

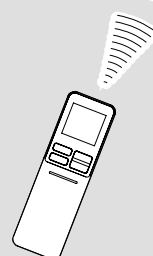
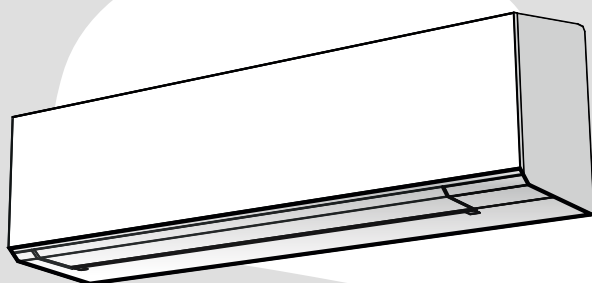
# TOSHIBA

## SERVICE MANUAL

# AIR-CONDITIONER

## SPLIT TYPE

***RAS-M05J2KVSG-E***  
***RAS-M05N4KVSG-E***



**R32**

**INVERTER**







Revised on Nov, 2023

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# 1. SAFETY PRECAUTIONS

	Read the precautions in this manual carefully before operating the unit.		This appliance is filled with R32. (Flammable Material)
	Information included in the Operation Manual and/or Installation Manual.		Service personnel should be handling this equipment with reference to the Installation Manual.

## For general public use

Power supply cord of outdoor unit shall be more than 1.5 mm<sup>2</sup> (H07RN-F or 60245IEC66) polychloroprene sheathed flexible cord.

- Read this "SAFETY PRECAUTIONS" carefully before servicing.
- The precautions described below include the important items regarding safety. Observe them without fail.
- After the servicing work, perform a trial operation to check for any problem.
- Turn off the main power supply switch (or breaker) before the unit maintenance.

### ■ Important information regarding the refrigerant used

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere. Refrigerant type: **R32**

GWP<sup>(1)</sup> value: **675\***

<sup>(1)</sup>GWP = global warming potential

The refrigerant quantity is indicated on the unit name plate.

\* This value is based on F gas regulation 517/2014

## CAUTION

### New Refrigerant Air Conditioner Installation

- **THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R32) WHICH DOES NOT DESTROY OZONE LAYER.**

R32 refrigerant is apt to be affected by impurities such as water, oxidizing membrane, and oils because the working pressure of R32 refrigerant is approx. 1.6 times of refrigerant R22. Accompanied with the adoption of the new refrigerant, the refrigeration machine oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigeration machine oil does not enter into the new type refrigerant R32 air conditioner circuit.

To prevent mixing of refrigerant or refrigerating machine oil, the sizes of connecting sections of charging port on main unit and installation tools are different from those used for the conventional refrigerant units.

Accordingly, special tools are required for the new refrigerant (R32) units. For connecting pipes, use new and clean piping materials with high pressure fittings made for R32 only, so that water and/or dust does not enter. Moreover, do not use the existing piping because there are some problems with pressure fittings and possible impurities in existing piping.

## CAUTION

### TO DISCONNECT THE APPLIANCE FROM THE MAIN POWER SUPPLY

This appliance must be connected to the main power supply by means of a circuit breaker or a switch with a contact separation of at least 3 mm in all poles.

## **DANGER**

- **ASK AN AUTHORIZED DEALER OR QUALIFIED INSTALLATION PROFESSIONAL TO INSTALL/MAINTAIN THE AIR CONDITIONER.**

INAPPROPRIATE SERVICING MAY RESULT IN WATER LEAKAGE, ELECTRIC SHOCK OR FIRE.

- TURN OFF MAIN POWER SUPPLY BEFORE ATTEMPTING ANY ELECTRICAL WORK. MAKE SURE ALL POWER SWITCHES ARE OFF. FAILURE TO DO SO MAY CAUSE ELECTRIC SHOCK.



### **DANGER: HIGH VOLTAGE**

The high voltage circuit is incorporated.

Be careful to do the check service, as the electric shock may be caused in case of touching parts on the P.C. board by hand.

- CORRECTLY CONNECT THE CONNECTING CABLE. IF THE CONNECTING CABLE IS INCORRECTLY CONNECTED, ELECTRIC PARTS MAY BE DAMAGED.
- CHECK THAT THE EARTH WIRE IS NOT BROKEN OR DISCONNECTED BEFORE SERVICE AND INSTALLATION. FAILURE TO DO SO MAY CAUSE ELECTRIC SHOCK.
- DO NOT INSTALL NEAR CONCENTRATIONS OF COMBUSTIBLE GAS OR GAS VAPORS. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FIRE OR EXPLOSION.
- TO PREVENT THE INDOOR UNIT FROM OVERHEATING AND CAUSING A FIRE HAZARD, PLACE THE UNIT WELL AWAY (MORE THAN 2 M) FROM HEAT SOURCES SUCH AS RADIATORS, HEAT REGISTORS, FURNACE, STOVES, ETC.
- WHEN MOVING THE AIR-CONDITIONER FOR INSTALLATION IN ANOTHER PLACE, BE VERY CAREFUL NOT TO ALLOW THE SPECIFIED REFRIGERANT (R410A) TO BECOME MIXED WITH ANY OTHER GASEOUS BODY INTO THE REFRIGERATION CIRCUIT. IF AIR OR ANY OTHER GAS IS MIXED IN THE REFRIGERANT, THE GAS PRESSURE IN THE REFRIGERATION CIRCUIT WILL BECOME ABNORMALLY HIGH AND IT MAY RESULT IN THE PIPE BURSTING AND POSSIBLE PERSONNEL INJURIES.
- IN THE EVENT THAT THE REFRIGERANT GAS LEAKS OUT OF THE PIPE DURING THE SERVICE WORK AND THE INSTALLATION WORK, IMMEDIATELY LET FRESH AIR INTO THE ROOM. IF THE REFRIGERANT GAS IS HEATED, SUCH AS BY FIRE, GENERATION OF POISONOUS GAS MAY RESULT.

## **WARNING**

- Never modify this unit by removing any of the safety guards or bypassing any of the safety interlock switches.
- Do not install in a place which cannot bear the weight of the unit. Personal injury and property damage can result if the unit falls.
- Before doing the electrical work, attach an approved plug to the power supply cord. Also, make sure the equipment is properly earthed.
- Appliance shall be installed in accordance with national wiring regulations. If you detect any damage, do not install the unit. Contact your dealer immediately.
- Do not use any refrigerant different from the one specified for complement or replacement. Otherwise, abnormally high pressure may be generated in the refrigeration cycle, which may result in a failure or explosion of the product or an injury to your body.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Be aware that refrigerants may not contain an odour.
- Do not pierce or burn as the appliance is pressurized. Do not expose the appliance to heat, flame, sparks, or other sources or ignition. Else, it may explode and cause injury or death.



- For R32 model, use pipes, flare nut and tools which is specified for R32 refrigerant. Using of existing (R22) piping, flare nut and tools may cause abnormally high pressure in the refrigerant cycle (piping), and possibly result in explosion and injury.
- Thickness of copper pipes used R32 must be more than 0.8mm. Never use copper pipes thinner than 0.8mm.
- After completion of installation or service, confirm there is no leakage of refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.
- Appliance and pipe-work shall be installed, operated and stored in a room with a floor area larger than  $A_{\min} \text{ m}^2$ . How to get  $A_{\min} \text{ m}^2$  :  $A_{\min} = (M / (2.5 \times 0.22759 \times h_0))^2$   
M is the refrigerant charge amount in appliance in kg.  $h_0$  is the installation height of the appliance in m: 0.6 m for floor standing/1.8 m for wall mounted/1.0 m for window mounted/2.2 m for ceiling mounted (For these units recommend installation height 2.5 m.).
- Comply with national gas regulations.

### CAUTION

- Exposure of unit to water or other moisture before installation could result in electric shock. Do not store it in a wet basement or expose to rain or water.
- After unpacking the unit, examine it carefully for possible damage.
- Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause of fire.
- Do not install in a place that can increase the vibration of the unit. Do not install in a place that can amplify the noise level of the unit or where noise and discharged air might disturb neighbors.
- To avoid personal injury, be careful when handling parts with sharp edges.
- Please read this installation manual carefully before installing the unit. It contains further important instructions for proper installation.
- The manufacturer shall not assume any liability for the damage caused by not observing the description of this manual.

### For Reference:

If a heating operation would be continuously performed for a long time under the condition that the outdoor temperature is 0°C or lower, drainage of defrosted water may be difficult due to freezing of the bottom plate, resulting in a trouble of the cabinet or fan.

It is recommended to procure an antifreeze heater locally for a safe installation of the air conditioner.

For details, contact the dealer.

## 2. SPECIFICATIONS

### 2-1. Specification

Unit model		Indoor		RAS-M05J2KVSG-E, RAS-M05N4KVSG-E		
		Outdoor		*1		
Cooling capacity		(kW)		*1		
Cooling capacity range		(kW)		*1		
Heating capacity		(kW)		*1		
Heating capacity range		(kW)		*1		
Power supply				1Ph/220-240V/50Hz		
Electric characteristic	Indoor	Operation mode		Cooling	Heating	
		Running current (A)		0.19-0.17	0.19-0.17	
		Power consumption (W)		25	25	
		Power factor (%)		60	60	
	Outdoor	Operation mode		Cooling	Heating	
		Running current (A)		*1		
		Power consumption (W)		*1		
		Power factor (%)		*1		
Starting current (A)		*1				
COP (Cooling / Heating)				*1		
Operating noise	Indoor	High	(Cooling / Heating) (dB-A)	37/37		
		Medium	(Cooling / Heating) (dB-A)	30/30		
		Low	(Cooling / Heating) (dB-A)	22/22		
	Outdoor		(Cooling / Heating) (dB-A)	*1		
Indoor unit	Unit model		RAS-M05J2KVSG-E, RAS-M05N4KVSG-E			
	Dimension	Height (mm)	293			
		Width (mm)	800			
		Depth (mm)	226			
	Net weight (kg)		9			
	Fan motor output (W)		25			
	Air flow rate (Cooling / Heating) (m³ / min)		10/10			
Outdoor unit	Unit model		*1			
	Dimension	Height (mm)	*1			
		Width (mm)	*1			
		Depth (mm)	*1			
	Net weight (kg)		*1			
	Compressor	Motor output (W)	*1			
		Type	*1			
		Model	*1			
	Fan motor output (W)		*1			
Air flow rate (Cooling / Heating) (m³ / min)		*1				
Piping connection	Type		Flare connection			
	Indoor unit	Liquid side (mm)	Ø6.35			
		Gas side (mm)	Ø9.52			
	Outdoor unit	Liquid side (mm)	*1			
		Gas side (mm)	*1			
	Maximum length (m)		*1			
	Maximum charge-less length (m)		*1			
	Maximum height difference (m)		*1			
Refrigerant	Name of refrigerant		R32			
	Weight (kg)		*1			
Wiring connection		Power supply		*1		
		Interconnection		4 Wires: Includes earth		
Usable temperature range		Indoor (Cooling / Heating) (°C)	21-32/ -28			
		Outdoor (Cooling / Heating) (°C)	*1			
Accessory	Indoor unit	Installation plate		1		
		Wireless remote controller		1		
		Batteries		2		
		Remote controller holder		1		
		Toshiba IAQ filter		1		
		Mounting screw		6(Ø4x25L)		
		Remote controller holder Flat head wood screw		2(Ø3.1x16L)		
		Installation manual		1		
		Owner's manual		1		

\*1 : Refer to the service manual of the multi outdoor unit to be combined.

Note : The specification may be subject to change without notice for purpose of improvement.

### 3. REFRIGERANT R32

This air conditioner adopts the new refrigerant HFC (R32) which does not damage the ozone layer.

The next section describes the precautions for air conditioner using the new refrigerant. Conforming to contents of the next section together with the general cautions included in this manual, perform the correct and safe work.

#### 3-1. Safety During Installation/Service

The basic installation servicing work procedures are the same as conventional R410A models.

As R32's pressure is about 1.6 times higher than that of R22, improper installation/servicing may cause a serious trouble. By using tools and materials exclusive for R32, it is necessary to carry out installation/servicing safely while taking the following precautions into consideration.

1. Never use refrigerant other than R32 in an air conditioner which is designed to operate with R32. If other refrigerant than R32 is mixed, pressure in the refrigeration cycle becomes abnormally high, and it may cause personal injury, etc. by a rupture.
2. Confirm the used refrigerant name, and use tools and materials exclusive for the refrigerant.  
The refrigerant name R32 is indicated on the visible place of the outdoor unit of the air conditioner using R32 as refrigerant. To prevent mischarging, the diameter of the service port differs from that of R22. R32 and other HFCs are heavier than air, and therefore they are inclined to settle near the floor surface.  
If the gas fills up the room or the bottom part of a room, it may also cause oxygen deficiency and may reach its combustion concentration.

**In order to prevent oxygen deficiency and R32 combustion, keep the room well-ventilated for a healthy work environment.**

In particular, using HFCs in a basement room or confined area creates a higher risk; be sure to furnish the room with local exhaust ventilation. If a refrigerant leak is confirmed in a room an inadequately ventilated location, do not use a flame until the area has been ventilated appropriately and the work environment has been improved.

**The same applies in case of brazing, ensure appropriate ventilation to prevent oxygen deficiency and R32 combustion.**

Check that there are no dangerous or combustible items nearby, and ensure a fire extinguisher is close at hand.

Keep a sufficient distance away from causes of fire (ignition sources) such as gas-burning equipment and electric heaters in places where installation, repairs, or similar work on air-conditioning equipment is performed.

3. If a refrigeration gas leakage occurs during installation/servicing, be sure to ventilate fully. If the refrigerant gas comes into contact with fire, a poisonous gas may occur.
4. When installing or removing an air conditioner, do not allow air moisture dust or oil to remain in the refrigeration cycle. Otherwise, pressure in the refrigeration cycle may become abnormally high so that a rupture or personal injury may be caused.
5. After completion of installation work, check to make sure that there is no refrigeration gas leakage. If the refrigerant gas leaks into the room, coming into contact with fire in the fan-driven heater, space heater, etc., a poisonous gas may occur
6. When an air conditioning system charged with a large volume of refrigerant is installed in a small room, it is necessary to exercise care so that, even when refrigerant leaks, its concentration does not exceed the marginal level. If the refrigerant gas leakage occurs and its concentration exceeds the marginal level, an oxygen starvation accident may result.
7. Be sure to carry out installation or removal according to the installation manual. Improper installation may cause refrigeration trouble, water leakage, electric shock, fire, etc.
8. Unauthorized modifications to the air conditioner may be dangerous. If a breakdown occurs please call a qualified air conditioner technician or electrician. Improper repair's may result in water leakage, electric shock and fire, etc.

#### 3-2. Refrigerant Piping Installation

##### 3-2-1. Piping Materials and Joints Used

For the refrigerant piping installation, copper pipes and joints are mainly used. Copper pipes and joints suitable for the refrigerant must be chosen and installed. Furthermore, it is necessary to use clean copper pipes and joints whose interior surfaces are less affected by contaminants.

##### 1. Copper Pipes

It is necessary to use seamless copper pipes which are made of either copper or copper alloy and it is desirable that the amount of residual oil is less than 40 mg/10 m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface).

Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

As an air conditioner using R32 incurs pressure higher than when using R22, it is necessary to choose adequate materials.

Thicknesses of copper pipes used with R32 are as shown in Table 3-2-1. Never use copper pipes thinner than 0.8 mm even when it is available on the market.

**Table 3-2-1 Thicknesses of annealed copper pipes**

		Thickness (mm)	
Nominal diameter	Outer diameter (mm)	R32(R410A)	R22
1/4	6.35	0.80	0.80
3/8	9.52	0.80	0.80
1/2	12.70	0.80	0.80
5/8	15.88	1.00	1.00

## 2. Joints

For copper pipes, flare joints or socket joints are used. Prior to use, be sure to remove all contaminants.

### a) Flare Joints

Flare joints used to connect the copper pipes cannot be used for pipings whose outer diameter exceeds 20 mm. In such a case, socket joints can be used.

Sizes of flare pipe ends, flare joint ends and flare nuts are as shown in Tables 3-2-3 to 3-2-6 below.

### b) Socket Joints

Socket joints are such that they are brazed for connections, and used mainly for thick pipings whose diameter is larger than 20 mm.

Thicknesses of socket joints are as shown in Table 3-2-2.

**Table 3-2-2 Minimum thicknesses of socket joints**

Nominal diameter	Reference outer diameter of copper pipe jointed (mm)	Minimum joint thickness (mm)
1/4	6.35	0.50
3/8	9.52	0.60
1/2	12.70	0.70
5/8	15.88	0.80

## 3-2-2. Processing of Piping Materials

When performing the refrigerant piping installation, care should be taken to ensure that water or dust does not enter the pipe interior, that no other oil than lubricating oils used in the installed air-water heat pump is used, and that refrigerant does not leak. When using lubricating oils in the piping processing, use such lubricating oils whose water content has been removed. When stored, be sure to seal the container with an airtight cap or any other cover.

### 1. Flare processing procedures and precautions

#### a) Cutting the Pipe

By means of a pipe cutter, slowly cut the pipe so that it is not deformed.

#### b) Removing Burrs and Chips

If the flared section has chips or burrs, refrigerant leakage may occur.

Carefully remove all burrs and clean the cut surface before installation.

#### c) Insertion of Flare Nut

d) Flare Processing

Make certain that a clamp bar and copper pipe have been cleaned.

By means of the clamp bar, perform the flare processing correctly.

Use either a flare tool for R32 or conventional flare tool.

Flare processing dimensions differ according to the type of flare tool. When using a conventional flare tool, be sure to secure "dimension A" by using a gauge for size adjustment.

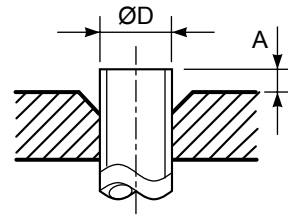


Fig. 3-2-1 Flare processing dimensions

Table 3-2-3 Dimensions related to flare processing for R32(R410A)

Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R32 clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0 to 0.5	1.0 to 1.5	1.5 to 2.0
3/8	9.52	0.8	0 to 0.5	1.0 to 1.5	1.5 to 2.0
1/2	12.70	0.8	0 to 0.5	1.0 to 1.5	2.0 to 2.5
5/8	15.88	1.0	0 to 0.5	1.0 to 1.5	2.0 to 2.5

Table 3-2-4 Dimensions related to flare processing for R22

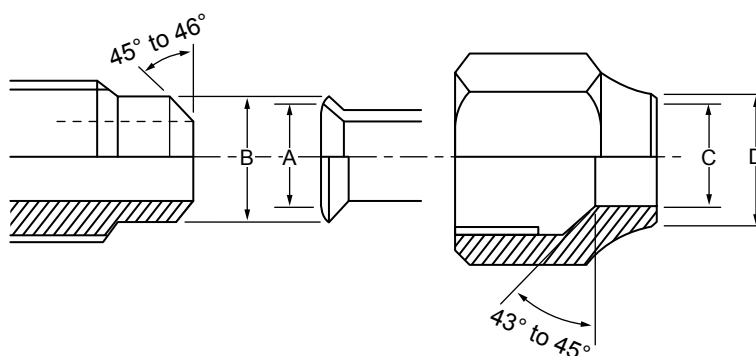
Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R22 clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0 to 0.5	0.5 to 1.0	1.0 to 1.5
3/8	9.52	0.8	0 to 0.5	0.5 to 1.0	1.0 to 1.5
1/2	12.70	0.8	0 to 0.5	0.5 to 1.0	1.5 to 2.0
5/8	15.88	1.0	0 to 0.5	0.5 to 1.0	1.5 to 2.0

Table 3-2-5 Flare and flare nut dimensions for R32(R410A)

Nominal diameter	Outer diameter (mm)	Thickness (mm)	Dimension (mm)				Flare nut width (mm)
			A	B	C	D	
1/4	6.35	0.8	9.1	9.2	6.5	13	17
3/8	9.52	0.8	13.2	13.5	9.7	20	22
1/2	12.70	0.8	16.6	16.0	12.9	23	26
5/8	15.88	1.0	19.7	19.0	16.0	25	29

**Table 3-2-6 Flare and flare nut dimensions for R22**

Nominal diameter	Outer diameter (mm)	Thickness (mm)	Dimension (mm)				Flare nut width (mm)
			A	B	C	D	
1/4	6.35	0.8	9.0	9.2	6.5	13	17
3/8	9.52	0.8	13.0	13.5	9.7	20	22
1/2	12.70	0.8	16.2	16.0	12.9	20	24
5/8	15.88	1.0	19.7	19.0	16.0	23	27
3/4	19.05	1.0	23.3	24.0	19.2	34	36



**Fig. 3-2-2 Relations between flare nut and flare seal surface**

## 2. Flare Connecting Procedures and Precautions

- Make sure that the flare and union portions do not have any scar or dust, etc.
- Correctly align the processed flare surface with the union axis.
- Tighten the flare with designated torque by means of a torque wrench. The tightening torque for R32 is the same as that for conventional R22. Incidentally, when the torque is weak, the gas leakage may occur. When it is strong, the flare nut may crack and may be made non-removable. When choosing the tightening torque, comply with values designated by manufacturers. Table 3-2-7 shows reference values.

### NOTE :

When applying oil to the flare surface, be sure to use oil designated by the manufacturer.  
If any other oil is used, the lubricating oils may deteriorate and cause the compressor to burn out.

**Table 3-2-7 Tightening torque of flare for R32(R410A) [Reference values]**

Nominal diameter	Outer diameter (mm)	Tightening torque N•m (kgf•cm)	Tightening torque of torque wrenches available on the market N•m (kgf•cm)
1/4	6.35	14 to 18 (140 to 180)	16 (160), 18 (180)
3/8	9.52	33 to 42 (330 to 420)	42 (420)
1/2	12.70	50 to 62 (500 to 620)	55 (550)
5/8	15.88	63 to 77 (630 to 770)	65 (650)

### 3-3. Tools

#### 3-3-1. Required Tools

The service port diameter of packed valve of the outdoor unit in the air-water heat pump using R32 is changed to prevent mixing of other refrigerant. To reinforce the pressure-resisting strength, flare processing dimensions and opposite side dimension of flare nut (For Ø12.7 copper pipe) of the refrigerant piping are lengthened.

The used refrigerating oil is changed, and mixing of oil may cause a trouble such as generation of sludge, clogging of capillary, etc. Accordingly, the tools to be used are classified into the following three types.

1. Tools exclusive for R32 (Those which cannot be used for conventional refrigerant (R22))
2. Tools exclusive for R32, but can be also used for conventional refrigerant (R22)
3. Tools commonly used for R32 and for conventional refrigerant (R22)

The table below shows the tools exclusive for R32 and their interchangeability.

#### Tools exclusive for R32 (The following tools for R410A are required.)

Tools whose specifications are changed for R32 and their interchangeability

No.	Used tool	Usage	R32(R410A) air-water heat pump installation		Conventional air-water heat pump installation
			Existence of new equipment for R32	Whether conven- tional equipment can be used	Whether new equipment can be used with conventional refrigerant
1	Flare tool	Pipe flaring	Yes	*(Note 1)	○
2	Copper pipe gauge for adjusting projection margin	Flaring by conventional flare tool	Yes	*(Note 1)	*(Note 1)
3	Torque wrench (For Ø12.7)	Connection of flare nut	Yes	×	×
4	Gauge manifold	Evacuating, refrigerant charge, run check, etc.	Yes	×	×
5	Charge hose				
6	Vacuum pump adapter	Vacuum evacuating	Yes	×	○
7	Electronic balance for refrigerant charging	Refrigerant charge	Yes	×	○
8	Leakage detector	Gas leakage check	Yes	×	○

**(Note 1)** When flaring is carried out for R32(R410A) using the conventional flare tools, adjustment of projection margin is necessary. For this adjustment, a copper pipe gauge, etc. are necessary.

#### General tools (Conventional tools can be used.)

In addition to the above exclusive tools, the following equipments which serve also for R22 are necessary as the general tools.

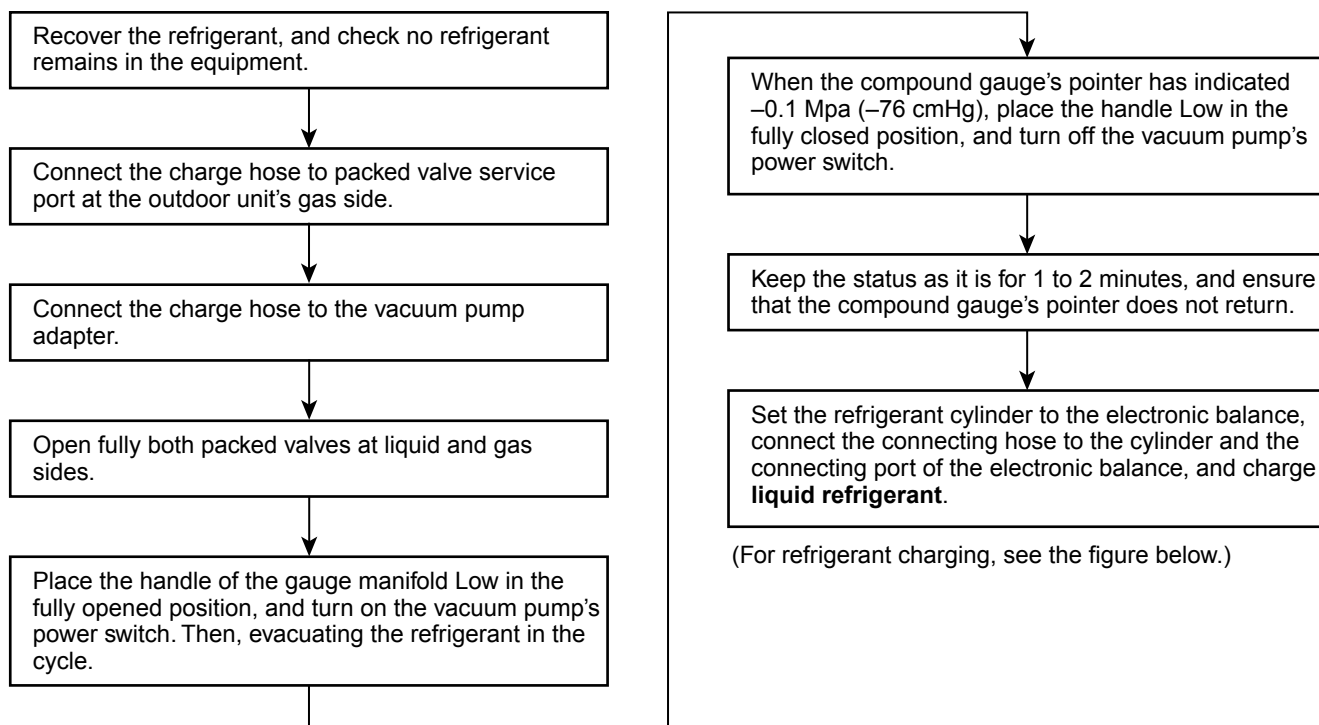
- |  |                             |   |
|--|-----------------------------|---|
| 1. Vacuum pump<br>Use vacuum pump by attaching<br>vacuum pump adapter. | 4. Reamer                   | 9. Hole core drill (Ø65)                  |
| 2. Torque wrench (For Ø6.35, Ø9.52)                                    | 5. Pipe bender              | 10. Hexagon wrench<br>(Opposite side 4mm) |
| 3. Pipe cutter   | 6. Level vial               | 11. Tape measure                          |
|  | 7. Screwdriver (+, -)       | 12. Metal saw                             |
|  | 8. Spanner or Monkey wrench |   |

Also prepare the following equipments for other installation method and run check.

- |                |                                 |
|----------------|---------------------------------|
| 1. Clamp meter | 3. Insulation resistance tester |
| 2. Thermometer | 4. Electroscop                  |

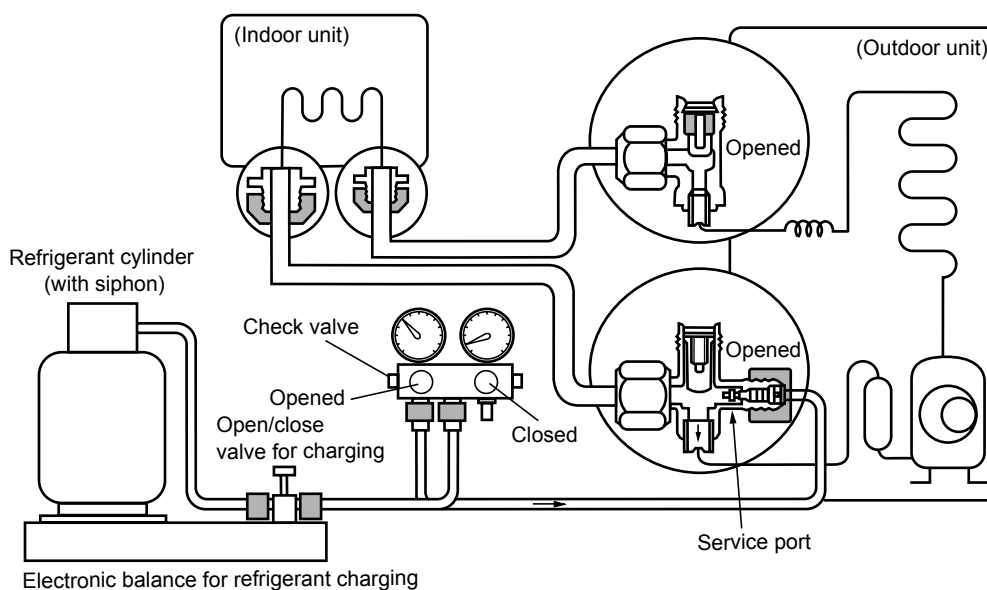
### 3-4. Recharging of Refrigerant

When it is necessary to recharge refrigerant, charge the specified amount of new refrigerant according to the following steps.



1. Never charge refrigerant exceeding the specified amount.
2. If the specified amount of refrigerant cannot be charged, charge refrigerant **bit by bit** in COOL mode.
3. Do not carry out additional charging.

When additional charging is carried out if refrigerant leaks, the refrigerant composition changes in the refrigeration cycle, that is characteristics of the air conditioner changes, refrigerant exceeding the specified amount is charged, and working pressure in the refrigeration cycle becomes abnormally high pressure, and may cause a rupture or personal injury.



**Fig. 3-4-1 Configuration of refrigerant charging**



1. Be sure to make setting so that **liquid** can be charged.
2. When using a cylinder equipped with a siphon, liquid can be charged without turning it upside down.

Accordingly, when charging refrigerant from the refrigerant cylinder to the equipment, charge it turning the cylinder upside down if cylinder is not equipped with siphon.

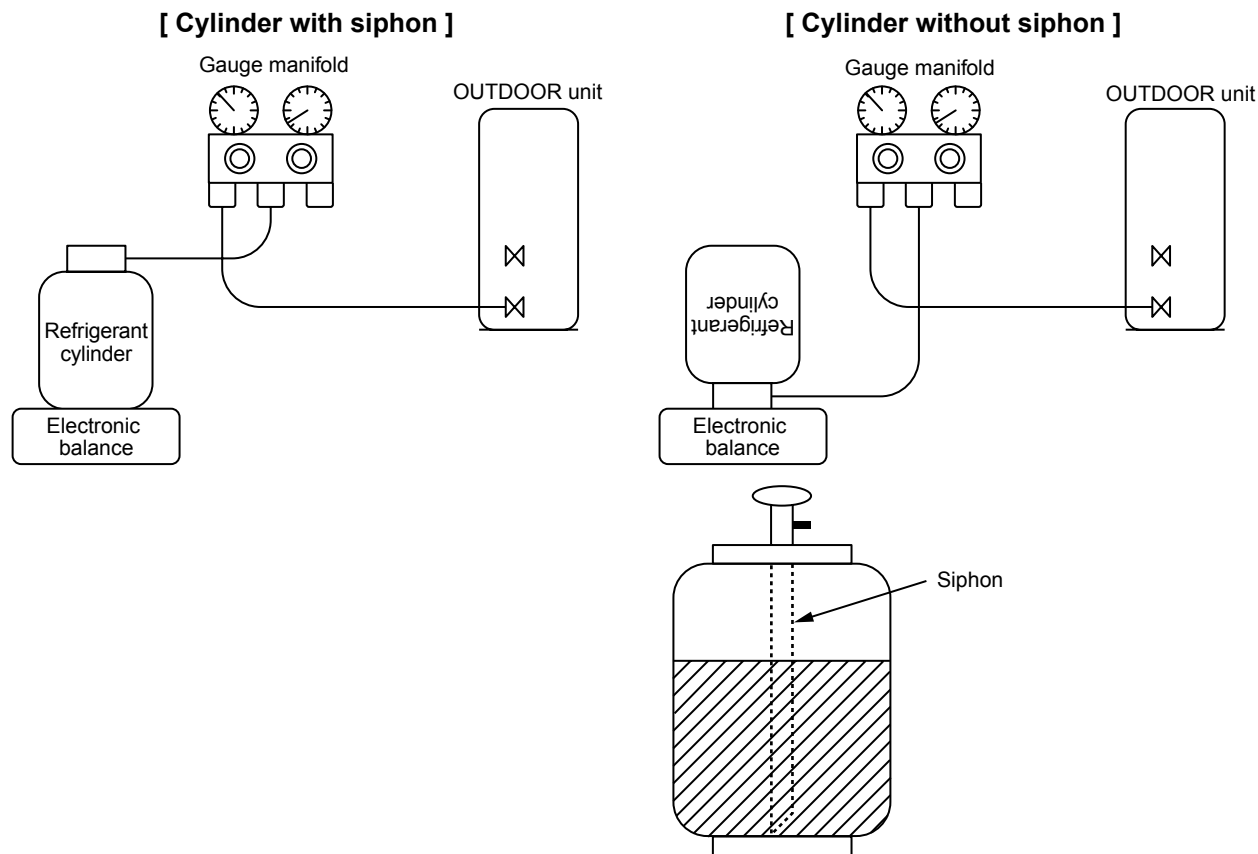


Fig. 3-4-2

### 3-5. Brazing of Pipes

#### 3-5-1. Materials for Brazing

##### 1. Silver brazing filler

Silver brazing filler is an alloy mainly composed of silver and copper. It is used to join iron, copper or copper alloy, and is relatively expensive though it excels in solderability.

##### 2. Phosphor bronze brazing filler

Phosphor bronze brazing filler is generally used to join copper or copper alloy.

##### 3. Low temperature brazing filler

Low temperature brazing filler is generally called solder, and is an alloy of tin and lead. Since it is weak in adhesive strength, do not use it for refrigerant pipes.

1. Phosphor bronze brazing filler tends to react with sulfur and produce a fragile compound water solution, which may cause a gas leakage. Therefore, use any other type of brazing filler at a hot spring resort, etc., and coat the surface with a paint.
2. When performing brazing again at time of servicing, use the same type of brazing filler.

#### 3-5-2. Flux

##### 1. Reason why flux is necessary

- By removing the oxide film and any foreign matter on the metal surface, it assists the flow of brazing filler.
- In the brazing process, it prevents the metal surface from being oxidized.
- By reducing the brazing filler's surface tension, the brazing filler adheres better to the treated metal.

## 2. Characteristics required for flux

- Activated temperature of flux coincides with the brazing temperature.
- Due to a wide effective temperature range, flux is hard to carbonize.
- It is easy to remove slag after brazing.
- The corrosive action to the treated metal and brazing filler is minimum.
- It excels in coating performance and is harmless to the human body.

As the flux works in a complicated manner as described above, it is necessary to select an adequate type of flux according to the type and shape of treated metal, type of brazing filler and brazing method, etc.

## 3. Types of flux

### • Noncorrosive flux

Generally, it is a compound of borax and boric acid.

It is effective in case where the brazing temperature is higher than 800°C.

### • Activated flux

Most of fluxes generally used for silver brazing are this type.

It features an increased oxide film removing capability due to the addition of compounds such as potassium fluoride, potassium chloride and sodium fluoride to the borax-boric acid compound.

## 4. Piping materials for brazing and used brazing filler/flux

Piping material	Used brazing filler	Used flux
Copper - Copper	Phosphor copper	Do not use
Copper - Iron	Silver	Paste flux
Iron - Iron	Silver	Vapor flux

1. Do not enter flux into the refrigeration cycle.
2. When chlorine contained in the flux remains within the pipe, the lubricating oil deteriorates. Therefore, use a flux which does not contain chlorine.
3. When adding water to the flux, use water which does not contain chlorine (e.g. distilled water or ion-exchange water).
4. Remove the flux after brazing.

## 3-5-3. Brazing

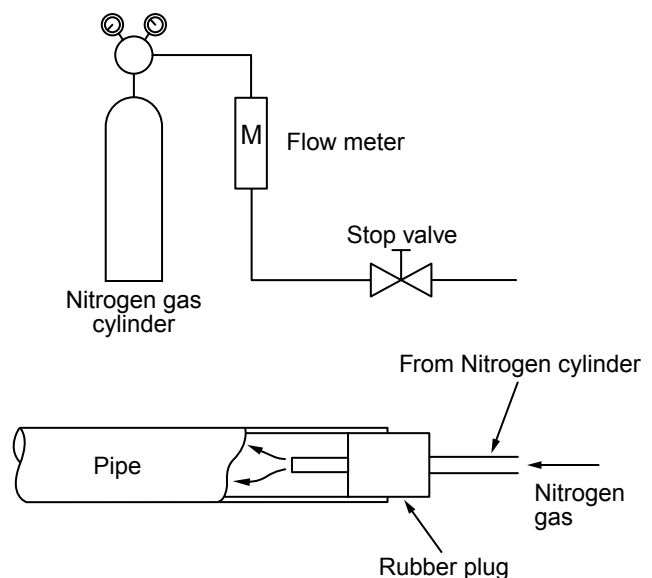
As brazing work requires sophisticated techniques, experiences based upon a theoretical knowledge, it must be performed by a person qualified.

In order to prevent the oxide film from occurring in the pipe interior during brazing, it is effective to proceed with brazing while letting dry Nitrogen gas (N<sub>2</sub>) flow.

**Never use gas other than Nitrogen gas.**

### 1. Brazing method to prevent oxidation

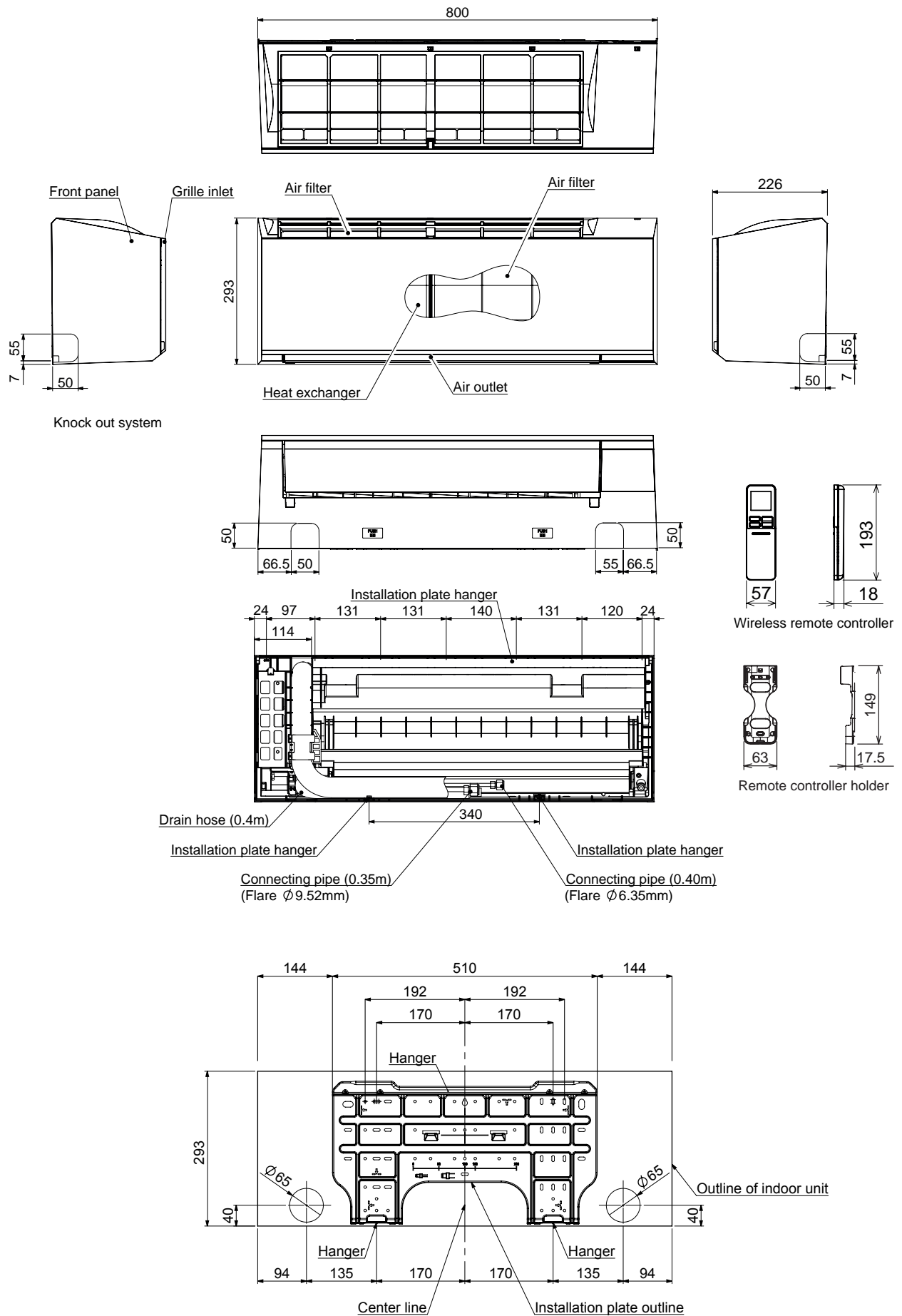
- 1) Attach a reducing valve and a flow-meter to the Nitrogen gas cylinder.
- 2) Use a copper pipe to direct the piping material, and attach a flow-meter to the cylinder.
- 3) Apply a seal onto the clearance between the piping material and inserted copper pipe for Nitrogen in order to prevent backflow of the Nitrogen gas.
- 4) When the Nitrogen gas is flowing, be sure to keep the piping end open.
- 5) Adjust the flow rate of Nitrogen gas so that it is lower than 0.05 m<sup>3</sup>/Hr or 0.02 MPa (0.2kgf/cm<sup>2</sup>) by means of the reducing valve.
- 6) After performing the steps above, keep the Nitrogen gas flowing until the pipe cools down to a certain extent (temperature at which pipes are touchable with hands).
- 7) Remove the flux completely after brazing.



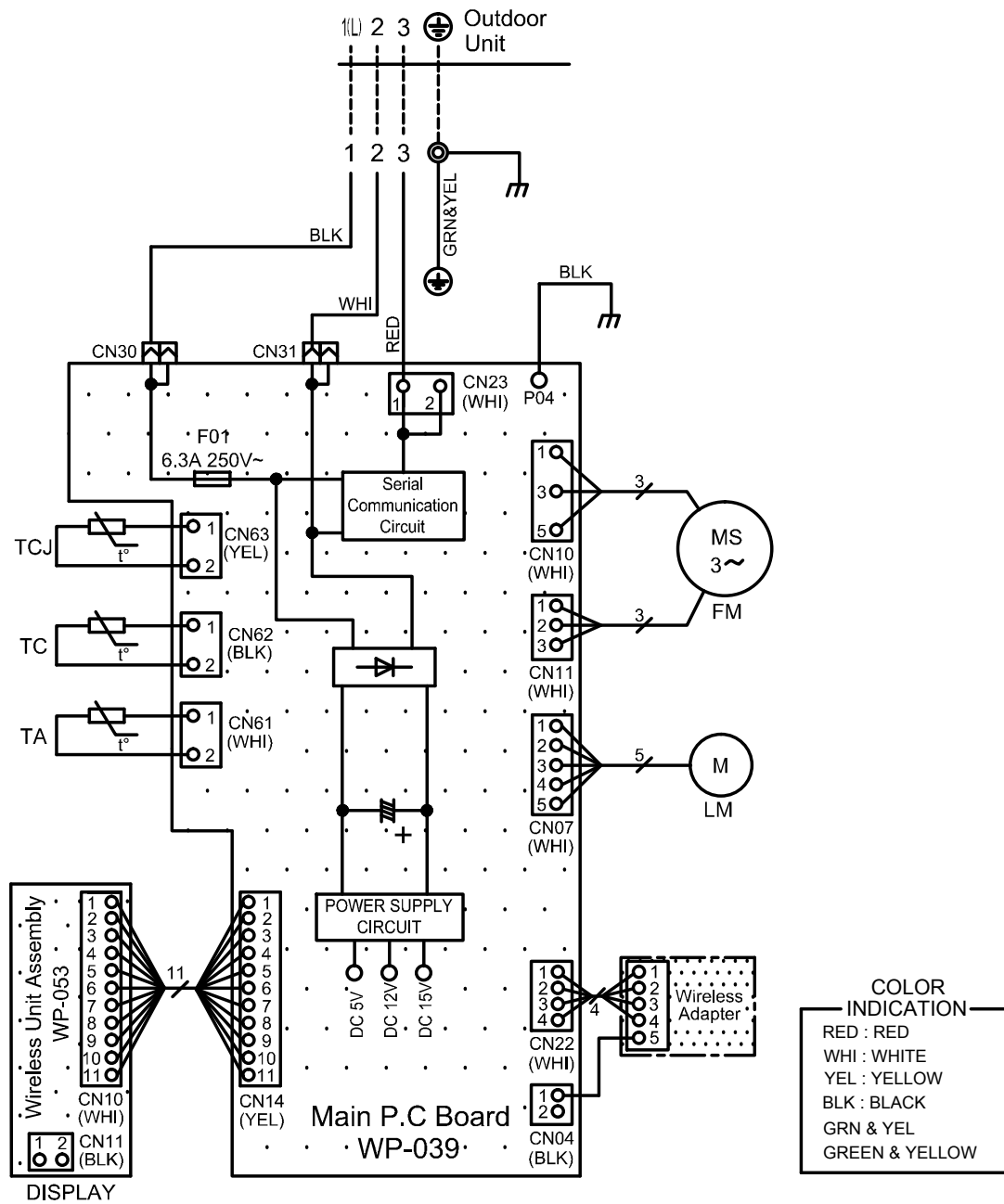
**Fig. 3-5-1 Prevention of oxidation during brazing**

## 4. CONSTRUCTION VIEWS

### 4-1. Indoor Unit



## 5. WIRING DIAGRAM



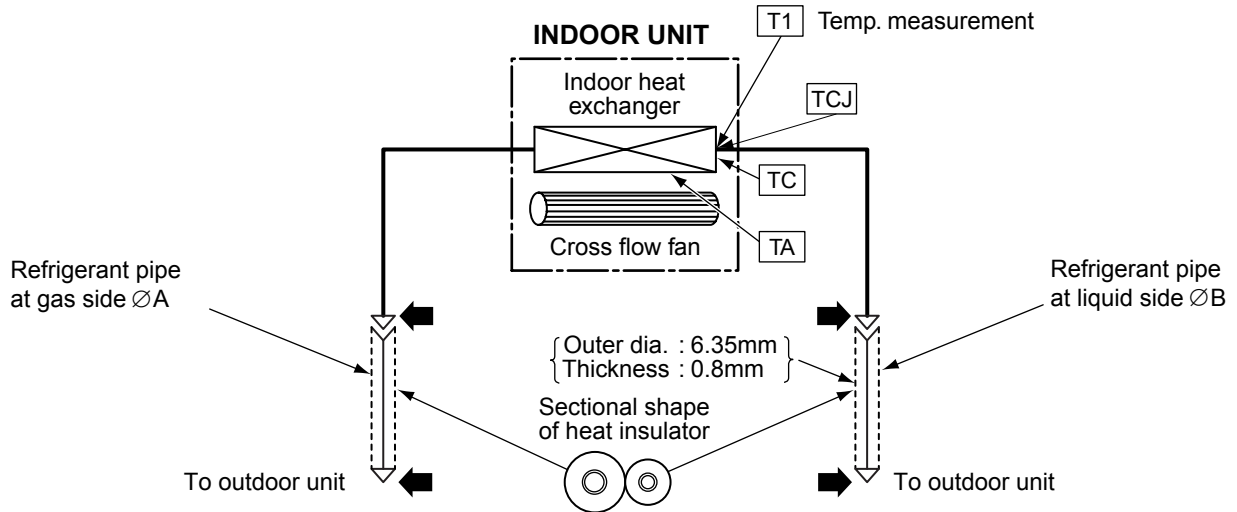
## 6. SPECIFICATIONS OF ELECTRICAL PARTS

### 6-1. Indoor Unit

No.	Parts name	Type	Specificat
1	Fan Motor (for indoor)	SJM-240-25	AC 220~240V, 25W
2	Room temp. sensor (TA-sensor)	(-)	10kΩ at 25°C
3	Heat exchanger temp. sensor (TC-sensor)	(-)	10kΩ at 25°C
4	Heat exchanger temp. sensor (TCJ-sensor)	(-)	10kΩ at 25°C
5	Louver motor	24BYJ48-ST	Output (Rated) 4 phase, DC12V

## 7. REFRIGERANT CYCLE DIAGRAM

### 7-1. Refrigerant Cycle Diagram

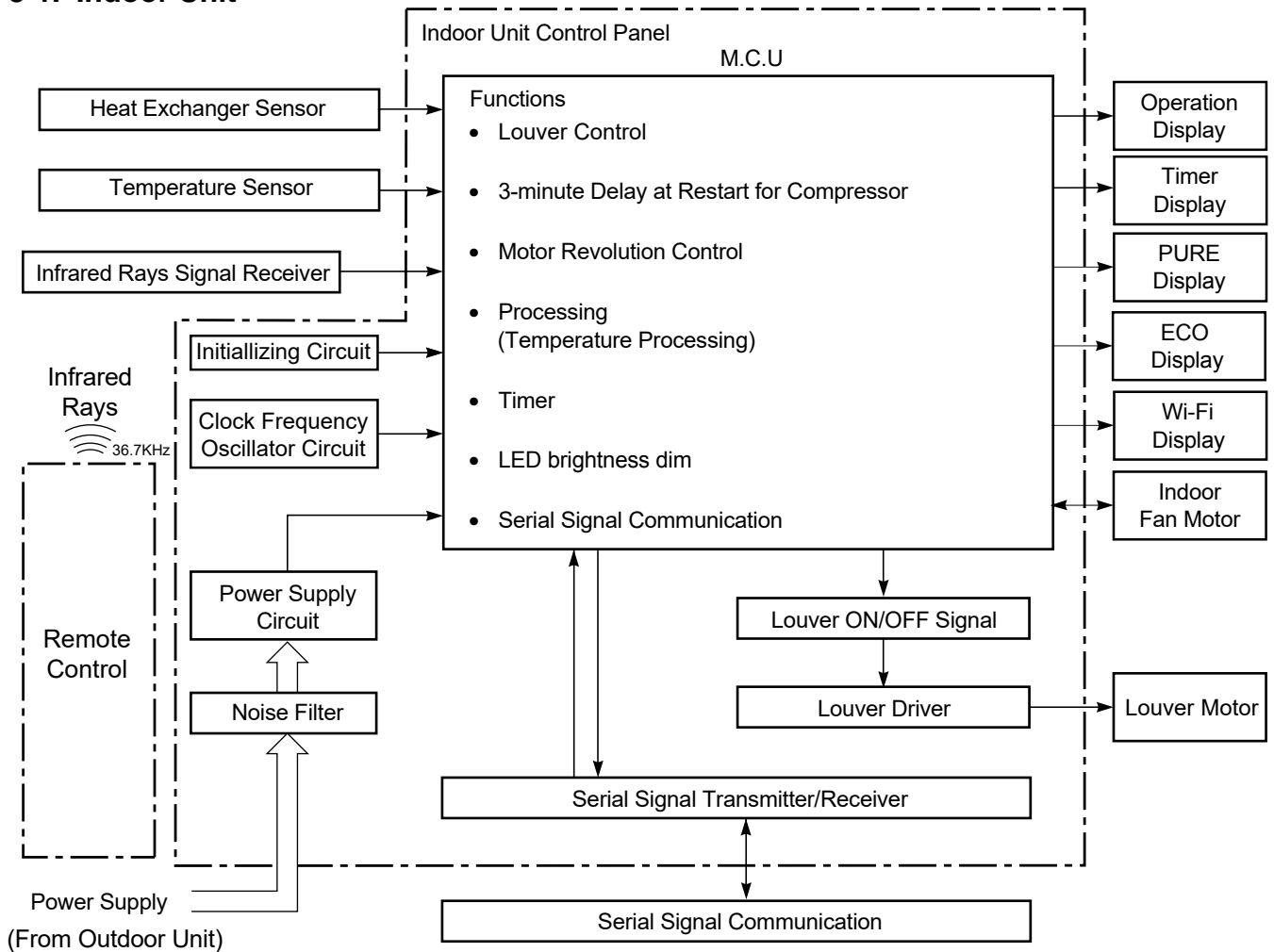


**Dimension table**

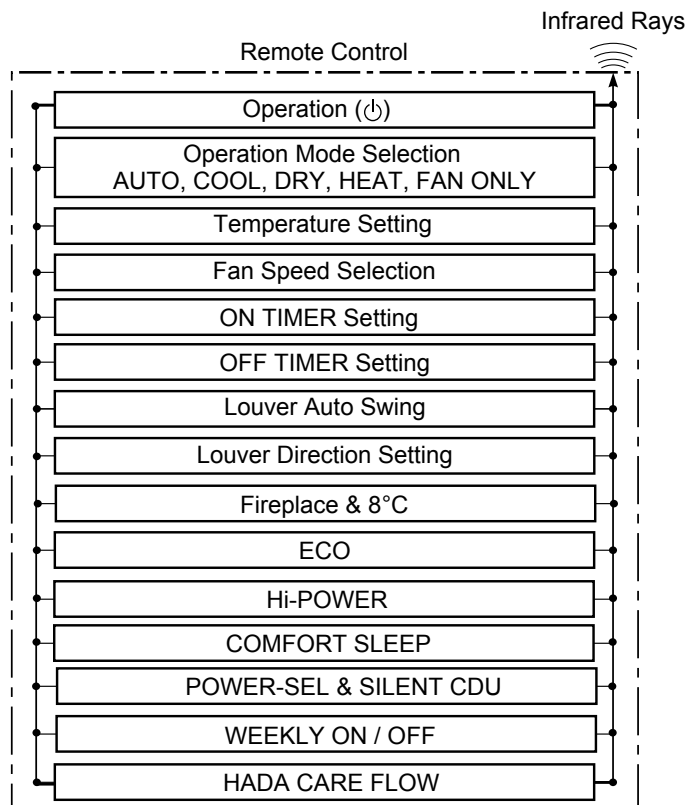
Indoor unit	Outer diameter of refrigerant pipe (mm)	
	Gas side $\varnothing A$	Liquid side $\varnothing B$
RAS-M05J2KVSG-E RAS-M05N4KVSG-E	9.52	6.35

## 8. CONTROL BLOCK DIAGRAM

### 8-1. Indoor Unit



### REMOTE CONTROL



## 9. OPERATION DESCRIPTION

### 9-1. Outline of Air Conditioner Control

This air conditioner is a capacity-variable type air conditioner. Its system can control the speed of compressor motor according to load. The drive circuit for the indoor motor is mounted in the indoor unit. The drive circuits for outdoor motor and compressor are mounted in the outdoor unit.

The entire air conditioner is mainly controlled by the indoor unit controller. The indoor unit controller drives the indoor fan motor based upon command sent from the remote controller. Moreover, it also determines required speed of compressor motor and then transfers the operation command to the outdoor unit controller.

The outdoor unit controller receives operation command from the indoor unit and controls revolution speed of the compressor motor.

The outdoor unit controller controls speed of compressor motor by controlling output voltage of the inverter and switching timing of supply power (current transfer timing), so that compressor motor operates according to the operation command. And then, the outdoor unit controller transfers the operating status back to the indoor unit controller.

**As the compressor adopts six-pole brushless DC motor, the frequency of the supply power from inverter to compressor is three-times cycles of the actual number of revolution.**

#### 1. Role of indoor unit controller

The indoor unit controller judges the operation commands from the remote controller and assumes the following functions.

- Judgment of suction air temperature of the indoor heat exchanger by using the indoor temp. sensor. (TA sensor)
- Judgment of the indoor heat exchanger temperature by using heat exchanger sensor (TC sensor) (Prevent-freezing control, etc.)
- Louver motor control
- Indoor fan motor operation control
- LED (Light Emitting Diode) display control
- Transferring of operation command signal (Serial signal) to the outdoor unit
- Reception of information of operation status (Serial signal including outside temp. data) from the outdoor unit and judgment/display of error

#### 2. Role of outdoor unit controller

Receiving the operation command signal (Serial signal) from the indoor unit controller, the outdoor unit performs compressor operation control as followed to judgment of serial signal from indoor side.

- Detection of inverter input current and current release operation
- Over-current detection and prevention operation to IGBT module (Compressor stop function)
- Compressor and outdoor fan stop function when serial signal is off (when the serial signal does not reach the board assembly of outdoor control by trouble of the signal system)
- Transferring of operation information (Serial signal) from outdoor unit controller to indoor unit controller
- Detection of outdoor temperature and operation revolution control
- Defrost control in heating operation (Temp. measurement by outdoor heat exchanger and control for 4-way valve and outdoor fan)

#### 3. Contents of operation command signal (Serial signal) from indoor unit controller to outdoor unit controller

The following three types of signals are sent from the indoor unit controller.

- Operation mode set on the remote controller
- Compressor revolution command signal defined by indoor temperature and set temperature (Correction along with variation of room temperature and correction of indoor heat exchanger temperature are added.)
- Temperature of indoor heat exchanger
- For these signals ([Operation mode] and [Compressor revolution] indoor heat exchanger temperature), the outdoor unit controller monitors the input current to the inverter, and performs the followed operation within the range that current does not exceed the allowable value.

#### 4. Contents of operation command signal (Serial signal) from outdoor unit controller to indoor unit controller

The following signals are sent from the outdoor unit controller.

- The current operation mode
  - The current compressor revolution
  - Outdoor temperature
  - Existence of protective circuit operation
- For transferring of these signals, the indoor unit controller monitors the contents of signals, and judges existence of trouble occurrence. Contents of judgment are described below.
- Whether distinction of the current operation status meets to the operation command signal
  - Whether protective circuit operates
- When no signal is received from the outdoor unit controller, it is assumed as a trouble.



## 9-2. Operation Description

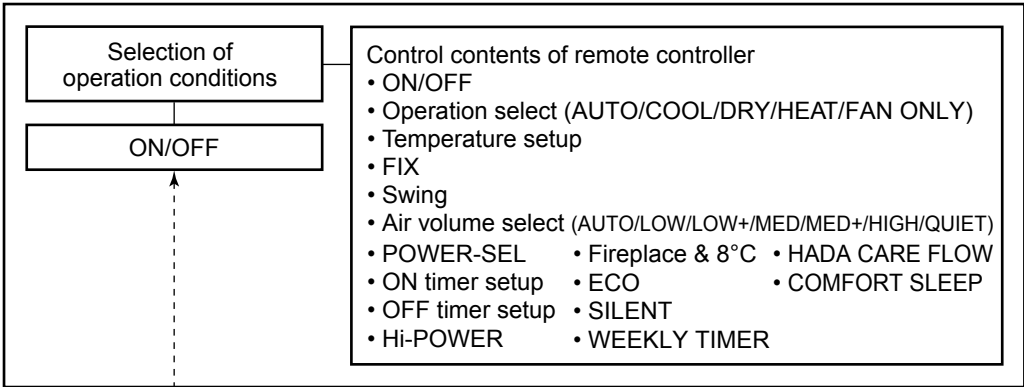
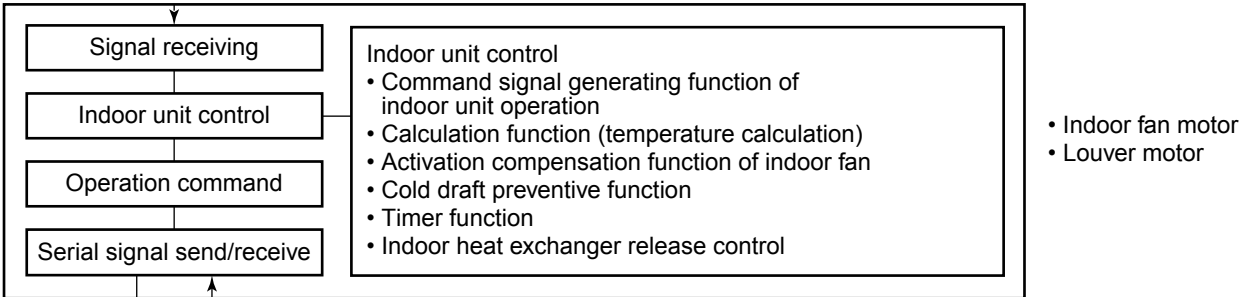
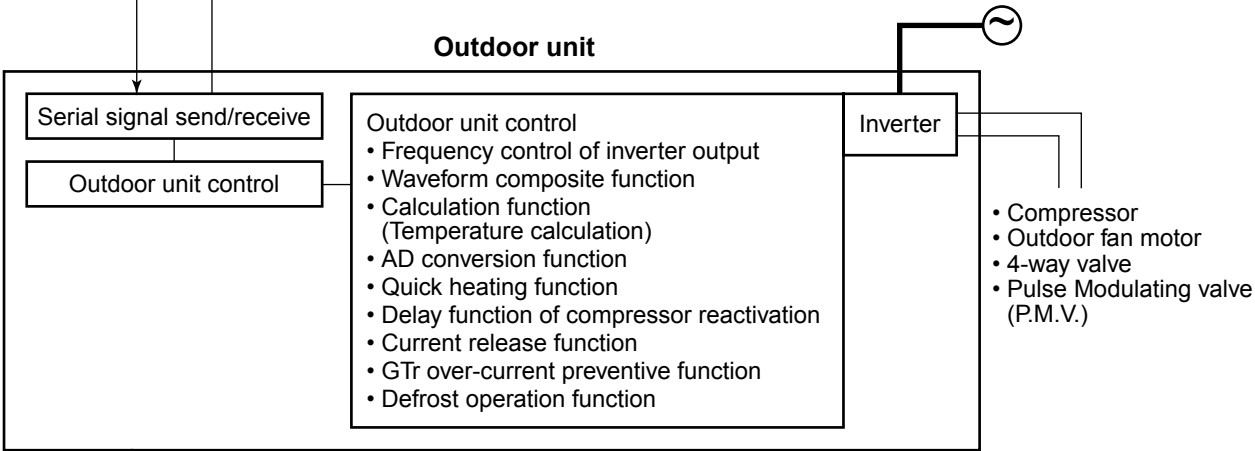
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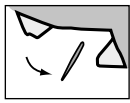


Item	Operation flow and applicable data, etc.	Description
1. Basic operation	<p><b>1. Operation control</b></p> <p>Receiving the user's operation condition setup, the operation statuses of indoor/outdoor units are controlled.</p> <ol style="list-style-type: none"> <li>1) The operation conditions are selected by the remote controller as shown in the below.</li> <li>2) A signal is sent by ON button of the remote controller.</li> <li>3) The signal is received by a sensor of the indoor unit and processed by the indoor controllers as shown in the below.</li> <li>4) The indoor controller controls the indoor fan motor and louver motor.</li> <li>5) The indoor controller sends the operation command to the outdoor controller, and sends/receives the control status with a serial signal.</li> <li>6) The outdoor controller controls the operation as shown in the left, and also controls the compressor, outdoor fan motor, 4-way valve and pulse Modulating valve.</li> </ol> <p style="text-align: center;"><b>Remote controller</b></p>  <p style="text-align: center;"><b>Indoor unit</b></p>  <p style="text-align: center;"><b>Outdoor unit</b></p> 	

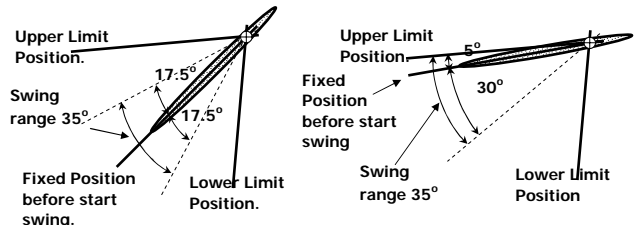
Item	Operation flow and applicable data, etc.	Description
1. Basic operation	<b>2. Cooling/Heating operation</b> <p>The operations are performed in the following parts by controls according to cooling/heating conditions.</p> <ol style="list-style-type: none"> <li>1) Receiving the operation ON signal of the remote controller, the cooling or heating operation signal starts being transferred from the indoor controller to the outdoor unit.</li> <li>2) At the indoor unit side, the indoor fan is operated according to the contents of "<b>2. Indoor fan motor control</b>" and the louver according to the contents of "<b>9. Louver control</b>", respectively.</li> <li>3) The outdoor unit controls the outdoor fan motor, compressor, pulse Modulating valve and 4-way valve according to the operation signal sent from the indoor unit.</li> </ol>	
	<b>3. AUTO operation</b> <p>Selection of operation mode  As shown in the following figure, the operation starts by selecting automatically the status of room temperature (<math>T_a</math>) when starting AUTO operation.</p> <p>*1. When reselecting the operation mode, the fan speed is controlled by the previous operation mode.</p>	<ol style="list-style-type: none"> <li>1) Detects the room temperature (<math>T_a</math>) when the operation started.</li> <li>2) Selects an operation mode from <math>T_a</math> in the left figure.</li> <li>3) Fan operation continues until an operation mode is selected.</li> <li>4) When AUTO operation has started within 2 hours after heating operation stopped and if the room temperature is 20°C or more, the fan operation is performed with "Super Ultra LOW" mode for 3 minutes. Then, select an operation mode.</li> <li>5) If the status of compressor-OFF continues for 15 minutes the room temperature after selecting an operation mode (COOL/HEAT), reselect an operation mode.</li> </ol>
	<b>4. DRY operation</b> <p>DRY operation is performed according to the difference between room temperature and the setup temperature as shown below.</p> <p>In DRY operation, fan speed is controlled in order to prevent lowering of the room temperature and to avoid air flow from blowing directly to persons.</p>	<ol style="list-style-type: none"> <li>1) Detects the room temperature (<math>T_a</math>) when the DRY operation started.</li> <li>2) Starts operation under conditions in the left figure according to the temperature difference between the room temperature and the setup temperature (<math>T_{sc}</math>).  Setup temperature (<math>T_{sc}</math>) = Set temperature on remote controller (<math>T_s</math>) + (0.0 to 1.0)</li> <li>3) When the room temperature is lower 1°C or less than the setup temperature, turn off the compressor.</li> </ol>


Item	Operation flow and applicable data, etc.	Description													
2. Indoor fan motor control	<b>&lt;In cooling operation&gt;</b> (This operation controls the fan speed at indoor unit side.) The indoor fan (cross flow fan) is operated by the phase-control induction motor. The fan rotates in 5 stages in MANUAL mode, and in 5 stages in AUTO mode, respectively. (Table 1)	<div><b>* Symbols</b> UH : Ultra High H : High M+ : Medium+ M : Medium L+ : Low+ L : Low L- : Low- UL : Ultra Low SUL : Super Ultra Low</div> <p>* The fan speed broadly varies due to position of the louver, etc. The described value indicates one under condition of inclining downward blowing.</p> <p>1) When setting the fan speed to L, L+, M, M+ or H on the remote controller, the operation is performed with the constant speed shown in Fig. 1.</p> <p>2) When setting the fan speed to AUTO on the remote controller, revolution of the fan motor is controlled to the fan speed level shown in Fig. 2 and Table 1 according to the setup temperature, room temperature, and heat exchanger temperature.</p>													
	<div><div>COOL ON</div><div>Fan speed setup</div><div>AUTO</div></div> <div><div>MANUAL</div><div><table><tr><th>Indication</th><th>Fan speed</th></tr><tr><td>L </td><td>W7</td></tr><tr><td>L+ </td><td>(L + M) / 2</td></tr><tr><td>M </td><td>WA</td></tr><tr><td>M+ </td><td>(M + H) / 2</td></tr><tr><td>H </td><td>WD</td></tr></table></div></div> <div>(Fig. 1)</div>		Indication	Fan speed	L	W7	L+	(L + M) / 2	M	WA	M+	(M + H) / 2	H	WD	
	Indication		Fan speed												
	L		W7												
L+	(L + M) / 2														
M	WA														
M+	(M + H) / 2														
H	WD														
<div><div><div>Ta [°C]</div><div></div></div><div><div>Air volume AUTO</div><div>M+(WC)</div><div>*3</div><div>*4</div><div>*5</div><div>L(W7)</div></div><div><div>*3 : Fan speed = (M + -L) x 3/4 + L</div><div>*4 : Fan speed = (M + -L) x 2/4 + L</div><div>*5 : Fan speed = (M + -L) x 1/4 + L</div><div>(Linear approximation from M+ and L)</div></div><div>(Fig. 2)</div></div>															


(Table 1) Indoor fan air flow rate							
Fan speed level	Mode			Cooling		Heating	
	Cool	Heat	Dry	Fan speed (rpm)	Air flow rate (m³/h)	Fan speed (rpm)	Air flow rate (m³/h)
WF		UH		950	529	900	495
WE	UH	H		950	529	900	495
WD	H	M+	UH	900	495	850	455
WC	M+		H	850	455	800	416
WB		M	M+	800	416	740	373
WA	M		M	700	343	700	343
W9		L+		650	316	650	316
W8	L+	L	L+	630	310	570	266
W7	L	L-		550	240	550	246
W6	L-		L	530	227	530	227
W5	UL	UL	L-	520	212	520	212
W4			UL	510	206	510	206
W3	SUL		SUL/SL-	510	206	510	206
W2		SUL		500	198	510	206
W1				500	198	500	198



Item	Operation flow and applicable data, etc.	Description
3. Capacity control	<p>The cooling capacity depending on the load is adjusted. According to difference between the setup value of temperature and the room temperature, the capacity is adjusted by the compressor revolution.</p> <pre> graph TD     subgraph Remote_controller [Remote controller]         Ts[Set temp. (Ts)]     end     subgraph Indoor_unit [Indoor unit]         Ta[Room temp. (Ta)]     end     Ts --&gt; Diff[Ts - Ta]     Ta --&gt; Diff     Diff --&gt; Hz[Correction of Hz signal]     Hz --&gt; EMF[Detection of electromotive force of compressor motor winding]     EMF --&gt; Speed[Detection of motor speed and rotor position]     Speed --&gt; Hz2[Correction value of Hz signal ≤ Operating Hz]     Hz2 --&gt; Inverter[Inverter output change Commutation timing change]     Inverter --&gt; Speed2[Change of compressor speed]           </pre>	<ol style="list-style-type: none"> <li>1) The difference between set temperature on remote controller (Ts) and room temperature (Ta) is calculated.</li> <li>2) According to the temperature difference, the correction value of Hz signal which determines the compressor speed is set up.</li> <li>3) The rotating position and speed of the motor are detected by the electromotive force occurred on the motor winding with operation of the compressor.</li> <li>4) According to the difference resulted from comparison of the correction value of Hz signal with the present operation Hz, the inverter output and the commutation timing are varied.</li> <li>5) Change the compressor motor speed by outputting power to the compressor.</li> </ol> <p>* The contents of control operation are same in cooling operation.</p>
4. Release protective control by temperature of indoor heat exchanger	<p><b>&lt;In cooling/dry operation&gt;</b> (Prevent-freezing control for indoor heat exchanger) In cooling/dry operation, the sensor of indoor heat exchanger detects evaporation temperature and controls the compressor speed so that temperature of the heat exchanger does not exceed the specified value.</p>	<ol style="list-style-type: none"> <li>1) When temperature of the indoor heat exchanger drops below 5°C, the compressor speed is reduced. (P zone)</li> <li>2) When temperature of the indoor heat exchanger rises in the range from 6°C to under 7°C, the compressor speed is kept. (Q zone)</li> <li>3) When temperature of the indoor heat exchanger rises to 7°C or higher, the capacity control operation returns to the usual control in cooling operation. (R zone)</li> </ol>

Item	Operation flow and applicable data, etc.	Description
<b>5. Louver control</b>  1) Louver position	<p>This function controls the air direction of the indoor unit.</p> <ul style="list-style-type: none"><li>• The position is automatically controlled according to the operation mode.</li><li>• The set louver position is stored in memory by the microcomputer, and the louver returns to the stored position when the next operation is performed.</li></ul> <p>The angle of the louver is indicated as the louver closes fully is 0°.</p> <p>1) Louver position</p> <div><div>Cooling operation/ AUTO (COOL)</div><div></div><div>Initial setting of "Cooling storage position" Louver : Directs downward (39.5°)</div></div>	
  2) Air directionadjustment	<div><div>Air direction</div><div><div>Horizontal blowing</div><div>Inclined blowing</div><div>Blowing downward</div><div>Inclined blowing</div><div>Horizontal blowing</div></div><div></div></div>	<ul style="list-style-type: none"><li>• The louver position can be arbitrarily set up by pressing [FIX] button.</li></ul>

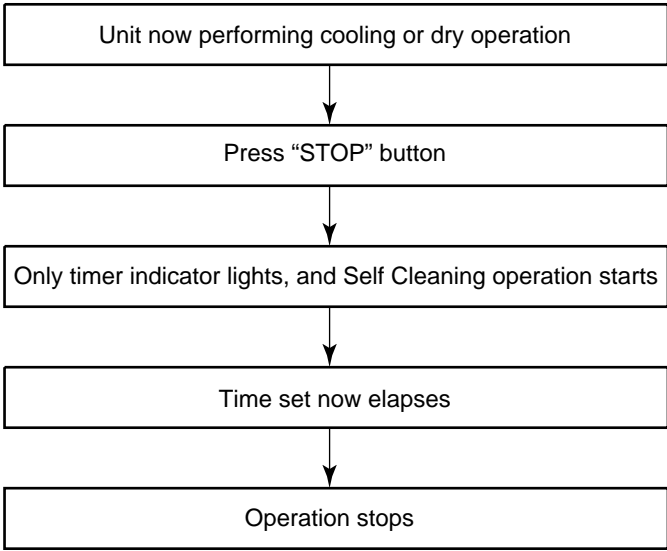
Item	Operation flow and applicable data, etc.	Description
<b>5. Louver control</b>  3) Swing	<ul style="list-style-type: none"> <li>• Swing operation is performed in range 35° with the Fixed position as the center.</li> <li>• If the swing range exceeded either upper or lower limit position, swing operation is performed in range 35° from the limit.</li> </ul> 	<ul style="list-style-type: none"> <li>• Swing When pressing [SWING] button during operation, the louver starts swinging.</li> </ul>
4) HADA CARE Position	<ul style="list-style-type: none"> <li>• Air flow upward to the ceiling provide indirect air flow to body and homogenize room temperature.</li> <li>• HADA care Louver position.</li> </ul>	

Cooling operation/ AUTO (COOL)

Initial setting of "Cooling storage position" Louver : Directs downward (33.9°)

Heating operation/ AUTO (HEAT)

Initial setting of "Heating storage position" Louver : Directs downward (79.1°)

Item	Operation flow and applicable data, etc.	Description
6. Temporary operation	<p>Pressing [RESET] button starts the temporary operation of [AUTO] operation. When keeping [RESET] button pressed for 10 seconds or more, the temporary [COOL] operation is performed.</p> <pre> graph TD     A[Press RESET button.] --&gt; B{Did you press [RESET] button for 3 seconds or more?}     B -- NO --&gt; C[Temporary [AUTO] operation]     B -- YES --&gt; D{Did you press [RESET] button for 10 seconds or more?}     D -- YES --&gt; E[Temporary [COOL] Operation]     D -- NO --&gt; F[Switch to [AUTO RESTART] control.]           </pre>	<ol style="list-style-type: none"> <li>1) When pressing [RESET] button, the temporary [AUTO] operation starts.</li> <li>2) When keeping [RESET] button pressed for 3 seconds or more, Pi, Pi, Pi sound is heard and [AUTO RESTART] control is changed.</li> <li>3) When keeping [RESET] button pressed for 10 seconds or more, "Pi" sound is heard and the temporary [COOL] operation starts.</li> <li>4) To stop the temporary operation, press the button again.</li> </ol>
7. Remote-A or B selection	<p><b>Setting the remote controller</b></p> <p>To separate using of remote control for each indoor unit in case of 2 air conditioners are installed nearby.</p> <p><b>Remote Control B Setup.</b></p> <ol style="list-style-type: none"> <li>1) Press [RESET] button on the indoor unit to turn the air conditioner ON.</li> <li>2) Point the remote control at the indoor unit.</li> <li>3) Push and hold [CHECK] button on the Remote Control by the tip of the pencil. "00" will be shown on the display (Picture ①).</li> <li>4) Press [MODE] during pushing [CHECK]. "B" will show on the display and "00" will disappear and the air conditioner will turn OFF. The Remote Control B is memorized (Picture ②).</li> </ol> <p>Note : 1. Repeat above step to reset Remote Control to be A.  2. Remote Control A has not "A" display.  3. Default setting of Remote Control from factory is A.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>①</span> <span>②</span> </div>	<ol style="list-style-type: none"> <li><b>1. Purpose</b> This operation is to operate only one indoor unit using one remote controller.</li> <li><b>2. Description</b> When operating one indoor unit in a situation where two indoor units have been installed in the same room or nearby rooms, this operation prevents the remote controller signal from being received simultaneously by both units, thus preventing both units from operating.</li> <li><b>3. Operation</b> The indoor unit on which the remote controller selection has been set to B receives the signal of the remote controller also set to B. (At the factory the remote controller selection is set to A on all the indoor units. There is no A setting display.)</li> </ol>



Item	Operation flow and applicable data, etc.	Description												
8. Self-Cleaning function	 <pre> graph TD     A[Unit now performing cooling or dry operation] --&gt; B[Press "STOP" button]     B --&gt; C[Only timer indicator lights, and Self Cleaning operation starts]     C --&gt; D[Time set now elapses]     D --&gt; E[Operation stops] </pre> <ul style="list-style-type: none"> <li>During Self-Cleaning operations: The louver opens slightly. The indoor fan operates continuously at a speed of 500 rpm.</li> </ul> <p>Self-Cleaning operation times</p> <table border="1"> <thead> <tr> <th></th><th>Operation time</th><th>Self-Cleaning operation time</th></tr> </thead> <tbody> <tr> <td rowspan="2">Cooling: Auto (cooling) Dry</td><td>Up to 10 minutes</td><td>No Self-Cleaning operation performed (0 minutes)</td></tr> <tr> <td>10 minutes or longer</td><td>30 mins.</td></tr> <tr> <td>Auto (fan only)</td><td colspan="2" rowspan="2">No Self-Cleaning operation performed</td></tr> <tr> <td>Shutdown</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>To stop an ongoing Self-Cleaning operation at any time Press the start/stop button on the remote controller twice during the Self-Cleaning operation. (After pressing the button for the first time, press it for the second time without delay (within 10 minutes).)</li> </ul>		Operation time	Self-Cleaning operation time	Cooling: Auto (cooling) Dry	Up to 10 minutes	No Self-Cleaning operation performed (0 minutes)	10 minutes or longer	30 mins.	Auto (fan only)	No Self-Cleaning operation performed		Shutdown	<p><b>1. Purpose</b> The Self-Cleaning operation is to minimize the growth of mold, bacteria etc. by running the fan and drying so as to keep the inside of the air conditioner clean.</p> <p><b>Self-Cleaning operation</b> When the cooling or dry operation shuts down, the unit automatically starts the Self-Cleaning operation which is then performed for the specified period based on duration of the operation which was performed prior to the shutdown, after which the Self-Cleaning operation stops.</p> <p><b>2. Operation</b></p> <ol style="list-style-type: none"> <li>When the stop signal from the remote controller or timer-off function is received, only the timer indicator light.</li> <li>The period of the Self-Cleaning operation is determined by the duration of the operation performed prior to the reception of the stop code.</li> <li>After the Self-Cleaning operation has been performed for the specified period, the unit stops operating.</li> </ol>
	Operation time	Self-Cleaning operation time												
Cooling: Auto (cooling) Dry	Up to 10 minutes	No Self-Cleaning operation performed (0 minutes)												
	10 minutes or longer	30 mins.												
Auto (fan only)	No Self-Cleaning operation performed													
Shutdown														

Item	Operation flow and applicable data, etc.		Description
8. Self-Cleaning function			
8-1-1. Self-Cleaning diagram			
Operation display	ON	OFF	OFF
FCU fan	ON rpm is depend on presetting.	ON (500RPM)	OFF
FCU louver	OPEN	OPEN (12.7°)	CLOSE
Timer display	ON or OFF depend on presetting of timer function.	ON	ON or OFF depend on presetting of timer function.
Compressor	ON or OFF depend on presetting per room temperature.	OFF	OFF
CDU fan	ON or OFF depend on presetting per room temperature.	OFF	OFF

Operation time

Cool mode or dry mode  
operation more than 10 mins.

Self-Cleaning mode  
operate 30 mins.

Turn off by remote controller or  
timer-off function.

Automatically turn-off.

8-1-2. Self-Cleaning function release

How to set/cancel Self-Cleaning function

To set/cancel the Self-Cleaning function, proceed as follows:

❑ Setting diagnosis code "06" on remote controlle  
(See detail of setting diagnosis code in 11-4-1)

❑ Turn on the power supply to air conditioner, after  
that press [RESET] button on air conditioner 1  
time to turn on the air conditioner (The LED  
display will show in operation LED)①

❑ Take the remote controller to direction of LED  
display on air conditioner, press button "up" (see  
detail of setting diagnosis code in 11-4-1) 1 time  
to send the code "07"  
\*(within 3 sec. after press [RESET] button),\* then  
air conditioner will shutdown automatically. Also,  
LED display will show flash follow the able below.

ON

OFF

ON

OFF

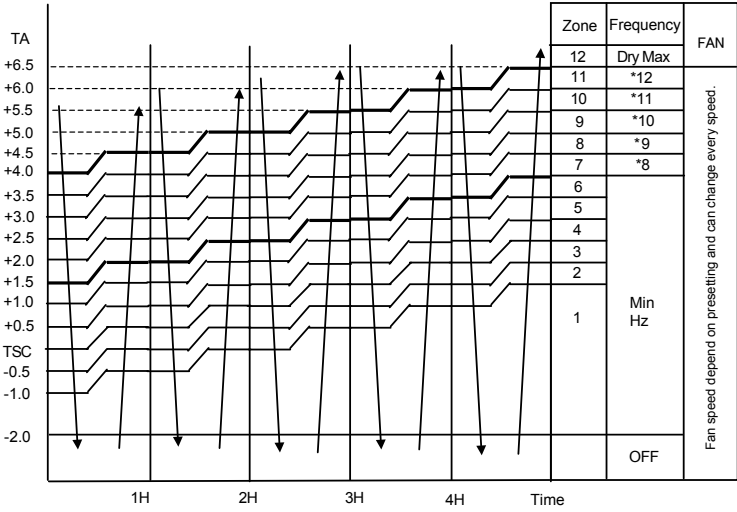
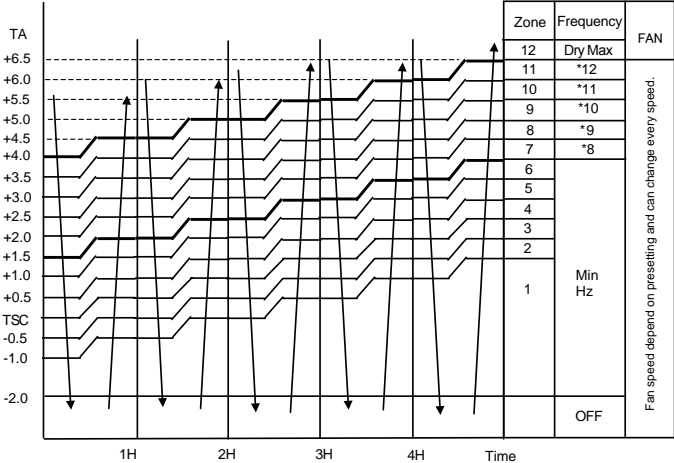
• Set or Cancel Self-Cleaning function by push  
the RESET button on air conditioner.  
When setting is changed, the sound warning will  
alarm "Beep". The setting is changed following  
below.
















• Turn on air conditioner again by remote controller  
to confirm setting.


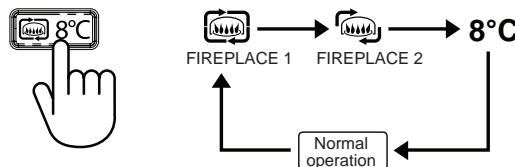


OPERATION /  
RESET Button

Self-cleaning function	Operation LED	Timer LED
ON	flash 1 Hz	not flash
OFF	flash 1 Hz	Flash 1 Hz

Note) Table above will show current status of  
Self-Cleaning function.

Item	Operation flow and applicable data, etc.	Description																																										
9. ECO operation	<p>When pressing [ECO] button on the remote controller, a Economic operation is performed.</p> <p><b>&lt;Cooling operation&gt;</b></p> <p>This function operates the air conditioner with the difference between the set and the room temperature as shown in the following figure.</p>  <table border="1" data-bbox="774 369 960 846"> <thead> <tr> <th>Zone</th><th>Frequency</th><th>FAN</th></tr> </thead> <tbody> <tr><td>12</td><td>Dry Max</td><td></td></tr> <tr><td>11</td><td>*12</td><td></td></tr> <tr><td>10</td><td>*11</td><td></td></tr> <tr><td>9</td><td>*10</td><td></td></tr> <tr><td>8</td><td>*9</td><td></td></tr> <tr><td>7</td><td>*8</td><td></td></tr> <tr><td>6</td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td></tr> <tr><td>2</td><td></td><td></td></tr> <tr><td>1</td><td>Min Hz</td><td></td></tr> <tr><td></td><td></td><td>OFF</td></tr> </tbody> </table> <p>Fan speed depend on presetting and can change every speed.</p> <p>* 12 (DRY max - COOL min) /6 x 5 + COOL min  * 11 (DRY max - COOL min) /6 x 4 + COOL min  * 10 (DRY max - COOL min) /6 x 3 + COOL min  * 9 (DRY max - COOL min) /6 x 2 + COOL min  * 8 (DRY max - COOL min) /6 x 1 + COOL min</p>	Zone	Frequency	FAN	12	Dry Max		11	*12		10	*11		9	*10		8	*9		7	*8		6			5			4			3			2			1	Min Hz				OFF	<p><b>&lt;Cooling operation&gt;</b></p> <ol style="list-style-type: none"> <li>1) The control target temperature increase 0.5°C per hour up to 2°C starting from the set temperature when ECO has been received.</li> <li>2) The indoor fan speed is depend on presetting and can change every speed after setting ECO operation.</li> <li>3) The compressor speed is controlled as shown in the left figure.</li> </ol>
Zone	Frequency	FAN																																										
12	Dry Max																																											
11	*12																																											
10	*11																																											
9	*10																																											
8	*9																																											
7	*8																																											
6																																												
5																																												
4																																												
3																																												
2																																												
1	Min Hz																																											
		OFF																																										
10. COMFORT SLEEP	<p><b>Cooling mode</b></p> <ul style="list-style-type: none"> <li>The preset temperature will increase as below.</li> <li>Press the [COMFORT SLEEP] button to choose the operating hours. Repeat pressing to select the hours. (1hr, 3hr, 5hr or 9hr)</li> <li>If the [COMFORT SLEEP] button is pressed again means cancel comfort sleep mode.</li> </ul>  <table border="1" data-bbox="774 1451 949 1883"> <thead> <tr> <th>Zone</th><th>Frequency</th><th>FAN</th></tr> </thead> <tbody> <tr><td>12</td><td>Dry Max</td><td></td></tr> <tr><td>11</td><td>*12</td><td></td></tr> <tr><td>10</td><td>*11</td><td></td></tr> <tr><td>9</td><td>*10</td><td></td></tr> <tr><td>8</td><td>*9</td><td></td></tr> <tr><td>7</td><td>*8</td><td></td></tr> <tr><td>6</td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td></tr> <tr><td>2</td><td></td><td></td></tr> <tr><td>1</td><td>Min Hz</td><td></td></tr> <tr><td></td><td></td><td>OFF</td></tr> </tbody> </table> <p>Fan speed depend on presetting and can change every speed.</p> <p>* 12 (DRY max - COOL min) /6 x 5 + COOL min  * 11 (DRY max - COOL min) /6 x 4 + COOL min  * 10 (DRY max - COOL min) /6 x 3 + COOL min  * 9 (DRY max - COOL min) /6 x 2 + COOL min  * 8 (DRY max - COOL min) /6 x 1 + COOL min</p> <p><b>Note :</b> DRY max for calculation only.</p>	Zone	Frequency	FAN	12	Dry Max		11	*12		10	*11		9	*10		8	*9		7	*8		6			5			4			3			2			1	Min Hz				OFF	<p>The principles of comfort sleep mode are:</p> <ul style="list-style-type: none"> <li>Quietness for more comfortable. When room temperature reach setting temperature</li> <li>Save energy by changing room temperature automatically.</li> <li>The air condition can shut down by itself automatically.</li> </ul> <p>Remarks:</p> <p>Comfort sleep mode will not operate in dry mode and fan only mode.</p>
Zone	Frequency	FAN																																										
12	Dry Max																																											
11	*12																																											
10	*11																																											
9	*10																																											
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4																																												
3																																												
2																																												
1	Min Hz																																											
		OFF																																										

Item	Operation flow and applicable data, etc.	Description															
11. Hi-POWER Mode	<p><b>([Hi-POWER] button on the remote controller is pressed)</b></p> <p>When [Hi-POWER] button is pressed while the indoor unit is in Auto or cooling operation, Hi-POWER mark is indicated on the display of the remote controller and the unit operates as follows.</p> <ol style="list-style-type: none"> <li><b>1. Automatic operation</b> <ul style="list-style-type: none"> <li>The indoor unit operates in according to the current operation.</li> </ul> </li> <li><b>2. Cooling operation</b> <ul style="list-style-type: none"> <li>The preset temperature drops 1°C (The value of the preset temperature on the remote controller does not change.) The indoor unit's fan speed level increase 1 tap.</li> </ul> </li> <li><b>3. The Hi-POWER mode can not be set in Dry operation</b></li> </ol>																
12. Display lamp brightness adjustment	<p>To decrease the display lamp brightness or turn it off.</p> <ol style="list-style-type: none"> <li>Press and hold  <b>FAN</b> for 3 seconds until brightness level (<b>d0</b>, <b>d1</b>, <b>d2</b> or <b>d3</b>) is shown on remote control LCD then release the button.</li> <li>Press  <b>TEMP.</b> Rise or  <b>TEMP.</b> Decrease to adjust brightness in 4 levels.</li> </ol> <table border="1"> <thead> <tr> <th>Remote control LCD</th><th>Operation display</th><th>Brightness</th></tr> </thead> <tbody> <tr> <td><b>d3</b></td><td>   Lamp illuminates full brightness. </td><td>100%</td></tr> <tr> <td><b>d2</b></td><td>   Lamp illuminates 50% brightness. </td><td>50%</td></tr> <tr> <td><b>d1</b></td><td>   Lamp illuminates 50% brightness and the operation lamp is turned off. </td><td>50%</td></tr> <tr> <td><b>d0</b></td><td>   All lamps are turned off. </td><td>All turned off</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li>In the examples of <b>d1</b> and <b>d0</b>, the lamp illuminates for 5 seconds before going off.</li> </ul>	Remote control LCD	Operation display	Brightness	<b>d3</b>	 Lamp illuminates full brightness.	100%	<b>d2</b>	 Lamp illuminates 50% brightness.	50%	<b>d1</b>	 Lamp illuminates 50% brightness and the operation lamp is turned off.	50%	<b>d0</b>	 All lamps are turned off.	All turned off	
Remote control LCD	Operation display	Brightness															
<b>d3</b>	 Lamp illuminates full brightness.	100%															
<b>d2</b>	 Lamp illuminates 50% brightness.	50%															
<b>d1</b>	 Lamp illuminates 50% brightness and the operation lamp is turned off.	50%															
<b>d0</b>	 All lamps are turned off.	All turned off															

Item	Operation flow and applicable data, etc.	Description										
13. Fireplace / 8°C heating Operation	<p><b>Fireplace Operation</b> (  )</p> <p>Keep indoor unit's fan blowing continuously during thermo off, to circulate heat from other sources over the room. There are three setting parameters: Default setting &gt; Fireplace 1 &gt; Fireplace 2</p> <p><b>Fireplace 1:</b> During thermo off period, the indoor unit's fan will continue to run by the same speed, previously selected by end-user.</p> <p><b>Fireplace 2:</b> During thermo off period, the indoor unit's fan will continue to run at super-low speed, programmed from factory.</p> <p><b>8°C Heating Operation (8°C)</b> Heat mode operation for keep room temperature (5-13°C) with less of energy usage.</p> <p><b>Fireplace and 8°C Heating Operation</b></p> <div></div> <p><b>Note:</b></p> <ul style="list-style-type: none"><li>• While Fireplace operation on heating mode, indoor unit fan always runs and cold air breezing might be occurred.</li><li>• Fireplace and 8°C will operate in Heating mode only.</li><li>• Fireplace doesn't work with IMS multi system combination.</li></ul>											
14. QUIET mode	<p>The "Quiet mode" selected from [  ] button;</p> <ul style="list-style-type: none"><li>- The fan of the indoor unit will be restricted the revolving speed at speed UL.</li><li>- The compressor speed is controlled as show in the figure.</li></ul> <table><tr><td>Model</td><td>RAS-M05J2KVSG-E RAS-M05N4KVSG-E</td></tr><tr><td>Cool min (Hz)</td><td>20</td></tr><tr><td>Heat min (Hz)</td><td>20</td></tr><tr><td>Quiet cool (Hz)</td><td>31</td></tr><tr><td>Quiet Heat (Hz)</td><td>31</td></tr></table> <p>The "Quiet mode" is canceled by [  ] button is pressed to select other speed.</p>	Model	RAS-M05J2KVSG-E RAS-M05N4KVSG-E	Cool min (Hz)	20	Heat min (Hz)	20	Quiet cool (Hz)	31	Quiet Heat (Hz)	31	<p>Quiet mode is the system which, control the revolving speed of indoor fan to work constantly at lower than speed L. In addition, noise level of indoor unit is less than usual.</p> <p>Remarks :</p> <ol style="list-style-type: none"><li>1. Quiet mode is unable to work in dry mode.</li><li>2. Quiet mode is appropriate to work with less cooling load and less heating load condition. Because of the fan speed L- may cause not enough the cooling capacity or heating capacity.</li></ol>
Model	RAS-M05J2KVSG-E RAS-M05N4KVSG-E											
Cool min (Hz)	20											
Heat min (Hz)	20											
Quiet cool (Hz)	31											
Quiet Heat (Hz)	31											

### 9-3. Auto Restart Function

This indoor unit is equipped with an automatic restarting function which allows the unit to restart operating with the set operating conditions in the event of a power supply being accidentally shut down.

The operation will resume without warning three minutes after power is restored.

This function is not set to work when shipped from the factory. Therefore it is necessary to set it to work.

#### 9-3-1. How to Set the Auto Restart Function

To set the auto restart function, proceed as follows:

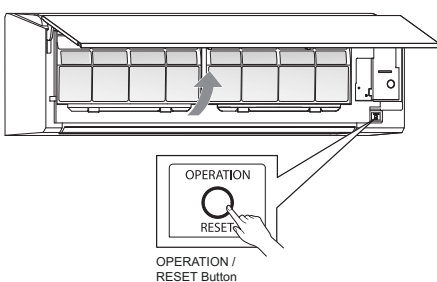
The power supply to the unit must be on ; the function will not set if the power is off.

Press the [RESET] button located in the center of the front panel continuously for three seconds.

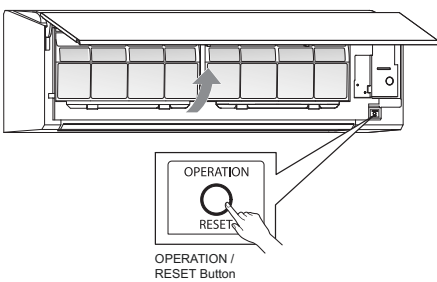
The unit receives the signal and beeps three times.

The unit then restarts operating automatically in the event of power supply being accidentally shut down.

#### • When the unit is standby (Not operating)

Operation	Motions
<p>Press [RESET] button for more than three seconds. (Less than 10 seconds)</p> 	<p>The unit is on standby.</p> <p>↓</p> <p>The unit starts to operate.      The white indicator is on.</p> <p>↓      After approx. three seconds,</p> <p>The unit beeps three times and continues to operate.      <b>The white indicator flashes for 5 seconds.</b></p> <p>If the unit is not required to operate at this time, press [RESET] button once more or use the remote controller to turn it off.</p>

#### • When the unit is in operation

Operation	Motions
<p>Press [RESET] button for more than three seconds. (Less than 10 seconds)</p> 	<p>The unit is in operation.      The white indicator is on.</p> <p>↓</p> <p>The unit stops operating.      The white indicator is turned off.</p> <p>↓      After approx. three seconds,</p> <p>The unit beeps three times.      <b>The white indicator flashes for 5 seconds.</b></p> <p>If the unit is required to operate at this time, press [RESET] button once more or use the remote controller to turn it on.</p>

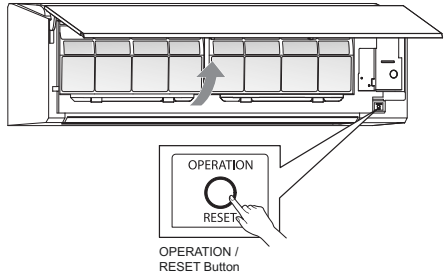
### 9-3-2. How to Cancel the Auto Restart Function

To cancel auto restart function, proceed as follows :

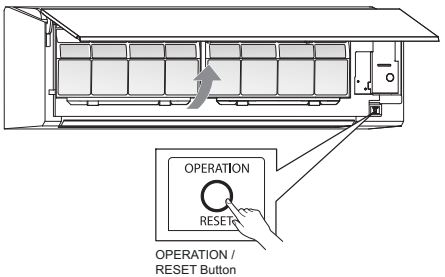
Repeat the setting procedure : the unit receives the signal and beeps three times.

The unit will be required to be turned on with the remote controller after the main power supply is turned off.

#### • When the system is on stand-by (not operating)

Operation	Motions
<p>Press [RESET] button for more than three seconds. (Less than 10 seconds)</p> 	<p>The unit is on standby.</p> <p>↓</p> <p>The unit starts to operate.                      The white indicator is on.</p> <p>↓                      After approx. three seconds,</p> <p>The unit beeps three times and continues to operate.</p> <p>If the unit is not required to operate at this time, press [RESET] button once more or use the remote controller to turn it off.</p>

#### • When the system is operating

Operation	Motions
<p>Press [RESET] button for more than three seconds. (Less than 10 seconds)</p> 	<p>The unit is in operation.                      The white indicator is on.</p> <p>↓</p> <p>The unit stops operating.                      The white indicator is turned off.</p> <p>↓                      After approx. three seconds,</p> <p>The unit beeps three times.</p> <p>If the unit is required to operate at this time, press [RESET] button once more or use the remote controller to turn it on.</p>

### 9-3-3. Power Failure During Timer Operation

When the unit is turned off because of power failure during timer operation, the timer operation is cancelled. In that case, set the timer operation again.

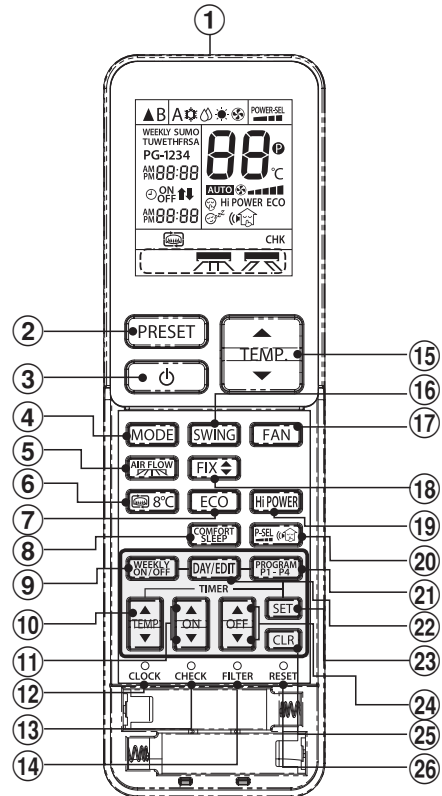
#### NOTE :

The Daily Timer is reset while a command signal can be received from the remote controller even if it stopped due to a power failure.

## 9-4. Remote control

### 9-4-1. Remote control and its functions

- ① Infrared signal emitter
- ② Memory and Preset button (PRESET)
- ③ Start/Stop button (⏻)
- ④ Mode select button (MODE)
- ⑤ Air flow button (AIR FLOW)
- ⑥ Fireplace/8°C button (8°C)
- ⑦ ECO button (ECO)
- ⑧ Comfort sleep button (COMFORT SLEEP)
- ⑨ Weekly timer (WEEKLY ON/OFF)
- ⑩ Temp for Weekly timer (TEMP)
- ⑪ On timer button (ON)
- ⑫ Set clock button (CLOCK)
- ⑬ Check button (CHECK)
- ⑭ Filter reset button (FILTER)
- ⑮ Temperature button (TEMP)
- ⑯ Swing louver button (SWING)
- ⑰ Fan speed button (FAN)
- ⑱ Set louver button (FIX)
- ⑲ High power button (HI POWER)
- ⑳ Power selection/Silent button (PSEL)
- ㉑ Program P1 - P4 (PROGRAM)
- ㉒ Day/Edit button (DAY/EDIT)
- ㉓ Setup button (SET)
- ㉔ Off timer button (OFF)
- ㉕ Clear button (CLR)
- ㉖ Reset button (RESET)



#### Note:

- The provided Remote Controller is a wireless type, which also can be used as a wire. Please see “How to Connect The Remote Controller for Wired Operation”, located in installation instruction, in case of wired control is required.
- In wire operation, remote controller will return to initial condition (PRESET, TIMER and CLOCK will return to initial condition) when user shutdown power supply of Air conditioner.

### 9-4-2. Operation of remote control

#### 1. Weekly timer operation

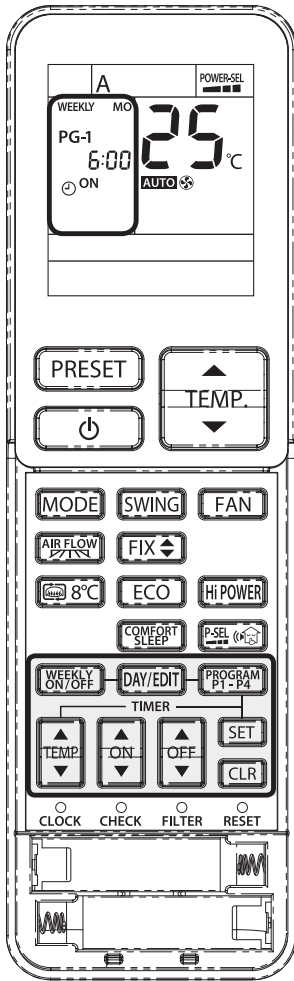
4 programs for each day in the week can be set in WEEKLY TIMER.

The following items can be set in WEEKLY TIMER operation.

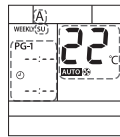
- a. Operation time (ON timer for Start and OFF timer for Stop operation)
- b. Operation mode (AUTO, COOL, DRY, HEAT, FAN ONLY)
- c. Temperature setting.
- d. Fan speed setting.
- e. Special operation (8°C, ECO, Hi-POWER, SILENT)



## How to set WEEKLY TIMER

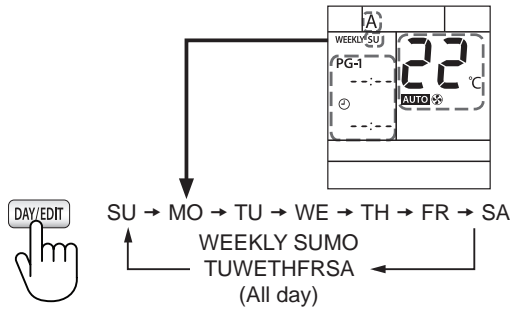


1. Press **DAY/EDIT** to enter WEEKLY TIMER setting.

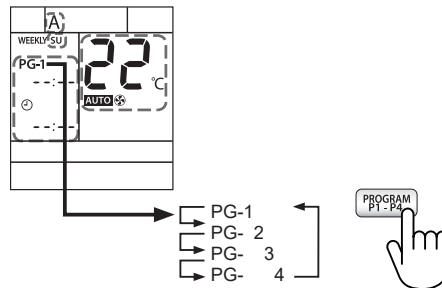


Blink

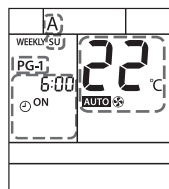
2. Press **DAY/EDIT** to select desired day in sequence.  
The sequence of day symbol appears on the LCD.



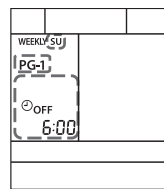
3. Press **PROGRAM P1-P4** to select the program number.
  - The program 1 is ready for setting while **DAY/EDIT** is pressed PG-1 appears on the LCD.
  - Press **PROGRAM P1-P4** to change the program number in the sequence program 1 to program 4.



4. Press **ON** or **OFF** to select the desired time.
  - The time can be set between 0:00 and 23:50 in 10 minute intervals.
  - Press and hold the button to change setting time for 1 hr.
  - Only one of ON or OFF timer can be set on each program.



ON timer display



OFF timer display\*

\*OFF timer is used to stop the air conditioner only.  
The display does not show Operation mode,  
Temperature, Fan speed and others.

5. Press to select desired operation.



6. Press or to select desired temperature.

- The temperature can be set between 17°C and 30°C.

7. Press to select the desired fan speed.

8. Add operations, if required.

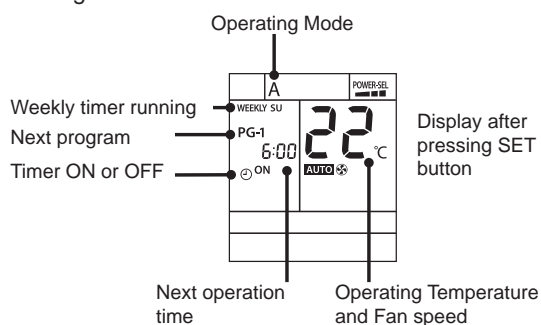
- Press to use 8°C operation.  
(Notes: Fireplace cannot select and memorize in weekly function)
- Press to use ECO operation.
- Press to use Hi-POWER operation.
- Press to use Silent operation.

9. Adding or editing the program.

The program can be set to perform on all the required days until is pressed to confirm the setting.

10. If adding or editing a program is required, please repeat steps 2 - 8 before setting confirmation.

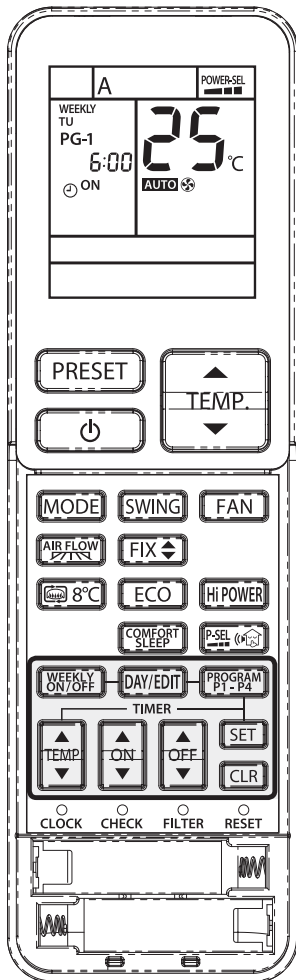
11. After adding or editing, press to confirm the setting\*.



\*Point remote control at air conditioner receiving module then, press SET button until you hear the “PiPi” sound. This means the setting operation has been completed. As the air conditioner is receiving the signal, you will hear separate “Pi” sounds corresponding to the number of days in the selected setting. An incomplete setting is indicated if the TIMER lamp is blinking. Press twice.

#### Notes :

1. Place the remote control where the indoor unit can receive the signal. This will increase the accuracy of the timing between the remote control and the air conditioning unit.
2. The ON/OFF timer can be set during the WEEKLY TIMER operation. In this situation, the air conditioner will first follow the normal timer until it is complete; then, it will return to the WEEKLY TIMER function.
3. During WEEKLY TIMER operation, all of operation such as MODE, TEMP, FAN, Hi-POWER, ECO and etc., can be adjusted but when the clock reaches the program setting, the operation will return to the set items in the program.
4. When the remote control is sending a signal to the air conditioner, avoid interference from objects that can block the signal.



### Edit Weekly timer program

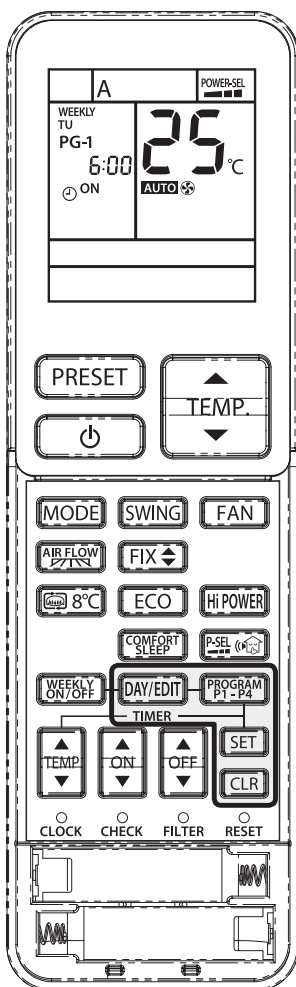
To edit the program after confirming the weekly timer setting, follow steps 1 - 3 below.

1. Press .
  - The day of the week and the program number of the current day will be displayed.
2. Press to select the day of the week and press to select program number to be confirmed.
  - Resetting the operation.
3. Press to exit confirming mode.

### Deactivating WEEKLY TIMER operation

Press while "WEEKLY" is displayed on the LCD.

- The "WEEKLY" indicator will disappear from the LCD. However, the program will remain in the remote control.
- The TIMER lamp goes off.
- To reactivate the WEEKLY TIMER operation again, press again, LCD shows the next program. The program, after reactivation, is related to the clock time.



## To delete programs

### The individual program

1. Press **DAY/EDIT**.
  - The day of the week and the program number is displayed.
  - Select the day to delete the program.
2. Press **PROGRAM P1-P4** to select the program number to be deleted.
3. Press **CLR**.
  - ON or OFF timer will be cleared and the LCD will blink.
4. Press **SET** to delete the program.
  - Press **SET** while the LCD is blinking.
 The program has now been deleted.

### All programs










1. Press **DAY/EDIT**.
  - The day of the week and the program number will be displayed.
2. Press **CLR** and hold for 3 seconds.
  - All programs will be deleted and LCD displays current operation.

### Notes :

Make sure the remote control receiving module on the air conditioner receives the signal from the remote control.

## 2. AUTOMATIC OPERATION

To automatically select cooling, heating, or fan only operation.

1. Press  : Select Auto A.
2. Press  : Select the desired temperature. Min 17°C, Max 30°C
3. Press  : Select AUTO, LOW , LOW+ , MED , MED+ , HIGH  or Quiet 

## 3. FIREPLACE AND 8°C HEATING OPERATION

### Fireplace Operation ()

Keep indoor unit's fan blowing continuously during thermo off, to circulate heat from other sources over the room. There are three setting parameters: Default setting > Fireplace 1 > Fireplace 2

#### Fireplace 1:

During thermo off period, the indoor unit's fan will continue to run by the same speed, previously selected by end-user.

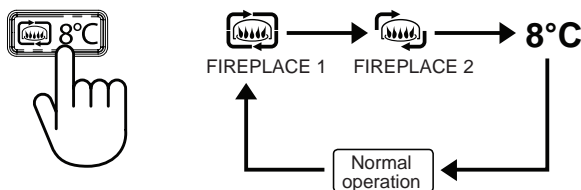
#### Fireplace 2:

During thermo off period, the indoor unit's fan will continue to run at super-low speed, programmed from factory.

### 8°C Heating Operation (8°C)

Heat mode operation for keep room temperature (5-13°C) with less of energy usage.













### Fireplace and 8°C Heating Operation



#### **Note:**

- While Fireplace operation on heating mode, indoor unit fan always runs and cold air breezing might be occurred.
- Fireplace and 8°C will operate in Heating mode only.
- Fireplace doesn't work with IMS multi system combination.



## 4. COOLING / HEATING / FAN ONLY OPERATION

1. Press  : Select Cool , Heat , or Fan only 
2. Press  : Set the desired temperature. Min 17°C, Max 30°C  
Fan Only : No temperature indication
3. Press  : Select AUTO, LOW , LOW+ , MED , MED+ , HIGH  or Quiet 

**Note :** QUIET is ultra low fan speed for quiet operation.

## 5. DRY OPERATION

For dehumidification, a moderate cooling performance is controlled automatically.

1. Press  : Select Dry 
2. Press  : Set the desired temperature. Min 17°C, Max 30°C

**Note :** DRY Mode fan speed is set to Auto only.

## 6. Hi-POWER OPERATION

To automatically control room temperature and airflow for faster cooling or heating operation (except in DRY and FAN ONLY mode)

Press **Hi POWER** : Start and stop the operation

## 7. ECO OPERATION

To automatically control room temperature to save energy (except in DRY and FAN ONLY mode)

Press **ECO** : Start and stop the operation.

**Note:** Cooling operation; the set temperature will increase automatically 1 degree/hour for 2 hours (maximum 2 degrees increase). For heating operation the set temperature will decrease.

## 8. COMFORT SLEEP OPERATION

For comfortable sleep, automatically control air flow and automatically turn OFF (Except in DRY mode.)

1. Press **COMFORT SLEEP** : Select 1, 3, 5 or 9 hrs for OFF timer operation.
2. Press **CLR** : to cancel the comfort sleep operation.

**Note:** The cooling operation, the set temperature will increase automatically 1 degree/hour for 2 hours (maximum 2 degrees increase). For heating operation, the set temperature will decrease.

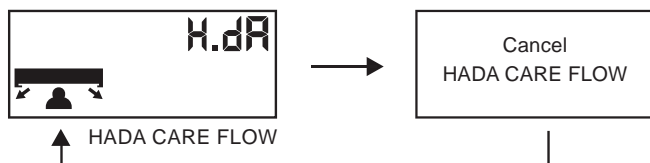
## 9. HADA CARE FLOW OPERATION

### HADA CARE FLOW

Air flow upward to the ceiling, provide Indirect air flow to body and homogenize room temperature.

### HADA CARE FLOW operation

Press **AIR FLOW** For start and stop HADA CARE FLOW



### **Note:**

- During HADA CARE FLOW mode, FIX and SWING button cannot active

## 10. POWER-SELECTION OPERATION / SILENT OPERATION (OUTDOOR UNIT)

### **Power-Selection** ( )

This function is used when the circuit breaker is shared with other electrical appliances. It limits the maximum current and power consumption to 100%, 75%, or 50% and can be implemented by POWER-SELECTION. The lower percentage, the higher saving and also longer compressor lifetime.

#### **Note:**

- When the level is selected, POWER-SEL level flashes on remote LCD display for 3 seconds.  
In case of 75% and 50% level, number "75" or "50" also flashes for 2 seconds.
- Due to the reason that POWER-SELECTION function limits the maximum current, inadequate cooling or heating capacity may occur.

### **Silent Operation** ( )

Keep outdoor unit operating silently to ensure either yourself or neighborhood will have a tight sleep in nighttime. By this feature, the heating capacity will be optimized to deliver such silent experience. The silent operation can be selected from one of two purposes (Silent 1 and Silent 2).

There are three setting parameters: Standard level > Silent 1 > Silent 2

#### **Silent 1:**

Though operating silently, the Heating (or Cooling) capacity is still prioritized to ensure having sufficient comfort inside the room.

This setting is a perfect balance between the Heating (or Cooling) capacity and the Sound level of outdoor unit.

#### **Silent 2:**

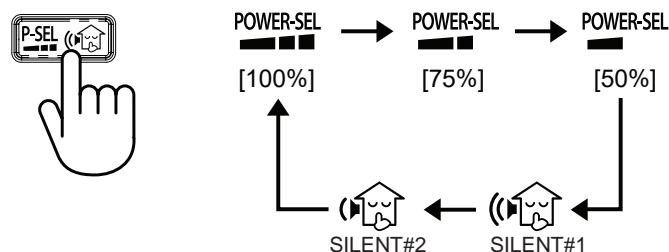
Compromising the Heating (or Cooling) capacity to the Sound level in any circumstance where the outdoor unit's sound level is highly prioritized.

This setting has a purpose to reduce the maximum sound level of outdoor unit by 4 dB(A).

#### **Note:**







- While activating of Silent operation, inadequate heating (or cooling) capacity may occur.

### **Power-Selection and Silent Operation (Outdoor Unit)**



## 11. TIMER OPERATION

Set the timer when the air conditioner is operating.




Setting the ON Timer		Setting the OFF Timer	
1	Press  : Set the desired ON timer.	Press  : Set the desired OFF timer.	
2	Press  : Set the timer.	Press  : Set the timer.	
3	Press  : Cancel the timer.	Press  : Cancel the timer.	

### Note:


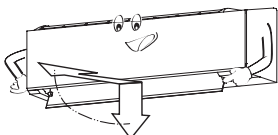

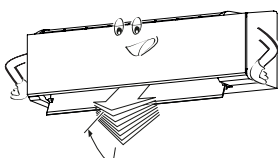
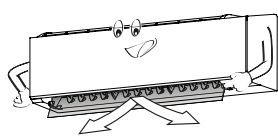
- Keep the remote control in accessible transmission to the indoor unit. otherwise, the time lag of up to 15 minutes will occur.
- The setting will be saved for the next same operation.

## 12. PRESET OPERATION

Set your preferred operation for future use. The setting will be memorized by the unit for future operation (except air flow direction).

1. Select your preferred operation.
2. Press and hold  for 3 seconds to memorize the setting. The  mark displays.
3. Press  : Operate the preset operation.

## 13. AIR FLOW DIRECTION

1	Press  : Move the louver in the desired vertical direction.	
2	Press  : Swing the air automatically and press again to stop.	
3	For horizontal direction, adjust manually.	

### Note:

- Do not move the louver manually by others.
- The louver may automation positioning by some operation mode.




### 9-4-3. Name and Functions of Indications on Remote Controller





#### [Display]

All indications, except for the clock time indicator, are displayed by pressing the  button.

#### 1 Transmission mark

This transmission mark  indicates when the remote controller transmits signals to the indoor unit.

#### 2 Mode indicator

Indicates the current operation mode.  
(A : Automatic ,  : Cool,  : Dry,  
 : Heat,  : Fan only)

#### 3 Temperature indicator

Indicates the temperature setting.  
(17°C to 30°C)






#### 4 HADA CARE FLOW indicator


Air flow upward to the ceiling, provide Indirect air flow to body and homogenize room temperature.

#### 5 FAN speed indicator

Indicates the selected fan speed.

AUTO or five fan speed levels

(LOW  , LOW+  , MED  , MED+  , HIGH  ) can be shown.

Indicates AUTO when the operating mode is  : Dry.

#### 6 TIMER and weekly timer indicator

The time setting for timer operation and weekly timer function is indicated.

The current time is always indicated except during TIMER operation.


#### 7 Hi-POWER indicator

Indicates when the Hi-POWER operation starts.

Press the Hi-POWER button to start and press it again to stop the operation.

#### 8 (PRESET) indicator

Flashes for 3 seconds when the PRESET button is pressed during operation.

The  mark is shown when holding down the button for more than 3 seconds while the mark is flashing.

Press another button to turn off the mark.

#### 9 POWER-SEL

Indicates the selected POWER-SEL level.

( 100%,  75%,  50%)

#### 10 A, B change indicator remote controller

When the remote controller switching function is set, "B" appears in the remote controller display.  
(When the remote controller setting is "A", there is no indication at this position.)

#### 11 Comfort sleep

Indicates when comfort sleep is activated.  
Press comfort sleep button to select function.

#### 12 Quiet

Indicates when quiet is activated.  
Press Fan button to start and press it again to select other fan speed for operation.

#### 13 ECO indicator

Indicates when the ECO is in activated.  
Press the ECO button to start and press it again to stop operation.

#### 14 Silent operation

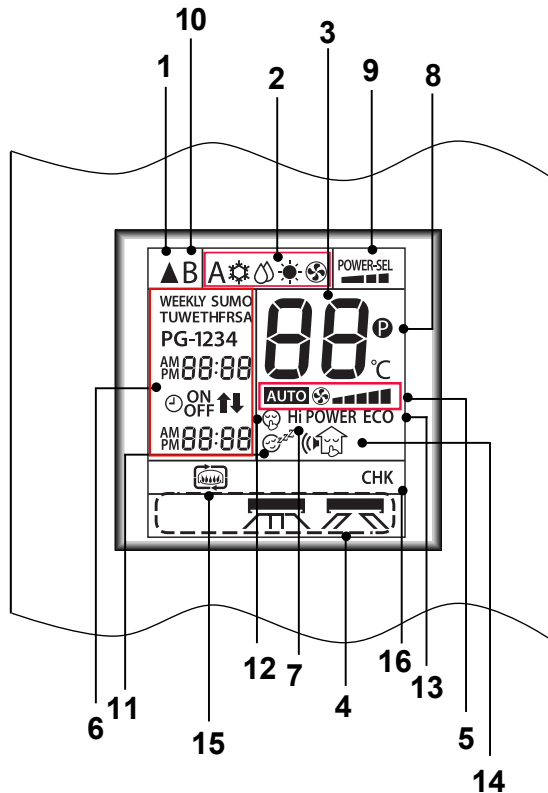
Indicates the selected Silent 1 and Silent 2.

#### 15 Fireplace operation

Indicates the selected Fireplace 1 and Fireplace 2.

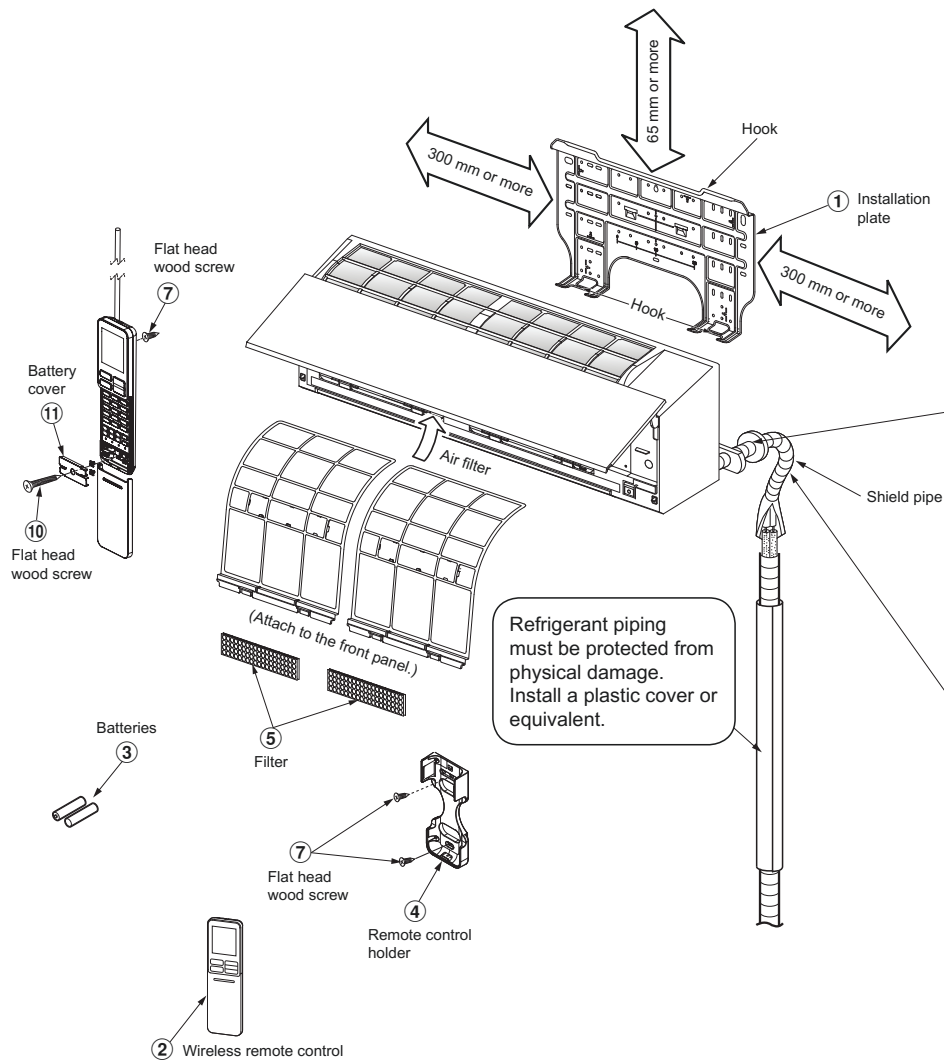
#### 16 Service Mode indicator

Shows during enter service Mode.

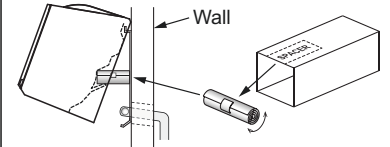


## 10. INSTALLATION PROCEDURE

### 10-1. Installation Diagram of Indoor and Outdoor Units

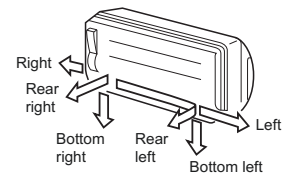


For the rear left, bottom left and left piping

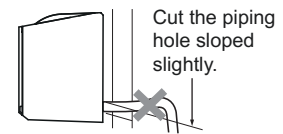


Cut out a piece of SPACER from indoor unit packaging box, roll it and insert between the indoor unit and wall to tilt the indoor unit for better operation.

The auxiliary piping can be connected to the left, rear left, rear right, right, bottom right or bottom left.

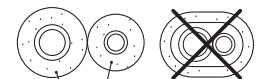


Do not allow the drain hose to get slack.



Make sure to run the drain hose sloped downward.

Insulate the refrigerant pipes separately with insulation, not together.

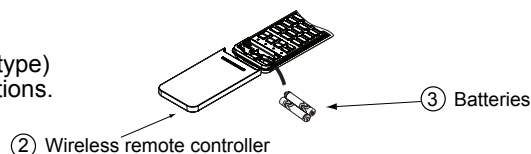


6 mm thick heat resisting polyethylene foam

The provided Remote Controller is a wireless type, which also can be used as a wire. Please see "How to Connect The Remote Controller for Wired Operation", in case of wired control is required.

#### Before installing the wireless remote controller

- Loading Batteries
  1. Remove the battery cover.
  2. Insert 2 new batteries (AAA type) following the (+) and (-) positions.














## 10-2. Installation

### 10-2-1. Optional installation parts

Part code	Parts name	Q'ty
Ⓐ	Refrigerant piping Liquid side : Ø6.35 mm Gas side : Ø9.52 mm	One each
Ⓑ	Pipe insulating material (polyethylene foam, 6 mm thick)	1
Ⓒ	Putty, PVC tapes	One each

### 10-2-2. Accessory and installation parts

Indoor Unit			
No.	Part name	No.	Part name
①	 Installation plate × 1	②	 Wireless remote control × 1
③	 Battery × 2	④	 Remote control holder × 1
⑤	 Toshiba Ultra pure filter × 2	⑥	 Mounting screw × 6
⑦	 Flat head wood screw × 2	⑧	 Owner's Manual × 1
⑨	 Installation Manual × 1	⑩	 Flat head wood screw × 1
⑪	 Battery cover		

#### Air filters

Clean every 2 weeks.

1. Open the air inlet grille.
2. Remove the air filters.
3. Vacuum or wash and then dry them.
4. Reinstall the air filters and close the air inlet grille.

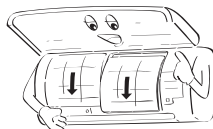
#### Filter

Maintenance & Shelf-life

Clean every 3-6 months when dust tuck or covers the filter.

1. Recommend to use vacuum to clean by sucking the dusts which stick or dip inside the filter or use the blower to blow the dust go out through the filter.
2. If necessary to use water to clean, simply use the plain water to wash the filter, dry with the sunlight for 3-4 hours or until it completely dry. Nevertheless, use hair drier to dry it. However, washing with water, it may reduce the performance of the filter.
3. Replace every 2 years or sooner. (contact your dealer to purchase new filter) (P/N : RB-A622DA)

Note: Filter life depends on the level of impurities in your operating environment. Higher levels of impurities may require more frequent cleaning and replacement. In all cases, we recommend an additional set of filters to improve the purifying and deodorizing performance of your air conditioner.










### 10-2-3. Installation/Service Tools

#### Changes in the product and components

In the case of an air conditioner using R32, in order to prevent any other refrigerant from being charged accidentally, the service port diameter of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping flare processing diameter and size of opposite side of flare nuts has been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

#### New tools for R32(R410a)

New tools for R32(R410a)	Applicable to R22 model		Changes
Gauge manifold	×		As pressure is high, it is impossible to measure by means of conventional gauge. In order to prevent any other refrigerant from being charged, each port diameter has been changed.
Charge hose	×		In order to increase pressure resisting strength, hose materials and port size have been changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to confirm the port size.
Electronic balance for refrigerant charging	○		As pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal diam. 1/2, 5/8)	×		The size of opposite sides of flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	○		By increasing the clamp bar's receiving hole, strength of spring in the tool has been improved.
Gauge for projection adjustment	—	—	Used when flare is made by using conventional flare tool.
Vacuum pump adapter	○		Connected to conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back to the charge hose. The charge hose connecting part has two ports-one for conventional refrigerant (7/16 UNF 20 threads per inch) and one for R32(R410a). If the vacuum pump oil (mineral) mixes with R32(R410a) a sludge may occur and damage the equipment.
Gas leakage detector	×		Exclusive for HFC refrigerant.

- Incidentally, the “refrigerant cylinder” comes with the refrigerant designation R32(R410a) and protector coating in the U.S's ARI specified rose color (ARI color code: PMS 507).
- Also, the “charge port and packing for refrigerant cylinder” require 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

## 10-3. Indoor Unit

### 10-3-1. Installation place

- A place which provides the spaces around the indoor unit as shown in the diagram
- A place where there are no obstacles near the air inlet and outlet
- A place which allows easy installation of the piping to the outdoor unit
- A place which allows the front panel to be opened
- The indoor unit shall be installed at least 2.5 m height. Also, it must avoided to put anything on the top of the indoor unit.

#### CAUTION

- Direct sunlight to the indoor unit's wireless receiver should be avoided.
- The microprocessor in the indoor unit should not be too close to RF noise sources.  
(For details, see the owner's manual.)

#### <Remote control>

- A place where there are no obstacles such as a curtain that may block the signal from the indoor unit.
- Do not install the remote control in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Keep the remote control at least 1 m apart from the nearest TV set or stereo equipment. (This is necessary to prevent image disturbances or noise interference.)
- The location of the remote control should be determined as shown below.

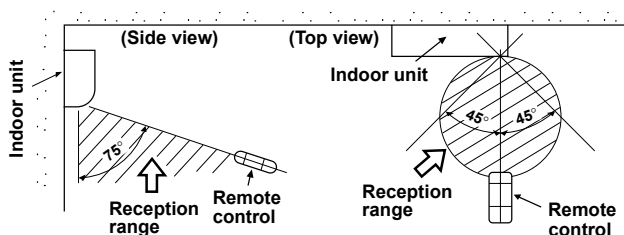


Fig. 10-3-1

### 10-3-2. Cutting a hole and mounting installation

#### <Cutting a hole>

When installing the refrigerant pipes from the rear.

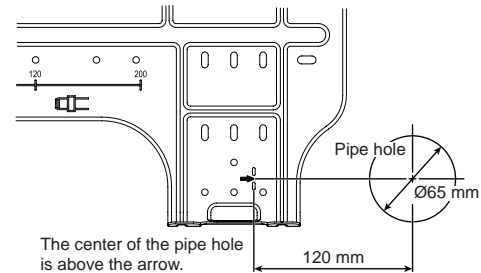


Fig. 10-3-2

1. After determining the pipe hole position on the mounting plate (➡), drill the pipe hole (Ø65 mm) at a slight downward slant to the outdoor side.

#### NOTE

- When drilling a wall that contains a metal lath, wire lath or metal plate, be sure to use a pipe hole brim ring sold separately.

#### <Mounting the installation plate>

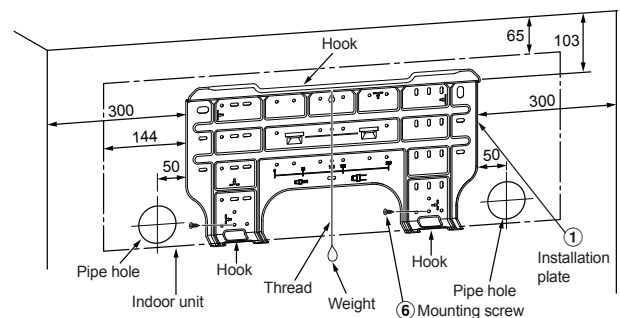


Fig. 10-3-3

**<When the installation plate is directly mounted on the wall>**

1. Securely fit the installation plate onto the wall by screwing it in the upper and lower parts to hook up the indoor unit.
2. To mount the installation plate on a concrete wall with anchor bolts, utilize the anchor bolt holes as illustrated in the above figure.
3. Install the installation plate horizontally in the wall.

**CAUTION**

When installing the installation plate with a mounting screw, do not use the anchor bolt hole. Otherwise the unit may fall down and result in personal injury and property damage.

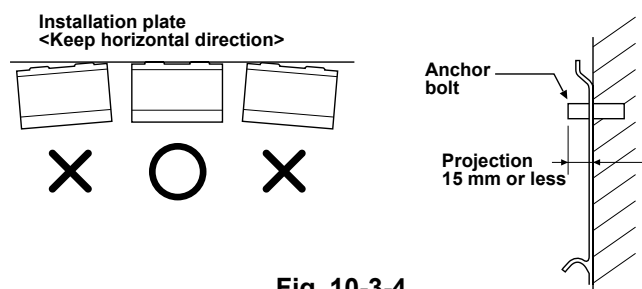


Fig. 10-3-4

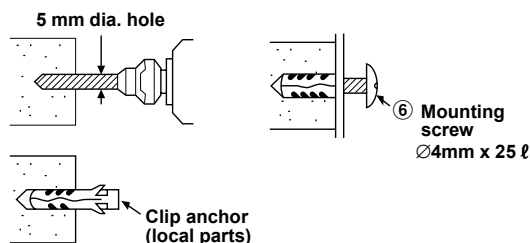


Fig. 10-3-5

**CAUTION**

Failure to firmly install the unit may result in personal injury and property damage if the unit falls.

- In case of block, brick, concrete or similar type walls, make 5 mm dia. holes in the wall.
- Insert clip anchors for appropriate mounting ⑥ screws.

**NOTE:**

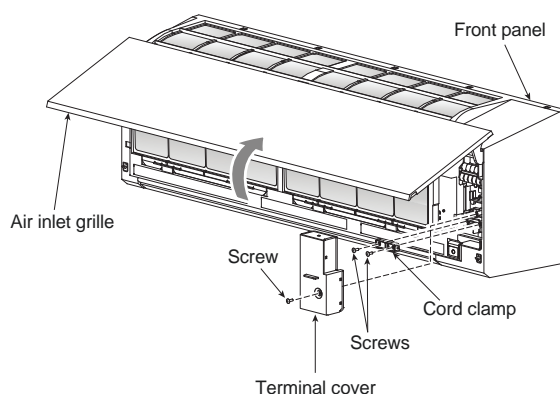
- Secure four corners and lower parts of the installation plate with 4 to 6 mounting screws to install it.

**10-3-3. Wiring Connection**

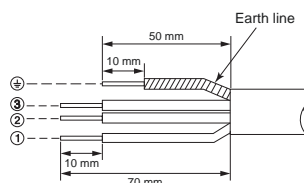
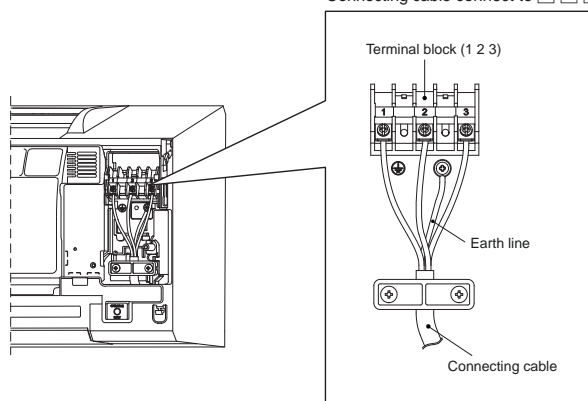
**Indoor unit**

**Wiring of the connecting cable can be carried out without removing the front panel.**

1. Remove the air inlet grille.  
Open the air inlet grille upward and pull it toward you.
2. Remove the terminal cover and cord clamp.
3. Insert the connecting cable (according to the local cords) into the pipe hole on the wall.
4. Take out the connecting cable through the cable slot on the rear panel so that it protrudes about 20 cm from the front.
5. Insert the connecting cable fully into the terminal block and secure it tightly with screws.
6. Tightening torque : 1.2 N·m (0.12 kgf·m)
7. Secure the connecting cable with the cord clamp.
8. Fix the terminal cover, rear plate bushing and air inlet grille on the indoor unit.

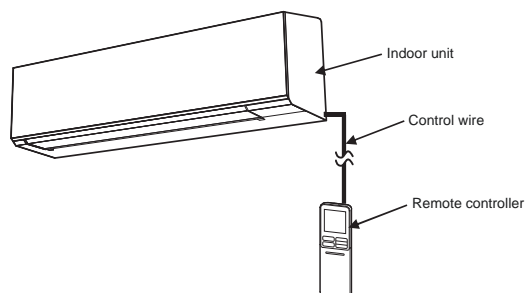


Connecting cable connect to ① ② ③ ⊕



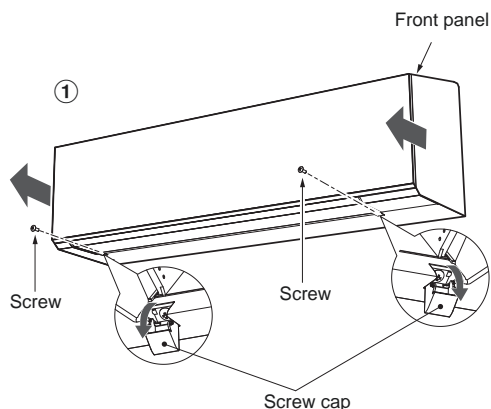
Stripping length of the Connecting cable

### 10-3-4. How to Connect Remote Controller for Wire Operation

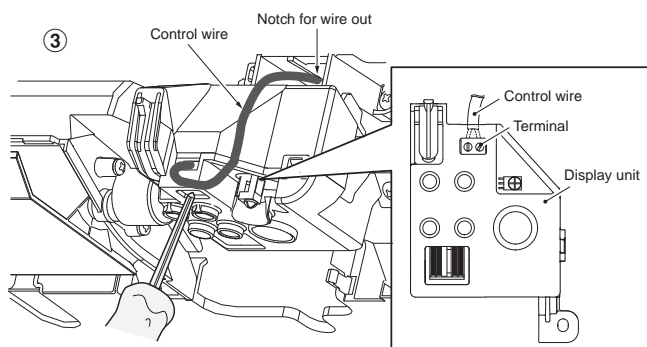
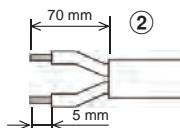


#### < For indoor unit >

1. Open two screw cap and securely remove two screws at the front panel.
2. Slightly open the lower part of the front panel then pull the upper part of the front panel toward you to remove it as shown on figure ①.
3. Arrange the control wire as detail and specification as shown on figure ②.
4. Securely connect the control wire to terminal of Display unit as shown on figure ③.  
(tighten firmly but not over 0.12 N·m (0.01 kgf·m)).
5. Set the control wire out from indoor unit same portion as power supply and connecting cable as shown on figure ③.  
(Notch for wire out)
6. Reassembly the indoor unit by reverse process of 1 to 2.

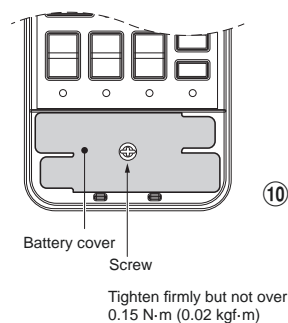
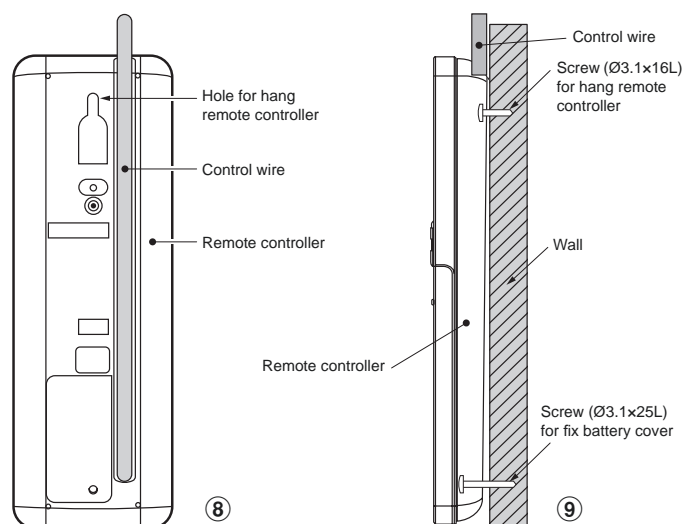
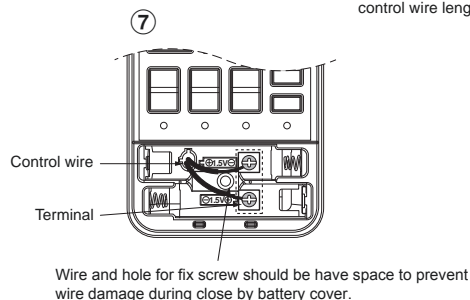
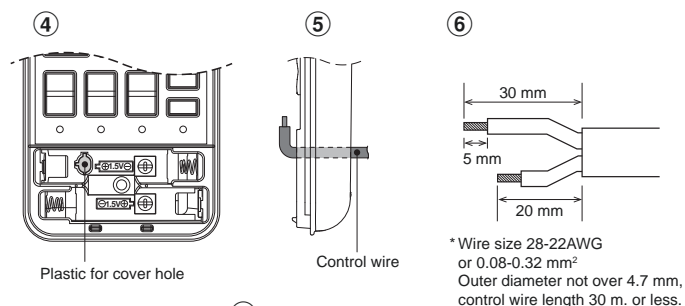


\* Wire size 28-22AWG  
or 0.08-0.32 mm<sup>2</sup>  
Outer diameter not over 4.7 mm,  
control wire length 30 m. or less.



#### < For remote controller >

1. Remove cover of remote controller by sliding down and take it out.
2. If batteries are exist, please take them out. The combination of using wire controller and batteries may cause of batteries explosion.
3. Make hole for insert control wire by use screwdriver break the plastic for cover hole as shown on figure ④.
4. Insert control wire from rear side of remote controller as shown on figure ⑤.
5. Fix control wire which arrange as shown on figure ⑥ and ⑦ to terminal by provided screws (tighten firmly but not over 0.25 N·m (0.03 kgf·m)).
6. Set control wire through gutter way at rear side of remote controller as shown on figure ⑧.
7. Fix provided screw (Ø3.1×16L) on the wall to hang remote controller as shown on figure ⑨.
8. Mark and arrange hole for fix below screw (Ø3.1×25L) as shown on figure ⑨.
9. Assembly battery cover which provided with accessory bag then use provide screw (Ø3.1×25L) to fix battery cover together with wall as shown on figure ⑩ (tighten firmly but not over 0.15 N·m (0.02 kgf·m)).
10. Reassembly cover of remote controller.





- \*Remark :**
1. Recommend to use double insulation lead wire for connect remote control and air conditioner.
  2. For wire operation, 1 remote control can control only 1 indoor unit
  3. In wire operation, remote controller will return to initial condition (PRESET, TIMER and CLOCK will return to initial condition) when user shutdown power supply of air conditioner.

### 10-3-5. Piping and drain hose installation

#### <Piping and Drain Hose Forming>

- \* Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.)

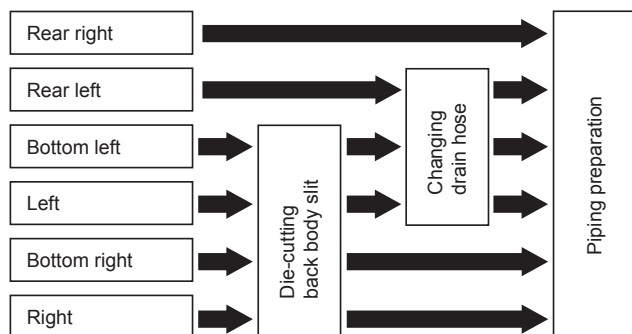


Fig. 10-3-6

#### 1. Die-cutting back body slit

Cut out the slit on the leftward or right side of the back body for the left or right connection and the slit on the bottom left or right side of the back body for the bottom left or right connection with a pair of nippers.

#### 2. Changing drain hose

For leftward connection, bottom-leftward connection and rear leftward connection's piping, it is necessary to change the drain hose and drain cap.

#### <How to remove the Drain Cap>

Clip the drain cap by needle-nose pliers and pull out.

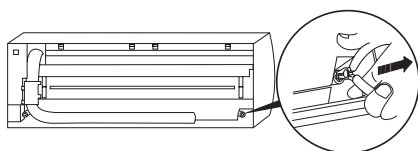


Fig. 10-3-7

#### <How to remove the drain hose>

- The drain hose can be removed by removing the screw securing the drain hose and then pulling out the drain hose.
- When removing the drain hose, be careful of any sharp edges of steel plate. The edges can injuries.
- To install the drain hose, insert the drain hose firmly until the connection part contacts with heat insulator, and the secure it with original screw.

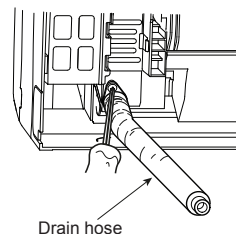


Fig. 10-3-8

#### <How to fix the Drain Cap>

- 1) Insert hexagon wrench (4 mm) in a center head.

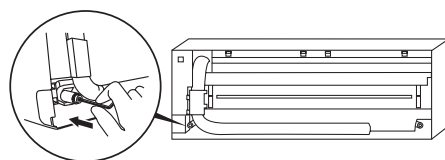


Fig. 10-3-9

- 2) Firmly insert drain cap.

Do not apply lubricating oil (refrigerant machine oil) when inserting the drain cap. Application causes deterioration and drain leakage of the plug.

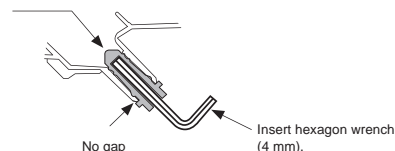


Fig. 10-3-10

### CAUTION

Firmly insert the drain hose and drain cap; otherwise, water may leak.



### <In case of right or left piping>

- After scribing slits of the back body with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool.

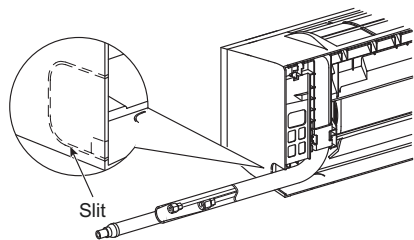


Fig. 10-3-11

### <In case of bottom right or bottom left piping>

- After scribing slits of the back body with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool.

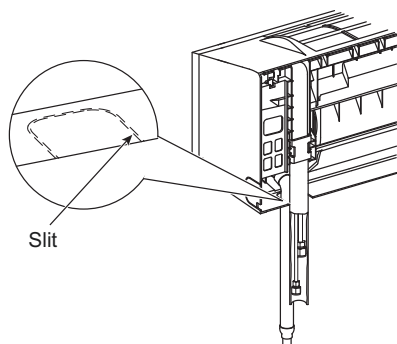


Fig. 10-3-12

### <Left-hand connection with piping>

Bend the connecting pipe so that it is laid within 43 mm above the wall surface. If the connecting pipe is laid exceeding 43 mm above the wall surface, the indoor unit may unstably be set on the wall. When bending the connecting pipe, make sure to use a spring bender so as not to crush the pipe.

### Bend the connecting pipe within a radius of 30 mm.

To connect the pipe after installation of the unit (figure)

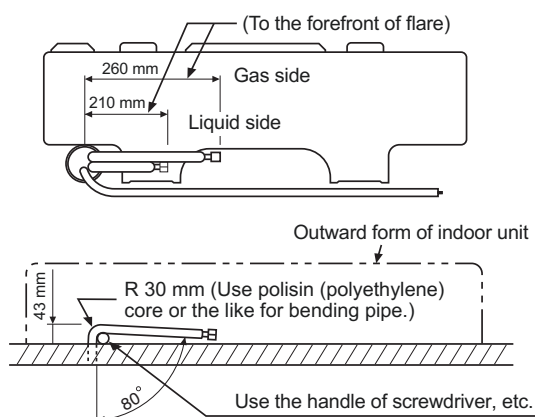


Fig. 10-3-13

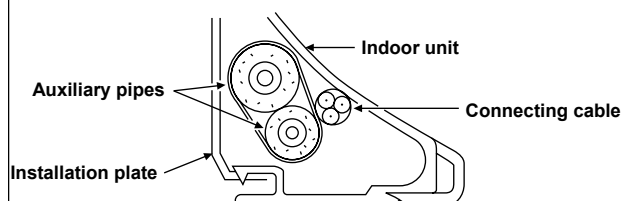
### NOTE

If the pipe is bent incorrectly, the indoor unit may unstably be set on the wall.

After passing the connecting pipe through the pipe hole, connect the connecting pipe to the auxiliary pipes and wrap the facing tape around them.

### CAUTION

- Bind the auxiliary pipes (two) and connecting cable with facing tape tightly. In case of leftward piping and rear-leftward piping, bind the auxiliary pipes (two) only with facing tape.



- Carefully arrange pipes so that any pipe does not stick out of the rear plate of the indoor unit.
- Carefully connect the auxiliary pipes and connecting pipes to each other and cut off the insulating tape wound on the connecting pipe to avoid double-taping at the joint, moreover, seal the joint with the vinyl tape, etc.
- Since dewing results in a machine trouble, make sure to insulate both the connecting pipes. (Use polyethylene foam as insulating material.)
- When bending a pipe, carefully do it, not to crush it.

### 10-3-6. Indoor unit fixing

1. Pass the pipe through the hole in the wall, and hook the indoor unit on the installation plate at the upper hooks.
2. Swing the indoor unit to right and left to confirm that it is firmly hooked up on the installation plate.
3. While pressing the indoor unit onto the wall, hook it at the lower part on the installation plate. Pull the indoor unit toward you to confirm that it is firmly hooked up on the installation plate.

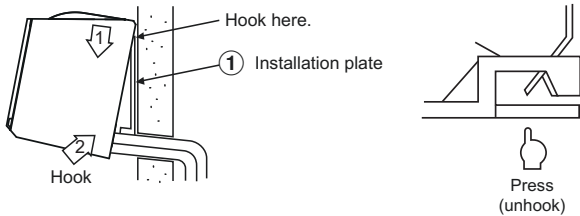


Fig. 10-3-14

- For detaching the indoor unit from the installation plate, pull the indoor unit toward you while pushing its bottom up at the specified parts.

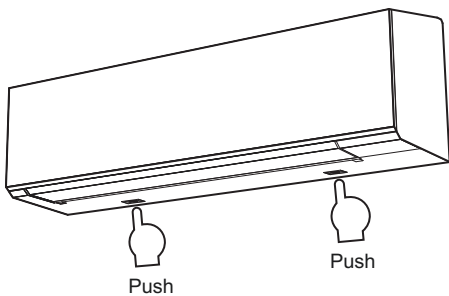


Fig. 10-3-15

### 10-3-7. Drainage

1. Run the drain hose sloped downwards.

#### NOTE

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

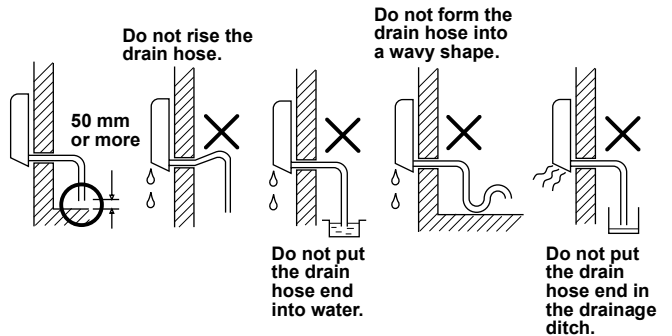


Fig. 10-3-16

2. Put water in the drain pan and make sure that the water is drained out of doors.
3. When connecting extension drain hose, insulate the connecting part of extension drain hose with shield pipe.

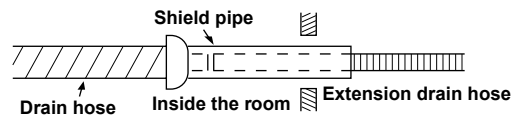


Fig. 10-3-17

#### CAUTION

Arrange the drain pipe for proper drainage from the unit. Improper drainage can result in dew-dropping.

This air conditioner has the structure designed to drain water collected from dew, which forms on the back of the indoor unit, to the drain pan. Therefore, do not store the power cord and other parts at a height above the drain guide.

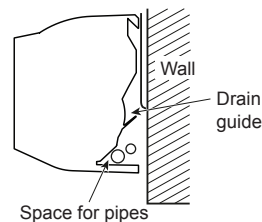


Fig. 10-3-18

## 10-3. Others

### 10-3-1. Gas leak test

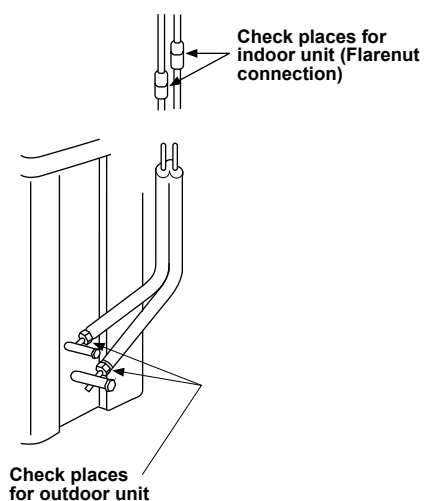


Fig. 10-3-1

- Check the flare nut connections for the gas leak with a gas leak detector or soap water.

### 10-3-2. Remote Control A-B Selection

- When two indoor units are installed in the same room or adjacent two rooms, if operating a unit, two units may receive the remote control signal simultaneously and operate. In this case, the operation can be preserved by setting either one remote control to B setting. (Both are set to A setting in factory shipment.)
- The remote control signal is not received when the settings of indoor unit and remote control are different.
- There is no relation between A setting/B setting and A room/B room when connecting the piping and cables.

To separate using of remote control for each indoor unit in case of 2 air conditioner are installed near.

#### Remote Control B Setup.

1. Press [RESET] button on the indoor unit to turn the air conditioner ON.
2. Point the remote control at the indoor unit.
3. Push and hold [CHECK] button on the Remote Control by the tip of the pencil. "00" will be shown on the display (Picture ①).
4. Press [MODE] during pushing [CHECK]. "B" will show on the display and "00" will disappear and the air conditioner will turn OFF. The Remote Control B is memorized (Picture ②).

- Note :
1. Repeat previous step to reset Remote Control to be A.
  2. Remote Control A have not "A" display.
  3. Default setting of Remote Control from factory is A.

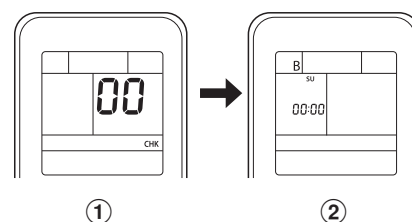


Fig. 10-3-2

### 10-3-3. Test operation

To switch the TEST RUN (COOL) mode, press [RESET] button for 10 sec.

(The beeper will make a short beep.)

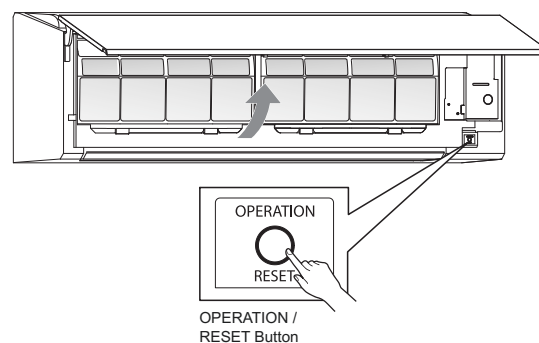


Fig. 10-3-3

### 10-3-4. Auto restart setting

This product is designed so that, after a power failure, it can restart automatically in the same operating mode as before the power failure.

#### Information

The product was shipped with Auto Restart function in the off position. Turn it on as required.

#### <How to turn ON the Auto Restart Function>

1. Press and hold the [OPERATION] button on the indoor unit for 3 seconds (3 beep sounds and OPERATION lamp blink 5 time/sec for 5 seconds).

#### <How to turn OFF the Auto Restart Function>

1. Press and hold the [OPERATION] button on the indoor unit for 3 seconds (3 beep sounds but OPERATION lamp does not blink).

#### NOTE

- In case of ON timer or OFF timer are set, AUTO RESTART OPERATION does not activate.

## 11. HOW TO DIAGNOSE THE TROUBLE

### 11-1. First Confirmation

#### 11-1-1. Confirmation of Power Supply

Confirm that the power breaker operates (ON) normally.

#### 11-1-2. Confirmation of Power Voltage

Confirm that power voltage is AC 220–230–240 ± 10%.

If power voltage is not in this range, the unit may not operate normally.

#### 11-1-3. Operation Which is not a Trouble (Program Operation)

For controlling the air conditioner, the program operations are built in the microcomputer as described in the following table.

If a claim is made for running operation, check whether or not it meets to the contents in the following table.

When it does, we inform you that it is not trouble of equipment, but it is indispensable for controlling and maintaining of air conditioner.

Table 11-1-1

No.	Operation of air conditioner	Description
1	When power breaker is turned "ON", the operation indicator (White) of the indoor unit flashes.	The OPERATION lamp of the indoor unit flashes when power source is turned on. If [⏻] button is operated once, flashing stops. (Flashes also in power failure)
2	Compressor may not operate even if the room temperature is within range of compressor-ON.	The compressor does not operate while compressor restart delay timer (3-minutes timer) operates. The same phenomenon is found after power source has been turned on because 3-minutes timer operates.
3	In Dry and ECO mode, FAN (air flow) display does not change even though FAN (air flow select) button is operated.	The air flow indication is fixed to [AUTO].
4	Increasing of compressor motor speed stops approx. 30 seconds after operation started, and then compressor motor speed increases again approx. 30 seconds after.	For smooth operation of the compressor, the compressor motor speed is restricted to Max. 41 rps for 2 minutes, and Max.91 rps for 2 minutes to 3 minutes, respectively after the operation has started.
5	In AUTO mode, the operation mode is changed.	After selecting Cool or Heat mode, select an operation mode again if the compressor keeps stop status for 15 minutes.
6	In HEAT mode, the compressor motor speed does not increase up to the maximum speed or decreases before the temperature arrives at the set temperature.	The compressor motor speed may decrease by high-temp. release control (Release protective operation by temp.-up of the indoor heat exchanger) or current release control.

## 11-2. Primary Judgment

To diagnose the troubles, use the following methods.

- 1) Judgment by flashing LED of indoor unit
- 2) Self-diagnosis by service check remote controller
- 3) Judgment of trouble by every symptom

Firstly use the method 1) for diagnosis. Then, use the method 2) or 3) to diagnose the details of troubles.

## 11-3. Judgment by Flashing LED of Indoor Unit

While the indoor unit monitors the operation status of the air conditioner, if the protective circuit operates, the contents of self-diagnosis are displayed with block on the indoor unit indication section.

Table 11-3-1

<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Indoor indication lamp flashes.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">Which lamp does flash?</div> <div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; align-items: center;"> <div style="width: 20px; height: 20px; background-color: black; margin-right: 5px;"></div> <div> <div style="border: 1px solid black; padding: 2px;">C</div> </div> </div> </div>	Item	Check code	Block display		Description for self-diagnosis
	A	—	OPERATION Flashing display (1 Hz)		Power failure (when power is ON)
	B	00	OPERATION Flashing display (5 Hz)		Protective circuit operation for indoor P.C. board
	C	01	OPERATION TIMER (White) Flashing display (5 Hz)		Protective circuit operation for connecting cable and serial signal system
	D	02	OPERATION Flashing display (5 Hz)		Protective circuit operation for outdoor P.C. board
	E	03	OPERATION TIMER Flashing display (5 Hz)		Protective circuit operation for others (including compressor)
	F	33	OPERATION Normal Flash 1 Hz Flash 2 Hz 2 times every 1 sec. None	TIMER Normal None None Flash 1Hz	Release status display Nothing Current release TD release TCrelease

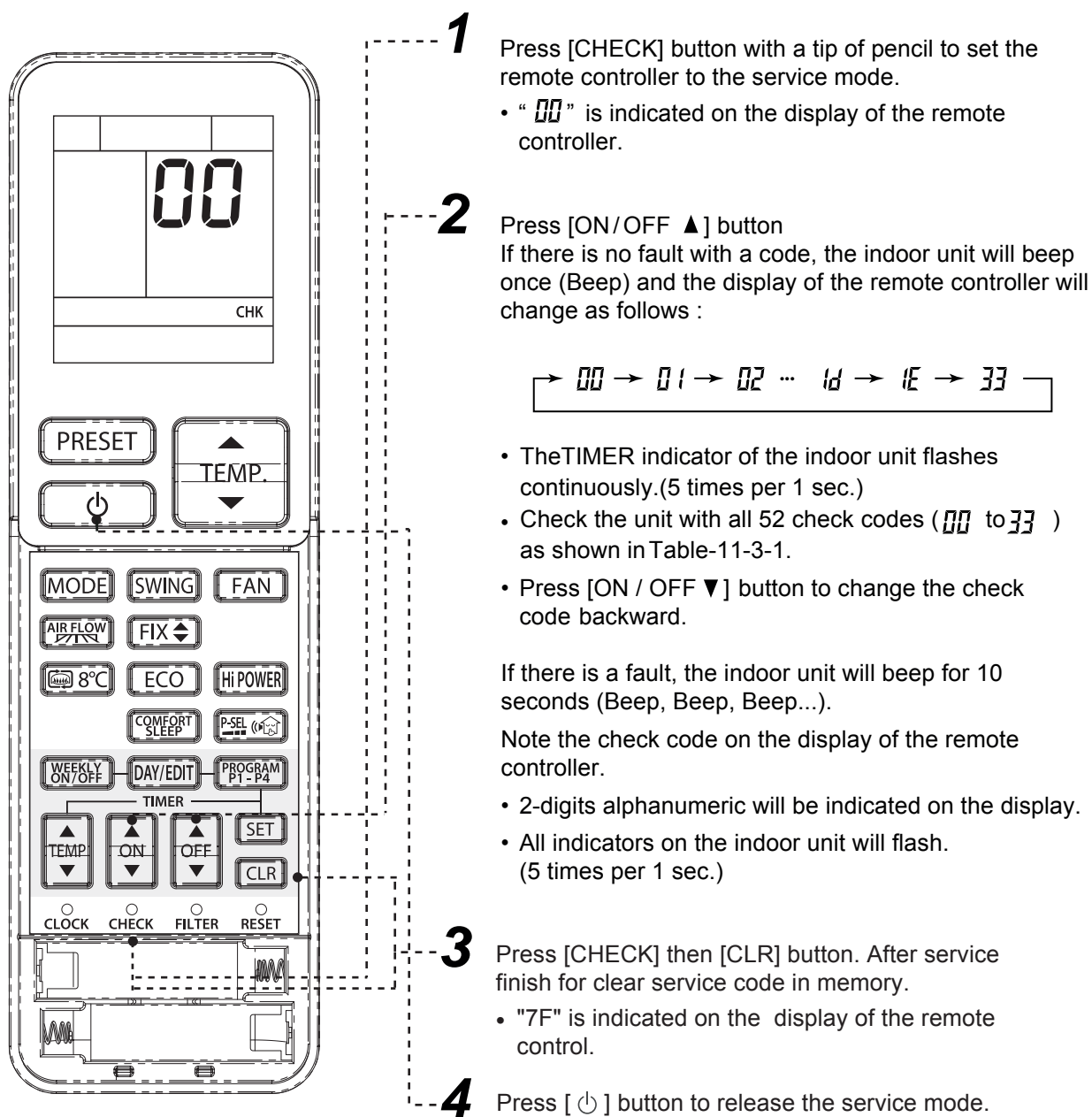
### NOTES :

1. The contents of items B and C and a part of item E are displayed when air conditioner operates.
2. When item B and C, and item B and a part of item E occur concurrently, priority is given to the block of item B.
3. The check codes can be confirmed on the remote controller for servicing.

## 11-4. Self-Diagnosis by Remote Controller (Check Code)

1. If the lamps are indicated as shown B to E in Table 11-3-1, execute the self-diagnosis by the remote controller.
2. When the remote controller is set to the service mode, the indoor controller diagnoses the operation condition and indicates the information of the self-diagnosis on the display of the remote controller with the check codes.  
If a fault is detected, all lamps on the indoor unit will flash at 5Hz and it will beep for 10 seconds (Beep, Beep, Beep ... ). The timer lamp usually flashes (5Hz) during self-diagnosis.

### 11-4-1. How to Use Remote Controller in Service Mode



Alphanumeric characters are used for the check codes.

5 is 5.      6 is 6.  
A is A.      b is B.  
C is C.      d is D.

Fig. 11-4-1

## 11-4-2 Caution at Servicing










1. After using the service mode of remote controller finished, press the [  ] button to reset the remote controller to normal function.
2. After finished the diagnosis by the remote controller, turn OFF power supply and turn its ON again to reset the air conditioner to normal operation. However, the check codes are not deleted from memory of the microcomputer.
3. After servicing finished, press [CLR] button of remote controller under service mode status to send code "7F" to the indoor unit. The check code stored in memory is cleared.

Table 11-4-1

Block distinction		Operation of diagnosis function				Action and Judgment
Check code	Block	Check code	Cause of operation	Air conditioner status	Display flashing error	
	Indoor P.C. board.		TA sensor ; The room temperature sensor is short-Circuit or disconnection.	Operation continues.	Flashes when error is detected.	1. Check the sensor TA and connection. 2. In case of the sensor and its connection is normal, check the P.C. board.
			TC sensor ; The heat exchanger temperature sensor of the indoor unit is out of place, disconnection, short-circuit or migration.	Operation continues.	Flashes when error is detected.	1. Check the sensor TC and connection. 2. In case of the sensor and its connection is normal, check the P.C. board.
			Gas detector sensor failure	Outdoor Unit "OFF" Indoor Unit continue fan only operation for 250 minute or "OFF".	Flashes when error is detected.	1. Check Gas sensor shortage / open. 2. Check Gas sensor disconnect.
			Fan motor of the indoor unit is failure, lock-rotor, short-circuit, disconnection, etc. Or its circuit on P.C. board has problem.	All OFF	Flashes when error is detected.	1. Check the fan motor and connection. 2. In case of the motor and its connection is normal, check the P.C. board.
			Other trouble on the indoor P.C. board.	Depend on cause of failure.	Depend on cause of failure.	1. Reset power supply. 2. Replace P.C. board.
			Refrigerant leakge is detected	Operation stops	"A" LED is flushing Beep sounds Fan forced operation	Check leakage Replace new sensor
			Gas detector sensor life time	Operation continues.	Flashes when error is detected.	Replace new sensor.

Block distinction		Operation of diagnosis function				Action and Judgment
Check code	Block	Check code	Cause of operation	Air conditioner status	Display flashing error	
01	Serial signal and connecting cable.	04	1) Defective wiring of the connecting cable or miss-wiring. 2) Operation signal has not send from the indoor unit when operation start. 3) Outdoor unit has not send return signal to the indoor unit when operation started. 4) Return signal from the outdoor unit is stop during operation. • Some protector (hardware, if exist) of the outdoor unit open circuit of signal. • Signal circuit of indoor P.C. board or outdoor P.C. board is failure in some period.	Indoor unit operates continue. Outdoor unit stop.	Flashes when error is detected. Flashing stop and outdoor unit start to operate when the return signal from the outdoor unit is normal.	1) to 3) The outdoor unit never operate. • Check connecting cable and correct if defective wiring. • Check 25A fuse of inverter P.C. board. • Check 3.15A fuse of inverter P.C. board. • Check operation signal of the indoor unit by using diode. Measure voltage at terminal block of the indoor unit between No.2 and No.3 (or L2 and S) If signal is varied 15-60V continuously, replace inverter P.C. board. If signal is not varied, replace indoor P.C. board. 4) The outdoor unit abnormal stop at some time. • If the other check codes are found concurrently, check them together. • Check protector (hardware) such as Hi-Pressure switch, Thermal-Relay, etc. • Check refrigerant amount or any possibility case which may caused high temperature or high pressure. • Check operation signal of the indoor unit by using diode. Measure voltage at terminal block of the indoor unit between No.2 and No.3 (or L2 and S) If signal is varied 15-60V continuously, replace inverter P.C. board. If signal is not varied, replace indoor P.C. board.

**Note : Operation signal of the indoor unit shall be measured in the sending period as picture below.**

**Sending signal of the indoor unit when have not return signal from the outdoor unit.**

\* Signal send only 1 minute and stop. Because of return signal from outdoor unit has not received.  
 \*\* Signal resend again after 3 minutes stop. And the signal will send continuously.  
 \*\*\* 1 minute after resending, the indoor unit display flashes error.



Block distinction		Operation of diagnosis function				Action and Judgment
Check code	Block	Check code	Cause of operation	Air conditioner status	Display flashing error	
02	Outdoor	14	Current on inverter circuit is over limit in short time. <ul style="list-style-type: none"> <li>• Inverter P.C. board is failure, IGBT shortage, etc.</li> <li>• Compressor current is higher than limitation, lock rotor, etc.</li> </ul>	All OFF	Flashes after error is detected 8 times*.	<ol style="list-style-type: none"> <li>1. Remove connecting lead wire of the compressor, and operate again.</li> <li>2. If outdoor fan does not operate or operate but stop after some period, replace the inverter P.C. board.</li> <li>3. If outdoor fan operates normally, measure 3-Phase output of inverter P.C. board (150-270VAC) at the connecting lead wire of compressor.</li> <li>4. If 3-Phase output is abnormal, replace inverter P.C.Board.</li> <li>5. If 3-Phase output is normal, replace compressor. (lock rotor, etc.)</li> </ol>
		15	Compressor position-detect circuit error or short-circuit between winding of compressor.	All OFF	Flashes after error is detected 8 times*.	<ol style="list-style-type: none"> <li>1. Remove connecting lead wire of the compressor, and operate again.</li> <li>2. If outdoor fan does not operate or operation but stop after some period, replace the inverter P.C. board.</li> <li>3. If outdoor fan operates normally, measure resistance of compressor winding. If circuit is shortage, replace the compressor.</li> </ol>
		17	Current-detect circuit of inverter P.C. board error.	All OFF	Flashes after error is detected 4 times*.	Even if trying to operate again, all operations stop, replace inverter P.C. board.
		18	TE or TS sensor; abnormal. Out of place, disconnection, shortage, or misconnection (TE sensor is connected to TS connector, TS sensor is connected to TE sensor connector)  TE sensor; Outdoor heat exchanger temperature sensor  TS sensor; Suction pipe temperature sensor	All OFF	Flashes after error is detected 4 times*.	<ol style="list-style-type: none"> <li>1. Check sensors, TE, TS connection. In case of sensors and it's connection is normal, check the inverter P.C. board</li> <li>2. Check 4way valve operation/position. In case TE, TS detected temperature relationship are different from normal operation, "18" might be detected.</li> </ol>
		19	TD sensor ; Discharge pipe temperature sensor is disconnection or shortage.	All OFF	Flashes after error is detected 4 times*.	<ol style="list-style-type: none"> <li>1. Check sensors TD and connection.</li> <li>2. In case of the sensor and its connection is normal, check the inverter P.C. board.</li> </ol>
		1A	Outdoor fan failure or its drive-circuit on the inverter P.C. board failure.	All OFF	Flashes after error is detected 8 times*.	<ol style="list-style-type: none"> <li>1. Check the motor, measure winding resistance, shortage or lock rotor.</li> <li>2. Check the inverter P.C. board.</li> </ol>
		1b	TO sensor ; The outdoor temperature sensor is disconnection or shortage.	Operation continues.	Record error after detected 4 times*. But does not flash display.	<ol style="list-style-type: none"> <li>1. Check sensors TO and connection.</li> <li>2. In case of the sensor and its connection is normal, check the inverter P.C. board.</li> </ol>

Block distinction		Operation of diagnosis function				Action and Judgment
Check code	Block	Check code	Cause of operation	Air conditioner status	Display flashing error	
02	Outdoor	11	<p>Compressor drive output error. (Relation of voltage, current and frequency is abnormal)</p> <ul style="list-style-type: none"> <li>Overloading operation of compressor caused by over-charge refrigerant, P.M.V. failure, etc.</li> <li>Compressor failure (High current).</li> <li>TE or TS sensor; abnormal. Out of place, disconnection, shortage, or misconnection (TE sensor is connected to TS connector, TS sensor is connected to TE sensor connector)</li> <li>TE sensor; Outdoor heat exchanger temperature sensor</li> <li>TS sensor; Suction pipe temperature sensor</li> </ul>	All OFF	Flashes after error is detected 8 times*.	<ol style="list-style-type: none"> <li>Check installation conditions such as packed valve opening, refrigerant amount and power supply (rate <math>\pm 10\%</math>, both of operation and non operation condition).</li> <li>(In case of P.M.V. exists) Check P.M.V. by measure the resistance of the coil and confirm its operation (sound of initial operation, etc.)</li> <li>Observe any possibility cause which may affect operation load of compressor.</li> <li>Operate again. If compressor operation is failure when 20 seconds passed (count time from operation starting of compressor), replace compressor.</li> <li>Check sensors, TE, TS connection. In case of sensors and it's connection is normal, check the inverter P.C. board.</li> <li>Check 4way valve operation/position. In case TE, TS detected temperature relationship are different from normal operation, "1C" might be detected.</li> </ol>
<p>* 4 or 8 times ; When first error is detected, error is count as 1 time, then once operation is stop and re-started.</p> <p>After re-starting operation within 6 minutes, if same error is detected, error count is add (count become 2 times)</p> <p>When error count comes 4, 8, 11 or 18 times, record error to check code. But after re-starting operation, if no error is detected and air conditioner can operate more than 6 minutes, error count is cleared.</p>						
03	The others (including compressor)	07	<p>Return signal of the outdoor unit has been sent when operation start. But after that, signal is stop some time.</p> <ul style="list-style-type: none"> <li>Instantaneous power failure.</li> <li>Some protector (hardware) of the outdoor unit open circuit of signal.</li> <li>Signal circuit of indoor P.C. board or outdoor P.C. board is failure in some period.</li> </ul>	Indoor unit operates continue. Outdoor unit stop.	Flashes when error is detected. Flashing stop and outdoor unit start to operate when the return signal from the outdoor unit is normal.	<ol style="list-style-type: none"> <li>Check power supply (Rate <math>\pm 10\%</math>)</li> <li>If the air conditioner repeat operates and stop with interval of approx. 10 to 40 minutes. <ul style="list-style-type: none"> <li>(In case of these exist) Check protector (hardware) such as Hi-Pressure switch, Thermal-Relay, etc.</li> <li>Check refrigerant amount, packed valve opening and any possibility cause which may affect high temperature or high pressure.</li> </ul> </li> <li>Check operation signal of the indoor unit by using diode. Measure voltage at terminal block of the indoor unit between No.2 and No.3 (or L2 and S) If signal is varied 15-60V continuously, replace inverter P.C. board. If signal is not varied, replace indoor P.C. board.</li> </ol>

Block distinction		Operation of diagnosis function				Action and Judgment
Check code	Block	Check code	Cause of operation	Air conditioner status	Display flashing error	
	The others (including compressor)		Compressor does not rotate. Because of missed wiring, missed phase or shortage.	All OFF	Flashes after error is detected 8 times*.	1. Remove connecting lead wire of the compressor, and operate again. 2. If outdoor fan does not operate or operation but stop after some period, replace the inverter P.C. board. 3. If outdoor fan operates normally, measure 3-Phase output of inverter P.C. board (150-270VAC) at the connecting lead wire of compressor. 4. If 3-Phase output is abnormal, replace inverter P.C.Board. 5. If 3-Phase output is normal, measure resistance of compressor winding. 6. If winding is shortage, replace the compressor.
			Discharge temperature exceeded 117°C.	All OFF	Flashes after error is detected 4 times*.	1. Check sensors TD. 2. Check refrigerant amount. 3. (In case of P.M.V. exists) Check P.M.V. by measure the resistance of the coil and confirm its operation (sound of initial operation, etc.) 4. Observe any possibility cause which may affect high temperature of compressor.
			Compressor is high current though operation Hz is decreased to minimum limit. • Installation problem. • Instantaneous power failure. • Refrigeration cycle problem. • Compressor break down. • Compressor failure (High current).operation, etc.)	All OFF	Flashes after error is detected 8 times*.	1. Check installation conditions such as packed valve opening, refrigerant amount and power supply (rate $\pm 10\%$ , both of operation and non operation condition). 2. (In case of P.M.V. exists) Check P.M.V. by measure the resistance of the coil and confirm its operation (sound of initial operation, etc.) 3. Observe any possibility cause which may affect high current of compressor. 4. If 1, 2 and 3 are normal, replace compressor.

Block distinction		Operation of diagnosis function				Action and Judgment
Check code	Block	Check code	Cause of operation	Air conditioner status	Display flashing error	
03	The others (including compressor)	21	<p>Return signal of the outdoor unit has been sent when operation start. But after that, signal is stop some time.</p> <ul style="list-style-type: none"> <li>Instantaneous power failure.</li> <li>Some protector (hardware) of the outdoor unit open circuit of signal.</li> <li>Signal circuit of indoor P.C. board or outdoor P.C. board is failure in some period.</li> <li>TE, TC high temperature TE for cooling operation TC for heating operation. (TE only exists in the Heat Pump system)</li> <li>TE or TS sensor; abnormal. Out of place, disconnection, shortage, or misconnection (TE sensor is connected to TS connector, TS sensor is connected to TE sensor connector)</li> </ul> <p>TE sensor; Outdoor heat exchanger temperature sensor TS sensor; Suction pipe temperature sensor</p>	Indoor unit operates continue. Outdoor unit stop.	<p>Flashes when error is detected 11 times*.</p> <p>Flashing stop and outdoor unit start to operate when the return signal from the outdoor unit is normal.</p>	<ol style="list-style-type: none"> <li>1. Check power supply (Rate <math>\pm 10\%</math>)</li> <li>2. If the air conditioner repeat operate and stop with interval of approx. 10 to 40 minutes. <ul style="list-style-type: none"> <li>(In case of these exist) Check protector (hardware) such as Hi-Pressure switch, Thermal-Relay, etc.</li> <li>Check refrigerant amount, packed valve opening and any possibility cause which may affect high temperature or high pressure.</li> </ul> </li> <li>3. Check operation signal of the indoor unit by using diode. Measure voltage at terminal block of the indoor unit between No.2 and No.3 (or L2 and S) If signal is varied 15-60V continuously, replace inverter P.C. board. If signal is not varied, replace indoor P.C. board.</li> <li>4. Check and clean heat exchanger area Indoor and Outdoor unit.</li> <li>5. Check sensors, TE, TS connection. In case of sensors and it's connection is normal, check the inverter P.C. board.</li> <li>6. Check 4way valve operation/position. In case TE, TS detected temperature relationship are different from normal operation, "21" might be detected.</li> </ol>

\* 4, 8 or 11 times ; When first error is detected, error is count as 1 time, then once operation is stop and re-started.

After re-starting operation within 6 minutes, if same error is detected, error count is add (count become 2 times) When error count comes 4, 8, 11 or 18 times, record error to check code. But after re-starting operation, if no error is detected and air conditioner can operate more than 6 minutes, error count is cleared.

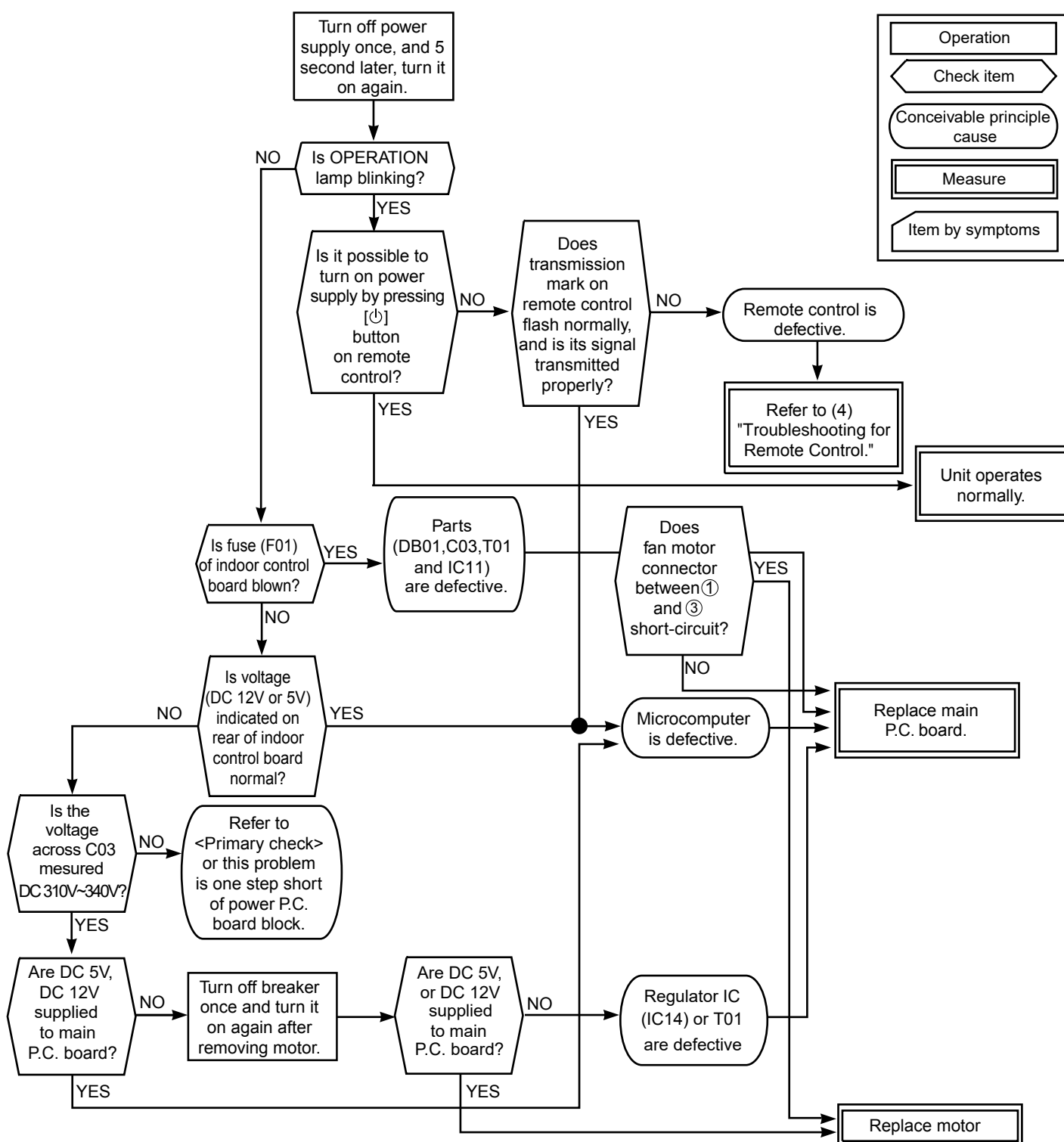
## 11-5. Judgment of Trouble by Every Symptom

### 11-5-1. Indoor Unit (Including Remote Controller)

#### (1) Power is not turned on (Does not operate entirely)

##### <Primary check>

1. Is the supply voltage normal?
2. Is the normal voltage provided to the outdoor unit?
3. Is the crossover cable connected properly?
4. Is the fuse (F01) blown?

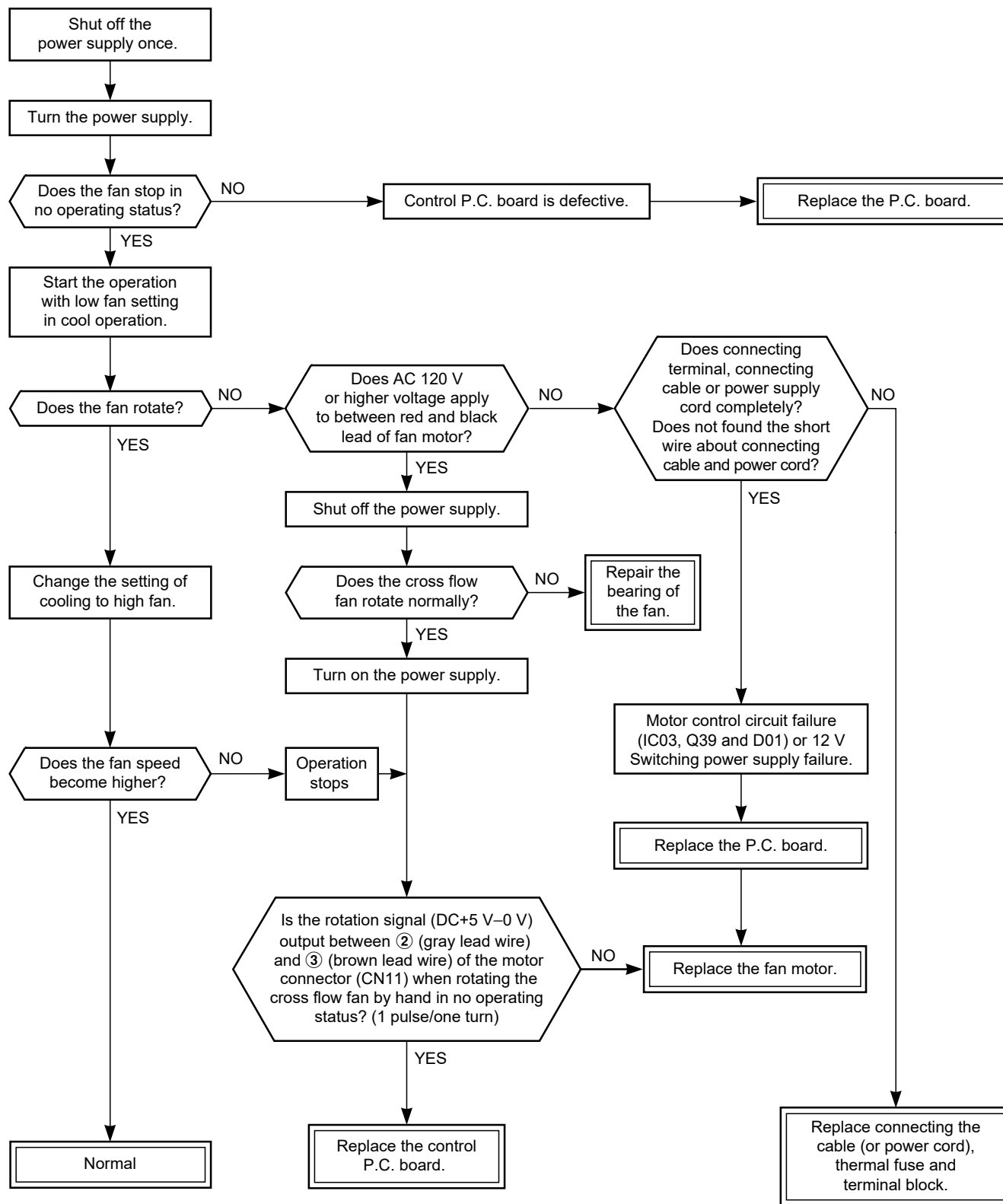


- Be sure to disconnect the motor connector CN10 after shut off the power supply, or it will be a cause of damage of the motor.

## (2) Only the indoor motor fan does not operate

### <Primary check>

1. Is it possible to detect the power supply voltage (AC220–240V) between ① and ② on the terminal block?
2. Does the indoor fan motor operate in cooling operation?  
(In heating operation, the indoor fan motor does not operate for approximately 10 minutes after it is turned on, to prevent a cold air from blowing in.)



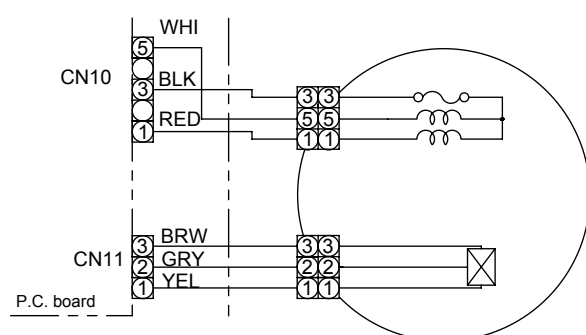
**(For AC fan motor)**

**<Inspection procedure>**

1. Remove the front panel. (Remove 2 screws.)
2. Remove the cover of the fan motor lead wires.
3. Check AC voltage with CN10 connector while the fan motor is rotating.

**NOTE :**

- Using a tester, measure the resistance value of each winding coil.
- Use a thin test rod.
- Do not disconnect the connector while the fan motor is rotating.
- For P.C. board side, proceed to the item "Only indoor fan does not operate" of "Judgment of Trouble by Every Symptom".

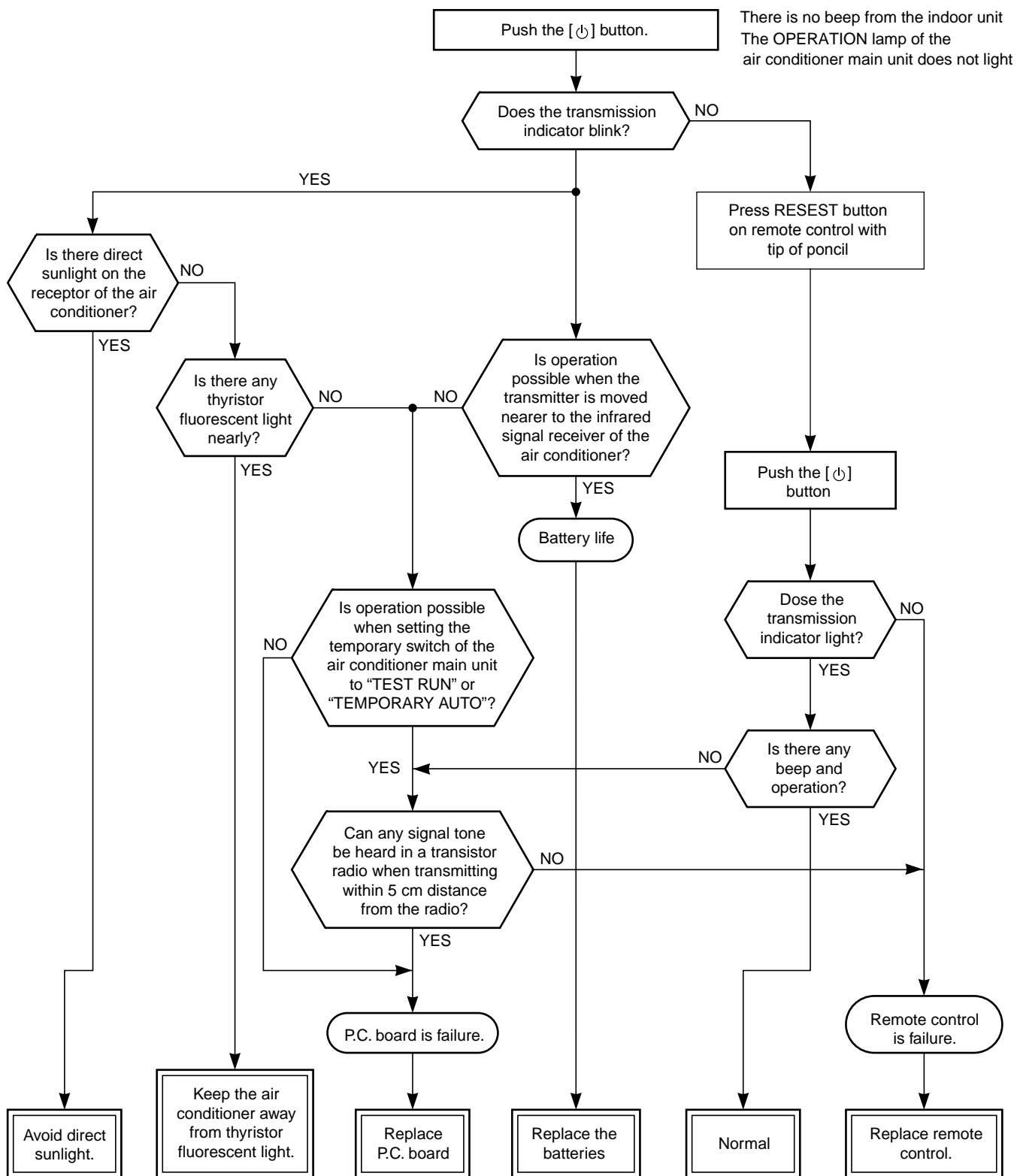


Position (P.C. board)	Resistance value
Between ③ (Black) - ① (Red)	120.6 ± 8.4 Ω
Between ③ (Black) - ⑤ (White)	244.2 ± 17 Ω
Between ① (Red) - ⑤ (White)	364.8 ± 25.5 Ω

### (3) Troubleshooting for remote controller

#### <Primary check>

Check that A or B selected on the main unit is matched with A or B selected on the remote controller.





## **11-6. How to Check Simply the Main Parts**

### **11-6-1. How to Check the P.C. Board (Indoor Unit)**

#### **(1) Operating precautions**

- 1) When removing the front panel or the P.C. board, be sure to shut off the power supply breaker.
- 2) When removing the P.C. board, hold the edge of the P.C. board and do not apply force to the parts.
- 3) When connecting or disconnecting the connectors on the P.C. board, hold the whole housing. Do not pull at the lead wire.

#### **(2) Inspection procedures**

- 1) When a P.C. board is judged to be defective, check for disconnection, burning, or discoloration of the copper foil pattern on this P.C. board.
- 2) The P.C. board consists of the following 2 parts

##### **a. Main P.C. board part :**

DC power supply circuit, Indoor fan motor control circuit, CPU and peripheral circuits, buzzer, and Driving circuit of louver.

##### **b. Indication unit of infrared ray receiving infrared ray receiving circuit, LED :**

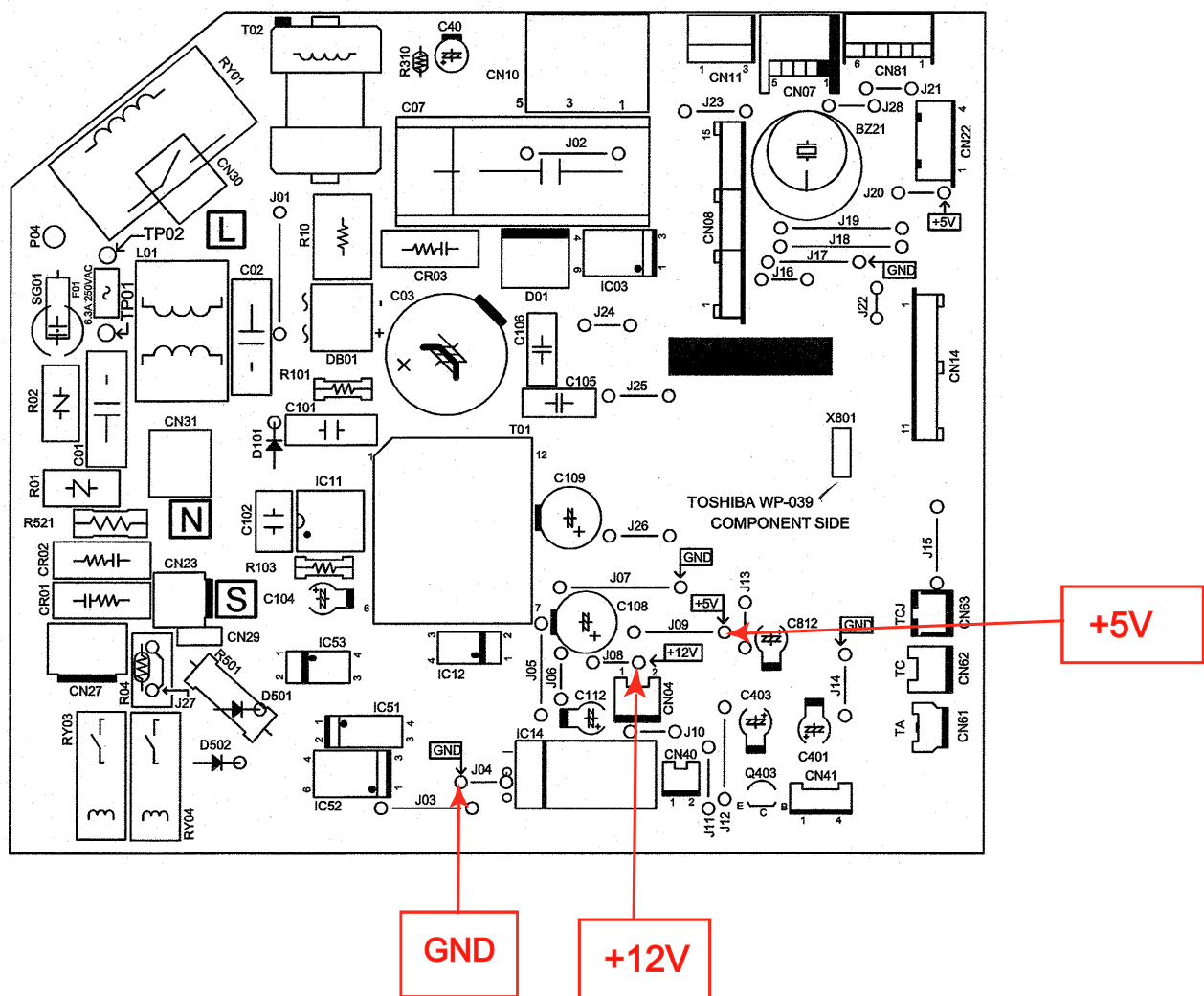
To check defect of the P.C. board, follow the procedure described below.

### (3) Check procedures

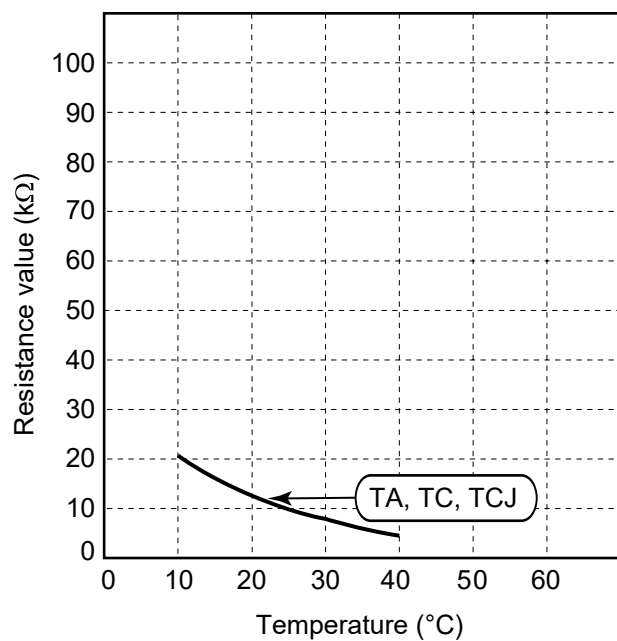
Table 11-6-1

No.	Procedure	Check points	Causes
1	Turn off the power supply breaker and remove the P.C. board assembly from electronic parts base. Remove the connecting cables from the terminal block.	Check whether or not the fuse (F01) is blown.	Impulse voltage was applied or the indoor fan motor short-circuited.
2	Remove the connector of the motor and turn on the power supply breaker. If OPERATION indicator flashes (once per second), it is not necessary to check steps (1 to 3) in the right next column.	Check power supply voltage : 1. Between CN30 and CN31 (AC 220–240V) 2. Between ⊕ and ⊖ of C03 (DC 310–340V) 3. Between 12V and GND 4. Between 5V and GND	1. The terminal block or the crossover cable is connected wrongly. 2. The capacitor (C03), line filter (L01), resistor (R10), or the diode (DB01) is defective. 3. T01 is defective. 4. IC14 and T01 are defective.
3	Push [⏻] button once to start the unit. (Do not set the mode to On-Timer operation.)	Check power supply voltage : 1. Between CN23 and CN31 (DC 15–60V)	IC51 and IC52 are defective.
4	Shorten the restart delay timer and start unit.	Check whether or not all indicators (OPERATION, TIMER, HI-POWER, ECO, Wi-Fi) are lit for 3 seconds and they return to normal 3 seconds later.	The indicators are defective or the housing assembly (CN14) is defective.
5	Push [⏻] button once to start the unit. • Shorten the restart delay timer. • Set the operation mode to COOL. • Set the fan speed level to AUTO. • Set the preset temperature much lower than the room temperature. (The unit (compressor) operates continuously in the above condition.)	1. Check whether or not the compressor operates. 2. Check whether or not the OPERATION indicator flashes.	1. The temperature of the indoor heat exchanger is extremely low. 2. The connection of the heat exchanger sensor is loose. (The connector is disconnected.) (CN62) 3. The heat exchanger sensor and the P.C. board are defective. (Refer to Table 11-4-1.) 4. The main P.C. board is defective.
6	If the above condition (No. 5) still continues, start the unit in the following condition. • Set the operation mode to HEAT. • Set the preset temperature much higher than room temperature.	1. Check whether or not the compressor operates. 2. Check whether or not the OPERATION indicator flashes.	1. The temperature of the indoor heat exchanger is extremely high. 2. The connection of the heat exchanger sensor short-circuited. (CN62) 3. The heat exchanger sensor and the P.C. board are defective. (Refer to Table 11-4-1.) 4. The main P.C. board is defective
7	Connect the motor connector to the motor and turn on the power supply. Start the unit the following condition. • Set the fan speed level to HIGH. (The unit (compressor) operates continuously in the above condition in No. 5.)	1. Check it is impossible to detect the voltage (AC120V or higher voltage) between red and black lead of the motor. 2. The motor does not operate or the fan motor does not rotate with high speed. (But it is possible to receive the signal from the remote controller.) 3. The motor rotates but vibrates strongly.	1. The indoor fan motor is defective. (Protected operation of P.C. board.) 2. The P.C. board is defective. 3. The connection of the motor connector is loose.

11-6-2. P.C . Board Layout

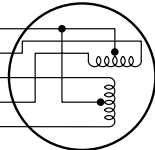


[1] Sensor characteristic table



TA : Room temp. sensor  
TC,TCJ : Heat exchanger temp. sensor

### 11-6-3. Indoor Unit (Other Parts)

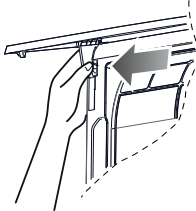
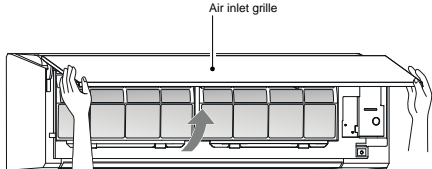
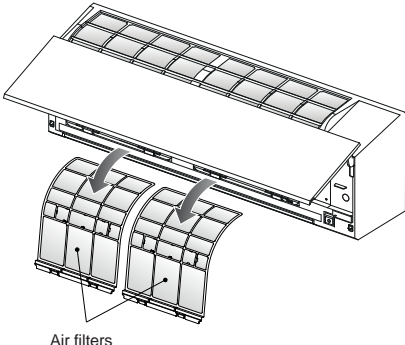
No.	Part name	Checking procedure												
1	Room temp. (TA) sensor Heat exchanger (TC,TCJ) sensor	Disconnect the connector and measure the resistance value with tester. (Normal temp.) <table><tr><th>Sensor \ Temperature</th><th>10°C</th><th>20°C</th><th>25°C</th><th>30°C</th><th>40°C</th></tr><tr><td>TA, TC, TCJ (kΩ)</td><td>20.7</td><td>12.6</td><td>10.0</td><td>7.9</td><td>4.5</td></tr></table>	Sensor \ Temperature	10°C	20°C	25°C	30°C	40°C	TA, TC, TCJ (kΩ)	20.7	12.6	10.0	7.9	4.5
Sensor \ Temperature	10°C	20°C	25°C	30°C	40°C									
TA, TC, TCJ (kΩ)	20.7	12.6	10.0	7.9	4.5									
2	Remote controller	Refer to 11-5-1. (3).												
3	Louver motor 24BYJ48-ST	Measure the resistance value of each winding coil by using the tester. (Under normal temp. 25°C) <div><div><div>White</div><div>Yellow</div><div>Yellow</div><div>Yellow</div><div>Yellow</div></div><div><div>①①</div><div>②②</div><div>③③</div><div>④④</div><div>⑤⑤</div></div><div></div></div> <table><tr><th>Position</th><th>Resistance value</th></tr><tr><td>1 to 2</td><td rowspan="4">200Ω ± 7%</td></tr><tr><td>1 to 3</td></tr><tr><td>1 to 4</td></tr><tr><td>1 to 5</td></tr></table> <div>at 25°C</div>	Position	Resistance value	1 to 2	200Ω ± 7%	1 to 3	1 to 4	1 to 5					
Position	Resistance value													
1 to 2	200Ω ± 7%													
1 to 3														
1 to 4														
1 to 5														
4	Indoor fan motor	Refer to 11-5-1. (2).												

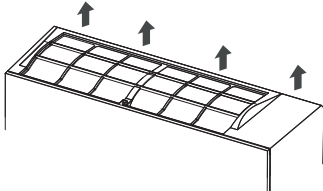
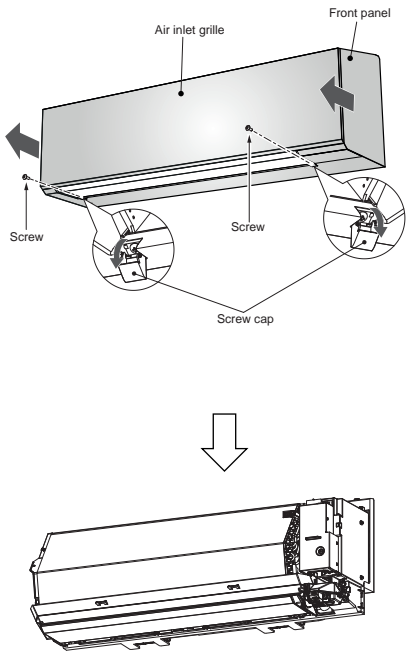
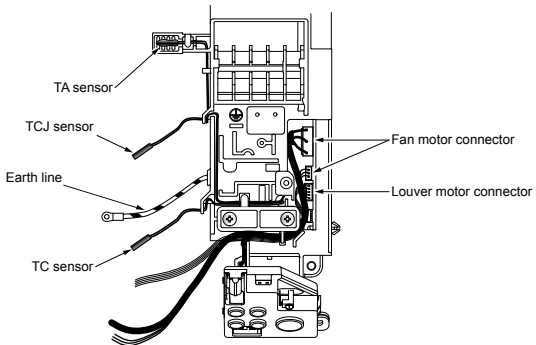
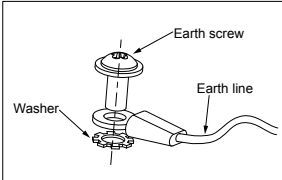
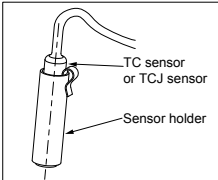
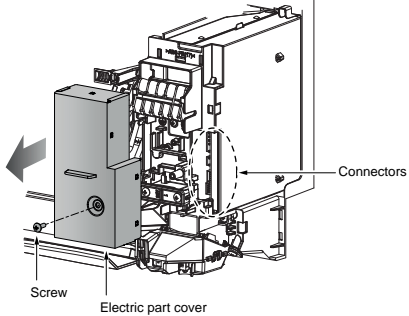
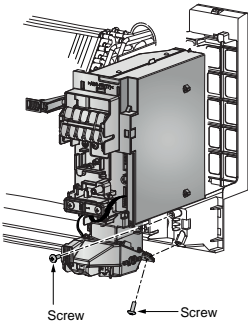
## 12. HOW TO REPLACE THE MAIN PARTS

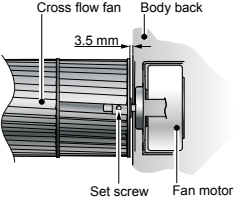
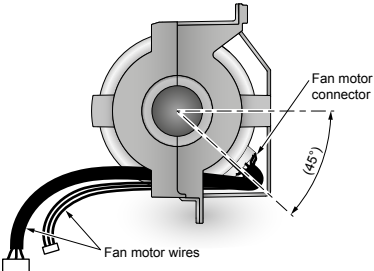
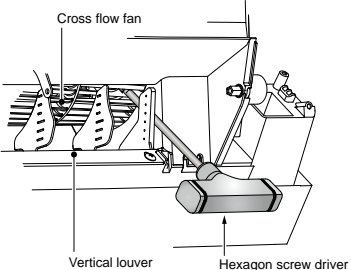
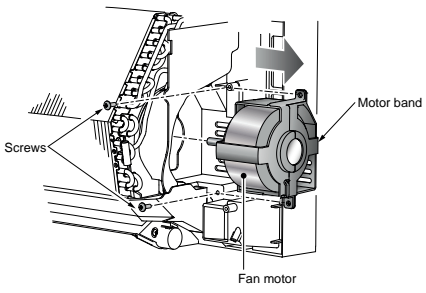
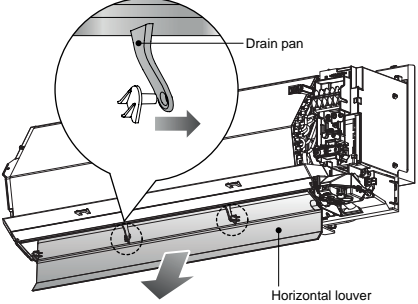
### WARNING

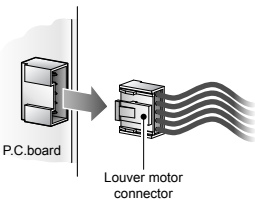
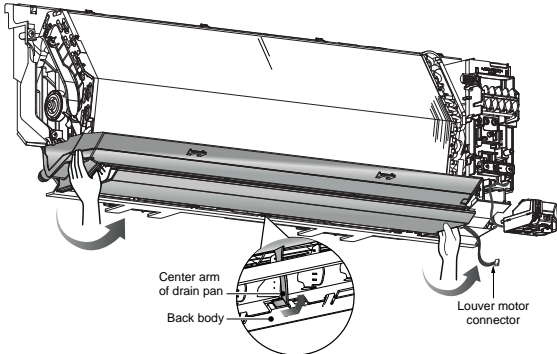
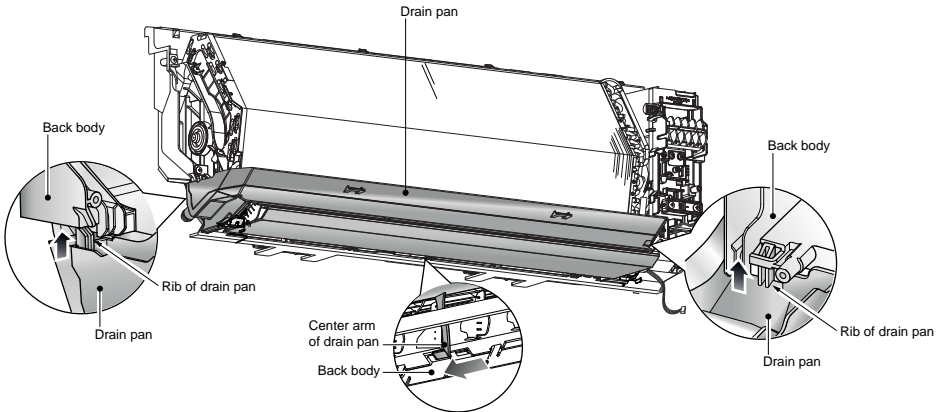
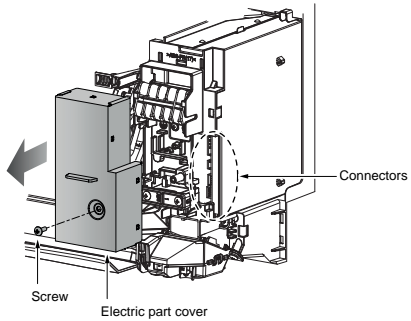
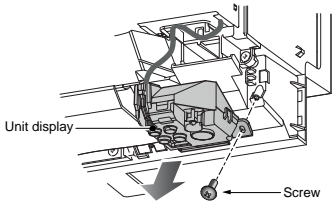
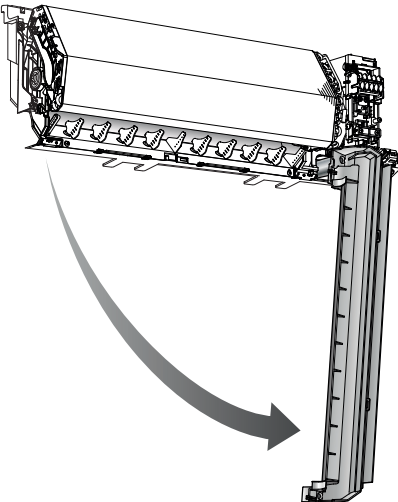
- Since high voltages pass through the electrical parts, turn off the power without fail before proceeding with the repairs.  
Electric shocks may occur if the power plug is not disconnected.
- After the repairs have been completed (after the front panel and cabinet have been installed), perform a test run, and check for smoking, unusual sounds and other abnormalities.  
If this check is omitted, a fire and/or electric shocks may occur.  
Before proceeding with the test run, install the front panel and cabinet.
- Ensure that the following steps are taken when doing repairs on the refrigerating cycle.
  1. Do not allow any naked flames in the surrounding area.  
If a gas stove or other appliance is being used, extinguish the flames before proceeding.  
If the flames are not extinguished, they may ignite any oil mixed with the refrigerant gas.
  2. Do not use welding equipment in an airtight room.  
Carbon monoxide poisoning may result if the room is not properly ventilated.
  3. Do not bring welding equipment near flammable objects.  
Flames from the equipment may cause the flammable objects to catch fire.
- **If keeping the power on is absolutely unavoidable while doing a job such as inspecting the circuitry, wear rubber gloves to avoid contact with the live parts.**  
Electric shocks may be received if the live parts are touched.  
High-voltage circuits are contained inside this unit.  
Proceed very carefully when conducting checks since directly touching the parts on the control circuit board may result in electric shocks.

### 12-1. Indoor Unit

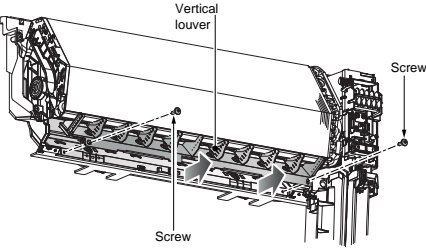
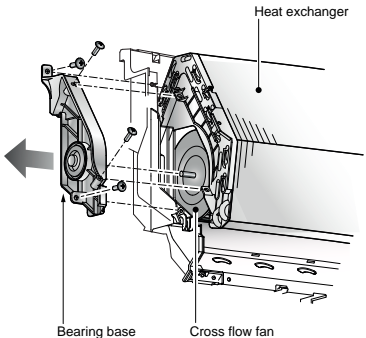
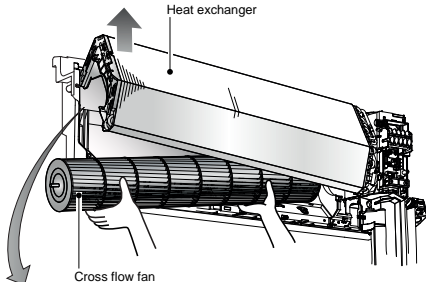
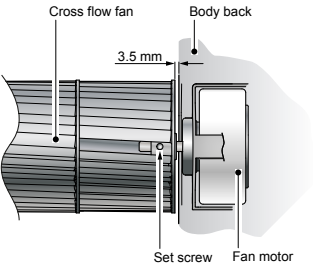
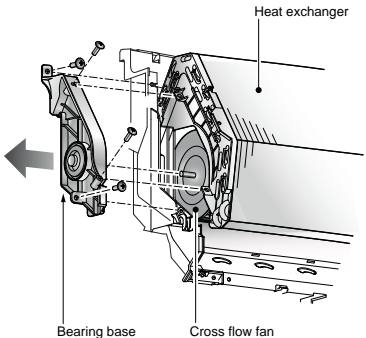
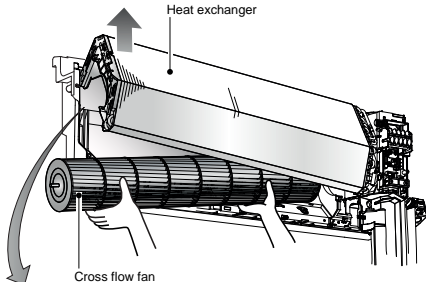
No.	Part name	Procedures	Remarks
①	Air inlet grille	1) Stop operation of the air conditioner and turn off its main power supply. 2) Open the air inlet grille and push it up until the air inlet grille take off.  <b>&lt;Remark&gt;</b> If you do not have enough space for push the air inlet grille up until it take off, you can push the arms of air inlet grille toward the outside, and remove the air inlet grille.  	
②	Air filters	1) Follow to the procedure in the item ①.   2) Remove the left and the right air filters from the front panel.	

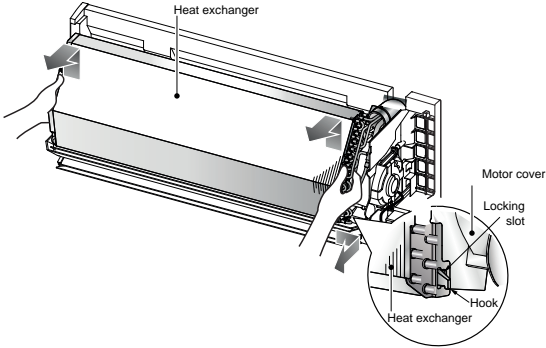
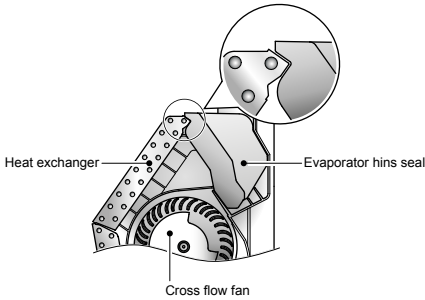
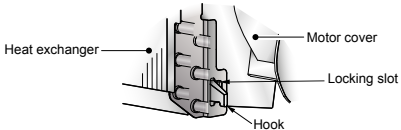
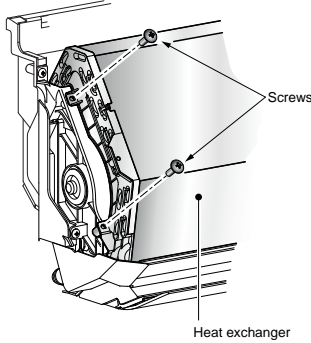
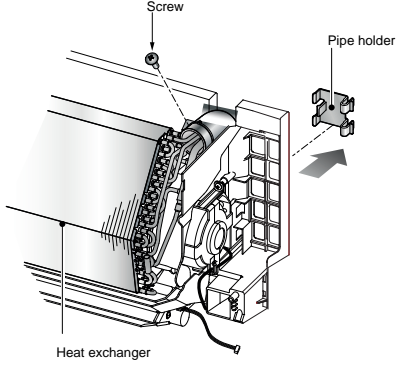
No.	Part name	Procedures	Remarks
③	Front panel	<p>1) Stop operation of the air conditioner and turn off its main power supply.</p> <p>2) Open two screw caps and securely remove screws (2 pcs.) at the front panel.</p>  <p>3) Take off the hooks of front panel from top side of the back body.</p> <p>4) Slightly open the lower part of the front panel then pull the upper part of the front panel toward you to remove it as shown on figure.</p>	
④	Electric part box assembly	<p>1) Follow the procedure item ③.</p> <p>2) Remove screw holding the electric part cover.</p>  <p>3) Disconnect the connectors for the fan motor and louver motor from P.C. board assembly.</p> <div style="display: flex; justify-content: space-around;">   </div> <p>4) Remove the earth screw and earth line from evaporator.</p> <p>5) Pull out TC and TCJ sensor from sensor holder of the evaporator.</p> <p>6) Remove the 2 fixing screws that secures the electric parts box assembly, unit display assembly and remove the electric parts box assembly.</p>	 

No.	Part name	Procedures	Remarks
⑤	Fan motor	<p>1) Follow the procedure item ③ and ④.  2) Loosen the set screw of the cross flow fan.</p>  <p>3) Remove 2 fixing screws of the motor band.  4) Pull the motor band and the fan motor outward.</p> <p><b>&lt;To re-installation&gt;</b></p> <ul style="list-style-type: none"> <li>- Check the type name of fan motor.</li> <li>- Keep connector position and arrange fan motor wires follow figure.</li> </ul>  <p><u>For SJM-240-25</u></p>	 
⑥	Horizontal louver	<p>1) Remove shaft of the horizontal louver from the back body. (First remove 2 the center shafts then remove the other shafts.)</p>	

No.	Part name	Procedures	Remarks
⑦	Drain pan assembly	<p>1) Follow the procedure item ③.</p> <p>2) Remove screw holding the electric part cover.</p>  <p>3) Disconnect the louver motor connector (5P) from P.C. board assembly.</p> <p>4) Remove fixing screws of the unit display and remove unit display.</p>  <p>5) Remove the drain pan from the back body.</p> <p><b>&lt;To re-installation&gt;</b></p> <ul style="list-style-type: none"> <li>- Press the drain pan into the back body</li> <li>- Please make sure ribs of drain pan in left and right side must be install to lock position.</li> <li>- Press the center arm of drain pan to back body.</li> </ul> 	  

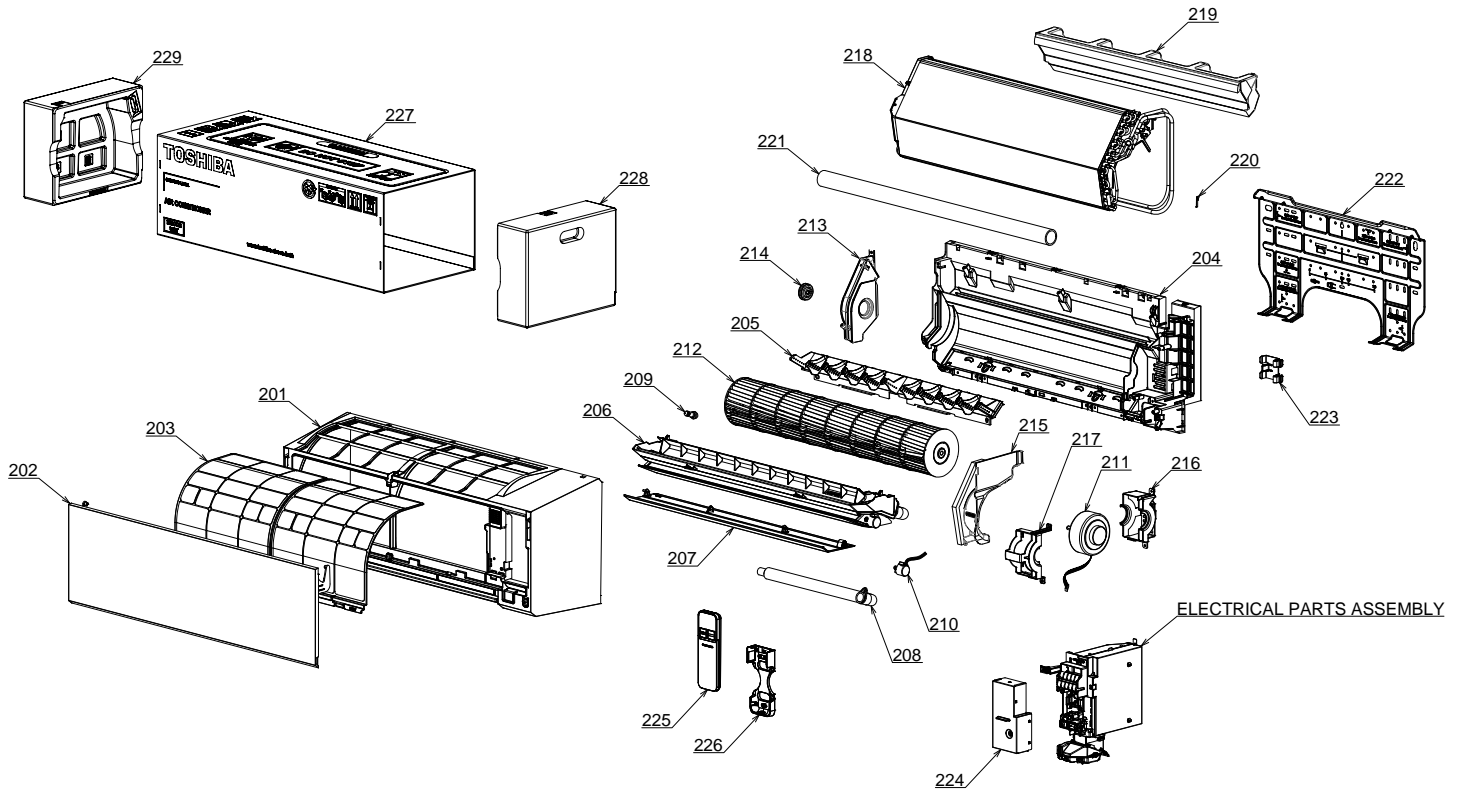


No.	Part name	Procedures	Remarks
⑧	Vertical louver assembly	1) Follow the procedure item③and⑦. 2) Remove 2 fixing screws from the base vertical louver then remove the vertical louver assembly from the body back.	
⑨	Cross flow fan	1) Follow the procedure item③and④. 2) Loosen the set screw of the cross flow fan. 3) Remove 4 fixing screws from the bearing base then remove it from the main unit.  4) Lift up the heat exchanger follow the figure. Pull out the left hand side until the cross flow fan is released from the shaft of the fan motor and then pull out the lower side of heat exchanger follow the figure.  <b>&lt;To re-installation&gt;</b> 1) To incorporate the fan motor and the motor into the position in the following figure. - Install the cross flow fan so that the right end of the 1st joint from the right of the Cross flow fan is keep 3.5mm from closed wall of the main unit.     - Holding the set screw, install the cross flow fan so that flat area on shaft of the fan motor comes to the mounting hole of the set screw.	 

No.	Part name	Procedures	Remarks
⑩	Heat exchanger (Evaporator)	<p>1) Follow the procedure in item③and④.</p> <p>2) Remove 2 fixing screws at the left side of the heat exchanger.</p> <p>3) Remove fixing screw at the upper right side of the heat exchanger.</p> <p>4) Remove the pipe holder from the rear side of the main unit.</p> <p>5) Pull out the right hand side until the locking slot of heat exchanger is released from the hook of the motor cover then pull out the upper side of heat exchanger.</p>  <p><b>&lt;To re-installation&gt;</b>  In case of evaporator is assembled with evaporator hins seal :</p> <ul style="list-style-type: none"> <li>- Put the evaporator hins seal on the body back before assembly the heat exchanger.</li> <li>- Please keep assembly heat exchanger follow figure as below :</li> </ul>  <ul style="list-style-type: none"> <li>- Please make sure that the hook of motor cover must be installed into the locking slot of heat exchanger.</li> </ul> 	 

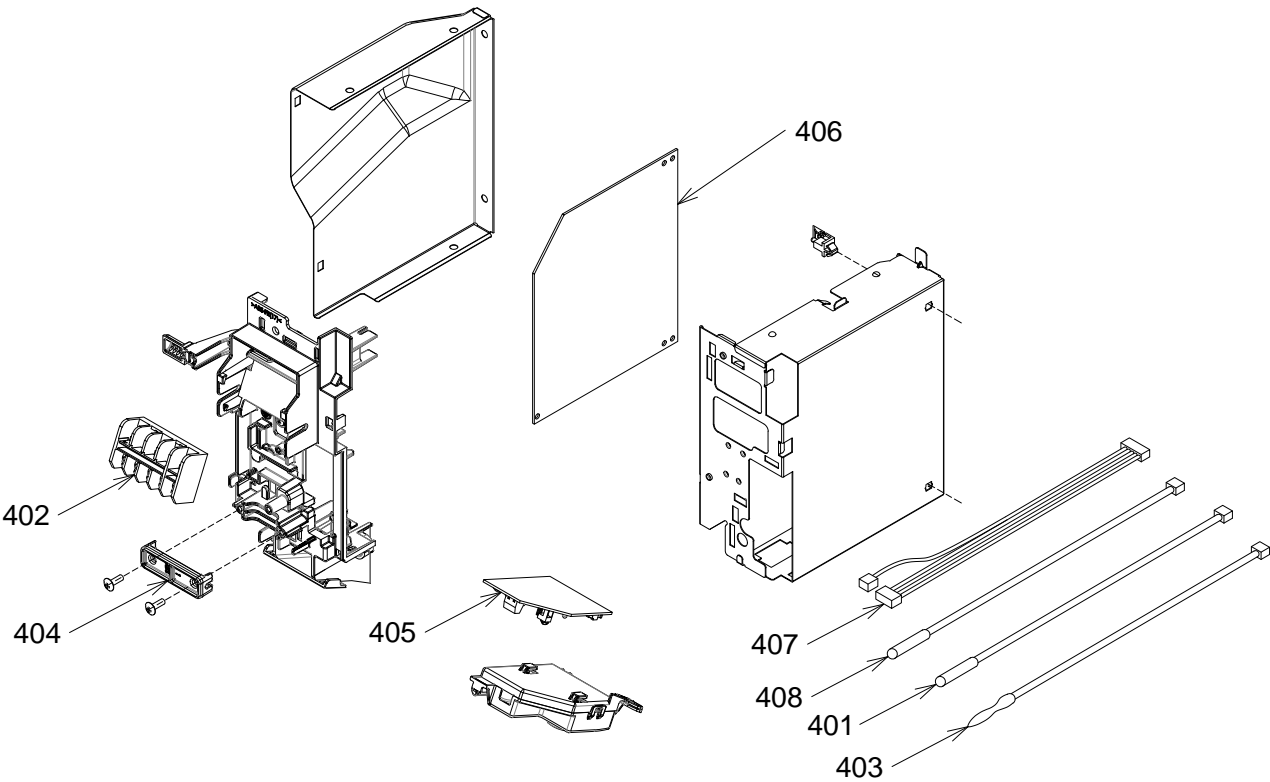
## 13. EXPLODED VIEWS AND PARTS LIST

### 13-1. Indoor Unit



Location No.	Part No.	Description	Location No.	Part No.	Description
201	43T00777	FRONT PANEL ASSY	216	43T39441	MOTOR BAND BACK ASSY
202	43T09585	GRILLE OF AIR INLET ASSY	217	43T39369	MOTOR BAND FRONT
203	43T80357	AIR FILTER	218	43T44668	REFRIGERATION CYCLE ASSY
204	43T03417	BACK BODY ASSY	219	43T39370	EVAPORATOR HINS SEAL
205	43T22343	VERTICAL LOUVER ASSY	220	43T19333	HOLDER, SENSOR
206	43T72350	DRAIN PAN ASSY	221	43T11321	PIPE-SHIELD
207	43T22364	HORIZONTAL LOUVER	222	43T82332	INSTALLATION PLATE
208	43T70321	DRAIN HOSE	223	43T49368	PIPE HOLDER
209	43T79322	DRAIN CAP	224	43T62360	TERMINAL COVER ASSY
210	43T21478	MOTOR; STEPPING	225	43T66403	WIRELESS REMOCO
211	43T21462	MOTOR FAN	226	43T83305	HOLDER, REMOTE CONTROL
212	43T20344	CROSS FLOW FAN ASSY	227	43T91305	PACKING SLEEVE
213	43T39365	BASE BEARING	228	43T91395	PACKING CUSHION RIGHT
214	43T22312	BEARING ASSY, MOLD	229	43T91396	PACKING CUSHION LEFT
215	43T39364	MOTOR COVER			

13-2. Indoor Unit (Part-E)



Location No.	Part No.	Description	Location No.	Part No.	Description
401	43T50394	TEMPERATURE SENSOR	406	43TN9804	PC BOARD ASSY (FOR RAS-M05N4KVSG-E)
402	43T6V695	TERMINAL(3P)	407	43T60480	HOUSING-WiFi
403	43T50392	SENSOR,THERMOSTAT	408	43T50306	TEMPERATURE SENSOR
404	43T62340	CORD-CLAMP			
405	43TN9904	PC BOARD ASSY : WRS-LED			
406	43T6W980	PC BOARD ASSY (FOR RAS-M05J2KVSG-E)			

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