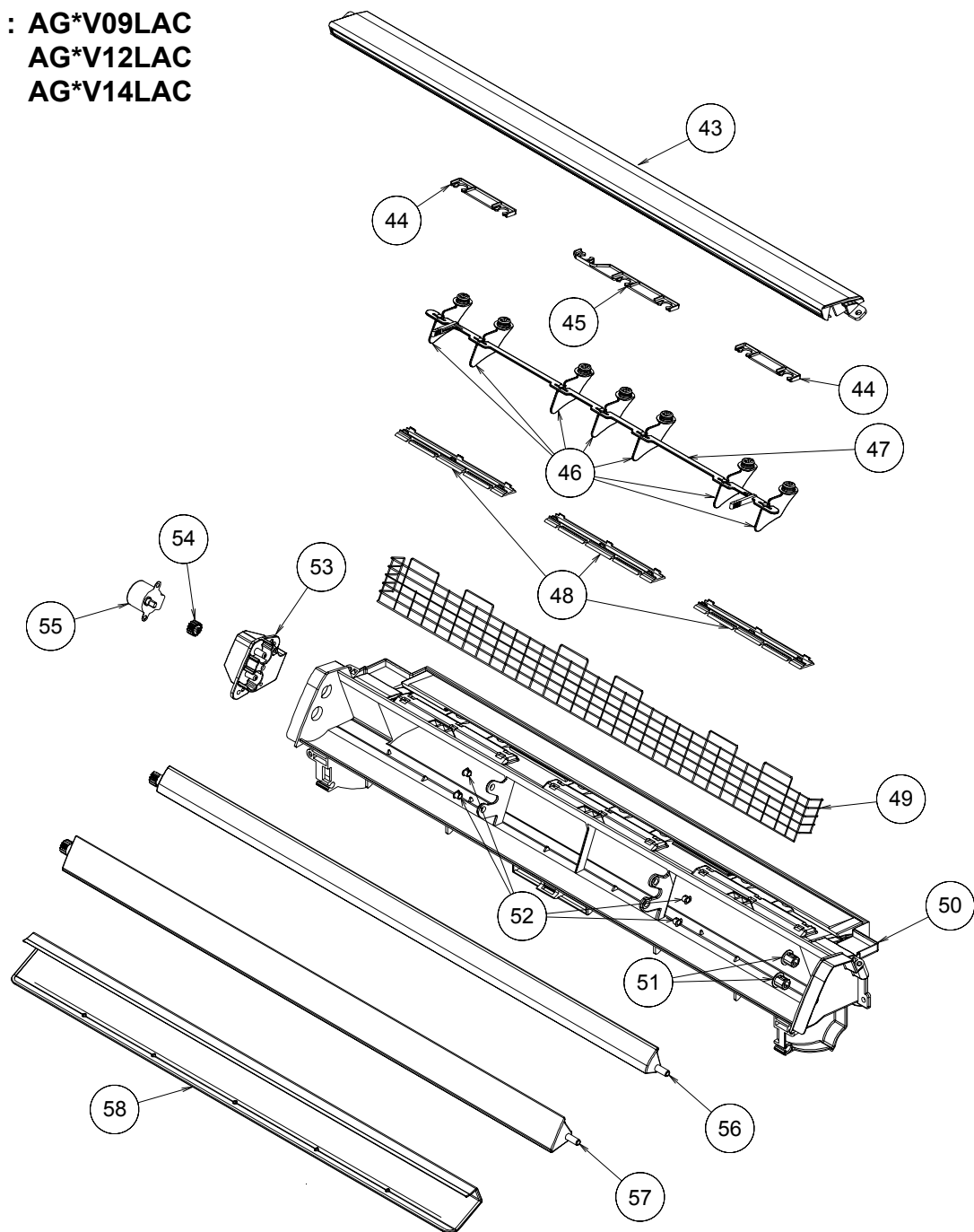


Ref No.	Description	Parts No.					Q'ty
		AG*V09LAC	AG*V12LAC	AG*V14LAC	-	-	
10	MOTOR CUSHION NR	9313168018	9313168018	9313168018	-	-	
11	MOTOR DC BRUSHLESS MFD-34ROM	9602109012	9602109012	9602109012	-	-	
12	MOTOR CUSHION N	9312979011	9312979011	9312979011	-	-	
13	CROSS FLOW FAN ASSY	9312004034	9312004034	9312004034	-	-	
14	BEARING C ASSY	9306628017	9306628017	9306628017	-	-	
15	TERMINAL	9900385026	9900385026	9900385026	-	-	
16	BRACKET (TERMINAL)	9316269019	9316269019	9316269019	-	-	
17	CORD CLAMP	9302271002	9302271002	9302271002	-	-	
18	COVER (TERMINAL)	9316307018	9316307018	9316307018	-	-	
19	BRACKET (PIPE)	9316270015	9316270015	9316270015	-	-	
20	BASE	9316193017	9316193017	9316193017	-	-	
21	PIPE THERMISTOR	9900425012	9900425012	9900425012	-	-	
22	DISPLAY CASE	9316194014	9316194014	9316194014	-	-	
23	DISPLAY PCB	9707571011	9707571011	9707571011	-	-	
24	DISPLAY COVER	9316191013	9316191013	9316191013	-	-	
25	THERMISTOR HOLDER	9316192010	9316192010	9316192010	-	-	
26	SLIDE SWITCH COVER	9316267015	9316267015	9316267015	-	-	
27	ROOM TEMP THERMISTOR	9700801108	9700801108	9700801108	-	-	
28	MOTOR HOLDER	9316195011	9316195011	9316195011	-	-	
29	MOTOR DC BRUSHLESS MFD-14SXM	9602481019	9602481019	9602481019	-	-	
30	CROSS FLOW FAN B ASSY	9316309012	9316309012	9316309012	-	-	
31	CONTROL COVER	9316201019	9316201019	9316201019	-	-	
32	CONTROLLER PCB	9707505016	9707505023	9707505030	-	-	
33	CONTROL BOX	9316200012	9316200012	9316200012	-	-	
34	CONTROL INNER COVER	9316487017	9316487017	9316487017	-	-	
35	SHIELD PANEL	9316441019	9316441019	9316441019	-	-	

**MODELS : AG*V09LAC
AG*V12LAC
AG*V14LAC**

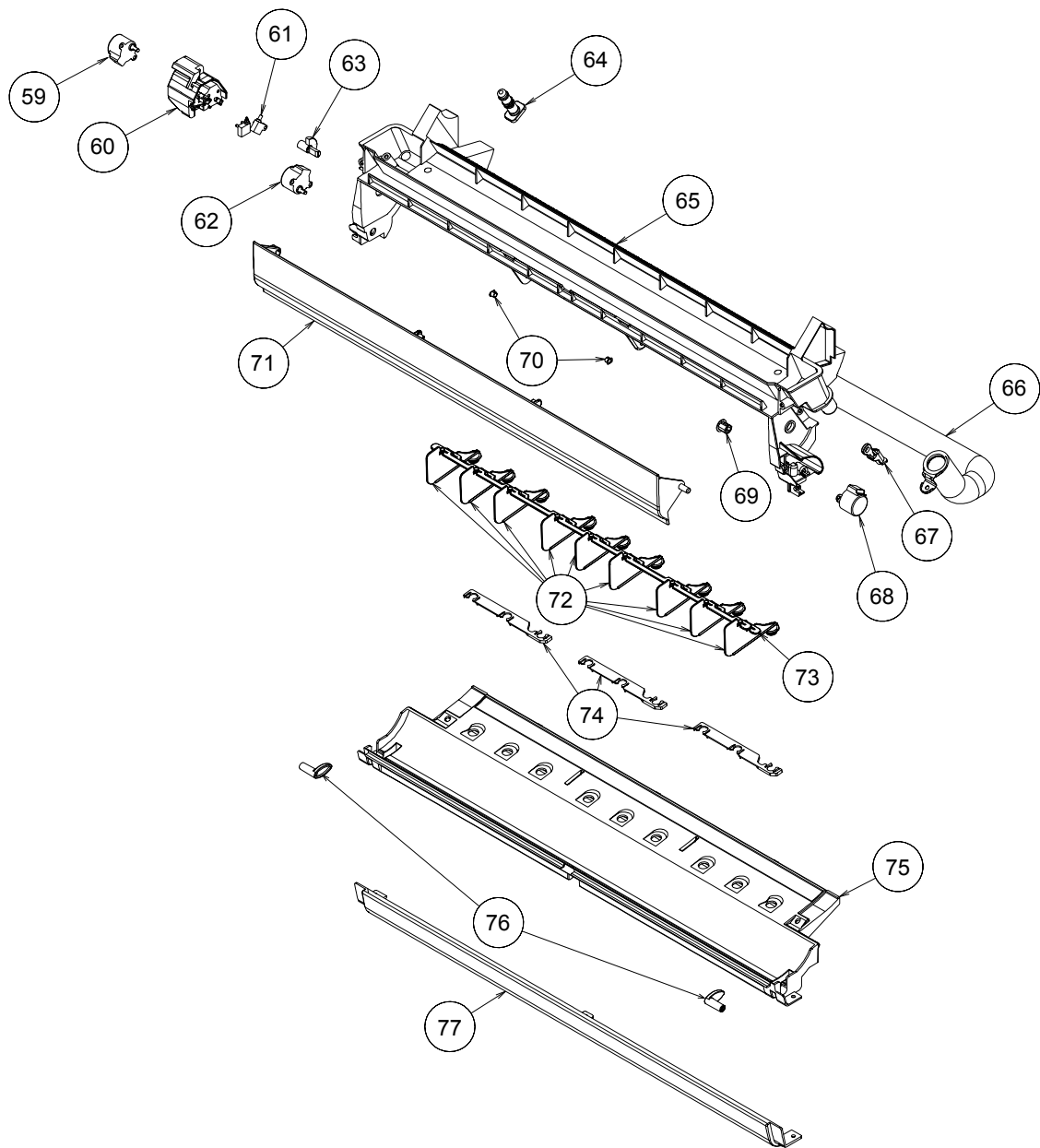
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MODELS : AG*V09LAC
AG*V12LAC
AG*V14LAC



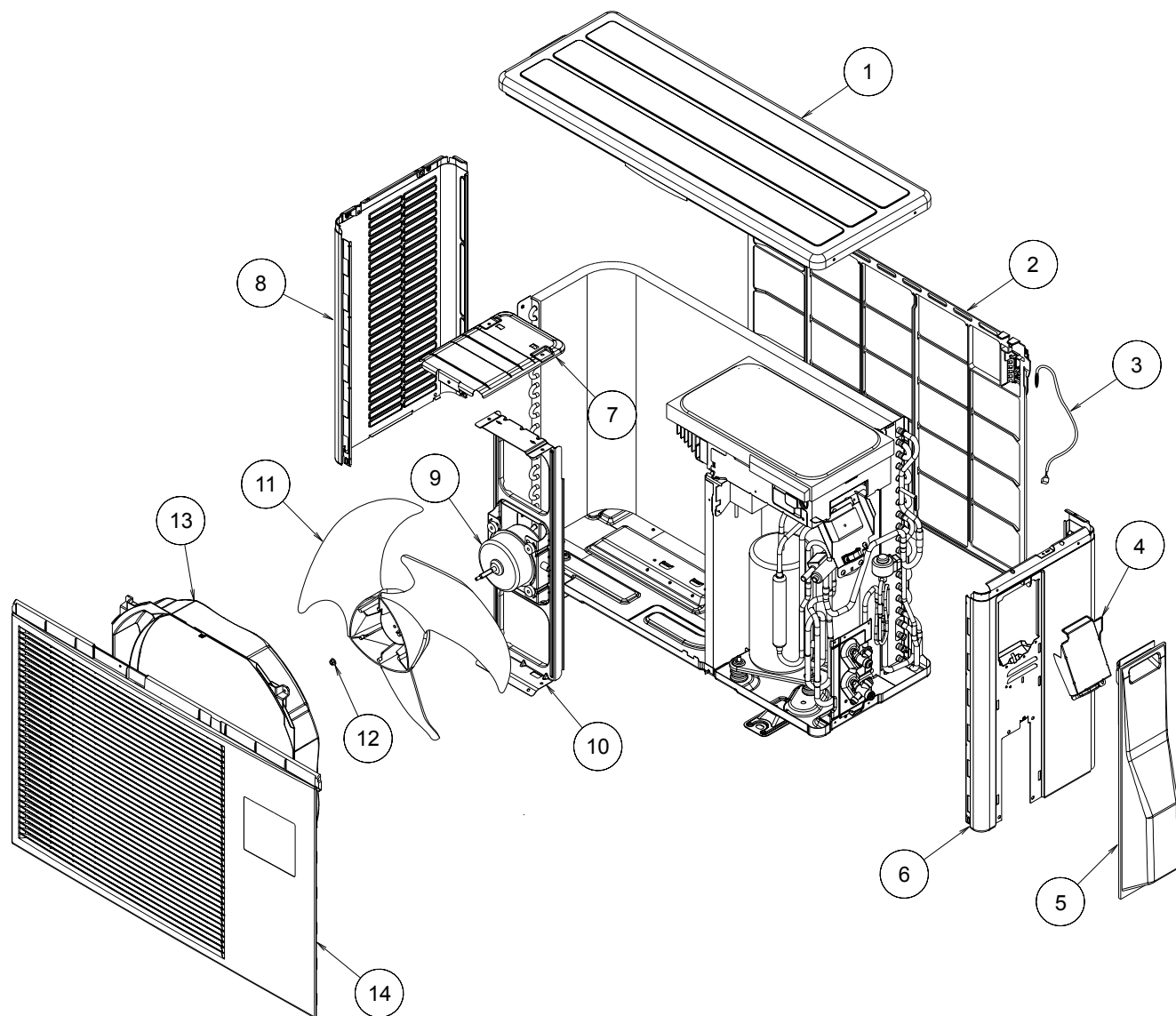
Ref No.	Description	Parts No.					Q'ty
		AG*V09LAC	AG*V12LAC	AG*V14LAC	-	-	
43	TOP COVER	9316207011	9316207011	9316207011	-	-	
44	SPACER C	9315281012	9315281012	9315281012	-	-	
45	SPACER D	9315282019	9315282019	9315282019	-	-	
46	R AND L LOUVER U	9316208018	9316208018	9316208018	-	-	
47	JOINT U	9316209015	9316209015	9316209015	-	-	
48	HOLDER (GUARD)	9316210011	9316210011	9316210011	-	-	
49	GUARD (FAN)	9316211018	9316211018	9316211018	-	-	
50	CASING	9316204010	9316204010	9316204010	-	-	
51	BUSING B	9312156016	9312156016	9312156016	-	-	
52	BUSING A	9303529010	9303529010	9303529010	-	-	
53	GEAR CASE	9316213012	9316213012	9316213012	-	-	
54	GEAR A	9309994003	9309994003	9309994003	-	-	
55	MOTOR STEP (UP/DOWN)	9900384043	9900384043	9900384043	-	-	
56	LOUVER U	9316205017	9316205017	9316205017	-	-	
57	LOUVER Z	9316206014	9316206014	9316206014	-	-	
58	REF (CASING)	9316378018	9316378018	9316378018	-	-	

MODELS : AG*V09LAC
AG*V12LAC
AG*V14LAC

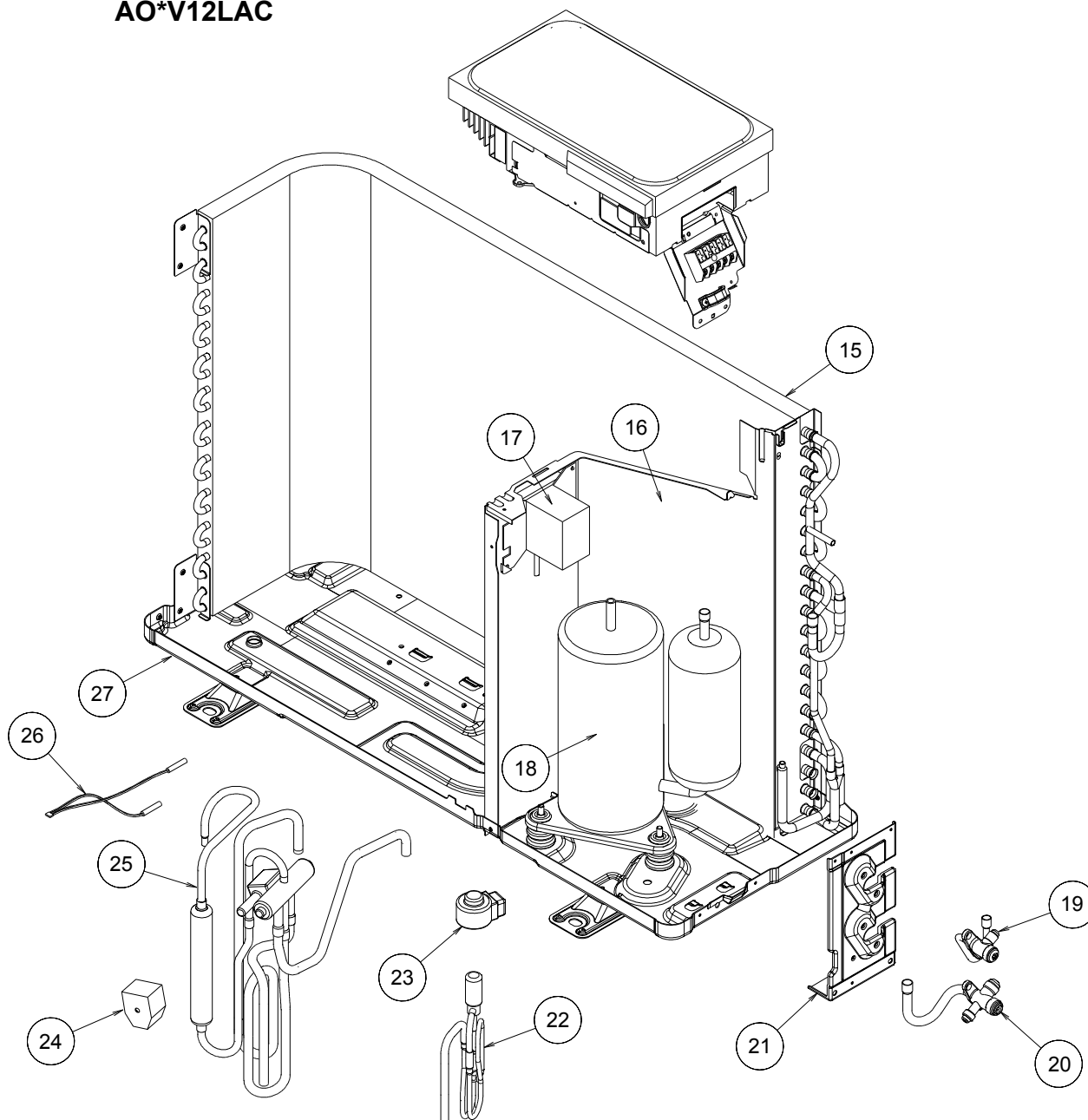


Ref No.	Description	Parts No.					Q'ty
		AG*V09LAC	AG*V12LAC	AG*V14LAC	-	-	
59	MOTOR STEP (DAMPER)	9900384050	9900384050	9900384050	-	-	
60	LIMIT SWITCH COVER	9316217010	9316217010	9316217010	-	-	
61	SWITCH MICRO	9900424015	9900424015	9900424015	-	-	
62	MOTOR STEP (DAMPER LOCK LEFT)	9900384067	9900384067	9900384067	-	-	
63	KEY TOP	9316218017	9316218017	9316218017	-	-	
64	CAP (DRAIN)	9316177017	9316177017	9316177017	-	-	
65	DRAIN PAN U	9316214019	9316214019	9316214019	-	-	
66	HOSE (DRAIN) ASSY	9314147029	9314147029	9314147029	-	-	
67	HOLDER (DRAIN HOSE)	9316384019	9316384019	9316384019	-	-	
68	MOTOR STEP (DAMPER LOCK RIGHT)	9900384074	9900384074	9900384074	-	-	
69	BUSING B	9312156016	9312156016	9312156016	-	-	
70	BUSING A	9303529010	9303529010	9303529010	-	-	
71	DAMPER	9316216013	9316216013	9316216013	-	-	
72	R AND L LOUVER Z	9316334014	9316334014	9316334014	-	-	
73	JOINT Z	9316335011	9316335011	9316335011	-	-	
74	SPACER D	9315282019	9315282019	9315282019	-	-	
75	DRAIN PAN Z	9316215016	9316215016	9316215016	-	-	
76	STOPPER	9316219014	9316219014	9316219014	-	-	
77	COVER (LOWER)	9316374010	9316374010	9316374010	-	-	

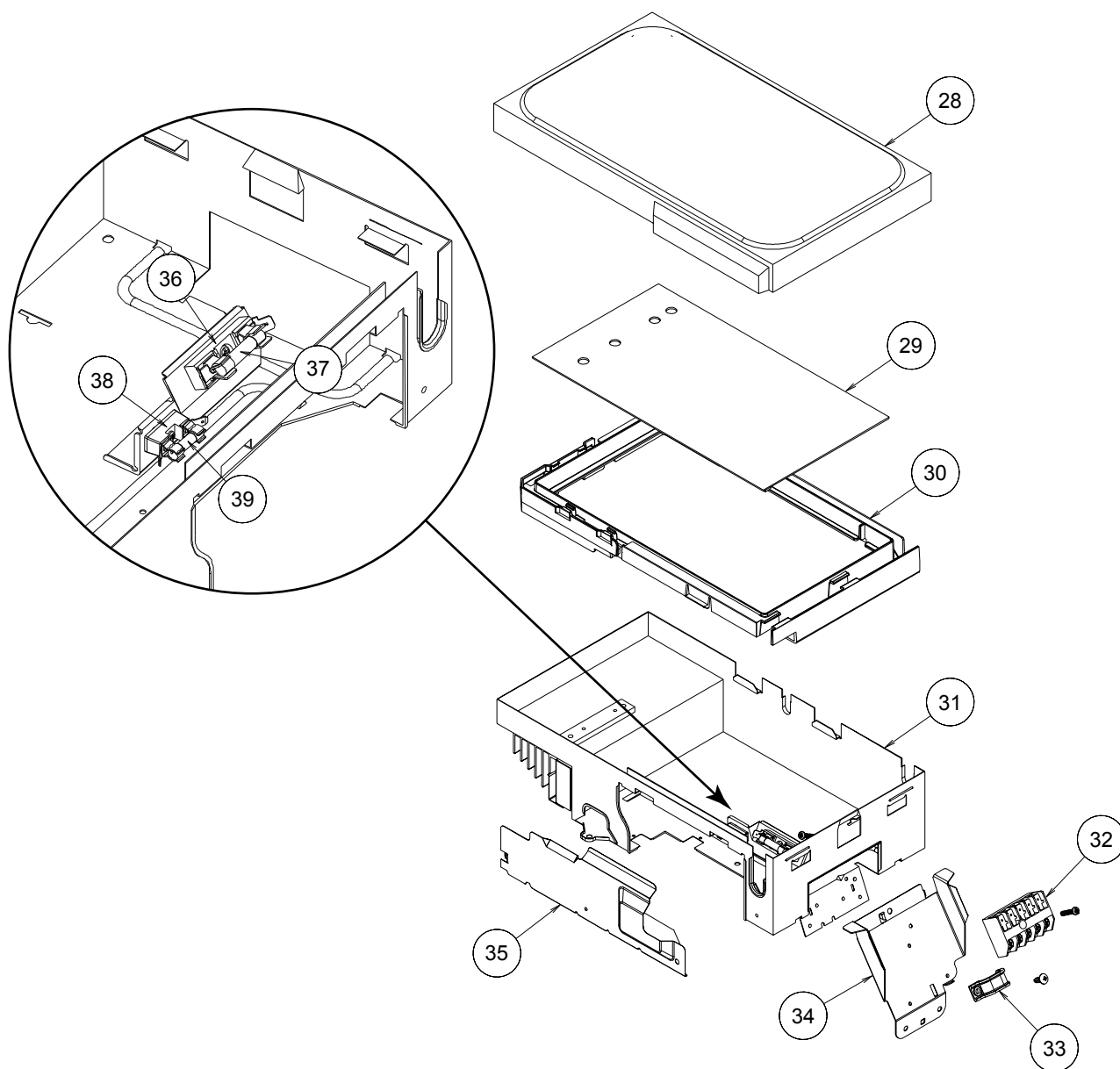
**MODELS : AO*V09LAC
AO*V12LAC**

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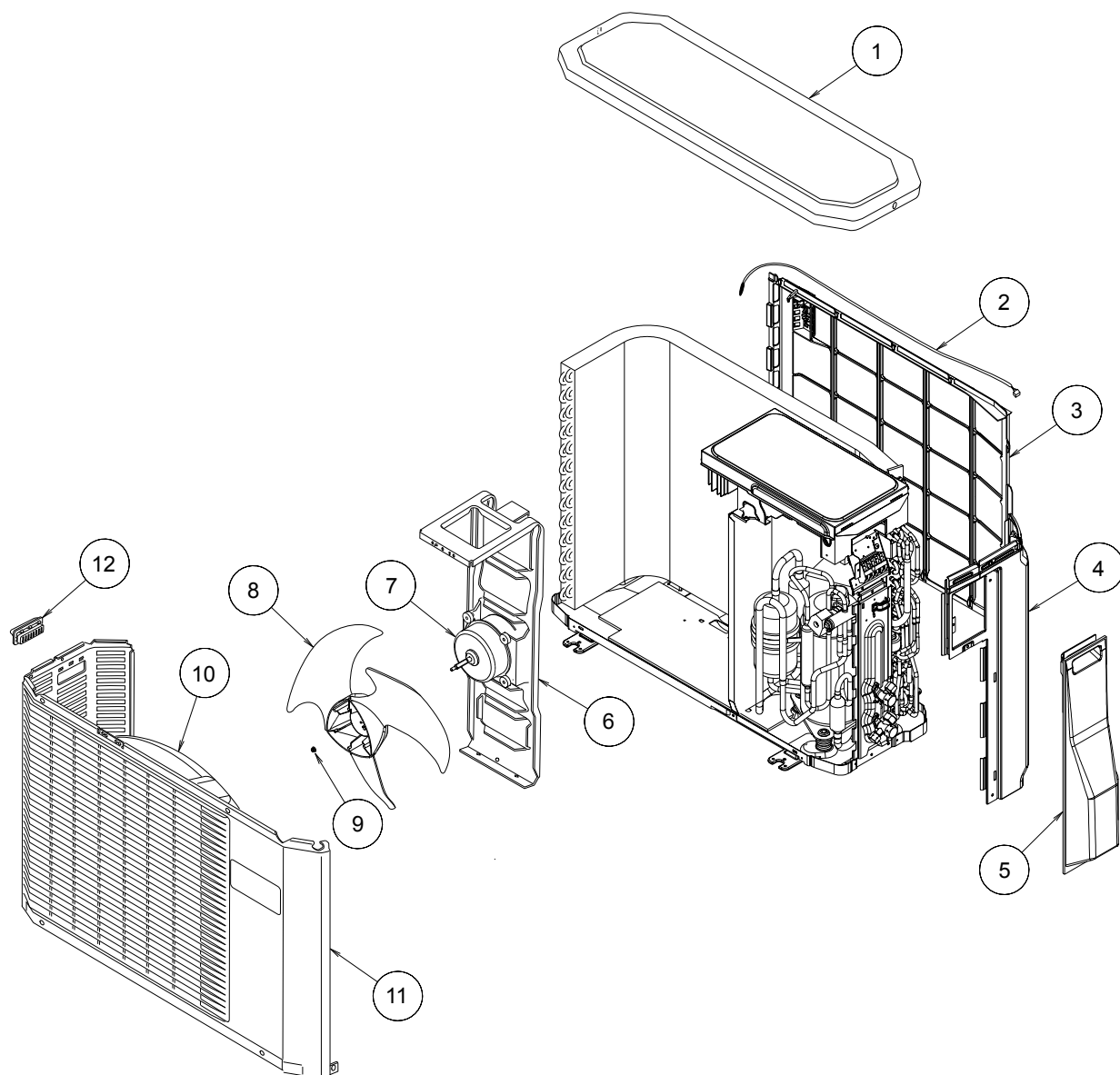
**MODELS : AO*V09LAC
AO*V12LAC**

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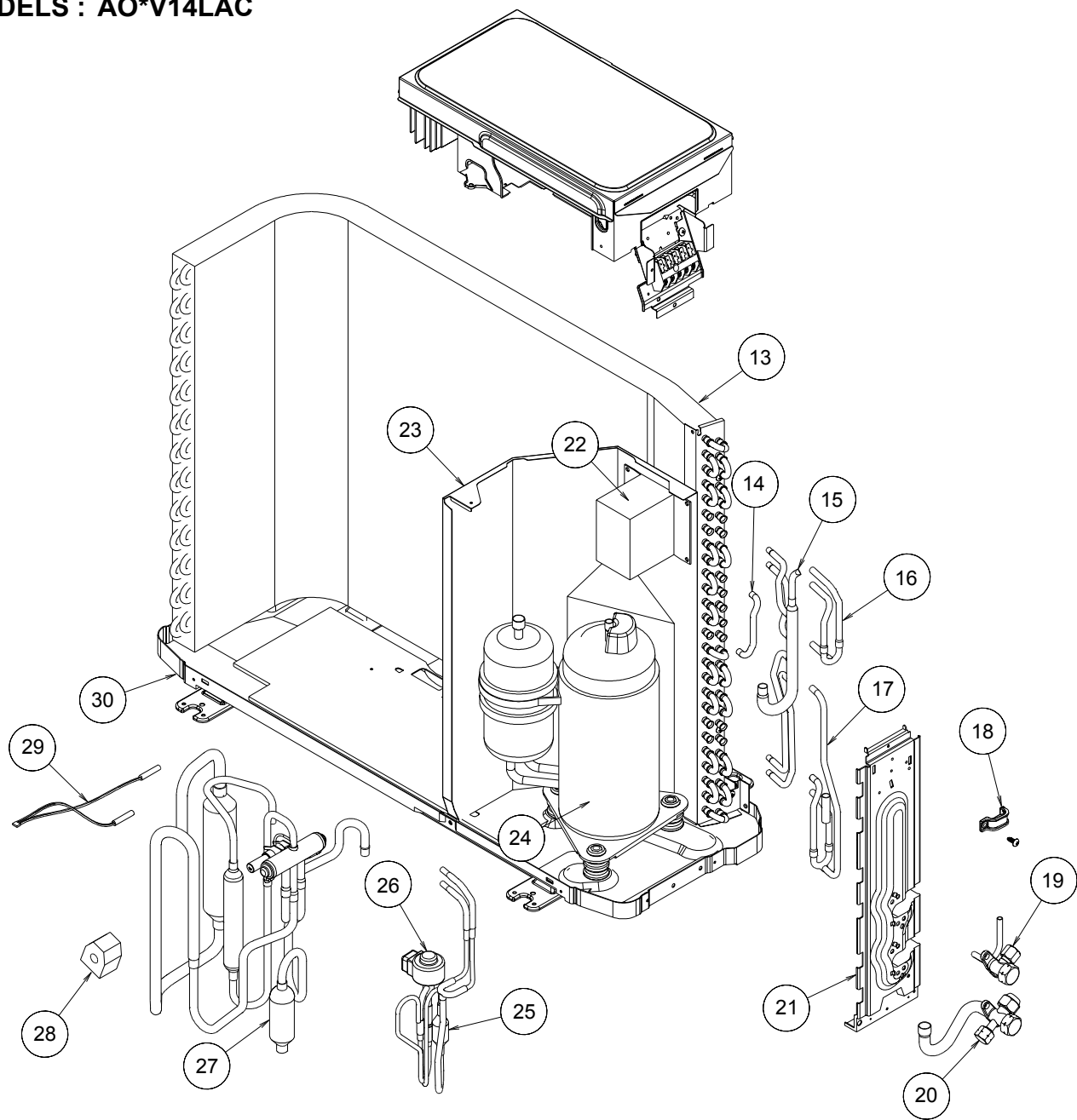
**MODELS : AO*V09LAC
AO*V12LAC**

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MODELS : AO*V14LAC

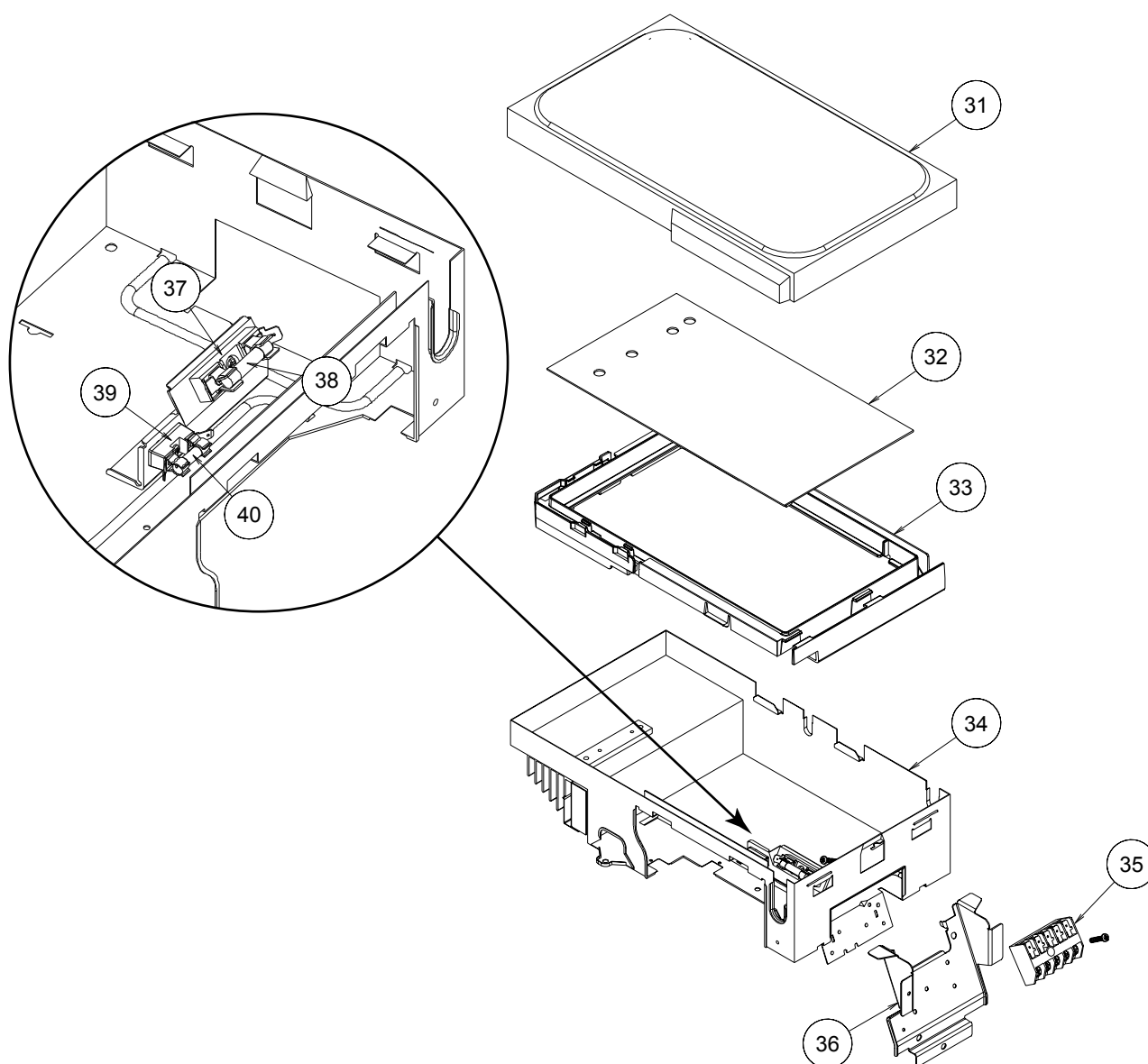
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MODELS : AO*V14LAC



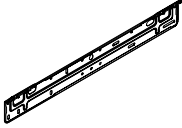






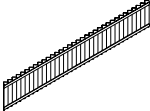
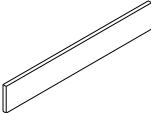
Ref No.	Description	Parts No.					Q'ty
		AO*V14LAC	-	-	-	-	
13	CONDENSER ASSY	9311382065	-	-	-	-	
14	JOINT E	9309495005	-	-	-	-	
15	ENTRANCE PIPE ASSY	9310812013	-	-	-	-	
16	JOINT PIPE ASSY A	9309488007	-	-	-	-	
17	JOINT PIPE ASSY B	9311287018	-	-	-	-	
18	CORD CLAMP	9307271014	-	-	-	-	
19	2-WAY VALVE ASSY	9313064013	-	-	-	-	
20	3-WAY VALVE ASSY	9315159014	-	-	-	-	
21	BRACKET (VALVE)	9308870025	-	-	-	-	
22	REACTOR ASSY	9900354015	-	-	-	-	
23	SEPARATER ASSY	9312971015	-	-	-	-	
24	COMPRESSOR ASSY	9313763022	-	-	-	-	
25	PULSE MOTOR VALVE ALL ASSY	9311641018	-	-	-	-	
26	COIL (EXPANSION VALVE)	9900057039	-	-	-	-	
27	VALVE (4-WAY) ASSY	9316475014	-	-	-	-	
28	SOLENOID	9970033018	-	-	-	-	
29	THERMISTOR ASSY (DISCHARGE, PIPE)	9900148027	-	-	-	-	
30	BASE ASSY PAINTED	9308869081	-	-	-	-	

MODELS : AO*V14LAC

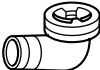
[illegible]

STANDARD ACCESSORIES

INDOOR UNIT

Name and Shape	Q'ty	Use	Part No.
Bracket panel 	1	For indoor unit installation	9316272019
Remote control unit AR-RAC1E 	1	Use for air conditioner operation	9316397019
Battery (penlight) 	2	For remote control unit	0600185527
Cloth tape 	1	For indoor unit installation	9310519004
Remote control unit holder 	1	Use as remote control unit holder	9305642045
Ttpping screw (big) ($\phi 4 \times 25$) 	9	For wall hook bracket and body installation	0700076046
Ttpping screw (small) ($\phi 3 \times 12$) 	2	For remote control unit holder installation	0700019036
Electric filter UTR-FC03-2 	1	With 2 sheets	9312832002
Ion deodrant filter UTR-FC03-3 	1	With 2 sheets	9312833009

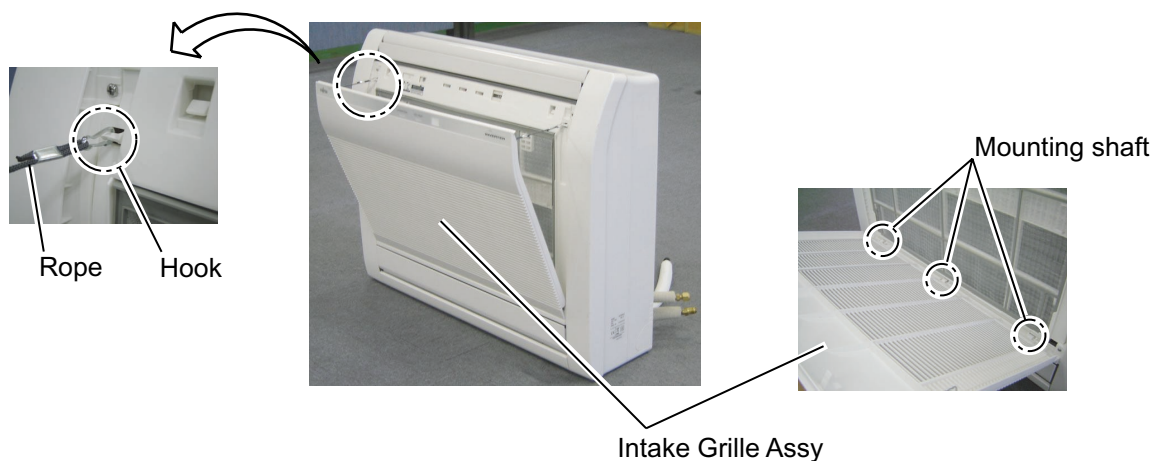
OUTDOOR UNIT

Name and Shape	Q'ty	Use	Part No.	
			AO*V09/12LAC	AO*V14LAC
Drain pipe assy 	1	For outdoor unit drain piping work	9303029022	9303029015

2. DISASSEMBLY PROCESS

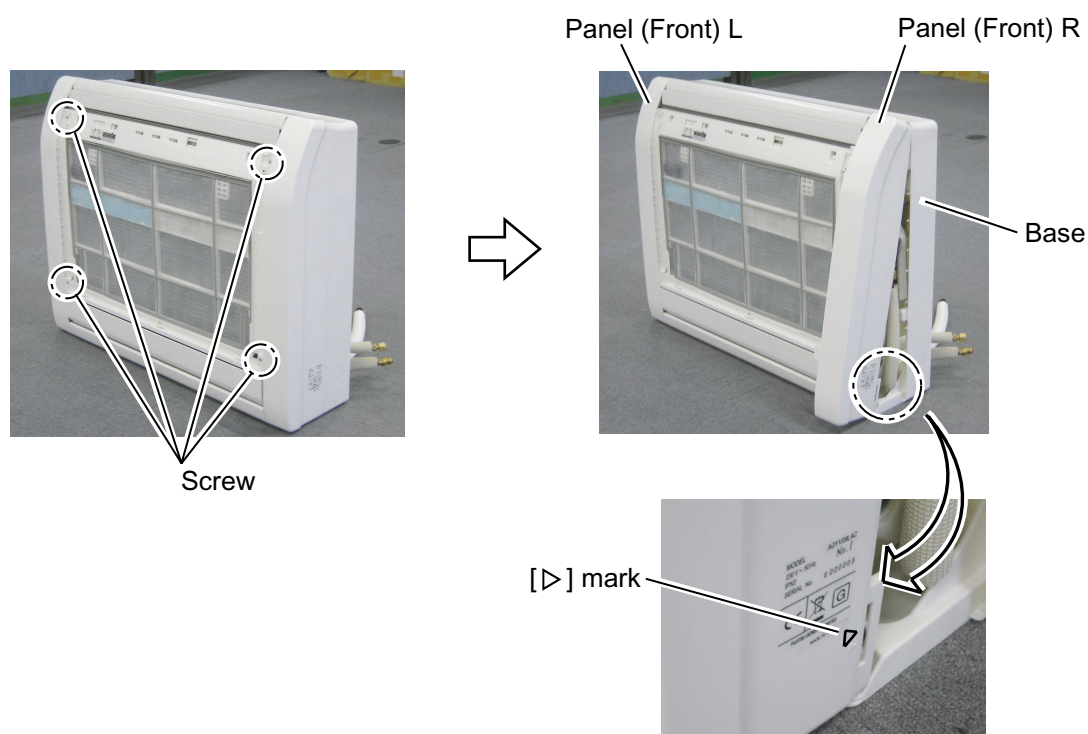
1. INTAKE GRILLE ASSY removal

- Open the INTAKE GRILLE ASSY.
- Remove the rope and hook.
- Lay down the INTAKE GRILLE ASSY, until the axle at the bottom of the INTAKE GRILLE ASSY is removed.



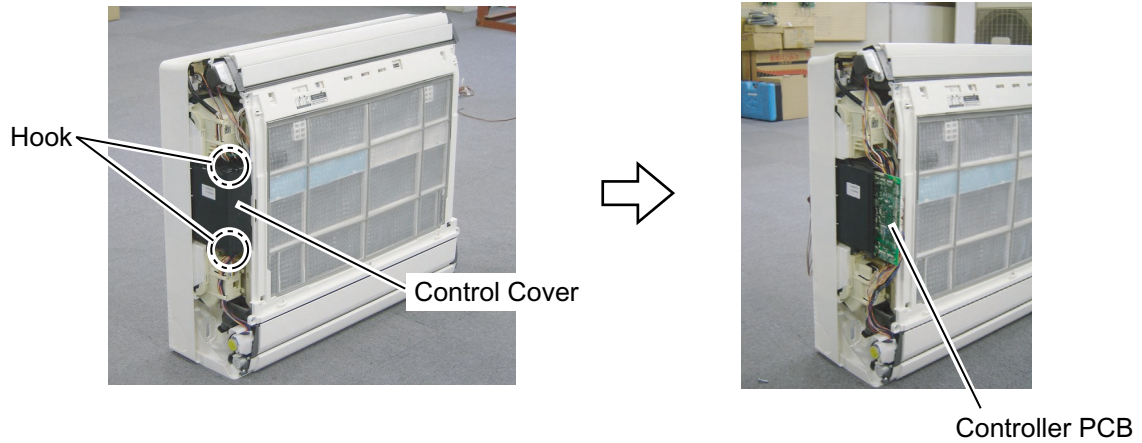
2. PANEL (FRONT) L/ R removal

- Remove 4 screws.
- The middle finger is hung on the lower part as shown in the figure, and it pulls to the front, pushing [▷] mark, and bottom hooks (two position) is removed from Base.
- The side panel is pulled to the front, raising the upper surface, and a side panel is removed.



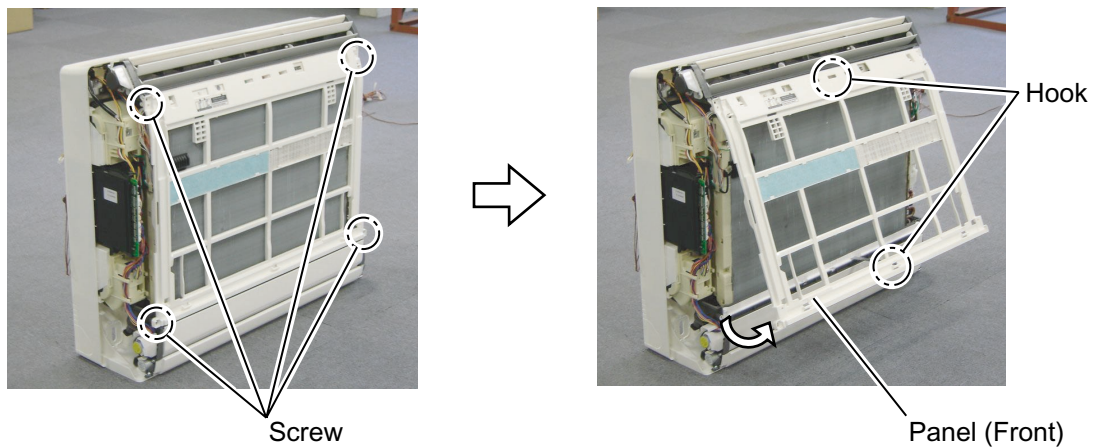
3. CONTROLLER PCB removal

- Remove the CONTROL COVER.
- Remove the connectors and cords.
- Remove the CONTROLLER PCB.



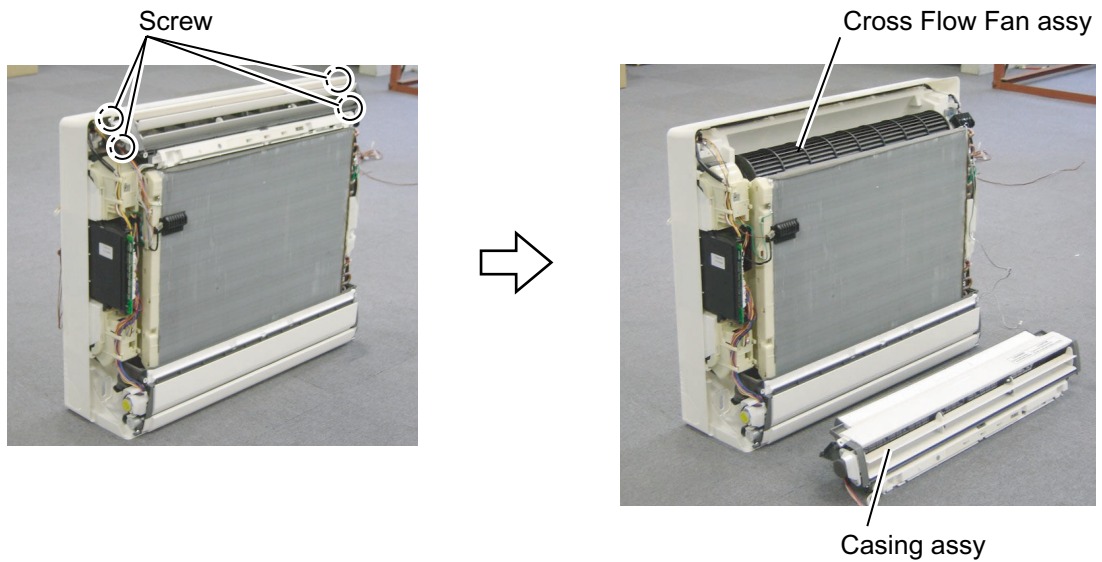
4. PANEL (FRONT) removal

- Remove 4 screws.
- Remove the PANEL (FRONT) by sliding upward.



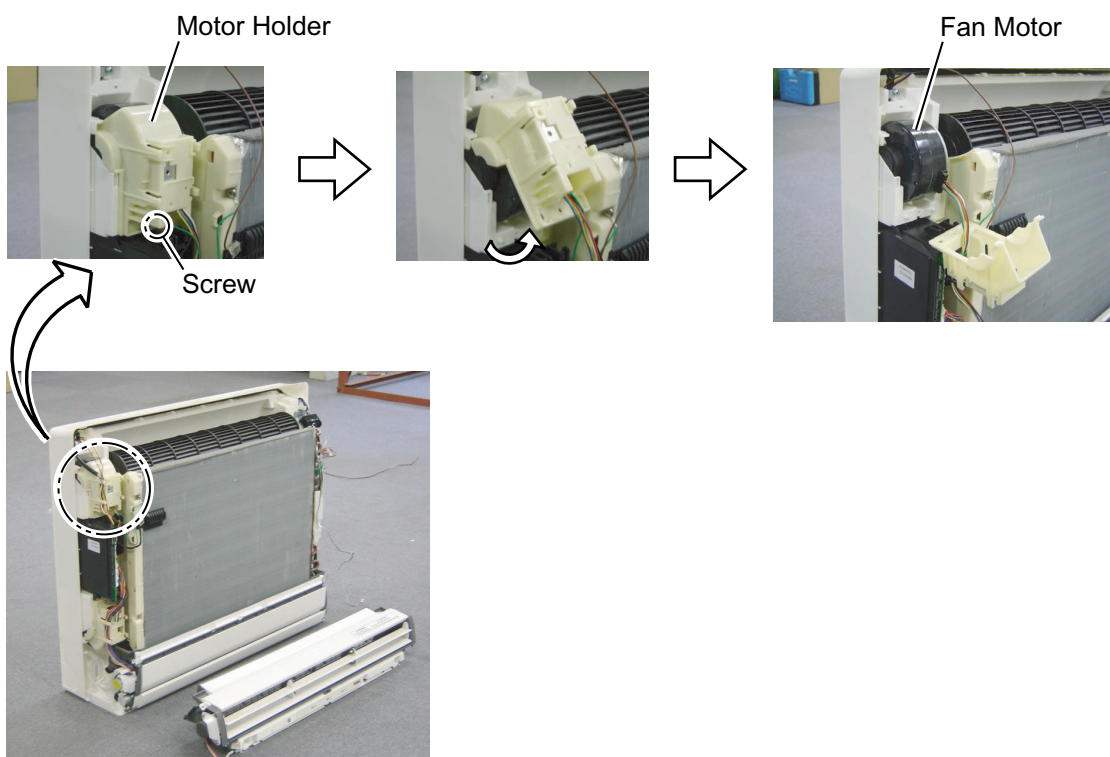
5. CASING ASSY removal

- Remove Remove 4 screws.
- Remove the CASING ASSY by sliding front side.



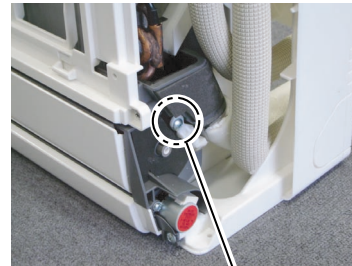
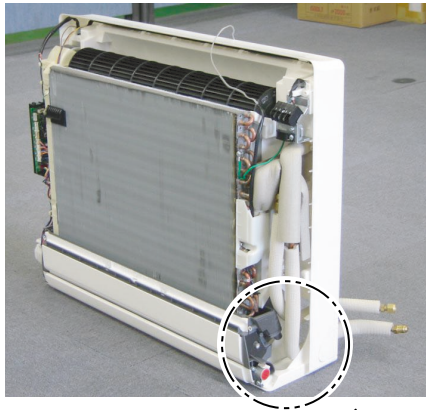
6. FAN MOTOR removal

- Remove Remove 1 screw.
- Remove the MOTOR HOLDER by sliding upward.
- Remove the FAN MOTOR.



7. HOSE (DRAIN) ASSY removal

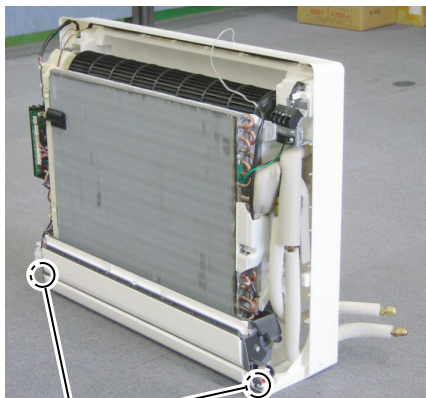
- Remove Remove 1 screw.
- Remove the HOLDER (DRAIN HOSE) and HOSE (DRAIN) ASSY.



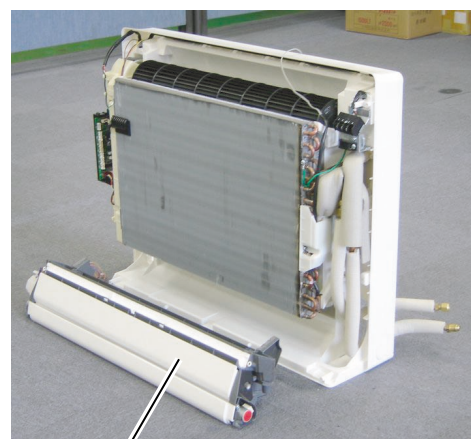
Screw

8. DRAIN PAN ASSY removal

- Remove Remove 2 screws.
- Remove the DRAIN PAN ASSY by sliding front side.



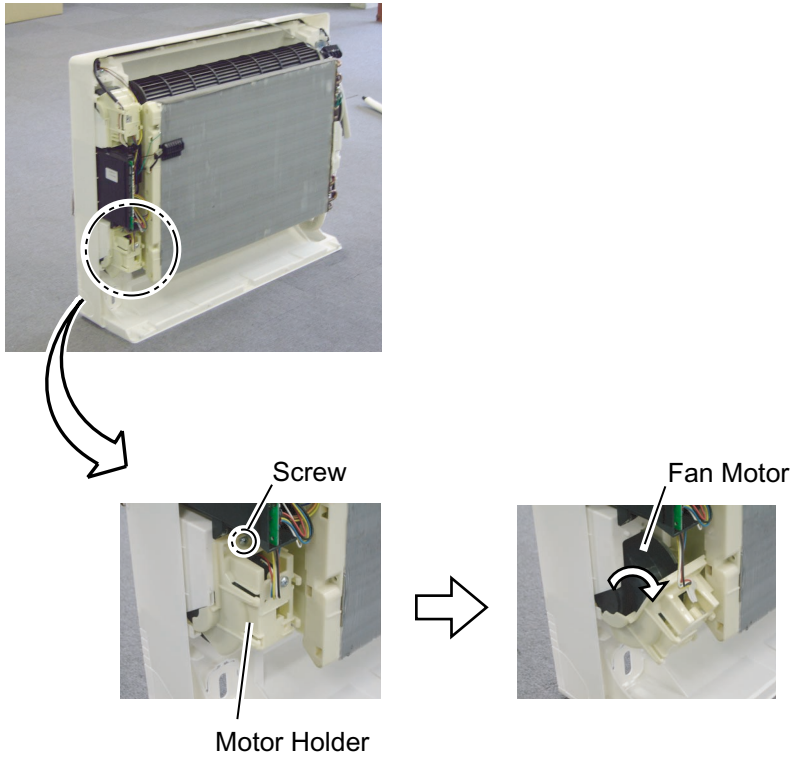
Screw



Drain Pan assy

9. FAN MOTOR removal

- Remove Remove 1 screw.
- Remove the MOTOR HOLDER by sliding downward.
- Remove the FAN MOTOR.



FLOOR type INVERTER

10 . INSTALLATION MANUAL

SPLIT TYPE ROOM AIR CONDITIONER

INSTALLATION MANUAL

(PART No. 9316421011-04)

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant (R22) models. However, pay careful attention to the following points:

(1) Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special.(See the table below.) Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.

(2) Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand.[The charging port thread diameter for R410A is 1/2 threads per inch.]

(3) Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant (R22) models. Also, when storing the piping ,securely seal the opening by pinching ,taping, etc.

(4) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals-0.1 to 5.3 MPa (-1 to 53 bar) for high pressure. -0.1 to 3.8 MPa (-1 to 38 bar) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion value or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in Table1.Never us copper pipes thinner than 0.8mm even when it is available on the market.

Table 1 Thicknesses of Annealed Copper Pipes

Nominal diameter	Outer diameter (mm)	Thickness (mm)	
		R410A	[ref.] R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80
1/2	12.7	0.80	0.80

WARNING

- (1) Do not use the existing (for R22) piping and flare nuts.
- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc.(Use the special R410A materials.)
- (2) When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant(R410A) to enter the refrigerant cycle.
- If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

CAUTION

When installing pipes shorter than 3m, sound of the outdoor unit will be transferred to the indoor unit, which will cause large operating sound or some abnormal sound.

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 air conditioner piping and cords available standards parts. This installation manual describes the correct connections using the standard accessories and the parts specified in this installation manual.
- (3) Have installation work done by authorized service personnel only.
- (4) Also do not use an extension cord.
- (5) 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.

STANDARD ACCESSORIES

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

Name and Shape	Q'ty	Name and Shape	Q'ty
Wall hook bracket	1	Cloth tape	1
Remote control unit	1	Tapping screw (big)	9
Battery	2	Tapping screw (small)	2
Remote control unit holder	1	Air cleaning filter	2

One set of following parts are necessary in installation of this product.

Name
Connection pipe assembly
Connection cord
Wall pipe
Decorative tape
Vinyl tape
Wall cap
Saddle
Drain hose
Tapping screws
Sealant

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.

- Electric wire size.

MODEL	9,000 ~14,000 BTU class
Connection cord (mm ²)	1.5

- Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)
- Always make the air conditioner power supply a special branch circuit and provide a special breaker.
- Always use H07RN-F or equivalent as the power supply cord and the connection cord.

POWER

WARNING

- (1) The rated voltage of this product is 230 V AC 50 Hz.
- (2) Before turning on the power, check if the voltage is within the 220 V -10 % to 240 V +10 % 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 air conditioner.
- (5) Do not extend the connection cord.
- (6) Perform wiring work in accordance with standards so that the 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 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.

SELECTING THE MOUNTING POSITION

- Decide the mounting position with the customer as follows:
- (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.
- (8) Install the place where is no gap around the unit.

WARNING

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

CAUTION

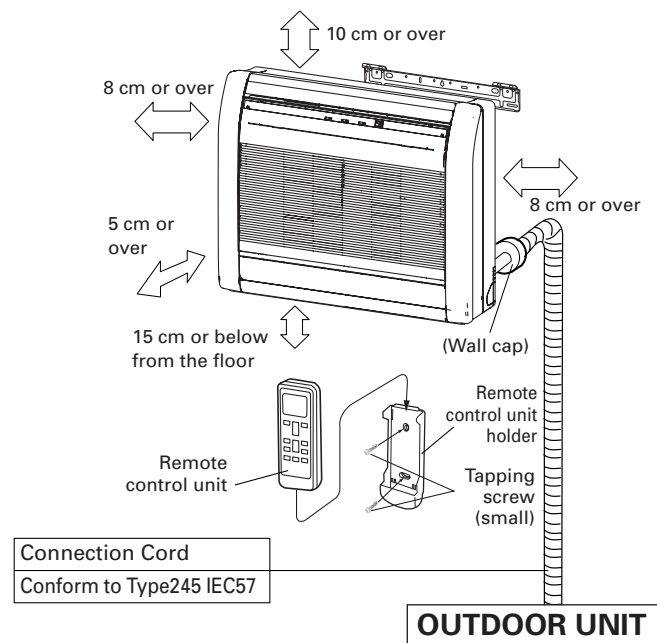
- (1) Do not install where there is the danger of combustible gas leakage.
- (2) Do not install near heat sources.
- (3) If children under 10 years old may approach the unit, take preventive measures so that they can not reach the unit.

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.

INSTALLATION DIAGRAM OF INDOOR UNIT

Fig. 1 [INDOOR UNIT]



[Indoor unit piping direction]

The piping can be connected in the six directions indicated by ①, ②, ③, ④, ⑤ and ⑥ in (Fig. 2). When the piping is connected in direction ② or ⑤, cut along the piping groove in the side of the base with a hacksaw.

When connecting the piping in direction ③, ⑥cut a notch in the thin wall at the front bottom of the base.

Fig. 2

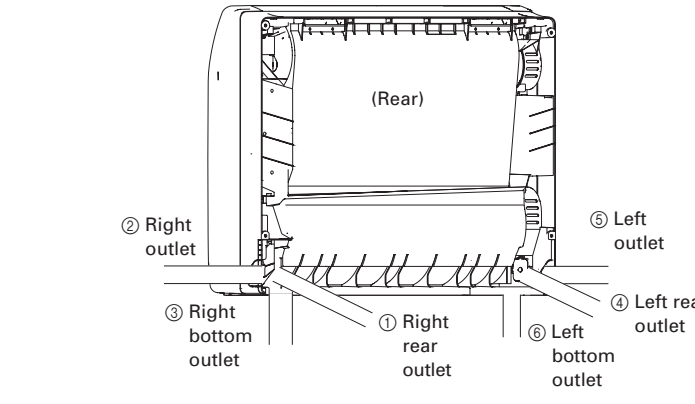
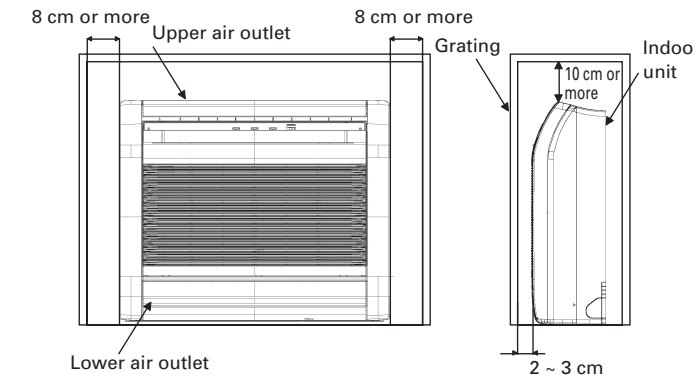


Fig. 3



SIDE PANEL L, R REMOVAL AND INSTALLATION

THE INTAKE GRILLE REMOVAL

- (1) Open the intake grille.
- (2) Remove the rope.
- (3) Lay down the intake grille, until the axle at the bottom of the intake grille is removed.

THE INTAKE GRILLE INSTALLATION

- (1) The fixing axle of the intake grille is installed on the Panel.
- (2) Lift the intake grille upward.

THE SIDE PANEL L, R REMOVAL

- (1) Remove intake grille (Reference the intake grille removal.)
- (2) Remove four screws.
- (3) The middle finger is hung on the lower part as shown in the figure, and it pulls to the front, pushing [<] mark , and bottom hooks (two position) is removed from Base.
- (4) The side panel is pulled to the front, raising the upper surface, and a side panel is removed.

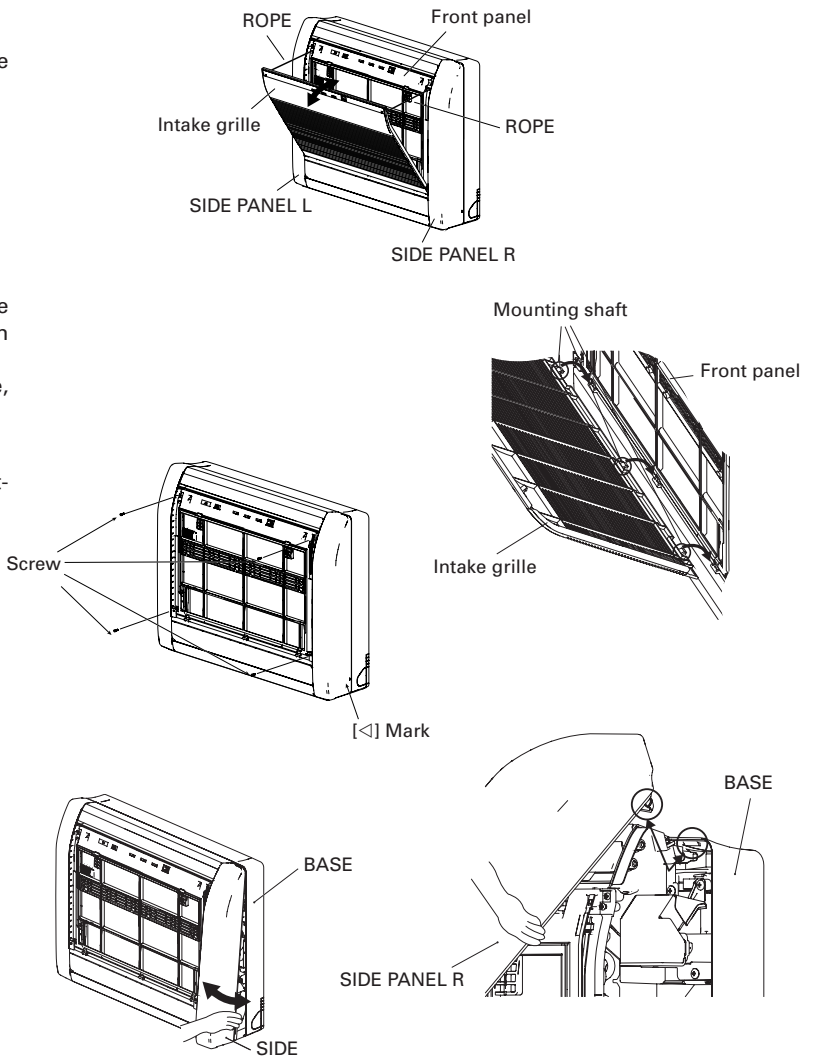
THE SIDE PANEL L, R INSTALLATION

- (1) Firstly, fit the top part of the side panel, and insert top and bottom hooks.
- (2) Four screws are attached.
- (3) The intake grille is attached.

CAUTION

Install the SIDE PANEL L, R and INTAKE GRILLE securely. If installation is imperfect, the SIDE PANEL L, R or INTAKE GRILLE may fall off and cause injury.

Fig. 4



When embedding the indoor unit in a wall, restrict the movement of the horizontal vane for the upper air outlet so that it only operates horizontally. If this setting is not performed, heat will build up in the wall and the room will not be cooled or warmed properly.

Please explain the vane setting of direction only horizontally to the customer.

HOW TO SETTING VANE

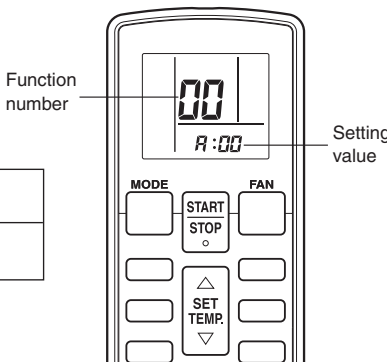
Perform the "FUNCTION SETTING" according to the installation condition using the remote controller.

Entering the Function Setting Mode

- ① While pressing the FAN button and SET TEMP simultaneously, press the RESET button to enter the function setting mode.
- ② Press the TIMER MODE button two times and check that the indoor unit can receive signal.
- ③ Selecting the function number and setting value.

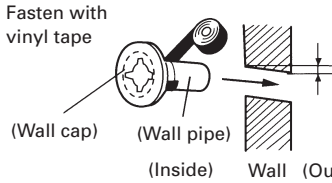
- (1) Press the SET TEMP. button to select the function number. (Press the MODE button to switch between the left and right digits.)
- (2) Press the FAN button to proceed to setting the value. (Press the FAN button again to return to the function number selection.)
- (3) Press the SET TEMP. button to select the setting value. (Press the MODE button to switch between the left and right digits.)
- (4) Press the TIMER MODE button, and START/STOP button, in the order listed to confirm the settings.
- (5) Press the RESET button to cancel the function setting mode.
- (6) After completing the FUNCTION SETTING, be sure to turn off the power and turn it on again.

FUNCTION SETTING	SETTING VALUE
23	2



CUTTING THE HOLE IN THE WALL FOR THE CONNECTING PIPING

- (1) Cut a 65 mm diameter hole in the wall at the position shown in (Fig. 5).
- (2) Always align the center of the wall hole. If misaligned, water leakage will occur.
- (3) 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. 5)
- (4) For left piping and right piping, cut the hole a little lower so that drain water will flow freely. (Fig. 5)



Fasten with vinyl tape

(Wall cap) (Wall pipe) (Inside) Wall (Outside)

WARNING

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

FORMING PIPE

- (1) Pass the refrigerant pipe through the piping hole to indoor side.
- (2) Arrange the pipes according to the direction of piping.

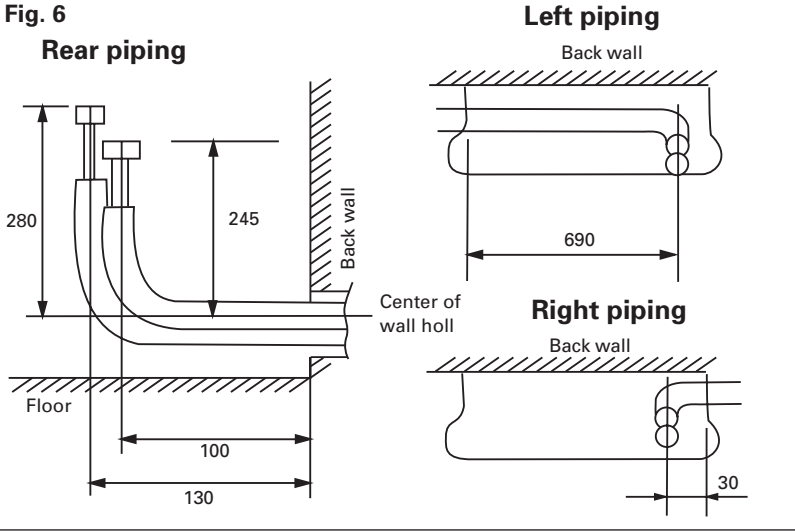
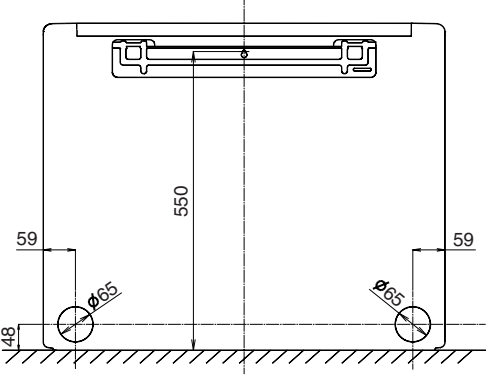
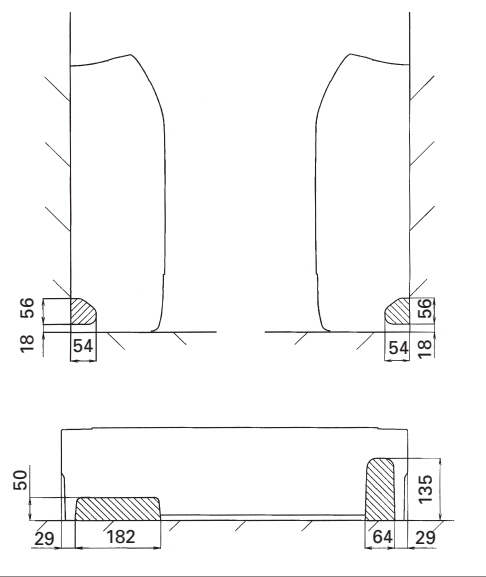


Fig. 5

FOR RIGHT or LEFT REAR PIPING
(The following figure is a front view of the indoor unit installation location.)



FOR RIGHT or LEFT Bottom PIPING
FOR LEFT PIPING FOR RIGHT PIPING



NOTE ON DRAIN HOSE

The drain hose can be connected at either side of the indoor unit.

The unit has been shipped with the drain hose connected at left (viewed from the back of the unit) and the drain cap applied at right.

- (1) Remove the both side panels.
- (2) Remove the screw and remove the drain holder from drain pan.
- (3) Pull out the drain cap.
- (4) Connect the drain hose to the right, attach the screw and insert the drain cap to the left.

CAUTION

- (1) In order to align the drain hose and drain cap, be sure to insert securely and vertically. Incline insertion will cause water leakage.
- (2) When inserting, be sure not to attach any material besides water. If any other material is attached, it will cause deterioration and water leakage.
- (3) After removing drain hose, be sure not to forget mounting drain cap.
- (4) Be sure to fix the drain hose with tape to the bottom of piping.

Installation method of Drain cap

- Use a hexagonal wrench (4mm at opposite side) to insert the drain cap, till the drain cap contacts the tip of drain cock.

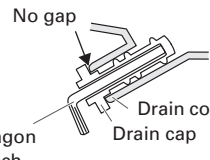
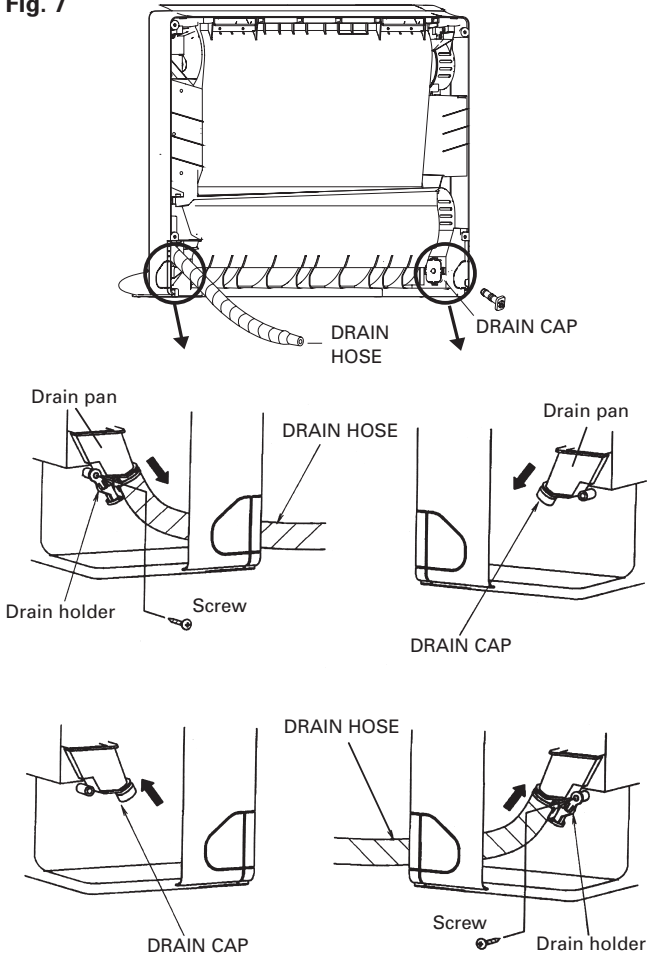


Fig. 7



CONNECTING THE PIPING

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. (Table 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.

Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Use the special R410A flare tool, or the conventional (for R22) flare tool. When using the conventional flare tool, always use an allowance adjustment gauge and secure the A dimension shown in table 3.

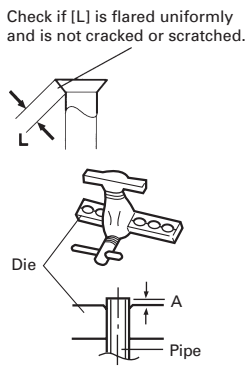


Fig. 10

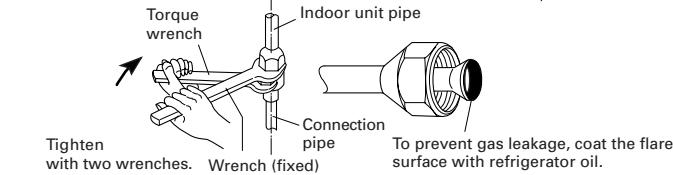


Table 2 Flare nut size and tightening torque

Flare nut	Diameter (mm) × Torque (N-m)
6.35 mm dia.	17 × 14 ~ 18
9.52 mm dia.	22 × 34 ~ 42
12.7 mm dia.	26 × 49 ~ 61

Table 3 Pipe outside diameter

Pipe outside diameter	Flare tool for R410A, clutch type	A (mm)	
		Conventional (R22) flare tool	Wing nut type
ø 6.35 mm (1/4")	0 to 0.5	1.0 to 1.5	1.5 to 2.0
ø 9.52 mm (3/8")	0 to 0.5	1.0 to 1.5	1.5 to 2.0
ø 12.7 mm (1/2")	0 to 0.5	1.0 to 1.5	1.5 to 2.0

CAUTION

- (1) Fasten a flare nut with a torque wrench as instructed in this manual. If fastened too tight, the flare nut may be broken after a long period of time and cause a leakage of refrigerant.
- (2) During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

INDOOR UNIT INSTALATION

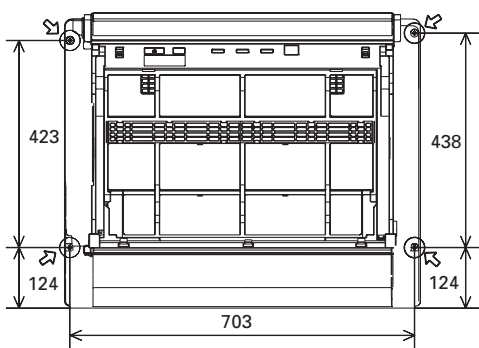
- Use the included and fasten the indoor unit at 4 locations (⇨) each at top and the middle of the unit.
- When the unit is set to the wall, use the wall hook bracket and hook the top of the indoor unit on the indoor unit wall hook bracket.

WARNING

[Installation of indoor unit]

- Fix the indoor unit with 4 screws surely. If improperly installed, might cause to injury due to the toppling or falling.
- Install the indoor unit at the place that has adequate strength. Install the indoor unit so that the installed unit can withstand the weight of adult body weight. If improperly installed, might cause accidental injury due to the toppling or falling.

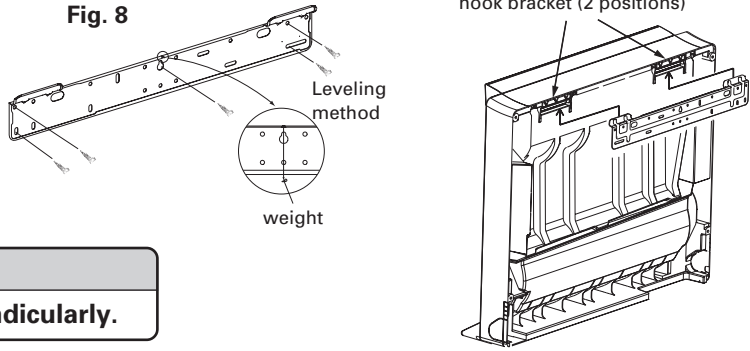
Fig. 7



INSTALLING THE WALL HOOK BRACKET

- (1) Install the wall hook bracket so that it is correctly positioned horizontally and vertically. If the wall hook bracket is tiled, water will drip to the floor.
- (2) Install the wall hook bracket so that it is strong enough to withstand the weight of an adult.
- Fasten the wall hook bracket to the wall with 5 or more screws through the holes near the outer edge of the bracket.
- Check that there is no rattle at the wall hook bracket.

Fig. 8

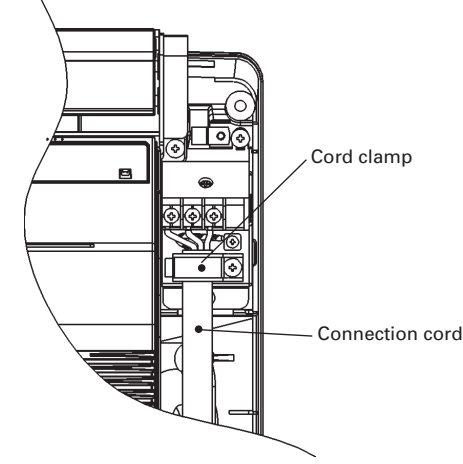
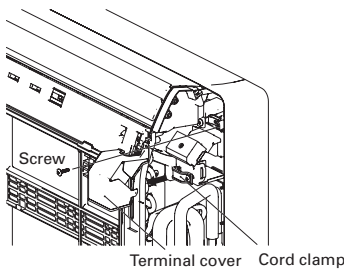


CAUTION

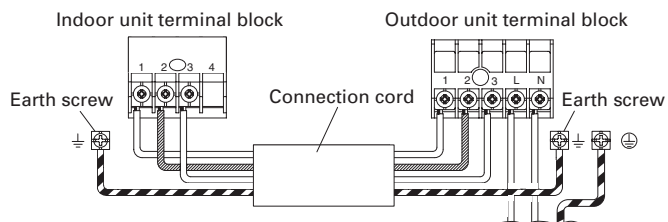
Install the wall hook bracket horizontally and perpendicularly.

INDOOR UNIT WIRING

- (1) Remove the terminal cover.
- (2) Remove the cord clamp.
- (3) Bend the end of the connection cord as shown in the figure.



- (4) Connect the end of the connection cord fully into the terminal block.
- (5) Fasten the connection cord with a cord clamp.



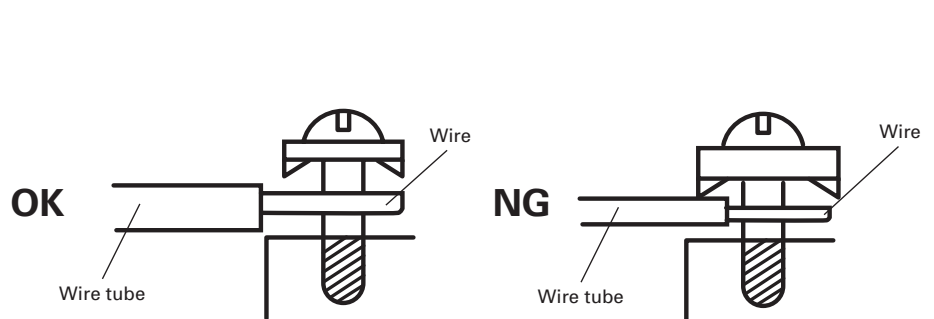
CAUTION

- (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) Securely earth the connection cord.
- (5) Do not use the earth screw for an external connector. Only use for inter-connection between two units.

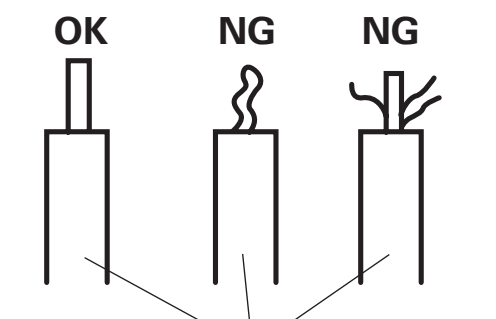
WARNING

Place the terminal cover surely after connecting the connection cable with the terminal of the indoor unit. If not placed the terminal cover, might cause smoke emission or fire.

CONNECTION STATEMENT OF WIRE



TREATMENT OF WIRE



FINISHING

- Insulate between pipes.
- Overlap the connection pipe heat insulation and indoor unit pipe heat insulation.
- Wrapping the connection pipe with cloth tape over the range within which they fit into the rear piping housing section.
- Fasten the pipe bracket with the screw (Fig. 12).
- Fill the gap between the outside wall pipe hole and the pipe with sealer so that rain water and wind cannot blow in.
- Fasten the drain hose to the outside wall, etc.

Fig. 12

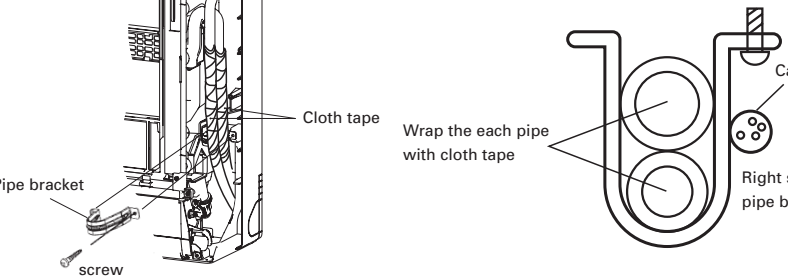
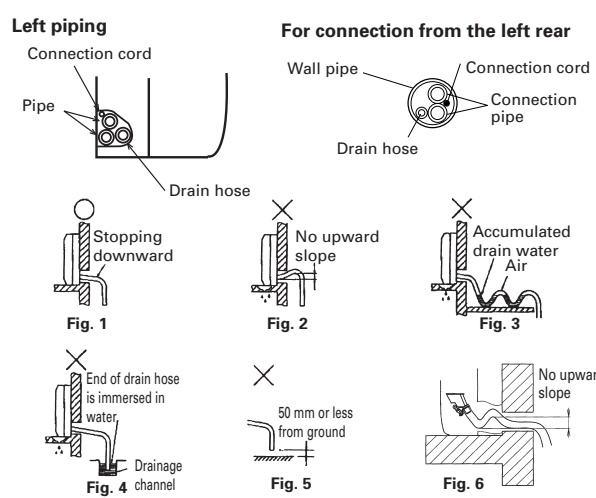


Fig. 13



TEST RUNNING

- Perform test operation and check items 1 and 2 below.
- For the test operation method, refer to the operating manual.
- The outdoor unit, may not operate, depending on the room temperature. In this case, press the test run button on the remote control unit while the air conditioner is running. (Point the transmitter section of the remote control unit toward the air conditioner and press the test run button with the tip of a ball-point pen, etc.)
- To end test operation, press the remote control unit START/STOP button. (When the air conditioner is run by pressing the test run button, the OPERATION indicator lamp and TIMER indicator lamp will simultaneously flash slowly.)

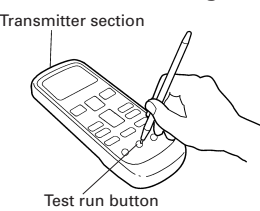
1. INDOOR UNIT

- (1) Is operation of each button on the remote control unit normal?
- (2) Does each lamp light normally?
- (3) Do the air flow-direction louver 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?

Fig. 14



WIRED REMOTE CONTROL UNIT (OPTIONAL)

1. SIDE PANEL L AND CONTROL COVER REMOVAL

- (1) Refer to "SIDE PANEL LR REMOVAL AND INSTALLATION" to remove the side panel L.
- (2) Remove the control cover.

2. CONNECTING TO CONTROL UNIT OF WIRE

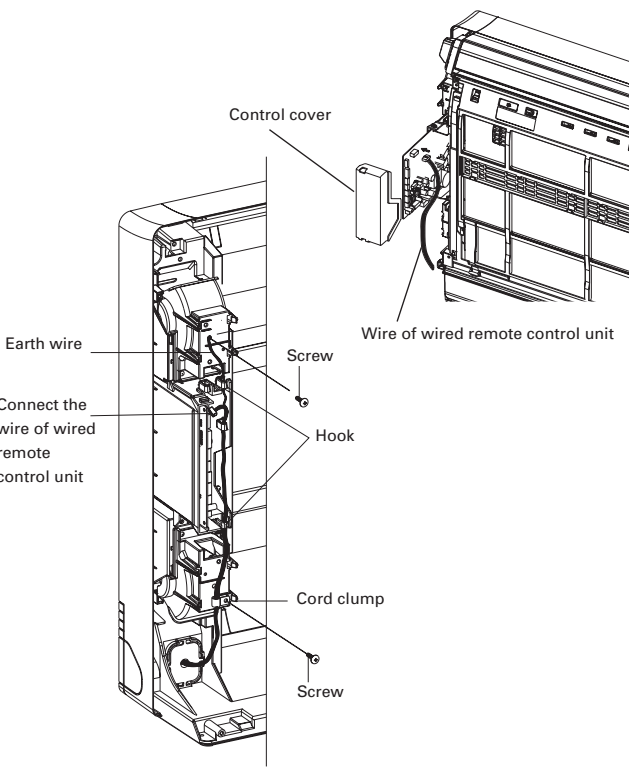
- (1) Connect the wire of wired remote control unit to the circuit board and screw the earth wire.
- (2) Install the control cover.
- (3) Use wire clasper and screw to fasten wire.

3. SIDE PANEL L INSTALLATION

Install side panel L by the reverse produres as stated in "1 SIDE PANEL L AND CONTROL COVER REMOVAL".

CAUTION

- (1) Before installing, be sure to disconnect all power supply.
- (2) During installing or removing operation, be sure not to have wire caught by parts or draw it hard. Or it may result troubles to the air-conditioner.
- (3) Insure the length of wire is not over the recommended maximum length.
- (4) Before setting up the wired remote unit, please confirm whether air-conditioner can receive the signal.



PUMP DOWN OPERATION (FORCED COOLING OPERATION)

To avoid discharging refrigerant into the atmosphere at the time of relocation or disposal, recover refrigerant by doing the cooling operation or forced cooling operation according to the following procedure. (When the cooling operation cannot start in winter, and so on, start the forced cooling operation.)

- (1) Do the air purging of the charge hose by connecting the charging hose of gauge manifold to the charging port of 3 way valve and opening the low-pressure valve slightly.
- (2) Close the valve stem of 2 way valve completely.
- (3) Start the cooling operation or following forced cooling operation. When using the remote control unit Press the TEST RUN button after starting the cooling operation by the remote control unit. The operation indicator lamp and timer indicator lamp will begin to flash simultaneously during test run. When using the MANUAL AUTO button of the indoor unit (The remote control unit is lost, and so on.) Keep on pressing the MANUAL AUTO button of the indoor unit for more than 10 seconds. (The forced cooling operation cannot start if the MANUAL AUTO button is not kept on pressing for more than 10 seconds.)
- (4) Close the valve stem of 3 way valve when the reading on the compound pressure gage becomes 0.05-0 Mpa (0.5-0 kg/cm²).
- (5) Stop the operation. Press the START/STOP button of the remote control unit to stop the operation. Press the MANUAL AUTO button when stopping the operation from indoor unit side. (It is not necessary to press on keeping for more than 10 seconds.)

CAUTION

During the pump-down operation, make sure that the compressor is turned off before you remove the refrigerant piping. Do not remove the connection pipe while the compressor is in operation with 2 way or 3 way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

SPLIT TYPE ROOM AIR CONDITIONER

INSTALLATION MANUAL

(PART No. 9316421028-01)

(V09LA)
(V12LA)

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant (R22) models. However, pay careful attention to the following points:

- (1) Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special.(See the table below.) Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
- (2) Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand.[The charging port thread diameter for R410A is 1/2 threads per inch.]
- (3) Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant (R22) models. Also, when storing the piping ,securely seal the opening by pinching ,taping, etc.
- (4) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals-0.1 to 5.3 MPa (-1 to 53 bar) for high pressure. -0.1 to 3.8 MPa (-1 to 38 bar) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion value or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in Table1.Never us copper pipes thinner than 0.8mm even when it is available on the market.

Table 1 Thicknesses of Annealed Copper Pipes

Nominal diameter	Outer diameter (mm)	Thickness (mm)	
		R410A	[ref.] R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80

WARNING

- (1) Do not use the existing (for R22) piping and flare nuts.
 - If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc.(Use the special R410A materials.)
- (2) When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant(R410A) to enter the refrigerant cycle.
 - If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

CAUTION

When installing pipes shorter than 3m, sound of the outdoor unit will be transferred to the indoor unit, which will cause large operating sound or some abnormal sound.

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 air conditioner piping and cords available standards parts. This installation manual describes the correct connections using the standard accessories and the parts specified in this installation manual.
- (3) Have installation work done by authorized service personnel only.
- (4) Do not use an extension cord.
- (5) 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 20 m. The maximum height difference of the piping is 15 m, if the units are further apart than these, correct operation can not be guaranteed.

OUTDOOR UNIT INSTALLATION

- 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.

Connector cover removal

- Remove the tapping screws.

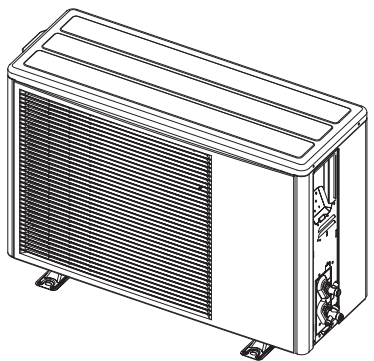
Installing the connector cover

- (1) After inserting the two front hooks, then insert the rear hook.
- (2) Tighten the tapping screws.

WARNING

- (1) Install the unit where it will not be tilted by more than 5°.
- (2) When installing the outdoor unit where it may exposed to strong wind, fasten it securely.

Fig. 1



ACCESSORY	Q'ty
Drain pipe	1

SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

- (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. 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.

WARNING

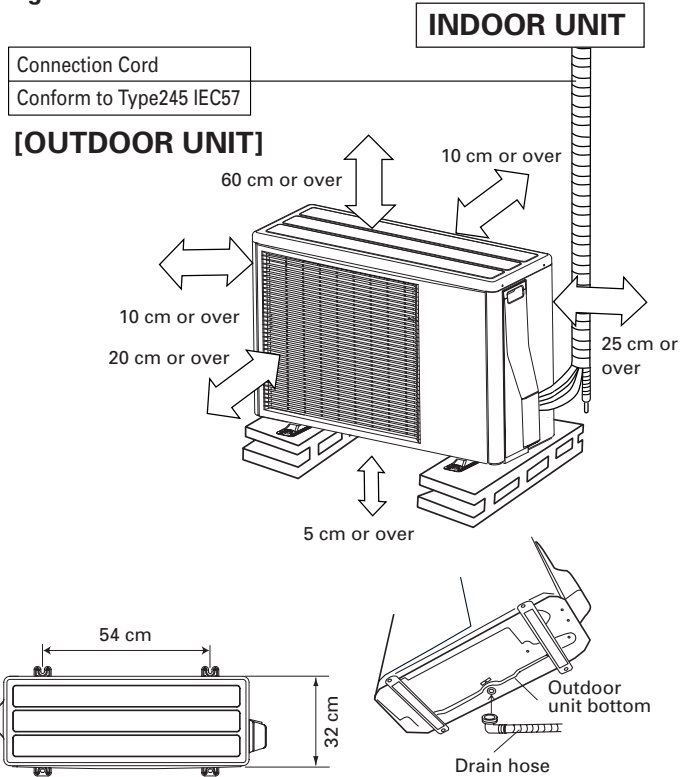
Install at a place that can withstand the weight of the outdoor units and install positively so that the units will not topple or fall.

CAUTION

- (1) Do not install where there is the danger of combustible gas leakage.
- (2) Do not install near heat sources.
- (3) In places where the outdoor temperature drops to 0°C or lower, the drain water may freeze and may stop up the drain or cause other outdoor unit trouble. Therefore take measures so that the drain water will not freeze and clog the drain.
- (4) In the area with heavy snowfall, if the intake and outlet of outdoor unit is blocked with snow, it might become difficult to get warm and it is likely to cause of the breakdown. Please construct a canopy and a pedestal or place the unit on a high stand (local configured).
- (5) If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

INSTALLATION DIAGRAM OF OUTDOOR UNIT

Fig. 2



Installation instruction on the back.

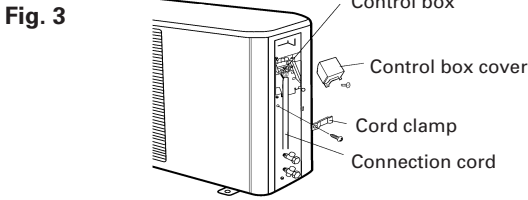
POWER

⚠ WARNING			
(1)	The rated voltage of this product is 230 V AC 50 Hz.	(5)	Do not extend the power supply cord and connection cord.
(2)	Before turning on the power, check if the voltage is within the 220 V -10 % to 240 V +10 % range.	(6)	Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.
(3)	Always use a special branch circuit and install a special receptacle to supply power to the room air conditioner.	(7)	Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.
(4)	Use a circuit breaker and receptacle matched to the capacity of the air conditioner.		

⚠ CAUTION	
(1)	The power source capacity must be the sum of the 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.

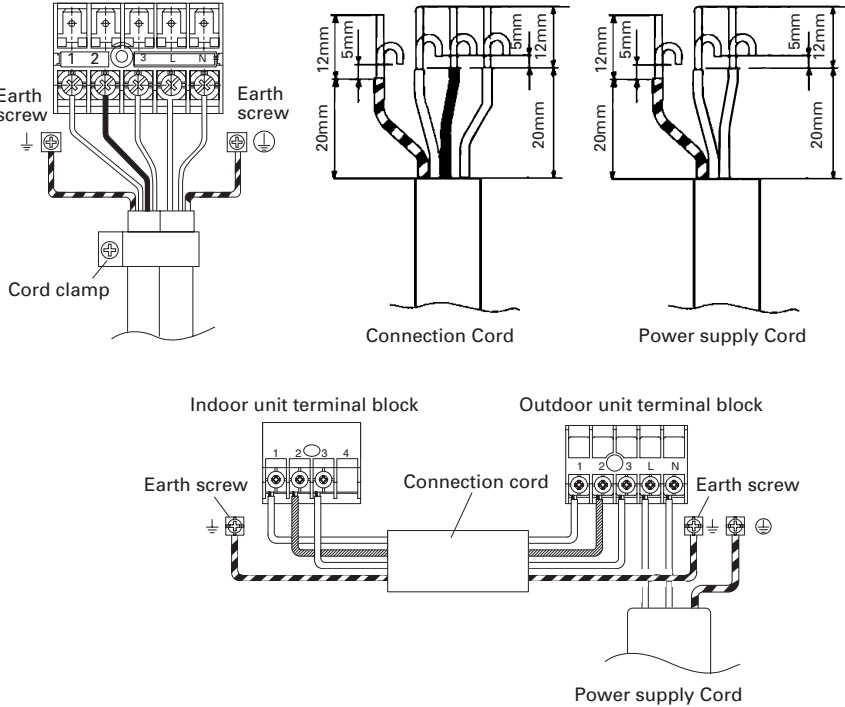
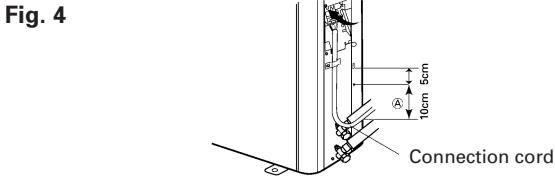
OUTDOOR UNIT WIRING

- (1) Remove the outdoor unit connector cover.
- (2) Bend the end of the cord as shown in the figure.
- (3) Connect the end of the connection cord fully into the terminal block.
- (4) Fasten the sheath with a cord clamp.
- (5) Install the connector cover.



Connection cord wiring

Run the connection cord to the rear of the outdoor unit within the Ⓐ range of the arrows shown in the figure. (The connector cover becomes difficult to install.)



⚠ CAUTION			
(1)	Match the terminal block numbers and connection cord colors with those of the indoor unit. Erroneous wiring may cause burning of the electric parts.	(3)	Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)
(2)	Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.	(4)	Securely earth the power cord.
		(5)	Do not use the earth screw for an external connector. Only use for interconnection between two units.

ELECTRICAL REQUIREMENT

• Electric wire size and fuse capacity:

MODEL	9,000 ~12,000 BTU class
Power supply cord (mm²)	1.5
Connection cord (mm²)	1.5
Fuse capacity (A)	20

- Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)
- Always make the air conditioner power supply a special branch circuit and provide a special breaker.
- Always use H07RN-F or equivalent as the power supply cord and the connection cord.

CONNECTING THE PIPING

CONNECTION

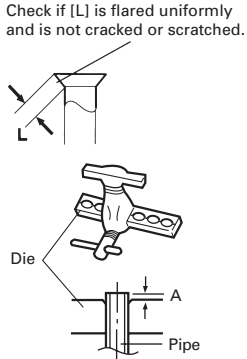
- (1) Install the outdoor unit wall cap (supplied with the optional installation set or procured at the site) to the wall pipe.
- (2) Connect the outdoor unit and indoor unit piping.
- (3) After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified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

Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Use the special R410A flare tool, or the conventional (for R22) flare tool.

When using the conventional flare tool, always use an allowance adjustment gauge and secure the A dimension shown in table 3 .



BENDING PIPES

- (1) When bending the pipe, be careful not to crush it.
- (2) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 70mm or over.
- (3) If the copper pipe is bend the pipe or pulled to often, it will become stiff. Do not bend the pipes more than three times at one place.

AIR PURGE

Always use a vacuum pump to purge the air. Refrigerant for purging the air is not charged in the outdoor unit at the factory.

Close the high pressure side valve of the gauge manifold fully and do not operate it during the following work.

1. Check if the piping connections are secure.
2. Check that the stems of 2-way valve and 3-way valve are closed fully.
3. Connect the gauge manifold charge hose to the charging port of the 3-way valve (side with the projection for pushing in the valve core).
4. Open the low pressure side valve of the gauge manifold fully.
5. Operate the vacuum pump and start pump down.
6. Slowly loosen the flare nut of the 3-way valve and check if air enters, then retighten the flare nut. (When the flare nut is loosened the operating sound of the vacuum pump changes and the reading of the compound pressure gauge goes from minus to zero.)
7. Pump down the system for at least 15 minutes, then check if the compound pressure gauge reads -0.1 MPa (-76 cmHg, -1 bar).
8. At the end of pump down, close the low pressure side gauge of the gauge manifold fully and stop the vacuum pump.
9. Slowly loosen the valve stem of the 3-way valve. When the compound pressure gauge reading reaches 0.1-0.2 MPa, retighten the valve stem and disconnect the charge hose from the 3-way valve charging port. (If the stem of the 3-way valve is opened fully before the charge hose is disconnected, it may be difficult to disconnect the charge hose.)

Additional charge

Refrigerant suitable for a piping length of 15 m is charged in the outdoor unit at the factory. When the piping is longer than 15 m, additional charging is necessary. For the additional amount, see the table below.

Table 5

Pipe length	15 m	20 m
Additional refrigerant	None	100 g

Fig. 5

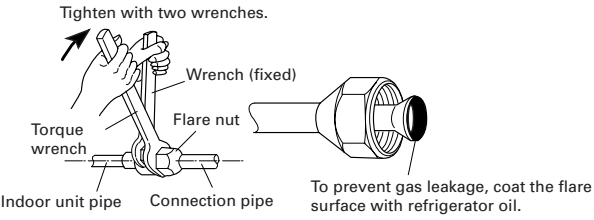


Table 2 Flare nut size and tightening torque

Flare nut	Diameter (mm) × Torque (N·m)
6.35 mm dia.	7 × 14 ~ 18
9.52 mm dia.	22 × 34 ~ 42

Table 3 Pipe outside diameter

Pipe outside diameter	Flare tool for R410A, clutch type	A (mm)	
		Conventional (R22) flare tool	
		Clutch type	Wing nut type
ø 6.35 mm (1/4")	0 to 0.5	1.0 to 1.5	1.5 to 2.0
ø 9.52 mm (3/8")	0 to 0.5	1.0 to 1.5	1.5 to 2.0

⚠ CAUTION	
(1)	Fasten a flare nut with a torque wrench as instructed in this manual. If fastened too tight, the flare nut may be broken after a long period of time and cause a leakage of refrigerant.
(2)	During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

⚠ CAUTION	
(1)	Refrigerant must not be discharged into atmosphere.
(2)	After connecting the piping , check the joints for gas leakage with gas leak detector.

10. Fully open the valve stems of the 2-way valve and 3-way valve using a hexagon wrench. (After the valve stem begins to turn, turn it with a torque of less than 2.9 N · m (30 kgf · cm) until it stops turning.)
11. Firmly tighten the 2-way valve and 3-way valve blank cap and the charging port cap.

Fig. 6

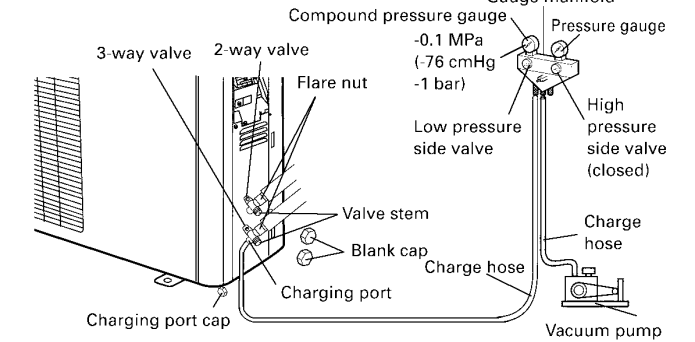


Table 4

	Tightening torque
Blank cap	19.6 to 24.5 N · m (200 to 250 kgf · cm)
Charging port cap	12.3 to 15.7 N · m (125 to 160 kgf · cm)

⚠ CAUTION	
(1)	When adding refrigerant, add the refrigerant from the charging port at the completion of work.
(2)	The maximum length of the piping is 20 m. If the units are further apart than this, correct operation can not be guaranteed.

Between 15 m and 20 m, when using a connection pipe other than that in the table, charge additional refrigerant with 20g/1 m as the criteria.

SPLIT TYPE ROOM AIR CONDITIONER

INSTALLATION MANUAL

(PART No. 9316421035-01)

(V14LA)

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant (R22) models. However, pay careful attention to the following points:

(1) Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special.(See the table below.) Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.

(2) Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand.[The charging port thread diameter for R410A is 1/2 threads per inch.]

(3) Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant (R22) models. Also, when storing the piping ,securely seal the opening by pinching ,taping, etc.

(4) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals-0.1 to 5.3 MPa (-1 to 53 bar) for high pressure. -0.1 to 3.8 MPa (-1 to 38 bar) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion value or capillary tube may become blocked with contaminants.

As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in Table1.Never us copper pipes thinner than 0.8mm even when it is available on the market.

Table 1 Thicknesses of Annealed Copper Pipes

		Thickness (mm)	
Nominal diameter	Outer diameter (mm)	R410A	[ref.] R22
1/4	6.35	0.80	0.80
1/2	12.7	0.80	0.80

⚠ WARNING

(1) Do not use the existing (for R22) piping and flare nuts.

• If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc.(Use the special R410A materials.)

(2) When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant(R410A) to enter the refrigerant cycle.

• If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

⚠ CAUTION

When installing pipes shorter than 3m, sound of the outdoor unit will be transferred to the indoor unit, which will cause large operating sound or some abnormal sound.

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 air conditioner piping and cords available standards parts. This installation manual describes the correct connections using the standard accessories and the parts specified in this installation manual.

(3) Have installation work done by authorized service personnel only.

(4) Do not use an extension cord.

(5) 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 20 m. The maximum height difference of the piping is 15 m, if the units are further apart than these, correct operation can not be guaranteed.

OUTDOOR UNIT INSTALLATION

- 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.

Connector cover removal

- Remove the tapping screws.

Installing the connector cover

- After inserting the two front hooks, then insert the rear hook.
- Tighten the tapping screws.

⚠ WARNING

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

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

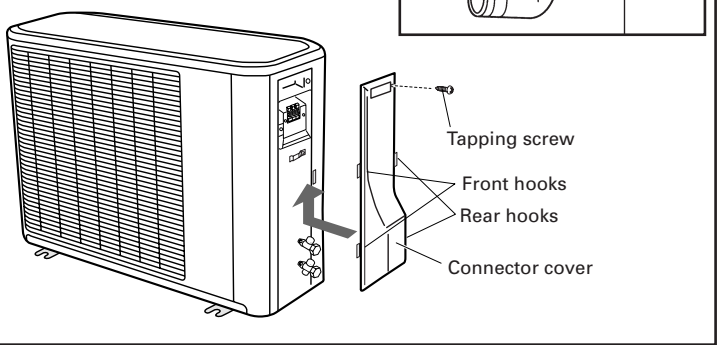
Fig. 1

ACCESSORY

Q'ty

Drain pipe

1



Tapping screw

Front hooks

Rear hooks

Connector cover

SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

- 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.)
- Do not install the unit where a strong wind blows or where it is very dusty.
- Do not install the unit where people pass.
- Take your neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise.
- 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.

⚠ WARNING

Install at a place that can withstand the weight of the 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) In places where the outdoor temperature drops to 0°C or lower, the drain water may freeze and may stop up the drain or cause other outdoor unit trouble. Therefore take measures so that the drain water will not freeze and clog the drain.

(4) In the area with heavy snowfall, if the intake and outlet of outdoor unit is blocked with snow, it might become difficult to get warm and it is likely to cause of the breakdown. Please construct a canopy and a pedestal or place the unit on a high stand (local configured).

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

INSTALLATION DIAGRAM OF OUTDOOR UNIT

Fig. 2

INDOOR UNIT

Connection Cord

Conform to Type245 IEC57

[OUTDOOR UNIT]

60 cm or over

10 cm or over

10 cm or over

30 cm or over

5 cm or over

54 cm

32 cm

Outdoor unit bottom

Drain hose

Installation instruction on the back.

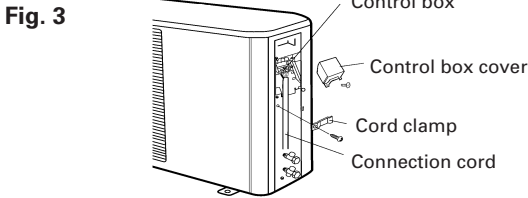
POWER

⚠ WARNING			
(1)	The rated voltage of this product is 230 V AC 50 Hz.	(5)	Do not extend the power supply cord and connection cord.
(2)	Before turning on the power, check if the voltage is within the 220 V -10 % to 240 V +10 % range.	(6)	Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.
(3)	Always use a special branch circuit and install a special receptacle to supply power to the room air conditioner.	(7)	Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.
(4)	Use a circuit breaker and receptacle matched to the capacity of the air conditioner.		

⚠ CAUTION	
(1)	The power source capacity must be the sum of the 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.

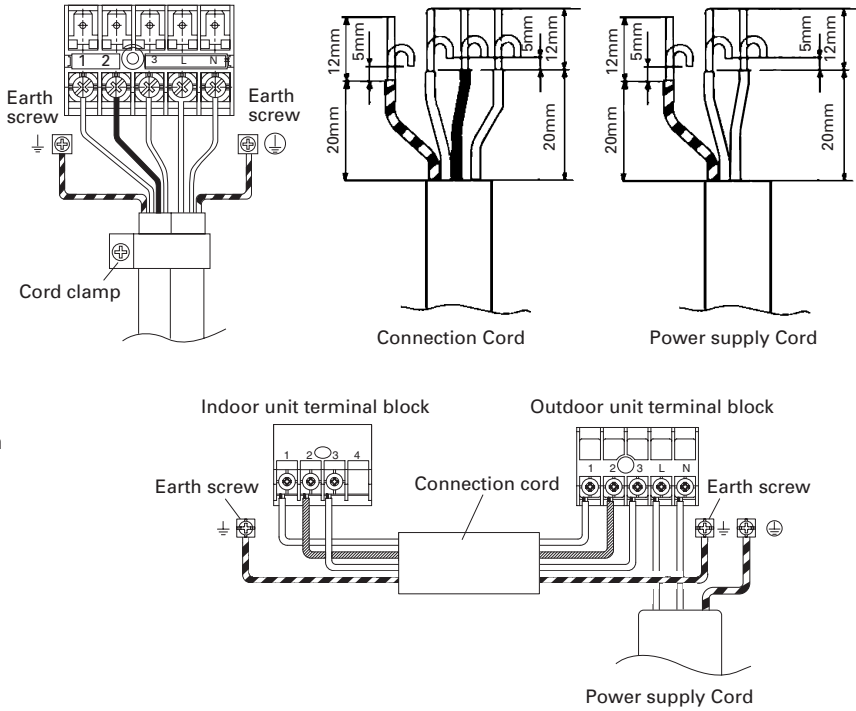
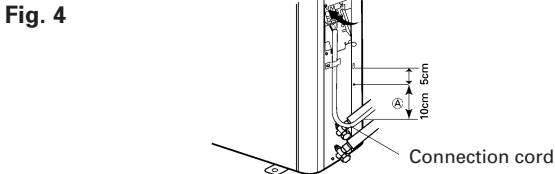
OUTDOOR UNIT WIRING

- (1) Remove the outdoor unit connector cover.
- (2) Bend the end of the cord as shown in the figure.
- (3) Connect the end of the connection cord fully into the terminal block.
- (4) Fasten the sheath with a cord clamp.
- (5) Install the connector cover.



Connection cord wiring

Run the connection cord to the rear of the outdoor unit within the Ⓐ range of the arrows shown in the figure. (The connector cover becomes difficult to install.)



⚠ CAUTION			
(1)	Match the terminal block numbers and connection cord colors with those of the indoor unit. Erroneous wiring may cause burning of the electric parts.	(3)	Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)
(2)	Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.	(4)	Securely earth the power cord.
		(5)	Do not use the earth screw for an external connector. Only use for interconnection between two units.

ELECTRICAL REQUIREMENT

• Electric wire size and fuse capacity:

MODEL	14,000 BTU class
Power supply cord (mm²)	1.5
Connection cord (mm²)	1.5
Fuse capacity (A)	20

- Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)
- Always make the air conditioner power supply a special branch circuit and provide a special breaker.
- Always use H07RN-F or equivalent as the power supply cord and the connection cord.

CONNECTING THE PIPING

CONNECTION

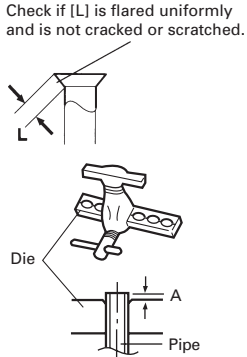
- (1) Install the outdoor unit wall cap (supplied with the optional installation set or procured at the site) to the wall pipe.
- (2) Connect the outdoor unit and indoor unit piping.
- (3) After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified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

Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Use the special R410A flare tool, or the conventional (for R22) flare tool.

When using the conventional flare tool, always use an allowance adjustment gauge and secure the A dimension shown in table 3.



BENDING PIPES

- (1) When bending the pipe, be careful not to crush it.
- (2) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 70mm or over.
- (3) If the copper pipe is bent the pipe or pulled to often, it will become stiff. Do not bend the pipes more than three times at one place.

AIR PURGE

Always use a vacuum pump to purge the air. Refrigerant for purging the air is not charged in the outdoor unit at the factory.

Close the high pressure side valve of the gauge manifold fully and do not operate it during the following work.

1. Check if the piping connections are secure.
2. Check that the stems of 2-way valve and 3-way valve are closed fully.
3. Connect the gauge manifold charge hose to the charging port of the 3-way valve (side with the projection for pushing in the valve core).
4. Open the low pressure side valve of the gauge manifold fully.
5. Operate the vacuum pump and start pump down.
6. Slowly loosen the flare nut of the 3-way valve and check if air enters, then retighten the flare nut. (When the flare nut is loosened the operating sound of the vacuum pump changes and the reading of the compound pressure gauge goes from minus to zero.)
7. Pump down the system for at least 15 minutes, then check if the compound pressure gauge reads -0.1 MPa (-76 cmHg, -1 bar).
8. At the end of pump down, close the low pressure side gauge of the gauge manifold fully and stop the vacuum pump.
9. Slowly loosen the valve stem of the 3-way valve. When the compound pressure gauge reading reaches 0.1-0.2 MPa, retighten the valve stem and disconnect the charge hose from the 3-way valve charging port. (If the stem of the 3-way valve is opened fully before the charge hose is disconnected, it may be difficult to disconnect the charge hose.)

Additional charge

Refrigerant suitable for a piping length of 15 m is charged in the outdoor unit at the factory. When the piping is longer than 15 m, additional charging is necessary. For the additional amount, see the table below.

Table 5

Pipe length	15 m	20 m
Additional refrigerant	None	100 g

Fig. 5

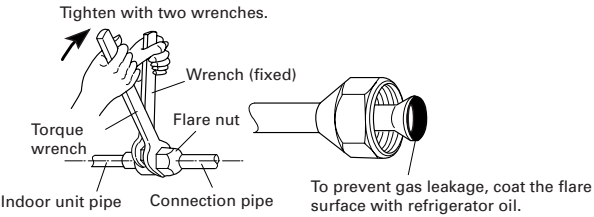


Table 2 Flare nut size and tightening torque

Flare nut	Diameter (mm) × Torque (N·m)
6.35 mm dia.	7 × 14 ~ 18
12.7 mm dia.	26 × 49 ~ 61

Table 3 Pipe outside diameter

Pipe outside diameter	Flare tool for R410A, clutch type	A (mm)	
		Conventional (R22) flare tool	Clutch type
ø 6.35 mm (1/4")	0 to 0.5	1.0 to 1.5	1.5 to 2.0
ø 12.7 mm (1/2")	0 to 0.5	1.0 to 1.5	1.5 to 2.0

⚠ CAUTION	
(1)	Fasten a flare nut with a torque wrench as instructed in this manual. If fastened too tight, the flare nut may be broken after a long period of time and cause a leakage of refrigerant.
(2)	During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

⚠ CAUTION	
(1)	Refrigerant must not be discharged into atmosphere.
(2)	After connecting the piping, check the joints for gas leakage with gas leak detector.

10. Fully open the valve stems of the 2-way valve and 3-way valve using a hexagon wrench. (After the valve stem begins to turn, turn it with a torque of less than 2.9 N · m (30 kgf · cm) until it stops turning.)
11. Firmly tighten the 2-way valve and 3-way valve blank cap and the charging port cap.

Fig. 6

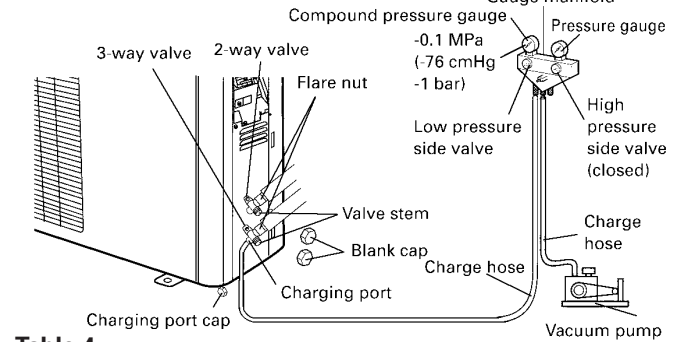


Table 4

	Tightening torque
Blank cap (2-way valve)	19.6 to 24.5 N·m (200 to 250 kgf·cm)
Blank cap (3-way valve)	27.4 to 31.4 N·m (280 to 320 kgf·cm)
Charging port cap	12.3 to 15.7 N·m (125 to 160 kgf·cm)

⚠ CAUTION	
(1)	When adding refrigerant, add the refrigerant from the charging port at the completion of work.
(2)	The maximum length of the piping is 20 m. If the units are further apart than this, correct operation can not be guaranteed.

Between 15 m and 20 m, when using a connection pipe other than that in the table, charge additional refrigerant with 20g/1 m as the criteria.

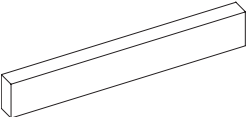
FLOOR TYPE HALF CONCEALED KIT:UTR-STA INSTALLATION MANUAL

(PART No. 9316532014)

- 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.

STANDARD ACCESSORIES

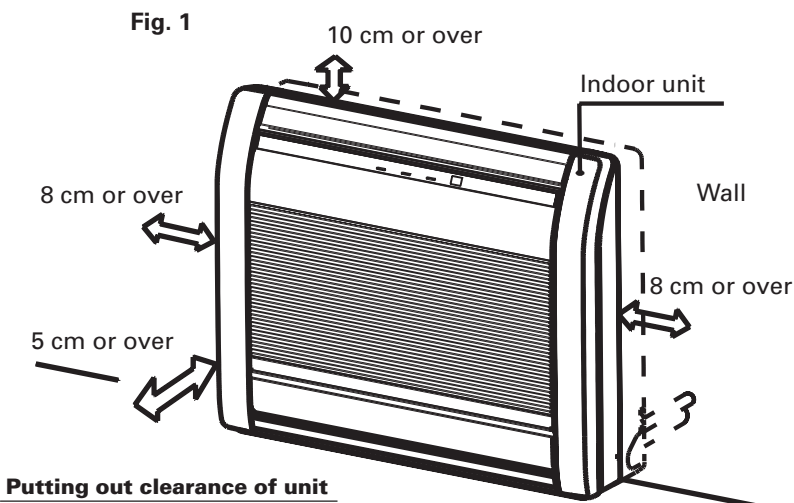
The following installation accessories are supplied.
Use them as required.

Name and Shape	Q'ty
Insulation Seal 	1

1. SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

- (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 drainpipe can be easily installed.
- (7) Take servicing, etc. into the unit where the filter can be removed in Fig1. Also install the unit where the filter can be removed.
- (8) Install the place where is no gap around the unit.

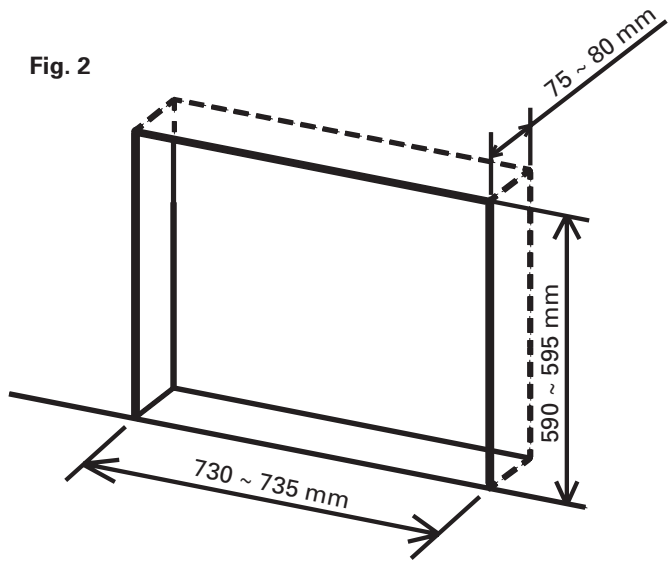


2. WALL HOLE

Drill a wall hole of the size shown in the Fig.2.

**WARNING**

Do not make a hole that is deeper than 80mm. The product cannot be maintained.



3. ATTACHMENT OF INSURATION SEAL

Cut the insulation seal in length in the Fig.3 and seal the insulation seal to the indoor unit on the top and back side in Fig.4.

Fig. 3

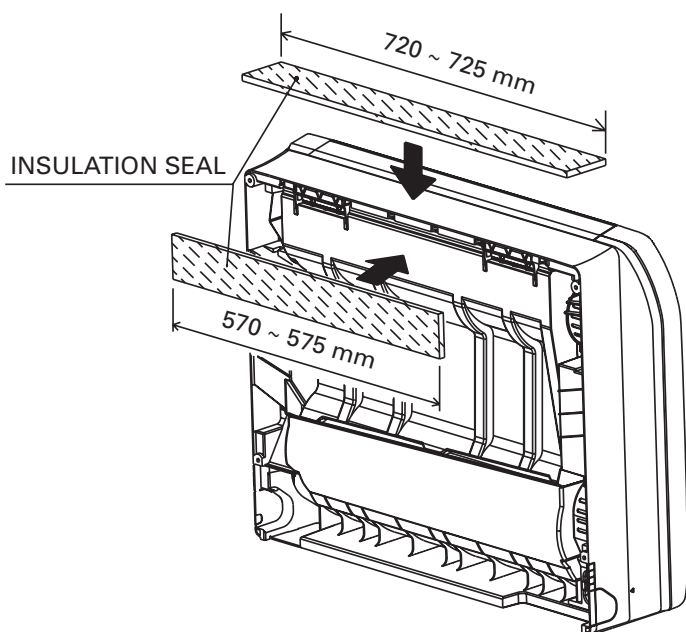
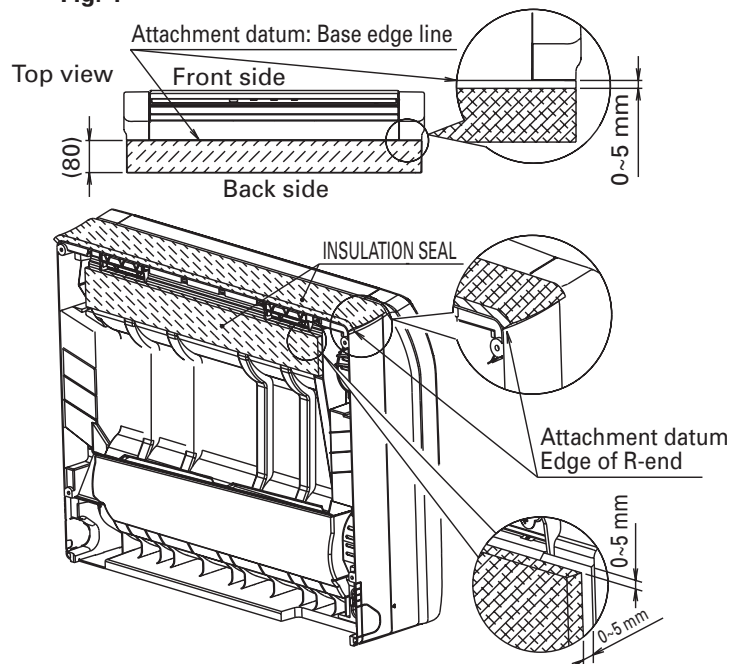


Fig. 4

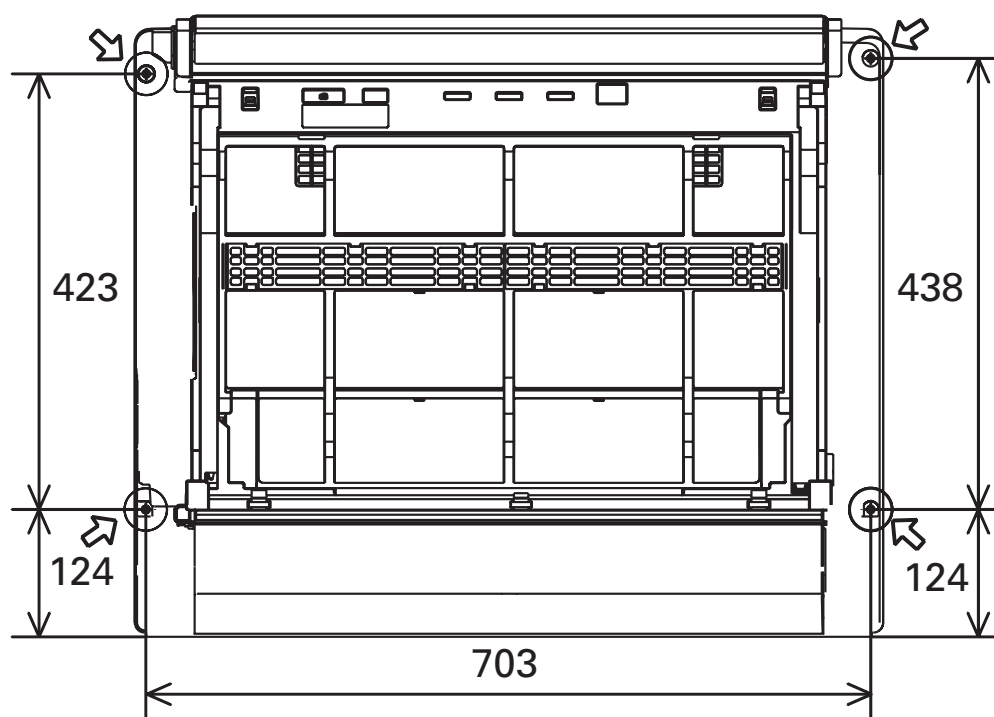


4. INSTALLING THE INDOOR UNIT

Install the indoor unit in the wall hole and fasten the indoor unit at 4 locations each at top and middle of the unit.(Fig.5)

- Do not use the wall hook bracket at half concealed.

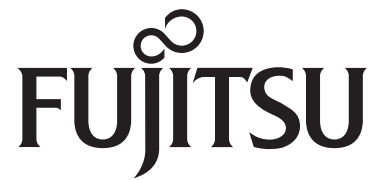
Please refer to the installation manual of the main body for other how to install it.



⚠ WARNING

[Installation of indoor unit]

- Fix the indoor unit with 4 screws surely.If improperly installed, might cause to injury due to the toppling or falling.
- Install the indoor unit at the place that has adequate strength.
Install the indoor unit so that the installed unit can withstand the weight of adult body weight.
If improperly installed, might cause accidental injury due to the toppling or falling.



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