TECHNICAL & SERVICE MANUAL

SANYO

SAP-KCRV243GJH
SAP-KCRV243GJ
SAP-KCRV303GJH
SAP-KCRV303GJ

Power Source:240V 50Hz

DC INVERTER SPLIT AIR CONDITIONER

Wall Mounted Type Indoor Unit

SAP-KRV243GJH
SAP-KRV243GJ
SAP-KRV303GJH
SAP-KRV303GJ

Outdoor unit

SAP-CRV243GJH
SAP-CRV243GJ
SAP-CRV303GJH
SAP-CRV303GJ

IMPORTANT

These air conditioners employ new refrigerant R410A.
Pay special attention when servicing the unit.

R410A

Important!
Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.

WARNING This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

If Necessary, Get Help
These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales / service outlet or your certified dealer for additional instructions.

In Case of Improper Installation
The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

Special Precautions

WARNING **When Wiring**

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.
- Ground the unit following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting
Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back.Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing…
…In a Ceiling or Wall
Make sure the ceiling / wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

…In a Room
Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

…In Moist or Uneven Locations
Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

…In an Area with High Winds
Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

…In a Snowy Area (for Heat Pump-type Systems)
Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

When Servicing
- Turn the power off at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.

Others


CAUTION

- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm upon completing installation that no refrigerant gas is leaking. If escaped gas comes in contact with a stove, gas water heater, electric room heater or other heat source, it can produce dangerously toxic gas.
- Do not install only a single indoor unit.

Table of Contents

1. OPERATING RANGE

	Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp.
Cooling	Maximum	32˚C D.B./ 23˚C W.B.	43˚C D.B.
	Minimum	19˚C D.B./ 14˚C W.B.	19˚C D.B.
Heating	Maximum	27˚C D.B.	24˚C D.B./ 18˚C D.B.
	Minimum	16˚C D.B.	— /-15˚C W.B.

2. SPECIFICATIONS

2-1. Unit Specifications

Indoor Unit **SAP-KRV243GJH**

Type			Wall mounted type indoor unit	
Power Source			240V~50Hz	
Voltage rating			240V	
Performance			Cooling	Heating
Capacity		kW	0.6-7.9	0.8-9.6
Air circulation (Hi)		L/S	305	325
Moisture removal (High)		Liters/h	4.0	–
Electrical Rating			Cooling	Heating
Available voltage range		V	216~264	
Running amperes		A	8.5	12.7
Power input		W	1950	2920
Features				
Controls/Temperature control			Microprocessor / I.C. thermostat	
Control unit			Wireless remote control unit	
Timer			ON/OFF 24 hours & Daily program, 1- hour OFF	
Fan speeds			3 and Auto	
Airflow direction (Indoor)		Horizontal	Manual	
		Vertical	Auto	
Air filter			Washable, Anti-Mold	
Operation sound	Hi/Lo	dB-A	47/38	
Refrigerant tubing connections			Flare type	
Refrigerant	Narrow tube	mm(in.)	6.35(1/4)	
tube diameter	Wide tube	mm(in.)	12.7(1/2)	
Refrigerant			R410A	
Refrigerant tube kit			Optional	
Dimensions & Weight				
Unit dimensions	Height	mm	330	
	Width	mm	1,140	
	Depth	mm	228	
Net Weight		Kg	18	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **SAP-KRV243GJ**

Type			Wall mounted type indoor unit
Power Source			240V~50Hz
Voltage rating			240V
Performance			Cooling
Capacity		kW	0.6-7.9
Air circulation (Hi)		L/S	305
Moisture removal (High)		Liters/h	4.0
Electrical Rating			Cooling
Available voltage range		V	216~264
Running amperes		A	8.5
Power input		W	1950
Features			
Controls/Temperature control			Microprocessor / I.C. thermostat
Control unit			Wireless remote control unit
Timer			ON/OFF 24 hours & Daily program, 1- hour OFF
Fan speeds			3 and Auto
Airflow direction (Indoor)		Horizontal	Manual
		Vertical	Auto
Air filter			Washable, Anti-Mold
Operation sound	Hi/Lo	dB-A	47/38
Refrigerant tubing connections			Flare type
Refrigerant	Narrow tube	mm(in.)	6.35(1/4)
tube diameter	Wide tube	mm(in.)	12.7(1/2)
Refrigerant			R410A
Refrigerant tube kit			Optional
Dimensions & Weight			
Unit dimensions	Height	mm	330
	Width	mm	1,140
	Depth	mm	228
Net Weight		Kg	18

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Indoor Unit **SAP-KRV303GJH**

Type			Wall mounted type indoor unit	
Power Source			240V~50Hz	
Voltage rating			240V	
Performance			Cooling	Heating
Capacity		kW	1.2-9.3	1.7-10.4
Air circulation (Hi)		L/S	305	325
Moisture removal (High)		Liters/h	4.5	*
Electrical Rating			Cooling	Heating
Available voltage range		V	216~264	
Running amperes		A	11.3	12.4
Power input		W	2650	2920
Features				
Controls/Temperature control			Microprocessor / I.C. thermostat	
Control unit			Wireless remote control unit	
Timer			ON/OFF 24 hours & Daily program, 1- hour OFF	
Fan speeds			3 and Auto	
Airflow direction (Indoor)		Horizontal	Manual	
		Vertical	Auto	
Air filter			Washable, Anti-Mold	
Operation sound	Hi/Lo	dB-A	47/38	
Refrigerant tubing connections			Flare type	
Refrigerant	Narrow tube	mm(in.)	6.35(1/4)	
tube diameter	Wide tube	mm(in.)	15.88(5/8)	
Refrigerant			R410A	
Refrigerant tube kit			Optional	
Dimensions & Weight				
Unit dimensions	Height	mm	330	
	Width	mm	1,140	
	Depth	mm	228	
Net Weight		kg	18	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **SAP-KRV303GJ**

Type			Wall mounted type indoor unit
Power Source			240V~50Hz
Voltage rating			240V
Performance			Cooling
Capacity		kW	1.2-9.3
Air circulation (Hi)		L/S	305
Moisture removal (High)		Liters/h	4.5
Electrical Rating			Cooling
Available voltage range		V	216~264
Running amperes		A	11.3
Power input		W	2650
Features			
Controls/Temperature control			Microprocessor / I.C. thermostat
Control unit			Wireless remote control unit
Timer			ON/OFF 24 hours & Daily program, 1- hour OFF
Fan speeds			3 and Auto
Airflow direction (Indoor)		Horizontal	Manual
		Vertical	Auto
Air filter			Washable, Anti-Mold
Operation sound	Hi/Lo	dB-A	47/38
Refrigerant tubing connections			Flare type
Refrigerant	Narrow tube	mm(in.)	6.35(1/4)
tube diameter	Wide tube	mm(in.)	15.88(5/8)
Refrigerant			R410A
Refrigerant tube kit			Optional
Dimensions & Weight			
Unit dimensions	Height	mm	330
	Width	mm	1,140
	Depth	mm	228
Net Weight		kg	18

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

2-2. Major Component Specifications

Indoor Unit **SAP-KRV243GJH**

Control PCB				
Part No.				POW-KMRV243GJ
Controls				Microprocessor
Control circuit fuse				2.50V 3.15A
Remote Control Unit				RCS-3MVHPS4E
Fan & Fan Motor				
Type Fan/Fan motor				Cross-flow /AC motor
Q'ty...Dia. and length		mm		1... D100
Fan motor model...Q'ty				KFG4X-31B6P-S...1
No. of poles...rpm (220V, High)				4...1269
Nominal output		W		30
Coil resistance (Ambient temp. 20˚C)		Ω	BRN-WHT: 161.2	ORG-YEL: 26.9
			WHT-VLT : 11.6	YEL-BLK : 22.8
			VLT-ORG : 68.7	BLK-PNK : 115.2
Safety devices	Type			Thermal protector
	Operating temp.	Open ˚C		130*8
		Close ˚C		79*15
Run capacitor		μF		1.5
		VAC		480
Flap Motor and Louver Motor				
Type				Stepping motor
Model				MP24GA2...2
Rating				DC 12V
Coil resistance (Ambient temp. 20˚C)		Ω		Each terminal (1-2, 1-3, 1-4, 1-5): 400*7%
Heat Exchanger Coil				
Coil				Aluminum plate fin/Copper tube
Rows				2
Fin pitch		mm		1.3
Face area		m^2		0.214

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **SAP-KRV243GJ**

Control PCB			
Part No.			POW-KMRV243GJ
Controls			Microprocessor
Control circuit fuse			2.50V 3.15A

Remote Control Unit	RCS-3MVPS4E

Fan & Fan Motor				
Type Fan/Fan motor				Cross-flow /AC motor
Q'ty...Dia. and length			mm	1... D100
Fan motor model...Q'ty				KFG4X-31B6P-S...1
No. of poles...rpm (220V, High)				4...1269
Nominal output			W	30
Coil resistance (Ambient temp. 20˚C)			Ω	BRN-WHT: 161.2 ORG-YEL: 26.9 WHT-VLT : 11.6 YEL-BLK : 22.8 VLT-ORG : 68.7 BLK-PNK : 115.2
Safety devices	Type			Thermal protector
	Operating temp.	Open	˚C	130*8
		Close	˚C	79*15
Run capacitor			μF	1.5
			VAC	480

Flap Motor and Louver Motor		
Type		Stepping motor
Model		MP24GA2...2
Rating		DC 12V
Coil resistance (Ambient temp. 20˚C)	Ω	Each terminal (1-2, 1-3, 1-4, 1-5): 400*7%

Heat Exchanger Coil		
Coil		Aluminum plate fin/Copper tube
Rows		2
Fin pitch	mm	1.3
Face area	m^2	0.214

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Indoor Unit **SAP-KRV303GJH**

Control PCB			
Part No.			POW-KMRV243GJ
Controls			Microprocessor
Control circuit fuse			2.50V 3.15A

Remote Control Unit	RCS-3MVHPS4E

Fan & Fan Motor				
Type Fan/Fan motor				Cross-flow /AC motor
Q'ty...Dia. and length			mm	1... D100
Fan motor model...Q'ty				KFG4X-31B6P-S...1
No. of poles...rpm (220V, High)				4...1269
Nominal output			W	30
Coil resistance (Ambient temp. 20˚C)			Ω	BRN-WHT: 161.2 ORG-YEL: 26.9 WHT-VLT : 11.6 YEL-BLK : 22.8 VLT-ORG : 68.7 BLK-PNK : 115.2
Safety devices	Type			Thermal protector
	Operating temp.	Open	˚C	130*8
		Close	˚C	79*15
Run capacitor			μF	1.5
			VAC	480

Flap Motor and Louver Motor		
Type		Stepping motor
Model		MP24GA2...2
Rating		DC 12V
Coil resistance (Ambient temp. 20˚C)	Ω	Each terminal (1-2, 1-3, 1-4, 1-5): 400*7%

Heat Exchanger Coil		
Coil		Aluminum plate fin/Copper tube
Rows		2
Fin pitch	mm	1.3
Face area	m^2	0.214

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Indoor Unit **SAP-KRV303GJ**

Control PCB			
Part No.			POW-KMRV243GJ
Controls			Microprocessor
Control circuit fuse			2.50V 3.15A

Remote Control Unit	RCS-3MVPS4E

Fan & Fan Motor				
Type Fan/Fan motor				Cross-flow /AC motor
Q'ty...Dia. and length			mm	1... D100
Fan motor model...Q'ty				KFG4X-31B6P-S...1
No. of poles...rpm (220V, High)				4...1269
Nominal output			W	30
Coil resistance (Ambient temp. 20˚C)			Ω	BRN-WHT: 161.2 ORG-YEL: 26.9 WHT-VLT : 11.6 YEL-BLK : 22.8 VLT-ORG : 68.7 BLK-PNK : 115.2
Safety devices	Type			Thermal protector
	Operating temp.	Open	˚C	130*8
		Close	˚C	79*15
Run capacitor			μF	1.5
			VAC	480

Flap Motor and Louver Motor		
Type		Stepping motor
Model		MP24GA2...2
Rating		DC 12V
Coil resistance (Ambient temp. 20˚C)	Ω	Each terminal (1-2, 1-3, 1-4, 1-5): 400*7%

Heat Exchanger Coil		
Coil		Aluminum plate fin/Copper tube
Rows		2
Fin pitch	mm	1.3
Face area	m^2	0.214

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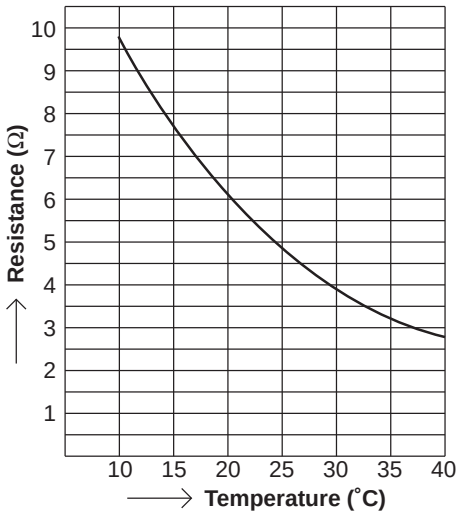
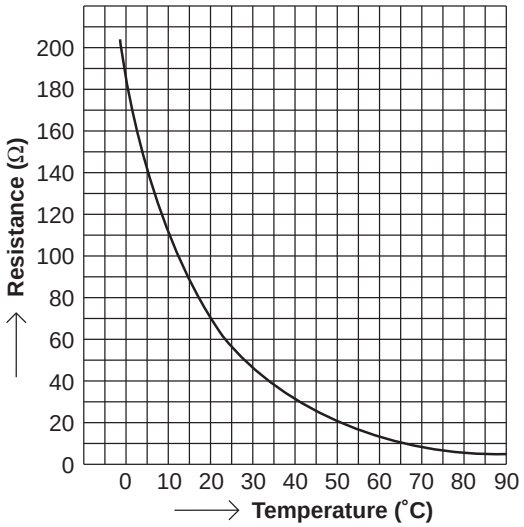
2-3. Other Component Specifications

Indoor Unit **SAP-KRV243GJH**
SAP-KRV243GJ
SAP-KRV303GJH
SAP-KRV303GJ

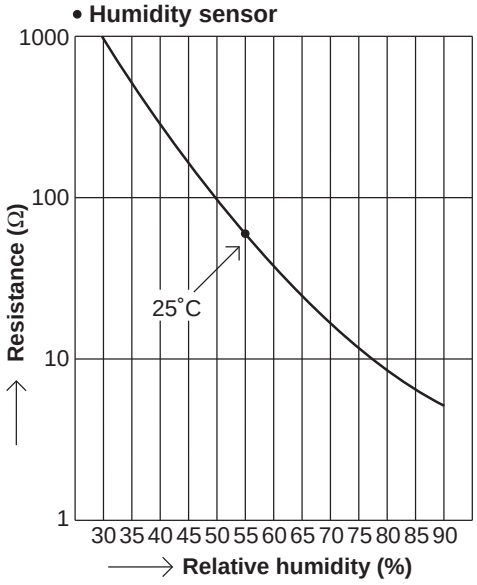
• **Indoor air temp sensor**



• **Indoor heat exchanger sensor**

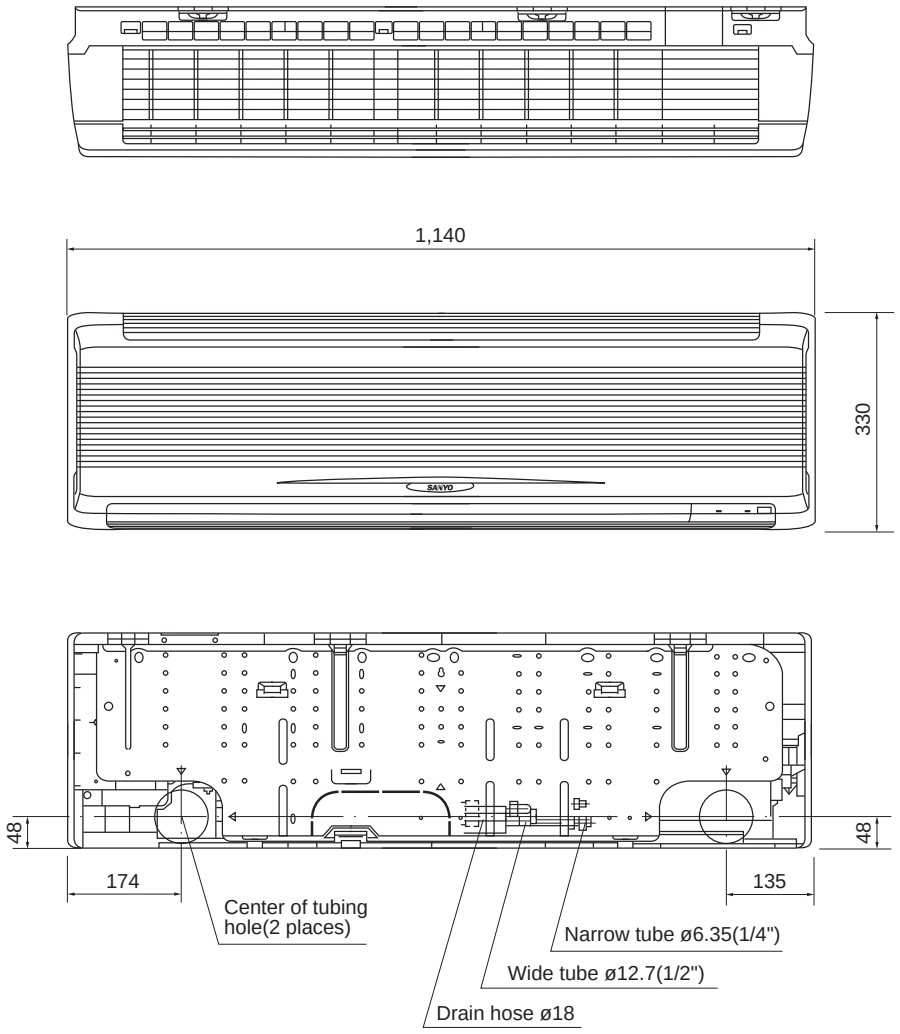


• **Humidity sensor**

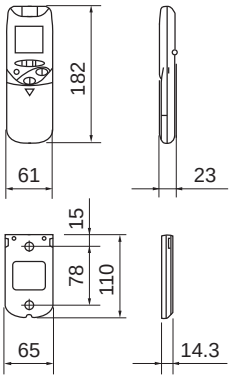


3. DIMENSIONAL DATA

Indoor Unit **SAP-KRV243GJH**

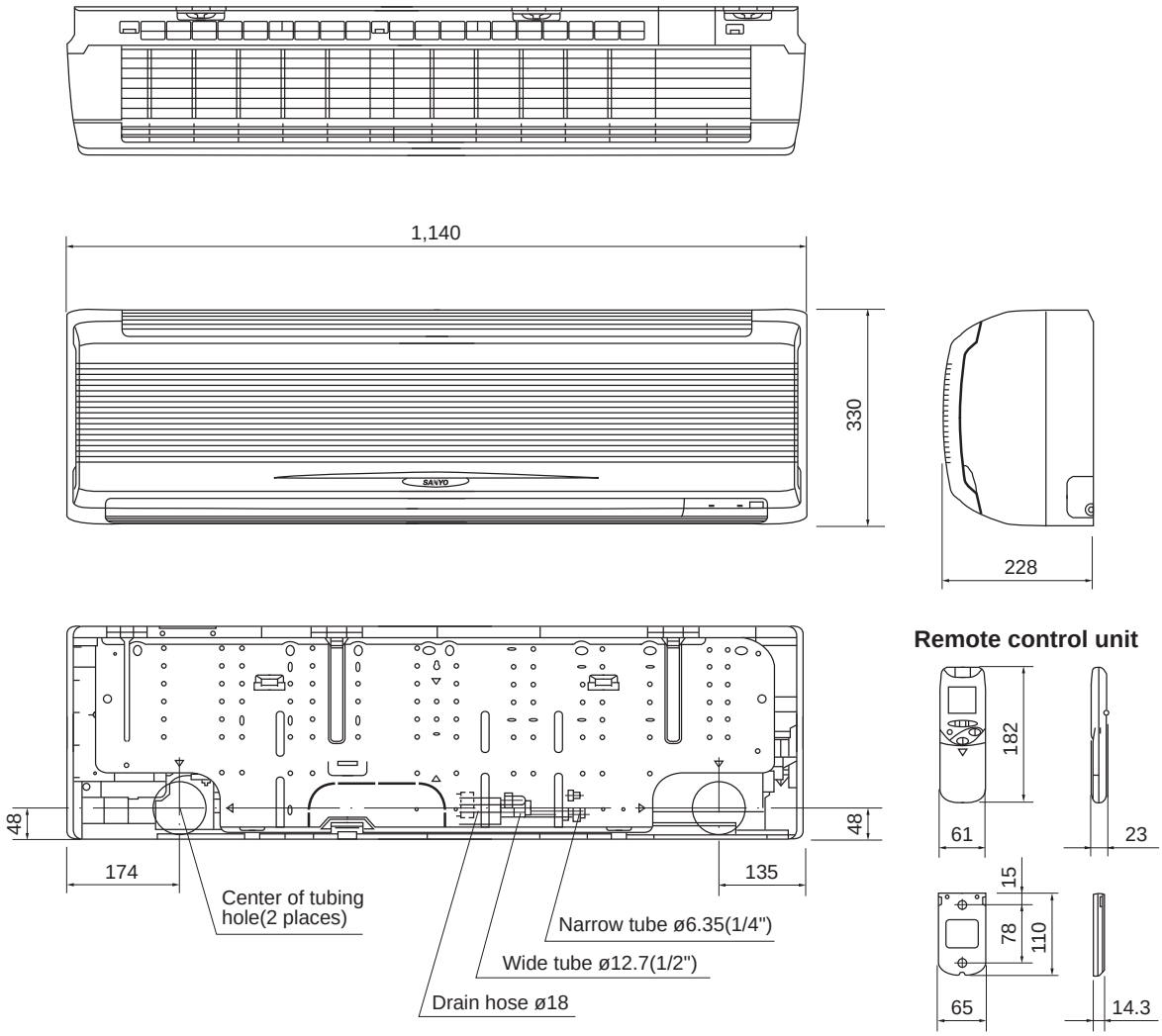


Remote control unit



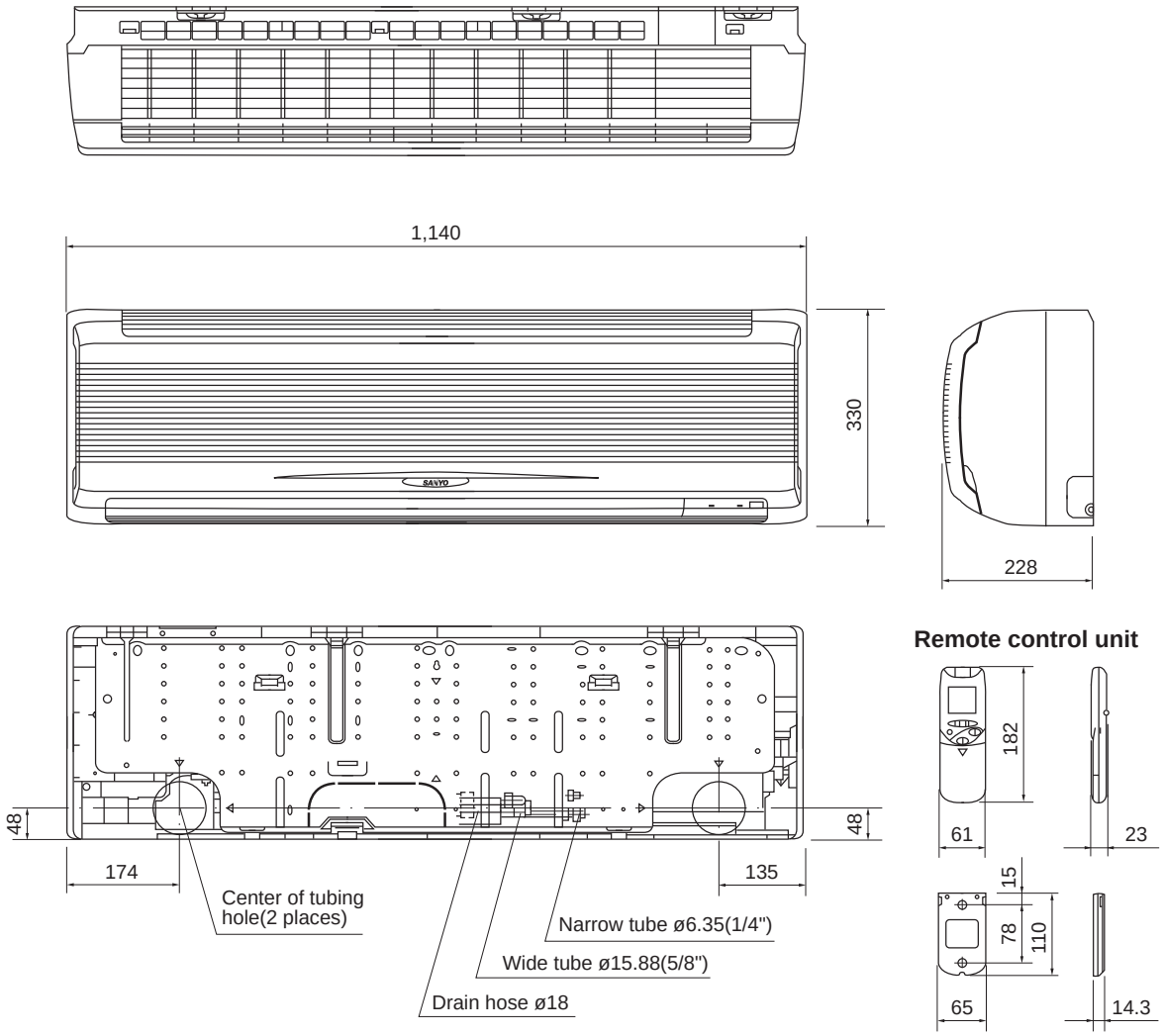
unit: mm

Indoor Unit **SAP-KRV243GJ**



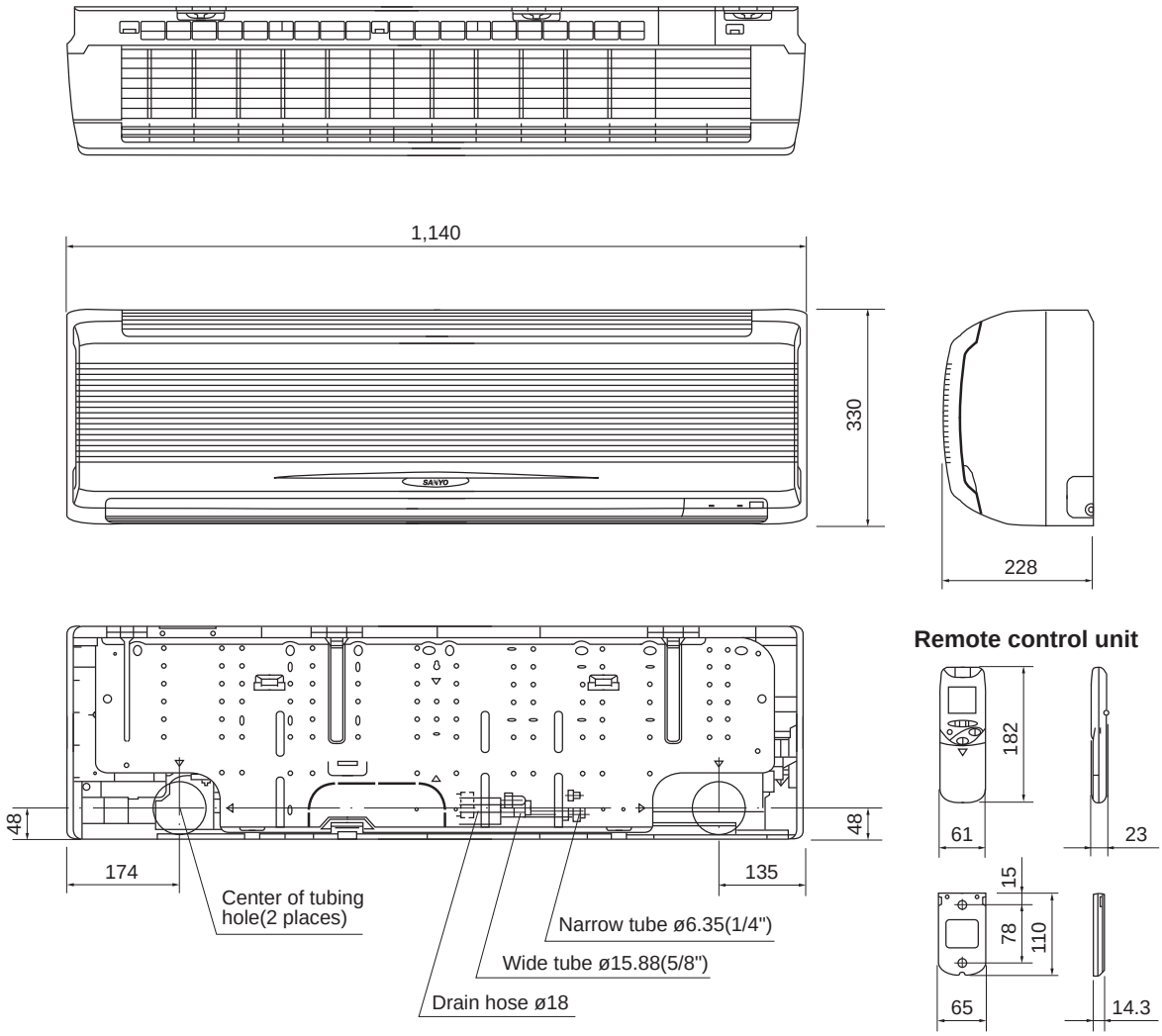
unit: mm

Indoor Unit **SPA-KRV303GJH**



Remote control unit

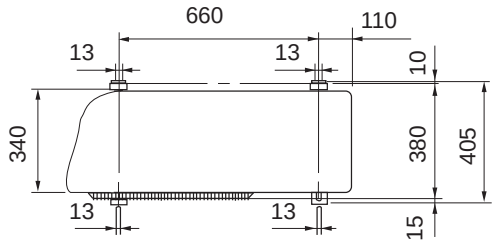
unit: mm

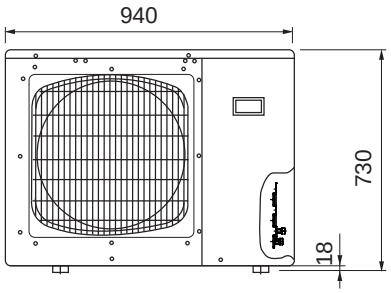


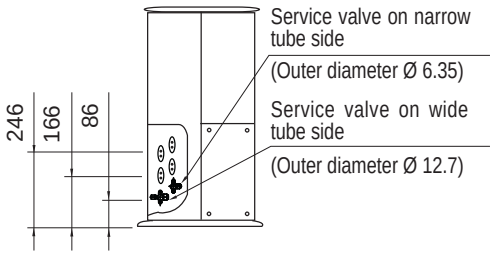
unit: mm

Outer Dimensions of Outdoor Unit

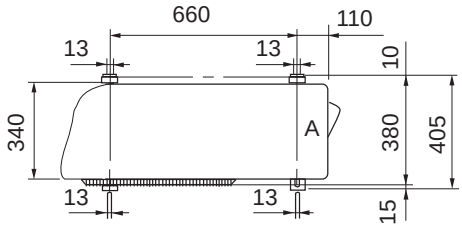
CRV243GJ/GJH

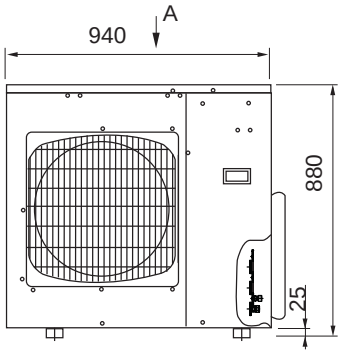


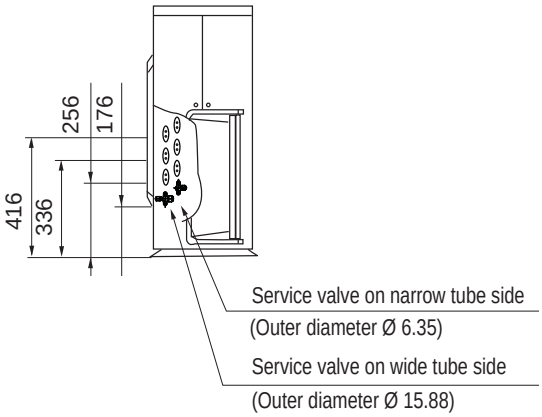




CRV303GJ/GJH

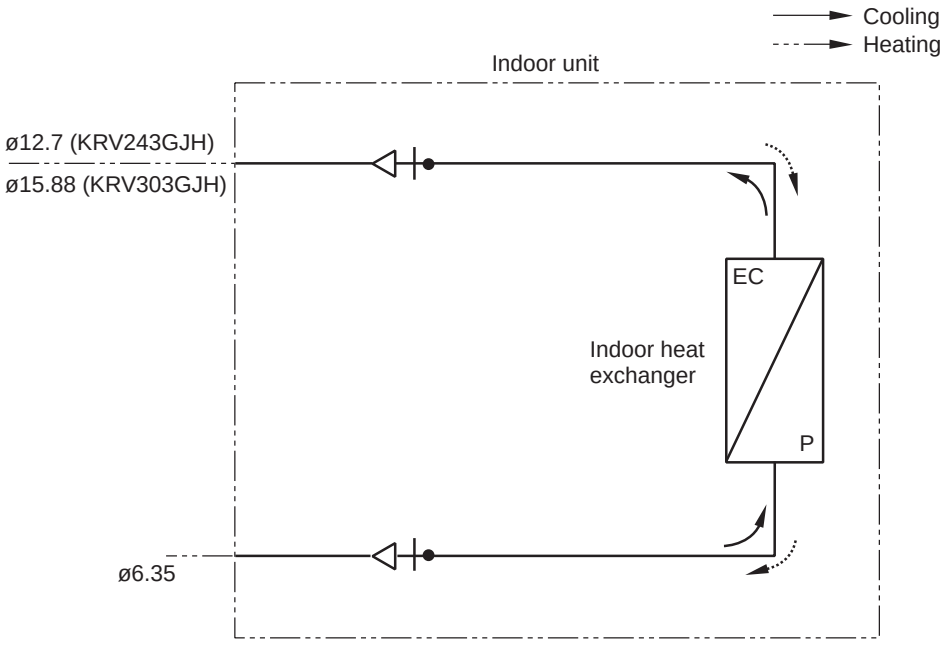




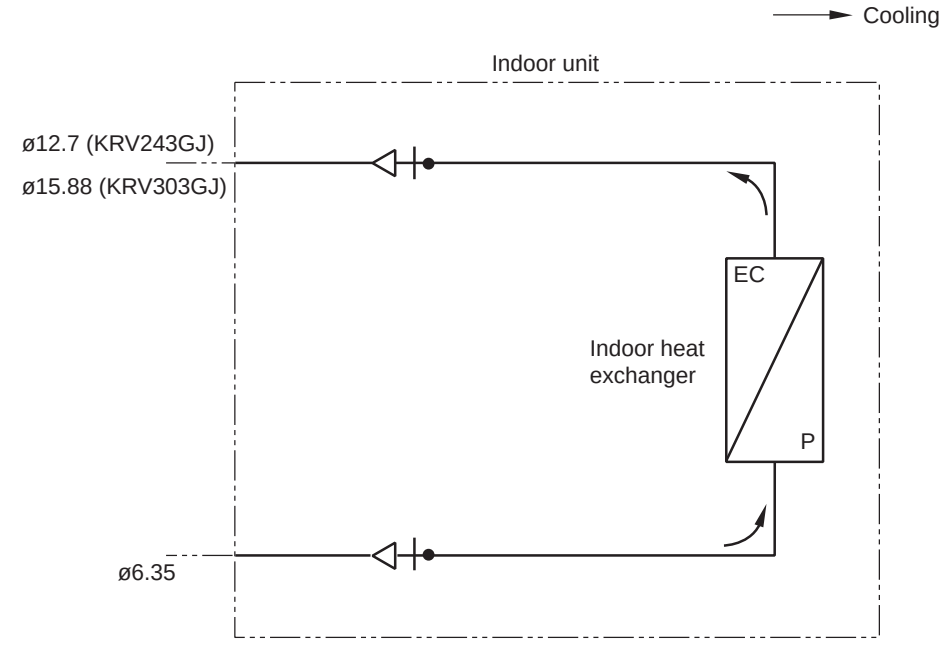


4. REFRIGERANT FLOW DIAGRAM

Indoor Unit **SAP-KRV243GJH**
SAP-KRV303GJH



Indoor Unit **SAP-KRV243GJ**
SAP-KRV303GJ



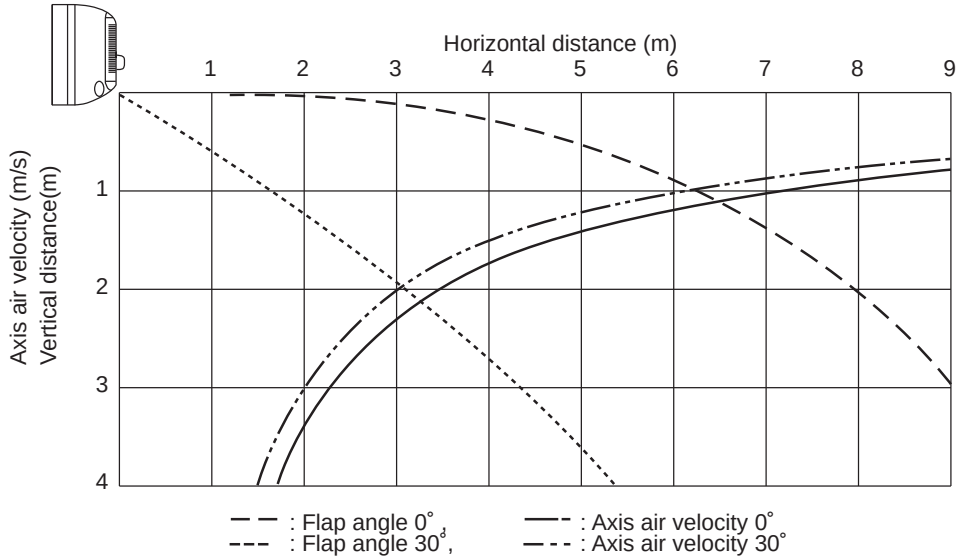
5. PERFORMANCE DATA

5-1. Air Throw Distance Chart

Indoor Unit **SAP-KRV243GJH**

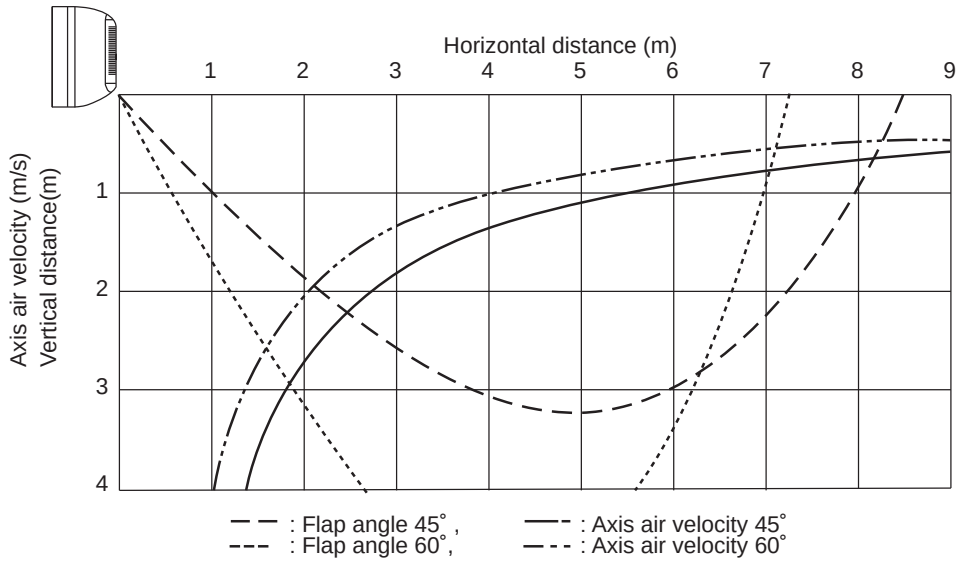
Cooling

Room air temp. : 27˚C
Fan speed : High



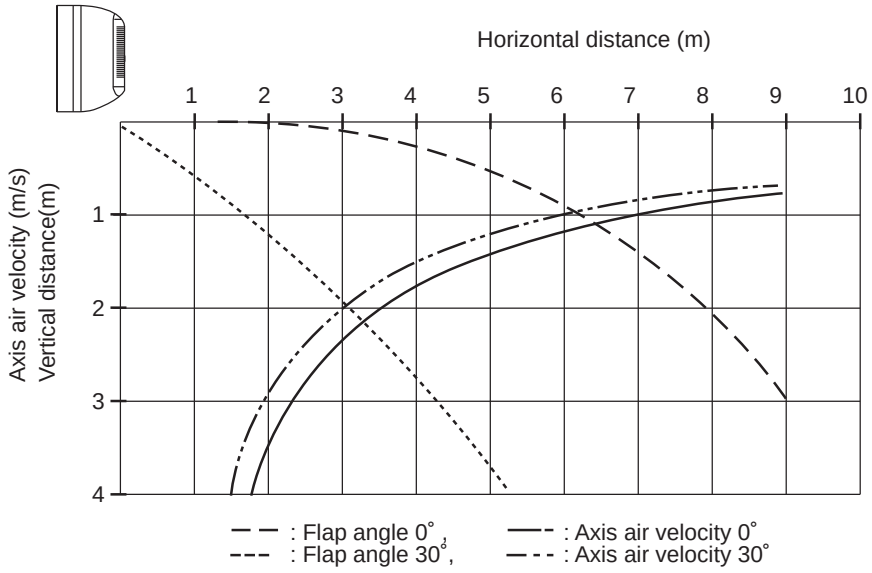
Heating

Room air temp. : 20˚C
Fan speed : High



Indoor Unit **SAP-KRV243GJ**

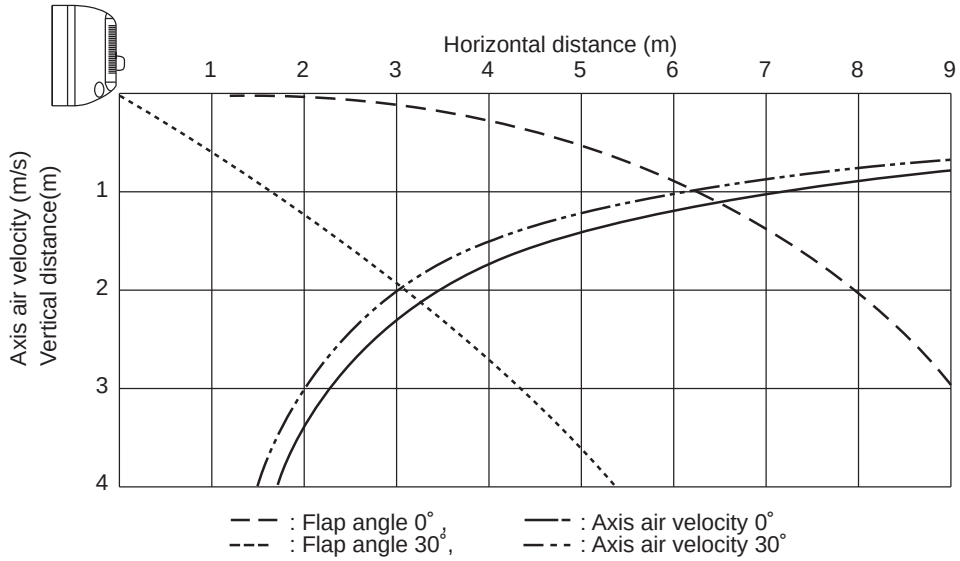
Room air temp. : 27˚C
Fan speed : High



Indoor Unit **SAP-KRV303GJH**

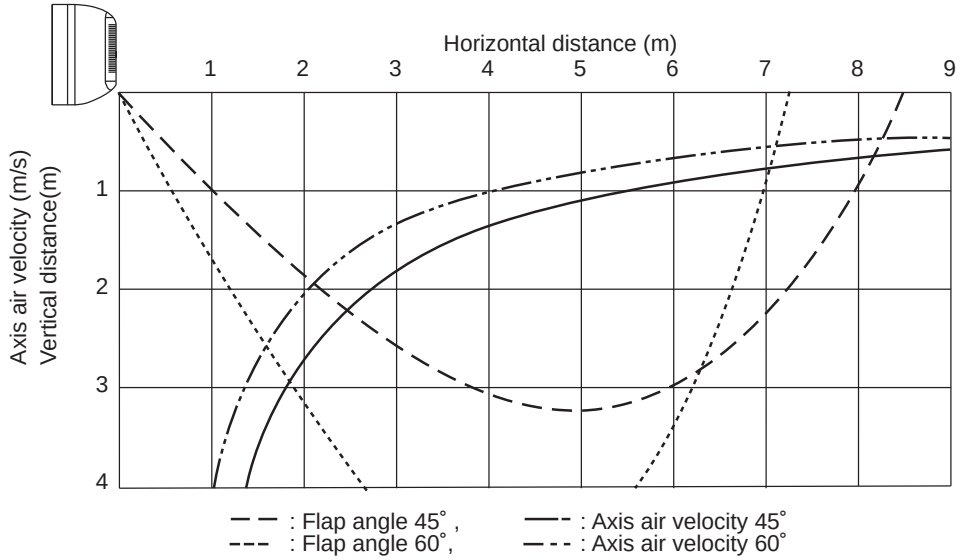
Cooling

Room air temp. : 27˚C
Fan speed : High



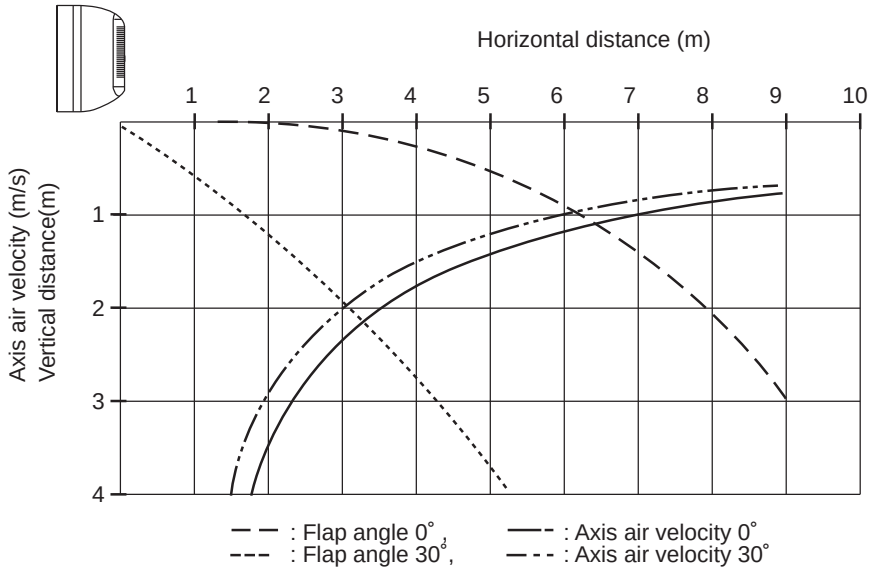
Heating

Room air temp. : 20˚C
Fan speed : High



Indoor Unit **SAP-KRV303GJ**

Room air temp. : 27˚C
Fan speed : High

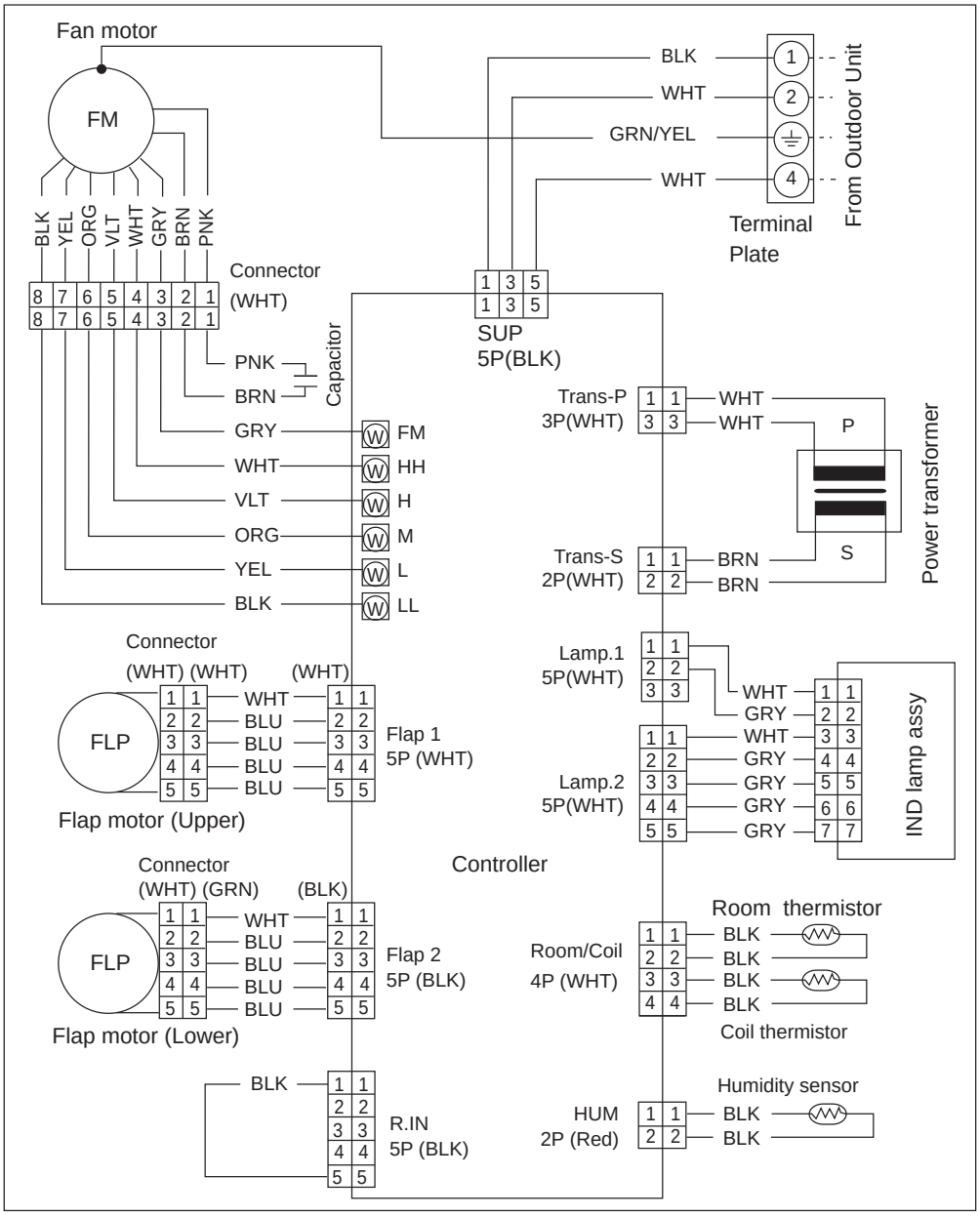


6. ELECTRICAL DATA

6-1. Electrical Characteristics

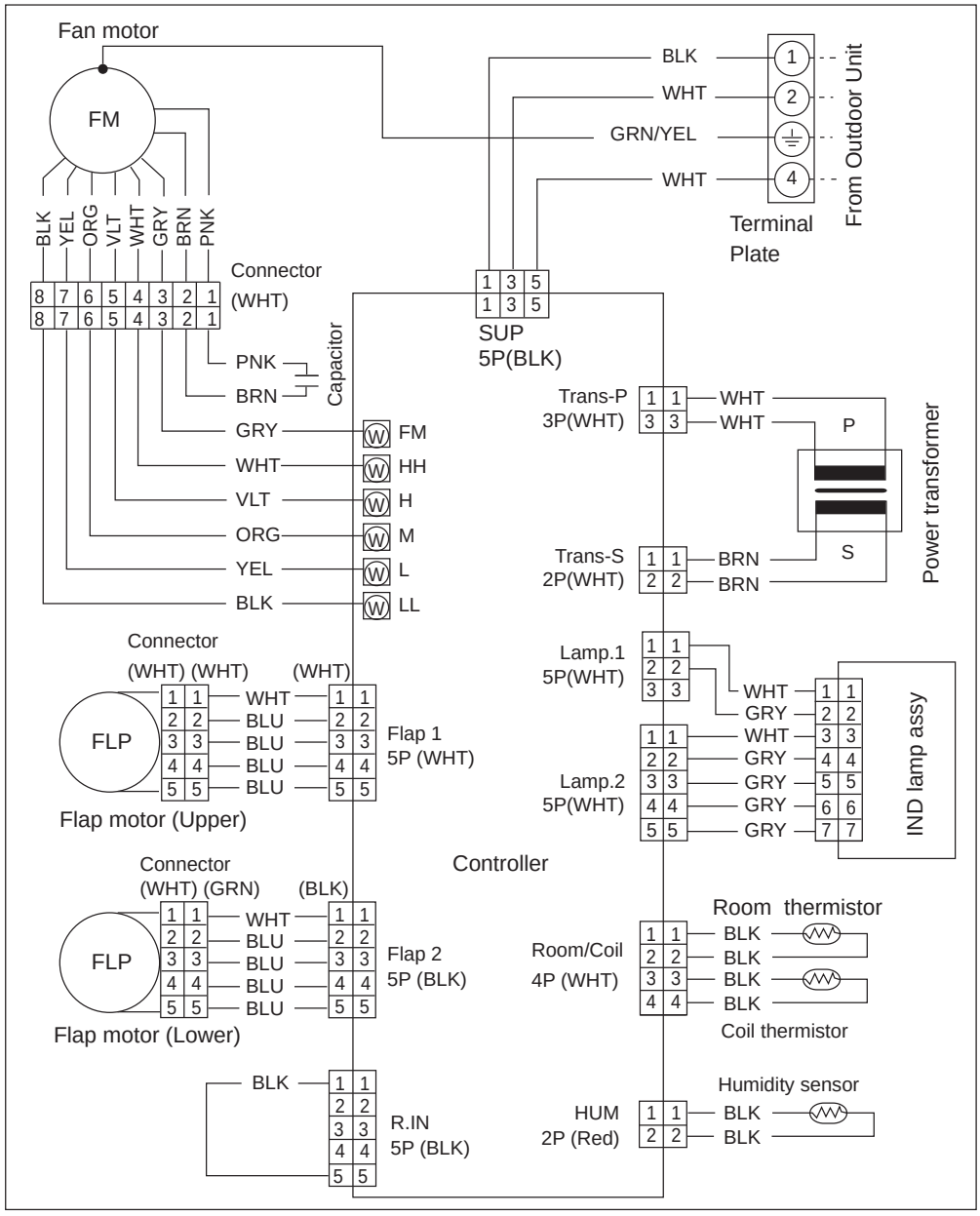
Indoor Unit **SAP-KRV243GJH**

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing andlor cleaning any electrical parts.***



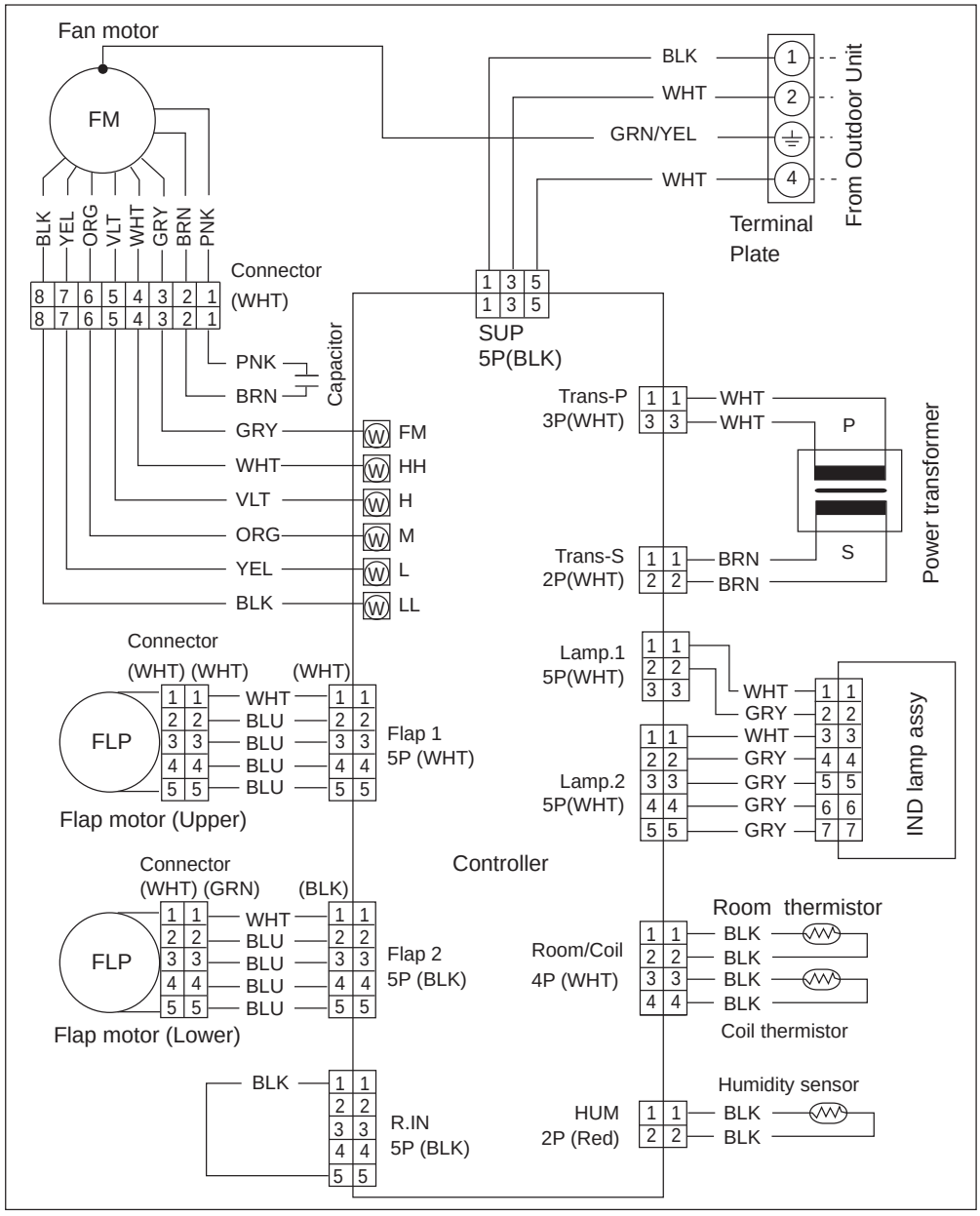
Indoor Unit **SAP-KRV243GJ**

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing andlor cleaning any electrical parts.***

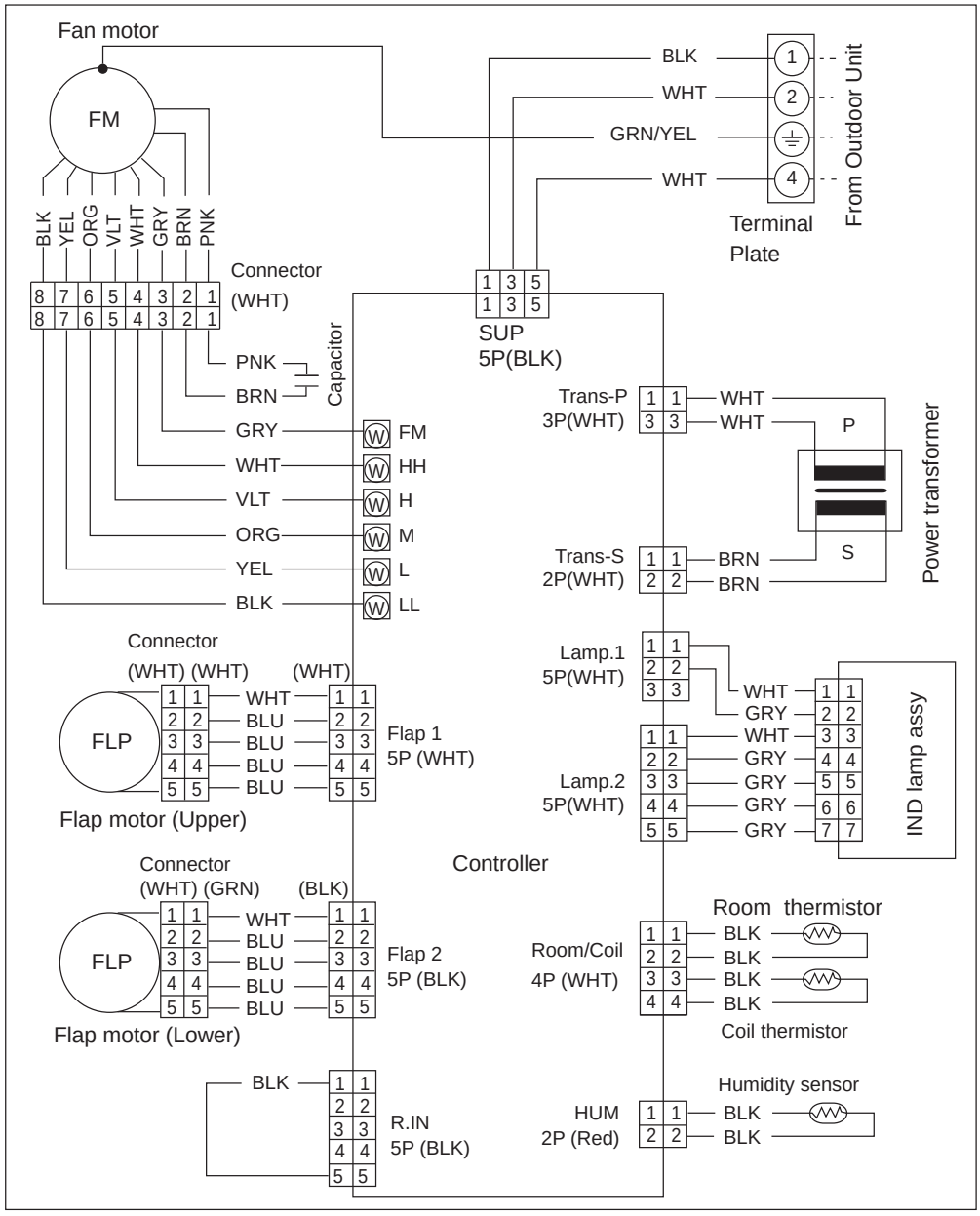


Indoor Unit **SAP-KRV303GJH**

WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing andlor cleaning any electrical parts.***



WARNING ***To avoid electrical shock hazard, be sure to disconnect power before checking, servicing andlor cleaning any electrical parts.***



7. INSTALLATION INSTRUCTIONS

7-1-1. Tools Required for Installation (not supplied)

1. Standard screwdriver
2. Phillips head screwdriver
3. Knife or wire stripper
4. Tape measure
5. Carpenter 's level
6. Sabre saw or key hole saw
7. Hacksaw
8. Core bits
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)
16. Vacuum pump (For R410A)
17. Manifold valve

7-1-2. Optional Copper Tubing Kit

Copper tubing for connecting the outdoor unit to the indoor unit is available in kits which contain the narrow and wide tubing, fittings and insulation. Consult your nearest sales outlet or A/C workshop.

7-1-3. Type of Copper Tube and Insulation Material

If you wish to purchase these materials separately from a local source, you will need:

(1) Deoxidized annealed copper tube for refrigerant tubing as detailed in Table 1.
Cut each tube to the appropriate lengths +30 cm to 40 cm to dampen vibration between units.

Table 1

Model	Narrow Tube		Wide Tube	
	Outer Dia.	Thickness	Outer Dia.	Thickness
SAP-KRV243	6.35 mm	0.8 mm	12.7 mm	1.0 mm
SAP-KRV303	6.35 mm	0.8 mm	15.88 mm	1.0 mm

(2) Foamed polyethylene insulation for the specified copper tubes as required to precise length of tubing. Wall thickness of the insulation should be not less than 8 mm.

(3) Use insulated copper wire for field wiring.
Wire size varies with the total length of wiring.
Refer to 7-5. Wiring Instructions for details.

CAUTION

Check local electrical codes and regulations before obtaining wire. Also, check any specified instructions or limitations.

7-1-4. Additional Materials Required for Installation

(1) Refrigeration (armored) tape
(2) Insulated staples or clamps for connecting wire (See local codes)
(3) Putty
(4) Refrigeration lubricant
(5) Clamps or saddles to secure refrigerant tubing

7-2. Installation Site Selection

7-2-1. Indoor Unit

WARNING

To prevent abnormal heat generation and the possibility of fire, do not place obstacles, enclosures and grilles in front of or surrounding the air conditioner in a way that may block air flow.

AVOID:

- direct sunlight.
- nearby heat sources that may affect performance of the unit.
- areas where leakage of flammable gas may be expected.
- places where large amounts of oil mist exist.

DO:

- select an appropriate position from which every corner of the room can be uniformly cooled. (High on a wall is best)
- select a location that will hold the weight of the unit.
- select a location where tubing and drain hose have the shortest run to the outside. (Fig 1a)
- allow room for operation and maintenance as well as unrestricted air flow around the unit. (Fig 1b)
- install the inter-unit cable more than 1 meter away from any antenna or power lines or connecting wires used for television, radio, telephone, security system, or intercom. Electrical noise from any of these sources may affect operation.
- install the unit within the maximum elevation difference (H1, H2) above or below the outdoor unit and within the maximum allowable tubing length from the outdoor unit to the door unit as detailed in table2 and Fig2a and Fig2b.

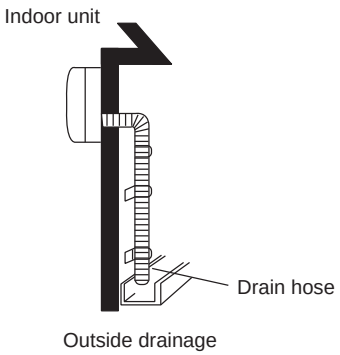


Fig. 1a

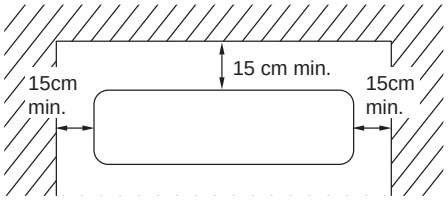


Fig. 1b

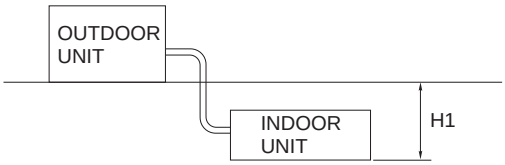


Fig. 2a

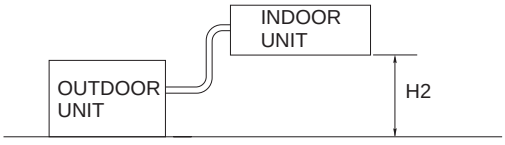


Fig. 2b

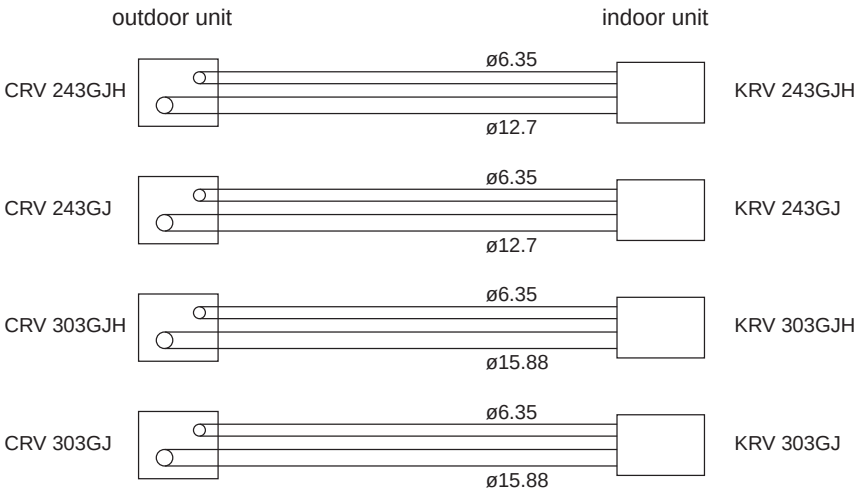
Table 2

Model	Max. Allowable Tubing Length (m)	Limit of Elevation Difference (H1, H2) (m)
243	30	7.5
303	30	7.5

NOTE

This outdoor unit requires no refrigerant charge up to the maximum limit for the maximum allowable tubing length of 7.5m (243, 303). Therefore, the refrigerant needs to be added on-site.

7-2. Connecting indoor unit and outdoor unit



7-2-2. Outdoor Unit

AVOID:

- heat sources, exhaust fans, etc. (Fig. 4)
- damp, humid or uneven locations.

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated.
- allow enough room around the unit for air intake/
- exhaust and possible maintenance. (Fig. 5a)
- provide a solid base (level concrete pad, concrete block, 15*40 cm beams or equal), a minimum of 15 cm above ground level to reduce humidity and protect the unit against possible water damage and decreased service life. (Fig. 5a)
- install cushion rubber under unit's feet to reduce vibration and noise. (Fig. 5b)
- use lug bolts or equal to bolt down unit, reducing vibration and noise.
- select a location where the operating noise and air blowing from the outdoor unit will not disturb neighbors.
- select a location where the clearance indicated by ⇔ in the installation diagram is ensured for the front, rear, left, and right of the main unit.
- install so that the unit is level.
  select a location that can fully support the weight of the outdoor unit, and that will not magnify operating noise or vibration.
  (Fasten in place with the anchor bolts (M10).)
- provide a base using concrete or similar material, and ensure proper drainage.
- select a location where there is no danger of flammable gas leakage.
- in snowy or rainy regions, be sure to construct a roof to keep off the snow and rain, and inhibit freezing and condensation.
- select a location that is at least 3 meters away from any antennas used for television, radio transceiver, or other equipment.
- for purposes of future service and repair, select a location where the inspection panel can be removed.
- select a location where the drain port will not be obstructed.

Install the inter-unit cable more than 1 meter away from any antenna or power lines or connecting wires used for television, radio, telephone, security system, or intercom. Electrical noise from any of these sources may affect operation.

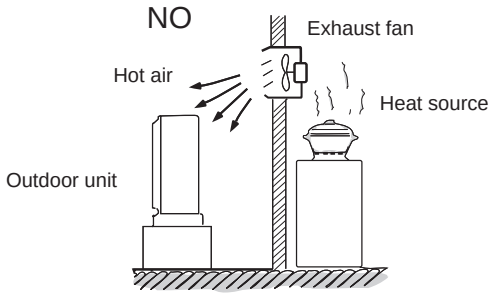
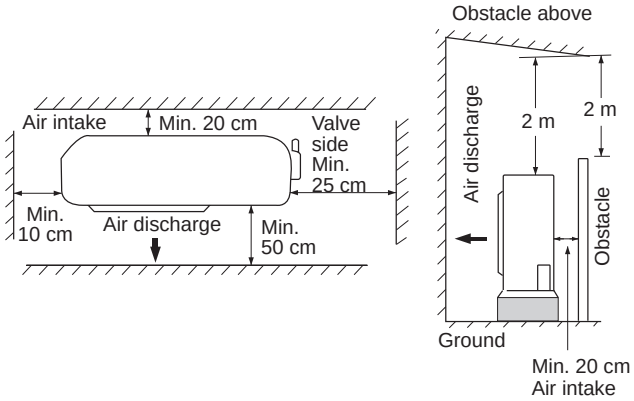


Fig. 4



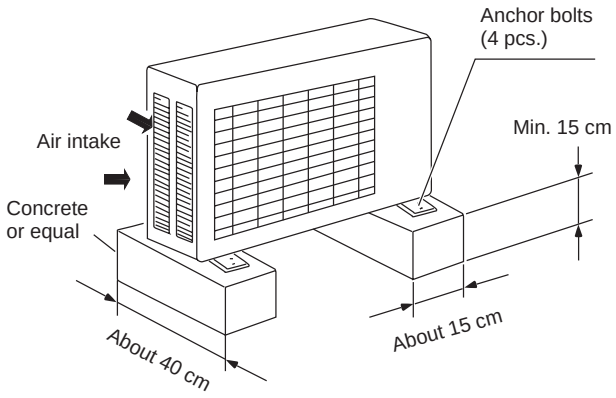


Fig. 5a

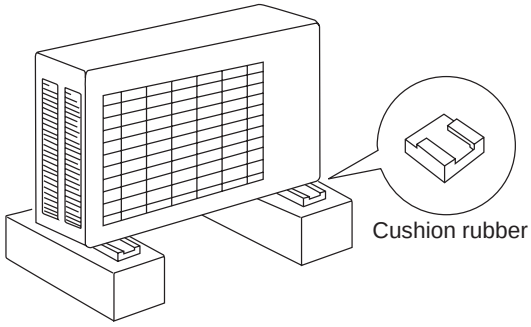


Fig. 5b

7-2-3. Diagram of Outdoor Unit Installation

CRV243

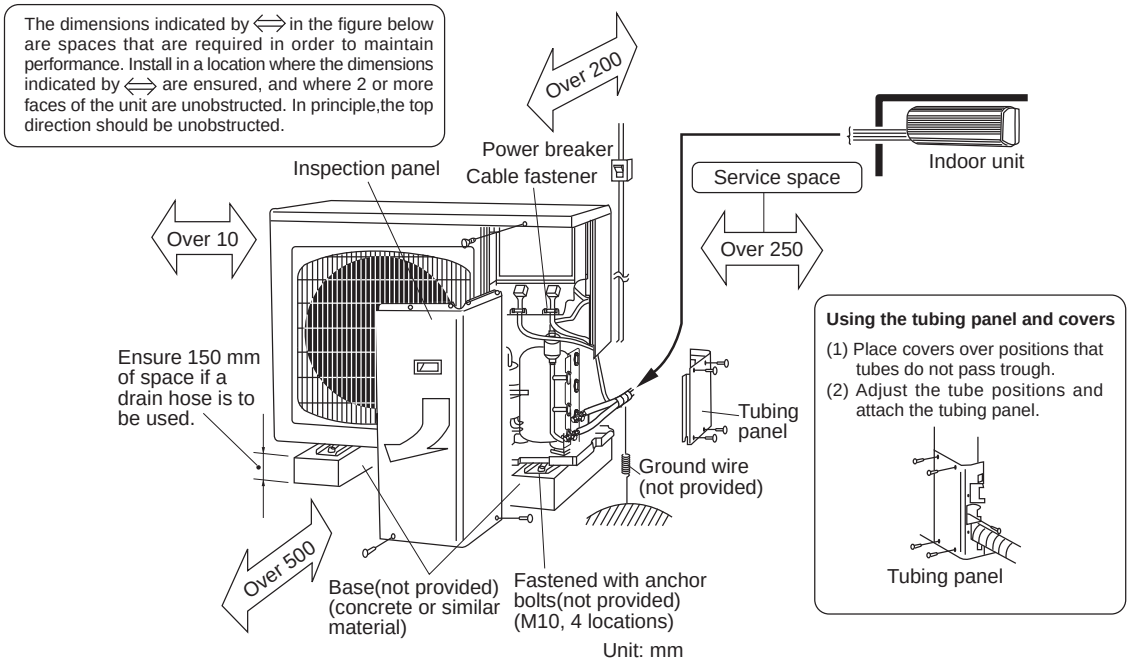


Fig. 7

CRV303

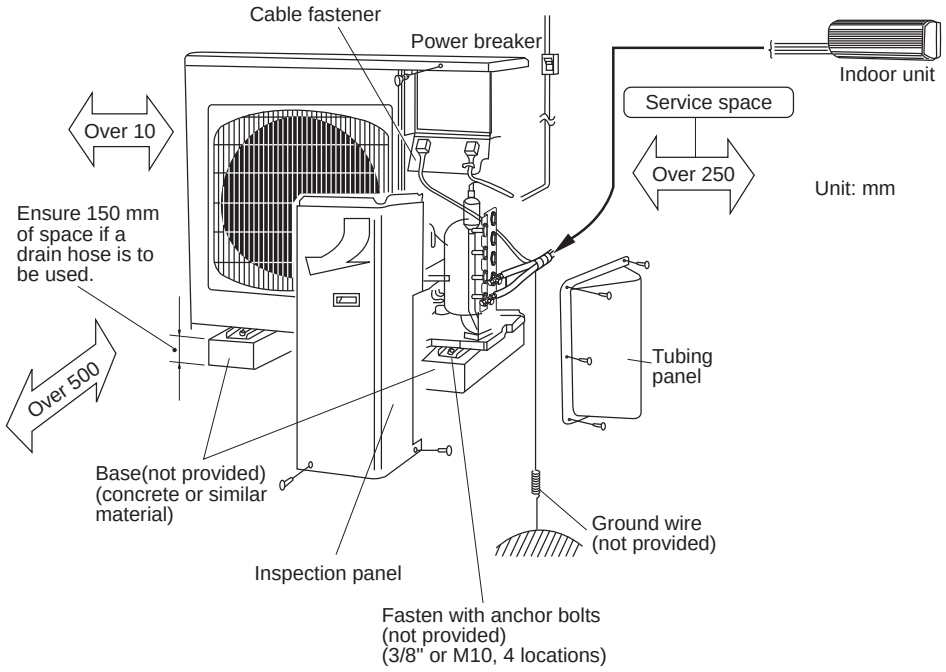


Fig. 7

7-3. Installation Process

7-3-1.Embedding the Tubing and Wiring

- Do not connect tubes to locations that are embedded.
- Be sure to bind refrigerant tubing and inter-unit cables together with vinyl tape.
- The power cable must be obtained on-site. (ø2.0: Less than 15 m /ø2.6: Less than 20 m / ø3.5: Less than 26 m)
- Be sure to apply the provided labels to both ends of the inter-unit cables to prevent miswiring.
- Securely seal the end of embedded tubing with vinyl tape in order to prevent dirt or moisture entry.
- In order to prevent insulation breakdown and ground faults, do not allow the wire ends to contact rainwater, or be subject to dew condensation.

7-3-2. Installing Outdoor Unit

(1) Select a location for installing the outdoor unit. (Refer to 7-2-2. Outdoor Unit.)
(2) The connection valves are stored inside the unit. Remove the inspection panel and remove the cable fasteners. (To remove the inspection panel, remove the 3 screws, then push the panel down and pull it toward you.) (Refer to 7-2-4. Diagram of Outdoor Unit Installation.)
(3) Remove the tubing panel in order to attach covers as needed, according to the number of indoor units. (Refer to 7-2-4. Diagram of Outdoor Unit Installation.)

Be sure to prepare special R410A-type tubes (wall thickness 0.8 mm except Ø12.7 tube. and ø15.88 tube for Ø 12.7 tube and ø15.88 tube, wall thickness should be 1.0 mm) as shown in the table at right.

Table 3

Model	Narrow Tube	Wide Tube
KRV243	Ø6.35 mm (1/4")	Ø12.7 mm (1/2")
KRV303	Ø6.35 mm (1/4")	Ø15.88 mm (5/8")

7-3-3. Use of the Flaring Method

Many conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.

7-3-4. Flaring Procedure with a Flare Tool

- For creating the flare, use the special R410A flare tool. The previous (R22) flare tool may also be used. (Fig. 10)

(1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut approx. 30- 50 cm longer than the tubing length you estimate.
(2) Remove burrs at the end of the copper tube with a tube reamer or file. This process is important and should be done carefully to make a good flare. (Fig. 8)

Deburring

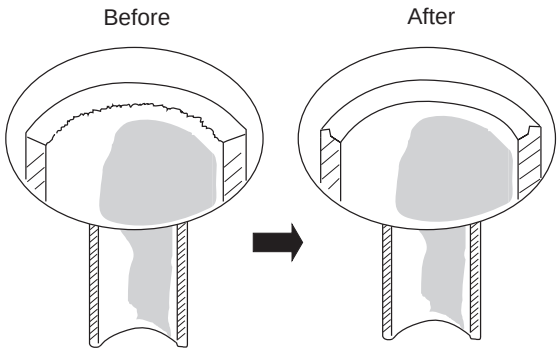


Fig. 8

NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. (Fig. 9)

(3) Remove the flare nut from the unit and be sure to mount it on the copper tube.

(4) Make a flare at the end of copper tube with a flare tool.*(Fig. 11)

(*Use“RIGID” or equivalent.)

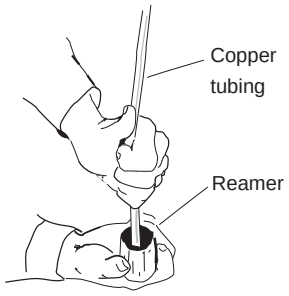


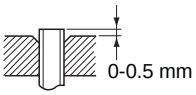
Fig. 9

NOTE

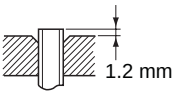
A good flare should have the following characteristics:

- inside surface is glossy and smooth.
- edge is smooth.
- tapered sides are of uniform length.

If the special R410A flare tool is used:



If the previous flare tool (clutch-type) is used:



Adjust so that the amount of tube protrusion is as shown in the figure.

Fig. 10

7-3-5. Caution before Connecting Tubes Tightly

a) Be sure to apply a sealing cap or water-proof tape to prevent dust or water from getting into the tubes before they are used.

b) Be sure to apply refrigerant lubricant to the matching surfaces of the flare and union before connecting them together. This is effective for reducing gas leaks. (Fig. 12)

c) For proper connection, align the union tube and flare tube straight with each other, then screw in the flare nut lightly at first to obtain a smooth match. (Fig. 13)

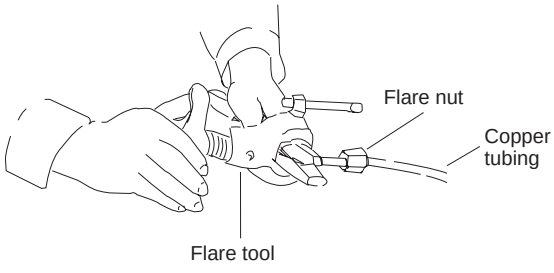


Fig. 11

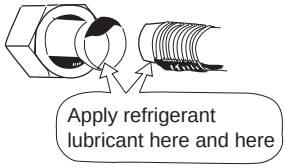


Fig. 12

7-3-6. Tubing Connections

a) Temporary connection:
Screw in 3- 5 rotations by hand. (Fig.14)

b) To fasten the flare nuts, apply specified torque as:

Table 4

Tube Dia.	Tightening Torque
6.35 mm	18 N·m (180kgf·cm)
12.7 mm	55 N·m (550kgf·cm)
15.88 mm	82 N·m (820kgf·cm)

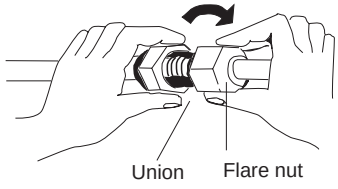


Fig. 13

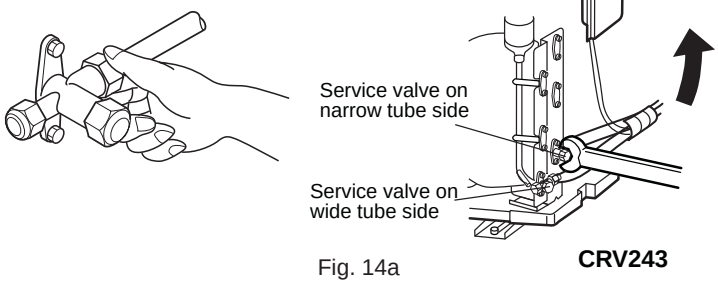


Fig. 14a

CRV243

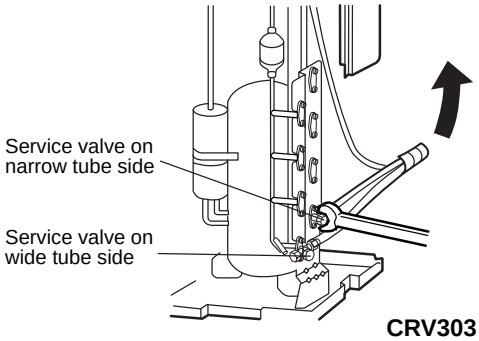


Fig. 14b

CRV303

CAUTION

Be sure to match refrigerant tubing and electric wiring between indoor and outdoor units. For more details, refer to "Tubing Check Control" in the Technical & Service Manual.

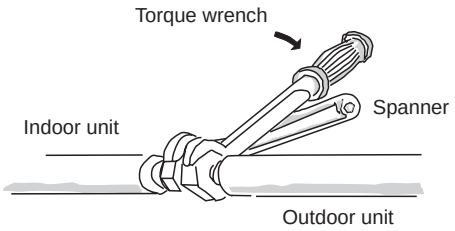


Fig. 15

7-3-7. Insulation of Refrigerant Tubing

IMPORTANT

To prevent heat loss and wet floors due to dripping of condensation, **both tubes must be well insulated with a proper insulation material.** The thickness of the insulation should be a minimum 8 mm. (Fig. 17)

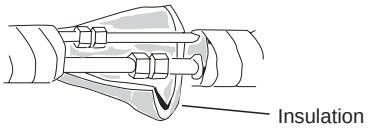


Fig. 16

CAUTION

After a tube has been insulated, never try to bend it into a narrow curve, as this may cause the tube to break or crack.

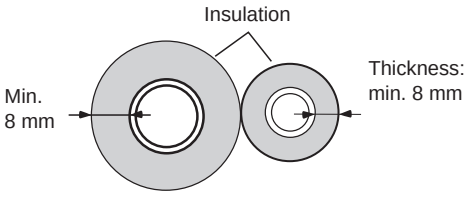


Fig. 17

7-3-8. Taping the Tubes

(1) At this time, the 2 refrigerant tubes (and electrical wire if local codes permit) should be taped together with armoring tape. The drain hose may also be included and taped together as 1 bundle with the tubing.
(2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall. As you wrap the tubing, overlap half of each previous tape turn. (Fig. 18a)
(3) Clamp the tubing bundle to the wall, using 1 clamp approx. every 120 cm.

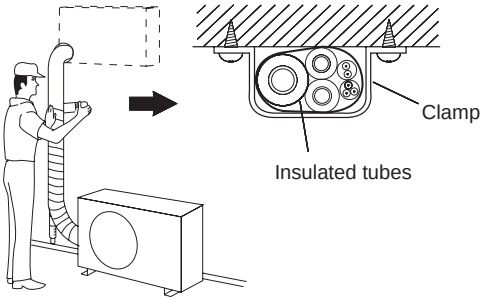


Fig. 18a

NOTE

Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also be sure the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

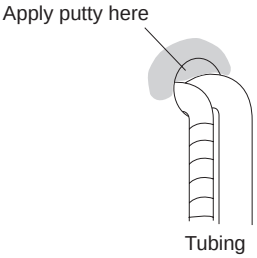


Fig. 18b

7-3-9. Finishing the Installation

After finishing insulating and taping over the tubing, use sealing putty to seal off the hole in the wall to prevent rain and draft from entering. (Fig. 18b)

7-3-10. Refrigerant Operation System

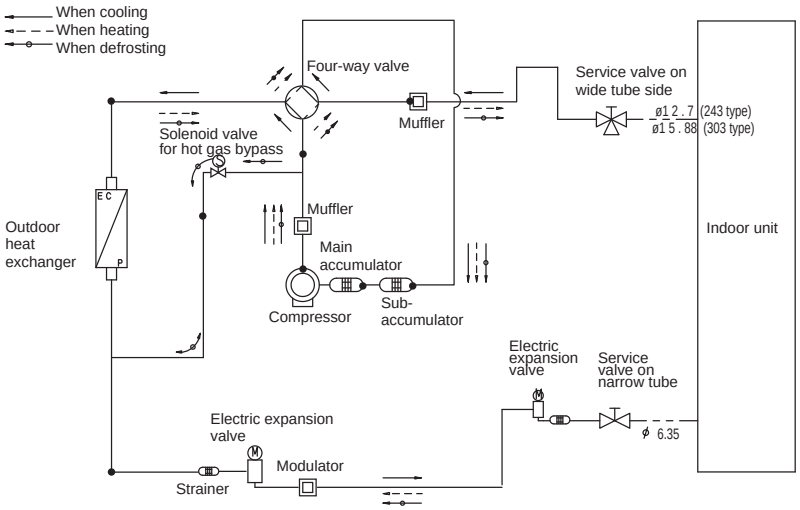
When the air conditioner is turned ON, the compressor starts to work. The compressor absorbs low-temperature and low-pressure refrigerant from the evaporator; the refrigerant is then compressed into high-temperature and high-pressure refrigerant gas and goes into the condenser (COMPRESSION). This high-temperature and high-pressure refrigerant gas is condensed into liquid refrigerant; during the CONDENSING process, heat is released to the outdoors through the condenser.

High-pressure and high-temperature liquid refrigerant goes into the capillary tube to reduce the pressure and to lower the temperature (PRESSURE REDUCTION). The low-pressure liquid refrigerant passed through the capillary tube is sent to the evaporator for evaporation. In this EVAPORATION process, heat in the room is absorbed. This cycle is repeated until the room temperature is lowered to the target level.

During the heating cycle, the direction of refrigerant flow is reversed by a 4-way valve. As a result, the condenser draws heat from the outdoor air and the evaporator supplies hot air to the room.

Refrigerant Tubing System Diagram

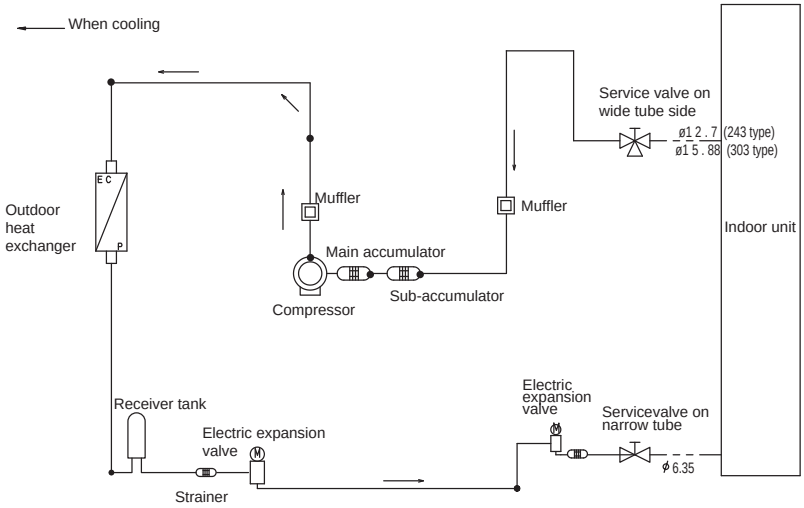
Unit: mm



KCRV243GJH
KCRV303GJH

Fig. 19a

Unit: mm



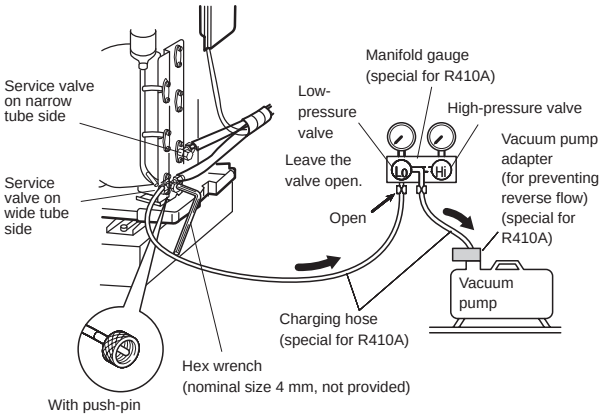
KCRV243GJ
KCRV303GJ

Fig. 19b

7-4. Air Purging

Air and moisture remaining in the refrigerant system have undesirable effects as indicated below. Therefore, they must be purged completely.

- pressure in the system rises
- operating current rises
- cooling efficiency drops
- moisture in the air may freeze and block capillary tubing
- water may lead to corrosion of parts in the refrigerant system

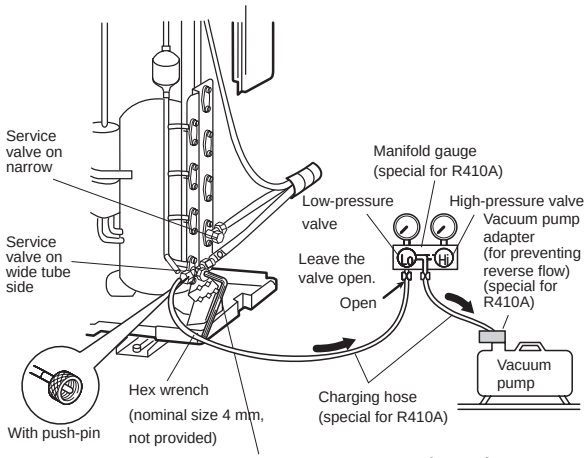


CRV243

Fig. 20a

■ Air Purging with a Vacuum Pump (for Test Run)

- In order to protect the earth's environment, be sure to use a vacuum pump to perform the air purge. (Never perform an air purge by using the refrigerant gas cylinder or other external gas, or by using the gas inside the outdoor unit.)



CRV303

Fig. 20b

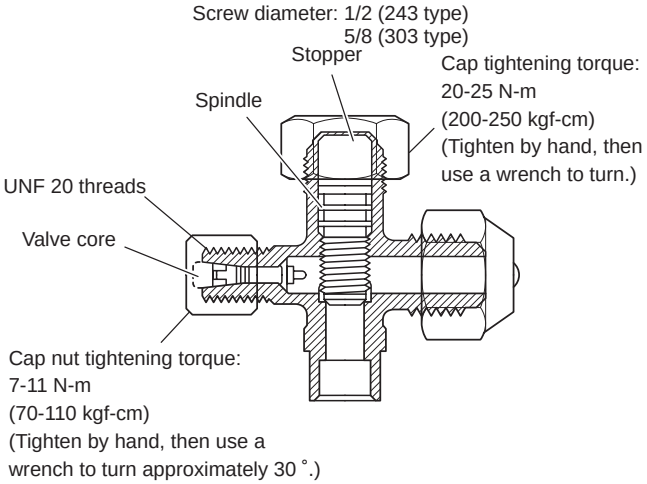
CAUTION

In order to prevent charging errors with A/C that uses R410A, the screw diameter at the service valve charging port has been changed. When recharging or performing other servicing, use the special charging hose and manifold gauge.

(1) Check that each tube (both narrow and wide tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Note that both narrow and wide tube service valves on the outdoor unit are kept closed at this stage.

(2) Using an adjustable wrench or box wrench, remove the valve caps from the service valve on both narrow and wide tubes.

(3) Connect a vacuum pump and a manifold valve (with pressure gauges) to the service port on the wide tube service valve. (Fig. 20).



<Structure of service valve on wide tube side>

Fig. 21

CAUTION

Before using the vacuum pump adapter, read the vacuum pump adapter manual, and use the adapter correctly.

CAUTION

Be sure to use a manifold valve for air purging. If it is not available, use a stop valve for this purpose. The "Hi" knob of the manifold valve must always be kept closed.

- When using a hex wrench to open the spindle, an extremely small amount of refrigerant may leak. This does not indicate a problem.
- Use a hex wrench of a type to which force can be easily applied.

(11) Replace the flare nut on the wide tube service port and fasten the flare nut securely with an adjustable wrench or box wrench. Next, mount the valve cap and tighten it with a torque wrench (the cap needs to be tightened with the torque of 200 kg-cm). This process is very important to prevent gas from leaking from the system.

(12) Test run the air conditioner . (See page 20.)

(13) While the air conditioner is running, apply liquid soap to check for any gas leaks around the service valves or caps.

(14) If there is no leakage, stop the air conditioner.

(15) Wipe off the soap on the tubing.
This completes air purging with a vacuum pump and the air conditioner is ready for actual operation.

■ Pump Down

In order to protect the earth's environment, be sure to perform pump-down to recover refrigerant gas without releasing it into the atmosphere.

- When relocating or disposing of the A/C, request this service from the dealer where the unit was purchased, or from an appropriate agent. Perform pump-down as described below.

What is pump-down?

- Pump-down refers to recovering the refrigerant gas from the refrigerant cycle at the outdoor unit. This work must be performed during cooling operation. The refrigerant gas cannot be recovered during heating operation.
- During winter, or if the temperature sensor prevents cooling operation, perform*forced cooling operation."

Pump-down procedure

(1) Fully close the spindles at the valves on the narrow tube side of tubes of the indoor unit.
(Refer to Fig. 23.)

(2) Connect the manifold gauge to the charging port at the valve on the wide tube side of the tube. Purge the air from the charging hose. (Refer to Fig. 24.)

Forced cooling operation

(The following explanation uses a wall-mounted unit as the example. Refer to each indoor unit's Installation Instruction for details)

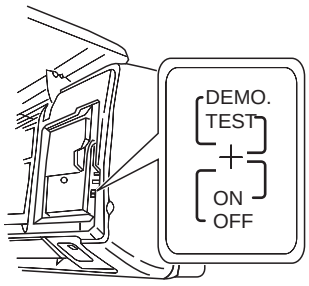


Fig. 22

1. Turn the operation knob to The ON position.
2. Use the remote control to start cooling operation.
3. Turn the operation knob from the ON position to the TEST RUN position.

* The operation knob differs to some degree depending on the model.

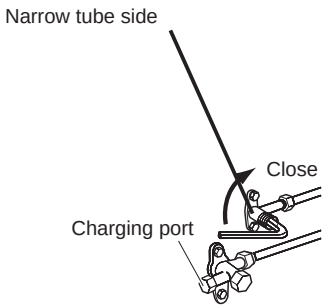


Fig. 23

(3) Perform cooling operation or forced cooling operation.
When the pressure at the low-pressure side is 0.15– 0.2 MPa (0.5– 1 kg/cm^{2}G), fully close the spindles at the valves on the wide tube of the indoor unit, and immediately stop operation. (Refer to Fig. 24.)
In the winter, the outdoor unit may stop after 5 - 10 minutes of operation. This is in order to protect the indoor unit heat exchanger from freezing and does not indicate a problem.

(4) Disconnect the manifold gauge and the inter-unit tubes, and attach the caps and flare nuts. At this point, pump-down is completed. (If the caps and flare nuts are not reattached, there is the danger of gas leakage.) (Refer to Fig. 25.)

If pump-down is not possible

If the A/C cannot be operated because of a malfunction or other cause, use a refrigerant recovery device to recover the refrigerant.

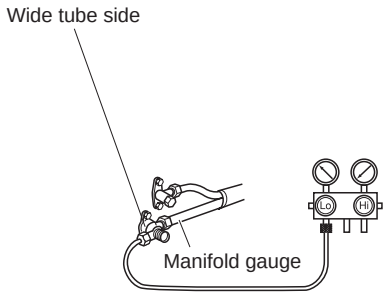


Fig. 24

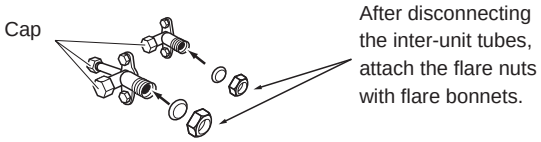


Fig. 25

7-5. Wiring Instructions

7-5-1. General Precautions on Wiring

(1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.

(2) Provide a power outlet to be used exclusively for each unit, with a power supply disconnect and circuit breaker for overcurrent protection provided in the exclusive line.

(3) To prevent possible hazard due to insulation failure, the unit must be grounded.

(4) Each wiring connection must be done tightly and in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.

(5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.

(6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.

7-5-2. Recommended Wire Length and Diameter

Regulations on wiring diameter differ from locality to locality. For field wiring requirements, please refer to your local electrical codes. Carefully observe these regulations when carrying out the installation.
Table 6 shows maximum wire lengths for control line and power line and fuse or circuit capacity.

NOTE

Refer to the wiring system diagram (Fig. 26) for the meaning of “A” and “B” in Table 6.

Table 6

Cross-sectional Area (mm^2) / Model	Max. Control Line Length (A)	Max. Power Line Length (B)			Fuse or Circuit Capacity
	1.0	2.0	2.6	3.5	
CRV243	34 m	15 m	20 m	26 m	20 A
CRV303	34 m	15 m	20 m	26 m	30 A

WARNING

Be sure to comply with local codes on running the wire from the indoor unit to the outdoor unit (size of wire and wiring method, etc.).
Each wire must be firmly connected.
No wire should be allowed to touch refrigerant tubing, the compressor, or any moving part.
Be sure to connect power wires correctly matching up nmubers on terminals of the outdoor unit.

WARNING

To avoid the risk of electric shock, each air conditioner unit must be grounded.

CAUTION

Be sure to connect the power supply line to the outdoor unit as shown in the wiring diagram. The indoor unit draws its power from the outdoor unit.

7-5-3. Wiring System Diagram

indoor unit with CRV243

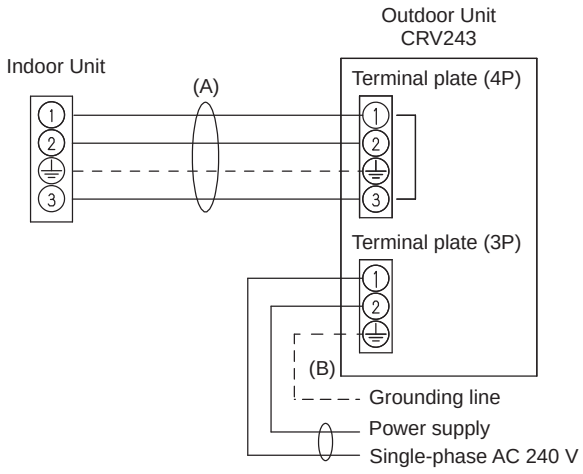


Fig. 26a

indoor unit with CRV303

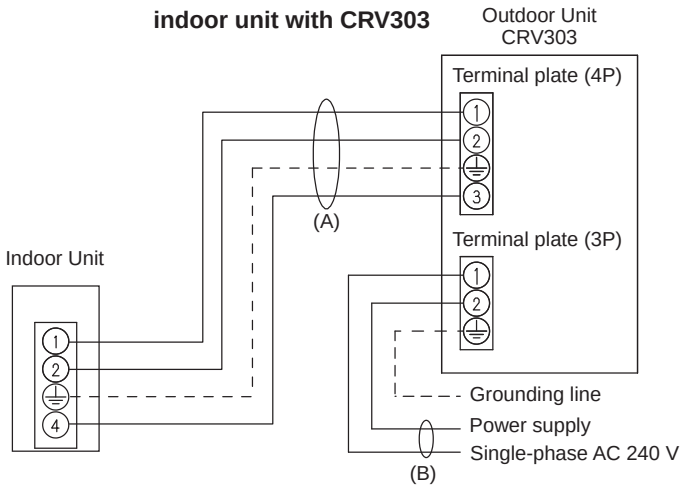
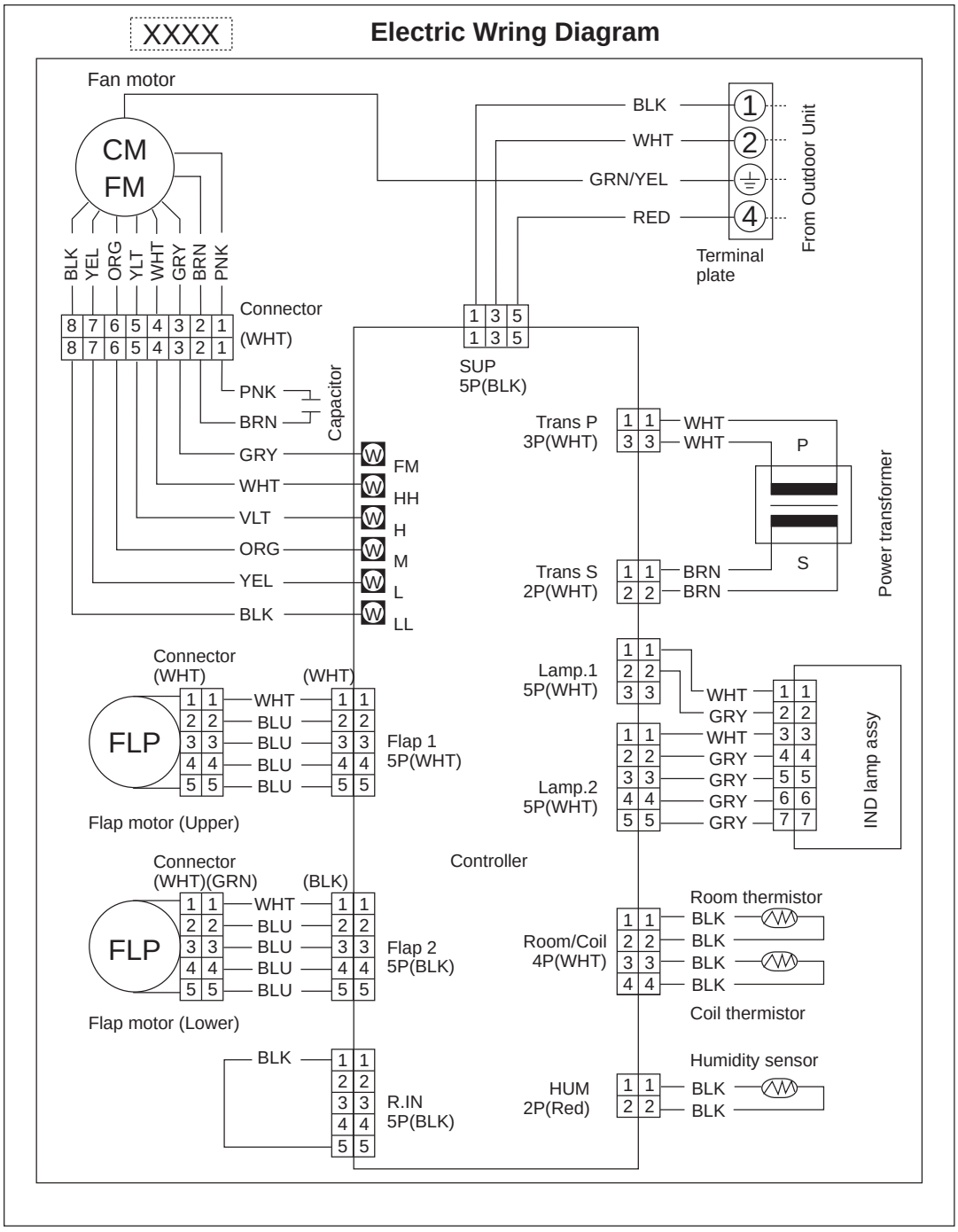


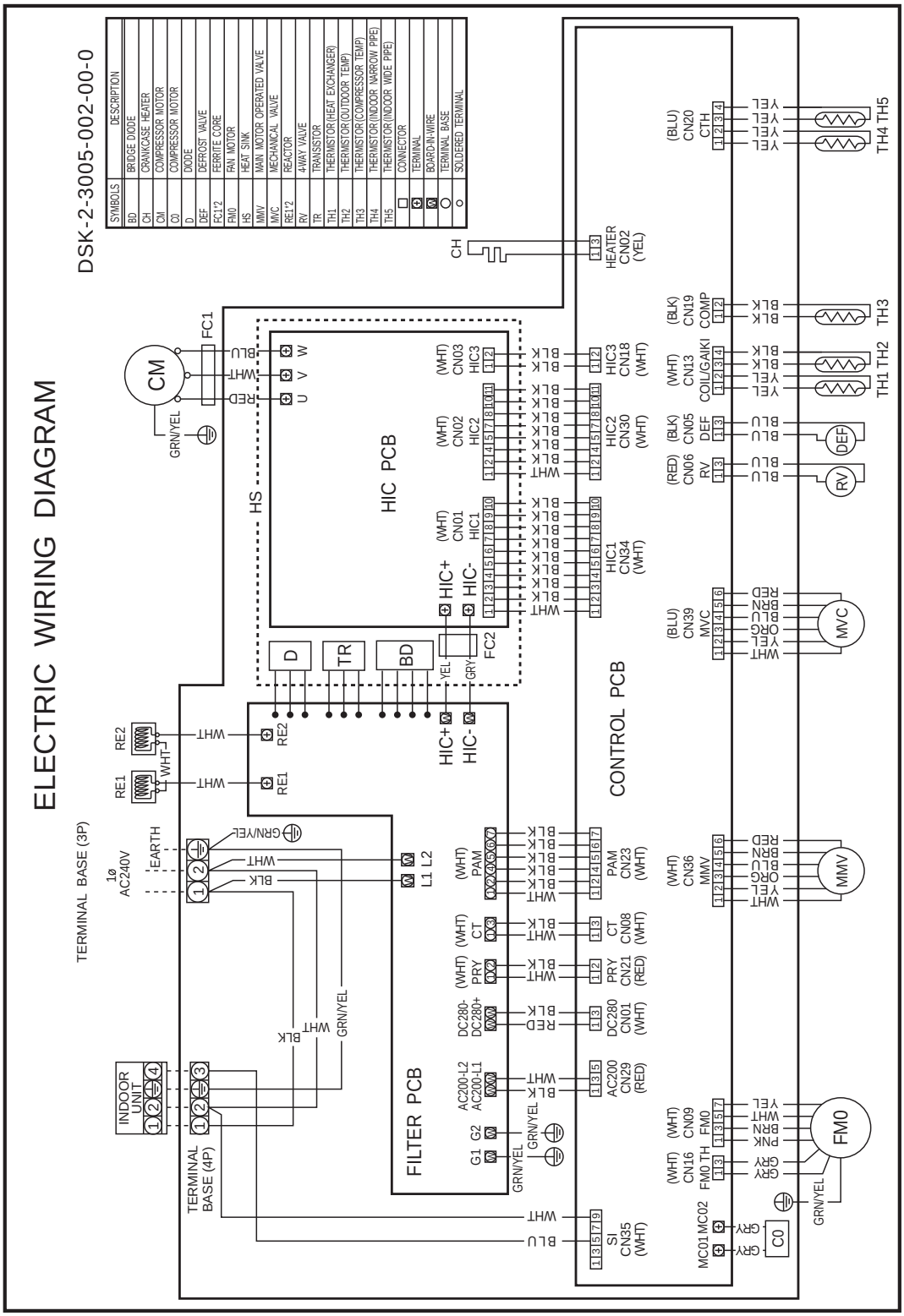
Fig. 26b

7-5-4. Electric Wiring Diagram

Electric Wiring Diagram for indoor unit KRV243GJH
KRV243GJ
KRV303GJH
KRV303GJ



Electric Wiring Diagram for outdoor unit (CRV243GJH)



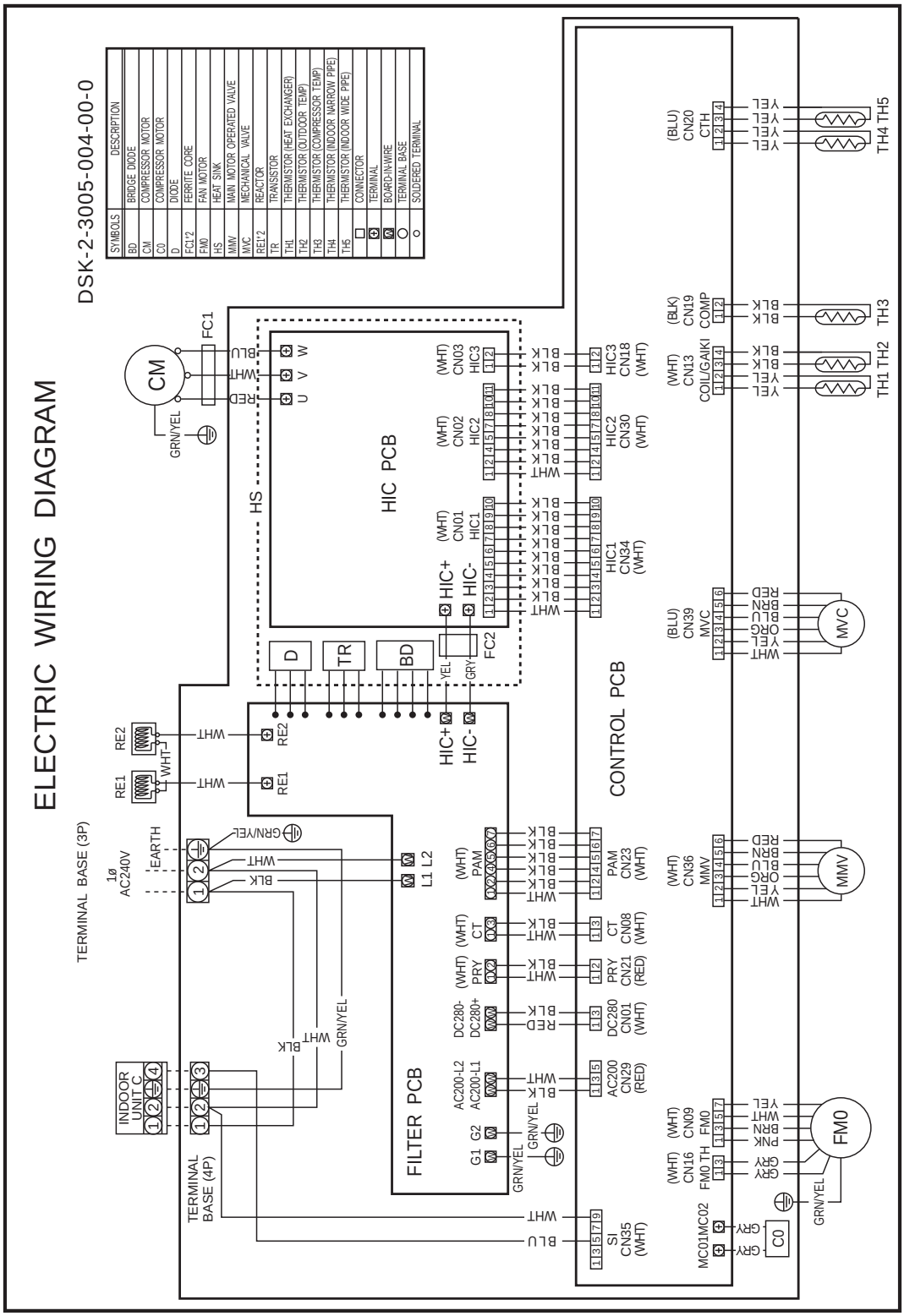
CAUTION

Before replacing PCBs, turn off the power and check that all lamps on the PCB are off before starting work. Electric shock will occur if work is performed while the lamps are lit.

Electric Shock

Fig.28

Electric Wiring Diagram for outdoor unit (CRV243GJ)



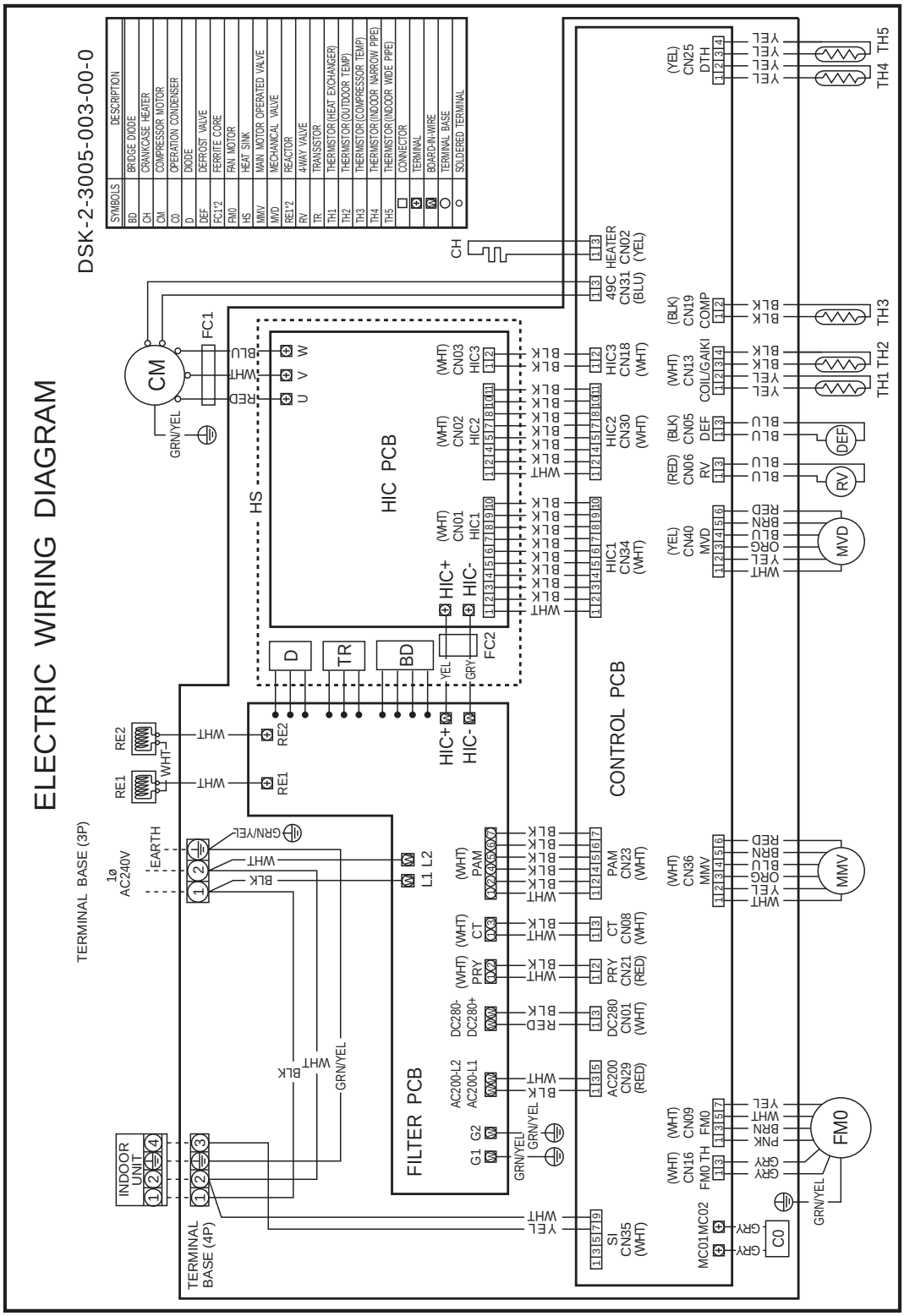
CAUTION

Before replacing PCBs, turn off the power and check that all lamps on the PCB are off before starting work. Electric shock will occur if work is performed while the lamps are lit.

Electric Shock

Fig.28

Electric Wiring Diagram for outdoor unit (CRV303GJH)



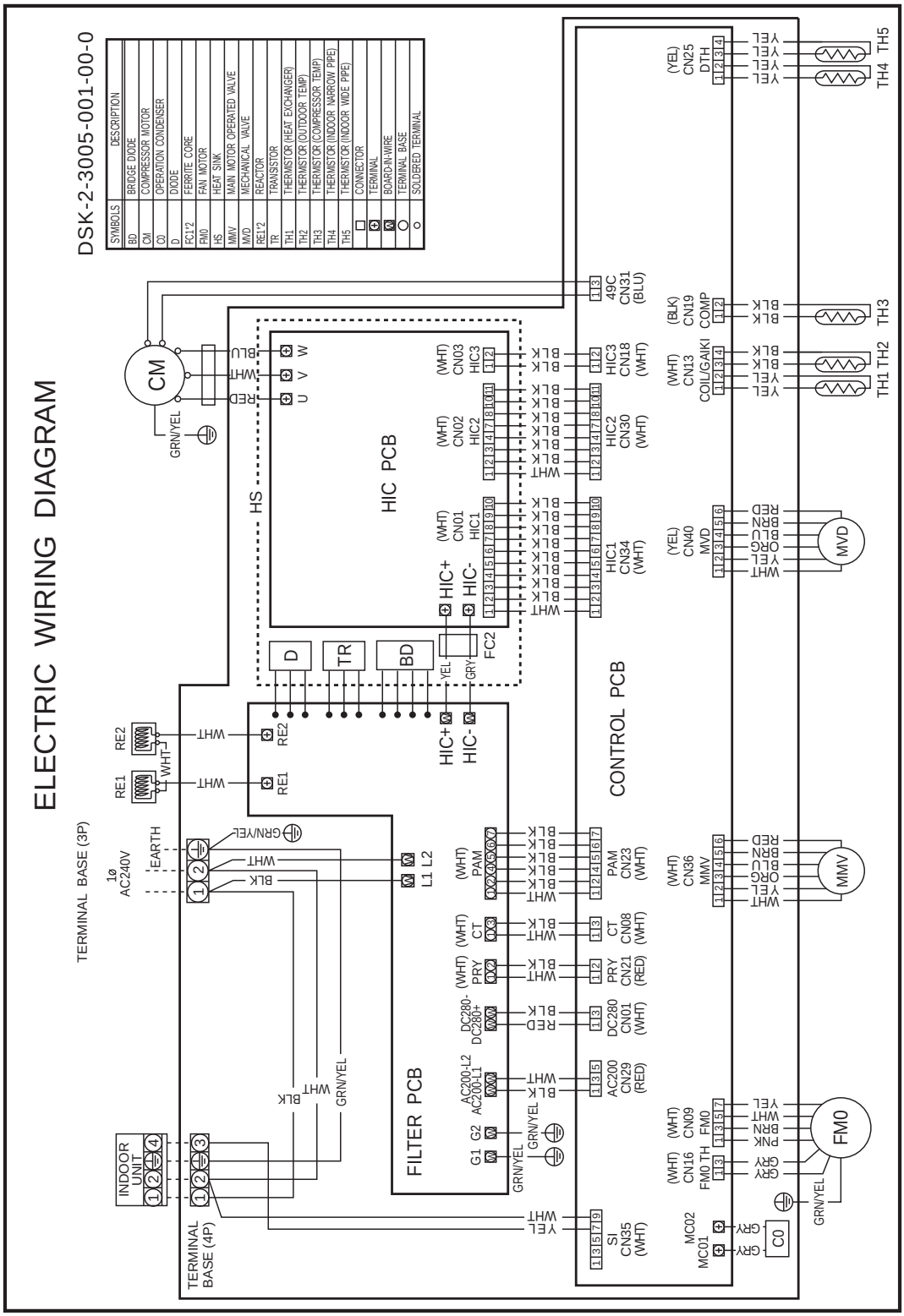
CAUTION

Before replacing PCBs, turn off the power and check that all lamps on the PCB are off before starting work. Electric shock will occur if work is performed while the lamps are lit.

Electric Shock

Fig.28

Electric Wiring Diagram for outdoor unit (CRV303GJ)



CAUTION

Before replacing PCBs, turn off the power and check that all lamps on the PCB are off before starting work. Electric shock will occur if work is performed while the lamps are lit.

Electric Shock

Fig.28

7-5-5. How to Connect Wiring to the Terminal

WARNING **Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also exist. Therefore, be sure all wiring is tightly connected.**

When connecting each power wire to the corresponding terminal, follow the instructions below and fasten the wire securely tight with the fixing screw of the terminal plate.

a) For Indoor Unit

(1) Cut the wire end with a cutting pliers, then strip the insulation to expose the wire about 7 mm. See the label (Fig. 29) near the terminal plate.

(2) Using a screwdriver, loosen the terminal screw on the terminal plate.

(3) Insert the wire and tighten the terminal screw completely using a screwdriver.

b) For Outdoor Unit

■ For solid core wiring (or F-cable)

(1) Cut the wire end with a cutting pliers, then strip the insulation to expose the solid wire about 25 mm. (Fig. 30a)

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

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

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

■ For stranded wiring

(1) Cut the wire end with a cutting pliers, then strip the insulation to expose the stranded wiring about 10 mm and tightly twist the wire ends. (Figs. 30b and 31a)

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

(3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring connector. (Fig. 30b)

(4) Place the ring connector wire, and replace and tighten the removed terminal screw using a screwdriver. (Fig. 31b)

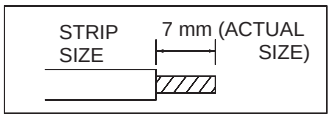


Fig. 29

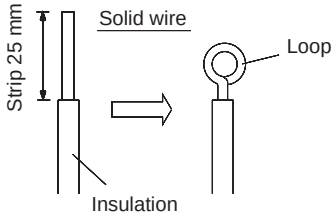


Fig. 30a

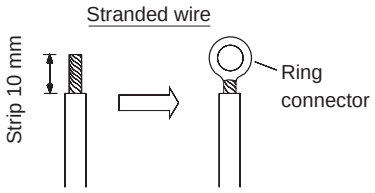


Fig. 30b

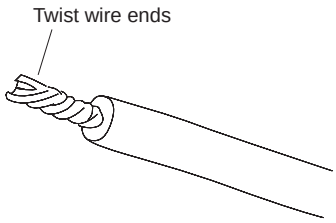


Fig. 31a

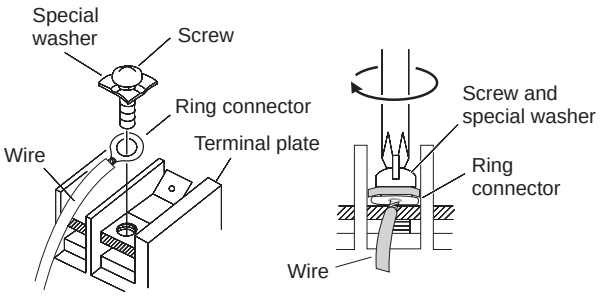
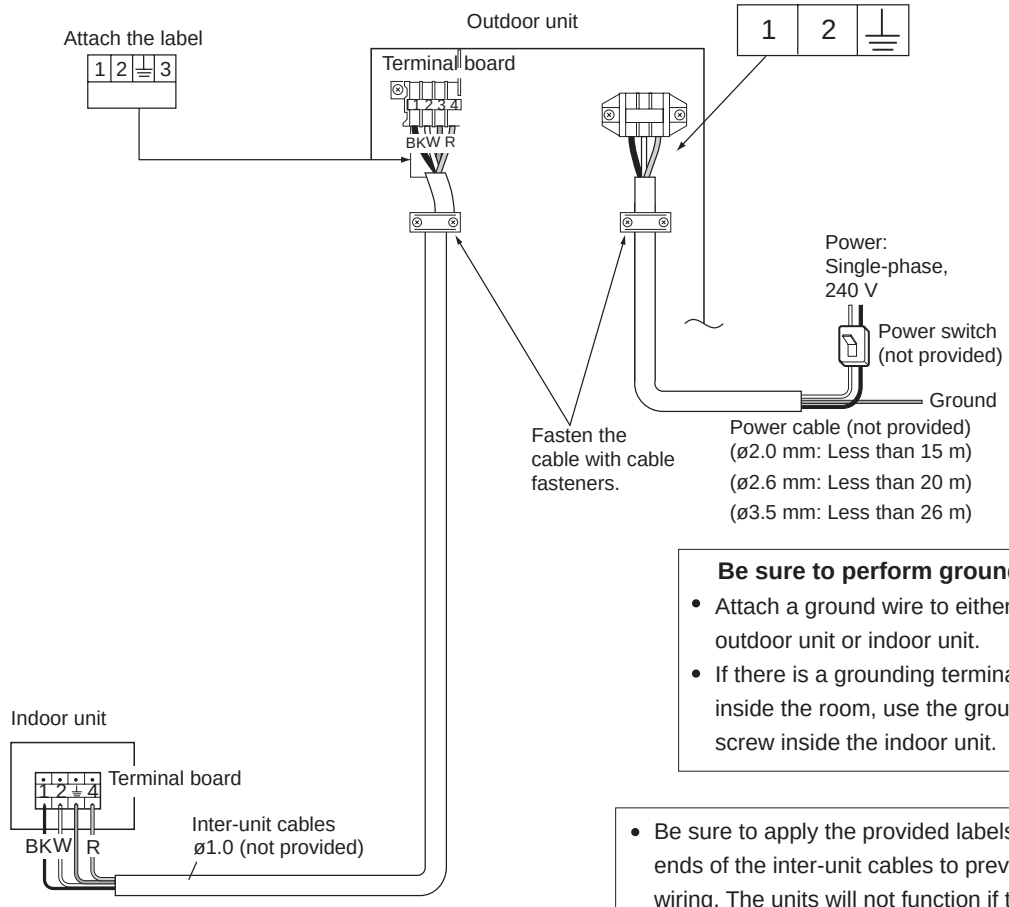


Fig. 31b

7-5-6. Wiring Instructions for the Outdoor Unit

CAUTION

- Be sure to correctly align inter-unit cables.



Be sure to perform grounding.

- Attach a ground wire to either the outdoor unit or indoor unit.
- If there is a grounding terminal inside the room, use the grounding screw inside the indoor unit.

- Be sure to apply the provided labels to both ends of the inter-unit cables to prevent mis-wiring. The units will not function if the wiring connections are incorrect.

Fig. 32

- Use a dedicated A/C circuit for power.
- To make connections to the outdoor unit, remove the inspection panel and tubing panel.
- Do not bring the inter-unit cables or power cable into contact with tubing or service valves.
- Use outdoor unit cable fasteners and fasten the inter-unit cables at the location where the cables are double-sheathed.
- Arrange the wiring so that the inter-unit cables are contained in the inspection panel and tubing panel, as shown in Fig. 32.

7-6. Test Run

Performing a test run

- Refer to the test run procedures in the indoor unit installation manual.
- Perform the test run.
- If the room temperature is 15˚C or below, it may not be possible to check for tubing errors with cooling operation. If this occurs, perform heating operation and check that warm air is discharged from indoor unit. If there is cold air mixed in with the warm air, check the tubing connections again.

Checking tubing and wiring

Perform the test run and check that operation is normal.

CAUTION

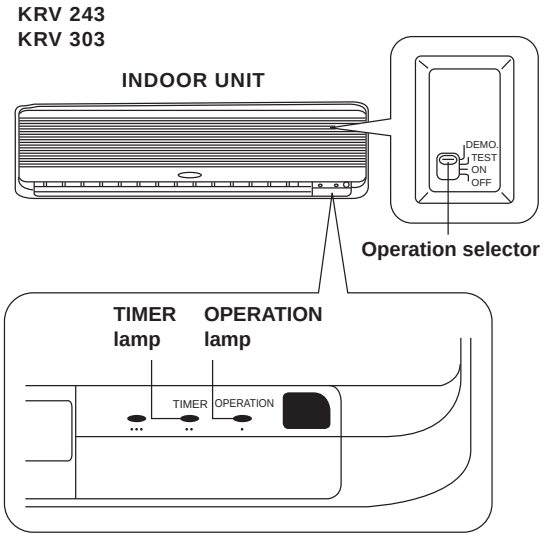
- Stop operation immediately if there is an error in tubing or wiring. Turn the power (breaker) to OFF, and check whether the inter-unit cables are connected incorrectly. Correct the connections.

- If there is an error in tubing, pump-down must be performed. Be sure to perform pump-down. After making corrections, again purge the air from the tubes.

7-7. Installation Check Sheet

- ☐ The strength of the installation location is sufficient to support the A/C weight.
- ☐ The indoor and outdoor units are installed level and vertically.
- ☐ The power and voltage are as specified.
- ☐ Inter-unit cables are securely fastened to the terminal board.
- ☐ Inter-unit cables are securely fixed.
- ☐ The power cord and inter-unit cables are not connected anywhere along their paths.
- ☐ The ground wire is securely connected.
- ☐ An air purge of the refrigerant circuit has been conducted.
- ☐ A leak test of the tubing connections has been performed.
- ☐ Thermal insulation has been applied to the tubing connections.
- ☐ Drain connections are secure and water drains properly.
- ☐ Putty has been used to close the hole in the wall.
- ☐ All service valves are fully open.
- ☐ Remote controller signals are being positively received.

8. Unit Display and Operation Selector

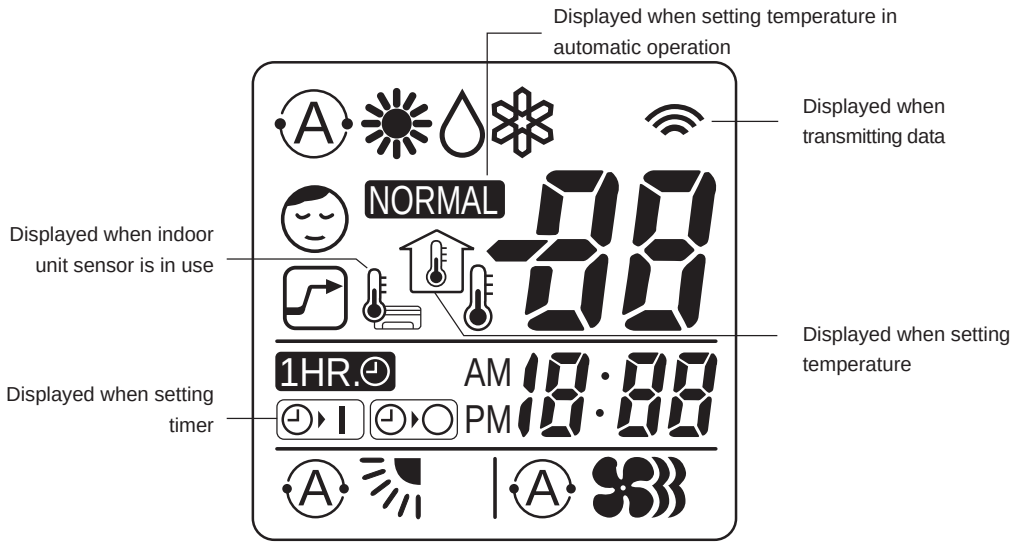


IMPORTANT

Avoid using radio equipment such as mobile phone near (within 1 m) the remote control receiver. Some radio equipment may cause malfunction of the unit.
If the trouble happens, disconnect power and restart the air conditioner after a few minutes.

REMOTE CONTROL receiver	This section picks up infrared signals from the remote control unit (transmitter).
Operation selector ON position	This position is for operating the air conditioner with the wireless remote control unit. Set the selector normally in this position.
OFF position **WARNING**	Switch the selector to the OFF position if you are not going to use the air conditioner for a new days or longer. **The OFF position does not disconnect the power. Use the main power switch to turn off power completely.**
TEST position **CAUTION**	This position is used only when servicing the air conditioner. **Do not set at the TEST position for normal operation.**
DEMO position	This position is used only when setting address of the remote control unit.
OPERATION lamp	This lamp lights when the system is in the continuous AUTO (red, orange or green), HEAT (red), DRY (orange) and COOL (green) mode.
TIMER lamp	This lamp lights when the system is being controlled by the timer.
SERVICE Lamp	When a fault occurs in the air conditioner, this lamp turns on or flashes in combination with the other two lamps to indicate the type of fault.

9. Remote Control Unit



Symbols

(1) Operation mode

AUTO .....

HEAT .....

DOUBLE SENSOR DRY .....

COOL .....

(2) Confirmation of transmission .....

(3) Set temperature 16-30 *

When set to 28 * .....

Current temperature indication .....

(4) Timer

ON Timer .....

OFF Timer .....

1-hour OFF Timer .....

(5) ECONOMY .....

(6) High power operation .....

(7) Flap indication

Auto. flap indication .....

Flap angle indication .....

Sweep indication .....

(8) Fan speed

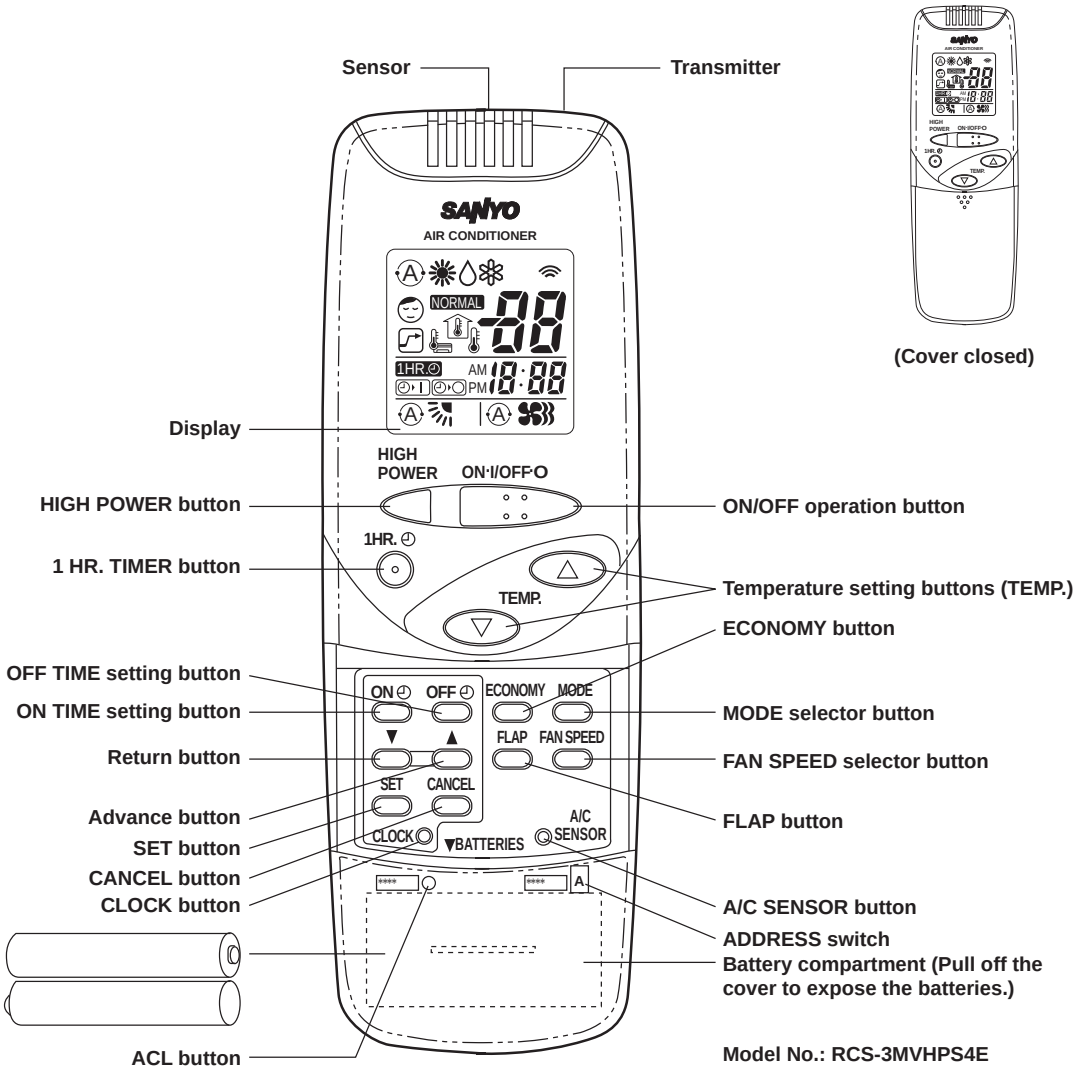
Automatic operation .....

HIGH .....

MEDIUM .....

LOW .....

Remote Control Unit (Continued)



NOTE The illustration above pictures the remote control unit after the cover has been lowered and removed.

Transmitter	When you press the buttons on the remote control unit, the mark appers in the display to transmit the setting changes to the receiver in the air conditioner.
Sensor	A temperature sensor inside the remote control unit senses the room temperature.
Display	Information on the operating conditions is displayed while the remote control unit is switched on. If the unit is turned off, only the mode that was set previously is still displayed.
HIGH POWER button	**: When you press this button, the current operation mode is set to the HIGH POWER mode, and the unit is operated in this mode for 15 minutes.**
ON / OFF operation button	This button is for turning the air conditioner on and off.
1 HR.TIMER button (1-HOUR OFF TIMER)	1HR. : When you press this button, regardless of whether the unit is operating or stopping, the unit operates for one hour and then shuts down.
Temperature setting buttons (TEMP.)	Press the button to increase the set temperature. Press the button to reduce the set temperature. For details, see Automatic operation and Manual operation.

Remote Control Unit (continued)

ON TIME / OFF TIME setting buttons	No display : The timer does not operate. : The air conditioner stops at the set time. : The air conditioner starts at the set time. : The air conditioner stops and starts, or starts and stops, at the set times every day. For details, see "Setting the Timer".
ECONOMY button	For details, see "ECONOMY Mode". When you press this button in the HEAT, DRY or COOL mode, the mark appears in the display, and the remote control unit will automatically adjust the set temperature to save energy.
MODE selector button **(AUTO)** **(HEAT)** **(DRY)** **(COOL)**	Use this button to select AUTO, HEAT, DRY or COOL mode. :When this setting is selected, the air conditioner calculates the difference between the outdoor temperature and the room temperature and automatically switches to the "COOL", "DRY" or "HEAT" mode as appropriate. : The air conditioner makes the room warmer. : The air conditioner reduces the humidity in the room. : The air conditioner makes the room cooler.
FLAP button **NOTE**	Press this button either to select the setting of the airflow direction to the auto. flap in each mode or one of the six possible positions manually or to select the sweep function which moves the flap up and down automatically. : Auto flap setting: If selected in a heating operation, the flap is set to position (3) in the following chart. If selected in a cooling or dry operation, the flap is set at position (7) in the following chart. : The airflow direction can be set manually. (six positions) : The flap moves up and down automatically. When you press the FLAP button, the air flow direction will be changed one by one as follows. (1) → (2) → (3) → (4) → (5) → (6) → (7) → (8) Swing
FAN SPEED selector button	: The air conditioner automatically decides the fan speeds. : High fan speed : Medium fan speed : Low fan speed
ACL button (ALL CLEAR)	Puts the remote control unit into pre-operation status. Always press this button after replacing the batteries.

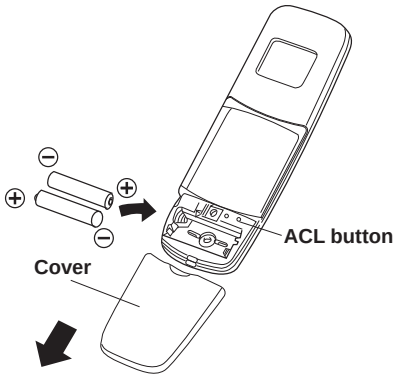
Remote Control Unit (continued)

ADDRESS switch	● Change the address switch to prevent mixing of signals from remote control units when two Sanyo air conditioners are installed next to each other. Normally, the address switch is set to A. When switching the adress, take the steps listed below. Contact your dealer where you made the purchase if 3 or more Sanyo air conditioners are to be operated. * Break off the address switching tabs on the remote control unit, and set the address switch to B. * Insert batteries into the remote control unit, press the ACL button, and attach the cover. * Open the intake grille of the indoor unit, and set the operation knob to the DEMO position. * Press the ON / OFF operation button on the remote control unit, and check that a receiving tone (beep) is heard from the indoor unit. * Set the operation selector to the ON position, and close the intake grille. * Operate the remote control unit, and check that a receiving tone (beep) is heard from the indoor unit. ● Normally, the tabs on the remote control unit should not be bent.
A / C SENSOR button **NOTE**	When you press this button (use a small-tipped object such as a ballpoint pen), the mark will appear at the display. And the room temperature is detected by the sensor which is built into the indoor unit and the air conditioner is controlled accordingly. If the remote control is located near a heat source, such as a space heater or in direct sunlight, press the A / C SENSOR button to switch to the sensor on the indoor unit.

NOTE The remote control unit sends the temperature signal to the air conditioner regularly at five minute intervals. If the signal from the remote control unit stops for more than ten minutes due to the loss of the remote control unit or other trouble, the air conditioner will switch to the temperature sensor which is built into the indoor unit and control the room temperature. In these cases, the temperature around the remote control unit may differ from the temperature detected at the air conditioner's position.

9-1. Using the Remote Control Unit

How to Install Batteries



1. Slide the cover in the direction indicated by the arrow and remove it.

2. Install two AAA alkaline batteries. Make sure the batteries point in the direction Marked in the battery compartment.

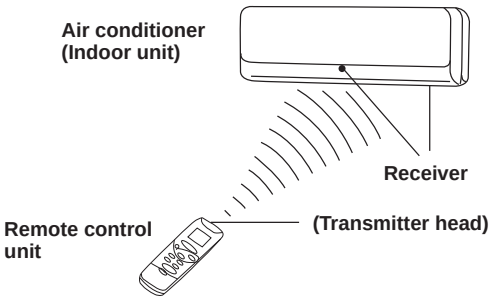
3. Use a thin object such as the tip of a pen to press the ACL button.

NOTE

- **The batteries last about six months, depending on how much you use the remote control unit.Replace the batteries when the remote control unit's display fails to indicate, or when the remote control cannot be used to change the air conditioner's settings.**
- **Use two fresh leak-proof type-AAA alkaline batteries.**
- **In replacing batteries, follow the instructions as mentioned in the sub-section "How to Install Batteries".**
- **If you do not use the remote control unit more than 1 month, take out the batteries.**

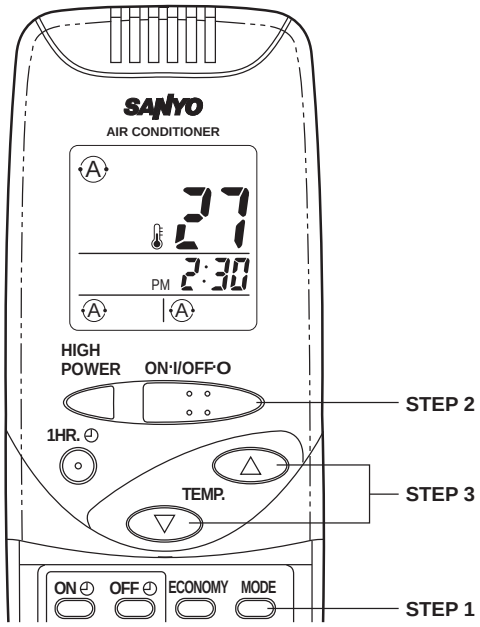
How to Use the Remote Control Unit

When using the remote control unit, always point the unit's transmitter head directly at the air conditioner's receiver.



9-2. Operation with the Remote Control Unit

1. Automatic Operation

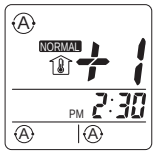


STEP1	Press the MODE selector button and select Ⓐ (AUTO).
STEP2	Press the ON / OFF button and switch the air conditioner ON.
STEP3	Press the temperature setting buttons (TEMP.). The air conditioner starts operating after automatically selecting the type of operation-whether heating, drying (dehumidifying) or cooling-that suits the conditions in the room, and automatically adjusting the temperature, fan speed and airflow direction.

Standard temperature settings during automatic operation

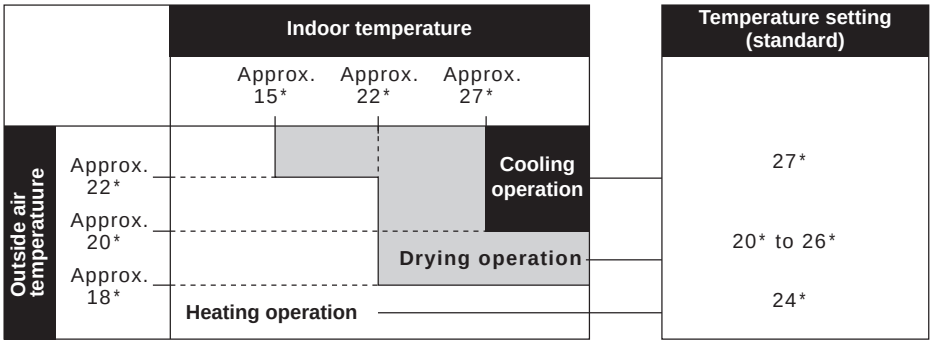
Type of operation	Standard temperature setting
Heating	24*
Drying	20* to 26* range (The exact temperature depends on the prevailing temperature when the unit starts operating.)
Cooling	27*

Each time one of the temperature setting buttons (TEMP.) is pressed, the temperature is changed by 1**



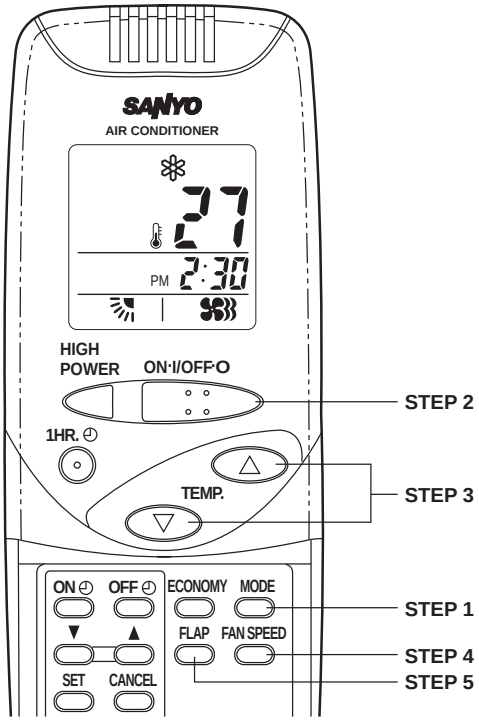
The temperature can be changed from +4*(higher) to -4* (lower) from the standard temperature setting.
(The upper limit during cooling is 30*.)

As shown in the figure below, the automatic selection of the operating modes is determined by the indoor temperature and outside air temperature.



- When multiple indoor units are used and units in other rooms are already operating, they will be set to the same type of operation as the operating indoor units.
- The temperature, airflow direction and fan speed are set automatically but the airflow direction and fan speed can be changed to suit your individual preference. It will take a few seconds for the fan speed to be switched.

2. Manual Operation



NOTE Check that the circuit breaker on the power panel is turned on and that the operation selector of the indoor unit is in the ON position.

STEP 1	Press the MODE selector button and select the desired mode. For heating operation * ☀ For dehumidifying operation * 💧 For cooling operation * ❄
STEP 2	To start the air conditioner, press the ON/ OFF operation button.
STEP 3	Press the temperature setting buttons to change the temperature setting to the desired temperature. Adjustable temperature range: 30 * max. 16 * min.
NOTE	● Room temperature control works to ensure that the temperature stabilizes within a range of *2 * of the temperature setting. For this reason, the value displayed on the remote control unit may differ from the actual temperature setting. Before the temperature stabilizes, this difference may exceed the *2 * range. ● The operating lamp of the indoor unit lights in one of the colors shown below.

Operating lamp	Heating	Red
	Drying	Orange
	Cooling	Green

STEP 4	Set the FAN SPEED selector button to the setting you want. (Refer to "Adjusting the Airflow Direction" on page 23.)
STEP 5	Presss the FLAP button and set the airflow direction as desired. (Refer to "Adjusting the Airflow Direction" on page 23.)

To stop the air conditioner, press the ON / OFF operation button again.

- After the cooling or drying operation has stopped, the indoor fan runs for about 30 seconds to dry out the inside of the air conditioner. (The operating lamps remain off.) The flap closes after the fan has stopped.
- If the room temperature rises above the temperature setting during a drying operation, the unit performs similar operation to cooling, and when the room temperature approaches the temperature setting, it performs the humidity-priority drying operation.
- The drying operation does not serve to raise the room temperature. (When the outside air temperature is low or when the heat quantity inside the room is low, the room temperature will not rise.)
- A change made to the temperature setting remains stored in the memory even after operation has stopped.
- If the temperature setting is lowered during a drying operation so that the unit has switched to a cooling operation, the outdoor unit shuts down for 3 minutes. (This happens only when one indoor unit is used.)
- When the unit is running in the drying operation mode while the temperature setting is higher than the room temperature, the humidity may not be reduced. In a case like this, select a temperature setting which is lower than the current room temperature, and perform the drying operation.

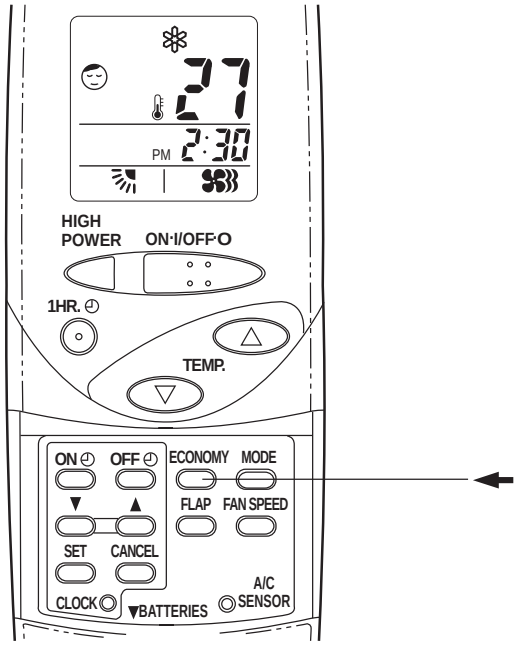
NOTE This appliance has a built-in 3-minute time delay circuit to ensure reliable operation. When the operation button is pressed, the compressor will start running within three minutes. In the event of power failure, the unit will stop.

3. Adjusting the Fan Speed

A. Automatic Simply set the FAN SPEED selector button to the the Ⓐ position.

B.Manual If you want to adjust fan speed manually during operation, just set the FAN SPEED selector button as desired. [, , or]

4. ECONOMY Mode

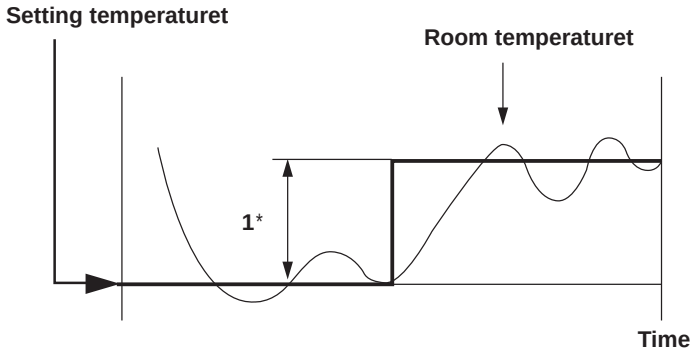


The ECONOMY Mode is used for saving energy.
Press the ECONOMY button while the air conditioner is operating.
The mark appears in the display.

To cancel the ECONOMY function, press the ECONOMY button again.

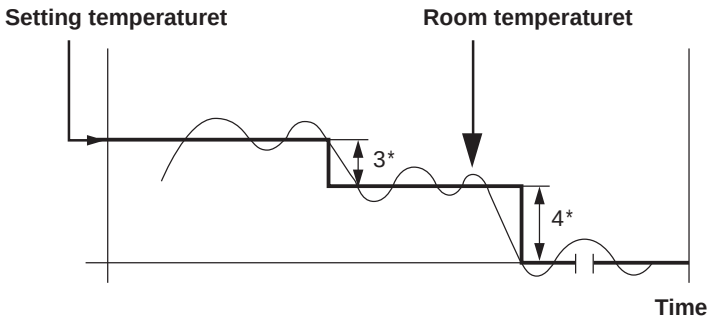
A. In Cooling and DRY Mode:
(❄ and 💧)

When the ECONOMY mode is selected, the air conditioner automatically raises the temperature setting 1* when 60 minutes have passed after the selection was made. This enables you to save energy without sacrificing comfort. This function is convenient when gentle cooling is needed.



B. In Heating Mode:
(☀)

When the ECONOMY mode is selected, the air conditioner automatically lowers the temperature setting 3* when 60 minutes have passed after the selection was made, and then another 4* after another 2 hours have passed, regardless of the indoor temperature when ECONOMY was selected. This enables you to save energy without sacrificing comfort. This function is convenient when gentle heating is needed.



NOTE **The temperature does not shift in the Auto mode during ECONOMY mode.**

9-3. Special Remarks

Power failure during operation

- In the event of power failure, the unit will stop. When the power is resumed, the unit will restart automatically after five minutes.

Clicking Sound

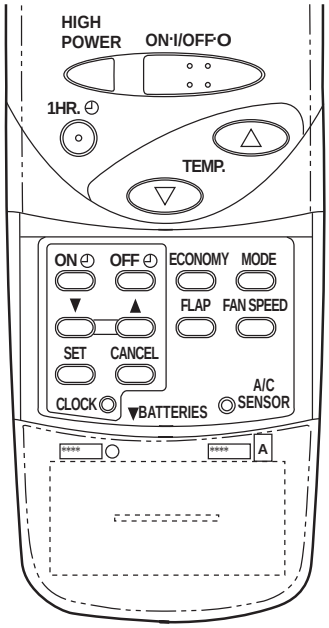
Clicking sound is heard from the air conditioner

- In heating or cooling operation, any plastic parts may expand or shrink due to a sudden temperature change. In this event, a clicking sound may occur. This is normal, and the sound will soon disappear.

Remote Control Unit

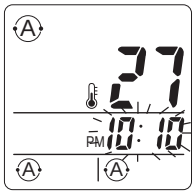
- The remote control unit sends the setting condition to the air conditioner regularly at five minute intervals.

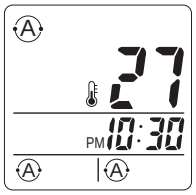
9-4. Setting the Timer



1. How to set the present time

(Example) To set to 10:30 pm.

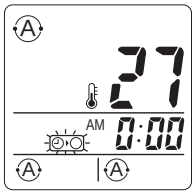


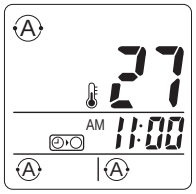


Operation	Indication
1. Press the CLOCK button three times.	The time indication alone blinks.
2. Press the Advance, Return (▲,▼) button until PM 10:30 is displayed.	The time can be set in 1-minute increments. Holding down the button advances the time rapidly in 10-minute increments.
3. Press the CLOCK button again.	This completes the setting of the current time.

2. How to set the OFF time

(Example) To stop the air conditioner at 11:00 am.





1. Press the OFF TIME setting button once.	The timer indication blinks and present OFF time is shown.
2. Press the Advance, Return (▲,▼) button until AM 11:00 is displayed.	The time can be set in 10-minute increments. Holding down the button advances the time rapidly in 10-minute increments.
3. Press the SET button.	The timer indication stops blinking and the present time is displayed.

NOTE

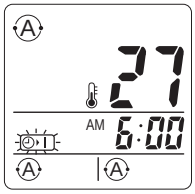
- The timer can be programmed while the unit is operating or while it is stopped.
- A timer program is canceled after the timer has operated. So the timer should be set every time programming operation is to be performed.
- The airflow direction, fan speed and temperature setting can be changed after a timer program has been set even when the unit is stopped. Even when operation is stopped during an ON timer program, the unit will start operating when the set time is reached provided that the program is not canceled.
- As a safeguard to prevent you forgetting to turn off the air conditioner, the unit's operation will be stopped if the remote control unit has not been operated for at least 25 hours after the ON timer starts.
- When the ON timer is used, the temperature setting may not be reached by the set time depending on the size and conditions in the room.

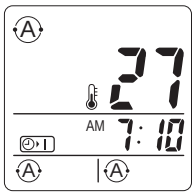
To cancel a timer program

- Press the CANCEL button.
- When either an ON or OFF timer is to be canceled, press the button corresponding to the timer whose program is to be canceled, and then press the CANCEL button.

3. How to set the ON time

(Example) To start operation at 7:10 am.





Operation	Indication
1. Press the ON TIME setting button once.	The timer indication blinks and present ON time is shown.
2. Press the Advance, Return (▲,▼) button until AM 7:10 is displayed.	The time can be set in 10-minute increments. Holding down the button advances the time rapidly in 10-minute increments.
3. Press the SET button.	The timer indication stops blinking and the present time is displayed.

NOTE

ON timer (comfort programming)

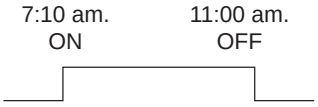
The unit starts operating automatically to attempt to change the temperature to the desired level by the set time. (The unit operates at the low fan speed from up to 60 minutes prior to the set time.)

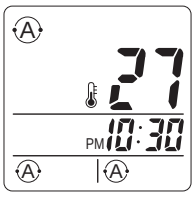
OFF timer

The unit stops operating at the set time.

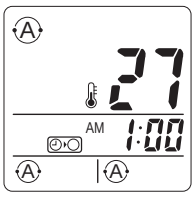
4. How to set DAILY ON / OFF REPEAT timer

(Example) to start operation at 7:10 am. and stop the air conditioner at 11:00 am.

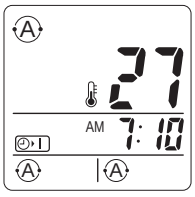




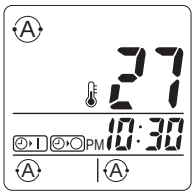
Present time



OFF time



ON time



Daily ON/OFF

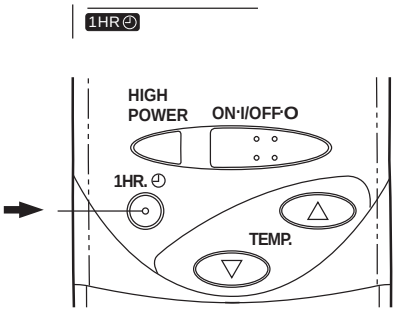
Operation	Indication
1. Set the timer ON / OFF times as shown in 2-1, 2, 3 and 3-1, 2, 3.	The present time 10:30 pm. and ⏲I ⏲O are displayed.

NOTE

- The ON / OFF combination timer uses the current time as the reference, and it is activated starting from whichever set time comes first.
- With the ON/ OFF combination timer, the settings are repeated every day.
- You can check the timer ON/ OFF times after you have set them by pressing the ONTIME and OFFTIME setting buttons.

9-5. Setting the 1-Hour OFFTimer

1. 1-Hour OFFTimer



This function causes the unit to operate for one hour and then stop, regardless of whether the unit is on or off when this button is pressed.
The 1HR. indicator in the display indicates that this function is operating.

Setting the 1-Hour OFFTimer
Regardless of whether the unit is operating or stopped, press the 1 HR. TIMER button. 1HR. appears in the display.

Cancelling the 1-Hour OFFTimer:
Press the ON / OFF operation button to turn the unit off, wait for the unit to stop operating, and then press the ON / OFF operation button again. The 1-Hour Timer function is now cancelled and the unit operates normally.

NOTE

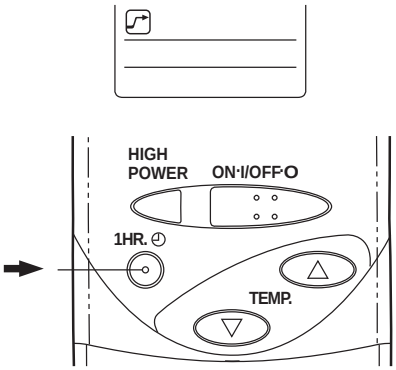
If, while the 1-Hour Timer function is operating, the 1 HR. TIMER button is pressed once to cancel the function and then again, the unit continues to operate for one hour from that point in time and then stops.

2. Operation together with the DAILY ON / OFF REPEAT Timer

- The 1 Hour OFF Timer setting is given priority over the DAILY ON / OFF REPEAT setting.
- It is not possible to use the OFFTimer and 1-Hour OFFTimer together. Whichever function is set last takes precedence. If the 1 HR. TIMER button is pressed while the TIMER OFF function operates, the OFF Timer is cancelled and the unit will stop operating one hour later.

9-6. Setting the HIGH POWER Operation

1. HIGH POWER Operation



This function causes the unit to operate at HIGH POWER in the present mode of operation for 15 minutes when this button is pressed while the unit is on. The indicator on the display indicates that this function is operating.

Canceling the HIGH POWER operation
HIGH POWER operation is canceled by pressing the ON / OFF operation button, HIGH POWER button (when it is pressed again) or MODE selector button, when the OFF time or HIGH POWER time setting is reached or when the ECONOMY mode operation is performed. The 15-minute timer is also cleared.

2. Operation together with the ECONOMY mode

It is not possible to use the HIGH POWER operation and ECONOMY mode operation together. Whichever function is set last takes precedence.
If the HIGH POWER button is pressed while the ECONOMY mode is operating, the ECONOMY mode operation is cancelled and the unit will change to the HIGH POWER operation.

NOTE

Concerning HIGH POWER operations

During a heating operation

- The room is heated for 15 minutes by warm air which has a slightly higher temperature than usual.
- When the HIGH POWER button is pressed during a defrosting operation, the unit enters the HIGH POWER operating mode upon completion of the defrosting operation.

When operating one indoor unit

During a cooling operation

- The room is cooled down for 15 minutes by cooling at a slightly lower temperature than usual, and the fan speed is set to the highest fan speed setting.

During a drying operation

- If the room temperature is higher than the temperature setting, the room is cooled down for 15 minutes by cooling at slightly lower temperature than usual, and if it is close to the temperature setting, the drying operation is performed, and the fan speed is set to the highest fan speed setting.

When operating multiple indoor units

During a cooling or drying operation

- The room is cooled down for 15 minutes by cooling at a slightly lower temperature than usual, and the fan speed is set to the highest fan speed setting.
- When the unit is used continuously for 15 minutes, the temperature setting has been reached during a cooling or heating operation or the humidity setting has been reached during a drying operation (which is only when one indoor unit is operated), operation will continue for the next 5 minutes at a reduced power level, after which the regular operation is restored.
  If the setting is not reached in either case, regular operation is restored immediately.
- After HIGH POWER operation has finished or when a HIGH POWER operation has been canceled on the way and then reinstated, regular operation is performed for about 5 minutes to protect the unit, and then the HIGH POWER operation is performed.
- During HIGH POWER operations, the room temperature may not coincide with the temperature setting.

NOTE:Tips for Energy Saving

Do not

- **Block the air intake and outlet of the unit. If they are obstructed, the unit will not work well, and may be damaged.**
- Let direct sunlight into the room. Use sunshades, blinds or curtains. If the walls and ceiling of the room are warmed by the sun, it will take longer to cool the room.

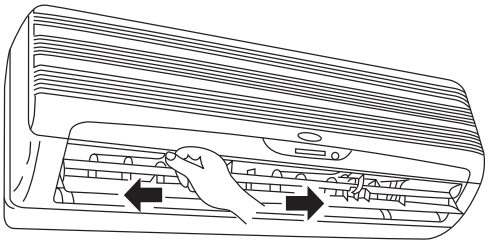
Do

- **Always try to keep the air filter clean. (Refer to "Care and Cleaning".)**
  A clogged filter will impair the performance of the unit.
- To prevent conditioned air from escaping, keep windows, doors and any other openings closed.

9-7. Adjusting the Airflow Direction

1. Horizontal

The horizontal airflow can be adjusted by moving the vertical vanes with your hands to the left or right.

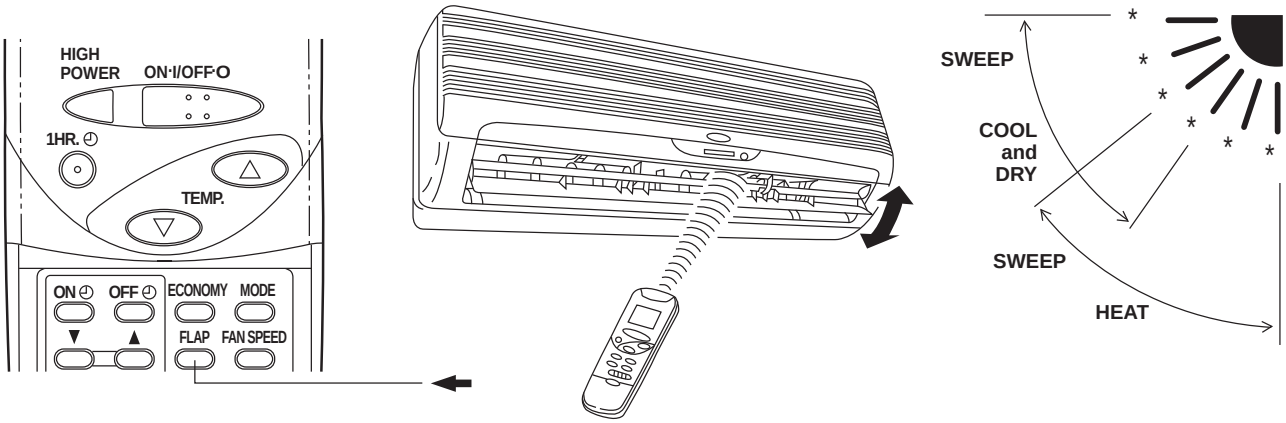


CAUTION

When the humidity is high, the vertical vanes should be in the front position during the cooling or dehumidifying operation. If the vertical vanes are positioned all of the way to the right or left, condensation may begin to form around the air vent and drip down.

2. Vertical

The vertical airflow can be adjusted by moving the flap with the remote control unit. Do not move the flap with your hands. Confirm that the remote control unit has been turned on. Use the FLAP button to set either the sweep function or one of the six airflow direction settings.



A. Sweep function

The flap starts moving up and down to deliver air over the sweep range.

B. Setting the airflow manually

Referring to the above illustration, use the FLAP button to set the airflow direction within the range used during the heating, cooling, or dehumidifying operation.

NOTE

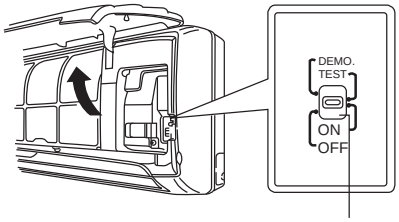
- The flap automatically closes when the unit is off.
- During the heating operation, the fan speed will be very low and the flap will be in the horizontal position (position*) until the air being blown out of the unit begins to warm. Once the air warms up, the flap position and fan speed change to the settings specified with the remote control.

CAUTION

- Use the FLAP button on the remote control to adjust the position of the flap. If you move the flap by hand, the factual flap position and the flap position on the remote control may no longer match. If this should happen, shut off the unit, wait for the flap to close, and then turn on the unit again; the flap position will now be normal again.
- Do not have the flap pointed down during cooling and drying operation. Condensation may begin to form around the air vent and drip down.

10. Operation without the Remote Control Unit

INDOOR UNIT



Operation selector

If you have lost the remote control unit or it has trouble, follow the steps below.

1. When the air conditioner is not running If you want to turn on the air conditioner, switch the operation selector to the OFF position, and then to the ON position.

NOTE The set temperature and fan speed are automatically set at the last selection before stopping.

2. When the air conditioner is running If you want to turn off the air conditioner, switch the operation selector to the OFF position.

11. Care and Cleaning

WARNING

1. For safety, be sure to turn the air conditioner off and also to disconnect the power before cleaning.
2. Do not pour water on the indoor unit to clean it. This will damage the internal components and cause an electric shock hazard.

Casing and Grille (Indoor Unit)

Clean the casing and grille of the indoor unit with a vacuum cleaner brush, or wipe them with a clean, soft cloth.

If these parts are stained, use a clean cloth moistened with a mild liquid detergent. When cleaning the grille, be careful not to force the vanes out of place.

CAUTION

1. Never use solvents, or harsh chemicals when cleaning the indoor unit. Do not wipe the plastic casing using very hot water.
2. Some metal edges and the fins are sharp and may cause injury if handled improperly; be especially careful when you clean these parts.
3. The internal coil and other components of the outdoor unit must be cleaned every year. Consult your dealer or service center.

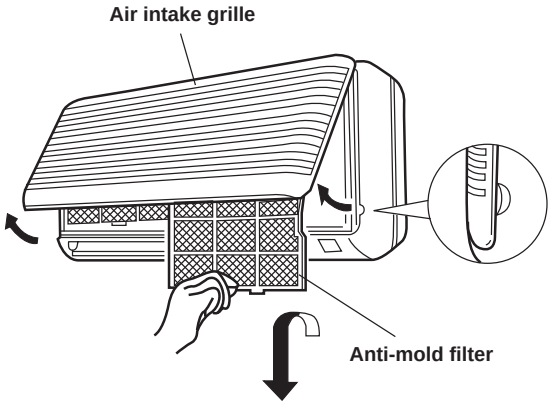
Care and Cleaning (continued)

Anti-Mold Filter

The anti-mold filter behind the air intake grille should be checked and cleaned at least once every two weeks.

How to remove the anti-mold filter

1. Grasp both ends of the air intake grille and pull it out and up.
2. Push the anti-mold filter up slightly, and then pull it down.

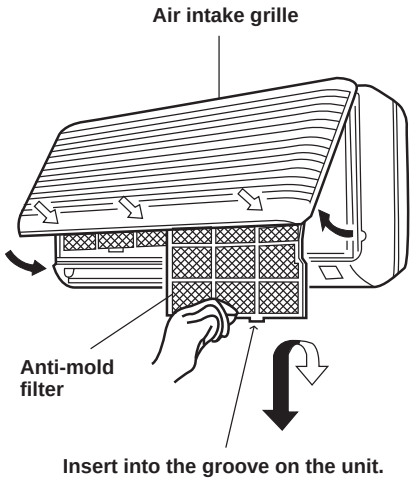


Cleaning

Use a vacuum cleaner to remove light dust. If there is sticky dust on the filter, wash the filter in lukewarm, soapy water, rinse it in clean water, and dry it.

How to replace the anti-mold filter

1. With the "FRONT" mark facing you, slide the anti-mold filter up into the unit and then lower the handle into the groove on the unit.
2. After installing the anti-mold filter, press the locations marked by the arrows (⇩) and close the air intake grille.



Care and cleaning (continued)

Air Cleaning Filter

The air cleaning filter removes dust and dirt from the air, and reduces odors and smoke from tobacco.

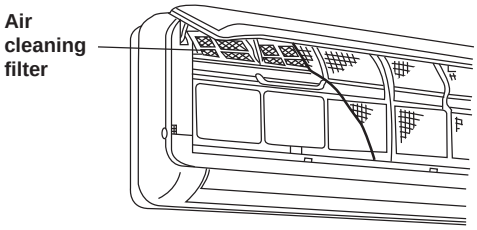
WARNING

This air cleaning filter cannot remove harmful gases or vapors nor ventilate air in the room. You must open doors or windows frequently when you use gas or oil heating appliances. Otherwise there is a risk of suffocation in extreme cases.

How to install the air cleaning filter

The air cleaning filter needs to be installed behind the anti-mold filter.

1. Remove the anti-mold filter.
2. Install the air cleaning filter in the position shown in the figure.
3. Reinstall the anti-mold filter.



NOTE

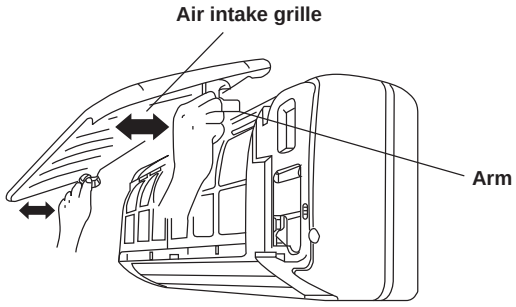
- In general, the filter should be replaced once every three months.
- Dirty air clean filters cannot be washed and reused. Purchase a replacement filter at your local dealer.

Cleaning the main unit and remote control unit

- Wipe clean using a soft, dry cloth.
- To remove stubborn dirt, moisten a cloth in warm water no hotter than 40*, wring thoroughly, and then wipe.
- The air intake grille can be removed in order to wash it with water.

Removing and remounting the air intake grille

- With the air intake grille open all the way, grip both arms with your hands and pull toward you to remove.
  To remount, hold the air intake grille roughly horizontal and push it in until the arm shafts fit into the indentations in the main unit, then fit the grille into place.



CAUTION

When using a footstool or the like, be careful not to let it tip over.

Washing the grille with water

- Clean the grille gently using a soft sponge, or the like. Then wipe away any remaining moisture.
- Neutral detergent may be used to remove stubborn dirt. Then rinse thoroughly with water and wipe away any remaining moisture.

12. FUNCTIONS

12-1. Operation Functions

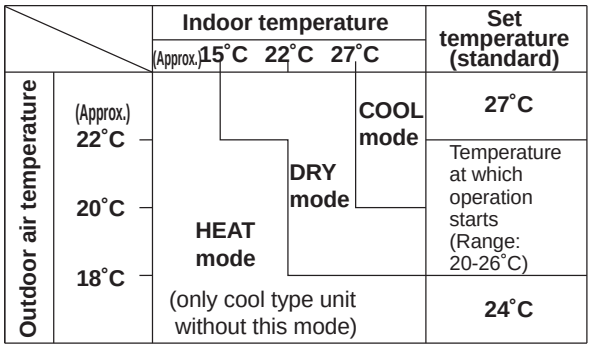
■ Functions of the main unit controller

*OFF (Self-diagnostics)	• Used to stop the unit when the remote controller is unavailable. • Used when service inspection is performed.
*ON	• During normal operation: Starts operation from the remote controller. • Emergency operation: When the remote Controller is unavailable, moving this switch from the OFF position to the ON position starts automatic operation.
*TEST	• Used when operating performance are checked. • Used when pump-down is carried out. (Operates at the rated frequency. At this time, the main unit lamp flashes, and the remote controller signal cannot be received.)
*DEMO	• This function is for shop displays. Ordinarily it is not used. • Used during servicing.

■ Automatic operation

● **Operating mode selection**

When automatic operation is selected, the indoor and outdoor temperature sensors function, and either HEAT, DRY, or COOL mode operation is selected automatically.



● **Desired-temperature memory**

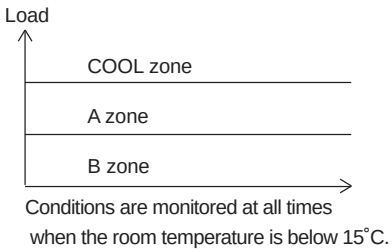
- The set temperature in the program can be changed as desired within the range of ±4˚C. This temperature can then be stored. During automatic operation, press the temperature setting buttons to change the temperature.

■ SENSOR DRY

During automatic operation, the system adjusts the room temperauture and fan speed according to the conditions in the room, in order to maintain a comfortable room environment.

SENSOR DRY operation

- Dry operation is as shown in the figure below.



DRY A

The compressor operation frequency varies depending on the relative humidity.
The indoor fan operates with 1/f fluctuation.

DRY B

The compressor operates at a low operating frequency.
The indoor fan operates with 1/f fluctuation.

Monitor

- Monitoring operation takes place when the room temperature is below 15˚C.
- When the monitoring range is entered, the compressor stops, and the indoor fan operates at LL.

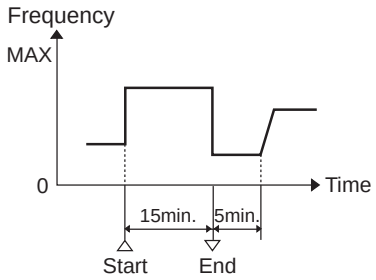
■ PAM-α control

- In order to further improve inverter performance, control is switched between PWM control at low operation speeds, and PAM control at high operation speeds, making the most effective use of power.

■ HIGH POWER

Raises the power but remains in the same operating mode. This function is set with the HIGH POWER button on the remote controller.
(It is set regardless of the temperature and fan speed settings.)

● **HIGH POWER operation from the remote controller**
The unit operates at maximum output for 15 minutes. regardless of the desired temperature.
The fan speed is 1 step above "High."



NOTE

- When HIGH POWER operation ends, the unit operates at low Hz for 5 minutes, regardless of the thermostat OFF conditions.
- When in DRY mode, operation is in the cooling zone.
- When in HEAT mode, defrosting dose not occur during HIGH POWER operation.(only cool type unit without this mode)
- If HIGH POWER is set while defrosting is in progress, HIGH POWER operation begins after defrosting ends. (it is not appropriate for only cool type unit)
- HIGH POWER operation cannot be set from the remote controller when the unit is stopped.
- HIGH POWER operation and ECONOMY operation cannot be used at the same time. The function set last takes priority.

■ ECONOMY

- When ECONOMY operation is set, the temperature and fan speed settings will be adjusted automatically to allow comfortable sleep.
- When ECONOMY operation is set "mark" appears on the remote controller.

● **COOL and DRY modes**
- The indoor unit fan speed is automatically lowered for quiet operation.
- The temperature setting is raised by 1˚C one hour after ECONOMY operation is set.

● **HEAT mode**
- The indoor unit and outdoor unit fan speeds are automatically lowered for quiet operation.
- The temperature setting is lowered by 3˚C one hour after ECONOMY operation is set.
  In addition, the temperature setting is lowered by 4˚C after two hours have passed.
  (only cool type unit without this mode.)

■ Lamp colors

Operation lamp

HEAT operation: Red
DRY operation : Orange
COOL operation Green
TIMER lamp : Green

■ ON timer operation

- Operation starts when the time set for the ON timer is reached. When a time is set, the TIMER lamp illuminates.
- The below comfort timer programming is performed.
  A comfort time is calculated from the set temperature and the room temperature, either 60 minutes prior or 30 minutes prior to the set ON timer time, and operation is started in advance of the set ON time. (The indoor fan speed is "Medium.")
  [COOL]
  Indoor temperature-Set temperature = Temperature difference
  [HEAT]
  Set temperature-Indoor temperature = Temperature difference

Temperature difference(˚C)	Advance start time (min.)
12<Temperature difference	60
6 < Temperature difference	30

NOTE

This function does not operate if the ON timer standby time is less than 30 minutes.

■ OFF timer operation

- Operation stops when the time set for the OFF timer is reached.
  When a time is set, the TIMER lamp illuminates.

■ Timer backup

- If the indoor unit is unable to receive the timer time-end signal when the ON or OFF time is reached, then timer time-end occurs according to the indoor unit backup timer within approximately 26 minutes.
- Operation stops if there are no operator controls for 25 hours or longer after unit operation switched from OFF to ON by use of ON timer operation.

13. TROUBLESHOOTING

■ Precautions before performing inspection or repair

- After checking the self-diagnostics monitor, turn the power OFF before starting inspection or repair.
- High-capacity electrolytic capacitors are used inside the outdoor unit controller (inverter). They retain an electrical charge (charging voltage DC 280V) even after the power is turned OFF, and some time is required for the charge to dissipate. Be careful not to touch any electrified parts before the controller LED (red) turns OFF.
  If the outdoor controller is normal, approximately 30 seconds will be required for the charge to dissipate. However, allow at least 5 minutes for the charge to dissipate if there is thought to be any trouble with the outdoor controller.
  After inspecition or repair is completed, be sure to move the operation switch to the DEMO position, turn the power ON, and erase the diagnostics contents.

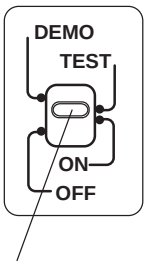
■ Method of self-diagnostics

If the indoor unit operation lamp is flashing every 0.5 seconds, follow the procedure below to perform detailed trouble diagnostics.

NOTE

1: If the operation lamp flashes every 0.5 seconds immediately when the power is turned ON, there is an external ROM (OTP data) failure on the indoor circuit board or ROM socket insertion problem, or the ROM has not been installed.

2: The failure mode is stored in memory even when the power is not ON. Follow the procedure below to perform diagnostics.



Operation selector
Ordinarily, this switch should be in the ON position.
The OFF, TEST, and DEMO positions are used for inspection.

PROCEDURE

* Turn the power switch ON.
* Move the operation selcetor on the main unit to OFF (self-diagnostics).
* If there is a sensor failure or a protective function has activated, self-diagnostics lamps 1, 2, and 3 will illuminate in the following pattern: 5 seconds flashing (illuminated) + 2 seconds OFF. (Buzzer sounds once while lamps are OFF)
  Note: If there is no trouble, then self-diagnostics lamps 1, 2, and 3 do not illuminate, and the buzzer does not sound.
* Diagnostics is completed when the buzzer sounds 3 beeps.
* After inspection or repair is completed, be sure to move the operation selector to the DEMO position, turn the power ON, and erase the diagnostics contents. Then move the selector to the OFF position and check that the diagnostics contents have been erased before using the unit.

Details of Self-Diagnostics

When the operation selector on the indoor unit is moved from the ON or TEST position to the OFF (Self-diagnostics) position, the indicator lamps on the indoor unit will flash (or remain ON) for 5 seconds and then turn OFF for 2 seconds (buzzer sounds once) to indicate the presence of a sensor failure or the activation of a protective function.
Self-diagnostics is completed when the buzzer sounds 3 beeps.
If there is no trouble, the lamps do not flash (illuminate). Also note that the corresponding parts listed below may not be present in some models.

Indication on indoor unit				✕ **...OFF** ◐ **...Flashing** ☼ **...ON**	
● ● ●	Timer ● ●	Operation ●	**Code**	**Diagnostics item**	**Diagnostics contents**
✕	✕	◐	S01	Room temperature sensor failure	* Sensor open circuit or short circuit * Contact failure at connector or open circuit at teminal crimping location (short-circuit detection only for the humidity sensor) * Indoor/outdoor circuit board failure
✕	◐	✕	S02	Indoor heat exchanger sensor failure	
✕	◐	◐	S03	Humidity sensor failure	
◐	✕	✕	S04	• Compressor temperature sensor failure • SH sensor failure	* Sensor open circuit or short circuit * Contact failure at connector or opern circuit at terminal crimping location * Outdoor circuit board failure
◐	✕	◐	S05	• Outdoor heat exchanger sensor failure • Outdoor narrow tubing sensor failure	
◐	◐	✕	S06	• Outdoor air temperature sensor failure • Outdoor wide tubing sensor failure	
◐	◐	◐	S07	Outdoor electrical current sensor failure	Outdoor circuit board failure
✕	✕	☼	E01	Indoor/outdoor communications failure (serial communications)	*Miswiring *AC power failure *Blown fuse *Power relay failure *Indoor or outdoor circuit board failure
✕	☼	✕	E02	• HIC circuit failure • Power Tr circuit failure	*HIC or power Tr failure *Outdoor fan does not turn *Instantaneous power outage *Service valve not opened *Outdoor fan blocked *Continuous overload operation *Compressor failure *Outdoor circuit board failure
✕	☼	☼	E03	Outdoor unit external ROM failure	*External ROM data failure *Outdoor circuit board failure
☼	✕	✕	E04	Peak current cut-off	*Instantaneous power outage *HIC or power Tr failure *Outdoor circuit board failure
☼	✕	☼	E05	PAM circuit failure Active circuit failure	*Outdoor circuit board failure *Outdoor power supply voltage failure
☼	☼	✕	E06	Compressor discharge overheat prevention	*Electric expansion valve failure *Capillaries blocked *No gas *Continuous overload operation *Outdoor fan does not turn *Outdoor circuit board failure
☼	☼	☼	E07	Indoor fan operating failure	*Fan motor failure *Contact failure at connector *Indoor circuit board failure
◐	◐	☼	E08	4-way valve switching failure Indoor zero-cross failure	*4-way valve failure *Outdoor circuit board failure
◐	☼	◐	E09	No-refrigerant protection	*Service valve not opened *No refrigerant
◐	☼	☼	E10	DC compressor drive circuit failure	*Open phase *Outdoor circuit board failure
☼	◐	◐	E11	Outdoor AC fan operating failure	*Fan motor failure *Contact failure at connector *Outdoor circuit board failure
☼	◐	☼	E12	Outdoor system communications failure Outdoor high-voltage SW, OLR operation Outdoor power supply open phase, outdoor col freezing	*Miswiring *Blown fuse *Power relay failure *Open phase *Outdoor circuit board failure *Compressor failure
☼	☼	◐	E13	Freeze-prevention operation	*Indoor fan system failure *No refrigerant *Low-temperature operation

Other: Timer lamp flashes (3-second intervals).

NOTE: If the operation lamp continues to flash (orange) even when the indoor unit operation selector has been moved to the OFF position, an indoor unit external ROM failure has occurred. (E14)
After inspection or repair is completed, be sure to move the operation selector to the DEMO position, turn the power ON, and erase the diagnostics contents.

OUTDOOR UNIT LED INDICATION

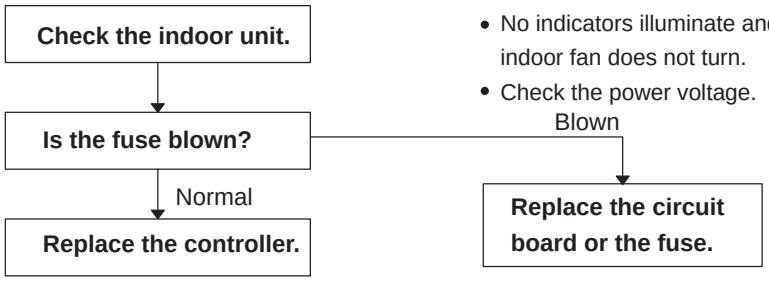
LED LAMP INDICATION

LED LANPS LIGHT AND SHOW THE PROTECTIVE OPERATION IN THE OUTDOOR UNIT AND THE TROUBLES CAUGHT BY SENSOR AS SHOWN BELOW TABLE.

○ : ON ×: OFF

ERROR DISPLAY						DETAIL
0	1	2	3	4	5	
○	×	×	×	×	×	SENSER FOR COMPRESSOR DISCHARGE TEMP
×	×	○	×	×	×	SENSER FOR HEAT EXCHANGER TEMP
×	×	×	○	×	×	SENSOR FOR BRANCH PIPE (NARROW TUBE)
○	○	×	○	×	×	OUTDOOR TEMP SENSOR
○	○	○	○	×	×	SENSOR FOR BRANCH PIPE (WIDE TUBE)
×	○	×	×	○	×	CURRENT SENSOR
×	○	○	×	○	×	HIC CIRCUIT TROUBLE (CURRENT. TEMP)
○	×	○	○	○	×	OTP DATA TROUBLE
×	×	×	○	○	×	CURRENT PEAK OUT
○	×	×	○	○	×	CURRENT CONTROL TROUBLE
○	×	○	×	×	○	ACTIVE CIRCUIT TROUBLE
×	○	×	○	○	×	COMPRESSOR DISCHARGE TEMP RISE
×	×	○	×	×	○	ZERO-CROSS TROUBLE
○	×	×	×	×	○	DC COMPRESOR ROTATION TROUBLE
○	○	×	×	○	×	DEFECTIVE PHASE OF 3ø 200V
×	○	○	×	×	○	ACTUATION OF COMP INTERNAL THERMOSTAT
×	×	○	×	○	×	ACTUATION OF HIGH PRESSURE SWITCH
○	×	○	×	○	×	MIS-WIRING. MIS-PIPING
○	○	×	×	×	○	ACTUATION OF FREEZE-PROTECTION SWITCH
×	×	○	○	○	×	RESET-COUNT OVER

■ If the self-diagnostics function fails to operate



<Checking the indoor and outdoor units>

■ Checking the indoor unit

No.	Control	Check items (unit operation)
1	Set operation selector of indoor unit to DEMO and start operation using the remote controller.	• The rated voltage must be present between inter-unit cables 1 and 2. • Connect a 5kΩresisto between inter-unit cables 2 and 3. When the voltage at both ends is measured, approximately 12-15 V DC must be output and the needle must fluctuate once every 8 seconds. In addition, insert an LED jig and check that the LED flickers once every 8 seconds.

● If there are no problems with the above, then check the outdoor unit.

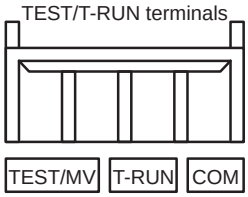
■ Checking the outdoor unit

No.	Control	Check items (unit operation)
1	Apply the rated voltage between outdoor unit terminals 1 and 2.	• The control panel LED (red) must illuminate.
2	Short-circuit the outdoor unit COM terminal to the T-RUN terminal.	• The compressor and fan motor must turn ON.

● If there are no problems with the above, then check the indoor unit.

● Using the TEST/T-RUN terminals

T-RUN : Test run (compressor and fan motor turn ON.)
TEST/MV : Compresses time to 1/60th (accelerates operation by 60 times faster than normal). Fully opens the electric expansion valve.



■ Checking the serial communications

	*Control 1	*Control 2	
Initial self-diagnostics	**short-circiut terminals 2 and 3 on the indoor unit 3P terminal block.**	**short-circiut terminals 2 and 3 on the indoor unit 3P terminal block.**	**Probable location of malfunction**
(1) illuminate	No change	———	Indoor unit circuit board failure
	Change: (1) and (3) illuminate, and (2) flashes.	Change: (1) and (3) illuminate, and (2) flashes.	Outdoor unit circuit board failure
	Change: (1) and (3) illuminate, and (3) flashes.	Change: (1) illuminates	Failure (open circuit, contact failure, etc.) in the inter-unit cable
(1) and (3) illuminate, and (2) flashes.	———	———	Indoor unit circuit board failure

● Turn the power OFF before performing short circuiting work.
● During the self-diagnostics check, the check results are the first indication when the operation switch is moved to OFF while the indicators are flashing after power ON *DEMO (5 seconds) *ON.
● So that the check can be made quickly, indicators flash at first communication after power ON.
● Before performing the above checks, perform DEMO operation, and check that AC 220V is output terminals 1 and 2. If it is not output, there is a failure related to the indoor unit power.

<Noise malfunction and electromagnetic interference>

An inverter A/C operates using pulse signal control and high frequencies. Therefore, it is susceptible to the effects of external noise, and is likely to cause electromagnetic interference with nearby wireless devices.
A noise filter is installed for ordinary use, preventing these problems. However, depending on the installation conditions, these effects may still occur. Please pay attention to the points listed below.

■ Noise malfunction

This refers to the application of high-frequency noise to the signal wires, resulting in abnormal signal pulses and malfunction.

Locations most susceptible to noise	Trouble	Correction
1. Locations near broadcast stations where there are strong electromagnetic waves 2. Locations near amateur radio (short wave) stations 3. Locations near electronic sewing machines and arc-welding machines	Either of the following trouble may occur. 1. The unit may stop suddenly during operation. 2. Indicator lamps may flicker.	(The fundamental concept is to make the system less susceptible to noise.) —— Insulate for noise or distance from the noise source. —— 1. Use shielded wires. 2. Move unit away from the noise source.

■ Electromagnetic interference

This refers to the noise generated by high-speed switching of the microcomputer and compressor. This noise radiates through space and returns to electric wiring, affecting any wireless devices (televisions, radios, etc.) located nearby.

Locations most susceptible to noise	Trouble	Correction
1. A television or radio is located near the A/C and A/C wiring. 2. The antenna cable for a television or radio is located close to the A/C and A/C wiring. 3. Locations where television and radio signals are weak.	1. Noise appears in the television picture, or the picture is distorted. 2. Static occurs in the radio sound.	1. Select a separte power source. 2. Keep the A/C and A/C wiring at least 1 meter away from wireless devices and antenna cables. 3. Change the wireless device's antenna to a high-sensitivity antenna. 4. Change the antenna cable to a BS coaxial cable. 5. Use a noise filter (for the wireless device.) 6. Use a signal booster.

SANYO

Dalian SANYO Air Conditioner Co.,Ltd.