

# TOSHIBA

## SERVICE MANUAL

# AIR-CONDITIONER

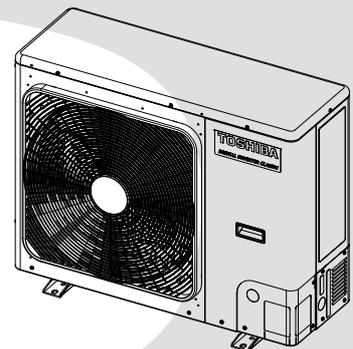
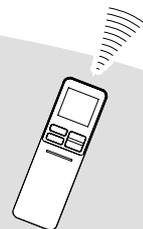
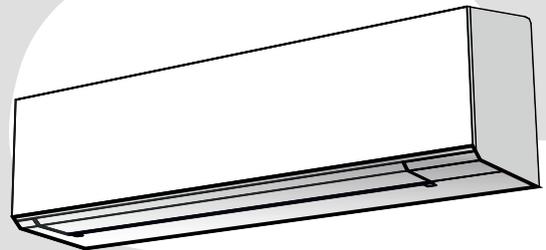
SPLIT TYPE

Indoor Unit

Outdoor Unit

**RAS-B50G3KVSG-ND**

**RAS-50G3AVSG-ND**



R32

**INVERTER**



Revised on Jun, 2024

# CONTENTS

1. SAFETY PRECAUTIONS .....	3
2. SPECIFICATIONS .....	6
3. REFRIGERANT R32 .....	8
4. CONSTRUCTION VIEWS .....	16
5. WIRING DIAGRAM .....	18
6. SPECIFICATIONS OF ELECTRICAL PARTS .....	19
7. REFRIGERANT CYCLE DIAGRAM .....	20
8. CONTROL BLOCK DIAGRAM .....	22
9. OPERATION DESCRIPTION .....	24
10. INSTALLATION PROCEDURE .....	60
11. HOW TO DIAGNOSE THE TROUBLE .....	80
12. OUTDOOR CONTROL CIRCUIT .....	100
13. HOW TO REPLACE THE MAIN PARTS .....	105
13. EXPLODED VIEWS AND PARTS LIST .....	125

# 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.

## Warning Indications on the Air Conditioner Unit

Warning indication	Description				
 <table border="1"> <tr> <td colspan="2"><b>CAUTION</b></td> </tr> <tr> <td><b>BURST HAZARD</b></td> <td>Open the service valves before the operation, otherwise there might be the burst.</td> </tr> </table>	<b>CAUTION</b>		<b>BURST HAZARD</b>	Open the service valves before the operation, otherwise there might be the burst.	<b>CAUTION</b> <b>BURST HAZARD</b> Open the service valves before the operation, otherwise there might be the burst.
<b>CAUTION</b>					
<b>BURST HAZARD</b>	Open the service valves before the operation, otherwise there might be the burst.				
 <table border="1"> <tr> <td colspan="2"><b>WARNING!</b></td> </tr> <tr> <td>Be sure to connect earth wire. (Grounding work)</td> <td></td> </tr> </table>	<b>WARNING!</b>		Be sure to connect earth wire. (Grounding work)		<b>WARNING</b> Be sure to connect earth wire. (Grounding work) Incomplete grounding causes an electric shock.
<b>WARNING!</b>					
Be sure to connect earth wire. (Grounding work)					

### For general public use

Power supply cord and connecting cable of appliance use shall be at least polychloroprene sheathed flexible cord (design H07RN-F) or cord designation 60245 IEC66. (Shall be installed in accordance with national wiring regulations.)

- 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.  
 Do not vent gases in to the atmosphere. Refrigerant type: **R32**  
 GWP<sup>(1)</sup> value: **675\*** (ex. R32 ref. AR4)  
<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 a circuit breaker or a switch with a contact separation of at least 3 mm.

## DANGER

- **ASK AN AUTHORIZED DEALER OR QUALIFIED INSTALLATION PROFESSIONAL TO IN-STALL/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 outdoor unit 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.
- A special tool for the R32 or R410A refrigerant is required for installation.
- Thickness of copper pipes used R32 must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm.
- 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.
- When the indoor unit is connected with multi-split R32 outdoor unit 3M26, 4M27 and 5M34. Please see IMS outdoor unit installation manual and consult your dealer about the minimum floor area.
- Comply with national gas regulations.

### WARNING

- **After installation work, make sure below before operation.**
  - **Connection pipes are connected properly and no leakage.**
  - **Packed valves are fully open.**

Running compressor without open packed valves may cause abnormal high pressure and parts failure. Leakage at connection piping may suck air and make further high pressure cause burst and injure.
- **During pump down work make sure below process.**
  - **Don't mix air into the refrigerant cycle.**
  - **Stop the compressor before removing piping after packed valves are fully closed.**

Removing piping under the compressor running and packed valves open, air might be sucked and refrigeration cycle pressure becomes abnormally high, and it causes burst or injury on persons.

### CAUTION

- Exposure of unit to water or other moisture before installation may result in an electrical short. Do not store in a wet basement or expose to rain or water.
- 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 or discharged air might disturb neighbors.
- To avoid personal injury, be careful when handling parts with sharp edges.
- **Perform the specified installation work to guard against an earthquake.**  
If the air conditioner is not installed appropriately, accidents may occur due to the falling unit.
- Please read this installation manual carefully before installing the unit. It contains further important instructions for proper installation, Improper installation may cause fire, burst, electric shock, injury and water leakage.

#### 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

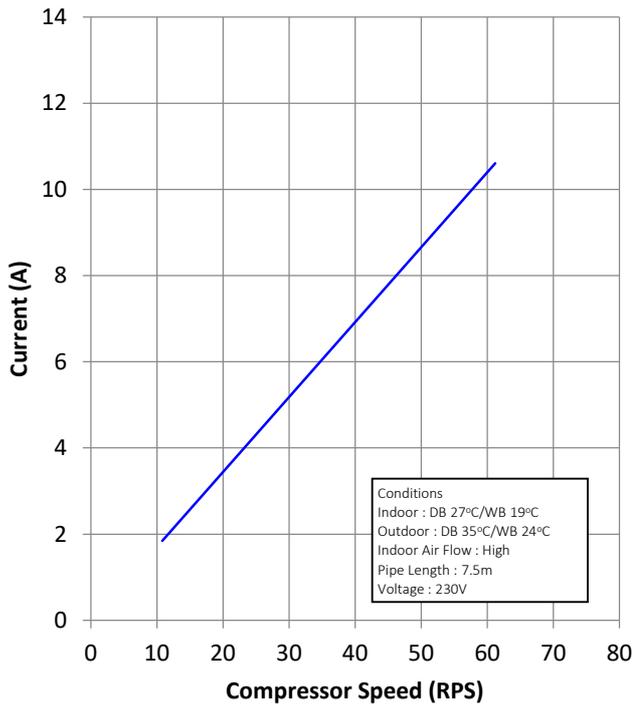
### 2-1. Specification

Unit model	Indoor	<b>RAS-B50G3KVSG-ND</b>				
	Outdoor	<b>RAS-50G3AVSG-ND</b>				
Cooling capacity		(kW)	5.00			
Cooling capacity range		(kW)	1.00-6.50			
Heating capacity		(kW)	6.00			
Heating capacity range		(kW)	1.00-8.70			
Power supply	1Ph/50Hz/220-240V					
Electric characteristic	Indoor	Operation mode		<b>Cooling</b>	<b>Heating</b>	
		Running current	(A)	0.30-0.28	0.30-0.28	
		Power consumption	(W)	40	40	
			Power factor	(%)	60	60
	Outdoor	Operation mode		<b>Cooling</b>	<b>Heating</b>	
		Running current	(A)	6.90-6.33	7.25-6.62	
		Power consumption	(W)	1380	1550	
		Power factor	(%)	91	98	
		Starting current	(A)	-	-	
COP (Cooling / Heating)		3.52/4.00				
Operating noise	Indoor	High	(Cooling / Heating)	(dB-A)	45/47	
		Medium	(Cooling / Heating)	(dB-A)	37/37	
		Low	(Cooling / Heating)	(dB-A)	31/31	
	Outdoor	(Cooling / Heating)		(dB-A)	49/52	
Indoor unit	Unit model		<b>RAS-B50G3KVSG-ND</b>			
	Dimension	Height	(mm)	320		
		Width	(mm)	1053		
		Depth	(mm)	245		
	Net weight	(kg)	16			
	Fan motor output	(W)	42			
Air flow rate	(Cooling / Heating)	(m <sup>3</sup> / hr)	1030/1170			
Outdoor unit	Unit model		<b>RAS-50G3AVSG-ND</b>			
	Dimension	Height	(mm)	710		
		Width	(mm)	900		
		Depth	(mm)	320		
	Net weight	(kg)	56			
	Compressor	Motor output	(W)	1810		
		Type	Twin rotary type with DC-inverter variable speed control			
		Model	KTM225D43UMU			
	Fan motor output	(W)	100			
Air flow rate	(Cooling / Heating)	(m <sup>3</sup> / hr)	2700/2970			
Piping connection	Type		Flare connection			
	Indoor unit	Liquid side	(mm)	Ø6.35		
		Gas side	(mm)	Ø9.52		
	Outdoor unit	Liquid side	(mm)	Ø6.35		
		Gas side	(mm)	Ø9.52		
	Maximum length	(m)	30			
	Maximum charge-less length	(m)	30			
Maximum height difference	(m)	15				
Refrigerant	Name of refrigerant		R32			
Weight	(kg)	1.70				
Wiring connection	Power supply		3 Wires: Includes earth (Outdoor)			
	Interconnection		4 Wires: Includes earth			
Usable temperature range	Indoor	(Cooling / Heating)	(°C)	21-32/ 0-28		
	Outdoor	(Cooling / Heating)	(°C)	-15,46/-25,24		
Accessory	Indoor unit	Installation plate	1			
		Wireless remote controller	1			
		Batteries	2			
		Remote controller holder	1			
		Toshiba Ultra pure filter	-			
		Mounting screw	6(Ø4x25L)			
		Remote controller holder Flat head wood screw	2(Ø3.1x16L)			
		Installation manual	1			
		Owner's manual	1			

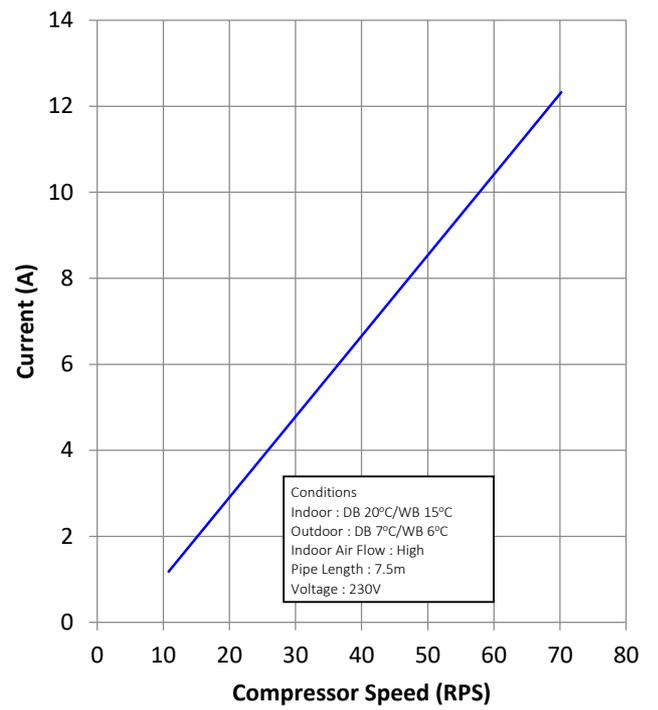
\* The specification may be subject to change without notice for purpose of improvement.

## 2-2. Operation Characteristic Curve

<Cooling>

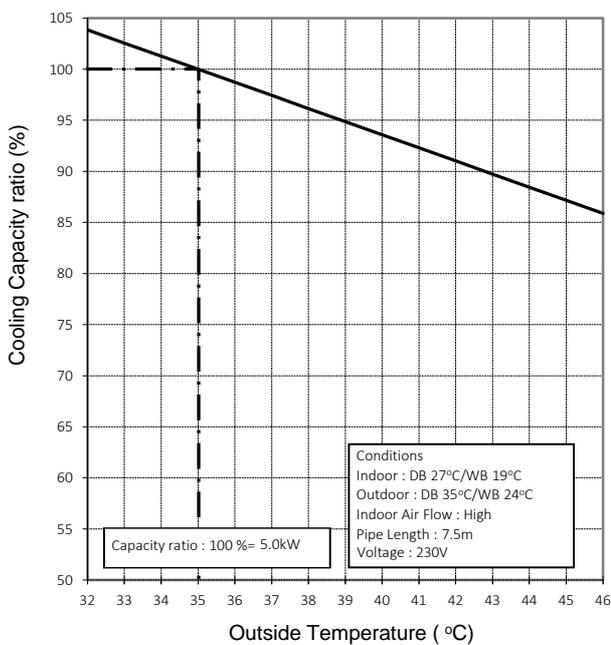


<Heating>

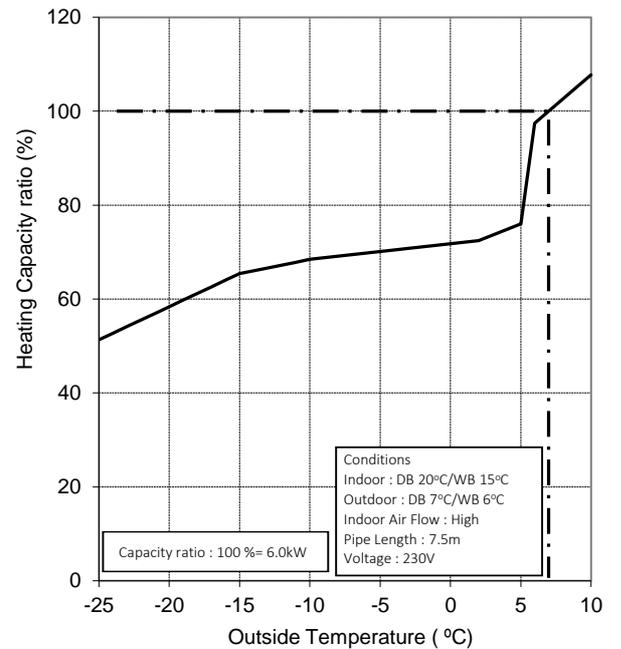


## 2-3. Capacity Variation ratio According to Temperature

<Cooling>



<Heating>



### 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.

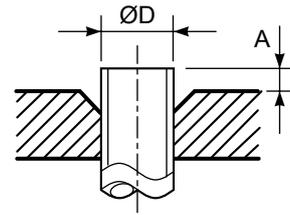


Fig. 3-2-1 Flare processing dimensions

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

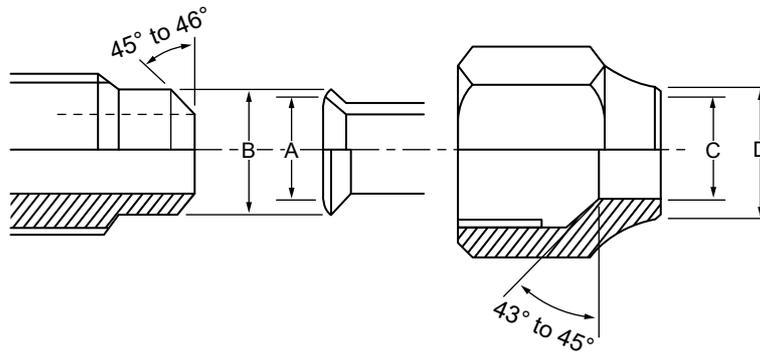
Nominal diameter	Outer diameter (mm)	Thickness (mm)	A (mm)		
			Flare tool for R22 clutch type	Conventional flare tool	
				Clutch type	Wing nut type
1/4	6.35	0.8	0 to 0.5	0.5 to 1.0	1.0 to 1.5
3/8	9.52	0.8	0 to 0.5	0.5 to 1.0	1.0 to 1.5
1/2	12.70	0.8	0 to 0.5	0.5 to 1.0	1.5 to 2.0
5/8	15.88	1.0	0 to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

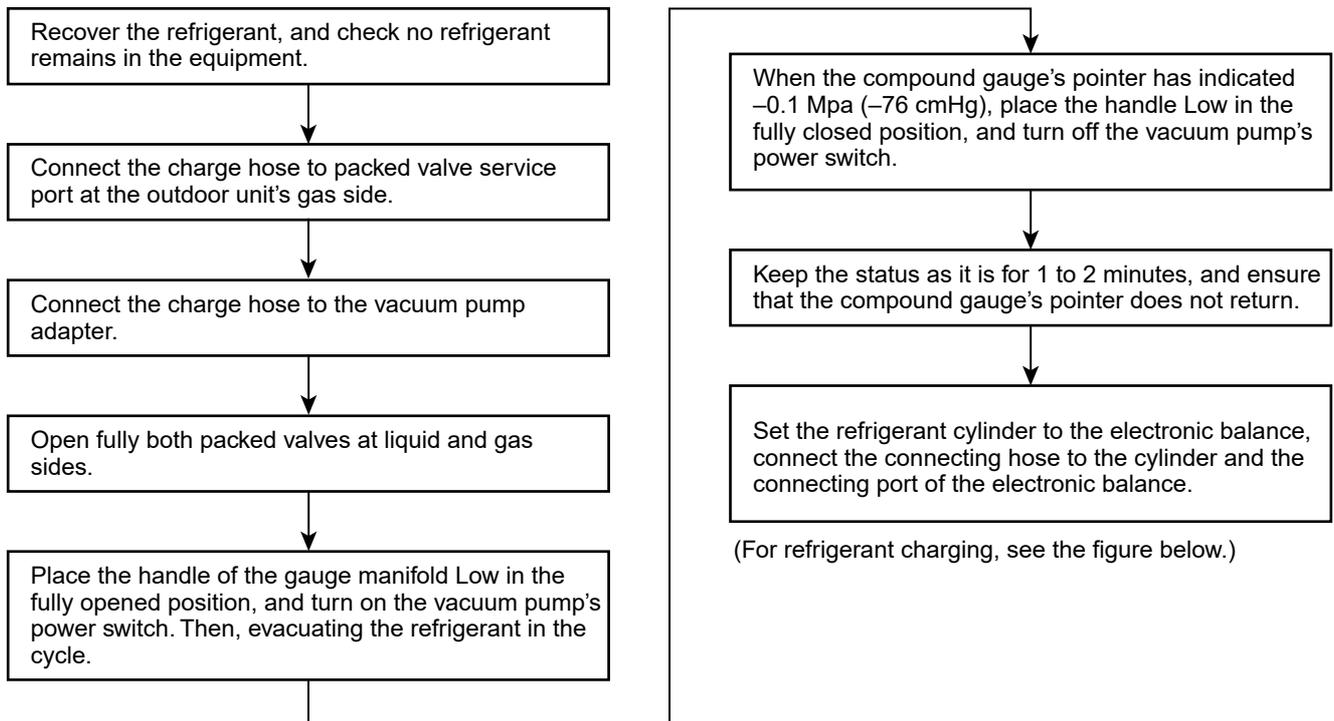
- |  |                             |   |
|--|-----------------------------|---|
| 1. Vacuum pump<br>Use vacuum pump by attaching<br>vacuum pump adapter. | 4. Reamer                   | 9. Hole core drill (Ø65)                  |
| 2. Torque wrench (For Ø6.35, Ø9.52)                                    | 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.

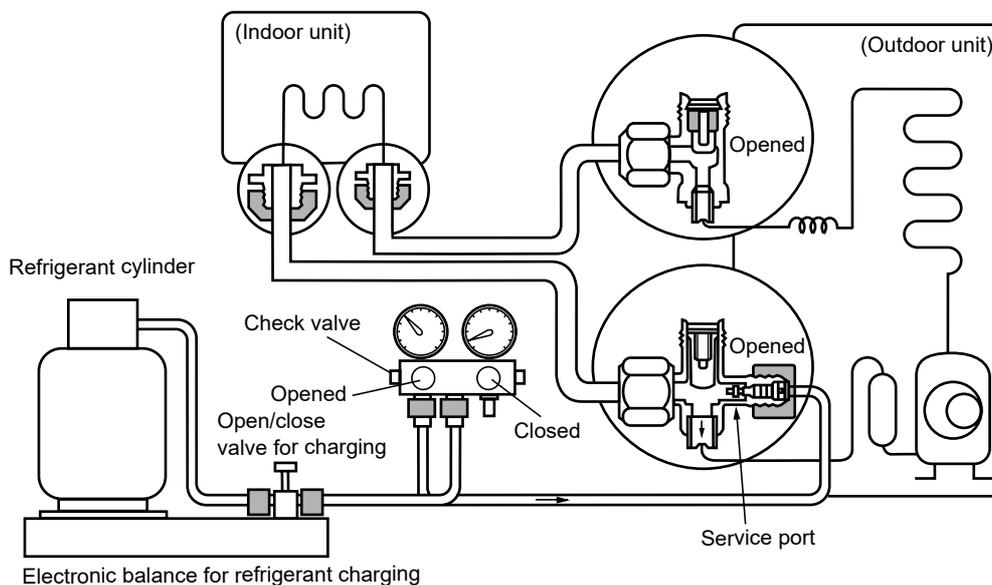


Fig. 3-4-1 Configuration of refrigerant charging

### 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

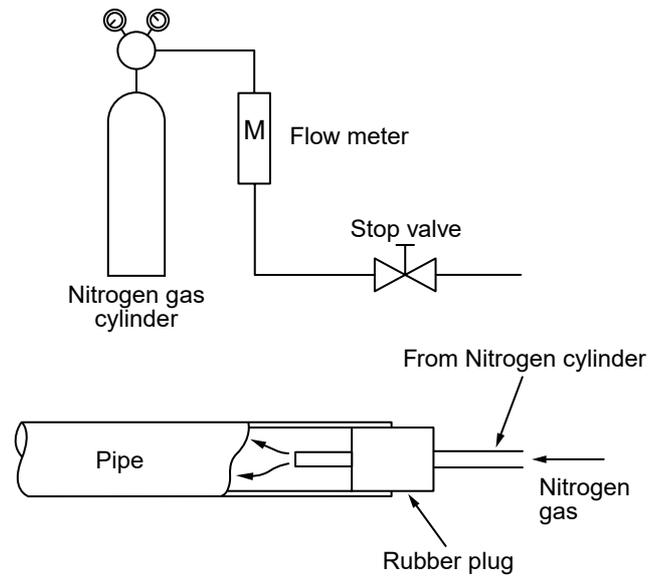
As brazing work requires sophisticated techniques, experiences based upon a theoretical knowledge, it must be performed by a person qualified.

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

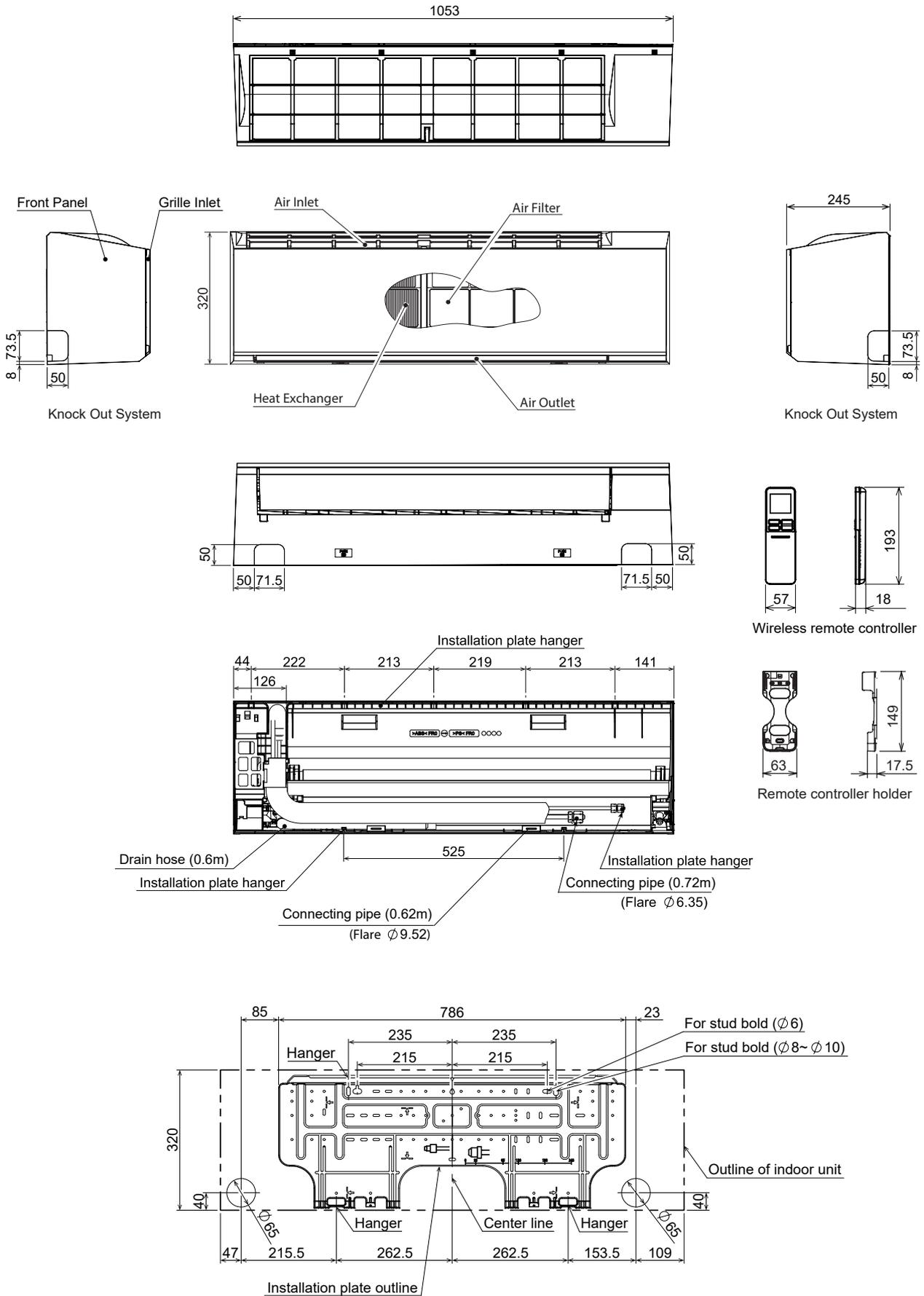
- 1) Attach a reducing valve and a flow-meter to the Nitrogen gas cylinder.
- 2) Use a copper pipe to direct the piping material, and attach a flow-meter to the cylinder.
- 3) Apply a seal onto the clearance between the piping material and inserted copper pipe for Nitrogen in order to prevent backflow 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**

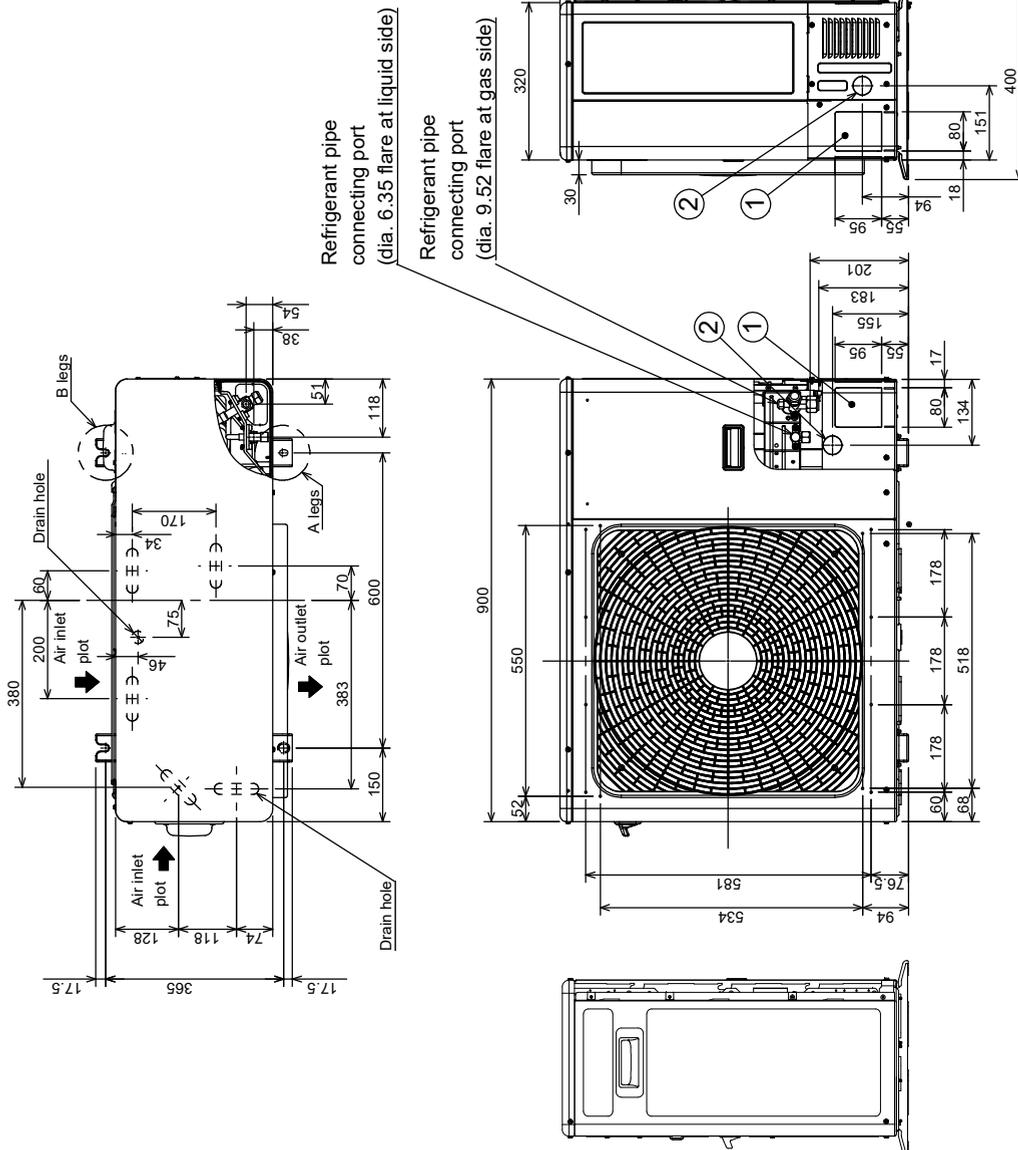
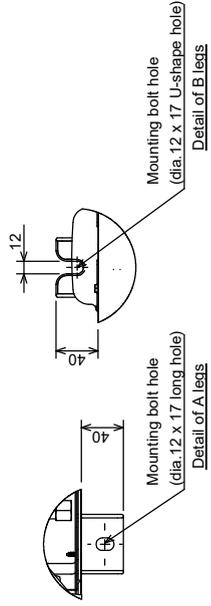
# 4. CONSTRUCTION VIEWS

## 4-1. Indoor Unit



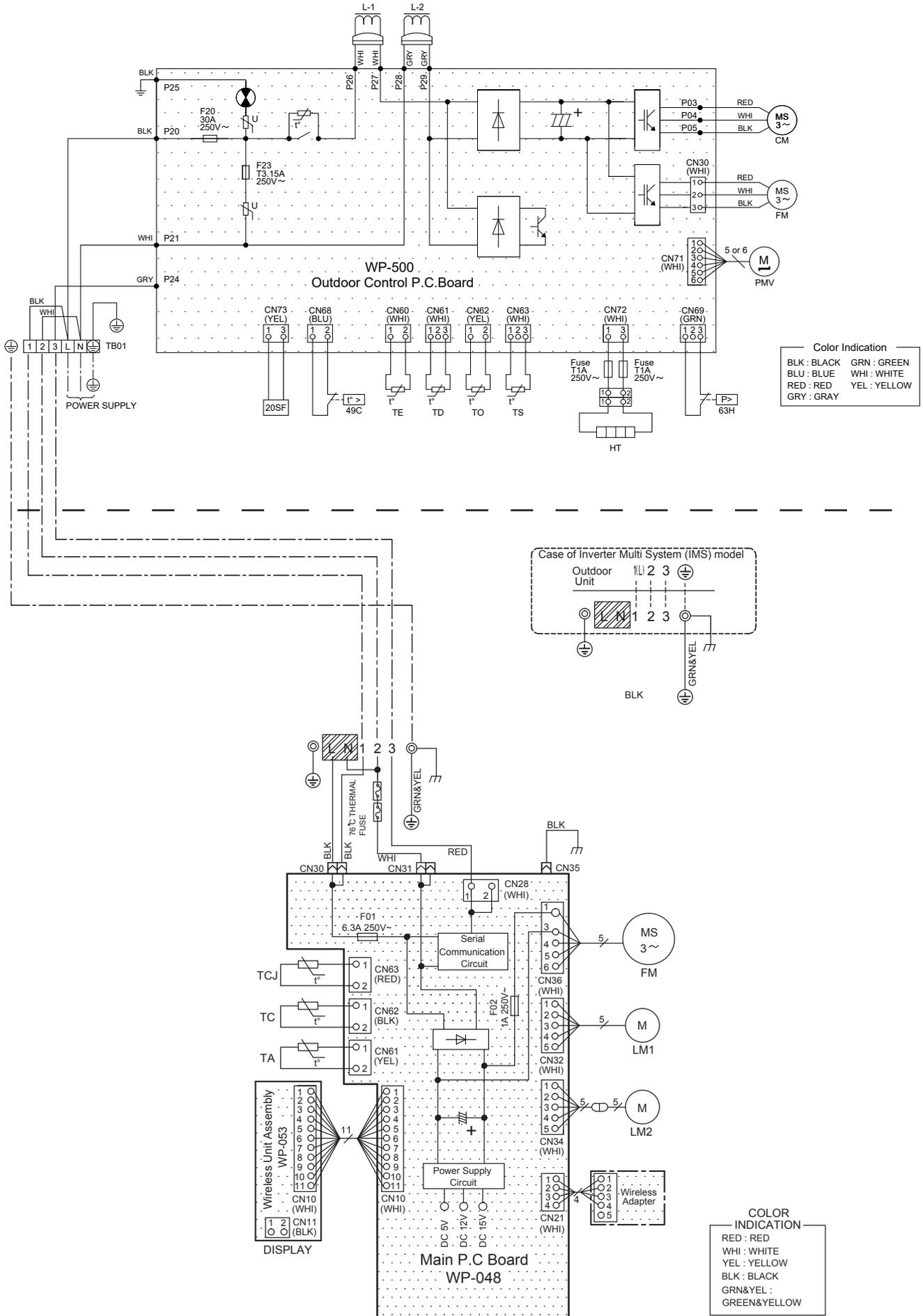
## 4-2. Outdoor Unit

	Name	Note
①	Refrigerant piping hole Indoor/Outdoor Unit connecting wire inlet hole.	-
②	Power supply inlet hole.	dia.38 Knockout hole



(Unit:mm.)

# 5. WIRING DIAGRAM



## 6. SPECIFICATIONS OF ELECTRICAL PARTS

### 6-1. Indoor Unit

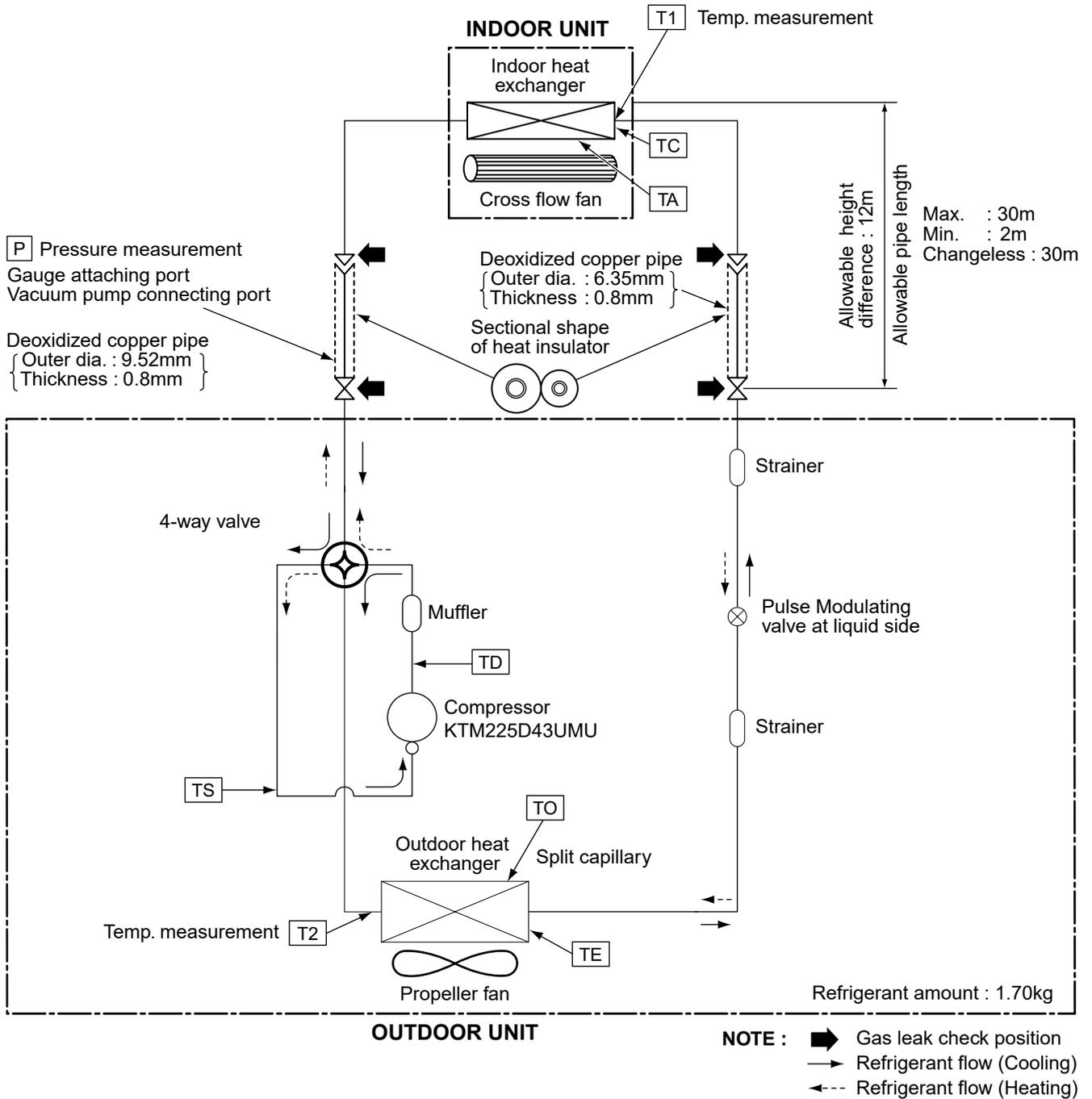
No.	Parts name	Type name	Specifications
1	Fan Motor (for indoor)	WDF-340-30	DC-340V, 42W
2	Room temp. sensor (TA-sensor)	(-)	10kΩ at 25°C
3	Heat exchanger temp. sensor (TC-sensor)	(-)	10kΩ at 25°C
4	Heat exchanger temp. sensor (TCJ-sensor)	(-)	10kΩ at 25°C
5	Louver motor (Horizontal) x 2 pcs.	24BYJ48-STHL	Output (Rated) 4 phase, DC12V

### 6-2. Outdoor Unit

No.	Parts name	Type name	Specifications
1	Compressor	KTM225D43UMU	3-Phases (6-Poles) ; 1810W
2	Fan Motor	LDF-340-A100-1	DC 200-380V ; 100W
3	Pulse Motor Valve (PMV) coil	PQ-M10012-000230	DC 12V
4	4-Way valve coil	STF-H01AJ1872A1	AC 220V-240V(50Hz/60Hz)
5	Reactor	CH-57-Z-T	8.88~10.01mH, 16A
6	Suction temp. sensor (TS sensor)	(Inverter attached)	10kΩ at 25°C
7	Discharge temp. sensor (TD sensor)	(Inverter attached)	62kΩ at 20°C
8	Outside air temp. sensor (TO sensor)	(Inverter attached)	10kΩ at 25°C
9	Heat Exchanger temp. sensor (TE sensor)	(Inverter attached)	10kΩ at 25°C
10	Terminal block (6 poles)	JX0-6B	AC 600V, 30A

# 7. REFRIGERANT CYCLE DIAGRAM

## 7-1. Refrigerant Cycle Diagram



## 7-2. Operation Data

### <Cooling>

Temperature condition(°C)		Model name RAS-	Standard pressure P (MPa)	Heat exchanger pipe temp.		Indoor fan mode	Outdoor fan mode	Compressor revolution (rps)	Connecting piping (m)
Indoor	Outdoor			T1 (°C)	T2 (°C)				
27/19	35/-	B50G3KVSG-ND	1.0 to 1.1	10 to 12	48 to 50	High	High	40.8	7.5

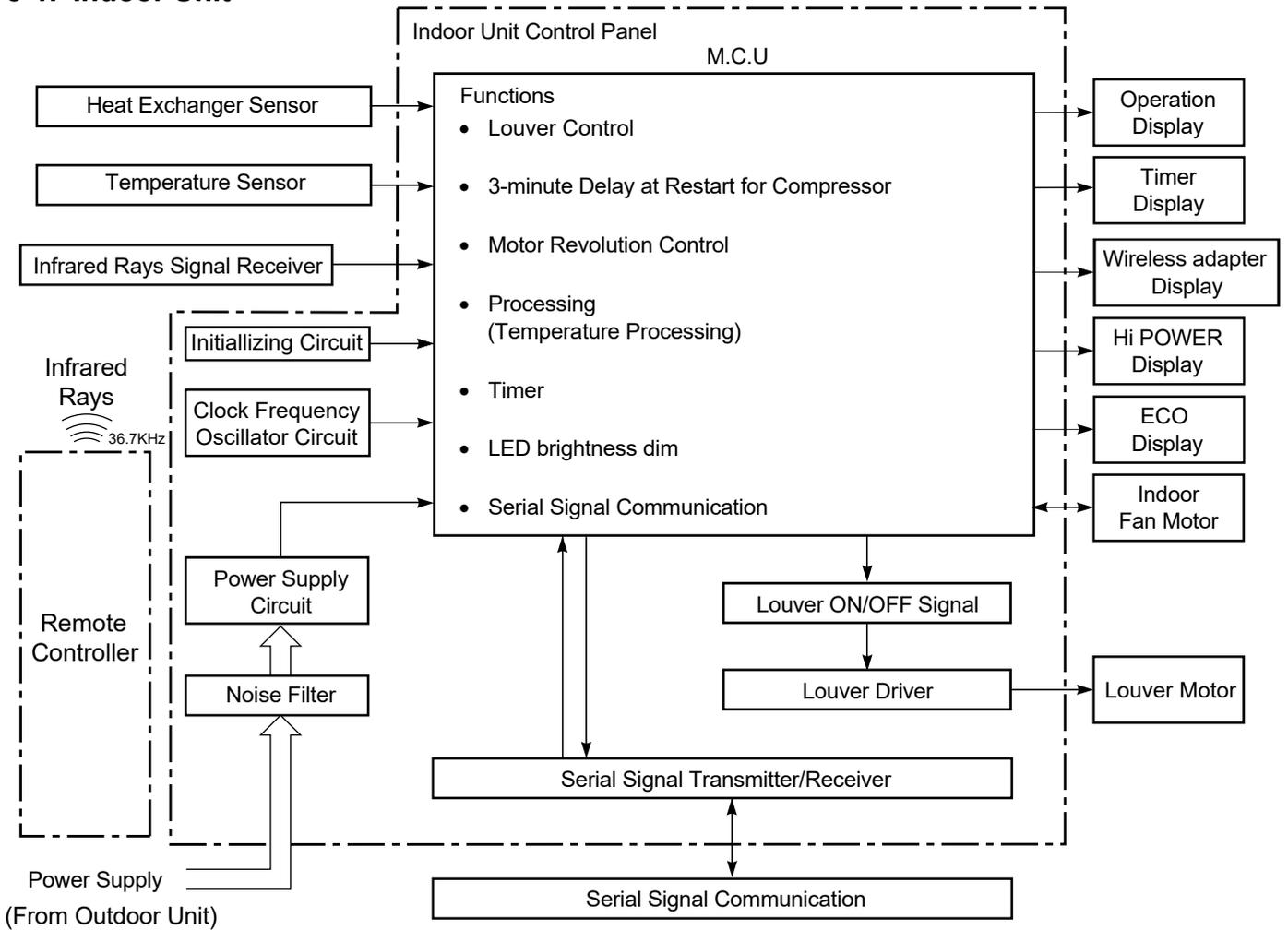
### <Heating>

Temperature condition(°C)		Model name RAS-	Standard pressure P (MPa)	Heat exchanger pipe temp.		Indoor fan mode	Outdoor fan mode	Compressor revolution (rps)	Connecting piping (m)
Indoor	Outdoor			T1 (°C)	T2 (°C)				
20/15	7/6	B50G3KVSG-ND	2.8 to 3.0	42 to 44	0 to 1	High	High	45.0	7.5

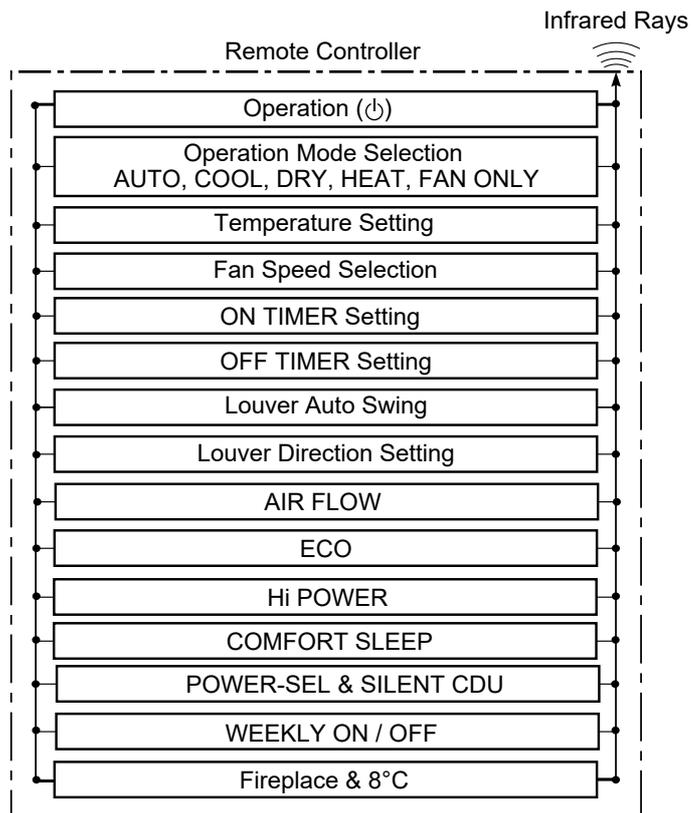
**NOTES** : Measure surface temperature of heat exchanger pipe around center of heat exchanger path U bent.  
(Thermistor thermometer)

## 8. CONTROL BLOCK DIAGRAM

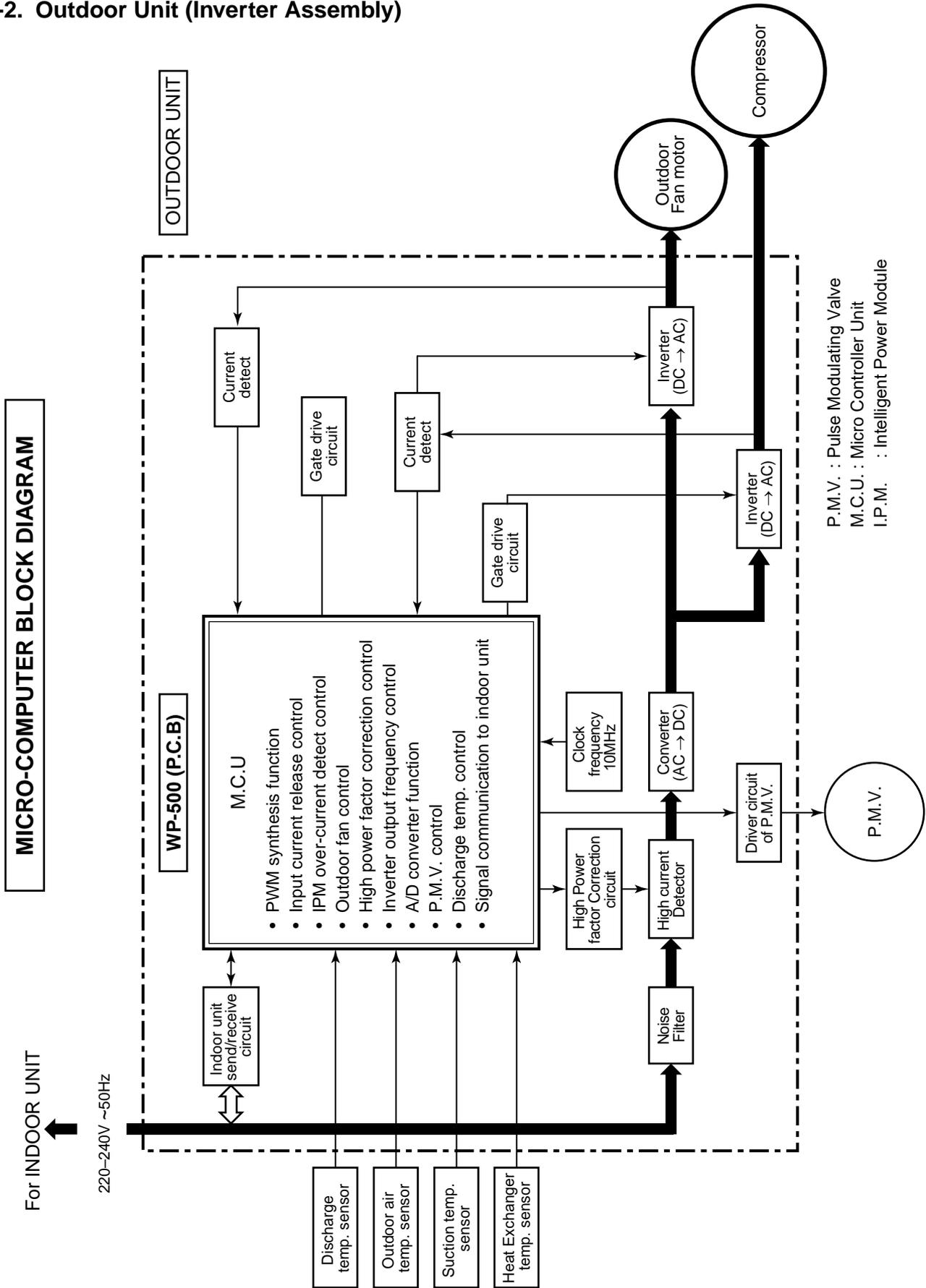
### 8-1. Indoor Unit



### REMOTE CONTROLLER



## 8-2. Outdoor Unit (Inverter Assembly)



## 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.

#### 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

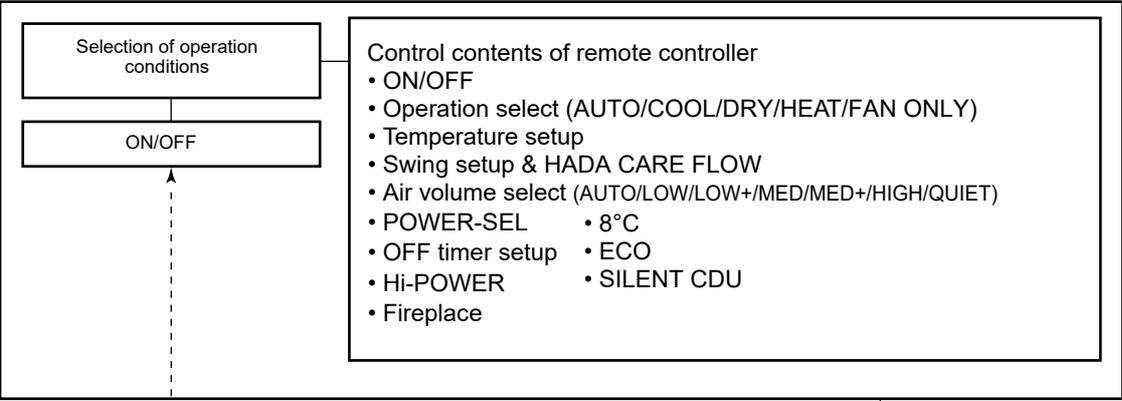
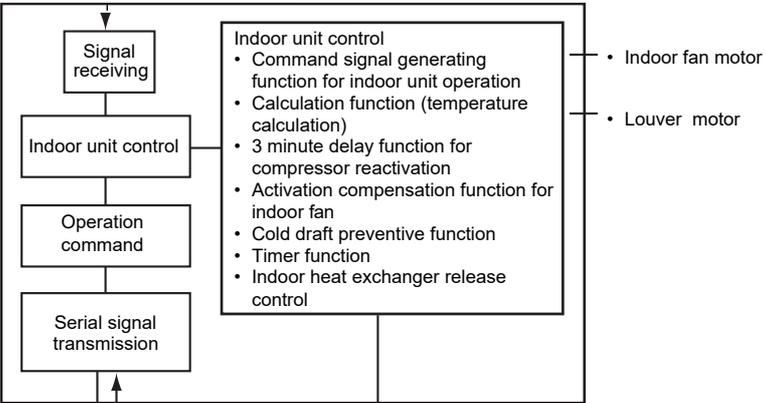
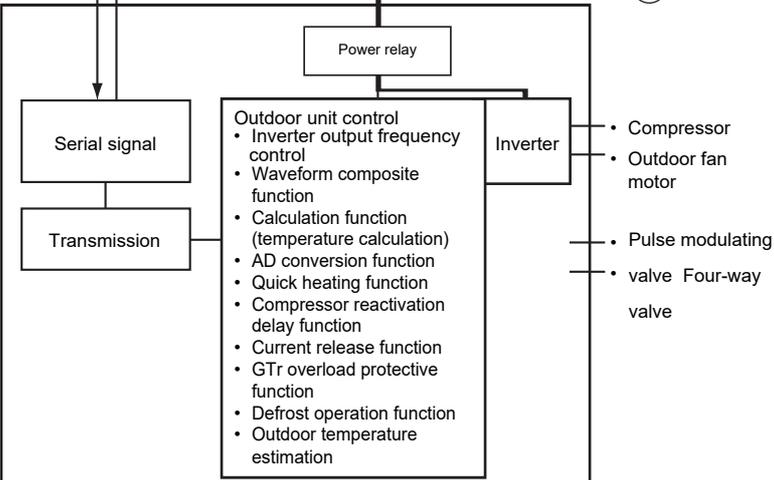
1. Basic operation .....	26
1. Operation control .....	26
2. Cooling/Heating operation .....	27
3. AUTO operation .....	28
4. DRY operation .....	28
2. Indoor fan motor control .....	29
3. Outdoor fan motor control .....	31
4. Capacity control .....	32
5. Current release control .....	32
6. Release protective control by temperature of indoor heat exchanger .....	33
7. Defrost control (Only in heating operation) .....	34
8. Louver control .....	35
1) Louver position .....	35
2) Wind direction adjustment .....	35
3) Swing .....	38
4) HADA CARE Position .....	38
9. Temporary operation .....	39
10. Discharge temperature control .....	39
11. High pressure control .....	39
12. Pulse Modulating valve (P.M.V.) control .....	40
13. Self-Cleaning function .....	41
14. Remote-A or B selection .....	43
15. Hi-POWER Mode .....	43
16. QUIET mode .....	44
17. Short Timer .....	44
18. POWER Selection Mode .....	45
19. Silent Operation .....	45
20. Fireplace Operation .....	46
21. 8°C heating / Frost protective operation .....	46
22. Operation mode selectable .....	47
23. Display lamp brightness control.....	47

## 9-3. Auto Restart Function

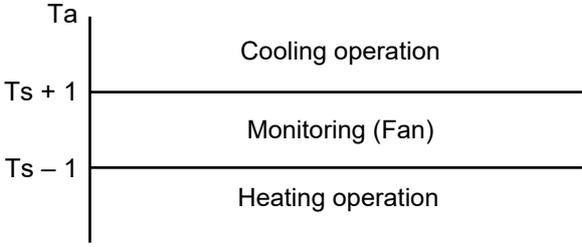
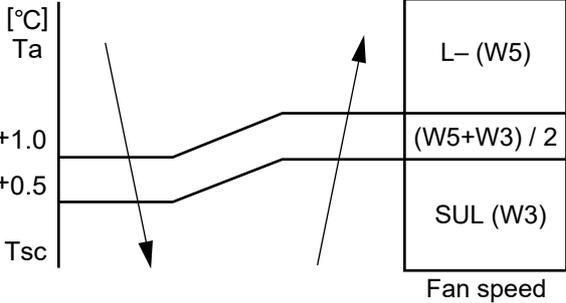
9-3-1. How to Cancel the Auto Restart Function .....	48
9-3-2. How to Set the Auto Restart Function .....	49
9-3-3. Power Failure During Timer Operation .....	49

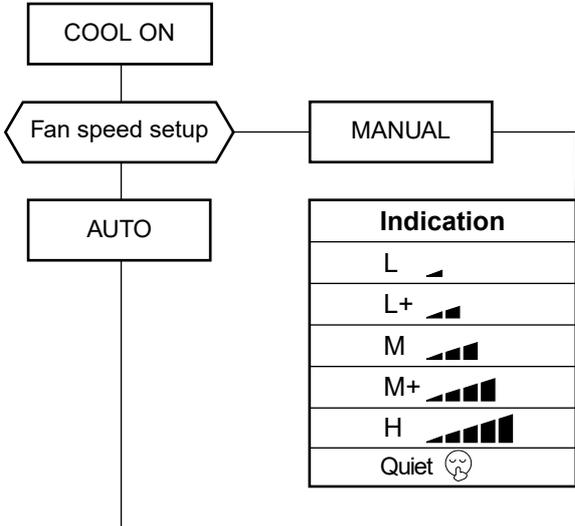
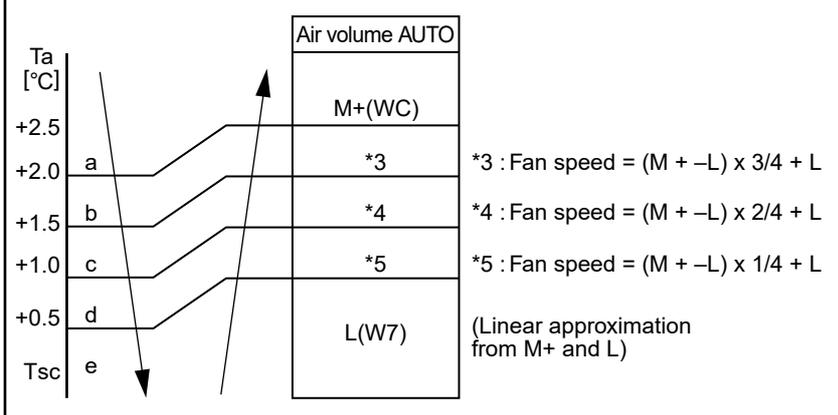
## 9-4. Remote Controller and Its Functions

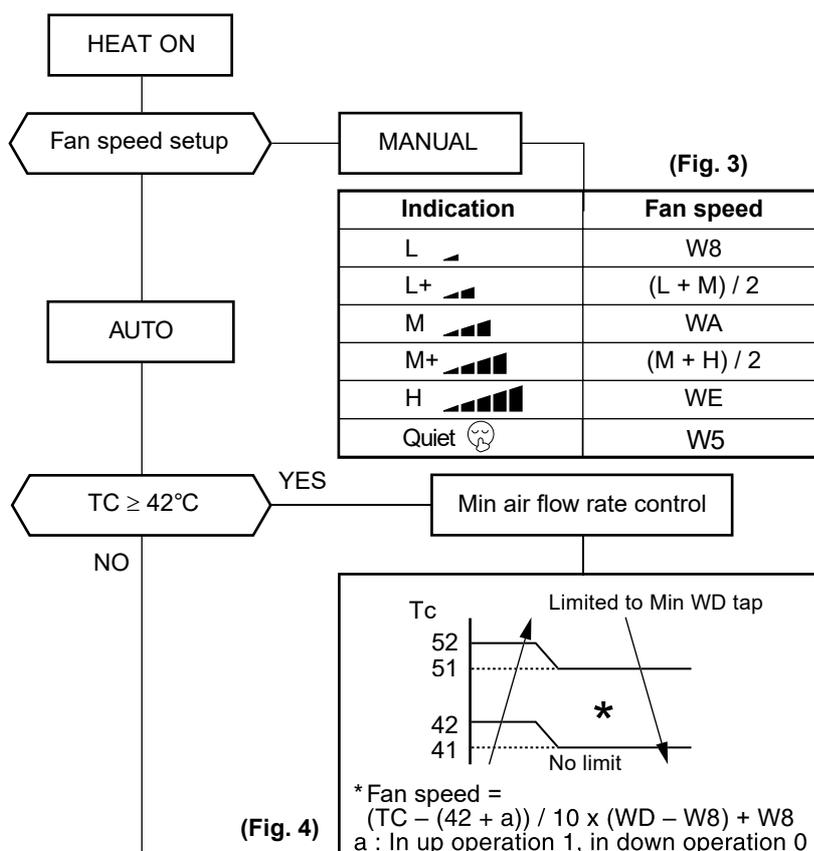
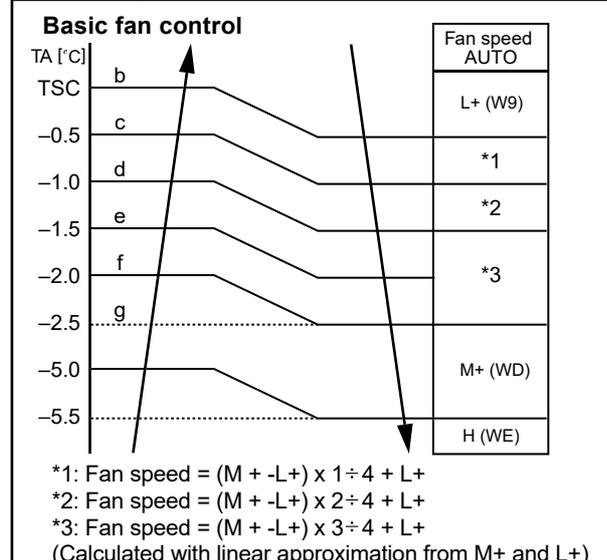
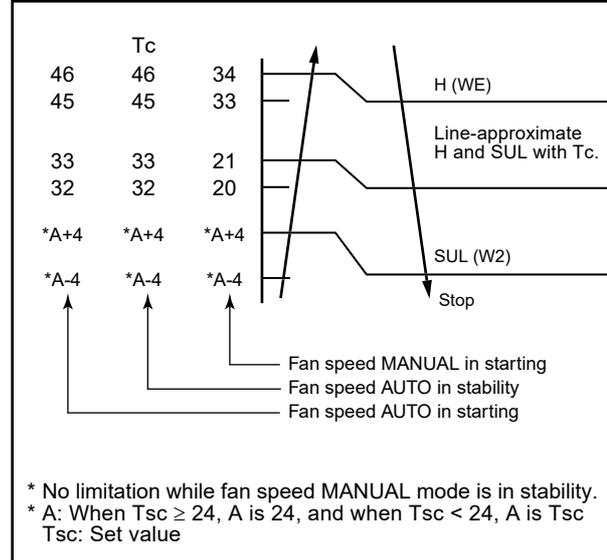
9-4-1. Parts Name of Remote Controller .....	50
9-4-2. Operation of Remote Controller .....	50
9-4-3. Name and Functions of Indications on Remote Controller .....	59

Item	Operation flow and applicable data, etc.	Description
<p><b>1. Basic operation</b></p>	<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. The power relay is tuned ON and power supply to the outdoor unit.</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 below, and also controls the compressor, outdoor fan motor, 4-ways valve and pulse Modulating valve are controlled</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
<p><b>1. Basic operation</b></p>	<p><b>2. Cooling/Heating operation</b></p> <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>8. 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> <pre> graph TD     A[Remote control settings] -.-&gt; B[Operation ON]     B --&gt; C[Indoor unit control]     C --- D[Indoor fan motor revolution control]     C --&gt; E[Operation command signal transmission]     E -.-&gt; F[Outdoor unit control]     F --- G["Compressor revolution control Outdoor fan motor revolution control Pulse modulating valve control Four-way valve control"]     H[Power relay ON] --- C     H --- F   </pre>	

Item	Operation flow and applicable data, etc.	Description
<p><b>1. Basic operation</b></p>	<p><b>3. AUTO operation</b></p> <p>Selection of operation mode As shown in the following figure, the operation starts by selecting automatically the status of room temperature (Ta) 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 (Ta) when the operation started.</li> <li>2) Selects an operation mode from Ta 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) In AUTO mode, either cooling or heating operation will be selected. When room temperature reach set temperature compressor will stop. In case that the compressor stops for 15 minutes, the AUTO mode will reselect cooling or heating operation.</li> </ol>
	<p><b>4. DRY operation</b></p> <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 (Ta) 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 (Tsc). Setup temperature (Tsc) = Set temperature on remote controller (Ts) + (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														
<p><b>2. Indoor fan motor control</b></p>	<p><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)</p> <div style="text-align: center;">  </div> <p style="text-align: right;">(Fig. 1)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Indication</th> <th>Fan speed</th> </tr> </thead> <tbody> <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> <tr> <td>Quiet </td> <td>W5</td> </tr> </tbody> </table> <p style="text-align: right;">(Fig. 2)</p> <div style="text-align: center;">  </div>	Indication	Fan speed	L 	W7	L+ 	(L + M) / 2	M 	WA	M+ 	(M + H) / 2	H 	WD	Quiet 	W5	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p><b>* Symbols</b></p> <p>UH : Ultra High            H : High            M+ : Medium+            M : Medium            L+ : Low+            L : Low            L- : Low-            UL : Ultra Low            SUL : Super Ultra Low</p> </div> <p>* The values of fan speed and air flow volume indicate on the table are measured when the louver is inclined downward. Fan speed and air flow volume broadly vary with position of louver.</p> <p>1) When setting the fan speed to L, L+, M, M+,H or Quiet 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>
Indication	Fan speed															
L 	W7															
L+ 	(L + M) / 2															
M 	WA															
M+ 	(M + H) / 2															
H 	WD															
Quiet 	W5															
<p><b>(Table 1) Indoor fan air flow rate</b></p>																
Fan speed level	Mode			RAS-B50G3KVSG-ND												
	Cool	Heat	Dry	Cooling		Heating										
				Fan speed (rpm)	Air flow rate (m <sup>3</sup> /h)	Fan speed (rpm)	Air flow rate (m <sup>3</sup> /h)									
WF				1050	1050	1150	1200									
WE	UH	UH		1050	1050	1100	1170									
WD	H	M+	UH	1000	1030	1010	1030									
WC	M+		H	1000	1030	950	960									
WB		M	M+	900	890	920	940									
WA	M		M	800	750	900	890									
W9		L+		800	750	830	840									
W8	L+	L	L+	740	720	750	760									
W7	L	L-		690	600	700	660									
W6	L-		L	530	340	680	600									
W5	UL	UL	L-	520	340	600	480									
W4			UL	510	320	510	320									
W3	SUL		SUL/SL-	510	320	510	320									
W2		SUL		500	250	510	320									
W1				500	250	500	250									

Item	Operation flow and applicable data, etc.	Description														
<p><b>2. Indoor fan motor control</b></p>  <p><b>(Fig. 3)</b></p> <table border="1" data-bbox="494 470 973 739"> <thead> <tr> <th>Indication</th> <th>Fan speed</th> </tr> </thead> <tbody> <tr> <td>L </td> <td>W8</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>WE</td> </tr> <tr> <td>Quiet </td> <td>W5</td> </tr> </tbody> </table> <p><b>(Fig. 4)</b></p> <p>* Fan speed = <math>(TC - (42 + a)) / 10 \times (WD - W8) + W8</math>  a : In up operation 1, in down operation 0</p>	Indication	Fan speed	L	W8	L+	(L + M) / 2	M	WA	M+	(M + H) / 2	H	WE	Quiet	W5	<p>&lt;In heating operation&gt;</p> <ol style="list-style-type: none"> <li>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. 3 and Table 1.</li> <li>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. 5 according to the set temperature and room temperature.</li> <li>3) Min air flow rate is controlled by temperature of the indoor heat exchanger (Tc) as shown in Fig. 4.</li> <li>4) Cold draft prevention, the fan speed is controlled by temperature of the indoor heat exchanger (Tc) as shown in Fig. 6.</li> <li>5) In order to prevent Cold draft when compressor step during heating operation. Then louver will move to upper position and fan speed will reduce or off.</li> </ol> <p><b>Cold draft preventive control</b></p>	<ol style="list-style-type: none"> <li>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. 3 and Table 1.</li> <li>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. 5 according to the set temperature and room temperature.</li> <li>3) Min air flow rate is controlled by temperature of the indoor heat exchanger (Tc) as shown in Fig. 4.</li> <li>4) Cold draft prevention, the fan speed is controlled by temperature of the indoor heat exchanger (Tc) as shown in Fig. 6.</li> <li>5) In order to prevent Cold draft when compressor step during heating operation. Then louver will move to upper position and fan speed will reduce or off.</li> </ol>
Indication	Fan speed															
L	W8															
L+	(L + M) / 2															
M	WA															
M+	(M + H) / 2															
H	WE															
Quiet	W5															
<p><b>Basic fan control</b></p>  <p>*1: Fan speed = <math>(M + -L+) \times 1 \div 4 + L+</math>  *2: Fan speed = <math>(M + -L+) \times 2 \div 4 + L+</math>  *3: Fan speed = <math>(M + -L+) \times 3 \div 4 + L+</math>  (Calculated with linear approximation from M+ and L+)</p> <p><b>(Fig. 5)</b></p>	 <p>* No limitation while fan speed MANUAL mode is in stability.  *A: When Tsc ≥ 24, A is 24, and when Tsc &lt; 24, A is Tsc  Tsc: Set value</p> <p><b>(Fig. 6)</b></p>	<p><b>Basic fan control</b></p> <p>TA [°C]</p> <p>TSC</p> <p>Fan speed AUTO</p> <p>L+ (W9)</p> <p>*1</p> <p>*2</p> <p>*3</p> <p>M+ (WD)</p> <p>H (WE)</p> <p>*1: Fan speed = <math>(M + -L+) \times 1 \div 4 + L+</math>  *2: Fan speed = <math>(M + -L+) \times 2 \div 4 + L+</math>  *3: Fan speed = <math>(M + -L+) \times 3 \div 4 + L+</math>  (Calculated with linear approximation from M+ and L+)</p> <p><b>(Fig. 5)</b></p> <p><b>Cold draft preventive control</b></p> <p>Tc</p> <p>46 46 34</p> <p>45 45 33</p> <p>33 33 21</p> <p>32 32 20</p> <p>*A+4 *A+4 *A+4</p> <p>*A-4 *A-4 *A-4</p> <p>H (WE)</p> <p>Line-approximate H and SUL with Tc.</p> <p>SUL (W2)</p> <p>Stop</p> <p>Fan speed MANUAL in starting</p> <p>Fan speed AUTO in stability</p> <p>Fan speed AUTO in starting</p> <p>* No limitation while fan speed MANUAL mode is in stability.  *A: When Tsc ≥ 24, A is 24, and when Tsc &lt; 24, A is Tsc  Tsc: Set value</p> <p><b>(Fig. 6)</b></p>														
<p><b>[In starting and in stability]</b></p> <table border="1" data-bbox="159 1859 1420 2060"> <thead> <tr> <th></th> <th>In starting</th> <th>In stability</th> </tr> </thead> <tbody> <tr> <td>FAN AUTO</td> <td> <ul style="list-style-type: none"> <li>• Until 12 minutes passed after operation start</li> <li>• When 12 to 25 minutes passed after operation start and room temp. is 3°C or lower than set temp.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• When 12 to 25 minutes passed after operation start and room temp. is higher than (set temp. -3°C)</li> <li>• When 25 minutes or more passed after operation start</li> </ul> </td> </tr> <tr> <td>FAN Manual</td> <td> <ul style="list-style-type: none"> <li>• Room temp. &lt; Set temp. -4°C</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Room temp. ≥ Set temp. -3.5°C</li> </ul> </td> </tr> </tbody> </table>		In starting	In stability	FAN AUTO	<ul style="list-style-type: none"> <li>• Until 12 minutes passed after operation start</li> <li>• When 12 to 25 minutes passed after operation start and room temp. is 3°C or lower than set temp.</li> </ul>	<ul style="list-style-type: none"> <li>• When 12 to 25 minutes passed after operation start and room temp. is higher than (set temp. -3°C)</li> <li>• When 25 minutes or more passed after operation start</li> </ul>	FAN Manual	<ul style="list-style-type: none"> <li>• Room temp. &lt; Set temp. -4°C</li> </ul>	<ul style="list-style-type: none"> <li>• Room temp. ≥ Set temp. -3.5°C</li> </ul>							
	In starting	In stability														
FAN AUTO	<ul style="list-style-type: none"> <li>• Until 12 minutes passed after operation start</li> <li>• When 12 to 25 minutes passed after operation start and room temp. is 3°C or lower than set temp.</li> </ul>	<ul style="list-style-type: none"> <li>• When 12 to 25 minutes passed after operation start and room temp. is higher than (set temp. -3°C)</li> <li>• When 25 minutes or more passed after operation start</li> </ul>														
FAN Manual	<ul style="list-style-type: none"> <li>• Room temp. &lt; Set temp. -4°C</li> </ul>	<ul style="list-style-type: none"> <li>• Room temp. ≥ Set temp. -3.5°C</li> </ul>														

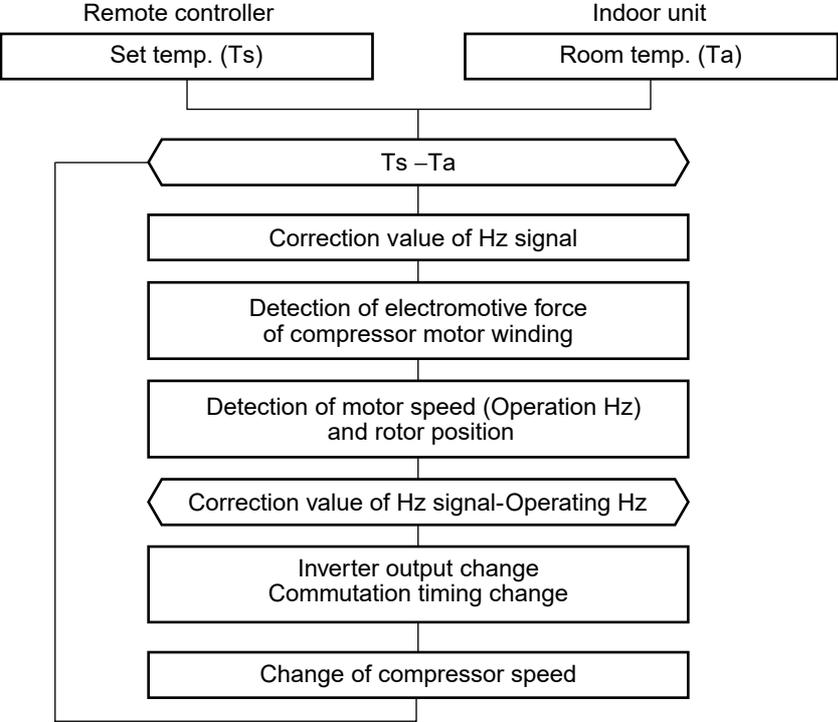
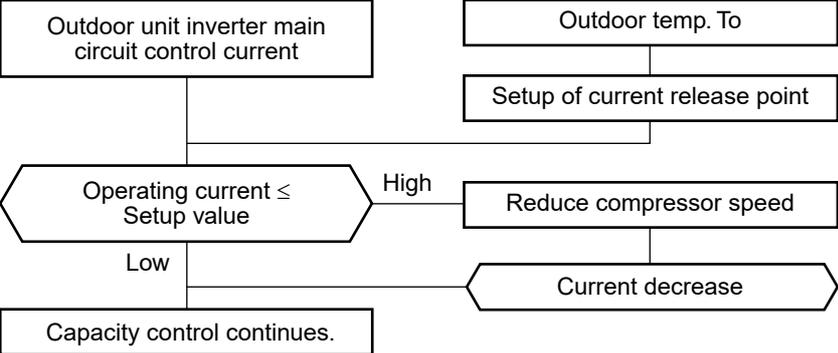
Item	Operation flow and applicable data, etc.	Description
3. Outdoor fan motor control	<p>The blowing air volume at the outdoor unit side is controlled. Receiving the operation command from the controller of indoor unit, the controller of outdoor unit controls fan speed.</p> <p>* For the fan motor, a DC motor with non-stage variable speed system is used. However, it is limited to 8 stages for reasons of controlling.</p> <pre> graph TD     A[Air conditioner ON Remote controller] --&gt; B[Indoor unit controller]     B --&gt; C[1) Outdoor unit operation command Outdoor fan control]     C --&gt; D{2) Fan speed ≥ 400. when the motor OFF. by strong wind}     D -- YES --&gt; E[Fan motor OFF continues Use wind for heat exchanging]     D -- NO --&gt; F[Fan motor ON]     F --&gt; G{3) Fan lock}     G -- YES --&gt; H[Air conditioner OFF]     H --&gt; I[Alarm display]     G -- NO --&gt; J[4) Motor operates as shown in the table below.]           </pre>	<ol style="list-style-type: none"> <li>The operation command sent from the remote controller is processed by the indoor unit controller and transferred to the controller of the outdoor unit.</li> <li>When strong wind blows at outdoor side, the operation of air conditioner continues with the fan motor stopped.</li> <li>Whether the fan is locked or not is detected, and the operation of air conditioner stops and an alarm is displayed if the fan is locked.</li> <li>According to each operation mode, by the conditions of outdoor temperature (To) and compressor revolution, the speed of the outdoor fan shown in the table is selected.</li> </ol>

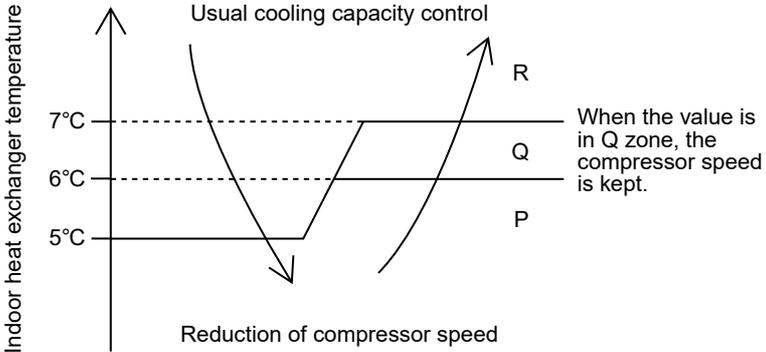
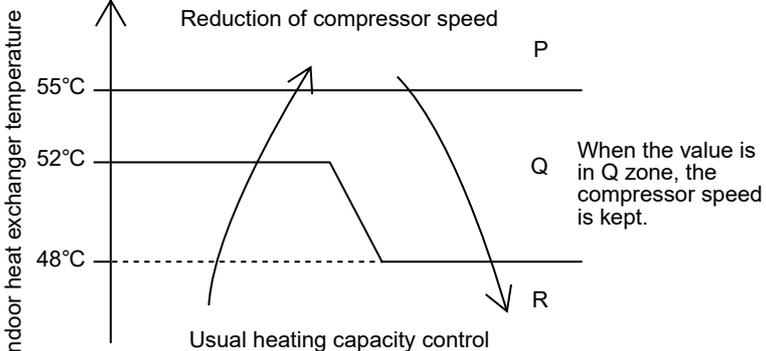
In cooling operation							
Compressor speed	RAS-50G3AVSG-ND	Hz < 34.2		34.2 ≤ Hz < 52.2		52.2 ≤ Hz	
Fan speed range		MIN	MAX	MIN	MAX	MIN	MAX
To	To ≥ 38°C	f6	fB	f8	fE	fA	fE
	To ≥ 28°C	f5	fA	f7	fE	f9	fE
	To ≥ 15°C	f3	f7	f5	f9	f7	fB
	To ≥ 5.5°C	f2	f5	f4	f7	f6	f9
	To ≥ 0°C	f1	f3	f3	f5	f4	f7
	To ≥ 0°C	f1	f2	f2	f4	f3	f5
When To is abnormal		OFF	fB	OFF	fE	f1	fE

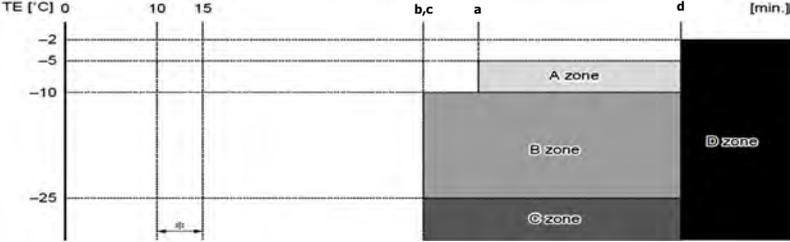
In heating operation							
Compressor speed	RAS-50G3AVSG-ND	Hz < 20.4		20.4 ≤ Hz < 45.0		45.0 ≤ Hz	
Fan speed range		MIN	MAX	MIN	MAX	MIN	MAX
To	To ≥ 10°C		f7		f8		f9
	To ≥ 5°C		f9		fB		fE
	To ≥ -3°C		fE		fE		fE
	To ≥ -10°C		fE		fE		fE
	To < -10°C		fE		fE		fE
When To is abnormal			fE		fF		fF

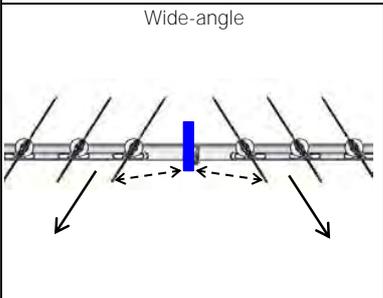
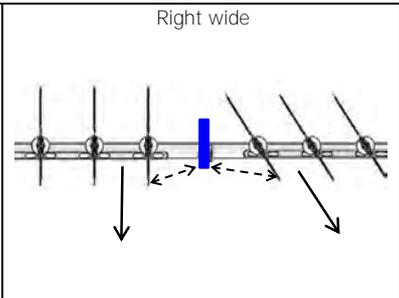
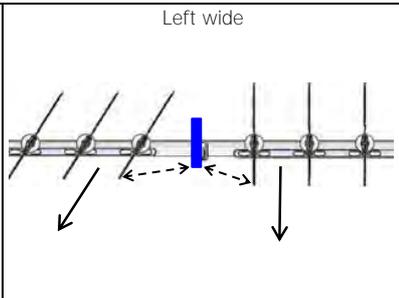
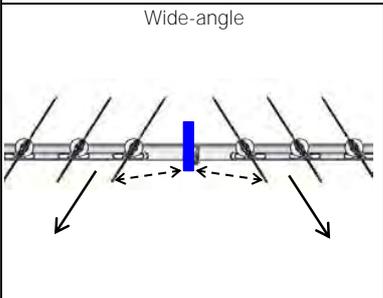
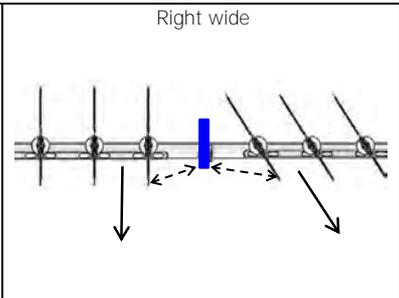
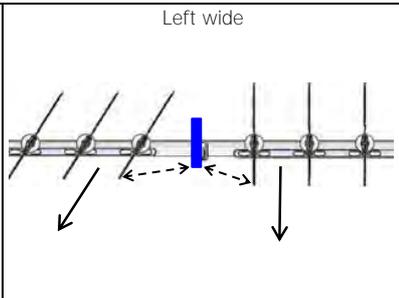
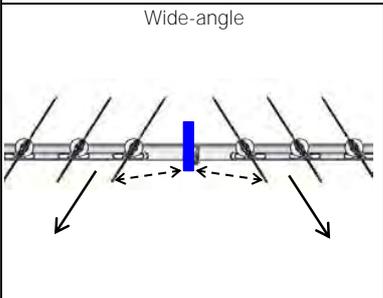
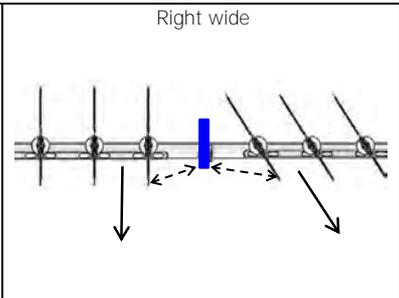
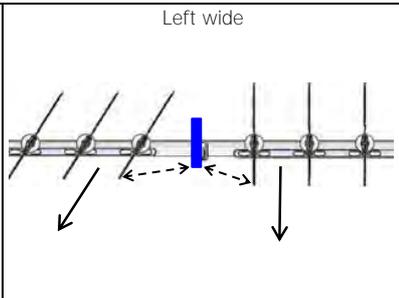
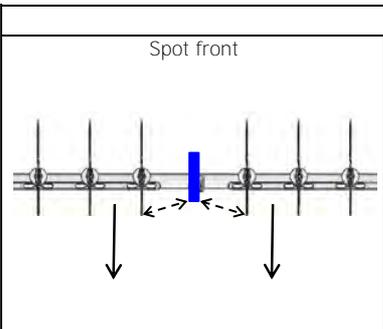
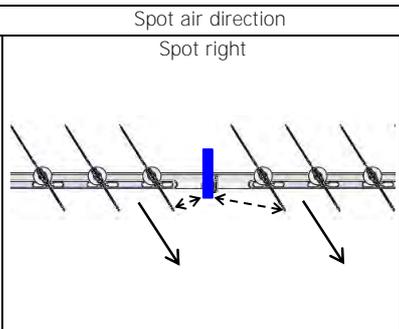
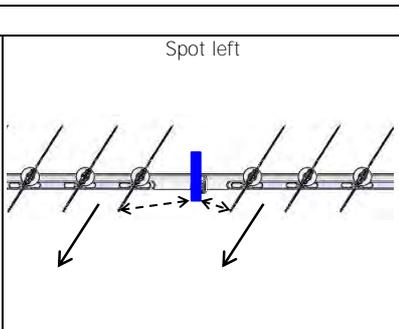
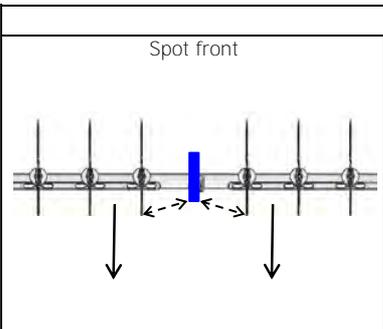
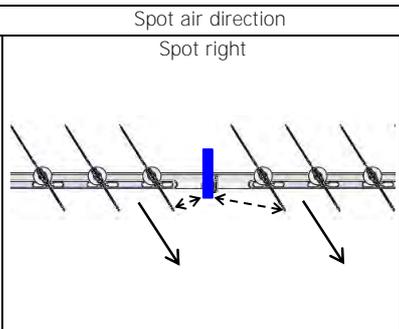
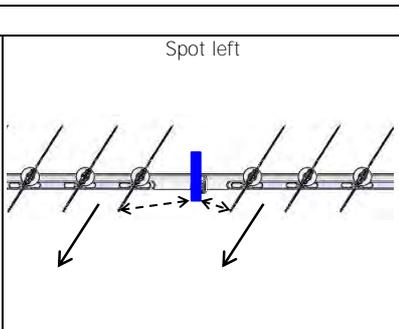
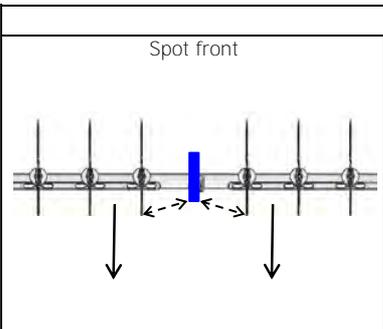
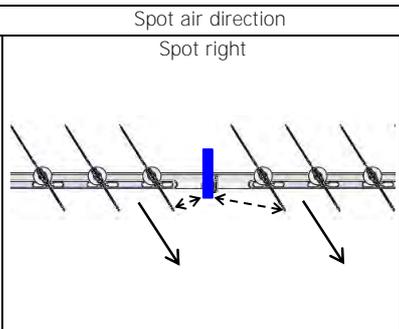
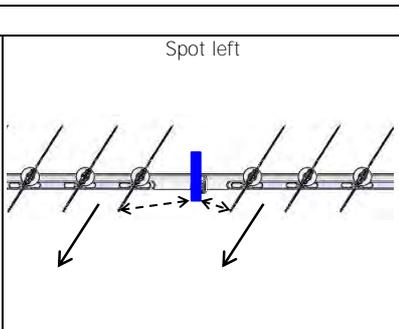
### Outdoor Fan Speeds (rpm)

Model name	Fan speed range															
	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9	fA	fB	fC	fD	fE	fF
RAS-50G3AVSG-ND	0	230	240	250	320	400	460	500	540	600	650	700	730	880	980	980

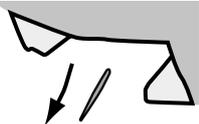
Item	Operation flow and applicable data, etc.	Description																		
<p><b>4. Capacity control</b></p>	<p>The cooling or heating capacity depending on the load is adjusted.</p> <p>According to difference between the setup value of temperature and the room temperature, the capacity is adjusted by the compressor revolution.</p> 	<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 and heating operation</p>																		
<p><b>5. Current release control</b></p>	<p>This function prevents troubles on the electronic parts of the compressor driving inverter.</p> <p>This function also controls drive circuit of the compressor speed so that electric power of the compressor drive circuit does not exceed the specified value.</p>  <table border="1" data-bbox="178 1742 986 2040"> <thead> <tr> <th rowspan="2">Mode</th> <th rowspan="2">Outdoor temperature: To (°C)</th> <th>Current Release Value (A)</th> </tr> <tr> <th>RAS-50G3AVSG-ND</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Cooling</td> <td>To ≥ 45</td> <td>15.8</td> </tr> <tr> <td>45 &gt; To ≥ 40</td> <td>16.0</td> </tr> <tr> <td>To &lt; 40</td> <td>16.0</td> </tr> <tr> <td rowspan="3">Heating</td> <td>To ≥ 16</td> <td>16.0</td> </tr> <tr> <td>16 &gt; To ≥ 11</td> <td>16.0</td> </tr> <tr> <td>To &lt; 11</td> <td>16.0</td> </tr> </tbody> </table>	Mode	Outdoor temperature: To (°C)	Current Release Value (A)	RAS-50G3AVSG-ND	Cooling	To ≥ 45	15.8	45 > To ≥ 40	16.0	To < 40	16.0	Heating	To ≥ 16	16.0	16 > To ≥ 11	16.0	To < 11	16.0	<ol style="list-style-type: none"> <li>1) The input current of the outdoor unit is detected in the inverter section of the outdoor unit.</li> <li>2) According to the detected outdoor temperature, the specific value of the current is selected.</li> <li>3) Whether the current value exceeds the specific value or not is judged.</li> <li>4) If the current value exceeds the specified value, this function reduces the compressor speed and controls speed up to the closest one commanded from the indoor unit within the range which does not exceed the specified value.</li> </ol>
Mode	Outdoor temperature: To (°C)			Current Release Value (A)																
		RAS-50G3AVSG-ND																		
Cooling	To ≥ 45	15.8																		
	45 > To ≥ 40	16.0																		
	To < 40	16.0																		
Heating	To ≥ 16	16.0																		
	16 > To ≥ 11	16.0																		
	To < 11	16.0																		

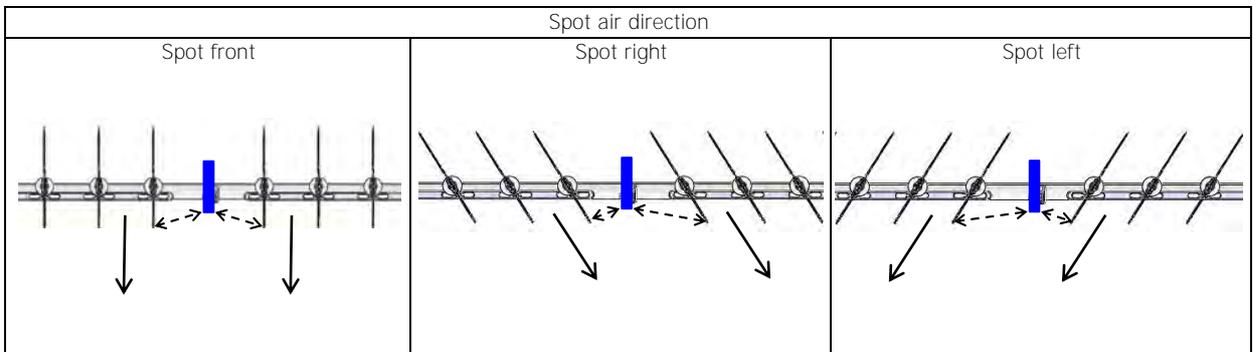
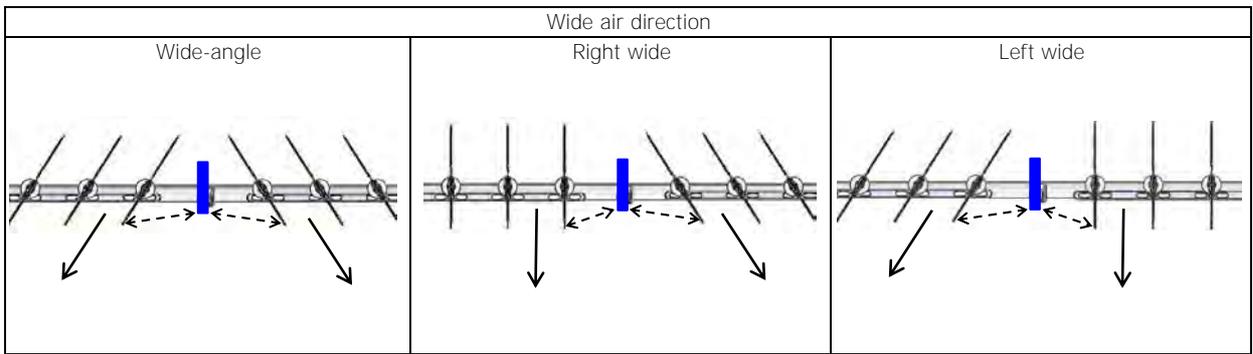
Item	Operation flow and applicable data, etc.	Description
<p><b>6. Release protective control by temperature of indoor heat exchanger</b></p>	<p><b>&lt;In cooling/dry operation&gt;</b>            (Prevent-freezing control for indoor heat exchanger)            In cooling/dry operation, the sensor of indoor 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>
	<p><b>&lt;In heating operation&gt;</b>            (Prevent-overpressure control for refrigerating cycle)            In heating operation, the sensor of indoor heat exchanger detects condensation 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 rises in the range from 52°C to 55°C, the compressor speed is kept. (Q zone)            When temperature of the indoor heat exchanger drops in the range from 48°C to under 55°C, the compressor speed is kept. (Q zone)</li> <li>2) When temperature of the indoor heat exchanger rises to 55°C or higher, the compressor speed is reduced. (P zone)</li> <li>3) When temperature of the indoor heat exchanger does not rise to 52°C, or when it drops below to 48°C, the capacity control operation returns to the usual control in heating operation. (R zone)</li> </ol>

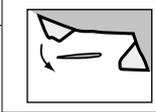
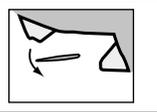
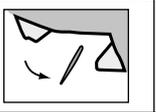
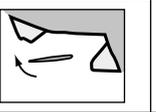
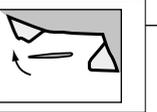
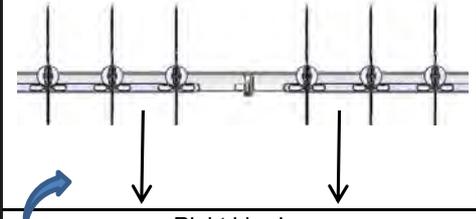
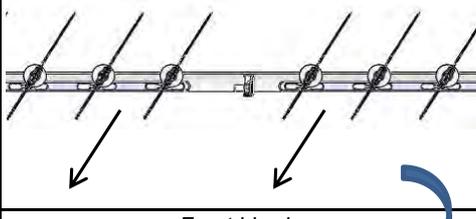
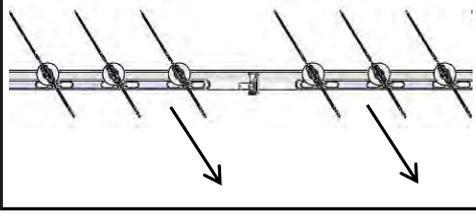
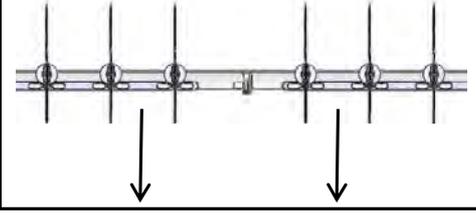
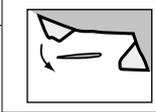
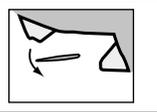
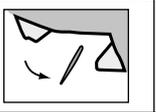
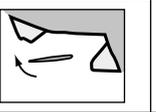
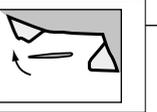
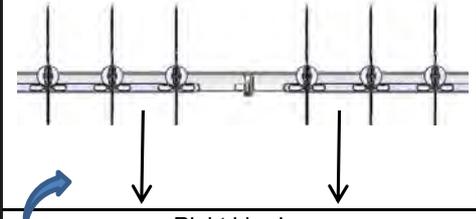
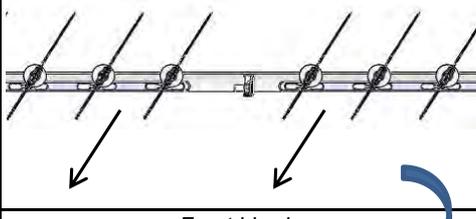
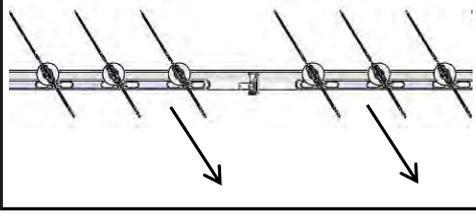
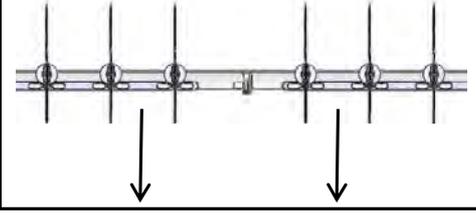
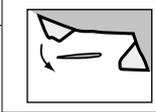
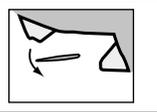
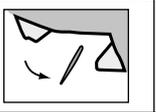
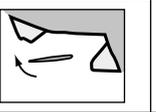
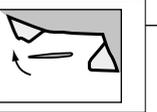
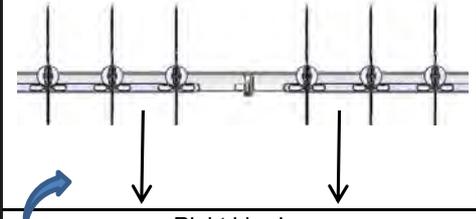
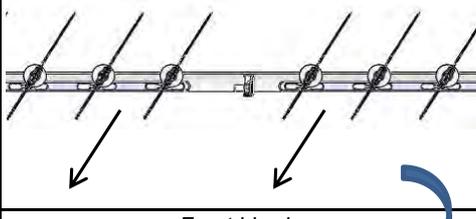
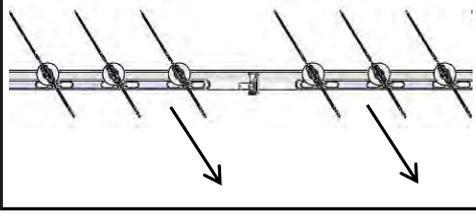
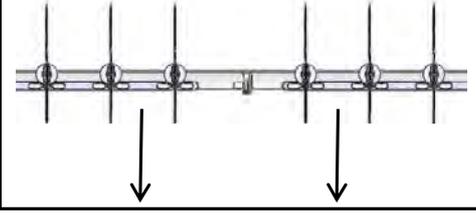
Item	Operation flow and applicable data, etc.	Description																										
<p><b>7. Defrost control (Only in heating operation)</b></p> <p><b>Start of heating operation</b></p>  <p><b>Table 1</b></p> <table border="1" data-bbox="148 797 956 943"> <thead> <tr> <th>Defrost zone</th> <th>In normal To</th> <th>In abnormal To</th> </tr> </thead> <tbody> <tr> <td>A zone</td> <td><math>TE_0-TE \geq 3^\circ\text{C}</math> &amp; <math>SH-SH_0 \leq 2</math></td> <td><math>(TE_0-TE)-(T_{00}-T_0) \geq 3^\circ\text{C}</math> &amp; <math>SH-SH_0 \leq 2</math></td> </tr> <tr> <td>B zone</td> <td><math>TE_0-TE \geq 2^\circ\text{C}</math> &amp; <math>SH-SH_0 \leq 2</math></td> <td><math>(TE_0-TE)-(T_{00}-T_0) \geq 2^\circ\text{C}</math> &amp; <math>SH-SH_0 \leq 2</math></td> </tr> <tr> <td>C zone</td> <td colspan="2"><math>TE \leq -25^\circ\text{C}</math> &amp; <math>SH-SH_0 \leq 2</math></td> </tr> <tr> <td>D zone</td> <td colspan="2">More than 90 minutes accumulate heating operation time condition <math>TE \leq -2^\circ\text{C}</math></td> </tr> </tbody> </table> <p><b>Table 2</b></p> <table border="1" data-bbox="148 1021 652 1256"> <thead> <tr> <th rowspan="2">Heating operation (time)</th> <th>Model</th> </tr> <tr> <th>RAS-50G3AVSG-ND</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>55</td> </tr> <tr> <td>b</td> <td>45</td> </tr> <tr> <td>c</td> <td>39</td> </tr> <tr> <td>d</td> <td>70</td> </tr> </tbody> </table>	Defrost zone	In normal To	In abnormal To	A zone	$TE_0-TE \geq 3^\circ\text{C}$ & $SH-SH_0 \leq 2$	$(TE_0-TE)-(T_{00}-T_0) \geq 3^\circ\text{C}$ & $SH-SH_0 \leq 2$	B zone	$TE_0-TE \geq 2^\circ\text{C}$ & $SH-SH_0 \leq 2$	$(TE_0-TE)-(T_{00}-T_0) \geq 2^\circ\text{C}$ & $SH-SH_0 \leq 2$	C zone	$TE \leq -25^\circ\text{C}$ & $SH-SH_0 \leq 2$		D zone	More than 90 minutes accumulate heating operation time condition $TE \leq -2^\circ\text{C}$		Heating operation (time)	Model	RAS-50G3AVSG-ND	a	55	b	45	c	39	d	70	<p>(This function removes frost adhered to the outdoor heat exchanger.)</p> <p>The temperature sensor of the outdoor heat exchanger (Te sensor) judges the frosting status of the outdoor heat exchanger and the defrost operation is performed with 4-way valve reverse defrost system.</p> <p><b>&lt;Defrost operation&gt;</b></p> <ul style="list-style-type: none"> <li>Defrost operation in A to C zones</li> </ul> <ol style="list-style-type: none"> <li>Stop operation of the compressor for 20 seconds.</li> <li>Invert (ON) 4-way valve 10 seconds after stop of the compressor.</li> <li>The outdoor fan stops at the same time when the compressor stops.</li> <li>When temperature of the indoor heat exchanger becomes <math>38^\circ\text{C}</math> or lower, stop the indoor fan.</li> </ol> <p><b>&lt;Finish of defrost operation&gt;</b></p> <ul style="list-style-type: none"> <li>Returning conditions from defrost operation to heating operation</li> </ul> <ol style="list-style-type: none"> <li>Temperature of outdoor heat exchanger rises to <math>+8^\circ\text{C}</math> or higher.</li> <li>Temperature of outdoor heat exchanger is kept at <math>+5^\circ\text{C}</math> or higher for 80 seconds.</li> <li>Defrost operation continues for 15 minutes.</li> </ol> <p><b>&lt;Returning from defrost operation&gt;</b></p> <ol style="list-style-type: none"> <li>Stop operation of the compressor for approx. 50 seconds.</li> <li>Invert (OFF) 4-way valve approx. 40 seconds after stop of the compressor.</li> <li>The outdoor fan starts rotating at the same time when the compressor starts.</li> </ol>	<p>The necessity of defrost operation is detected by the outdoor heat exchanger temperature. The conditions to detect the necessity of defrost operation differ in A, B, or C zone each. (Table 1)</p>
Defrost zone	In normal To	In abnormal To																										
A zone	$TE_0-TE \geq 3^\circ\text{C}$ & $SH-SH_0 \leq 2$	$(TE_0-TE)-(T_{00}-T_0) \geq 3^\circ\text{C}$ & $SH-SH_0 \leq 2$																										
B zone	$TE_0-TE \geq 2^\circ\text{C}$ & $SH-SH_0 \leq 2$	$(TE_0-TE)-(T_{00}-T_0) \geq 2^\circ\text{C}$ & $SH-SH_0 \leq 2$																										
C zone	$TE \leq -25^\circ\text{C}$ & $SH-SH_0 \leq 2$																											
D zone	More than 90 minutes accumulate heating operation time condition $TE \leq -2^\circ\text{C}$																											
Heating operation (time)	Model																											
	RAS-50G3AVSG-ND																											
a	55																											
b	45																											
c	39																											
d	70																											

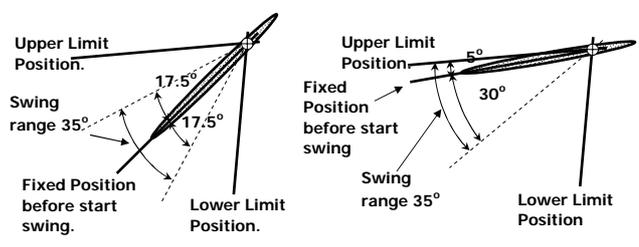
Item	Operation flow and applicable data, etc.	Description									
<b>8. Louver control</b> 1) Louver position	<p>This function controls the air direction of the indoor unit.</p> <ul style="list-style-type: none"> <li>• The position is automatically controlled according to the operation mode (COOL/HEAT).</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. (Cooling/Heating memory position)</li> </ul> <p>The angle of the louver is indicated as the louver closes fully is 0°.</p>										
1) Louver position in cooling operation	<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p><b>Cooling operation/ AUTO (COOL)</b></p>  <p>Initial setting of "Cooling storage position" Louver : Directs downward (39.5°)</p> </div>										
<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="3">Wide air direction</th> </tr> </thead> <tbody> <tr> <td style="width: 33%;">Wide-angle</td> <td style="width: 33%;">Right wide</td> <td style="width: 33%;">Left wide</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Wide air direction			Wide-angle	Right wide	Left wide			
Wide air direction											
Wide-angle	Right wide	Left wide									
											
<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="3">Spot air direction</th> </tr> </thead> <tbody> <tr> <td style="width: 33%;">Spot front</td> <td style="width: 33%;">Spot right</td> <td style="width: 33%;">Spot left</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Spot air direction			Spot front	Spot right	Spot left			
Spot air direction											
Spot front	Spot right	Spot left									
											

Item	Operation flow and applicable data, etc.	Description
8. Louver control	Louver position in heating operation	

<b>Heating operation/ AUTO (HEAT)</b>

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



Item	Operation flow and applicable data, etc.	Description																		
<p><b>8. Louver control</b></p> <p>2) Wind direction adjustment</p>	<div style="text-align: center; margin-bottom: 20px;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;">Air direction</div> </div> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 5px;">Horizontal blowing</td> <td style="width: 20%; padding: 5px;">Inclined blowing</td> <td style="width: 20%; padding: 5px;">Blowing downward</td> <td style="width: 20%; padding: 5px;">Inclined blowing</td> <td style="width: 20%; padding: 5px;">Horizontal blowing</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Front blowing</td> <td style="width: 50%; padding: 5px;">Left blowing</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Right blowing</td> <td style="padding: 5px;">Front blowing</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Horizontal blowing	Inclined blowing	Blowing downward	Inclined blowing	Horizontal blowing						Front blowing	Left blowing			Right blowing	Front blowing			<ul style="list-style-type: none"> <li>• The Up-Down louver position can be arbitrarily set up by pressing [FIX↕] button.</li> <li>• The Left-Right louver position can be arbitrarily set up by pressing [FIX↔] button.</li> </ul>
Horizontal blowing	Inclined blowing	Blowing downward	Inclined blowing	Horizontal blowing																
																				
Front blowing	Left blowing																			
																				
Right blowing	Front blowing																			
																				

Item	Operation flow and applicable data, etc.	Description
<p><b>8. Louver control</b></p> <p>3) Swing</p> <p>4) HADA CARE Position</p>	<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>• Air flow upward to the ceiling provide indirect air flow to body and homogenize room temperature.</li> <li>• HADA care Louver position.</li> </ul>	<ul style="list-style-type: none"> <li>• Swing When pressing [SWING] button during operation, the louver starts swinging.</li> <li>• Up-Down and Left-Right louver are same setting.</li> </ul>

<b>Cooling operation/ AUTO (COOL)</b>

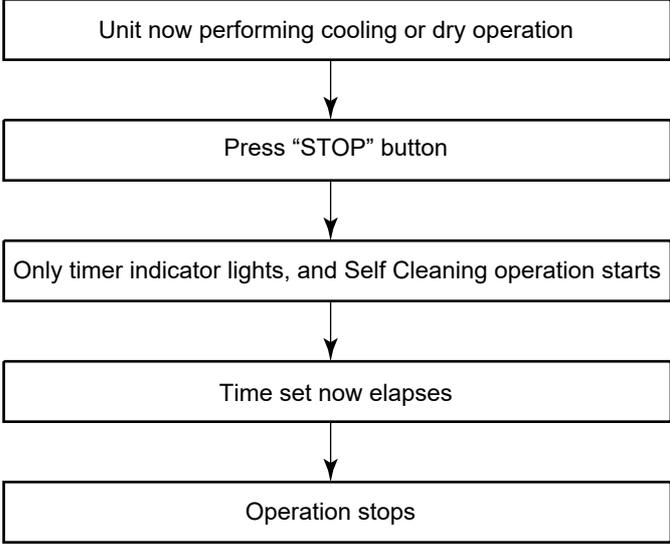
Initial setting of "Cooling storage position" Louver : Directs downward (33.9°)

<b>Heating operation/ AUTO (HEAT)</b>

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

Item	Operation flow and applicable data, etc.	Description																					
<p><b>9. Temporary operation</b></p>	<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>																					
<p><b>10. Discharge temperature control</b></p>	<table border="1"> <thead> <tr> <th data-bbox="331 987 478 1030">Td value</th> <th data-bbox="478 987 948 1030">Control operation</th> </tr> </thead> <tbody> <tr> <td data-bbox="331 1030 478 1072">117°C</td> <td data-bbox="478 1030 948 1072">Judges as an error and stops the compressor.</td> </tr> <tr> <td data-bbox="331 1072 478 1115">115°C</td> <td data-bbox="478 1072 948 1115">Reduce the compressor speed.</td> </tr> <tr> <td data-bbox="331 1115 478 1158">106°C</td> <td data-bbox="478 1115 948 1158">Reduce slowly compressor speed.</td> </tr> <tr> <td data-bbox="331 1158 478 1200">103°C</td> <td data-bbox="478 1158 948 1200">Keeps the compressor speed.</td> </tr> <tr> <td data-bbox="331 1200 478 1276">96°C</td> <td data-bbox="478 1200 948 1276">If the operation is performed with lower speed than one commanded by the serial signal, speed is slowly raised up to the commanded speed.</td> </tr> <tr> <td data-bbox="331 1276 478 1328">96°C</td> <td data-bbox="478 1276 948 1328">Operates with speed commanded by the serial signal.</td> </tr> </tbody> </table>	Td value	Control operation	117°C	Judges as an error and stops the compressor.	115°C	Reduce the compressor speed.	106°C	Reduce slowly compressor speed.	103°C	Keeps the compressor speed.	96°C	If the operation is performed with lower speed than one commanded by the serial signal, speed is slowly raised up to the commanded speed.	96°C	Operates with speed commanded by the serial signal.	<ol style="list-style-type: none"> <li><b>1. Purpose</b> This function detects error on the refrigerating cycle or error on the compressor, and performs protective control.</li> <li><b>2. Operation</b> Control of the compressor speed The speed control is performed as described in the left table based upon the discharge temperature.</li> </ol>							
Td value	Control operation																						
117°C	Judges as an error and stops the compressor.																						
115°C	Reduce the compressor speed.																						
106°C	Reduce slowly compressor speed.																						
103°C	Keeps the compressor speed.																						
96°C	If the operation is performed with lower speed than one commanded by the serial signal, speed is slowly raised up to the commanded speed.																						
96°C	Operates with speed commanded by the serial signal.																						
<p><b>11. High pressure control</b></p>	<table border="1"> <thead> <tr> <th data-bbox="331 1552 478 1603">Cooling (TE)</th> <th data-bbox="478 1552 638 1603">Heating (TC)</th> <th data-bbox="638 1552 948 1603">Control operation</th> </tr> </thead> <tbody> <tr> <td data-bbox="331 1603 478 1646">63°C</td> <td data-bbox="478 1603 638 1646">62°C</td> <td data-bbox="638 1603 948 1646">Judges as an error and stops the compressor.</td> </tr> <tr> <td data-bbox="331 1646 478 1688">63°C</td> <td data-bbox="478 1646 638 1688">57°C</td> <td data-bbox="638 1646 948 1688">Reduce the compressor speed.</td> </tr> <tr> <td data-bbox="331 1688 478 1731">61°C</td> <td data-bbox="478 1688 638 1731">55°C</td> <td data-bbox="638 1688 948 1731">Reduce slowly compressor speed.</td> </tr> <tr> <td data-bbox="331 1731 478 1774">59°C</td> <td data-bbox="478 1731 638 1774">53°C</td> <td data-bbox="638 1731 948 1774">Keeps the compressor speed.</td> </tr> <tr> <td data-bbox="331 1774 478 1850">55°C</td> <td data-bbox="478 1774 638 1850">49°C</td> <td data-bbox="638 1774 948 1850">If the operation is performed with lower speed than one commanded by the serial signal, speed is slowly raised up to the commanded speed.</td> </tr> <tr> <td data-bbox="331 1850 478 1892">55°C</td> <td data-bbox="478 1850 638 1892">49°C</td> <td data-bbox="638 1850 948 1892">Operates with speed commanded by the serial signal.</td> </tr> </tbody> </table>	Cooling (TE)	Heating (TC)	Control operation	63°C	62°C	Judges as an error and stops the compressor.	63°C	57°C	Reduce the compressor speed.	61°C	55°C	Reduce slowly compressor speed.	59°C	53°C	Keeps the compressor speed.	55°C	49°C	If the operation is performed with lower speed than one commanded by the serial signal, speed is slowly raised up to the commanded speed.	55°C	49°C	Operates with speed commanded by the serial signal.	<ol style="list-style-type: none"> <li><b>1. Purpose</b> This function detects error on the refrigerating cycle or error on the compressor, and performs protective control.</li> <li><b>2. Operation</b> Control of the compressor speed The speed control is performed as described in the left table based upon the heat exchanger temperature (TE, TC).</li> </ol>
Cooling (TE)	Heating (TC)	Control operation																					
63°C	62°C	Judges as an error and stops the compressor.																					
63°C	57°C	Reduce the compressor speed.																					
61°C	55°C	Reduce slowly compressor speed.																					
59°C	53°C	Keeps the compressor speed.																					
55°C	49°C	If the operation is performed with lower speed than one commanded by the serial signal, speed is slowly raised up to the commanded speed.																					
55°C	49°C	Operates with speed commanded by the serial signal.																					

Item	Operation flow and applicable data, etc.	Description
<p><b>12. Pulse Modulating valve (P.M.V.) control</b></p>	<p>This function controls throttle amount of the refrigerant in the refrigerating cycle. According to operating status of the air conditioner, this function also controls the open degree of valve with an expansion valve with pulse Modulation.</p> <pre> graph TD     Start[Starting up] --&gt; Init[Initialize]     Init --&gt; Move[Move to initial position]     Move --&gt; Comp[Compressor ON]     Comp --&gt; SH[SH control]     Comp --&gt; Td[Td release control]     SH --&gt; PMV[PMV open degree control]     Td --&gt; PMV     PMV --&gt; Stop[Stop by remote controller]     PMV --&gt; Room[Room temp. sensor (Ta sensor) control]     Stop --&gt; Power[Power OFF]     Room --&gt; Defrost[Defrost]     Defrost --&gt; Move   </pre> <p>* SH (Super Heat amount) = Ts (Temperature of suction pipe of the compressor) – Tc or Te (Heat exchanger temperature at evaporation side)</p> <p>* PMV: Pulse Modulating Valve</p>	<ol style="list-style-type: none"> <li>1) When starting the operation, move the valve once until it fits to the stopper. (Initialize) * In this time, "Click" sound may be heard.</li> <li>2) Adjust the open degree of valve by super heat amount. (SH control)</li> <li>3) If the discharge temperature was excessively up, adjust the open degree of valve so that it is in the range of set temperature. (Discharge temp. control)</li> <li>4) When defrost operation is performed, the open degree of valve is adjusted according to each setup conditions during preparation for defrost and during defrost operation (4-way valve is inverted.).</li> <li>5) When operation is OFF by the remote controller or when compressor is OFF by room temperature control, the open degree of valve is adjusted to the stop position.</li> </ol>

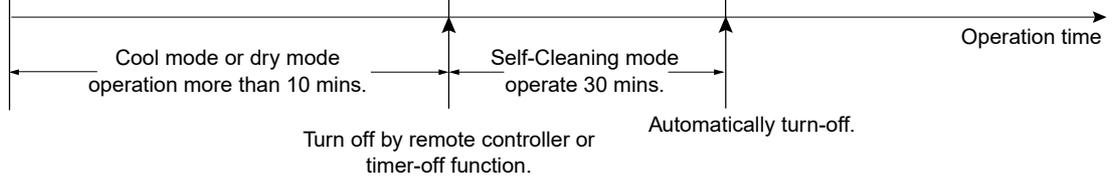
Item	Operation flow and applicable data, etc.	Description													
<p><b>13. Self-Cleaning function</b></p>	 <pre> graph TD     A[Unit now performing cooling or dry operation] --&gt; B[Press "STOP" button]     B --&gt; C[Only timer indicator lights, and Self Cleaning operation starts]     C --&gt; 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" data-bbox="397 1227 1262 1576"> <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>Heating: Auto (heating)</td> <td colspan="2" rowspan="3">No Self-Cleaning operation performed</td> </tr> <tr> <td>Auto (fan only)</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.	Heating: Auto (heating)	No Self-Cleaning operation performed		Auto (fan only)	Shutdown	<p><b>1. Purpose</b></p> <p>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></p> <p>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. (The Self-Cleaning operation is not performed after a heating operation.)</p> <p><b>2. Operation</b></p> <ol style="list-style-type: none"> <li>1) When the stop signal from the remote controller or timer-off function is received, only the timer indicator light.</li> <li>2) 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>3) 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.													
Heating: Auto (heating)	No Self-Cleaning operation performed														
Auto (fan only)															
Shutdown															

Item	Operation flow and applicable data, etc.	Description
------	--	-------------

**13. Self-Cleaning function**

**13-1-1. 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



**13-1-2. Self-Cleaning function release**

**How to set/cancel Self-Cleaning function**

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

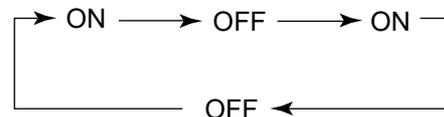
- Setting diagnosis code "06" on remote controlle (See detail of setting diagnosis code in 11-4-1)
- Turn on the power supply to air conditioner, after that press [RESET] button on air conditioner 1 time to turn on the air conditioner (The LED display will show in operation LED)①
- Take the remote controller 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.

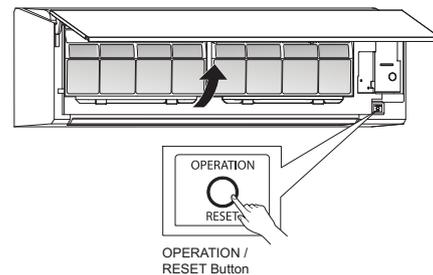
Self-cleaning function	Operation LED	Timer LED
ON	flash 1 Hz	not flash
OFF	flash 1 Hz	Flash 1 Hz

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

- 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.

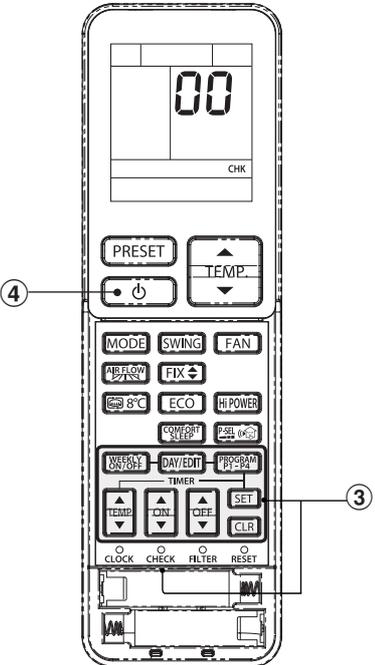


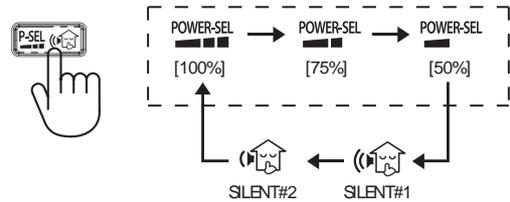
- Turn on air conditioner again by remote controller to confirm setting.



①

Item	Operation flow and applicable data, etc.	Description
<b>14. Remote-A or B selection</b>	<p><b>Setting the remote controller</b></p> <p>To separate using of remote control for each indoor unit in case of 2 air conditioner 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="text-align: center;">  </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>
<b>15. Hi-POWER Mode</b>	<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, Cooling or Heating 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. Heating operation</b> <ul style="list-style-type: none"> <li>• The preset temperature increases 2°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>4. The Hi-POWER mode can not be set in Dry operation</b></li> </ol>	

Item	Operation flow and applicable data, etc.	Description										
<p><b>16. QUIET Mode</b></p>	<p>The "Quiet mode" selected from [ FAN ] 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 shown in the table below.</li> </ul> <table border="1" data-bbox="376 398 938 544"> <thead> <tr> <th>Model</th> <th>RAS-B50G3KVSG-ND</th> </tr> </thead> <tbody> <tr> <td>Cool min (Hz)</td> <td>10.8</td> </tr> <tr> <td>Quiet Cool (Hz)</td> <td>26.4</td> </tr> <tr> <td>Heat min (Hz)</td> <td>10.8</td> </tr> <tr> <td>Quiet Heat (Hz)</td> <td>23.4</td> </tr> </tbody> </table> <p>The "Quiet mode" is canceled by [ FAN ] button is pressed to select other speed.</p>	Model	RAS-B50G3KVSG-ND	Cool min (Hz)	10.8	Quiet Cool (Hz)	26.4	Heat min (Hz)	10.8	Quiet Heat (Hz)	23.4	<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 condition. Because of the fan speed L- may cause not enough the cooling capacity capacity.</li> </ol>
Model	RAS-B50G3KVSG-ND											
Cool min (Hz)	10.8											
Quiet Cool (Hz)	26.4											
Heat min (Hz)	10.8											
Quiet Heat (Hz)	23.4											
<p><b>17. Short Timer</b></p>	<p>In the normal condition, after switching one circuit breaker, 3-minute delay time for compressor and 1 hour for plasma air purifier are set for the maintenance of the unit.</p> 	<p><b>Purpose</b></p> <p>To start the unit immediately for the purpose of testing, trial...etc, short timer can be used. maintenance of the unit.</p> <p><b>Short Timer Setting</b></p> <ol style="list-style-type: none"> <li>① Press [ ⏻ ] button to turn the unit OFF.</li> <li>② Set the operation mode or plasma air purifier on the remote control without sending the signal to the unit.</li> <li>③ Use the tip of the pencil to push the [CHK] button and hold, "00" will show on display, then press [SET] button to make "00" disappear.</li> <li>④ Press [ ⏻ ] button to turn the unit ON.</li> <li>⑤ When short timer is activated, all setting on the remote operates immediately, besides, all indicators on front panel turns ON continuously for 3 seconds.</li> </ol>										

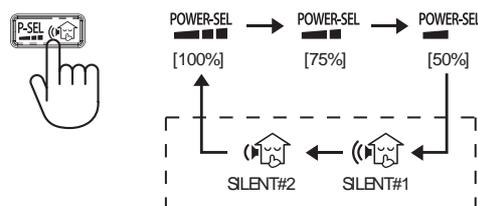
Item	Operation flow and applicable data,etc	Description
<b>18. POWER Selection Mode</b>	<p>( [ P-SEL ] button on the remote controller is pressed)</p> <ul style="list-style-type: none"> <li>– Power Selection 75% is 75% of maximum current.</li> <li>– Power Selection 50% is 50% of rate maximum current.</li> </ul> <p><b>POWER-SELECTION AND SILENT OPERATION</b></p> 	<p><b>1. Purpose</b></p> <p>The function is used when its circuit breaker is shared with other electrical appliances. It limits the maximum current/ power consumption to 100%, 75% or 50%.</p> <p>The lower the percentage, the higher the saving and also the longer the compressor lifetime.</p> <p><b>2. Description</b></p> <p>When the level is selected, Power-SEL level flashes on LCD display for 3 seconds. In case of 75% and 50% level, number "75" or "50" also flashes for 2 seconds.</p> <p><b>Note :</b> Due to the reason that POWER SELECT FUNCTION limits the maximum current, inadequate capacity may occur.</p>

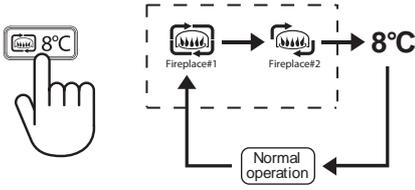
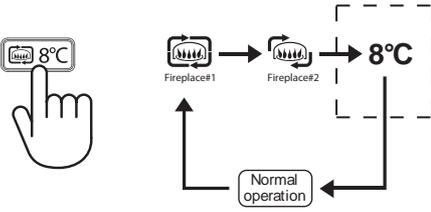
<b>19. Silent Operation</b>	<p>Silent [ P-SEL ] button on remote controller is pressed.</p> <p><b>Silent 1:</b> Cooling/heating capacity is limited maximum for 70% of rated. Only compressor speed is limited.</p> <p><b>Silent 2:</b> CDU sound level is limited for lowest CDU sound level. Compressor and CDU fan speed are limited.</p>	<p>This function is used when the user need to keep silent at outdoor side. It is limit maximum compressor speed and CDU fan speed. Sound level can be implemented by 2 silent level.</p> <p><b>Sound level:</b> Rated level &gt; Silent 1 &gt; Silent 2</p> <p><b>Note:</b> Due to Silent operation reason, In adequate cooling/heating capacity may occur.</p>
-----------------------------	--	--

**Silent Operation description**

Models	Silent Operation	Cooling		Heating	
		Compressor frequency (rps)	CDU Fan Speed (rpm)	Compressor frequency (rps)	CDU Fan Speed (rpm)
RAS-50G3AVSG-ND	Silent 1	31.8	Max 650	31.8	Max 700
	Silent 2	26.4	600	23.4	600

**POWER-SELECTION AND SILENT OPERATION**



Item	Operation flow and applicable data,etc	Description
<p><b>20. Fireplace Operation</b></p>	<p>Fireplace  button on remote controller is pressed.</p> <p><b>Fireplace 1:</b> Cancel cold draft prevention control and fan speed depend on user require base on basic control.</p> <p><b>Fireplace 2:</b> Cold draft prevention control is active with super low fan speed (640 rpm).</p> <p><b>Fireplace Operation</b></p> 	<p>Keep air circulation during other heat source applied.</p> <p><b>Note:</b> With Fireplace operation on heating mode indoor unit always runs and cold air breezing might be occurred.</p>
<p><b>21. 8°C heating / Frost protective operation</b></p>	<p> Button on remote controller is pressed. Set temperature is performed for 5°C to 13°C and no cold draft prevention control.</p> <p><b>8°C heating operation</b></p> 	<p>Intended for cold latitudes and performs objective heating operation.</p>

Item	Operation flow and applicable data, etc.	Description																								
<p><b>22. Operation mode selectable</b></p>	<p>Operating system setting</p>  <table border="1" data-bbox="371 651 930 864"> <thead> <tr> <th colspan="2">Jumper</th> <th colspan="2">Operation Mode</th> </tr> <tr> <th>J802</th> <th>J803</th> <th>Cooling</th> <th>Heating</th> </tr> </thead> <tbody> <tr> <td>Short</td> <td>Short</td> <td colspan="2">Default factory setting</td> </tr> <tr> <td>Short</td> <td>Cut</td> <td>Allow</td> <td>Deny</td> </tr> <tr> <td>Cut</td> <td>Short</td> <td>Deny</td> <td>Allow</td> </tr> <tr> <td>Cut</td> <td>Cut</td> <td colspan="2">Default factory setting</td> </tr> </tbody> </table> <p>Remark : This setting designed for heat pump model only. Do not try cooling only model.</p>	Jumper		Operation Mode		J802	J803	Cooling	Heating	Short	Short	Default factory setting		Short	Cut	Allow	Deny	Cut	Short	Deny	Allow	Cut	Cut	Default factory setting		<ol style="list-style-type: none"> <li>Purpose Choosing the operating system as appropriate in real condition</li> <li>Operation Factory default setting prefer "Heat pump" system. Through it is able to cooling only system heating only system or return to factory default.</li> </ol>
Jumper		Operation Mode																								
J802	J803	Cooling	Heating																							
Short	Short	Default factory setting																								
Short	Cut	Allow	Deny																							
Cut	Short	Deny	Allow																							
Cut	Cut	Default factory setting																								
<p><b>23. Display lamp brightness adjustment</b></p>	<p>To decrease the display lamp brightness or turn it off.</p> <ol style="list-style-type: none"> <li>Press and hold  for 3 seconds until brightness level (d0, d1, d2 or d3) is shown on remote control LCD then release the button.</li> <li>Press  Rise or  to adjust brightness in 4 levels.</li> </ol> <table border="1" data-bbox="405 1267 1286 1753"> <thead> <tr> <th>Remote control LCD</th> <th>Operation display</th> <th>Brightness</th> </tr> </thead> <tbody> <tr> <td>d3</td> <td> Lamp illuminates an operation with full brightness.</td> <td>100%</td> </tr> <tr> <td>d2</td> <td> Lamp illuminates an operation with 50% brightness.</td> <td>50%</td> </tr> <tr> <td>d1</td> <td> Lamp illuminates an operation with 50% brightness and the operation mode lamp is turned off.</td> <td>50%</td> </tr> <tr> <td>d0</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 d1 and d0, the lamp illuminates for 5 seconds before going off.</li> </ul>	Remote control LCD	Operation display	Brightness	d3	 Lamp illuminates an operation with full brightness.	100%	d2	 Lamp illuminates an operation with 50% brightness.	50%	d1	 Lamp illuminates an operation with 50% brightness and the operation mode lamp is turned off.	50%	d0	 All lamps are turned off.	All turned off										
Remote control LCD	Operation display	Brightness																								
d3	 Lamp illuminates an operation with full brightness.	100%																								
d2	 Lamp illuminates an operation with 50% brightness.	50%																								
d1	 Lamp illuminates an operation with 50% brightness and the operation mode lamp is turned off.	50%																								
d0	 All lamps are turned off.	All turned off																								

### 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 set to work when shipped from the factory.

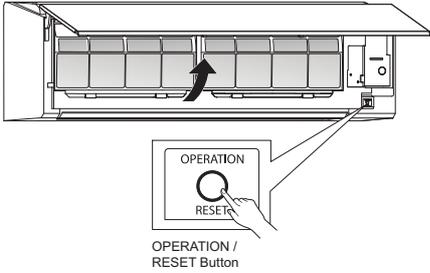
#### 9-3-1. How to Cancel the Auto Restart Function

To cancel auto restart function, proceed as follows :

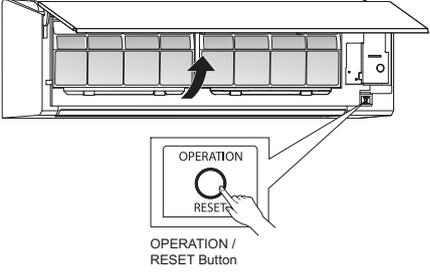
Repeat the setting procedure : the unit receives the signal and beeps three times.

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

#### • When the 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 style="text-align: center;">↓</p> <p>The unit starts to operate.                      The white indicator is on.</p> <p style="text-align: center;">↓                      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 style="text-align: center;">↓</p> <p>The unit stops operating.                      The white indicator is turned off.</p> <p style="text-align: center;">↓                      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 Set the Auto Restart Function

To set the auto restart function, proceed as follows:

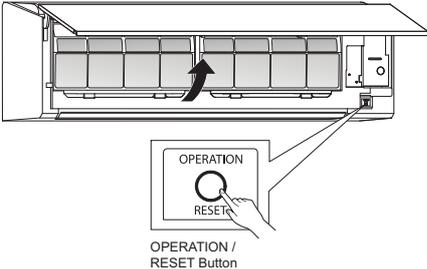
The power supply to the unit must be on ; the function will not set if the power is off.

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

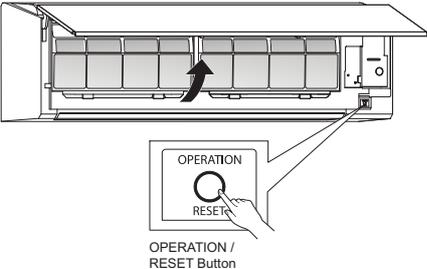
The unit receives the signal and beeps three times.

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

#### • When the 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 style="text-align: center;">↓</p> <p>The unit starts to operate.                      The white indicator is on.</p> <p style="text-align: center;">↓                      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 style="text-align: center;">↓</p> <p>The unit stops operating.                      The white indicator is turned off.</p> <p style="text-align: center;">↓                      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.

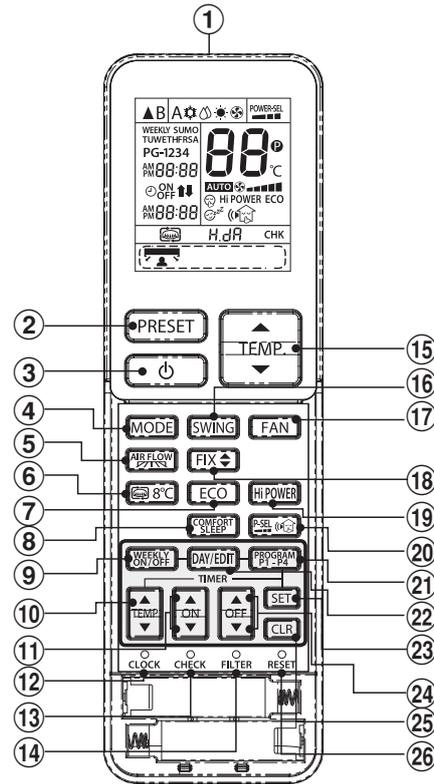
#### NOTE :

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 controller and Its Functions

### 9-4-1. Parts Name of Remote Controller

- ① Infrared signal emitter
- ② Memory and Preset button (PRESET)
- ③ Start/Stop button (POWER)
- ④ Mode select button (MODE)
- ⑤ AIR FLOW and HADA CARE 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 controller

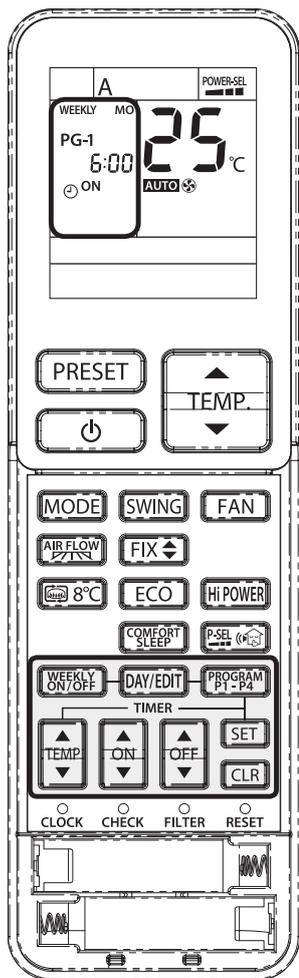
#### 1. Weekly timer operation

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

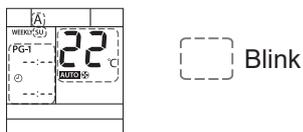
The following items can be set in WEEKLY TIMER operation.

- 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)

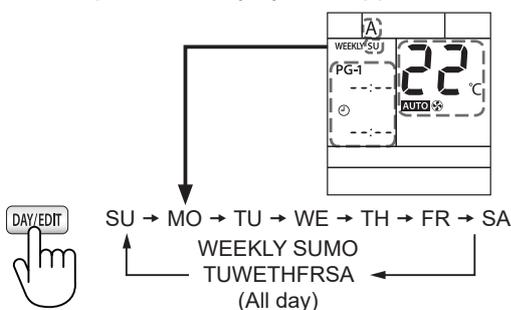
## How to set WEEKLY TIMER



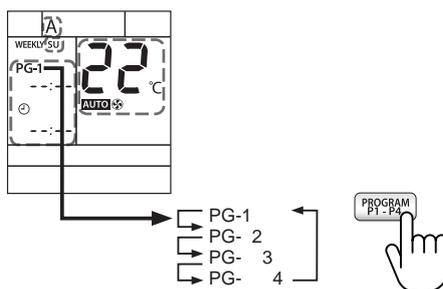
1. Press DAY/EDIT to enter WEEKLY TIMER setting.



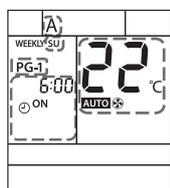
2. Press DAY/EDIT to select desired day in sequence. The sequence of day symbol appears on the LCD.



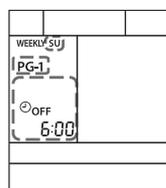
3. Press PROGRAM P1-P4 to select the program number.
  - The program 1 is ready for setting while DAY/EDIT is pressed PG-1 appears on the LCD.
  - Press PROGRAM P1-P4 to change the program number in the sequence program 1 to program 4.



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.

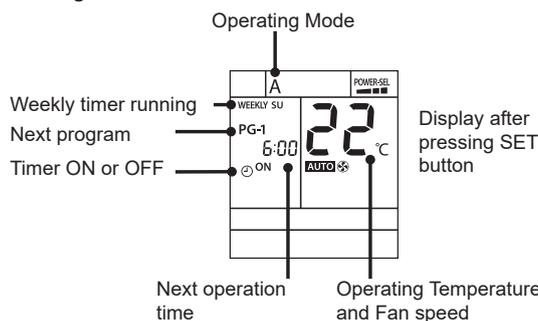
- Press to use 8°C operation.  
(Notes: Fireplace cannot select and memorize in weekly function)
- Press to use ECO operation.
- Press to use Hi-POWER operation.
- Press to use SILENT operation.

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.

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

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

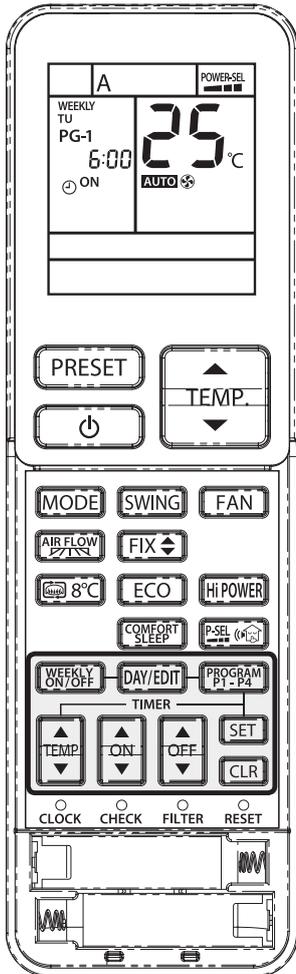


\*Point remote controller at air conditioner receiving module then, press SET button until you hear the “PiPi” sound. This means the setting operation has been completed. As the air conditioner is receiving the signal, you will hear separate “Pi” sounds corresponding to the number of days in the selected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

An incomplete setting is indicated if the TIMER lamp is blinking. Press twice.

### Notes :

1. Place the remote controller where the indoor unit can receive the signal. This will increase the accuracy of the timing between the remote controller 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 controller is sending a signal to the air conditioner, avoid interference from objects that can block the signal.



### Edit Weekly timer program

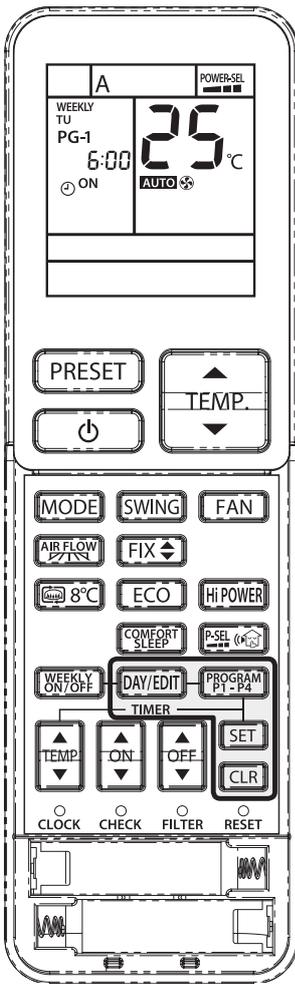
To edit the program after confirming the weekly timer setting, follow steps 1 - 3 below.

1. Press **DAY/EDIT**.
  - The day of the week and the program number of the current day will be displayed.
2. Press **DAY/EDIT** to select the day of the week and press **PROGRAM P1-P4** to select program number to be confirmed.
  - Resetting the operation.
3. Press **SET** to exit confirming mode.

### Deactivating WEEKLY TIMER operation

Press **WEEKLY ON/OFF** while "WEEKLY" is displayed on the LCD.

- The "WEEKLY" indicator will disappear from the LCD. However, the program will remain in the remote controller.
- The TIMER lamp goes off.
- To reactivate the WEEKLY TIMER operation again, press **WEEKLY ON/OFF** 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 controller receiving module on the air conditioner receives the signal from the remote controller.

## 2. AUTOMATIC OPERATION

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

1. Press **MODE** : Select Auto A.
2. Press **TEMP.** : Select the desired temperature. Min 17°C, Max 30°C
3. Press **FAN** : 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.

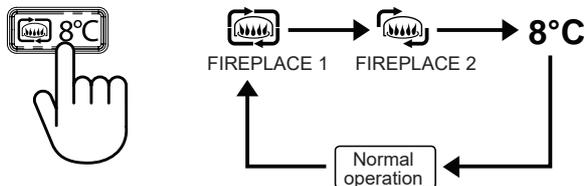
#### Fireplace 2:

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.

## 4. COOLING / HEATING / FAN ONLY OPERATION

1. Press **MODE** : Select Cool , Heat , or Fan only 
2. Press **TEMP.** : Set the desired temperature. Min 17°C, Max 30°C  
Fan Only : No temperature indication
3. Press **FAN** : 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 **MODE** : Select Dry 
2. Press **TEMP.** : 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  : Start and stop the operation

## 7. ECO OPERATION

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

Press  : 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  : Select 1, 3, 5 or 9 hrs for OFF timer operation.
2. Press  : 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.

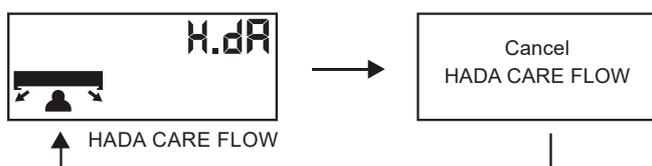
## 9. HADA CARE FLOW OPERATION

### HADA CARE FLOW

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

### HADA CARE FLOW operation

Press  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 ( P-SEL )**

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:**

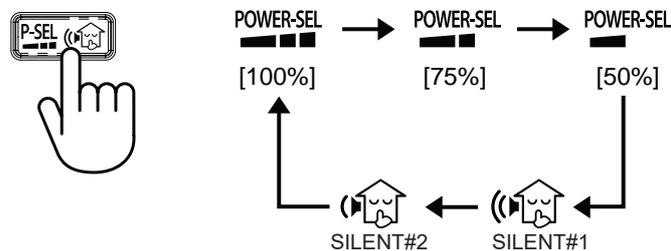
Compromising the Heating (or Cooling) capacity to the Sound level in any circumstance where the outdoor unit's sound level is highly prioritized.

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
<b>1</b>	Press  : Set the desired ON timer.	Press  : Set the desired OFF timer.
<b>2</b>	Press  : Set the timer.	Press  : Set the timer.
<b>3</b>	Press  : Cancel the timer.	Press  : Cancel the timer.

### Note:

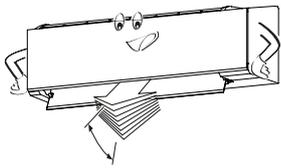
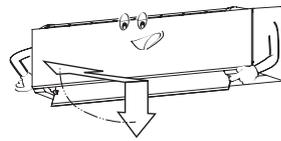
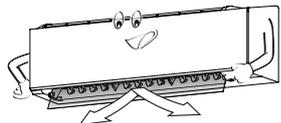
- Keep the remote controller in accessible transmission to the indoor unit. otherwise, the time lag of up to 15 minutes will occur.
- The setting will be saved for the next same operation.

## 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

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

### Note:

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

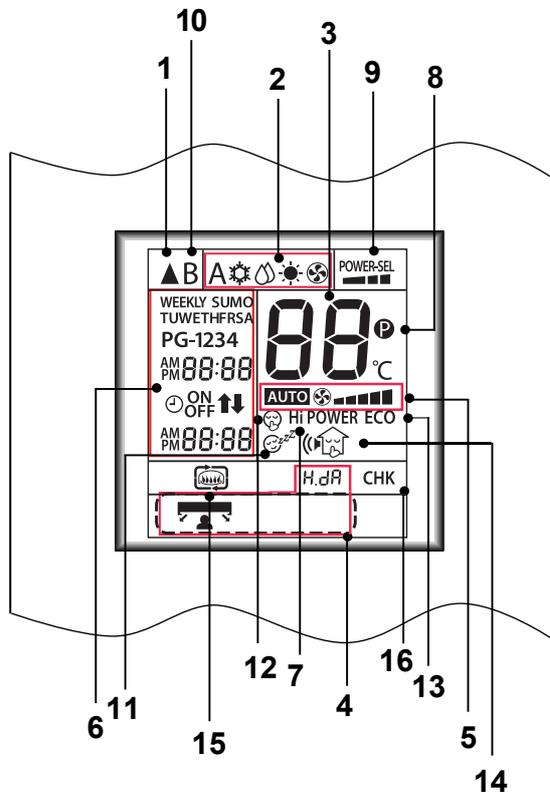
### 9-4-3. Name and Functions of Indications on Remote Controller

#### [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.

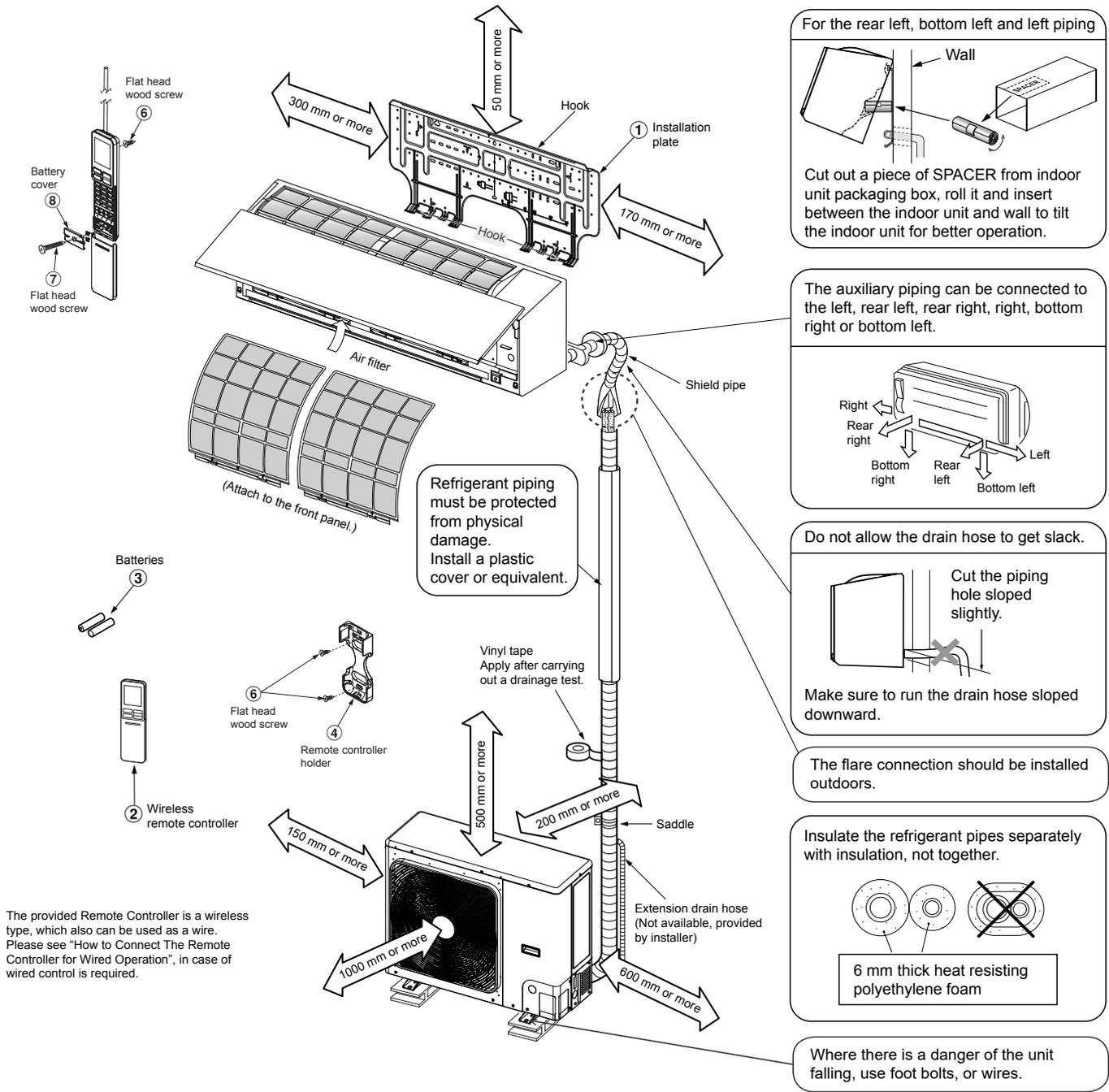
- 6 TIMER and weekly timer indicator**  
The time setting for timer operation and weekly timer function is indicated.  
The current time is always indicated except during TIMER operation.
- 7 Hi-POWER indicator**  
Indicates when the Hi-POWER operation starts.  
Press the Hi-POWER button to start and press it again to stop the operation.
- 8 P (PRESET) indicator**  
Flashes for 3 seconds when the PRESET button is pressed during operation.  
The P 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



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 slide cover.
  2. Insert 2 new batteries (AAA type) following the (+) and (-) positions.

(2) Wireless remote controller

## 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

#### <Fixing bolt arrangement of outdoor unit>

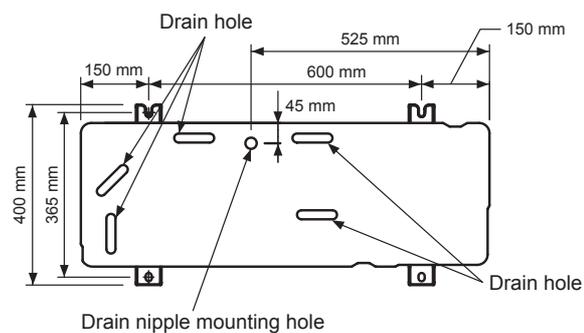
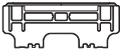
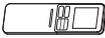
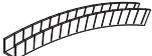


Fig. 10-2-1

- Secure the outdoor unit with fixing bolts and nuts if the unit is likely to be exposed to a strong wind.
- Use Ø 8 mm or Ø 10 mm anchor bolts and nuts.
- If it is necessary to drain the defrost water, attach drain nipple ⑭ and cap water proof ⑮ to the bottom plate of the outdoor unit before installing it.

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

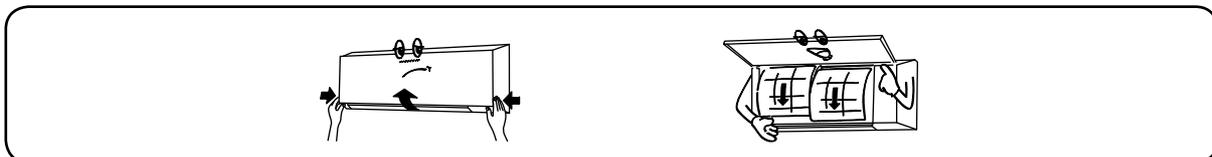
Indoor Unit			
No.	Part name	No.	Part name
①	 Installation plate × 1	②	 Wireless remote controller × 1
③	 Battery × 2	④	 Remote controller holder × 1
⑤	 Mounting screw × 6	⑥	 Flat head wood screw × 2
⑦	 Flat head wood screw × 1	⑧	 Battery cover
⑨	 Owner's Manual × 1	⑩	 Installation Manual × 1
⑪	 Screw × 2	⑫	 B Label × 1
⑬	 Safety Manual × 1		

Outdoor Unit			
No.	Part name	No.	Part name
⑭	 Drain nipple × 1	⑮	 Cap water proof × 5 (For some model only)
⑯	 Cable tie × 2 (Fixing the power cord)	⑰	 Protective bush × 1 (Protecting wire, pipe cover)
⑱	 Guard material for passage part × 1 (Protecting passage part, pipe 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.



### 10-2-3. Installation/Serviceing 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 controller>

- 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 controller in a place exposed to direct sunlight or close to a heating source, such as a stove.
- Keep the remote controller 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 controller should be determined as shown below.

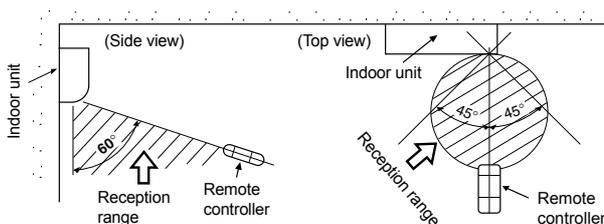


Fig. 10-3-1

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

#### <Cutting a hole>

When installing the refrigerant pipes from the rear.

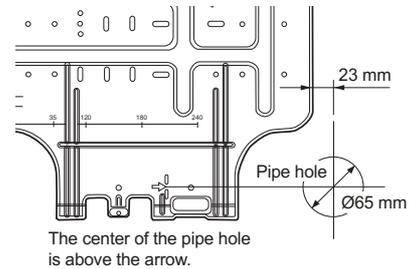


Fig. 10-3-2

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>

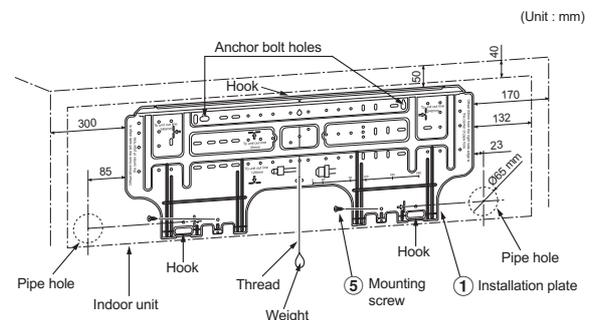


Fig. 10-3-3

- Space allows for moving range of the air inlet grille and horizontal louver in operation above curtain rails, window cornice or other objects.

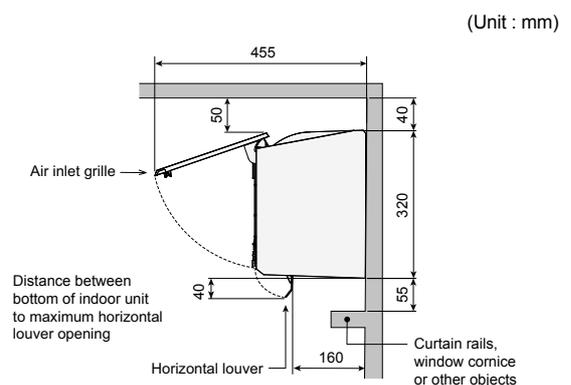


Fig. 10-3-4

## CAUTION

- If have curtain rails, window cornice or other objects, allow space from the indoor unit should be 55 mm or more.
- If allow space is less than 55 mm, this can affect the opening and closing of the air inlet grille and the horizontal louver.
- However, there should be no objects in the air outlet position.  
It will block the air flow direction and drop performance.

### <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.

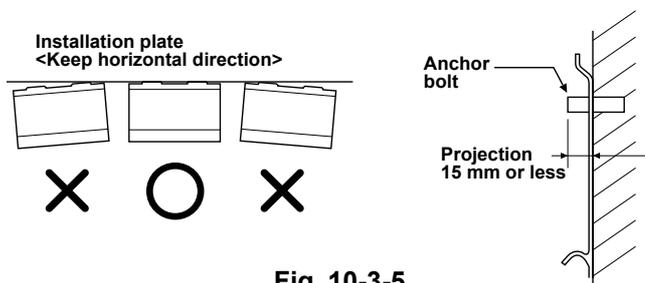


Fig. 10-3-5

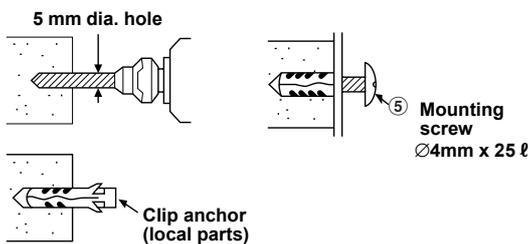


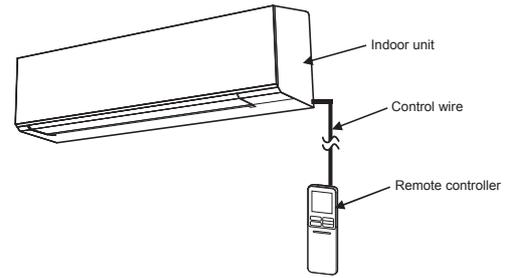
Fig. 10-3-6

## CAUTION

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

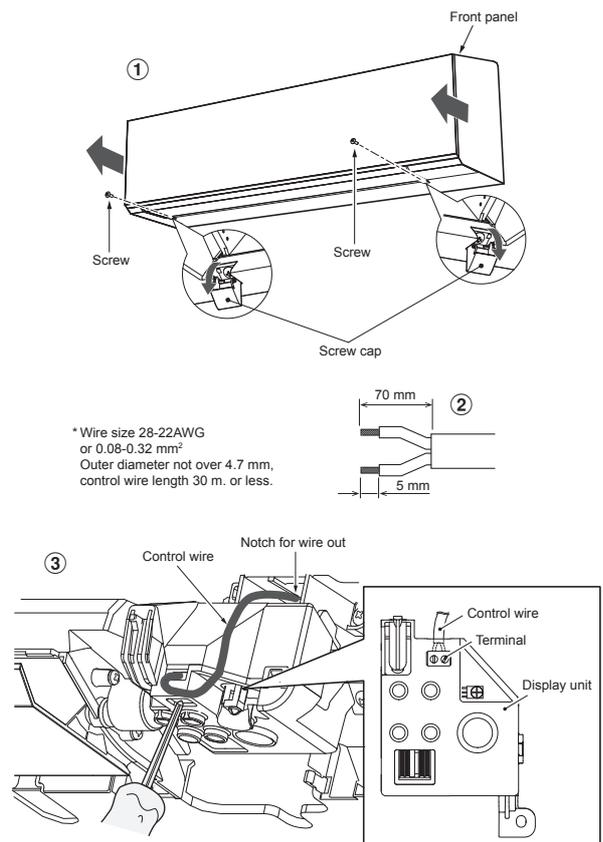
- In case of block, brick, concrete or similar type walls, make 5 mm dia. holes in the wall.
- Insert clip anchors for appropriate mounting ⑤ crews.

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



#### < For indoor unit >

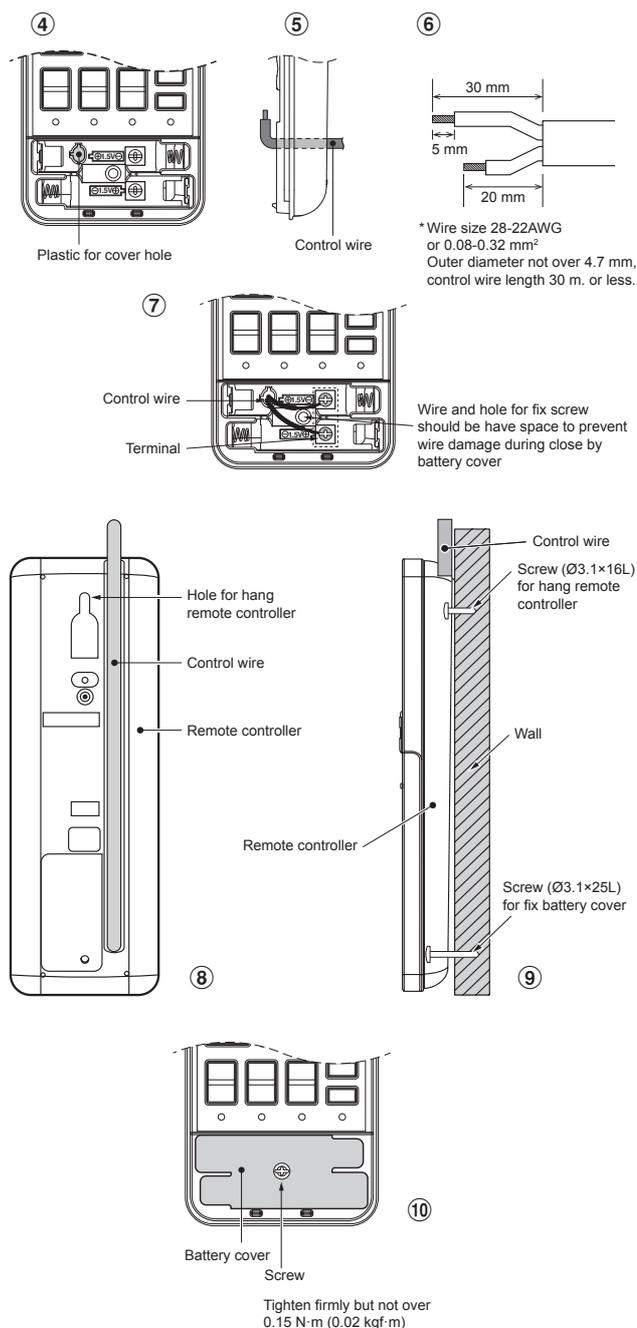
1. Open two screw cap and securely remove two screws at the front panel.
2. Slightly open the lower part of the front panel then pull the upper part of the front panel toward you to remove it as shown on figure ① .
3. Arrange the control wire as detail and specification as shown on figure ② .
4. Securely 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.



#### < 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 polyester sheet 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 ⑩.
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.

## 10-3-4. 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.)

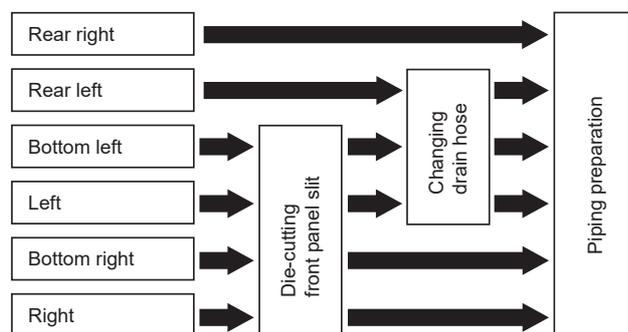


Fig. 10-3-7

#### 1. Die-cutting front panel slit

Cut out the slit on the left or right side of the front panel for the left or right connection and the slit on the bottom left or right side of the front panel 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.

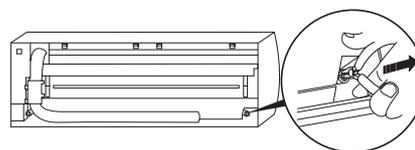


Fig. 10-3-8

#### <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.

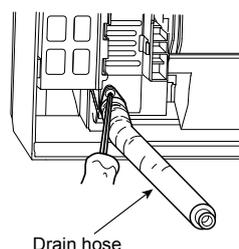


Fig. 10-3-9

### <How to fix the Drain Cap>

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

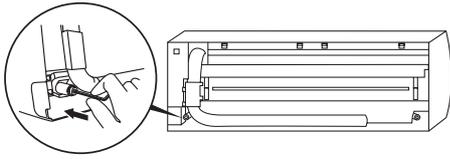


Fig. 10-3-10

- 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.

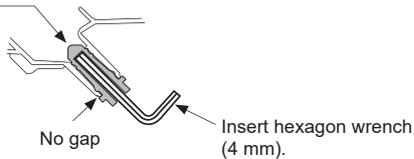


Fig. 10-3-11

### 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 front panel with a knife or a making-off pin, cut them with a pair of nippers or an equivalent tool.

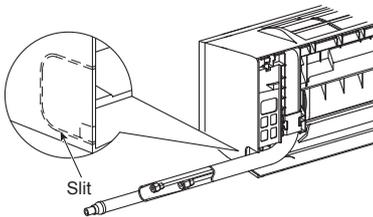


Fig. 10-3-12

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

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

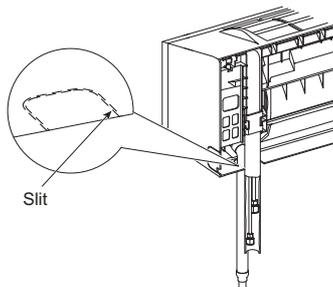


Fig. 10-3-13

### <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)

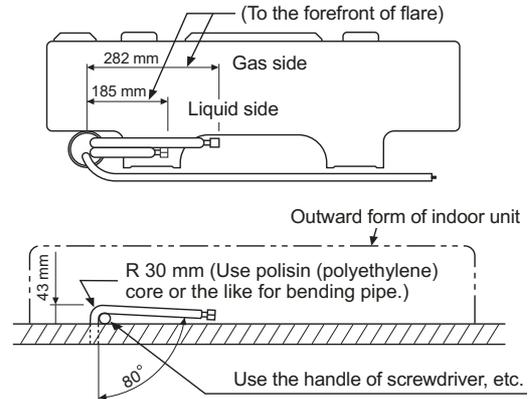


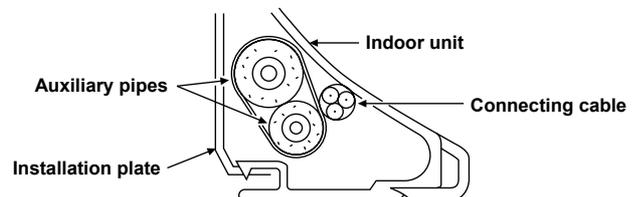
Fig. 10-3-14

### 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.

### 10-3-5. 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.

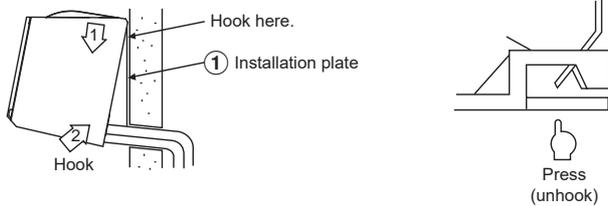


Fig. 10-3-15

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

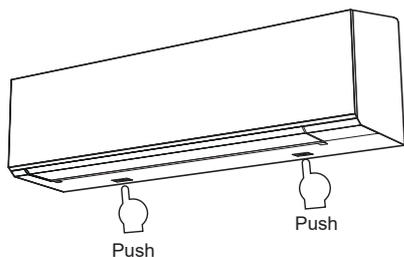


Fig. 10-3-16

#### Information

The lower part of indoor unit may float, due to the condition of piping and you cannot fix it to the installation plate. In that case, use the ⑪ screws provided to fix the unit and the installation plate.

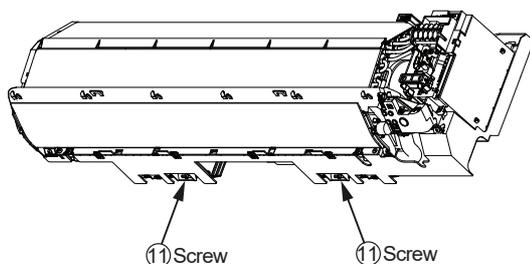


Fig. 10-3-17

### 10-3-6. Drainage

1. Run the drain hose sloped downwards.

#### NOTE

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

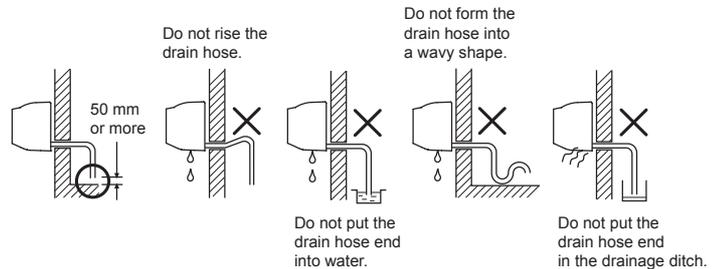


Fig. 10-3-18

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.

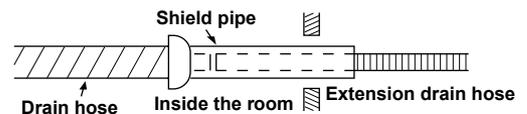


Fig. 10-3-19

#### 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.

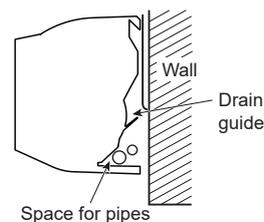


Fig. 10-3-20

## 10-4. Outdoor Unit

### 10-4-1. Installation place

- A place which provides the spaces around the outdoor unit as shown in the diagram
- A place which can bear the weight of the outdoor unit and does not allow an increase in noise level and vibration
- A place where the operation noise and discharged air do not disturb your neighbors
- A place which is not exposed to a strong wind
- A place free of a leakage of combustible gases
- A place which does not block a passage
- When the outdoor unit is to be installed in an elevated position, be sure to secure its feet.
- The allowable length of the connecting pipe.

Model	RAS-50G3AVSG-ND
Chargeless	Up to 30 m
Maximum length	30 m
Additional refrigerant charging	-
Maximum refrigerant charging	1.70 kg

- The allowable height of outdoor unit installation site.

Model	RAS-50G3AVSG-ND
Maximum height	15 m

- A place where the drain water does not raise any problems or with good drainage.
- A place where it can be installed horizontally.

### Precautions for adding refrigerant

Use a scale having a precision with at least 10 g per index line when adding the refrigerant.  
Do not use a bathroom scale or similar instrument.

### CAUTION

When the outdoor unit is installed in a place where the drain water might cause any problems, Seal the water leakage point tightly using a silicone adhesive or caulking compound.

### 10-4-2. Precautions about installation in Regions with Snowfall and Cold Temperatures

- Do not use the supplied drain nipple for draining water. Drain the water from all the drain holes directly.
  - To protect the outdoor unit from snow accumulation, install a holding frame, and attach a snow protection hood and plate.
- \* Do not use a double-stacked design.

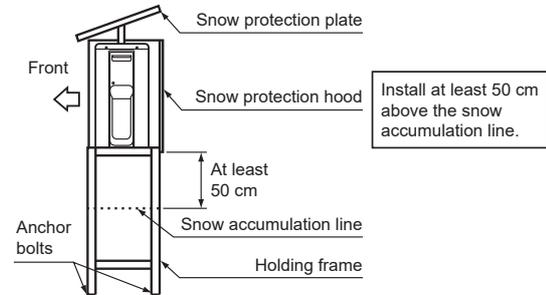
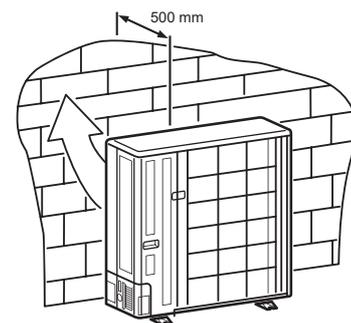


Fig. 10-4-1

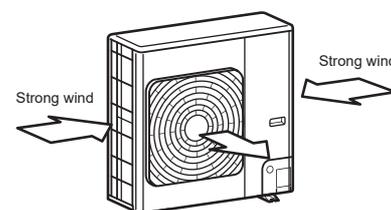
### CAUTION

1. Install the outdoor unit in a location where the discharge air is not blocked.
2. When an outdoor unit is installed in a location that is always exposed to strong winds like a coast or on the high stories of a building, secure normal fan operation by using a duct or wind shield.
3. When installing the outdoor unit in a location that is constantly exposed to strong winds such as on the upper stairs or rooftop of a building, apply the wind proofing measures referred to in the following examples.

- 1) Install the unit so that its discharge port faces the wall of the building.  
Keep a distance 500 mm or more between the unit and wall surface.



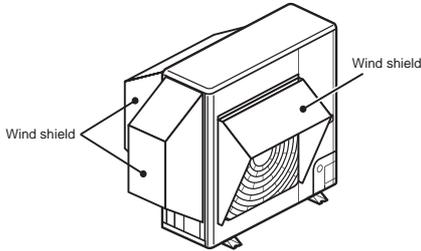
- 2) Consider the wind direction during the operational season of the air conditioner, and install the unit so that the discharge port is set at a right angle relative to the wind direction.



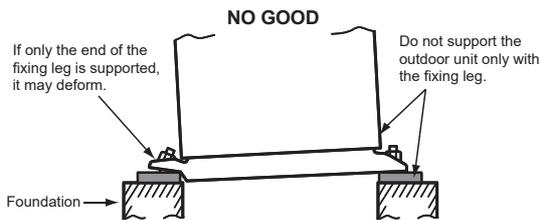
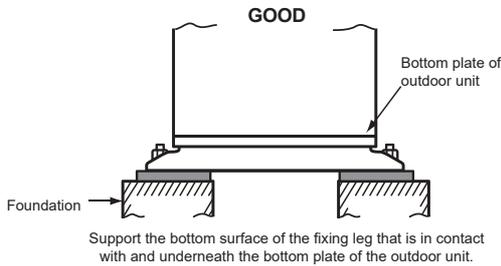
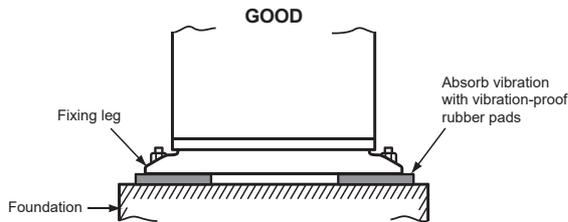
**CAUTION**

- When using an air conditioner under low outside temperature conditions (Outside temp: -5°C or lower) in COOL mode, prepare a duct or wind shield so that it is not affected by the wind.

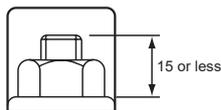
<Example>



- As shown in the figure below, install the foundation and vibration-proof rubber pads to directly support the bottom surface of the fixing leg that is in contact with and underneath the bottom plate of the outdoor unit.



Set the out margin of the anchor bolt to 15 mm or less.



**Fig. 10-4-2**

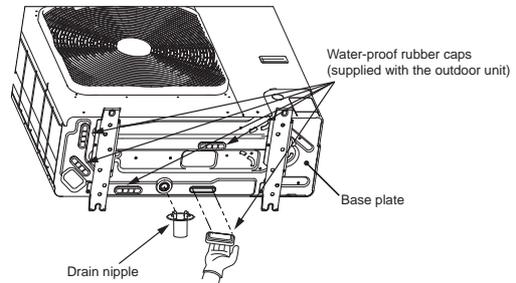
**10-4-3. Draining the Water**

- Holes are provided on the base plate of the outdoor unit to ensure that the defrost water produced during heating operations is drained off efficiently. If a centralized drain is required when installing the unit on a balcony or wall, follow the steps below to drain off the water.

- Proceed with water-proofing by installing the water-proof rubber caps in the 5 elongated holes on the base plate of the outdoor unit.

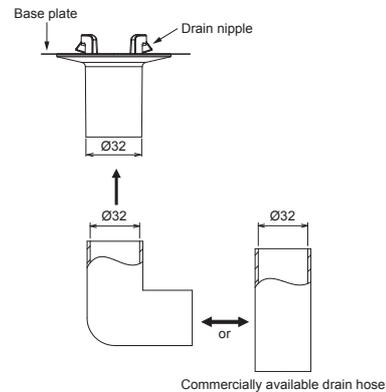
[How to install the water-proof rubber caps]

- Place four fingers into each cap, and insert the caps into the water drain holes by pushing them into place from the underside of the base plate.
- Press down on the outer circumferences of the caps to ensure that they have been inserted tightly. (Water leaks may result if the caps have not been inserted properly, if their outer circumferences lift up or the caps catch on or wedge against something.)



**Fig. 10-4-3**

- Install the drain nipple and a commercially available drain hose (with 32 mm inside diameter), and drain off the water. (For the position where the drain nipple is installed, refer to the installation diagram of the indoor and outdoor units.)
- Check that the outdoor unit is horizontal, and route the drain hose at a downward sloped angle while ensuring that it is connected tautly.

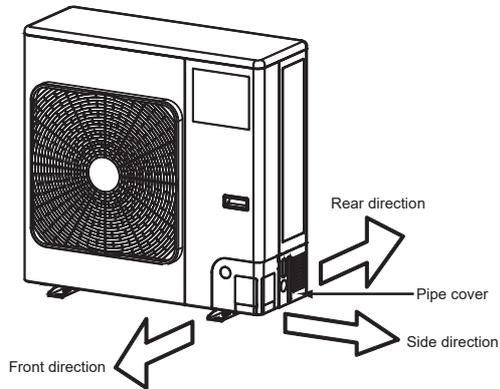


Do not use ordinary garden hose, but one can flatten and prevent water from draining.

### 10-4-4. Refrigerant Piping

#### Knockout of pipe cover

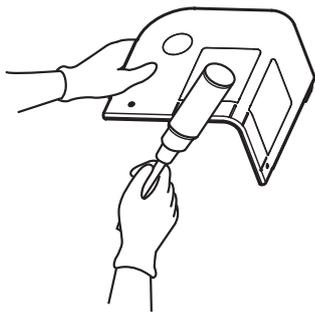
##### Knockout procedure



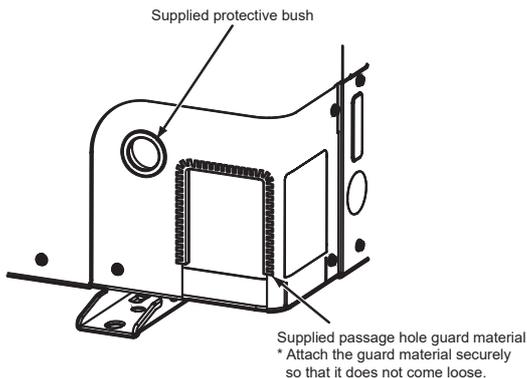
- The indoor/outdoor connecting pipes can be connected in 3 directions. Take off the knockout part of the pipe cover through which pipes or wires will pass through the base plate.
- Detach the pipe cover and tap on the knockout section a few times with the shank of a screwdriver. A knockout hole can easily be punched.
- After punching out the knockout hole, remove burrs from the hole and then install the supplied protective bush and guard material around the passage hole to protect wires and pipes.

Be sure to attach the pipe covers after pipes have been connected. Cut the slits under the pipe covers to facilitate the installation.

After connecting the pipes, be sure to mount the pipe cover. The pipe cover is easily mounted by cutting off the slit at the lower part of the pipe cover.



\* Be sure to wear heavy work gloves while working.



\* Attach the guard material securely so that it does not come loose.

### 10-4-5. Refrigerant piping connection

#### <Flaring>

1. Cut the pipe with a pipe cutter.

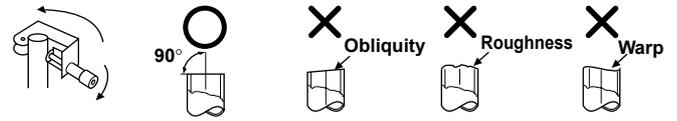


Fig. 10-4-4

2. Insert a flare nut into the pipe, and flare the pipe.
  - Projection margin in flaring : A (Unit : mm)

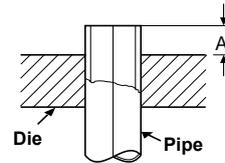


Fig. 10-4-5

#### RIDGID (clutch type)

Outer dia. of copper pipe	Tool used	Conventional tool used
Ø6.35	0 to 0.5	1.0 to 1.5
Ø9.52	0 to 0.5	1.0 to 1.5
Ø12.70	0 to 0.5	1.0 to 1.5
Pipes thickness	0.8 mm or more	

#### IMPERIAL (wing nut type)

Outer dia. of copper pipe	Tool used
Ø6.35	1.5 to 2.0
Ø9.52	1.5 to 2.0
Ø12.70	2.0 to 2.5
Pipes thickness	0.8 mm or more

#### CAUTION

- Do not scratch the inner surface of the flared part when removing burrs.
- Flare processing under the condition of scratches on the inner surface of flare processing part will cause refrigerant gas leak.

### <Tightening connection>

Align the centers of the connecting pipes and tighten the flare nut as far as possible with your fingers. Then tighten the nut with a spanner and torque wrench as shown in the figure.

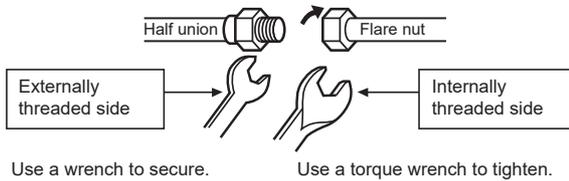


Fig. 10-4-6

### CAUTION

Do not apply excess torque. Otherwise, the nut may crack depending on the conditions.

(Unit : N•m)

Outer dia. of copper pipe	Tightening torque
Ø6.35 mm	14 to 18 (1.4 to 1.8 kgf•m)
Ø9.52 mm	30 to 42 (3.0 to 4.2 kgf•m)
Ø12.70 mm	50 to 62 (5.0 to 6.2 kgf•m)

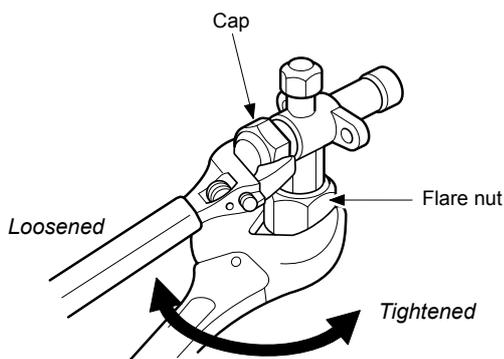
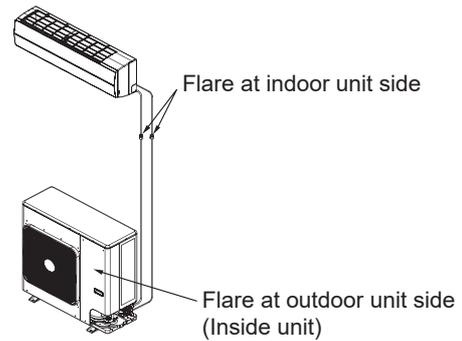


Fig. 10-4-7

- After the installation work, be sure to check for gas leaks of the pipe connections with nitrogen.
- Pressure of R32 is higher than that of R22 (Approx. 1.6 times). Therefore, using a torque wrench, tighten the are pipe connecting sections that connect the indoor/outdoor units at the specified tightening torque. Incomplete connections may cause not only a gas leak, but also trouble with the refrigeration cycle.

**Do not apply refrigerant oil to the flared surface.**



### CAUTION

- **KEEP IMPORTANT 7 POINTS FOR PIPING WORK**
  - (1) Take away dust and moisture (inside of the connecting pipes).
  - (2) Tighten the connections (between pipes and unit).
  - (3) Evacuate the air in the connecting pipes using a VACUUM PUMP.
  - (4) Check gas leak (connected points).
  - (5) Be sure to fully open the packed valves before operation.
  - (6) Reusable mechanical connectors and flared joints are not allowed indoors. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
  - (7) Don't operate air conditioner in case no refrigerant in the system.

### 10-4-6. Evacuating

After the piping has been connected to the indoor unit, you can perform the air purge together at once.

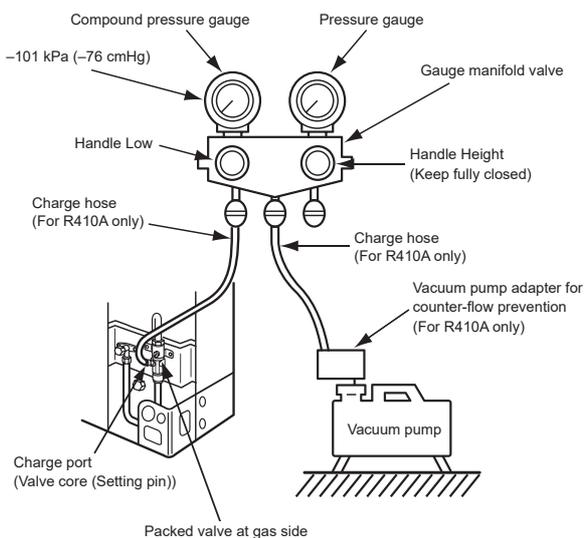
#### < Vacuuming >

Evacuate the air in the connecting pipes and in the indoor unit using a vacuum pump. Do not use the refrigerant in the outdoor unit. For details, see the manual of the vacuum pump.

#### <Using a vacuum pump>

Be sure to use a vacuum pump with counter-flow prevention function so that inside oil of the pump does not flow backward into pipes of the air conditioner when the pump stops. (If oil inside of the vacuum pump enters into the air conditioner, which use R410, refrigeration cycle trouble may result.)

1. Connect the charge hose from the manifold valve to the service port of the packed valve at gas side.
2. Connect the charge hose to the port of the vacuum pump.
3. Open fully the low pressure side handle of the gauge manifold valve.
4. Operate the vacuum pump to start evacuating. Perform evacuating for about 15 minutes if the piping length is 20 meters. (15 minutes for 20 meters) (assuming a pump capacity of 27 liters per minute) Then confirm that the compound pressure gauge reading is -101 kPa (-76 cmHg).
5. Close the low pressure side valve handle of the gauge manifold valve.
6. Open fully the valve stem of the packed valves (both gas and liquid sides).
7. Remove the charging hose from the service port.
8. Securely tighten the caps on the packed valves.



#### <Pump down process>

1. Turn off the Air Conditioner system.
2. Connect the charge hose from the manifold valve to the service port of the packed valve at gas side.
3. Turn on the Air Conditioner system in cooling operation more than 10 minutes.
4. Check the operating pressure of the system should be normal value. (Ref. with product specification)
5. Release the valve rod cap of both service valves.
6. Use the Hexagon wrench to turning the valve rod of Liquid side fully close.  
(\*Make sure no entering air into the system)
7. Continue operate Air Conditioner system until the gauge of manifold dropped into the range of 0.5 - 0 kgf/cm<sup>2</sup>
8. Use the Hexagon wrench to turning the valve rod of Gas side fully close. And turn off the Air Conditioner system immediately thereafter.
9. Remove the gauge manifold from the service port of the packed valve.
10. Securely tighten the valve rod cap to the both service valves.

#### CAUTION

Should be check the compressor operating condition while pumping down process. It must not any abnormal sound, more vibration. It is abnormal condition appears and must turn off the Air Conditioner immediately.

- Securely tighten the valve cap with torque in the following table

Cap	Cap Size (H)	Torque
Valve Rod Cap	H17 - H19	14~18 N.m (1.4 to 1.8 kgf·m)
	H22 - H30	33~42 N.m (3.3 to 4.2 kgf·m)
Service Port Cap	H14	8~12 N.m (0.8 to 1.2 kgf·m)
	H17	14~18 N.m (1.4 to 1.8 kgf·m)

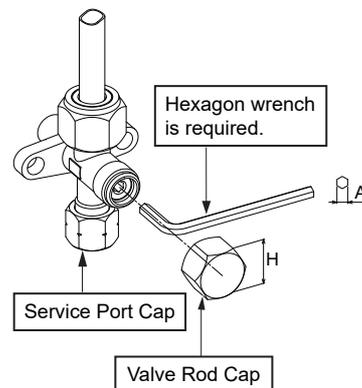


Fig. 10-4-8

#### <Packed valve handling precautions>

- Open the valve stem all the way out, but do not try to open it beyond the stopper.

Pipe size of Packed Valve	Size of Hexagon wrench
12.70 mm and smaller	A = 4 mm
15.88 mm	A = 5 mm

## 10-5. Electrical works

The power supply can be selected to connect to indoor unit or outdoor unit. Choose proper way and connect the power supply and connecting cable by follow the instruction as following.

Model	RAS-B50G3KVSG-ND
Power source	50Hz, 220 – 240V Single phase
Maximum running current	15.85 A
Circuit breaker rating	20 A
Power supply cable	H07RN-F or 60245 IEC66 (2.5 mm <sup>2</sup> or more)
Connecting cable	H07RN-F or 60245 IEC66 (2.5 mm <sup>2</sup> or more)

### 10-5-1. 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 and air inlet grille on the indoor unit.

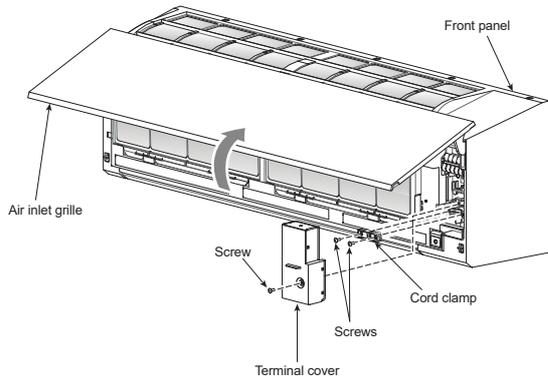


Fig. 10-5-1

#### <How to install the air inlet grille on the indoor unit>

- When attaching the air inlet grille, the contrary of the removed operation is performed.

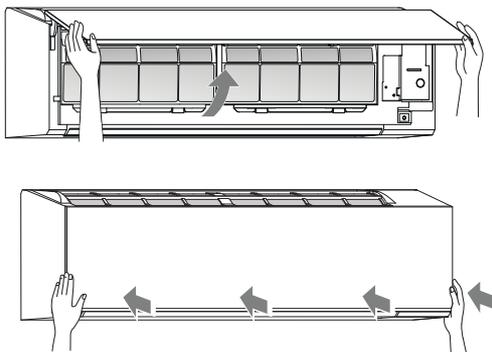


Fig. 10-5-2

#### <Outdoor unit>

1. Remove the panel, and you can see electric parts on the front side
2. A metal pipe can be installed through the hole for wiring. If the hole size does not fit the wiring pipe to be used, drill the hole again to an appropriate size.
3. Be sure to clamp the power wire and indoor/outdoor connecting wires with a banding band along the connecting pipe so that the wires do not touch the compressor or discharge pipe.  
(The compressor and the discharge pipe become hot.)  
Furthermore, be sure to secure these wires with the pipe valve fixing plate and cord clamps stored in the electric parts box.

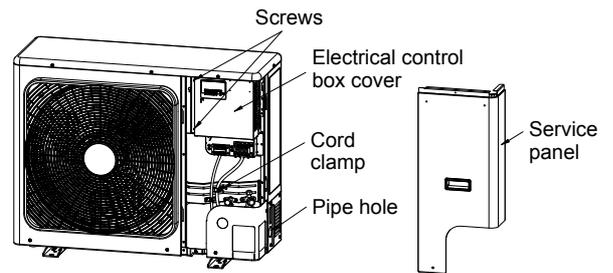
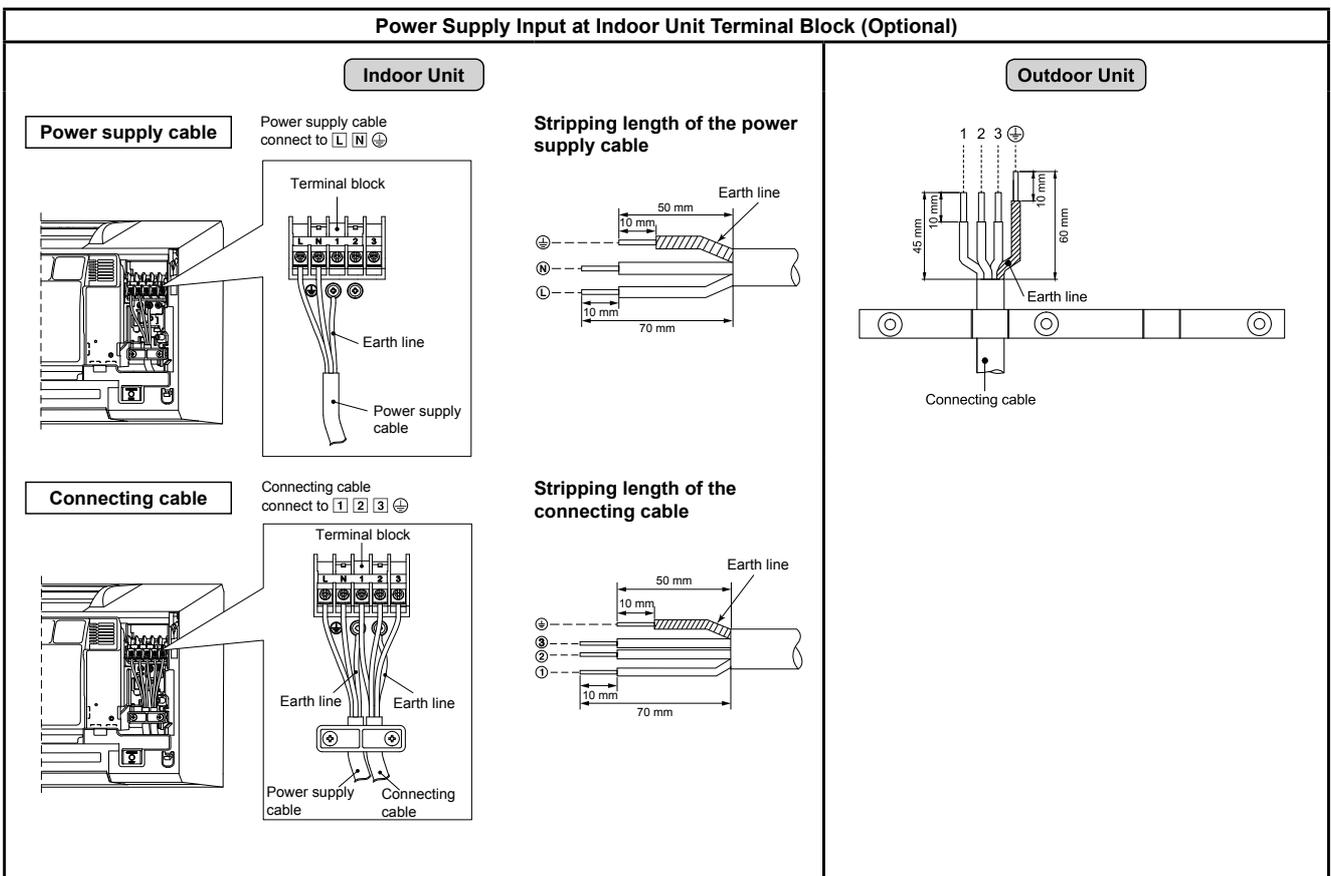
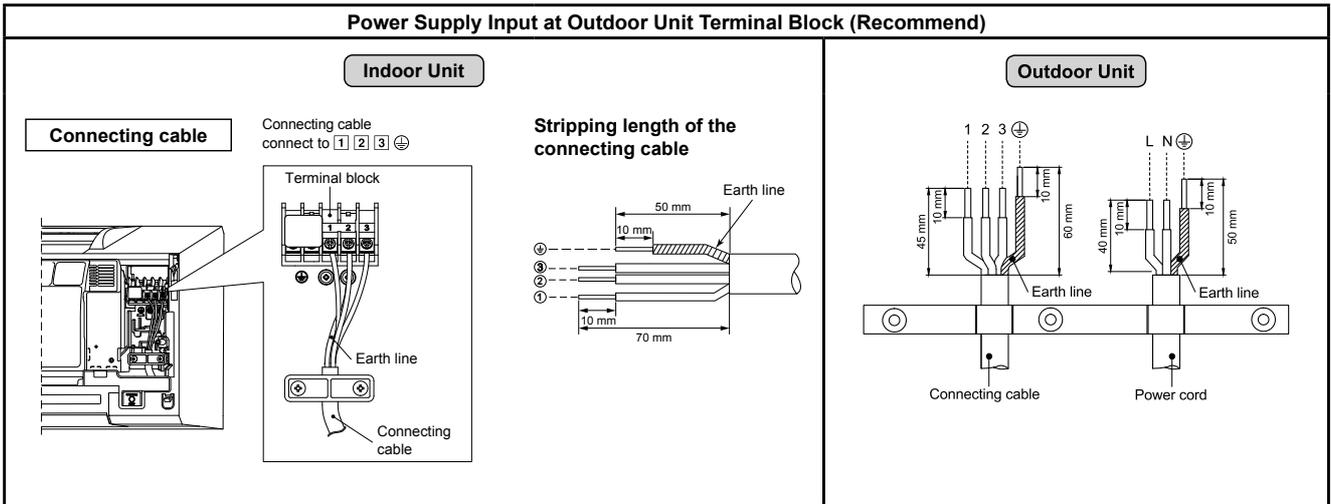


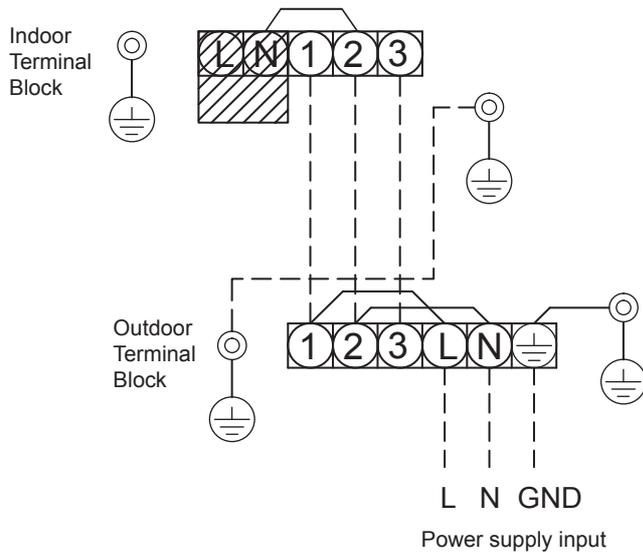
Fig. 10-5-3

## 10-5-2. In Case of Indoor Unit Connect With 1:1 Outdoor Unit

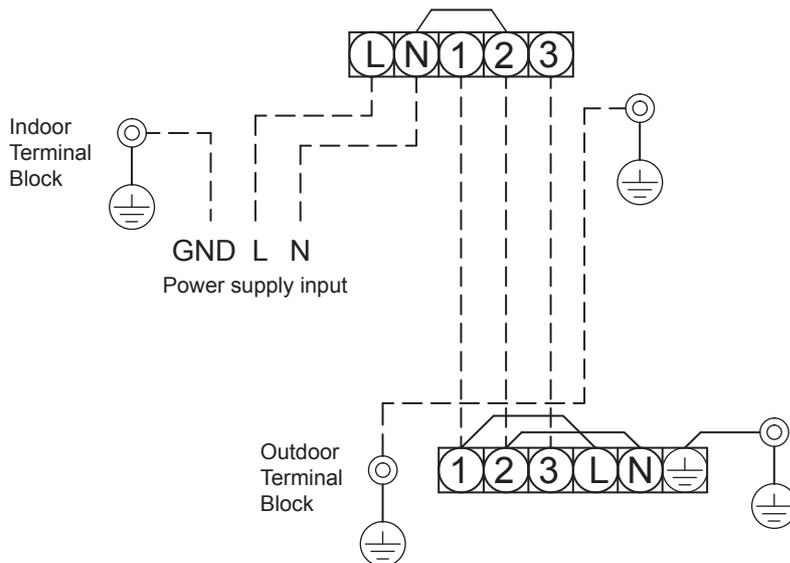


### 10-5-3. Power supply input Wiring Diagram for 1:1 Outdoor Unit

#### Power supply input at Outdoor Terminal Block (Recommend)



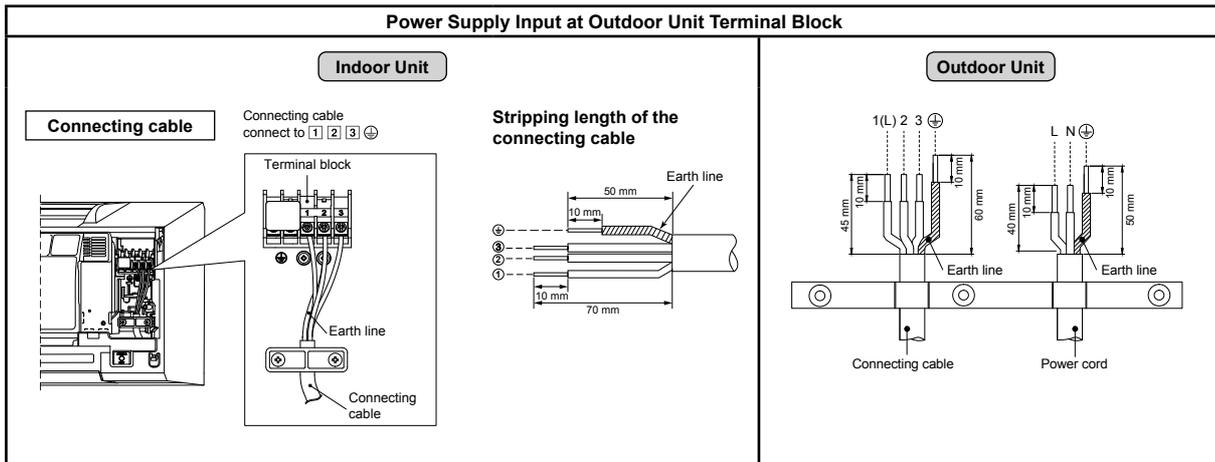
#### Power supply input at Indoor Terminal Block (Optional)



### CAUTION

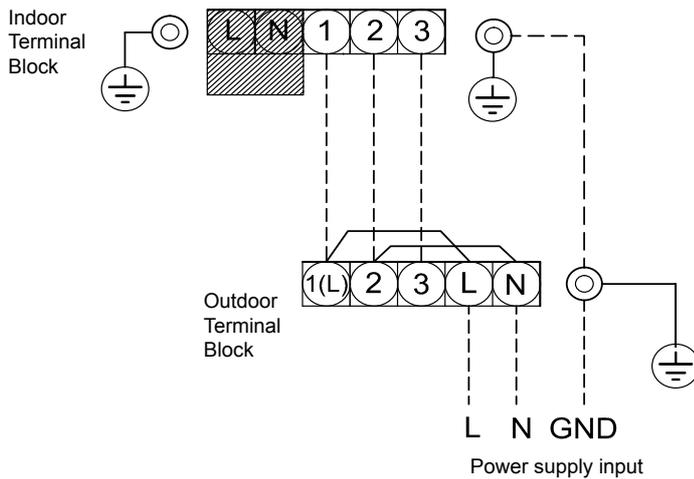
1. The power supply must be same as the rated of air conditioner.
2. Prepare the power source for exclusive use with air conditioner.
3. Circuit breaker must be used for the power supply line of this air conditioner.
4. Be sure to comply power supply and connecting cable for size and wiring method.
5. Every wire must be connected firmly.
6. Perform wiring works so as to allow a general wiring capacity.
7. Wrong wiring connection may cause some electrical part burn out.
8. Incorrect or incomplete wiring is carried out, it will cause an ignition or smoke.
9. This product can be connected to main power supply.  
 Connection to fixed wiring : A switch which disconnects all poles and has a contact separation at least 3mm must be incorporated in the fixed wiring.

## 10-5-4. In Case of Indoor Unit Connect With Inverter Multi System (IMS)



## Power supply input Wiring Diagram for Inverter Multi System (IMS)

### Power supply input at Outdoor Terminal Block



## CAUTION

1. The power supply must be same as the rated of air conditioner.
2. Prepare the power source for exclusive use with air conditioner.
3. Circuit breaker must be used for the power supply line of this air conditioner.
4. Be sure to comply power supply and connecting cable for size and wiring method.
5. Every wire must be connected firmly.
6. Perform wiring works so as to allow a general wiring capacity.
7. Wrong wiring connection may cause some electrical part burn out.
8. Incorrect or incomplete wiring is carried out, it will cause an ignition or smoke.
9. This product can be connected to main power supply.  
Connection to fixed wiring: A switch which disconnects all poles and has a contact separation at least 3mm must be incorporated in the fixed wiring.

## 10-6. Others

### 10-6-1. Gas leak test

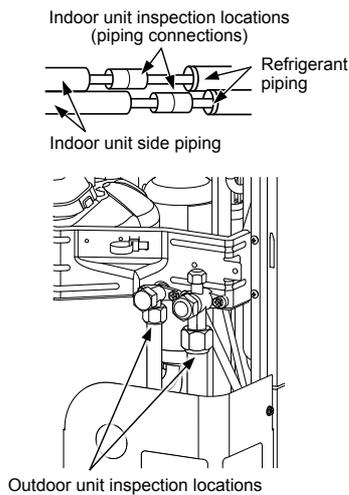


Fig. 10-6-1

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

### 10-6-2. 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 back side of Remote Control. "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.

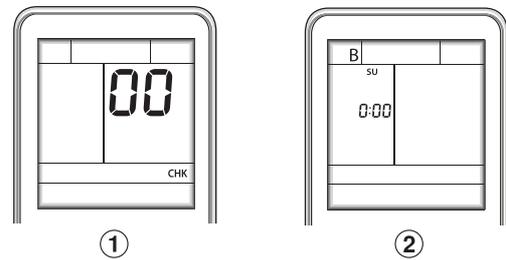


Fig. 10-6-2

### 10-6-3. Adhesion of B label (When setting to B)

Be sure to adhere the B label ⑫ on the cover terminal same as the below figure.

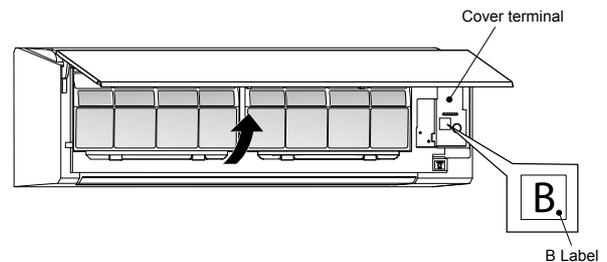


Fig. 10-6-3

### 10-6-4. Test operation

To switch the TEST RUN (COOL) mode, press [RESET] button for 10 sec.  
(The beeper will make a short beep.)

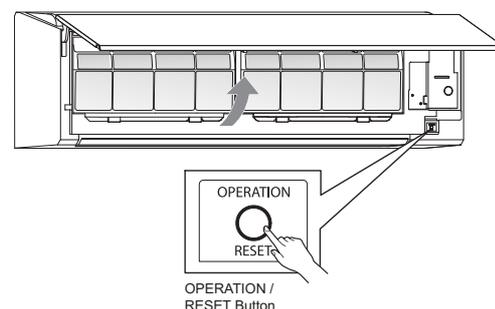


Fig. 10-6-4

### 10-6-5. Auto Restart Function 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 is shipped with Auto Restart function in the ON position. Turn it OFF if this function is not required.

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

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

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

- 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).

#### **NOTE**

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

## 11. HOW TO DIAGNOSE THE TROUBLE

The pulse motor circuits are mounted to both indoor and outdoor units. Therefore, diagnose troubles according to the trouble diagnosis procedure as described below. (Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.)

Table 11-1

No.	Troubleshooting Procedure
1	First Confirmation
2	Primary Judgment
3	Judgment by Flashing LED of Indoor Unit
4	Self-Diagnosis by Remote Controller
5	Judgment of Trouble by Every Symptom

No.	Troubleshooting Procedure
6	How to Check Simply the Main Parts
7	Troubleshooting
8	How to Diagnose Trouble in Outdoor Unit
9	How to Check Simply the Main Parts
10	How to Simply Judge Whether Outdoor Fan Motor is Good or Bad

### ◆ Precautions when handling the new inverter



#### **CAUTION: 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.

The new inverter will be incorporated starting with this unit.

**⚠ CAUTION**

A high voltage (equivalent to the supply voltage) is also energized to ground through the sensors, PMV and other low-voltage circuits. The sensor leads and other wires are covered with insulated tubes for protection. Nevertheless, care must be taken to ensure that these wires are not pinched.

Take sufficient care to avoid directly touching any of the circuit parts without first turning off the power.

At times such as when the circuit board is to be replaced, place the circuit board assembly in a vertical position.

Laying the board flat on an electrically conductive object (such as the top panel of the air conditioner's outdoor unit) while a charge is still retained by the electrolytic capacitors of the inverter's main circuit may cause short-circuiting between the electrolytic capacitors and secondary circuit components and result in damage to the components.

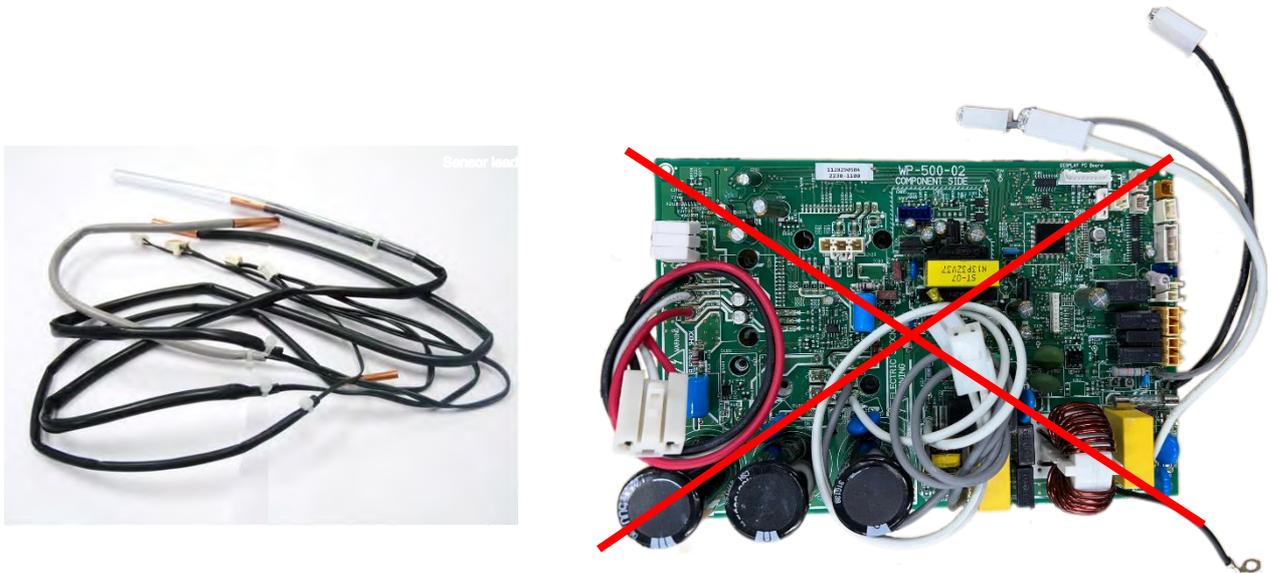


Fig. 11-1

**Do NOT lay the circuit board assembly flat.**

## ◆ Precautions when inspecting the control section of the outdoor unit

### NOTE :

A large-capacity electrolytic capacitor is used in the outdoor unit controller (inverter). Therefore, if the power supply is turned off, charge (charging voltage DC280 to 380V) remains and discharging takes a lot of time. After turning off the power source, if touching the charging section before discharging, an electrical shock may be caused. Discharge the electrolytic capacitor completely by using soldering iron, etc.

### < Discharging method >

1. Remove the inverter cover (plating) by opening four mounting claws.
2. As shown below, connect the discharge resistance (approx.  $100\Omega/40W$ ) or plug of the soldering iron to voltage between + – terminals of the C-28, C-29, C-30 (“WARNING ELECTRIC SHOCK” is indicated.) electrolytic capacitor ( $500\mu F/400V$ ) on P.C. board, and then perform discharging.

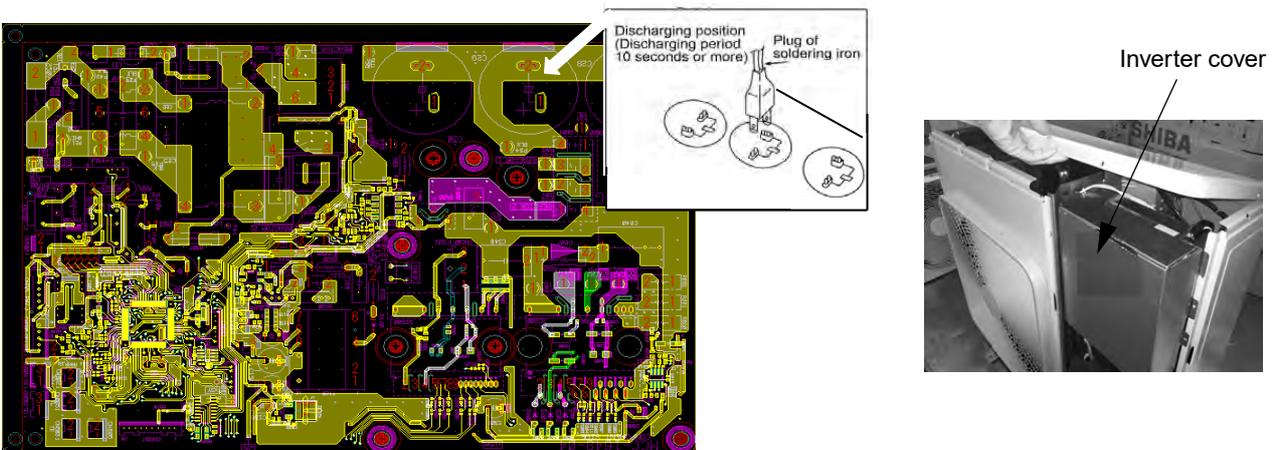


Fig. 11-2

### ⚠ CAUTION

A high voltage (equivalent to the supply voltage) is also energized to ground through the sensors, PMV and other low-voltage circuits. The sensor leads and other wires are covered with insulated tubes for protection. Nevertheless, care must be taken to ensure that these wires are not pinched.

Take sufficient care to avoid directly touching any of the circuit parts without first turning off the power.

At times such as when the circuit board is to be replaced, place the circuit board assembly in a vertical position.

Laying the board flat on an electrically conductive object (such as the top panel of the air conditioner's outdoor unit) while a charge is still retained by the electrolytic capacitors of the inverter's main circuit may cause short-circuiting between the electrolytic capacitors and secondary circuit components and result in damage to the components.

## 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 (Blue) 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

	Item	Check code	Block display	Description for self-diagnosis														
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Indoor indication lamp flashes.</div> <div style="margin-left: 20px;">↓</div> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Which lamp does flash?</div> <div style="margin-left: 20px;">↓</div> <div style="margin-left: 20px;">→</div>	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	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <td style="width: 50%;">OPERATION</td> <td style="width: 50%;">TIMER</td> <td></td> </tr> <tr> <td>Normal</td> <td>Normal</td> <td>Nothing</td> </tr> <tr> <td>Flash 1 Hz</td> <td>None</td> <td>Current release</td> </tr> <tr> <td>Flash 2 Hz 2 times every 1 sec</td> <td>None</td> <td>TD release</td> </tr> <tr> <td>None</td> <td>Flash 1Hz</td> <td>TC release</td> </tr> </table>	OPERATION	TIMER		Normal	Normal	Nothing	Flash 1 Hz	None	Current release	Flash 2 Hz 2 times every 1 sec	None	TD release	None	Flash 1Hz	TC release
OPERATION	TIMER																	
Normal	Normal	Nothing																
Flash 1 Hz	None	Current release																
Flash 2 Hz 2 times every 1 sec	None	TD release																
None	Flash 1Hz	TC release																

### 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

**1** Press [CHECK] button with a tip of pencil to set the remote controller to the service mode.

- “00” is indicated on the display of the remote controller.

**2** Press [ON/OFF ▲] button

If there is no fault with a code, the indoor unit will beep once (Beep) and the display of the remote controller will change as follows :

00 → 01 → 02 ... 1d → 1E → 33

- TheTIMER indicator of the indoor unit flashes continuously.(5 times per 1 sec.)
- Check the unit with all 52 check codes (00 to 33 ) as shown in Table-11-4-1.
- Press [ON / OFF ▼] button to change the check code backward.

If there is a fault, the indoor unit will beep for 10 seconds (Beep, Beep, Beep...).

Note the check code on the display of the remote controller.

- 2-digits alphanumeric will be indicated on the display.
- All indicators on the indoor unit will flash. (5 times per 1 sec.)

**3** Press [CHECK] then [CLR] button. After service finish for clear service code in memory.

- "7F" is indicated on the display of the remote control.

**4** Press [ON/OFF ▼] button to release the service mode.

- The display of the remote controller returns to as it was before service mode was engaged.

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

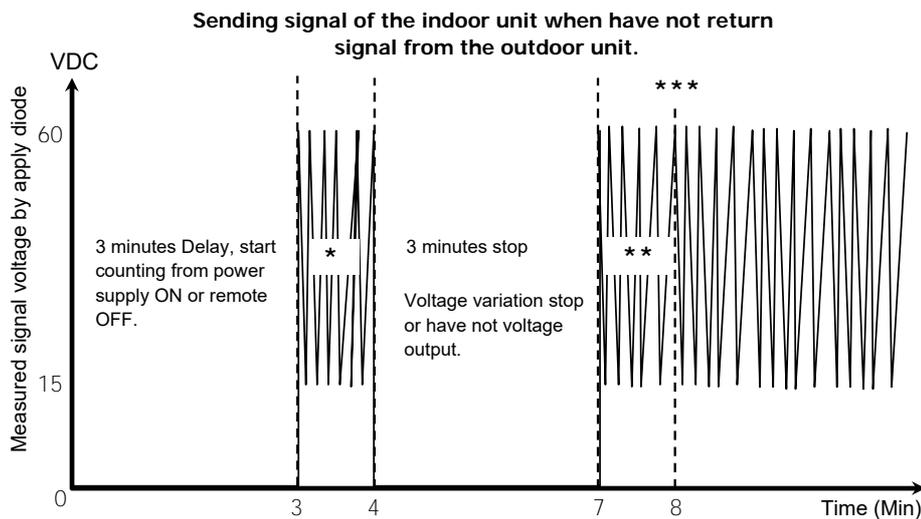
1. After using the service mode of remote controller finished, press the [ ⏻ ] button to reset the remote controller to normal function.
2. After finished the diagnosis by the remote controller, turn OFF power supply and turn its ON again to reset the air conditioner to normal operation. However, the 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	
00	Indoor P.C. board.	01	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.
		02	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.
		0E	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.
		11	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.
		12	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.
		26	Gas detector sensor life time	Operation continues.	Flashes when error is detected.	Replace new sensor.
			Smart sensing failure.	Operation continues.	No flashing	1. Check the smart sensing sensor and connection. 2. In case of the sensor and its connection is normal, check the P.C.board.
27	Ionizer sensor failure	Operation continues.	No flashing	1. Check the Ionizer sensor and connection. 2. In case of the sensor and its connection is normal, check the P.C.board.		

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. <ul style="list-style-type: none"> <li>• Some protector (hardware, if exist) 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.	1) to 3) The outdoor unit never operate. <ul style="list-style-type: none"> <li>• Check connecting cable and correct if defective wiring.</li> <li>• Check 25A fuse of inverter P.C. board.</li> <li>• Check 3.15A fuse of inverter P.C. board.</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> </ul> 4) The outdoor unit abnormal stop at some time. <ul style="list-style-type: none"> <li>• If the other check codes are found concurrently, check them together.</li> <li>• Check protector (hardware) such as Hi-Pressure switch, Thermal-Relay, etc.</li> <li>• Check refrigerant amount or any possibility case which may caused high temperature or high pressure.</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> </ul>

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



\* 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 P.C. board	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 P.C. board	11	Compressor drive output error. (Relation of voltage, current and frequency is abnormal) <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> </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> </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	Return signal of the outdoor unit has been sent when operation start. But after that, signal is stop some time. <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	
03	The others (including compressor)	1d	Compressor does not rotate. Because of missed wiring, missed phase or shortage.	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 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, measure resistance of compressor winding.</li> <li>6. If winding is shortage, replace the compressor.</li> </ol>
		1E	Discharge temperature exceeded 117°C.	All OFF	Flashes after error is detected 4 times*.	<ol style="list-style-type: none"> <li>1. Check sensors TD.</li> <li>2. Check refrigerant amount.</li> <li>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.)</li> <li>4. Observe any possibility cause which may affect high temperature of compressor.</li> </ol>
		1F	Compressor is high current though operation Hz is decreased to minimum limit. <ul style="list-style-type: none"> <li>• Installation problem.</li> <li>• Instantaneous power failure.</li> <li>• Refrigeration cycle problem.</li> <li>• Compressor break down.</li> <li>• Compressor failure (High current).operation, etc.)</li> </ul>	All OFF	Flashes after error is detected 8 times*.	<ol style="list-style-type: none"> <li>1. 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>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.)</li> <li>3. Observe any possibility cause which may affect high current of compressor.</li> <li>4. If 1, 2 and 3 are normal, replace compressor.</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	
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> </ul>	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>Check power supply (Rate <math>\pm 10\%</math>)</li> <li>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>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>Check and clean heat exchanger area Indoor and Outdoor unit.</li> </ol>
<p>* 4, 8 or 11 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) 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>						

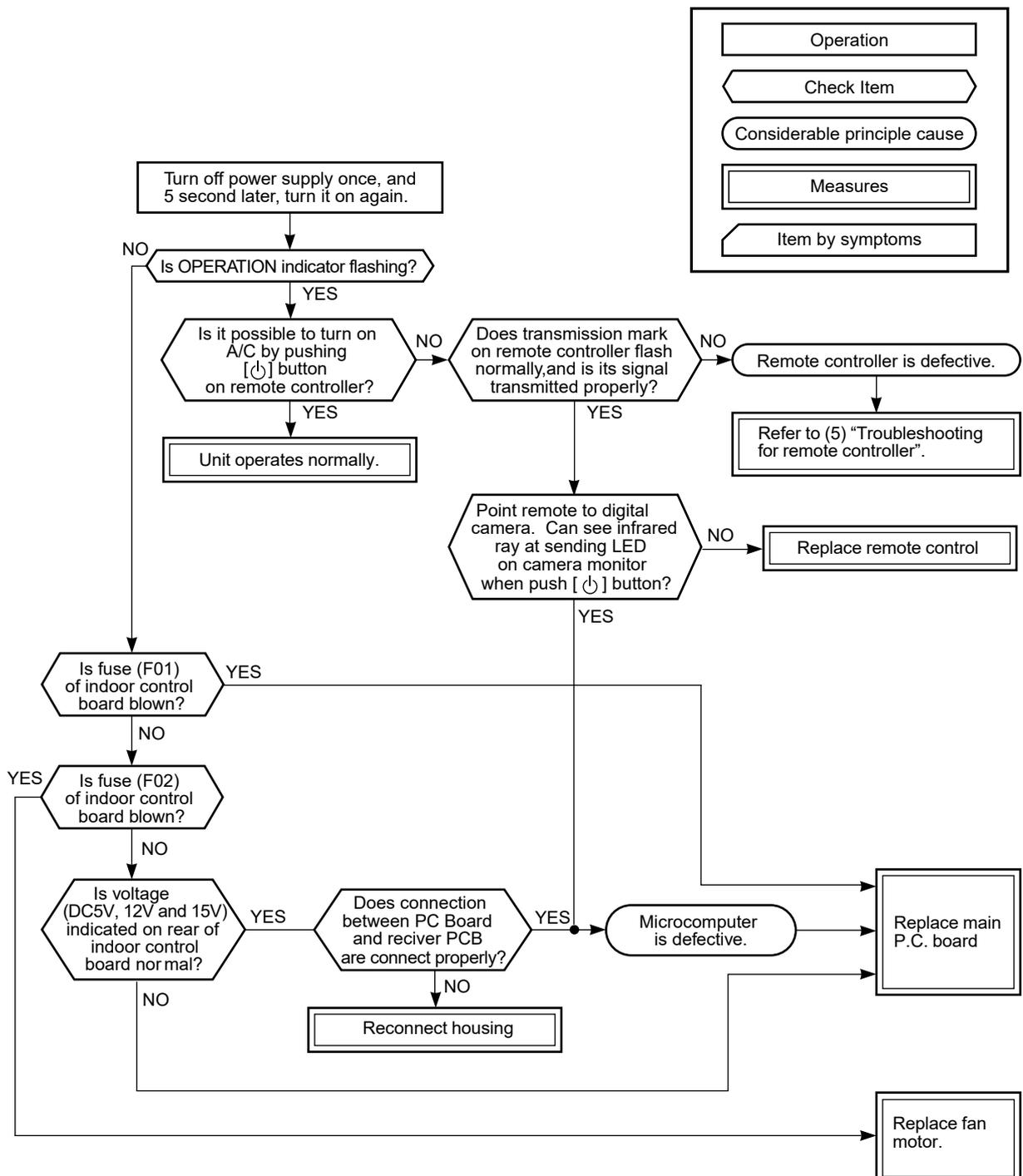
## 11-5. Judgment of Trouble by Every Symptom

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

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

##### <Primary check>

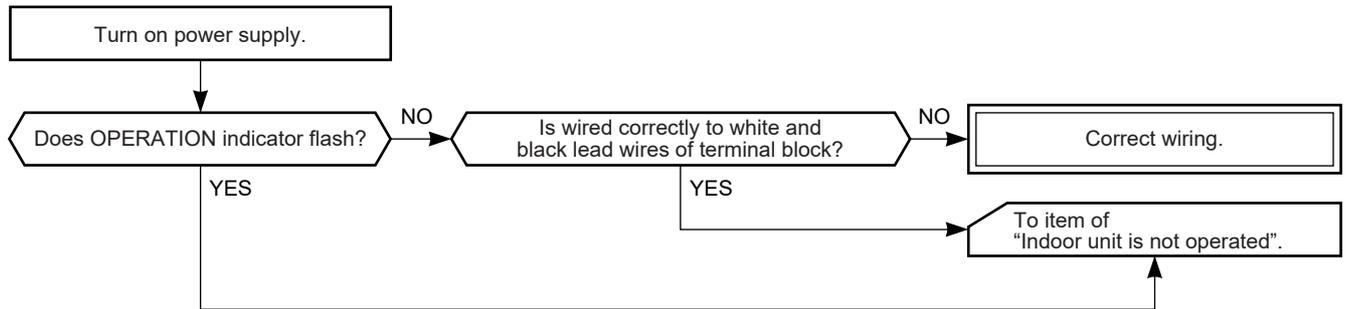
1. Is the supply voltage normal?
2. Is the normal voltage provided to the outdoor unit?
3. Is the crossover cable connected properly?
4. Is the fuse (F01) blown?



- Be sure to disconnect the motor connector CN36 after shut off the power supply, or it will be a cause of damage of the motor.

**(2) Operation is not turned on though Indoor P.C. board is replaced**

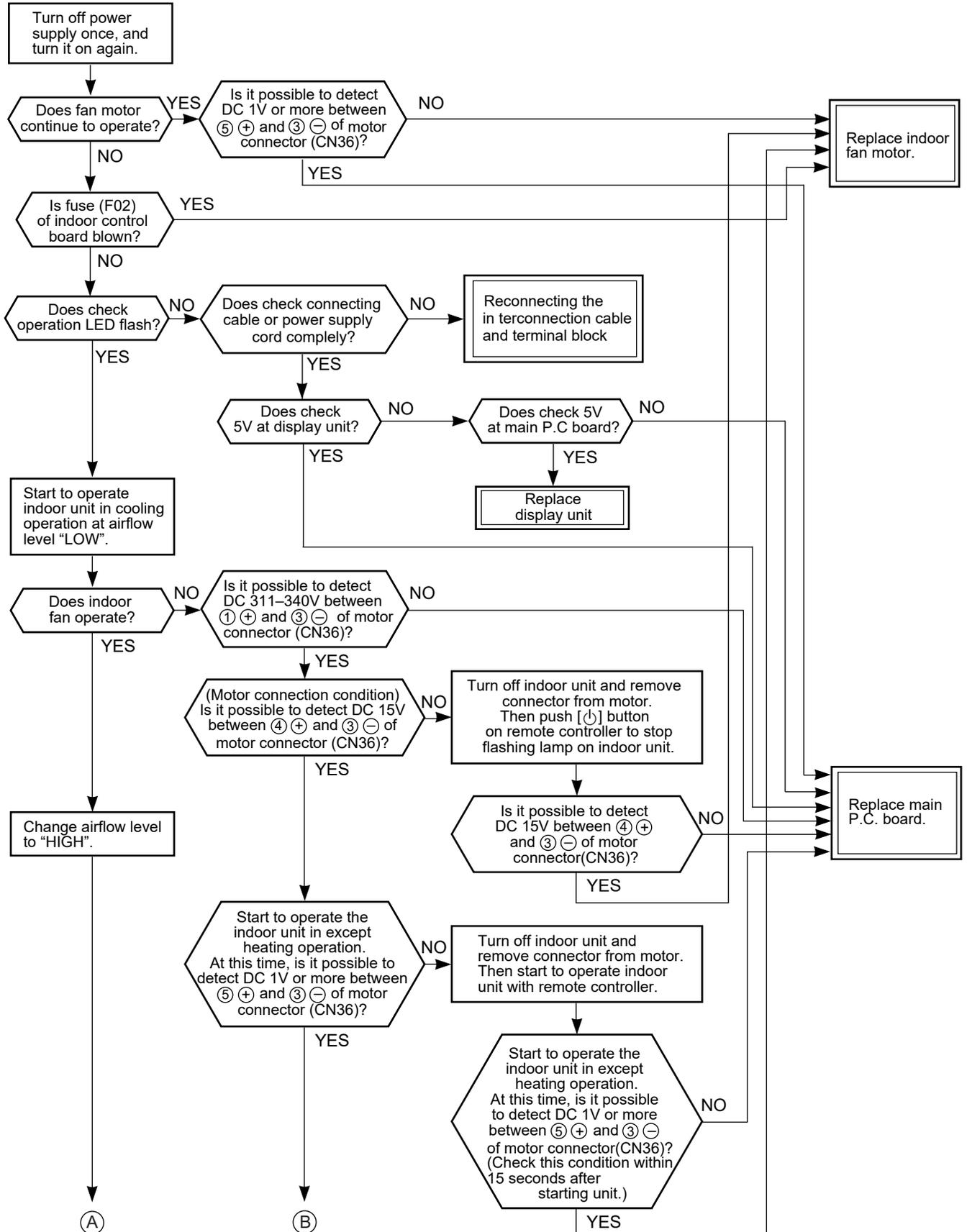
**<Confirmation procedure>**

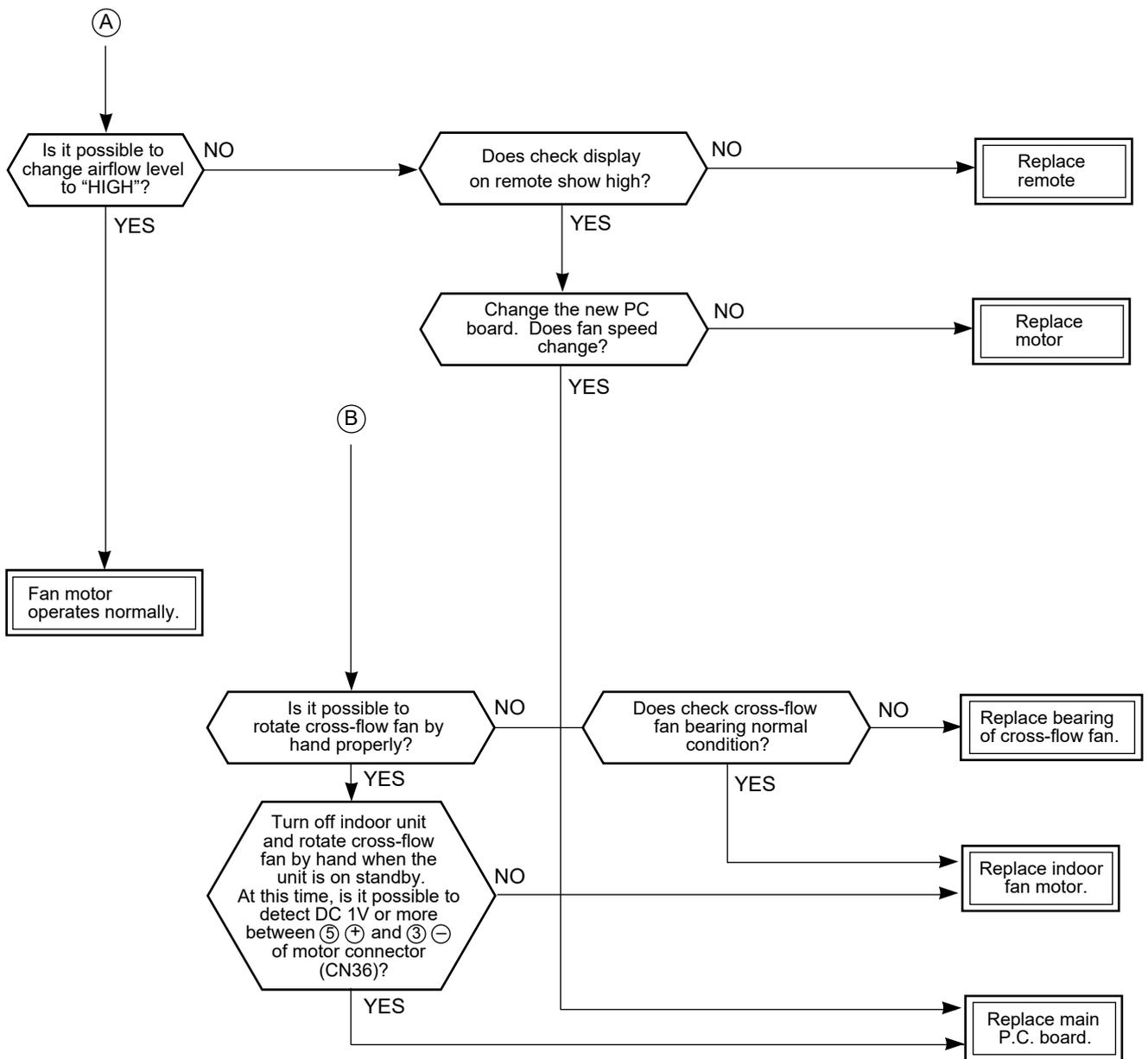


### (3) Only the indoor motor fan does not operate

#### <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.)





**(4) Indoor fan motor automatically starts to rotate by turning on power supply**

**[For DC fan motor]**

**<Cause>**

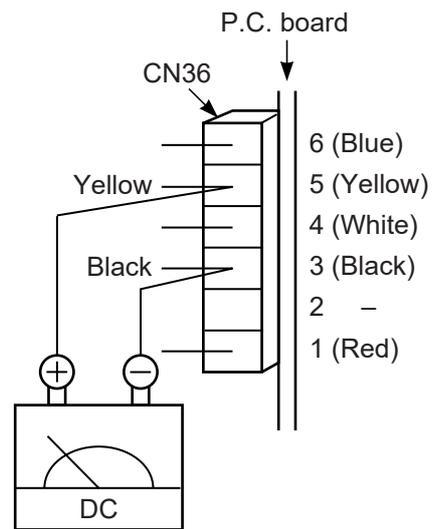
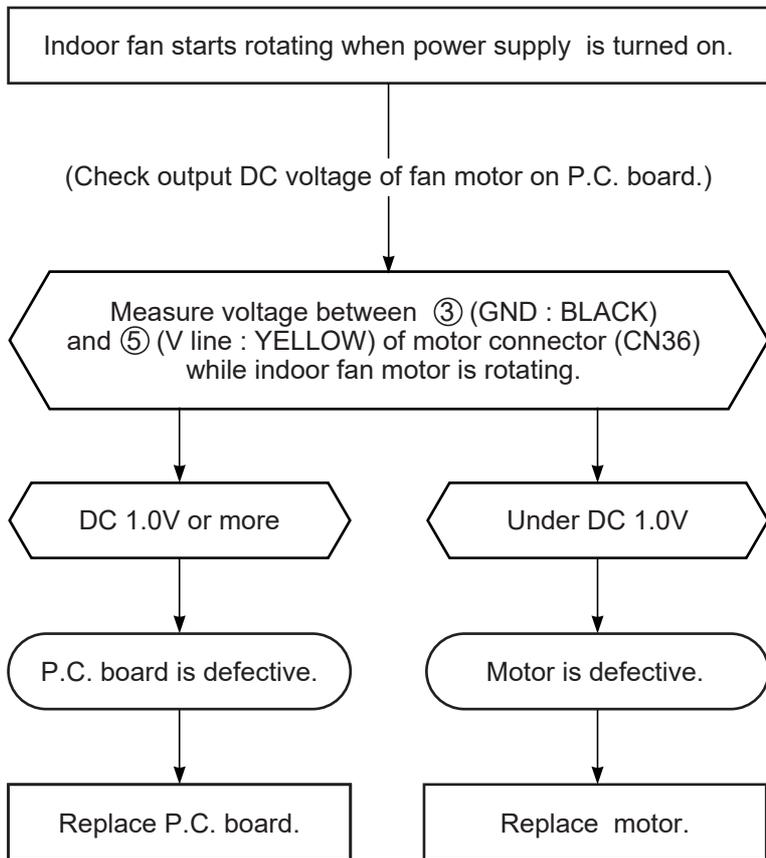
The IC is built in the indoor fan motor. Therefore the P.C. board is also mounted to inside of the motor. If the P.C. board is soldered imperfectly or the IC is defective, the fan motor may automatically rotate by turning on power supply.

**<Inspection procedure>**

1. Remove the front panel. (Remove 2 screws.)
2. Remove the cover of the fan motor lead wires.
3. Check DC voltage with CN36 connector while the fan motor is rotating.

**NOTE :**

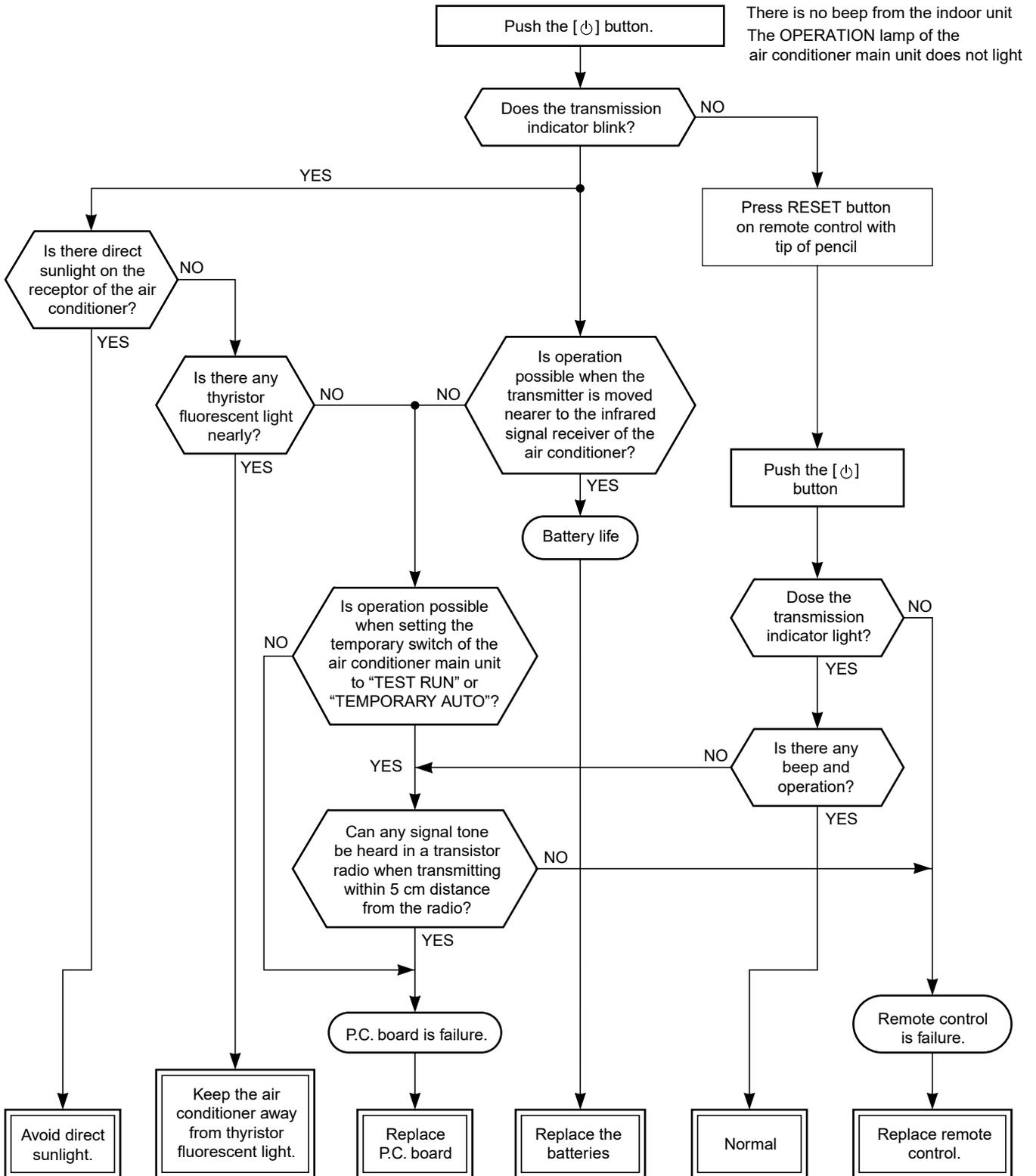
- Do not disconnect the connector while the fan motor is rotating.
- Use a thin test rod.



## (5) 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.



## 11-5-2. Wiring Failure (Interconnecting and Serial Signal Wire)

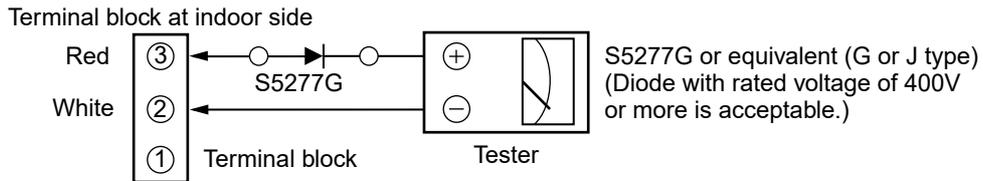
### (1) Outdoor unit does not operate

- 1) Is the voltage between ② and ③ of the indoor terminal block varied?

Confirm that transmission from indoor unit to outdoor unit is correctly performed based upon the following diagram.

#### NOTE:

- Measurement should be performed 2 minutes and 30 seconds after starting of the operation.
- Be sure to prepare a diode for judgment.



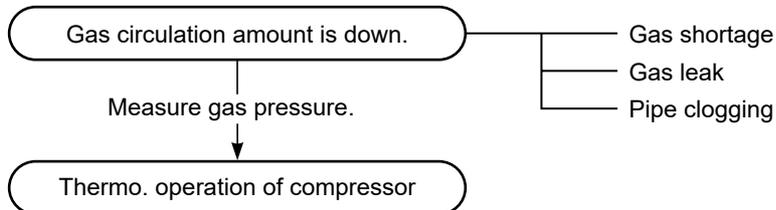
Normal time : Voltage swings between DC15 and 60V. .... Inverter Assembly check (11-7-1.)

Abnormal time : Voltage does not vary.

### (2) Outdoor unit stops in a little while after operation started

<Check procedure> Select phenomena described below.

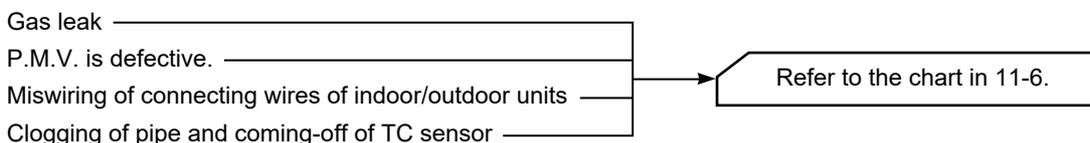
- 1) The outdoor unit stops 10 to 20 minutes after operation started, and 10 minutes or more are required to restart the unit.



- 2) If the unit stops once, it does not operate until the power will be turned on again.

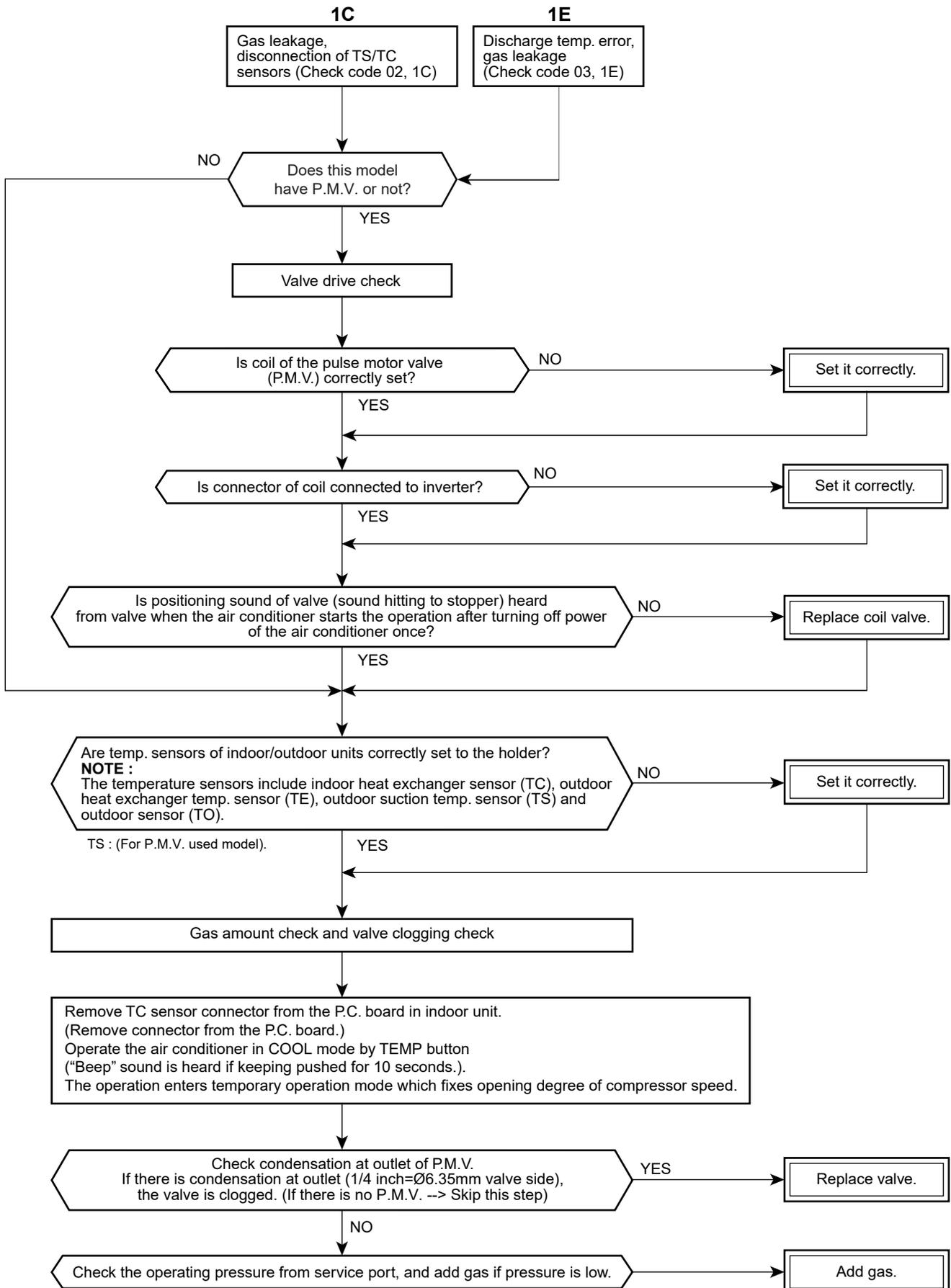
To item of Outdoor unit does not operate.

- 3) The outdoor unit stops 10 minutes to 1 hour after operation started, and an alarm is displayed. (Discharge temp. error check code 03, 1E Sensor temp. error check code 02, 1C)



## 11-6. How to Check Simple the Main Parts

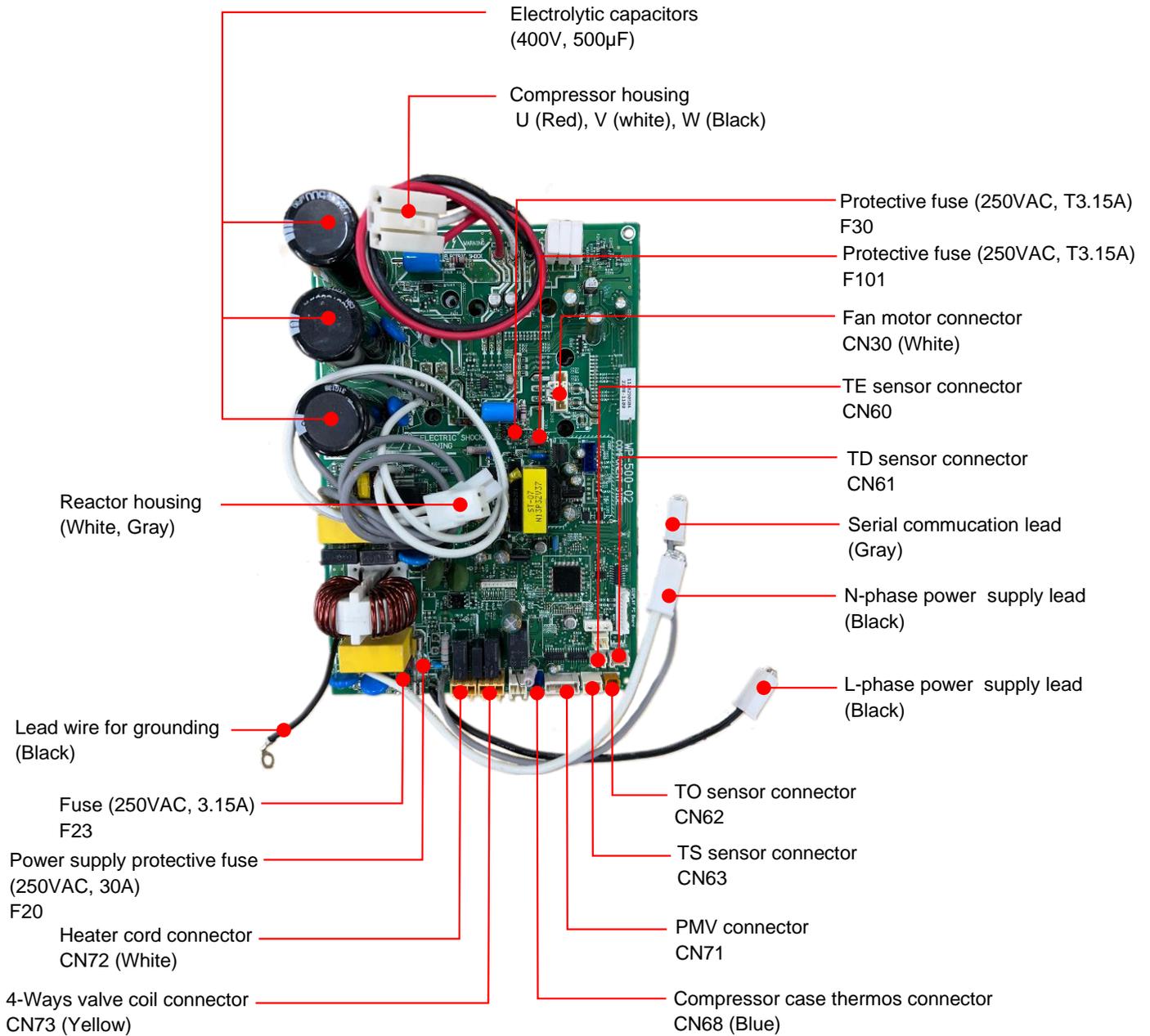
<Check procedure>



## 12. OUTDOOR CONTROL CIRCUIT

### 12-1. Outdoor unit control

<WP-500>



## **12-2. How to Check Simply the Main Parts**

### **12-2-1. 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 or 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 :**

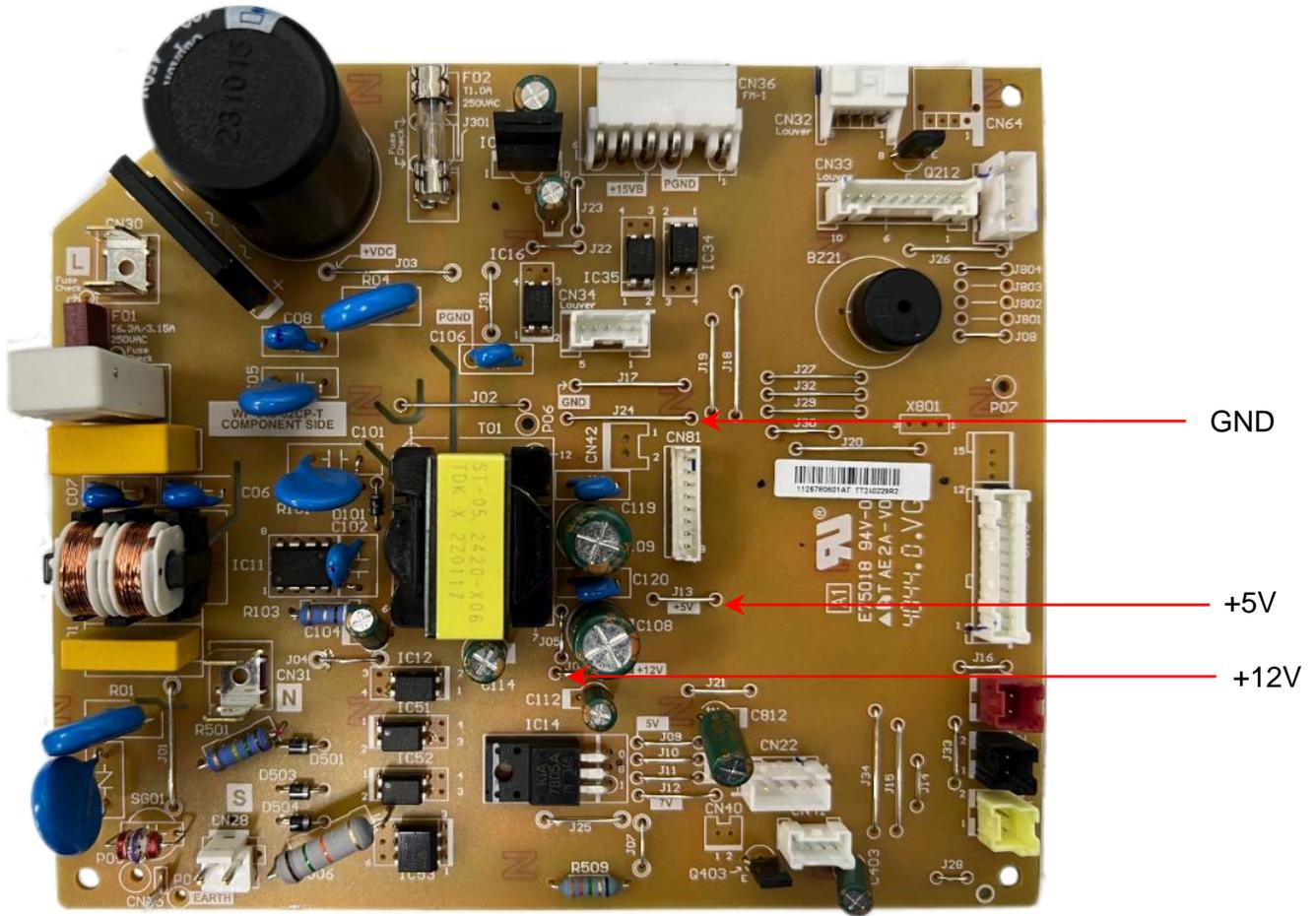
To check defect of the P.C. board, follow the procedure described below.

### (3) Check procedures

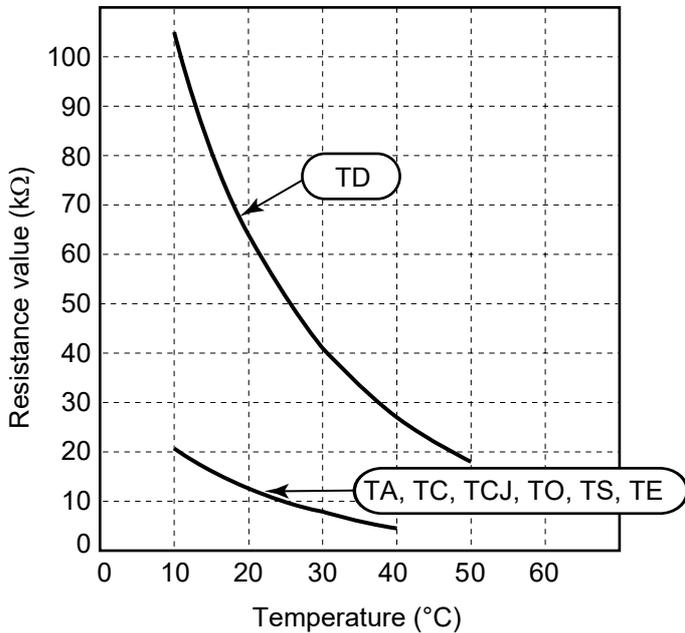
**Table 12-2-1**

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) or (F02) 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 5) 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 ⊖ of C117 and output side of IC15 (DC 15V) 4. Between 12V and GND 5. Between 5V and GND	1. The terminal block or the crossover cable is connected wrongly. 2. The capacitor (C03), line filter (L01), resistor (R03), or the diode (DB01) is defective. 3. IC11, R105, C117 and T-01 are defective. 4. IC11, IC14, C112 and T-01 are defective.
3	Push [⏻] button once to start the unit. (Do not set the mode to Fan Only or On-Timer operation.)	Check power supply voltage : 1. Between CN28 and CN31 (DC 15–60V)	IC52 and IC53 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 indicated for 3 seconds and they return to normal 3 seconds later.	The indicators are defective or the housing assembly (CN10) 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. 4. The main P.C. board is defective.
6	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 (DC 15V) between 3 and 4 of the motor terminals. 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.

12-2-2. P.C . Board Layout

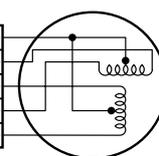


[1] Sensor characteristic table

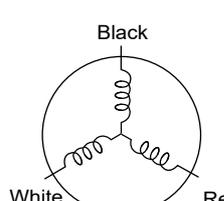
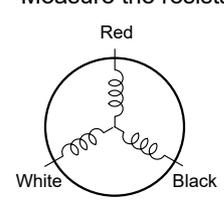
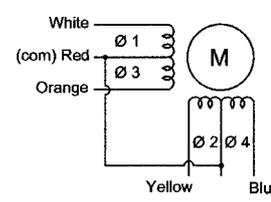


- TD : Discharge temp. sensor
- TA : Room temp. sensor
- TC, TCJ : Heat exchanger temp. sensor
- TO : Outdoor temp. sensor
- TS : Suction temp. sensor
- TE : Outdoor heat exchanger temp sensor.

### 12-2-3. 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 border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Temperature</th> <th>10°C</th> <th>20°C</th> <th>25°C</th> <th>30°C</th> <th>40°C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Sensor</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">TA, TC, TCJ (kΩ)</td> <td style="text-align: center;">20.7</td> <td style="text-align: center;">12.6</td> <td style="text-align: center;">10.0</td> <td style="text-align: center;">7.9</td> <td style="text-align: center;">4.5</td> </tr> </tbody> </table>	Temperature	10°C	20°C	25°C	30°C	40°C	Sensor						TA, TC, TCJ (kΩ)	20.7	12.6	10.0	7.9	4.5
Temperature	10°C	20°C	25°C	30°C	40°C															
Sensor																				
TA, TC, TCJ (kΩ)	20.7	12.6	10.0	7.9	4.5															
2	Remote controller	Refer to 11-5-1. (5).																		
3	Louver motor 24BYJ48-STHL (Horizontal)	Measure the resistance value of each winding coil by using the tester. (Under normal temp. 25°C) <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;"> <p>White ①①</p> <p>Yellow ②②</p> <p>Yellow ③③</p> <p>Yellow ④④</p> <p>Yellow ⑤⑤</p> </div>  <div style="margin-left: 10px;"> <table border="1" style="margin-right: 10px;"> <thead> <tr> <th>Position</th> <th>Resistance value</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;"><b>24BYJ48-ST</b></td> </tr> <tr> <td>1 to 2</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">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> </tbody> </table> <p style="text-align: right; margin-right: 0;">at 25°C</p> </div> </div>	Position	Resistance value	<b>24BYJ48-ST</b>		1 to 2	200Ω ± 7%	1 to 3	1 to 4	1 to 5									
Position	Resistance value																			
<b>24BYJ48-ST</b>																				
1 to 2	200Ω ± 7%																			
1 to 3																				
1 to 4																				
1 to 5																				
4	Indoor fan motor	Refer to 11-5-1. (3) and (4).																		

### 12-2-4. Outdoor Unit

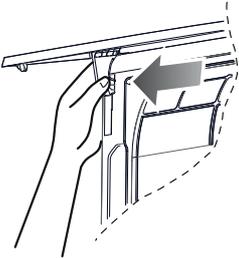
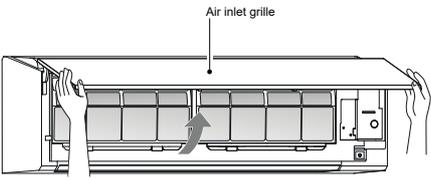
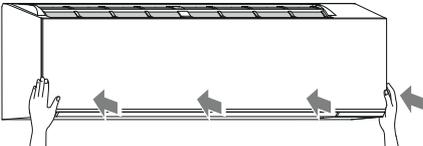
1	Compressor Model : KTM225D43UMU	Measure the resistance value of each winding by using the tester. <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <table border="1" style="margin-right: 10px;"> <thead> <tr> <th>Position</th> <th>Resistance value</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">KTM225D43UMU</td> </tr> <tr> <td>Red - White</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">1.03Ω</td> </tr> <tr> <td>White - Black</td> </tr> <tr> <td>Black - Red</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 0;">at 20°C</p> </div> </div>	Position	Resistance value	KTM225D43UMU		Red - White	1.03Ω	White - Black	Black - Red																
Position	Resistance value																									
KTM225D43UMU																										
Red - White	1.03Ω																									
White - Black																										
Black - Red																										
2	Fan motor Model : LDF-340-A100-1	Measure the resistance value of winding by using the tester. <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <table border="1" style="margin-right: 10px;"> <thead> <tr> <th>Position</th> <th>Resistance value</th> </tr> </thead> <tbody> <tr> <td>Red - White</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">14.8 ± 1.5Ω</td> </tr> <tr> <td>White - Black</td> </tr> <tr> <td>Black - Red</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 0;">at 20°C</p> </div> </div>	Position	Resistance value	Red - White	14.8 ± 1.5Ω	White - Black	Black - Red																		
Position	Resistance value																									
Red - White	14.8 ± 1.5Ω																									
White - Black																										
Black - Red																										
3	Pulse Modulating Valve (PMV) coil Model : PQ-M10012-000230	Measure the resistance value of winding by using the tester. <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <table border="1" style="margin-right: 10px;"> <thead> <tr> <th>Position</th> <th>Resistance value</th> </tr> </thead> <tbody> <tr> <td>Red - White</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">46.3 ± 3.7Ω</td> </tr> <tr> <td>Red - Orange</td> </tr> <tr> <td>Gray- Yellow</td> </tr> <tr> <td>Gray- Blue</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 0;">at 20°C</p> </div> </div>	Position	Resistance value	Red - White	46.3 ± 3.7Ω	Red - Orange	Gray- Yellow	Gray- Blue																	
Position	Resistance value																									
Red - White	46.3 ± 3.7Ω																									
Red - Orange																										
Gray- Yellow																										
Gray- Blue																										
4	Outside air temp. sensor (TO) Discharge temp. sensor (TD) Suction temp. sensor (TS) Exchanger temp. sensor (TE)	Disconnect the connector, and measure resistance value with the tester. (Normal temperature) <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Temperature</th> <th>10°C</th> <th>20°C</th> <th>30°C</th> <th>40°C</th> <th>50°C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Sensor</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">TD (kΩ)</td> <td style="text-align: center;">105</td> <td style="text-align: center;">64</td> <td style="text-align: center;">41</td> <td style="text-align: center;">27</td> <td style="text-align: center;">18</td> </tr> <tr> <td style="text-align: center;">TO, TS, TE (kΩ)</td> <td style="text-align: center;">20.7</td> <td style="text-align: center;">12.6</td> <td style="text-align: center;">7.9</td> <td style="text-align: center;">4.5</td> <td style="text-align: center;">3.4</td> </tr> </tbody> </table>	Temperature	10°C	20°C	30°C	40°C	50°C	Sensor						TD (kΩ)	105	64	41	27	18	TO, TS, TE (kΩ)	20.7	12.6	7.9	4.5	3.4
Temperature	10°C	20°C	30°C	40°C	50°C																					
Sensor																										
TD (kΩ)	105	64	41	27	18																					
TO, TS, TE (kΩ)	20.7	12.6	7.9	4.5	3.4																					

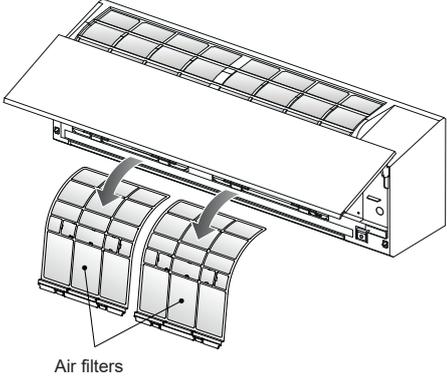
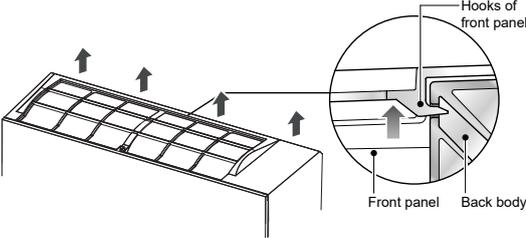
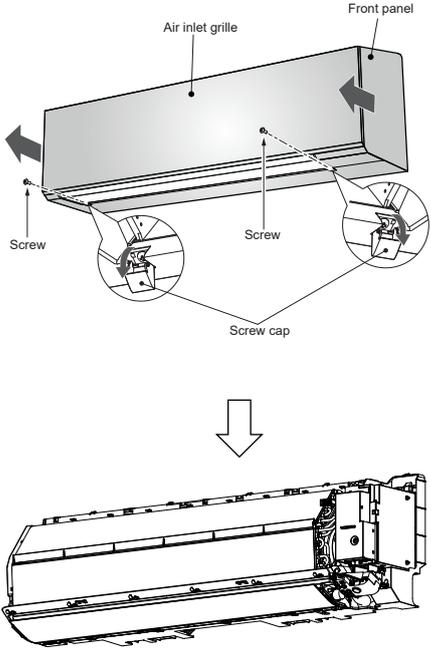
## 13. HOW TO REPLACE THE MAIN PARTS

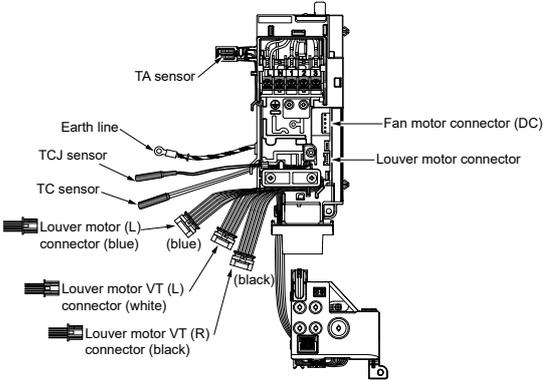
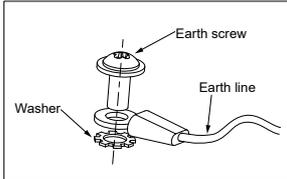
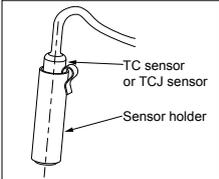
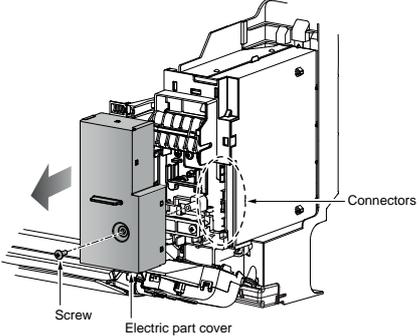
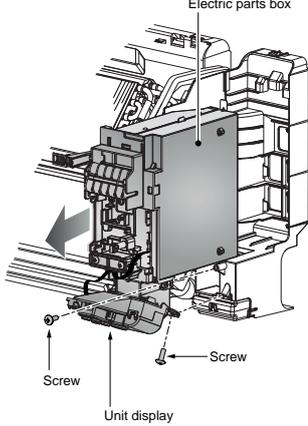
### WARNING

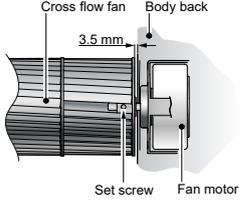
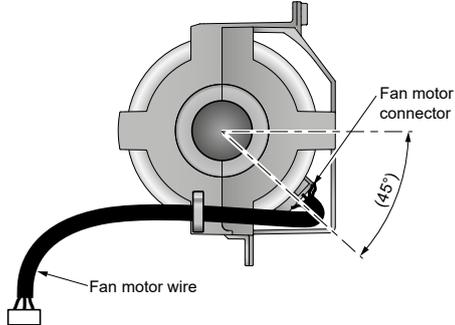
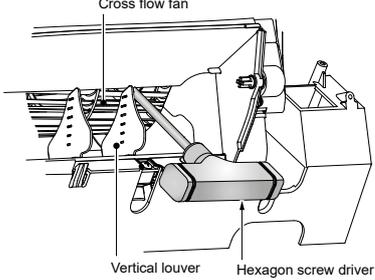
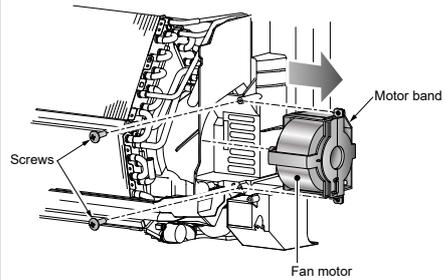
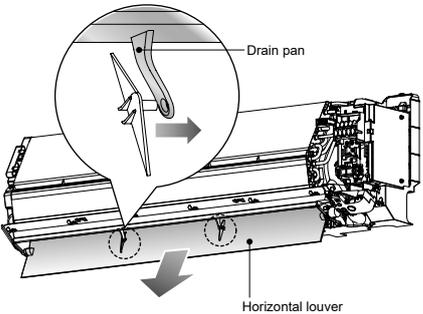
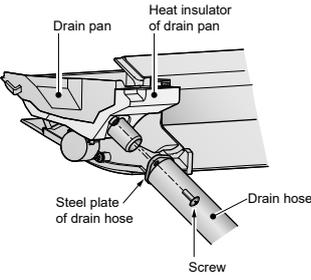
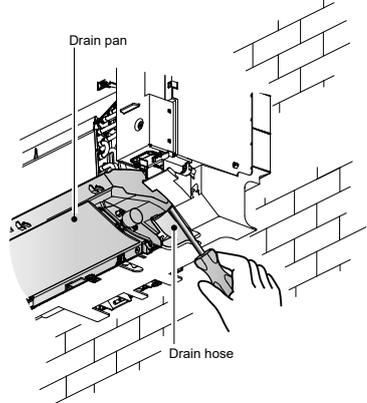
- Since high voltages pass through the electrical parts, turn off the power without fail before proceeding with the repairs.  
Electric shocks may occur if the power plug is not disconnected.
- After the repairs have been completed (after the front panel and cabinet have been installed), perform a test 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.

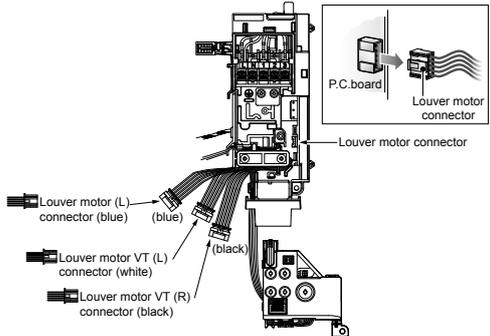
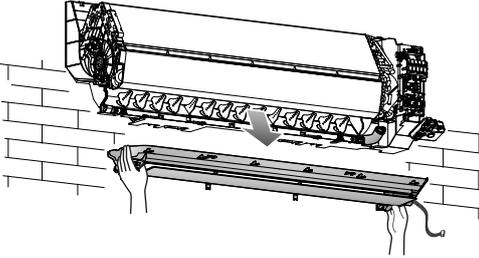
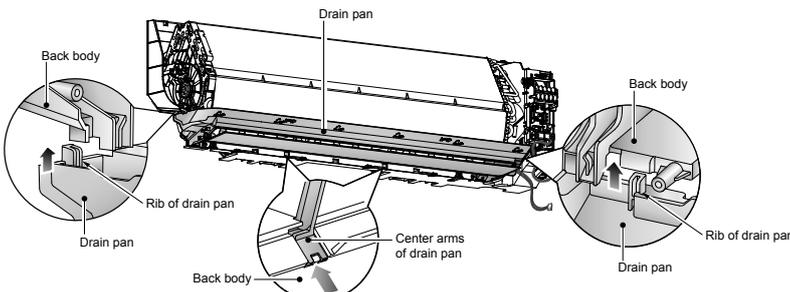
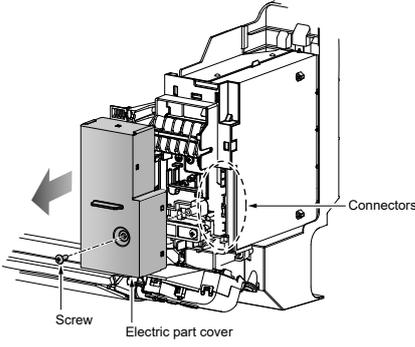
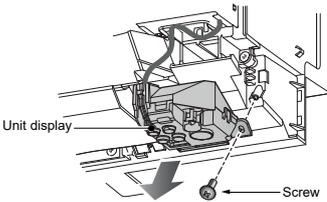
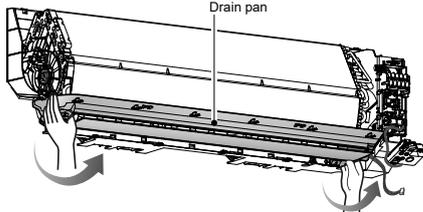
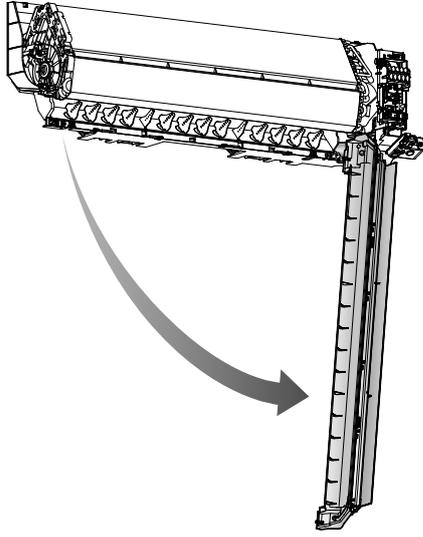
### 13-1. Indoor Unit

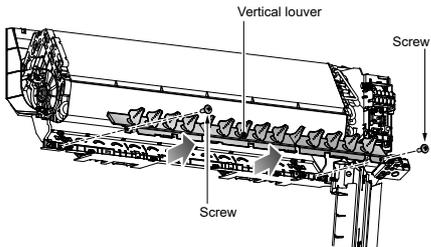
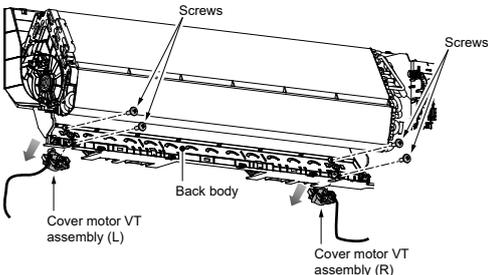
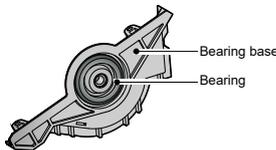
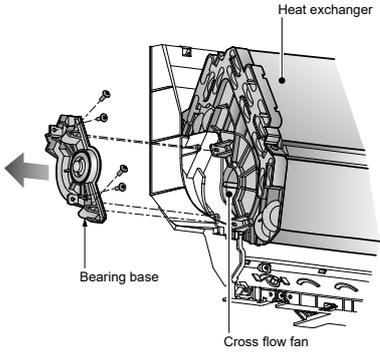
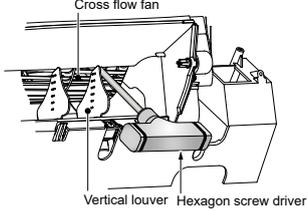
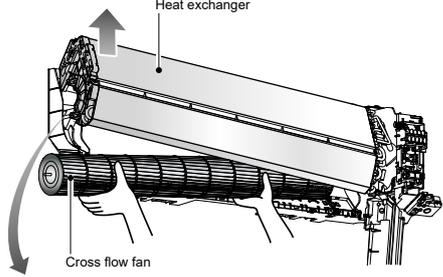
No.	Part name	Procedures	Remarks
①	Air inlet grille	1) Stop operation of the air conditioner and turn off its main power supply. 2) Open the air inlet grille and push it up until the air inlet grille take off.  <b>&lt;Remark&gt;</b> If you do not have enough space for push the air inlet grille up until it take off, you can push the arms of air inlet grille toward the outside, and remove the air inlet grille.    <b>&lt;To re-installation&gt;</b> - Carry out attaching in the reverse order to removal. - Keep front panel horizontally and put both arms into guides. - Make sure both arms are inserted completely.	  

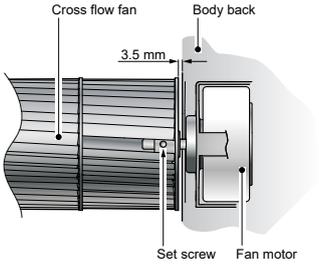
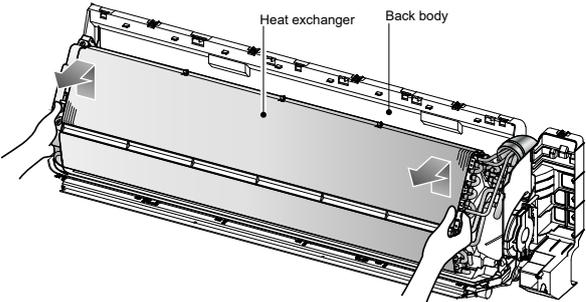
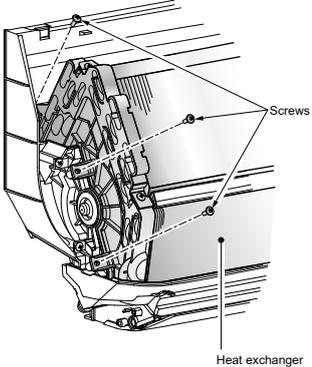
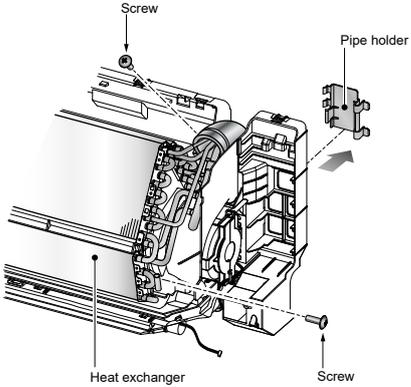
No.	Part name	Procedures	Remarks
②	Air filters	<p>1) Follow to the procedure in the item ①.</p>  <p>2) Remove the left and the right air filters from the front panel.</p>	
③	Front panel	<p>1) Stop operation of the air conditioner and turn off its main power supply.</p> <p>2) Open two screw caps and securely 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>	

No.	Part name	Procedures	Remarks
④	Electric part box assembly	<p>1) Follow the procedure item ③.  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.  4) Disconnect the cord motor of Louver VT (5P) from the Louver VT (L/R) connector.  5) Disconnect the cord motor of Louver motor (L) from the Louver motor (L) connector.</p>   <p>6) Remove the earth screw and earth line from evaporator.  7) Pull out TC and TCJ sensor from sensor holder of the evaporator.  8) 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>  - Keep connector position and arrange fan motor wire follow figure.</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>	
⑦	Drain hose	<p>1) Follow the procedure item ③.  2) The drain hose can be removed by removing the screw securing the drain hose and then pulling out the drain hose.  3) When removing the drain hose, be careful of any sharp edges of steel plate. The edges can injuries.</p>  <p><b>&lt;To re-installation&gt;</b>  - To install the drain hose, insert the drain hose firmly until the connection part contacts with heat insulator, and then secure it with original screw.</p>	

No.	Part name	Procedures	Remarks
⑧	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) Disconnect the cord motor of Louver VT (5P) from the Louver VT (L/R) connector.</p> <p>5) Disconnect the cord motor of Louver motor (L) (5P) from the Louver motor (L) connector.</p>  <p>6) Remove fixing screw of the unit display and remove unit display.</p> <p>7) Remove drain pan can be selected remove drain hose or not remove drain hose following:</p> <ul style="list-style-type: none"> <li>- <b>Not remove drain hose;</b> Pulling out the drain pan from back body, then holding the drain pan with main unit.</li> <li>- <b>Remove drain hose;</b> Drain hose can be removed follow the procedure item ⑦. After that remove the drain pan from main unit.</li> </ul>  <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 two center arms of drain pan to back body.</li> </ul> 	   

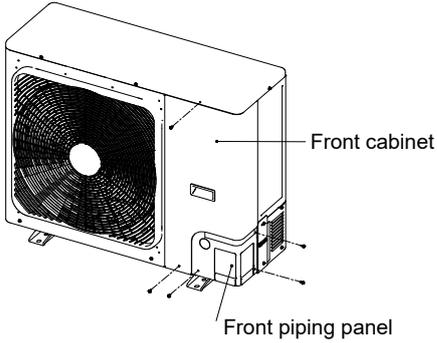
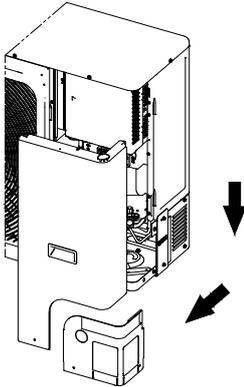
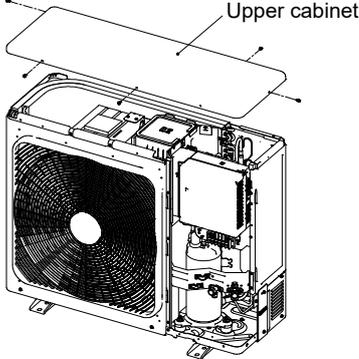
No.	Part name	Procedures	Remarks
⑨	Vertical louver assembly	1) Follow the procedure item③and⑧. 2) Remove 2 fixing screws from the base vertical louver then remove the vertical louver assembly from the body back.	
⑩	Cover motor VT assembly	1) Follow the procedure item③,⑧and⑨. 2) Remove 4 fixing screws from the body back, then remove cover motor VT assembly from rear side of main unit.	
⑪	Bearing base	1) Follow the procedure item ③. 2) Remove 4 fixing screws from the bearing base, then remove it from the main unit.	 <p><b>&lt;Caution at assembling&gt;</b>            - If the bearing is out from the housing, push it into the specified position, then incorporate it in the main unit.</p> 
⑫	Cross flow fan	1) Follow the procedure item ⑨ and ⑪. 2) Loosen the set screw of the cross flow fan. 3) Lift up the heat exchanger follow the figure. Pull out the left hand side until the cross flow fan released from the shaft of the fan motor and then pull out the lower side of heat exchanger follow the figure.	 <p><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.</p> 

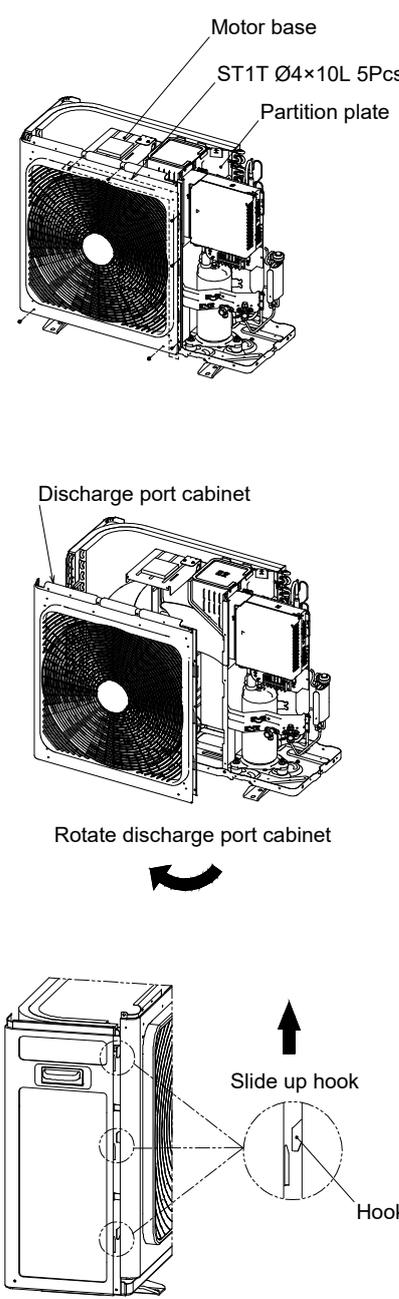
No.	Part name	Procedures	Remarks
		 <p data-bbox="459 517 970 640">- Holding the set screw, install the cross flow fan so that flat area on shaft of the fan motor comes to the mounting hole of the set screw.</p>	
⑬	Heat exchanger (Evaporator)	<ol style="list-style-type: none"> <li data-bbox="437 685 927 719">1) Follow the procedure in item③ and④.</li> <li data-bbox="437 719 951 779">2) Remove 3 fixing screws at the upper left side of the heat exchanger.</li> <li data-bbox="437 1077 959 1137">3) Remove 2 fixing screws at the upper and right side of the heat exchanger.</li> <li data-bbox="437 1137 975 1198">4) Remove the pipe holder from the rear side of the main unit.</li> <li data-bbox="437 1238 970 1272">5) Pull out the heat exchanger to upper side.</li> </ol>  <p data-bbox="443 1720 687 1749"><b>&lt;To re-installation&gt;</b></p> <ul style="list-style-type: none"> <li data-bbox="448 1753 991 1814">- Keep the back body horizontally and put the heat exchanger carefully to the back body.</li> <li data-bbox="448 1814 991 1910">- Make sure the heat exchanger can be assembled with the back body and secure it tightly with screws.</li> </ul>	 

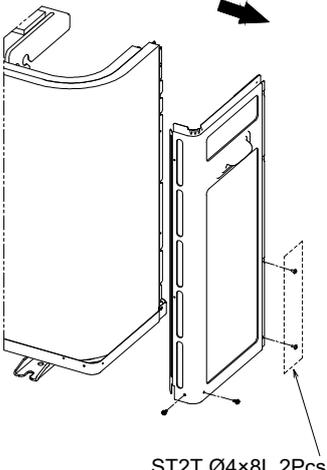
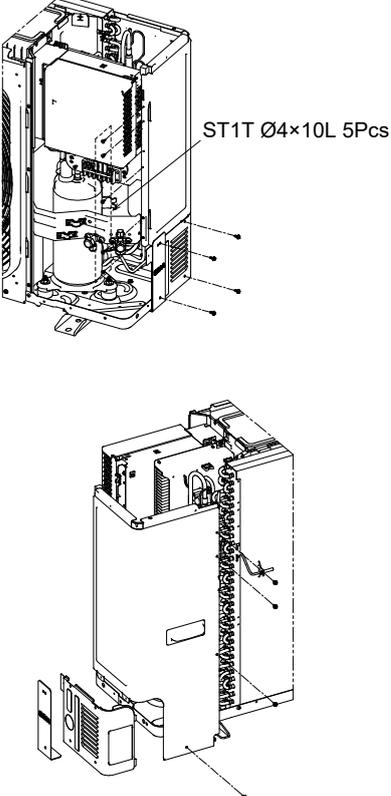
## Microcomputer

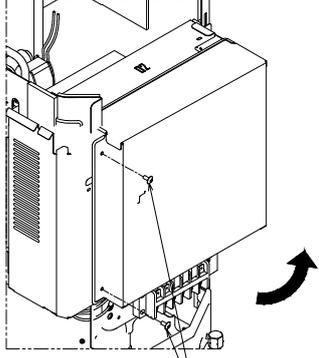
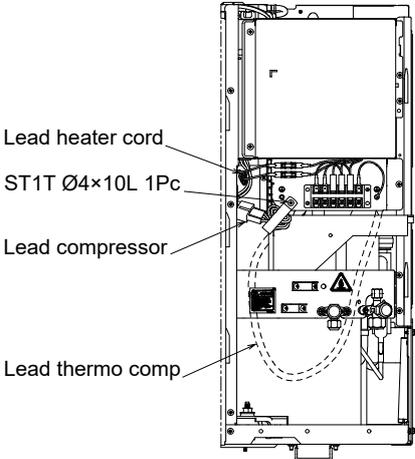
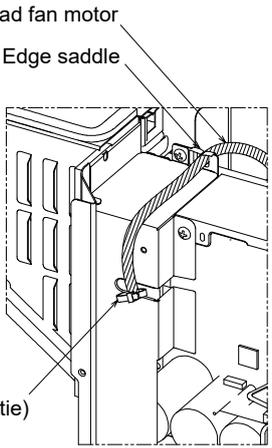
No.	Part name	Procedure	Remarks
①	Common procedure	<ol style="list-style-type: none"><li>1) Turn the power supply off to stop the operation of air-conditioner.</li><li>2) Remove the front panel.<ul style="list-style-type: none"><li>• Remove the 2 fixing screws.</li></ul></li><li>3) Remove the electrical part base.</li></ol>	Replace terminal block, microcomputer ass'y and the P.C. board ass'y.

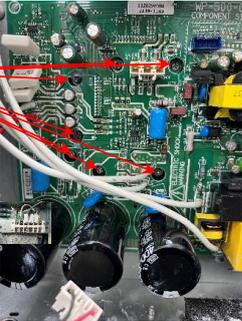
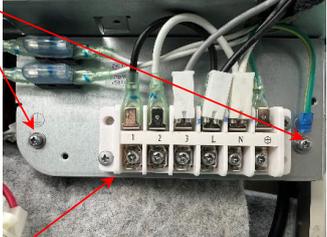
## 13-2. Outdoor Unit

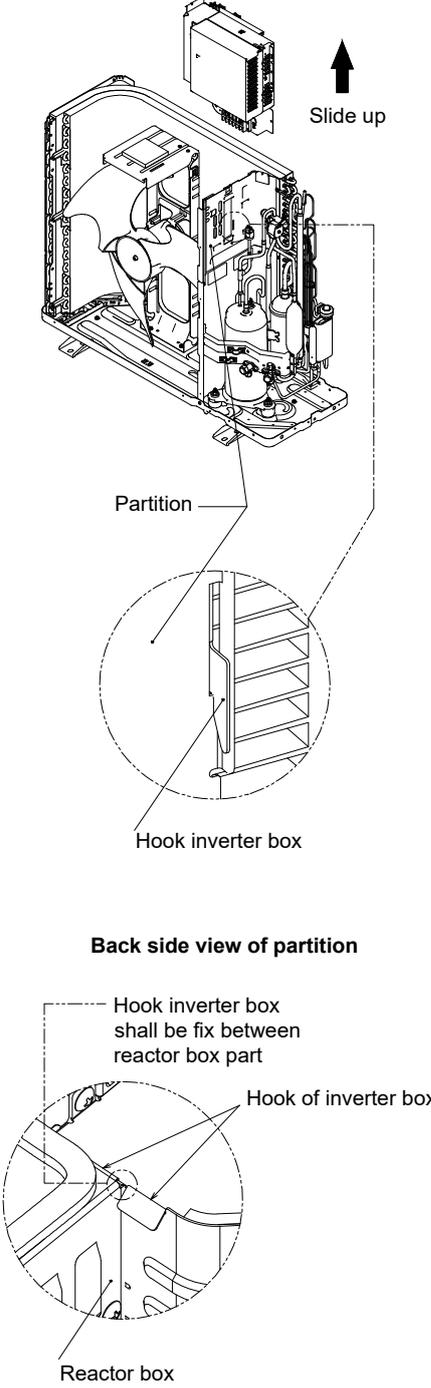
No.	Part name	Procedure	Remarks								
①	Common procedure	<p style="text-align: center;"><b>CAUTION</b></p> <hr/> <p>Never forget to put on the gloves at working time; otherwise an injury will be caused by the parts etc.</p> <hr/> <p><b>1. Detachment</b></p> <ol style="list-style-type: none"> <li>1) Stop operation of the air conditioner, and turn off switch of the breaker for air conditioner</li> <li>2) Take off screw for the front cabinet and front piping panel (Hexagonal Ø4×10L 5Pcs.) *After taking off screw, draw the front cabinet to side down and remove it while pulling the front cabinet</li> <li>3) Remove the power wire and indoor/outdoor connecting wire from the cord clamp and the terminal</li> <li>4) Take off screw for the upper cabinet (Hexagonal Ø4×10L 5Pcs.)</li> </ol> <p><b>2. Attachment</b></p> <ol style="list-style-type: none"> <li>1) Attach the top plate (Hexagonal Ø4×10L 5Pcs.)</li> <li>2) Connecting the power supply wire and the indoor/outdoor connecting wire to the terminal and fixed it with cord clamp</li> </ol> <hr/> <p style="text-align: center;"><b>CAUTION</b></p> <p>Using bundling band on the market, be sure to fixed the power wire and indoor/outdoor connecting wire along the crossover pipe so that they do not come to contact with the compressor, valve at gas side, pipe at gas side and discharge pipe</p> <hr/> <ol style="list-style-type: none"> <li>3) Attach the front panel and front piping panel (Hexagonal Ø4×10L 5Pcs.)</li> </ol> <p><b>Screw type</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="text-align: center;"></td> <td>HEX-ST-SCREW Ø4 x 10</td> </tr> <tr> <td style="text-align: center;"></td> <td>TT2T-4x8 MS-GM Ø4 x 8</td> </tr> <tr> <td style="text-align: center;"></td> <td>ST2T-4X8SS5-DP Ø4 x 8</td> </tr> <tr> <td style="text-align: center;"></td> <td>ST1T-4X10SS5-DP Ø4 x 10</td> </tr> </tbody> </table>		HEX-ST-SCREW Ø4 x 10		TT2T-4x8 MS-GM Ø4 x 8		ST2T-4X8SS5-DP Ø4 x 8		ST1T-4X10SS5-DP Ø4 x 10	  
	HEX-ST-SCREW Ø4 x 10										
	TT2T-4x8 MS-GM Ø4 x 8										
	ST2T-4X8SS5-DP Ø4 x 8										
	ST1T-4X10SS5-DP Ø4 x 10										

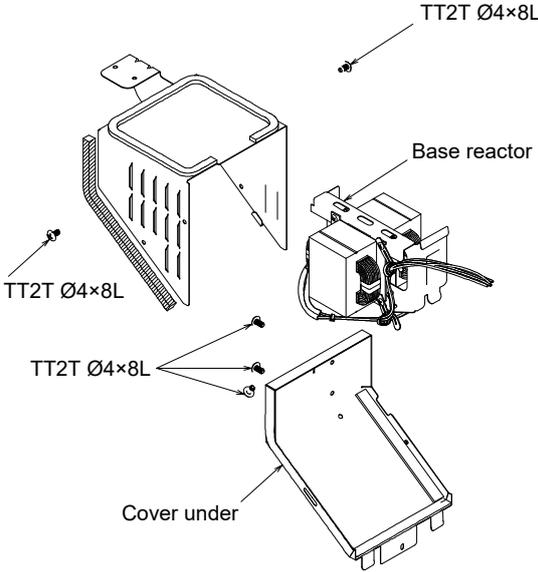
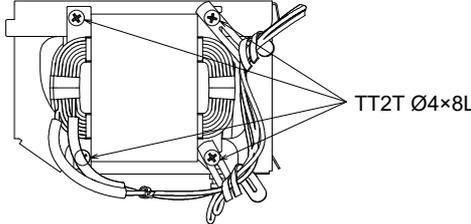
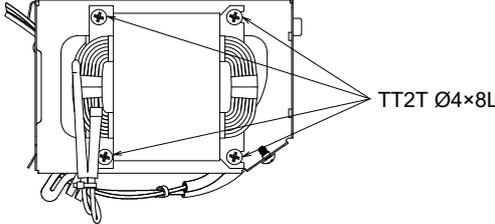
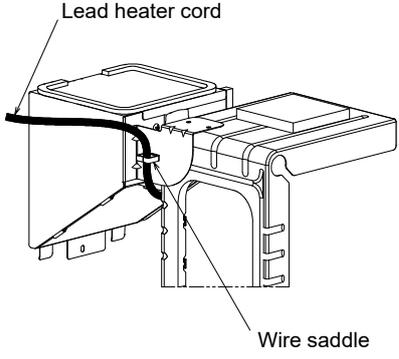
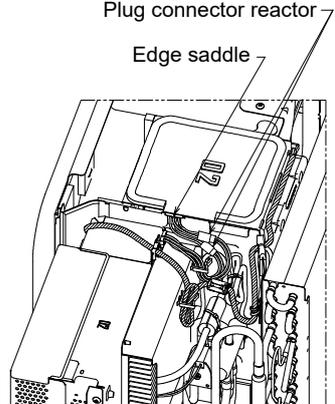
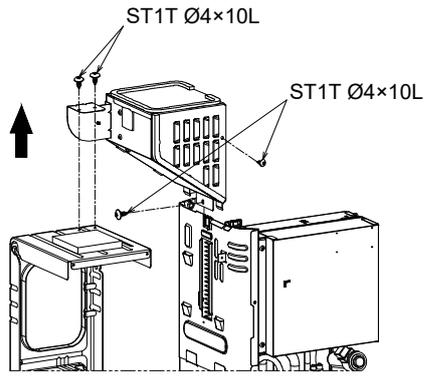
No.	Part name	Procedure	Remarks
②	Discharge port cabinet	<p><b>1. Detachment</b></p> <ol style="list-style-type: none"> <li>1) Perform work 1 of ①</li> <li>2) Take off screw for the discharge port cabinet the partition plate (ST1T Ø4×10L 3Pcs.)</li> <li>3) Take off screw for the discharge port cabinet the motor base (ST1T Ø4×10L 2Pcs.)</li> <li>4) Take off screw for the discharge port cabinet the bottom base(Hexagonal Ø4×10L 2Pcs.)</li> <li>5) Remove the discharge port cabinet</li> </ol> <p>● After taking off screw, rotate the discharge port cabinet side up from hooks</p>	 <p>Motor base ST1T Ø4×10L 5Pcs Partition plate</p> <p>Discharge port cabinet</p> <p>Rotate discharge port cabinet</p> <p>Slide up hook Hook</p>

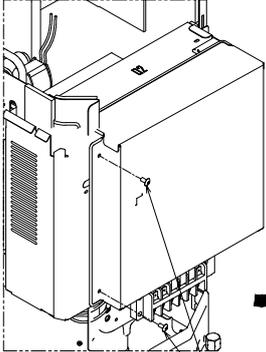
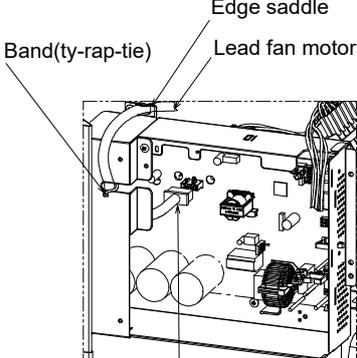
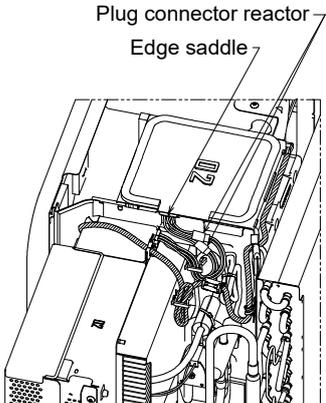
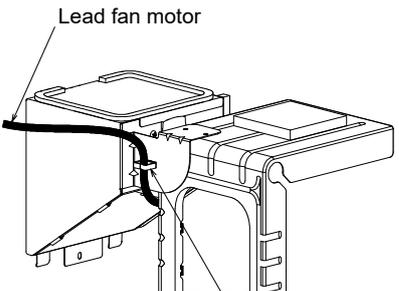
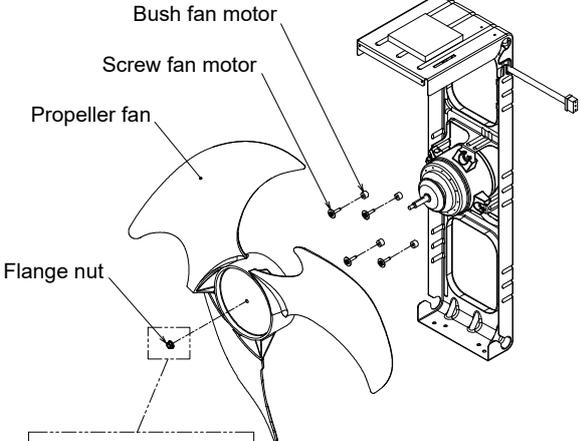
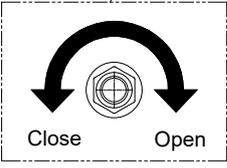
No.	Part name	Procedure	Remarks
③	Left cabinet	<b>1. Detachment</b> 1) Perform work 1 of ① and ② 2) Take off screw for the left cabinet (Hexagonal Ø4×10L 2Pcs.) (ST2T Ø4×8L 2Pcs.) 3) Remove the left cabinet	
④	Back cabinet	<b>1. Detachment</b> 1) Perform work 1 of ① 2) Take off screw for the back cabinet and back piping panel (Hexagonal Ø4×10L 8Pcs.) (ST1T Ø4×10L 5Pcs.) 3) Remove the back cabinet and back piping panel	

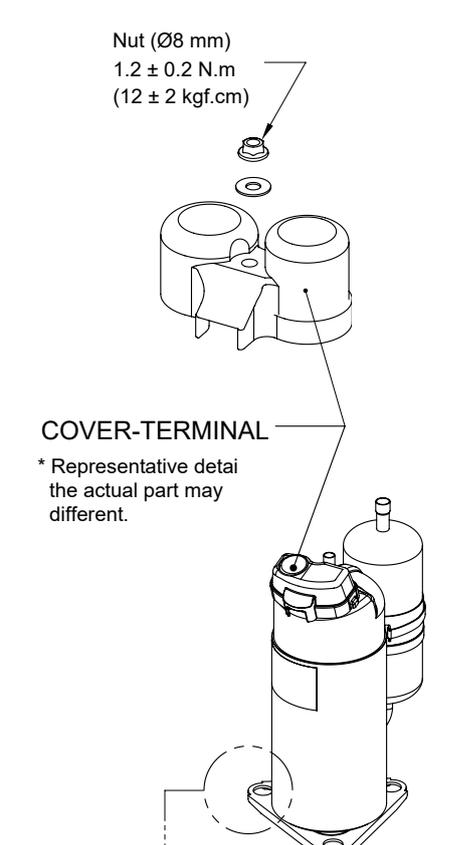
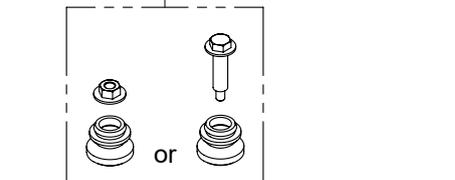
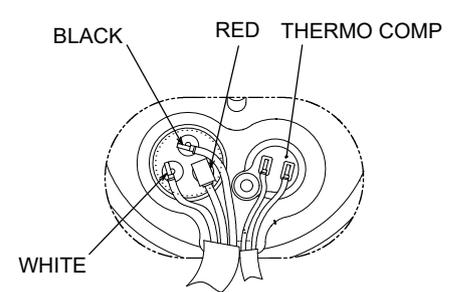
No.	Part name	Procedure	Remarks
⑤	Inverter assembly	<p><b>1. Detachment</b></p> <p>1) Perform work 1 of ①, ② and ④</p> <p><b>⚠ WARNING</b></p> <hr/> <p>Never disassemble the inverter until 5 minutes after the power supply was turned off because there is a fear that an electric shock may occur.</p> <hr/> <p><b>NOTE)</b></p> <hr/> <p>When working, be sure to use the insulate tools and put on the insulated gloves.</p> <hr/> <p>2) Take off screw for the inverter cover (TT2T Ø4×8L 2Pcs.)</p> <p>3) Remove the inverter cover (Rotate the cover to right hand)</p> <p>4) Take off screw for the clamp filter (ST1T Ø4×10L 1Pc.)</p> <p>5) Remove the connectors that to the other part from the inverter assembly</p> <ul style="list-style-type: none"> <li>● Lead connected to compressor</li> <li>● Lead connected to heater cord</li> <li>● Lead connected to reactor</li> <li>● Lead fan motor to board</li> <li>● Lead high pressure switch to board</li> <li>● Lead thermo comp</li> </ul> <p style="text-align: center;"><b>CAUTION</b></p> <hr/> <p>Disengage the lock on the housing to unplug the connector.</p> <hr/> <p>CN60 ... TE sense (2P : White)  CN61 ... TD sense (3P : White)  CN62 ... TO sense (2P : Yellow)  CN63 ... TS sense (3P : White)  CN64 ... TL sense (2P : White)  CN68 ... Thermostat (2P : Blue)  CN69 ... High pressure SW (2P : Green)  CN73 ... AC 4-way valve (2P : Yellow)  CN61 ... PMV coil (6P : White)  CN30 ... Connection with fan motor (White)</p>	 <p style="text-align: right;">TT2T Ø4×8L 2Pcs</p>  <p>Lead heater cord  ST1T Ø4×10L 1Pc  Lead compressor  Lead thermo comp</p>  <p>Lead fan motor  Edge saddle  Band (ty-rap-tie)</p>  <p>Reactor connectors</p>

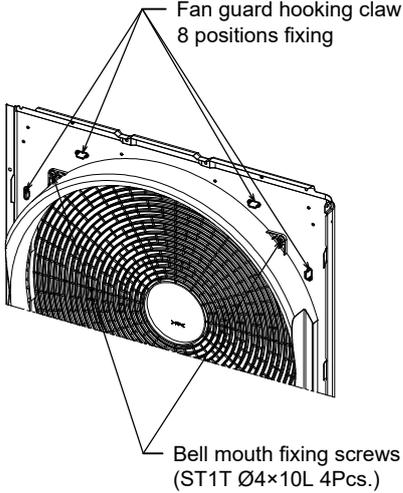
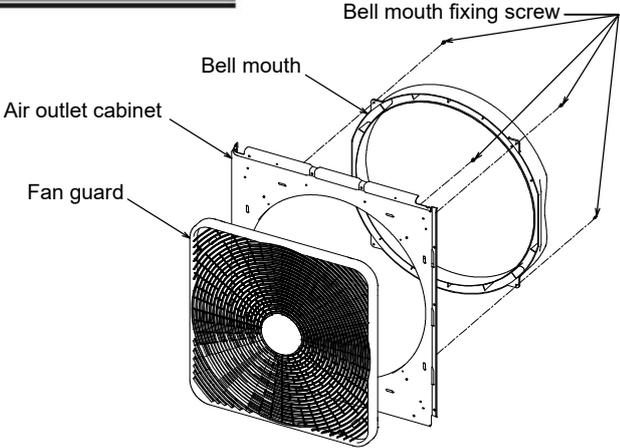
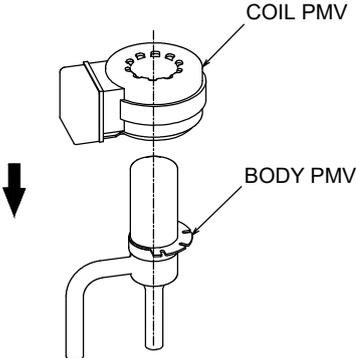
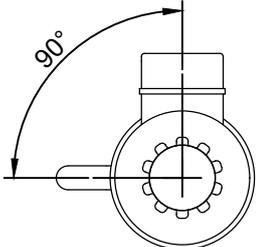
No.	Part name	Procedure	Remarks
⑤	Inverter assembly	<p>6) Remove the screw of the P.C.board (Screw :M3 x 14, 7pcs.)</p> <p>7) Remove the screw of the earth wire (Screw :M4 x 8, 1pc.)</p> <p>8) Remove the screw of power supply terminal box</p> <p>9) Remove the P.C.board of support spacer 3 position</p> <p>10) Cut the binding band and remove clamp filter</p> <p><b>2.Attachment</b></p> <p>1) Install it in the reverse of the procedure to remove it.</p> <p>2) Apply heat silicones to E-parts</p>	 <p>Compressor connector</p>  <p>Screws</p>  <p>Earth wire</p> <p>Terminal block</p>

No.	Part name	Procedure	Remarks
⑤	Inverter assembly (Continue)	<p>11) Move partition of inverter box up</p> <p><b>Note)</b></p> <p>1) When move inverter box up of the unit make sure, all connecting shall be take off</p> <p>2) Check position hook locking shall be fixed them position</p>	 <p>Slide up</p> <p>Partition</p> <p>Hook inverter box</p> <p><b>Back side view of partition</b></p> <p>Hook inverter box shall be fix between reactor box part</p> <p>Hook of inverter box</p> <p>Reactor box</p> <p><b>Position hook is on top side of inverter box</b></p>

No.	Part name	Procedure	Remarks
⑥	Reactor	<p><b>1. Detachment</b></p> <ol style="list-style-type: none"> <li>1) Perform work 1 of ① and ②</li> <li>2) Move lead motor out of wire saddle</li> <li>3) Take off plug connector reactor</li> <li>4) Take off screw fixed the reactor box (ST1T Ø4×10L 4Pcs.)</li> <li>5) Move the reactor box up from partition and move reactor lead out of edge saddle</li> <li>6) Detail and component part remove reactor on box <ul style="list-style-type: none"> <li>● Take off screw fixed cover top (TT2T Ø4×8L 2Pcs.)</li> <li>● Take off screw fixed base reactor box and cover under (TT2T Ø4×8L 3Pcs.)</li> <li>● Take off screw fixed reactor 2Pcs (TT2T Ø4×8L 8Pcs.)</li> </ul> </li> </ol>    <p style="text-align: center;"><b>Position screw TT2T Ø4×8L fixed reactor</b></p>	  

No.	Part name	Procedure	Remarks
⑦	Fan motor	<p><b>1. Detachment</b></p> <ol style="list-style-type: none"> <li>1) Perform work 1 of ① and ②</li> <li>2) Take off screw for the inverter cover (TT2T Ø4×8L 2Pcs.)</li> <li>3) Take off plug connector reactor</li> <li>4) remove the inverter cover (Rotate the cover to right hand)</li> <li>5) Move plug connector of fan motor out off board inverter</li> <li>6) Cut band(ty-rap-tie) at lead fan motor</li> <li>7) Take lead fan motor out off inverter box</li> <li>8) Take lead fan motor out off edge saddle, bushing, on partition and wire saddle on inverter box</li> <li>9) Take off flange nut on propeller fan (Nut Ø10) <ul style="list-style-type: none"> <li>* The flange nut is loosened by turning it clockwise (To tighten the flange nut, turn it counterclockwise)</li> </ul> </li> <li>10) Remove the propeller fan</li> <li>11) Take off screw fixed fan motor (4Pcs. each) while supporting the fan motor, so that it dose not fall <ul style="list-style-type: none"> <li>* Caution to assembly fan motor <ul style="list-style-type: none"> <li>● Tighten the flange nut with 6.86 N.m (70 Kgf.cm)</li> </ul> </li> </ul> </li> </ol>	 <p>TT2T Ø4×8L 2Pcs</p>   
		  <p>Close      Open</p>	
		<b>CAUTION</b>	
		<p>Using the metal band of the motor base, be sure to fix the fan motor lead to the base so that the fan motor lead dose not come to contact with the propeller fan</p>	

No.	Part name	Procedure	Remarks
⑧	Compressor	<p><b>1. Detachment</b></p> <ol style="list-style-type: none"> <li>1) Perform works of 1 of ① .</li> <li>2) Recover the refrigerant gas from the outdoor unit.</li> <li>3) Perform works of ②, ④ and ⑤ .</li> <li>4) Remove the soundproof plate and sensor.</li> <li>5) Remove a cover terminal of compressor.</li> <li>6) Remove plug connector and bimetal-thermo on terminal of compressor.</li> <li>7) Remove all leads out of terminal compressor.</li> <li>8) Remove the tube connecting discharge and suction of compressor.</li> <li>9) Remove the three compressor bolts or nuts.</li> <li>10) Remove the compressor from base plate of unit.</li> </ol> <p><b>NOTE)</b></p> <hr/> <ol style="list-style-type: none"> <li>1) Be careful the electrical parts such as sensors, compressor and etc. should not be burned by flame. (Otherwise operation problem may occur).</li> <li>2) The process recovery of refrigerant out of the unit should be treated by two or more persons.</li> <li>3) A compressor weigh approximately 15kg. Should be treated a compressor by two or more persons.</li> </ol> <hr/> <p><b>Caution to assemble the compressor.</b></p> <ol style="list-style-type: none"> <li>1) Be sure, the lead of coils are not burned by flame.</li> <li>2) Be sure, all sensors are fixed in self position.</li> </ol>	 <p>Nut (Ø8 mm) 1.2 ± 0.2 N.m (12 ± 2 kgf.cm)</p> <p>COVER-TERMINAL</p> <p>* Representative detail the actual part may different.</p>  <p>Nut or Bolt compressor 3 pcs. Hexagonal Ø13 5 N.m (50 kgf.cm)</p>  <p>BLACK RED THERMO COMP</p> <p>WHITE</p> <p><b>Plug terminal compressor</b></p>

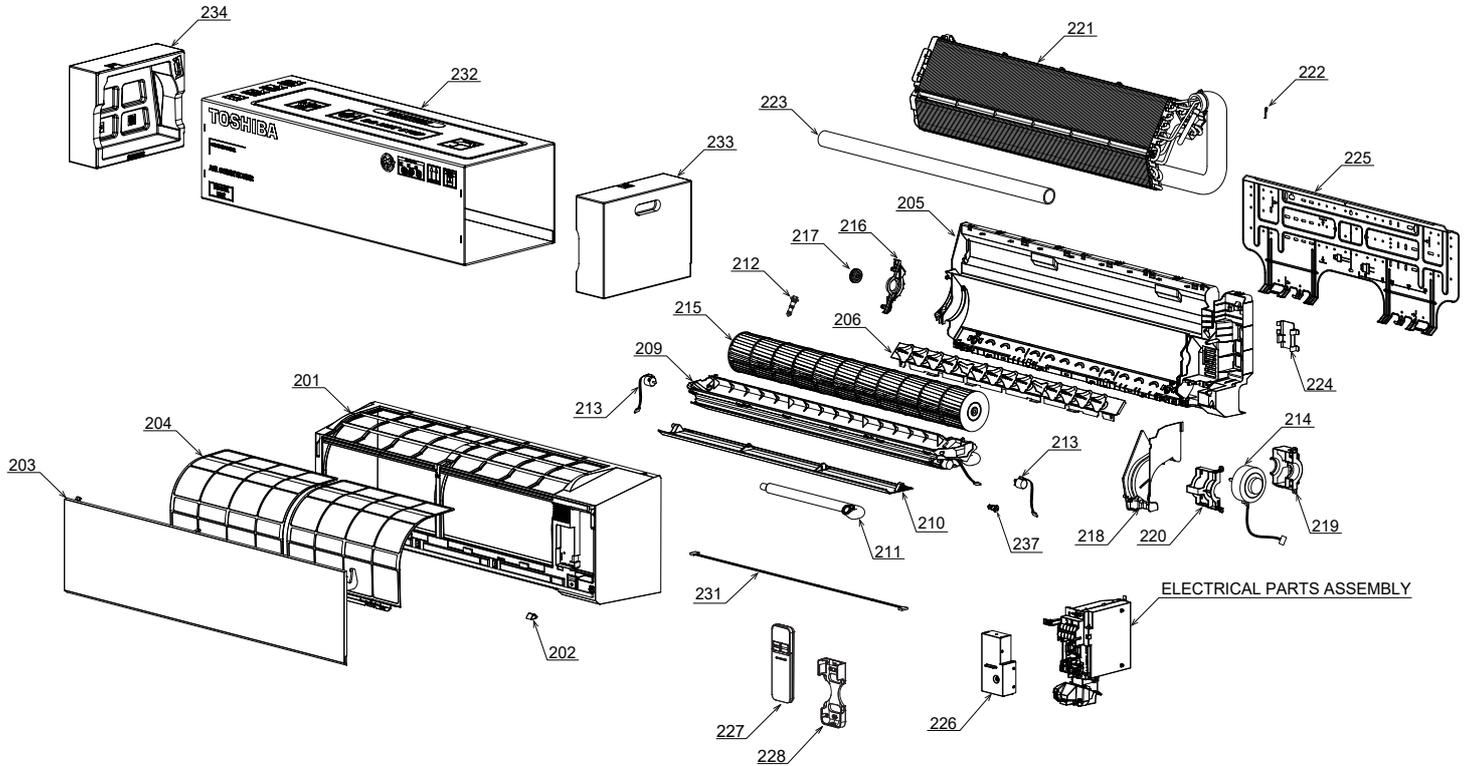
No.	Part name	Procedure	Remarks
⑨	Fan guard	<p><b>1. Detachment</b></p> <p>1) Perform work 1 of ① and ②</p> <p style="text-align: center;"><b>CAUTION</b></p> <hr/> <p>Work on the cardboard, cloth, and etc. In order to prevent damage on the product.</p> <hr/> <p>2) Take off screw for the bell mouth screw with assembly to air outlet cabinet (ST1T Ø4×10L 4Pcs.)</p> <p>3) Remove the eight fan motor hoking claws which assembly to air outlet cabinet by push downward direction</p> <p style="text-align: center;"><b>CAUTION</b></p> <hr/> <p>Check all the hooking claws are fixed at each specified position.</p> <hr/>	 
⑩	Electronic expansions valve coil	<p><b>1. Detachment</b></p> <p>1) Perform work 1 of ① and ④</p> <p>2) Remove the coil by pulling it up from the electronic control valve body.</p> <p><b>2. Attachment</b></p> <p>1) When assembling the coil into the valve body, ensure that the coil anti-turn lock is installed properly in the pipe.</p> <p><b>&lt;Handling precaution&gt;</b></p> <p>When handling the parts, do not pull the leads. When removing the coil from the valve body, use your hand to secure the body in order to prevent the pipe from being bent out of shape.</p>	 

No.	Part name	Procedure	Remarks
⑪	TE sensor (outdoor heat exchanging temperature sensor) • <b>Attachment</b>	Install the sensor onto the straight pipe part of the condenser output pipe.	
⑫	TS sensor (Suction pipe temperature sensor) • <b>Attachment</b>	Install the sensor onto the straight pipe part of the suction pipe. Be careful for the lead direction of the sensor.	
⑬	TD sensor (Discharge pipe temperature sensor) • <b>Attachment</b>	With its leads pointed upward, install the sensor onto the vertical straight pipe part of the discharge pipe.	
⑭	TO sensor (Outside air temperature sensor) • <b>Attachment</b>	Insert the outdoor air temperature sensor into the holder, and install the holder onto the heat exchanger.	
<b>CAUTION</b>			
During the installation work (and on its completion), take care not to damage the coverings of the sensor leads on the edges of the metal plates or other parts. It is dangerous for these coverings to be damaged since damage may cause electric shocks and/or a fire.			
<b>CAUTION</b>			
After replacing the parts, check whether the positions where the sensors were installed are the proper positions as instructed. The product will not be controlled properly and trouble will result if the sensors have not been installed in their proper positions.			
⑮	Heater cord	<b>1. Detachment</b> 1) Perform work 1 of ① to ⑦ 2) Take off screw for the base (ST1T Ø4×10L 2Pcs.) 3) Take off screw for the partition (ST1T Ø4×10L 5Pcs.) 4) Take off screw comp on the base (3Pcs.) 5) To replace the new base with heater cord	

No.	Part name	Procedure	Remarks
⑯	Pressure switch	<p><b>1. Detachment</b></p> <ol style="list-style-type: none"> <li>1) Perform work of Detachment 1 of ①.</li> <li>2) Recover the refrigerant gas from the outdoor unit.</li> <li>3) Perform works of ④ and ⑤.</li> <li>4) Remove the soundproof plate, TD sensor, and butyl on the pipe of pressure switch.</li> <li>5) Using a burner, remove the welded parts of the pipe of pressure switch.</li> </ol> <p><b>NOTE) "Case of using 4-way valve unit"</b></p> <hr/> <p>Take care that the electric parts, 4-way valve unit, butyle, compressor, accum tank, and etc. are not caught by flame. (Otherwise operaion trouble may occur.)</p> <hr/> <p><b>2. Attachment</b></p> <ul style="list-style-type: none"> <li>• Be sure not to burn lead wire of the pressure switch.</li> <li>• Take care there is no missing of sensor.</li> </ul> <p><b>NOTE)</b></p> <hr/> <p>Take care that the body of the pressure is not be 100°C or more. For cooling pressure switch, use the wet towel and etc. Use the protective plate for the welding.</p> <hr/> <p>Take care that the electric parts, 4-way valve unit, butyle, compressor, accum tank, and etc. are not caught by flame. (Otherwise operaion trouble may occur.)</p> <hr/>	 <p>High Pressure switch</p> <p>Protective plate for welding</p> <p>Wet towel</p>

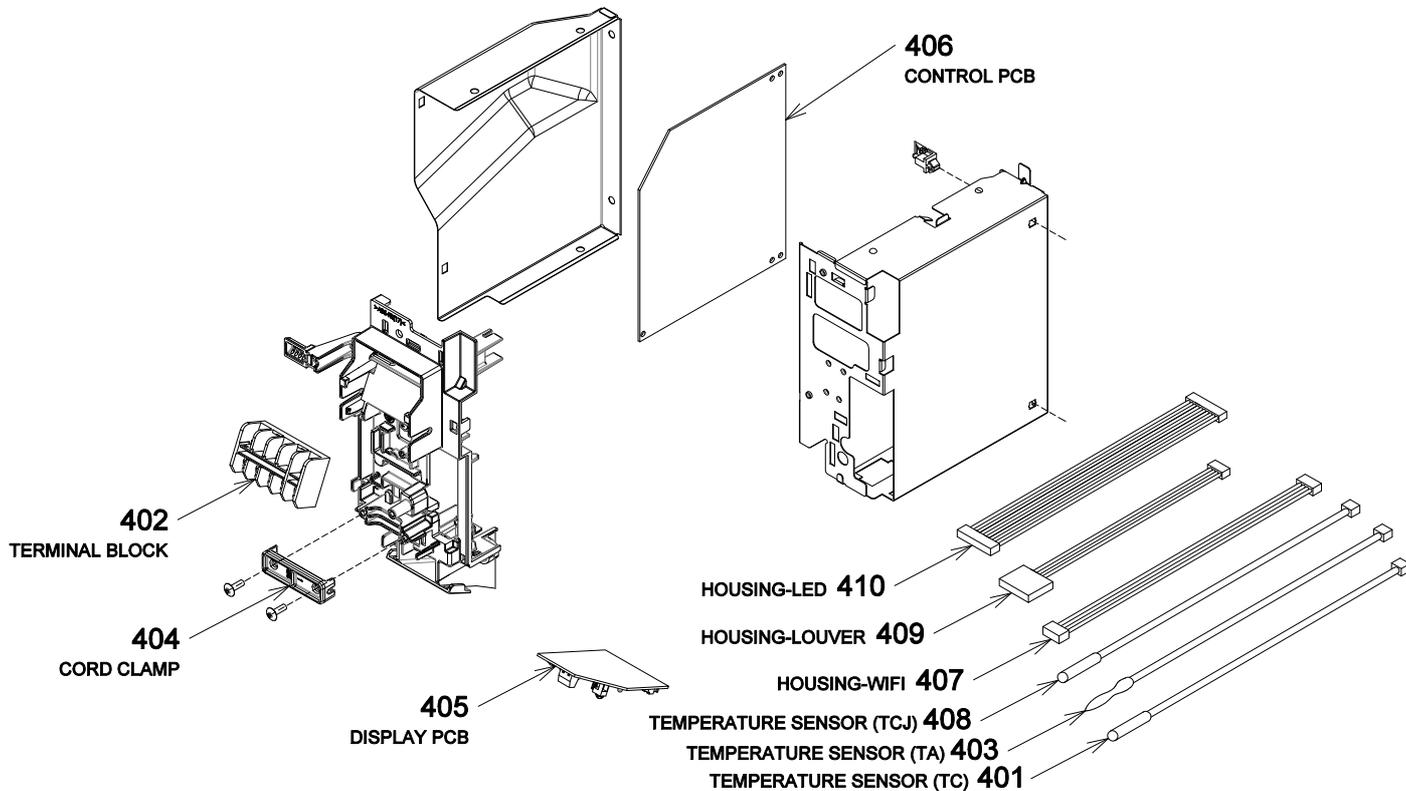
## 14. EXPLODED VIEWS AND PARTS LIST

### 14-1. Indoor Unit



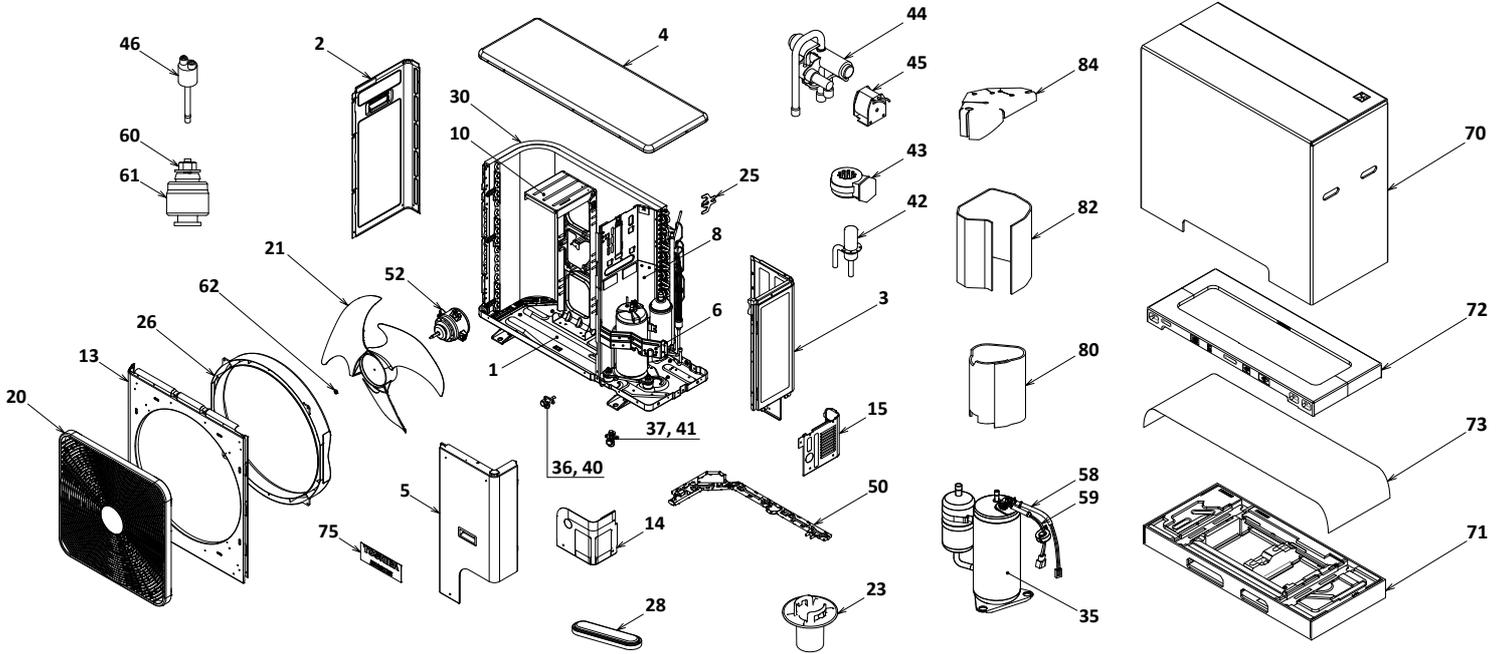
Location No.	Part No.	Description	Location No.	Part No.	Description
201	43T00949	FRONT PANEL ASSY	219	43T39455	MOTOR BAND BACK ASSY
202	43T00715	CAP SCREW	220	43T39382	MOTOR BAND FRONT
203	43T09586	GRILLE OF AIR INLET ASSY	221	43T44867	REFRIGERATION CYCLE ASSY
204	43T80358	AIR FILTER	222	43T19333	HOLDER, SENSOR
205	43T03405	BACK BODY ASSY	223	43T11354	PIPE SHIELD
206	43T22357	VERTICAL LOUVER ASSY	224	43T49043	HOLDER, PIPE
209	43T72422	DRAIN PAN ASSY	225	43T82008	PLATE, INSTALLATION
210	43T22367	HORIZONTAL LOUVER	226	43T62360	TERMINAL COVER ASSY
211	43T70314	HOSE-DRAIN	227	43T66403	WIRELESS REMOCO (WH-TA15PE)
212	43T79322	DRAIN CAP	228	43T83305	HOLDER, REMOTE CONTROL
213	43T21546	STEPPING-MOTOR (24BYJ48-STHL)	231	43T60483	CORD MOTOR LOUVER HR
214	43T21496	MOTOR FAN	232	43T91333	PACKING SLEEVE
215	43T20357	CROSS FLOW FAN ASSY	233	43T91397	PACKING CUSHION RIGHT
216	43T39385	BASE BEARING	234	43T91398	PACKING CUSHION LEFT
217	43T22312	BEARING ASSY, MOLD	237	43125202	COVER-AXIS
218	43T39383	MOTOR COVER			

## 14-2. Indoor Unit (Part-E)



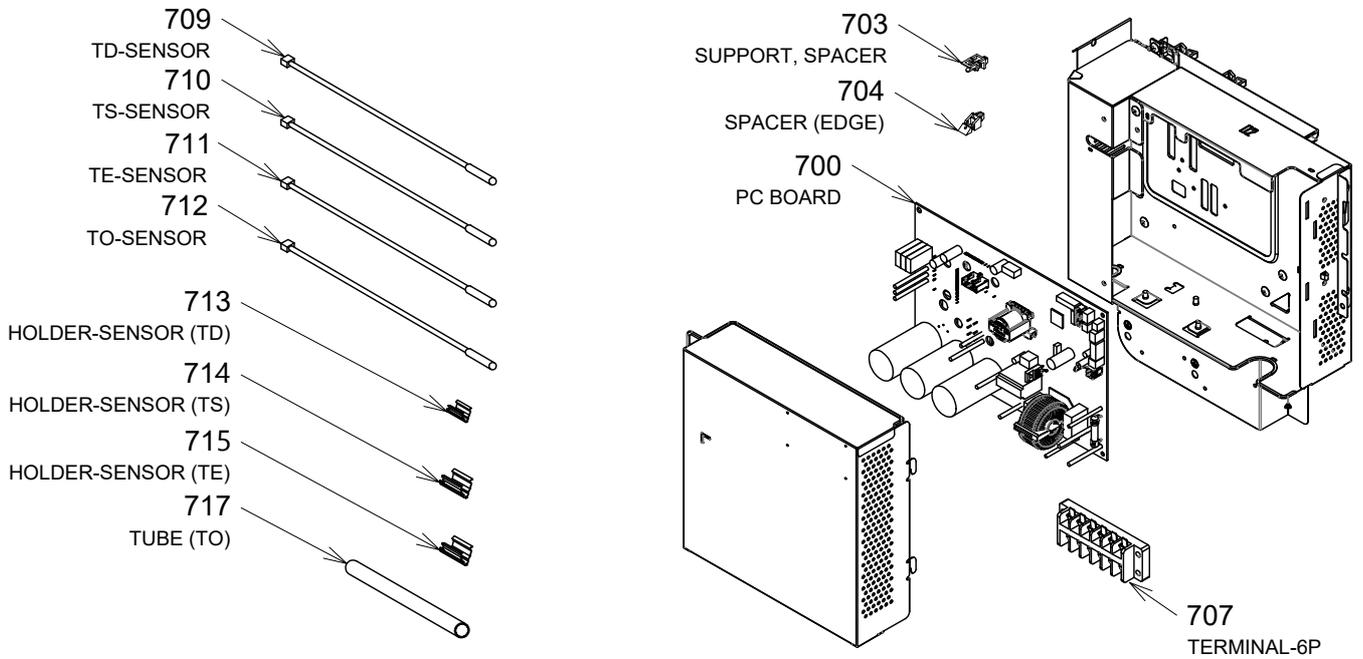
Location No.	Part No.	Description	Location No.	Part No.	Description
401	43T50393	TEMPERATURE SENSOR	406	43TNV464	PC BOARD (WP-048)
402	43T6V673	TERMINAL(5P-TF)	407	43T60502	HOUSING-Wifi
403	43T60604	SENSOR-TA(SEMITEC)	408	43T60605	TEMPERATURE SENSOR
404	43T62340	CORD-CLAMP	409	43T60639	HOUSING-LOUVER
405	43T6W727	PC BOARD ASSY : WRS-LED	410	43T60640	HOUSING-LED

### 14-3. Outdoor Unit



Location No.	Part No.	Description	Location No.	Part No.	Description
1	43T42400	BASE ASSEMBLY (WITH HEATER)	41	43T46574	VALVE; PACKED 9.52 DIA
2	43T00956	LEFT SIDE PANEL ASSEMBLY	42	43T46569	BODY PMV
3	43T00952	BACK SIDE PANEL ASSEMBLY	43	43T63398	COIL-PMV
4	43T00858	UPPER CABINET ASSEMBLY	44	43T46375	4 WAY VALVE
5	43T00953	FRONT SIDE PANEL ASSEMBLY	45	43T63337	4 WAY VALVE COIL ASSEMBLY
6	43T00713	VALVE FIXING PLATE	46	43T63381	HIGH PRESSURE SWITCH ASSEMBLY
8	43T04516	PARTITION ASSEMBLY	50	43T57320	HEATER CORD ASSEMBLY
10	43T39435	MOTOR BASE ASSEMBLY	52	43T21542	FAN-MOTOR(LDF-340-A100-1)
13	43T00857	AIR OUTLET CABINET	58	43T60522	TEMPERATURE SENSOR
14	43T00954	PANEL PIPING FRONT ASSEMBLY	59	43T60443	ASM-LEAD-COMP
15	43T00955	PANEL PIPING BACK ASSEMBLY	60	43T97001	NUT
20	43T19372	FAN GUARD(TOSHIBA)	61	43T49357	RUBBER,CUSHION
21	43T20329	PROPELLER FAN	62	43T47001	NUT FLANGE
23	43T79324	DRAIN NIPPLE	70	43T91415	CARTON BOX
25	43T63376	HOLDER, SENSOR	71	43T91442	FIBERBOARD UNDER ASSEMBLY
26	43T22313	BELLMOUTH	72	43T91416	CUSHION PACKING UPPER
28	43089160	CAP, WATERPROOF	73	43T91301	PE SHEET
30	43T43721	CONDENSER ASSEMBLY	75	43T01331	TOSHIBA INVERTER MARK
35	43T41610	COMPRESSOR	80	43T04517	SOUND INSULATION (INSIDE)
36	43T47403	BONNET, 6.35 DIA	82	43T04513	SOUND INSULATION (OUTSIDE)
37	43T47404	BONNET, 9.52 DIA	84	43T04478	SOUND-INSU(UP)
40	43T46578	VALVE PACKED 6.35DIA			

## 14-4. Outdoor Unit (Part-E)



Location No.	Part No.	Description	Location No.	Part No.	Description
700	43TNV455	PC BOARD (WP-500)	711	43T50418	TC-SENSOR(TE)
703	43T95301	SUPPORT, SPACER	712	43T50417	TEMPERATURE SENSOR, TO
704	43T95302	SPACER(EDGE)	713	43T63317	HOLDER,SENSOR
707	43T60384	TERMINAL-6P	714	43T63323	HOLDER,SENSOR
709	43T50346	TEMPERATURE SENSOR	715	43T63318	HOLDER SENSOR
710	43T50336	TEMPERATURE SENSOR	717	43T62401	TUBE

# **CARRIER AIR CONDITIONING (THAILAND) CO., LTD.**

144/9 MOO 5, BANGKADI INDUSTRIAL PARK, TIVANON ROAD, TAMBOL BANGKADI,  
AMPHUR MUANGPATHUMTHANI, PATHUMTHANI 12000, THAILAND