TECHNICAL & SERVICE MANUAL

SAP-KRV94EHDX + SAP-CRV94EHDX
SAP-KRV124EHDX + SAP-CRV124EHDX

FILE NO.

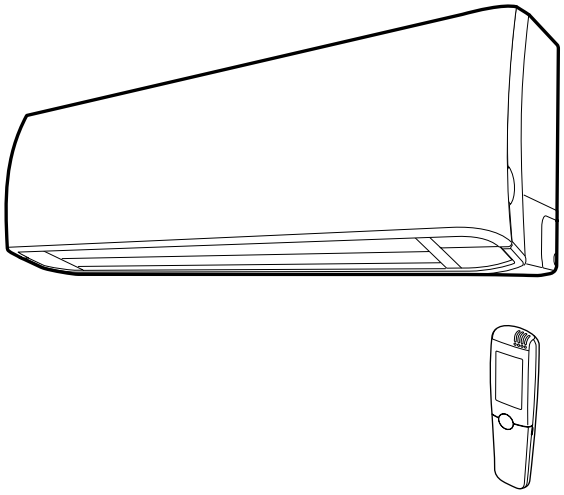
Destination: Europe
Northern Europe

DC INVERTER SPLIT SYSTEM AIR CONDITIONER

Indoor Model No.	Product Code No.
SAP-KRV94EHDX	1 852 099 77
SAP-KRV124EHDX	1 852 099 78

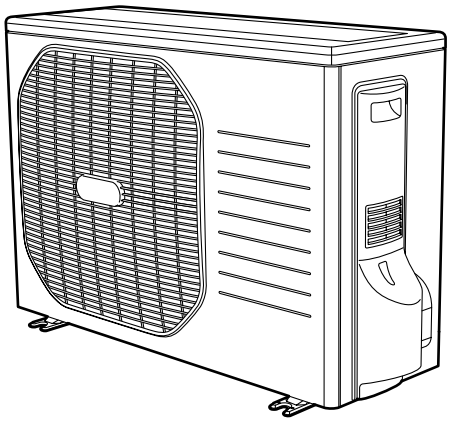
Outdoor Model No.	Product Code No.
SAP-CRV94EHDX	1 852 330 10
SAP-CRV124EHDX	1 852 330 11

Indoor Unit



SAP-KRV94EHDX
SAP-KRV124EHDX

Outdoor Unit



SAP-CRV94EHDX
SAP-CRV124EHDX

IMPORTANT

These air conditioners employ new refrigerant R410A.

Pay special attention when servicing the unit.

R410A

REFERENCE NO. SM700639

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.

Table of Contents

Page

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.	−15 °C D.B.
Heating	Maximum	27 °C D.B.	24 °C D.B. / 18 °C W.B.
	Minimum	16 °C D.B.	— D.B. / −20 °C W.B.

2. SPECIFICATIONS

2-1. Unit Specifications

Indoor Unit **SAP-KRV94EHDX**
Outdoor Unit **SAP-CRV94EHDX**

Voltage Rating				230 V	
Performance				Cooling	Heating
Capacity			kW	2.65 (0.9 to 3.8)	3.60 (0.9 to 5.5)
			BTU/h	9,000 (3,100 to 13,000)	12,300 (3,100 to 18,800)
Air Circulation (High)			m^3/h	600	600
Moisture Removal (High)			Liters/h	1.8	-
Electrical Rating				Cooling	Heating
Available Voltage Range			V	198 to 264	
Running Amperes			A	2.40 (1.6 to 6.9)	3.30 (1.6 to 9.9)
Power Input			W	530 (250 to 1,350)	720 (250 to 1,450)
Power Factor			%	96	95
E.E.R.			W/W	5.0	-
C.O.P.			W/W	-	5.0
Compressor Locked Rotor Amperes			A	7.8	
Features					
Controls / Temperature Control				Microprocessor / I.C. Thermister	
Control Unit				Wireless Remote Control Unit	
Timer				24-Hour ON or OFF Timer, 1.2.3.5-Hours OFF Timer	
Fan Speeds		Indoor / Outdoor		Auto and 3 steps	
Airflow Direction (Indoor)		Horizontal		Auto	
		Vertical		Auto	
Air Filter				Washable, Anti-Mold	
Compressor				DC Twin Rotary (Inverter)	
Refrigerant / Amount charged at shipment			g	R410A / 1,380	
Refrigerant Control				Electric Expansion Valve	
Operation Sound	Indoor : Hi/Me/Lo/Qt*		dB-A	39 / 38 / 30 / 22	40 / 38 / 30 / 22
(*Qt = Quiet mode)	Outdoor : Hi		dB-A	49	50
Refrigerant Tubing Connections				Flare Type	
Max. allowable tubing length at shipment			m	7.5	
Refrigerant	Narrow tube		mm (in.)	6.35 (1/4)	
Tube Diameter	Wide tube		mm (in.)	9.52 (3/8)	
Refrigerant Tube Kit / Accessories				Optional / Air Clean Filter	
Dimensions & Weight				Indoor Unit	Outdoor Unit
Unit Dimensions	Height		mm	300	569
	Width		mm	898	790
	Depth		mm	200	285
Package Dimensions	Height		mm	280	645
	Width		mm	970	921
	Depth		mm	360	386
Weight	Net		kg	12.5	40.0
	Shipping		kg	14.0	43.0
Shipping Volume			m^3	0.098	0.229

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:
Cooling: Indoor air temperature 27°C D.B. / 19°C W.B.
Outdoor air temperature 35°C D.B. / 24°C W.B.
Heating: Indoor air temperature 20°C D.B.
Outdoor air temperature 7°C D.B. / 6°C W.B.

Indoor Unit **SAP-KRV124EHDX**
Outdoor Unit **SAP-CRV124EHDX**

Power Source	220 to 240V Single-Phase 50Hz

Voltage Rating	230 V

Performance		Cooling	Heating
Capacity	kW	3.50 (0.9 to 4.2)	4.80 (0.9 to 6.0)
	BTU/h	11,900 (3,100 to 14,300)	16,400 (3,100 to 20,500)
Air Circulation (High)	m^3/h	630	630
Moisture Removal (High)	Liters/h	2.0	-

Electrical Rating		Cooling	Heating
Available Voltage Range	V	198 to 264	
Running Amperes	A	4.00 (1.6 to 7.8)	5.20 (1.6 to 9.9)
Power Input	W	875 (250 to 1,435)	1,140 (250 to 1,545)
Power Factor	%	95	95
E.E.R.	W/W	4.0	-
C.O.P.	W/W	-	4.21
Compressor Locked Rotor Amperes	A	7.8	

Features				
Controls / Temperature Control			Microprocessor / I.C. Thermister	
Control Unit			Wireless Remote Control Unit	
Timer			24-Hour ON or OFF Timer, 1.2.3.5-Hours OFF Timer	
Fan Speeds		Indoor / Outdoor	Auto and 3 steps	
Airflow Direction (Indoor)		Horizontal	Auto	
		Vertical	Auto	
Air Filter			Washable, Anti-Mold	
Compressor			DC Twin Rotary (Inverter)	
Refrigerant / Amount charged at shipment		g	R410A / 1,380	
Refrigerant Control			Electric Expansion Valve	
Operation Sound	Indoor : Hi/Me/Lo/Qt*	dB-A	40 / 38 / 30 / 22	41 / 38 / 30 / 22
(*Qt = Quiet mode)	Outdoor : Hi	dB-A	50	51
Refrigerant Tubing Connections			Flare Type	
Max. allowable tubing length at shipment		m	7.5	
Refrigerant	Narrow tube	mm (in.)	6.35 (1/4)	
Tube Diameter	Wide tube	mm (in.)	9.52 (3/8)	
Refrigerant Tube Kit / Accessories			Optional / Air Clean Filter	

Dimensions & Weight			Indoor Unit	Outdoor Unit
Unit Dimensions	Height	mm	300	569
	Width	mm	898	790
	Depth	mm	200	285
Package Dimensions	Height	mm	280	645
	Width	mm	970	921
	Depth	mm	360	386
Weight	Net	kg	12.5	40.0
	Shipping	kg	14.0	43.0
Shipping Volume		m^3	0.098	0.229

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Remarks: Rating conditions are:
Cooling: Indoor air temperature 27°C D.B. / 19°C W.B.
Outdoor air temperature 35°C D.B. / 24°C W.B.
Heating: Indoor air temperature 20°C D.B.
Outdoor air temperature 7°C D.B. / 6°C W.B.

2-2. Major Component Specifications

2-2-1. Indoor Unit

Indoor Unit **SAP-KRV94EHDX**

Control PCB			
	Part No.		CB-KRV94EHDX
	Controls		Microprocessor
	Control Circuit Fuse		250V 3.15A
Remote Control Unit			RCS-4HVPDXS4EE
Fan			
	Type		Cross-Flow
	Q'ty ... Dia. and Length	mm	1 ... D100 / L677
Fan Motor			
	Type		DC Motor
	Model ... Q'ty		SIC-39CVL-D847-3 ... 1
	No. of Poles		8
	Rough Measure RPM (Cool / Heat)		1,200 / 1,200
	Nominal Output	W	30
	Coil Resistance (Ambient Temp. 20 °C)	Ohm	-
	Safety Device		
	Type		Internal Controller
	Over- Current Protection		Yes
	Over-Heat Protection		Yes
	Run Capacitor	Micro F	-
		VAC	-
Flap Motor			
	Type		Stepping Motor
	Model For Right Flap		MP24Z2
	For Left Flap		MP24Z2
	For Upper Flap		MP24Z5
	For Lower Flap		MP24Z1
	Rating		DC 5V
	Coil Resistance (Ambient Temp. 25 °C)	Ohm	Each Pair of Terminal : 70 +/- 7%
Panel Motor			
	Type		Stepping Motor
	Model		MP35EA
	Rating		DC 12V
	Coil Resistance (Ambient Temp. 25 °C)	Ohm	Each Pair of Terminal : 130 +/- 7%
Heat Exchanger Coil			
	Coil		Aluminum Plate Fin / Copper Tube
	Rows		2
	Fin Pitch	mm	1.1
	Face Area	m^2	0.272

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Indoor Unit **SAP-KRV124EHDX**

Control PCB			
	Part No.		CB-KRV124EHDX
	Controls		Microprocessor
	Control Circuit Fuse		250V 3.15A
Remote Control Unit			RCS-4HVPDXS4EE
Fan			
	Type		Cross-Flow
	Q'ty ... Dia. and Length	mm	1 ... D100 / L677
Fan Motor			
	Type		DC Motor
	Model ... Q'ty		SIC-39CVL-D847-3 ... 1
	No. of Poles		8
	Rough Measure RPM (Cool / Heat)		1,250 / 1,250
	Nominal Output	W	30
	Coil Resistance (Ambient Temp. 20 °C)	Ohm	-
	Safety Device		
	Type		Internal Controller
	Over- Current Protection		Yes
	Over-Heat Protection		Yes
	Run Capacitor	Micro F	-
		VAC	-
Flap Motor			
	Type		Stepping Motor
	Model For Right Flap		MP24Z2
	For Left Flap		MP24Z2
	For Upper Flap		MP24Z5
	For Lower Flap		MP24Z1
	Rating		DC 5V
	Coil Resistance (Ambient Temp. 25 °C)	Ohm	Each Pair of Terminal : 70 +/- 7%
Panel Motor			
	Type		Stepping Motor
	Model		MP35EA
	Rating		DC 12V
	Coil Resistance (Ambient Temp. 25 °C)	Ohm	Each Pair of Terminal : 130 +/- 7%
Heat Exchanger Coil			
	Coil		Aluminum Plate Fin / Copper Tube
	Rows		2
	Fin Pitch	mm	1.1
	Face Area	m^2	0.272

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

2-2-2. Outdoor Unit

Outdoor Unit **SAP-CRV94EHDX**

Control PCB		
Part No.		CB-CRV94EHDX
Controls		Microprocessor
Control Circuit Fuse		250V 25A

Compressor		
Type		DC Twin Rotary (Hermetic)
Compressor Model / Nominal Output		C-6RVN93H0Q / 1,050W
Compressor Oil ... Amount	CC	FV50S ... 350
Coil Resistance (Ambient Temp. 20 °C)	Ohm	R - S : 0.482 S - T : 0.482 T - R : 0.482
Safety Device		
CT (Peak current cut-off control)		Yes
Compressor Discharge Temp. Control		Yes
Operation cut-off control in abnormal ambient Temp.		Yes
Run Capacitor	Micro F	-
	VAC	-
Crankcase Heater		-

Fan		
Type		Propeller
Q'ty ... Dia.	mm	1 ... D420

Fan Motor		
Type		DC Motor
Model ... Q'ty		DAJ12-55J71-CR ... 1
No. of Poles		8
Rough Measure RPM (Cool / Heat)		750 / 750
Nominal Output	W	50
Coil Resistance (Ambient Temp. 20 °C)	Ohm	RED - WHT : 77.5 WHT - BLU : 77.5 BLU - RED : 77.5
Safety Device		
Type		Internal Controller
Over- Current Protection		Yes
Run Capacitor	Micro F	-
	VAC	-

Heat Exchanger Coil		
Coil		Aluminum Plate Fin / Copper Tube
Rows		2
Fin Pitch	mm	1.3
Face Area	m^2	0.452

External Finish	Acrylic baked-on enamel finish

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Outdoor Unit **SAP-CRV124EHDX**

Control PCB		
Part No.		CB-CRV124EHDX
Controls		Microprocessor
Control Circuit Fuse		250V 25A

Compressor		
Type		DC Twin Rotary (Hermetic)
Compressor Model / Nominal Output		C-6RVN93H0Q / 1,050W
Compressor Oil ... Amount	CC	FV50S ... 350
Coil Resistance (Ambient Temp. 20 °C)	Ohm	R - S : 0.482 S - T : 0.482 T - R : 0.482
Safety Device		
CT (Peak current cut-off control)		Yes
Compressor Discharge Temp. Control		Yes
Operation cut-off control in abnormal ambient Temp.		Yes
Run Capacitor	Micro F	-
	VAC	-
Crankcase Heater		-

Fan		
Type		Propeller
Q'ty ... Dia.	mm	1 ... D420

Fan Motor		
Type		DC Motor
Model ... Q'ty		DAJ12-55J71-CR ... 1
No. of Poles		8
Rough Measure RPM (Cool / Heat)		750 / 750
Nominal Output	W	50
Coil Resistance (Ambient Temp. 20 °C)	Ohm	RED - WHT : 77.5 WHT - BLU : 77.5 BLU - RED : 77.5
Safety Device		
Type		Internal Controller
Over- Current Protection		Yes
Run Capacitor	Micro F	-
	VAC	-

Heat Exchanger Coil		
Coil		Aluminum Plate Fin / Copper Tube
Rows		2
Fin Pitch	mm	1.3
Face Area	m^2	0.452

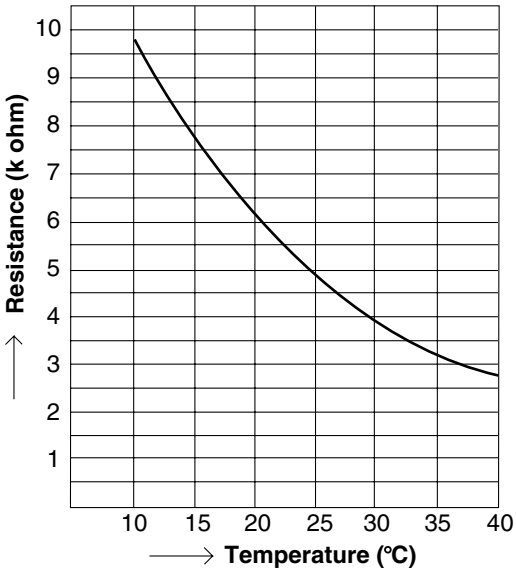
External Finish	Acrylic baked-on enamel finish

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

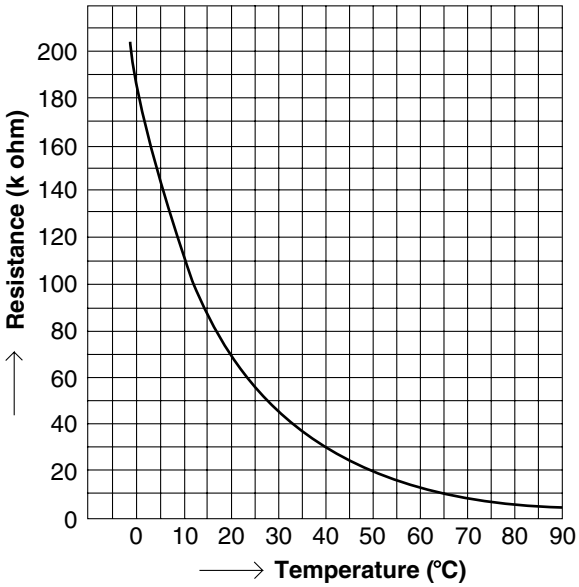
2-3. Other Component Specifications

Indoor Unit **SAP-KRV94EHDX**
SAP-KRV124EHDX
Outdoor Unit **SAP-CRV94EHDX**
SAP-CRV124EHDX

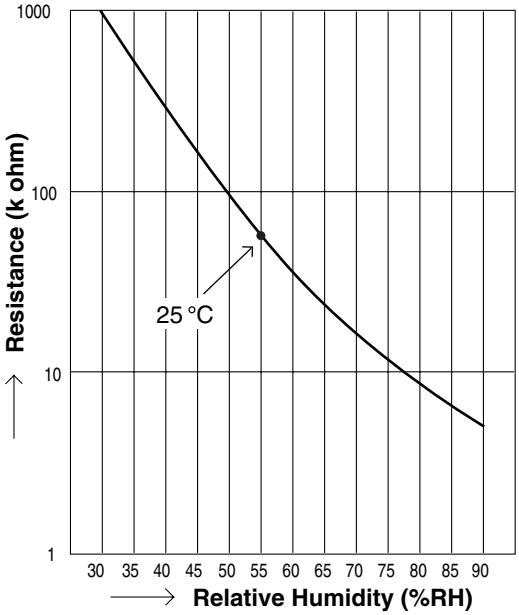
・Indoor air temp sensor
(Model:DTN-TKS223Y TH1)



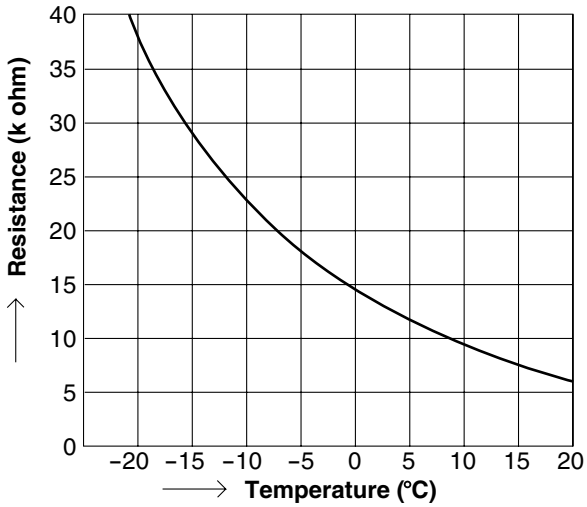
・Indoor heat exchanger sensor
(Model:DTN-TKS223Y TH2)
・Compressor temp sensor
(Model:1FA4V2E033800)



・Humidity sensor
(Model:C10-M52R-SY)

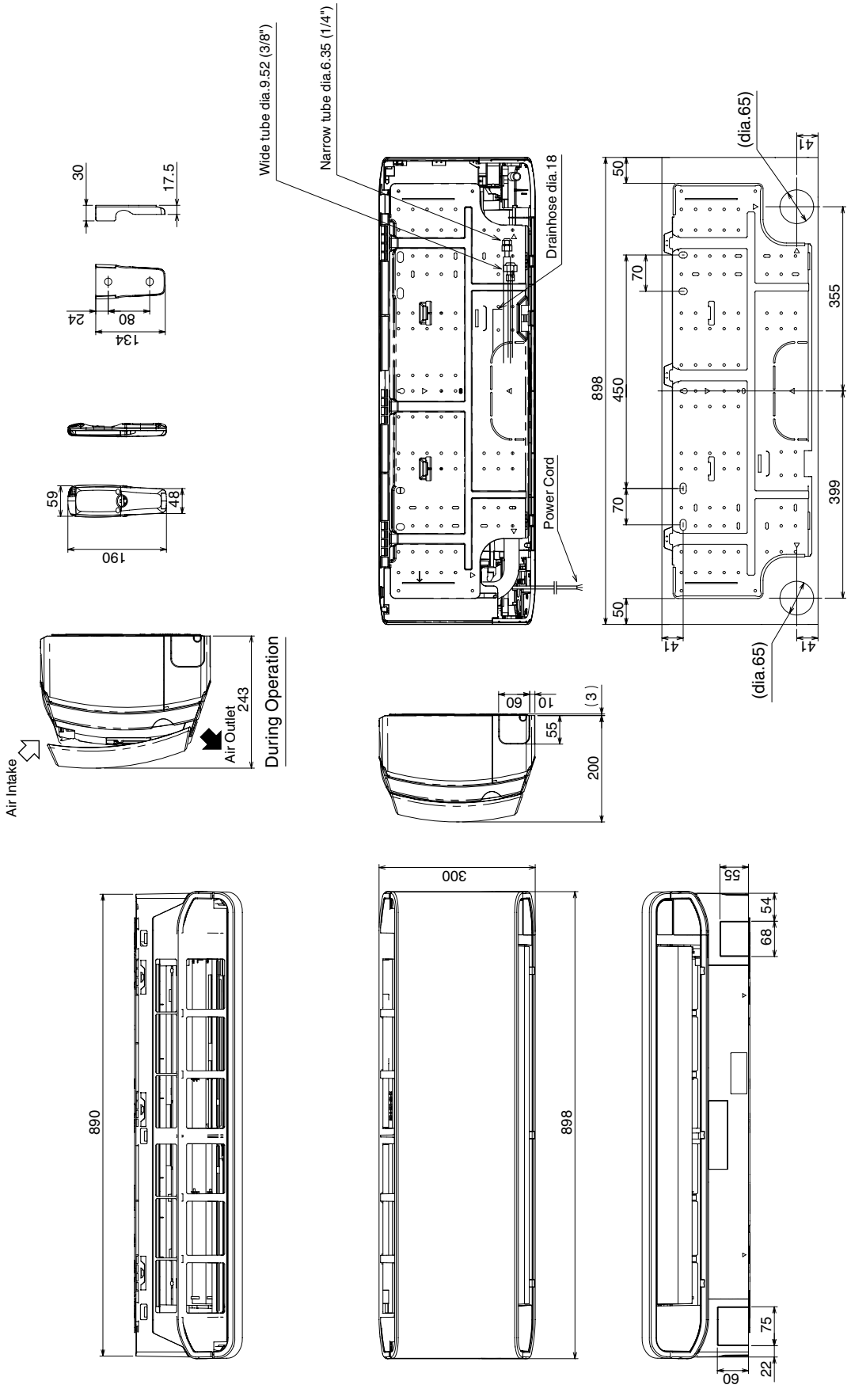


・Suction temp sensor
(Model:1FA4V2E033800)
・Outdoor air temp sensor
(Model:8FA0525920400)
・Outdoor heat exchanger sensor
(Model:8FA0525920400)



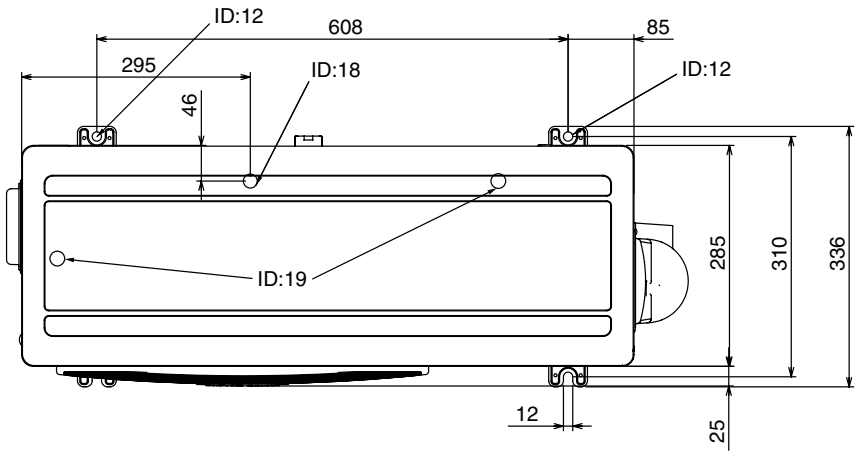
3. DIMENSIONAL DATA

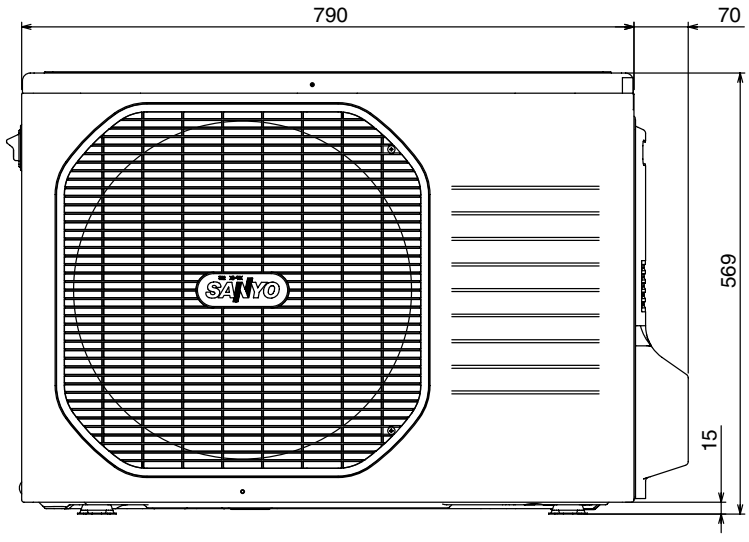
Indoor Unit **SAP-KRV94EHDX**
SAP-KRV124EHDX

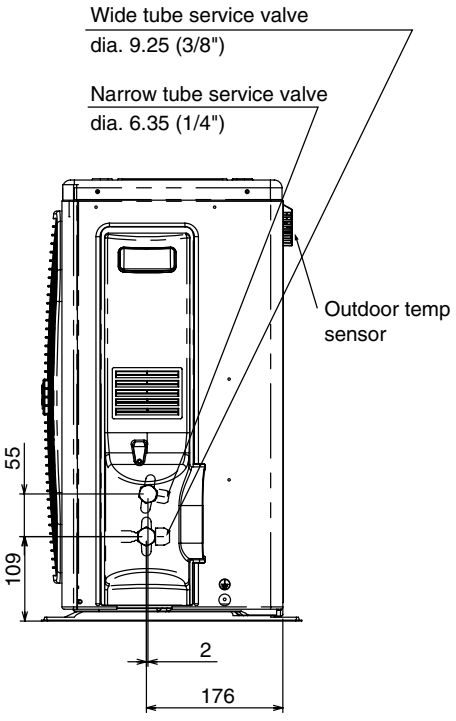


Unit: mm

Outdoor Unit **SAP-CRV94EHDX**
SAP-CRV124EHDX







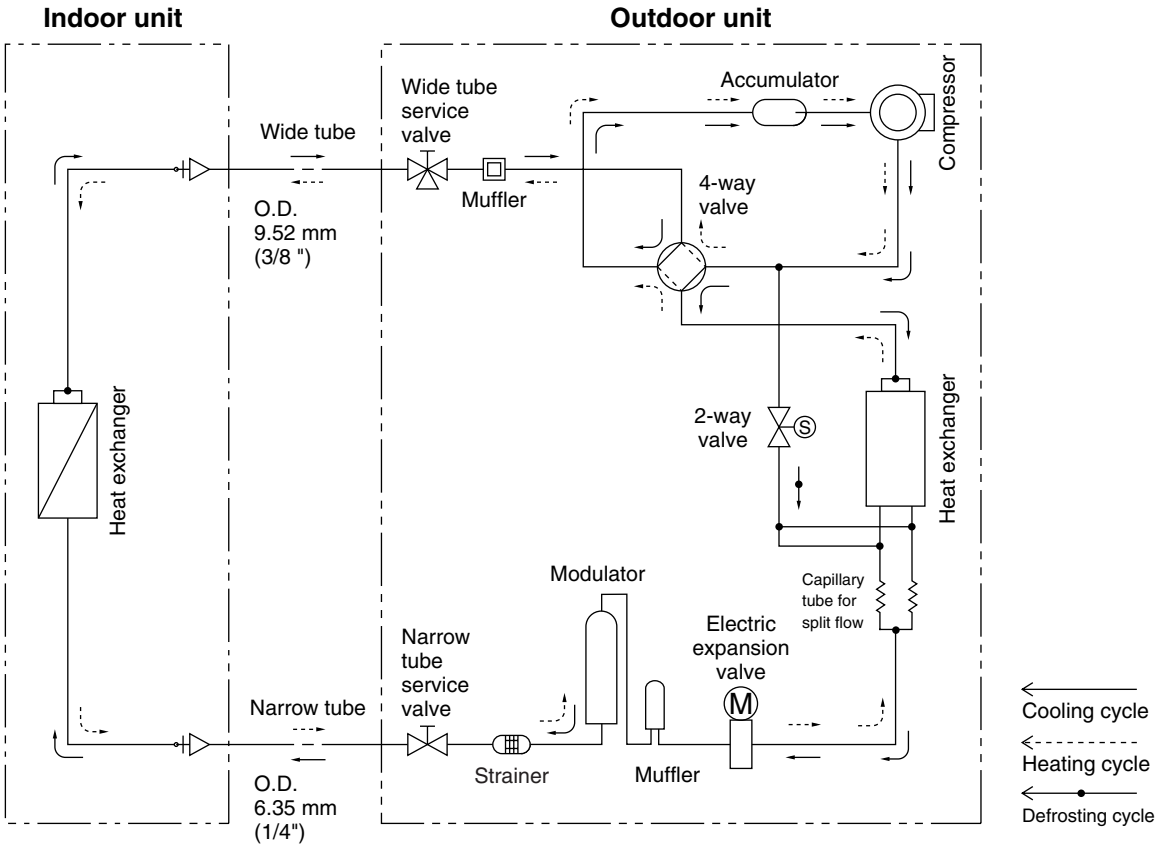
Unit: mm

4. REFRIGERANT FLOW DIAGRAM

4-1. Refrigerant Flow Diagram

Indoor Unit **SAP-KRV94EHDX**
SAP-KRV124EHDX

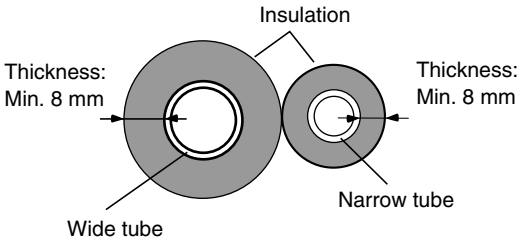
Outdoor Unit **SAP-CRV94EHDX**
SAP-CRV124EHDX



Insulation of Refrigerant Tubing

IMPORTANT

Because capillary tubing is used in the outdoor unit, both the wide and narrow tubes of this air conditioner become cold. 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 min. 8 mm.



CAUTION

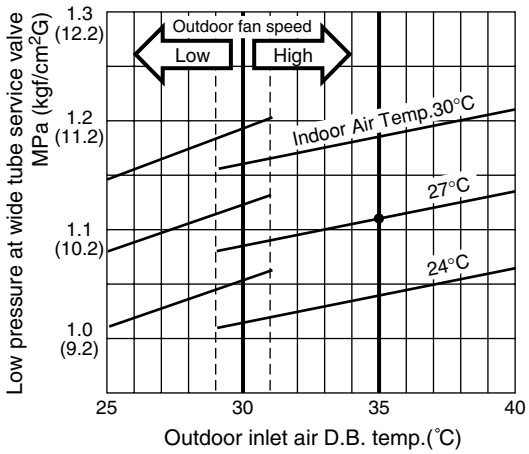
After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.

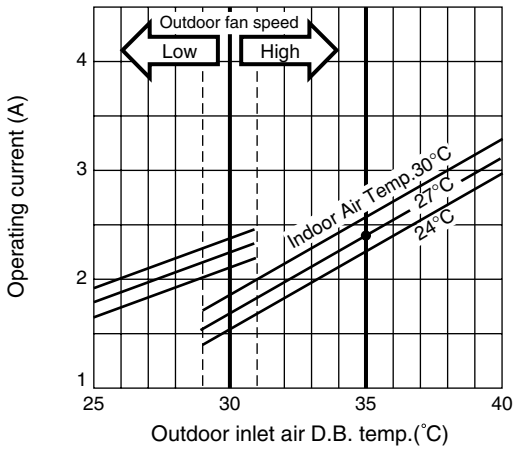
5. PERFORMANCE DATA

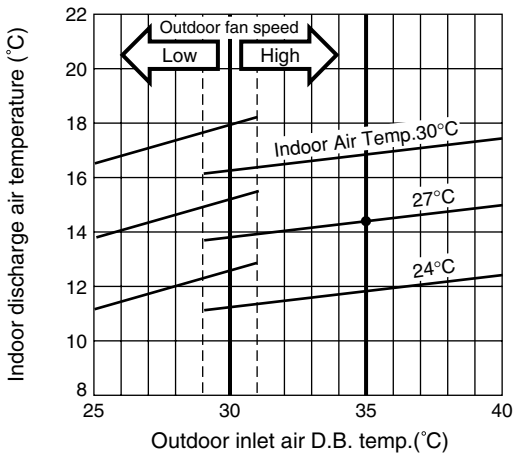
5-1. Temperature Charts

Indoor Unit **SAP-KRV94EHDX**
Outdoor Unit **SAP-CRV94EHDX**

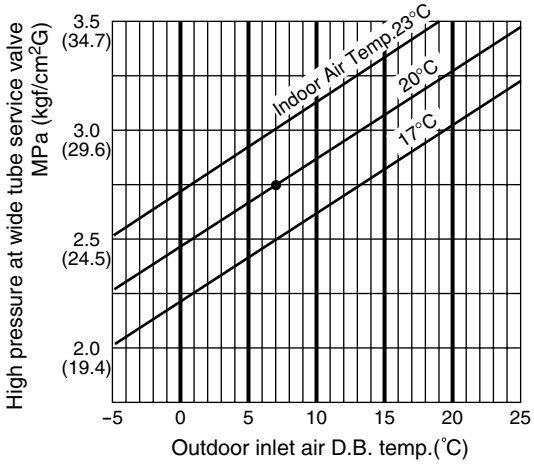
■ Cooling Characteristics

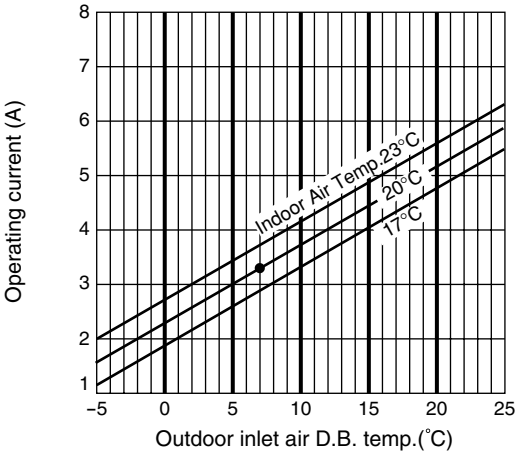


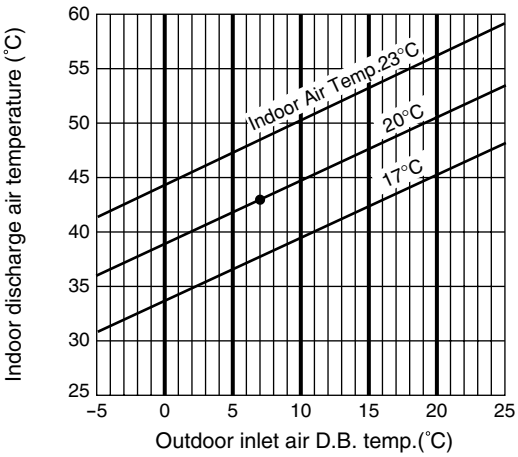




■ Heating Characteristics







NOTE

- Check each performance value in test-run mode. Electrical performance values represent a combined indoor/outdoor value.
- Overload prevention operates to protect the air conditioner when outdoor ambient temperature becomes extremely high in heating mode. (Refer to "9-2. Overload prevention during heating.")

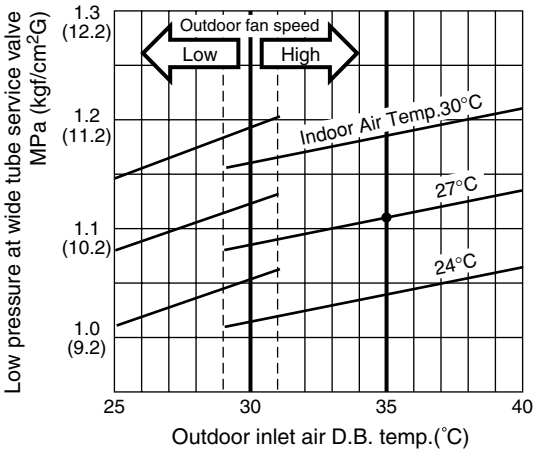
●:Points of rating condition
Black dots in above charts indicate the following rating conditions.

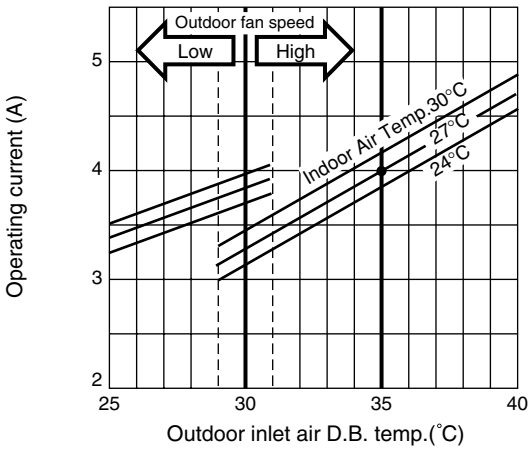
Cooling: Indoor air temperature 27 °C D.B. / 19 °C W.B.
Outdoor air temperature 35 °C D.B. / 24 °C W.B.

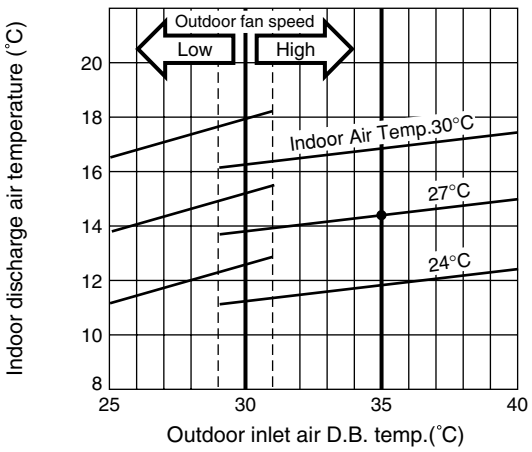
Heating: Indoor air temperature 20 °C D.B.
Outdoor air temperature 7 °C D.B. / 6 °C W.B.

Indoor Unit **SAP-KRV124EHDX**
Outdoor Unit **SAP-CRV124EHDX**

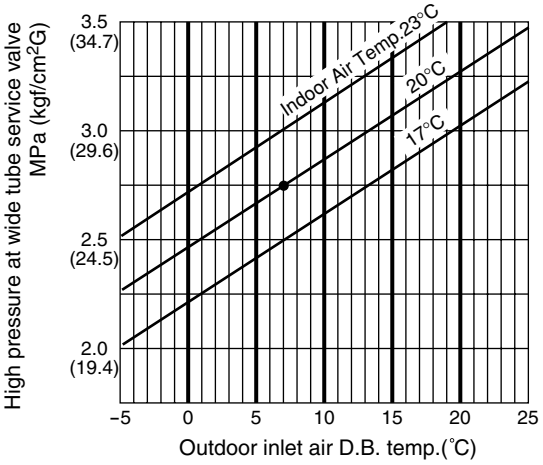
■Cooling Characteristics

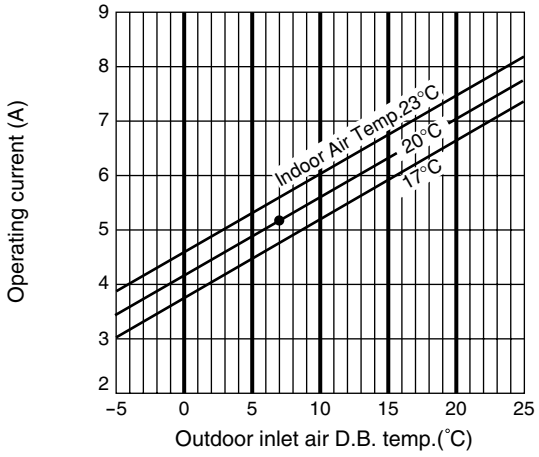


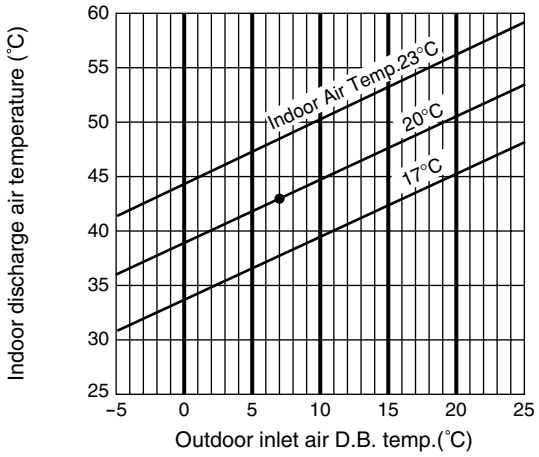




■Heating Characteristics







NOTE

- Check each performance value in test-run mode. Electrical performance values represent a combined indoor/outdoor value.
- Overload prevention operates to protect the air conditioner when outdoor ambient temperature becomes extremely high in heating mode. (Refer to "9-2. Overload prevention during heating.")

●:Points of rating condition
Black dots in above charts indicate the following rating conditions.

Cooling: Indoor air temperature 27 °C D.B. / 19 °C W.B.
Outdoor air temperature 35 °C D.B. / 24 °C W.B.

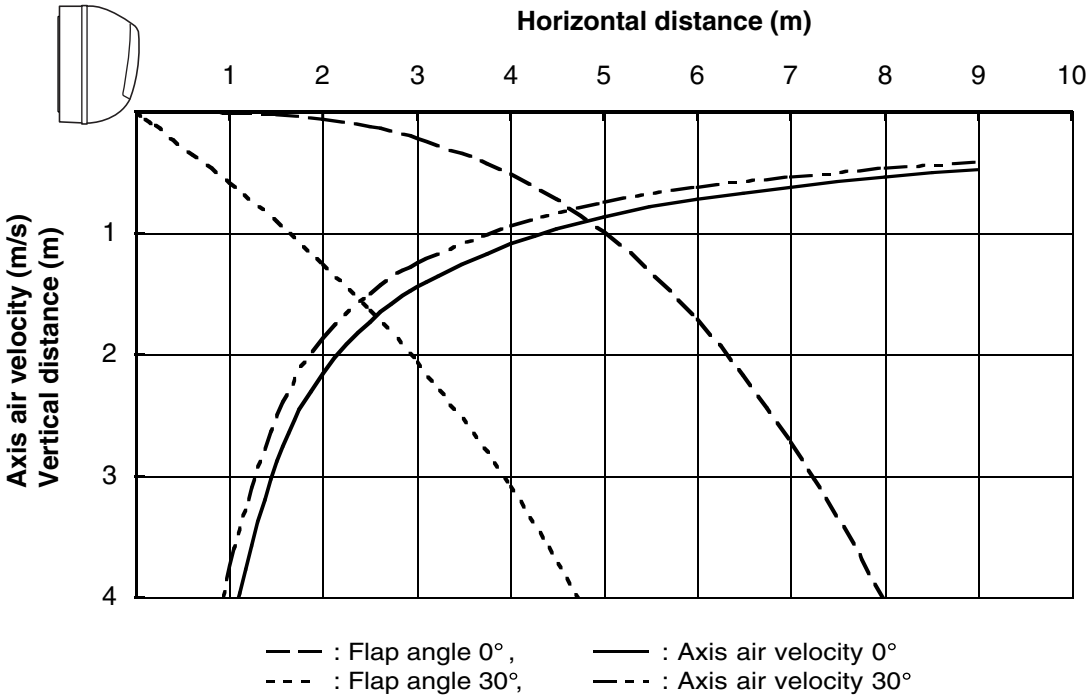
Heating: Indoor air temperature 20 °C D.B.
Outdoor air temperature 7 °C D.B. / 6 °C W.B.

5-2. Air Throw Distance Charts

Indoor Unit **SAP-KRV94EHDX**

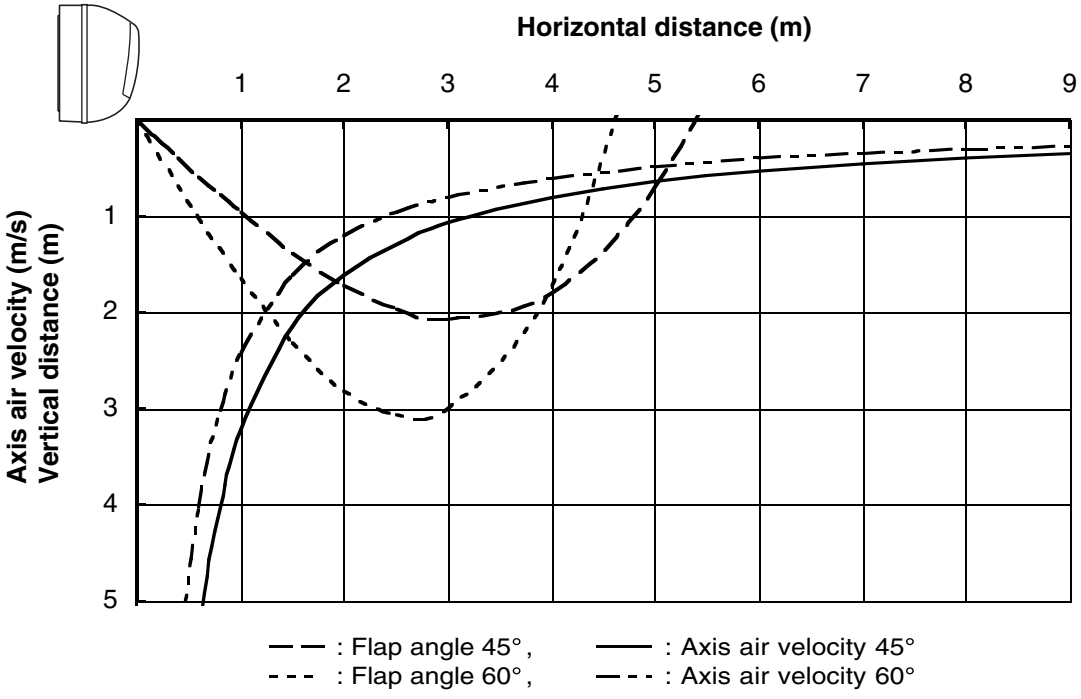
Cooling

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



Heating

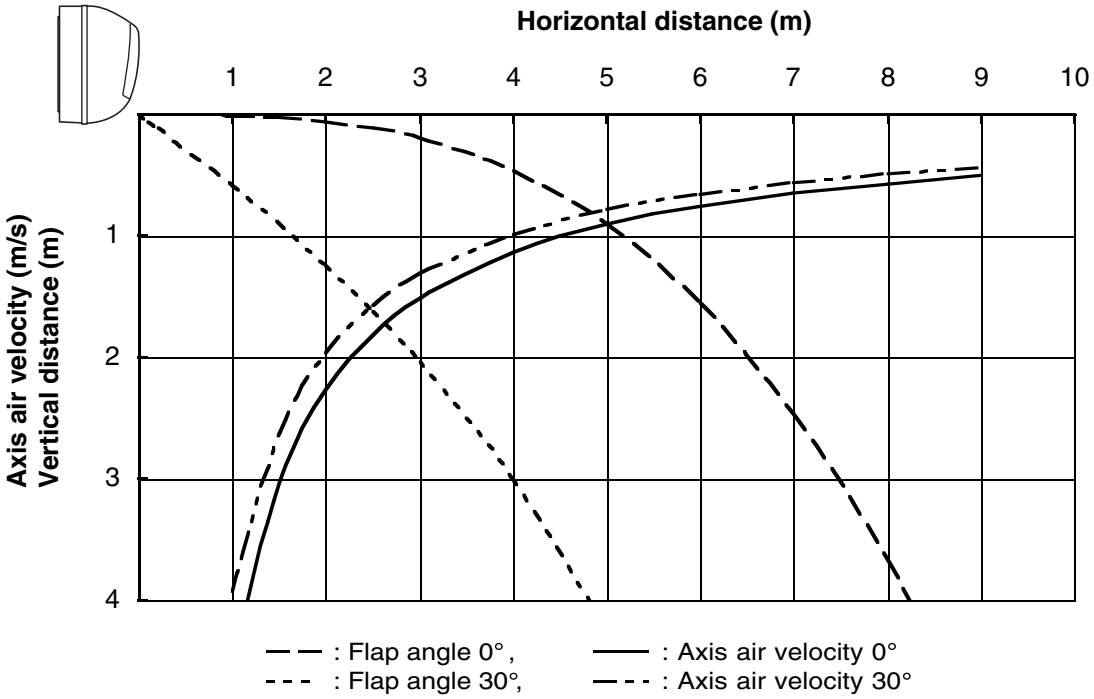
Room air temp. : 20 °C
Fan speed : High



Indoor Unit **SAP-KRV124EHDX**

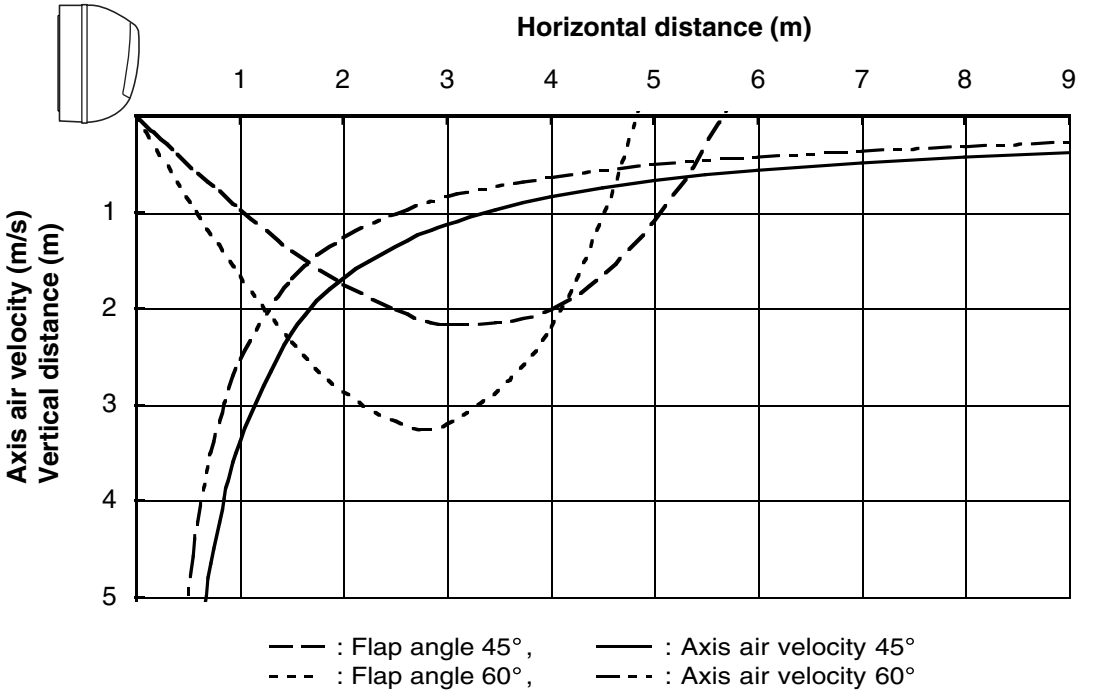
Cooling

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



Heating

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



6. ELECTRICAL DATA

6-1. Electrical Characteristics

Indoor Unit **SAP-KRV94EHDX**
Outdoor Unit **SAP-CRV94EHDX**

Cooling

			Indoor Unit	Outdoor Unit	Complete Unit
			Fan Motor	Fan Motor + Compressor	
Performance at			230V Single-phase 50Hz		
Rating conditions	Running amp.	A	0.35	2.05	2.4
	Power input	kW	0.028	0.502	0.530

Rating conditions: Indoor air temperature: 27 °C D.B. / 19 °C W.B.
Outdoor air temperature: 35 °C D.B.

Heating

			Indoor Unit	Outdoor Unit	Complete Unit
			Fan Motor	Fan Motor + Compressor	
Performance at			230V Single-phase 50Hz		
Rating conditions	Running amp.	A	0.35	2.95	3.3
	Power input	kW	0.028	0.692	0.720

Rating conditions: Indoor air temperature 20 °C D.B.
Outdoor air temperature 7 °C D.B. / 6 °C W.B.

Indoor Unit **SAP-KRV124EHDX**
Outdoor Unit **SAP-CRV124EHDX**

Cooling

			Indoor Unit	Outdoor Unit	Complete Unit
			Fan Motor	Fan Motor + Compressor	
Performance at			230V Single-phase 50Hz		
Rating conditions	Running amp.	A	0.35	3.65	4.0
	Power input	kW	0.028	0.847	0.875

Rating conditions: Indoor air temperature: 27 °C D.B. / 19 °C W.B.
Outdoor air temperature: 35 °C D.B.

Heating

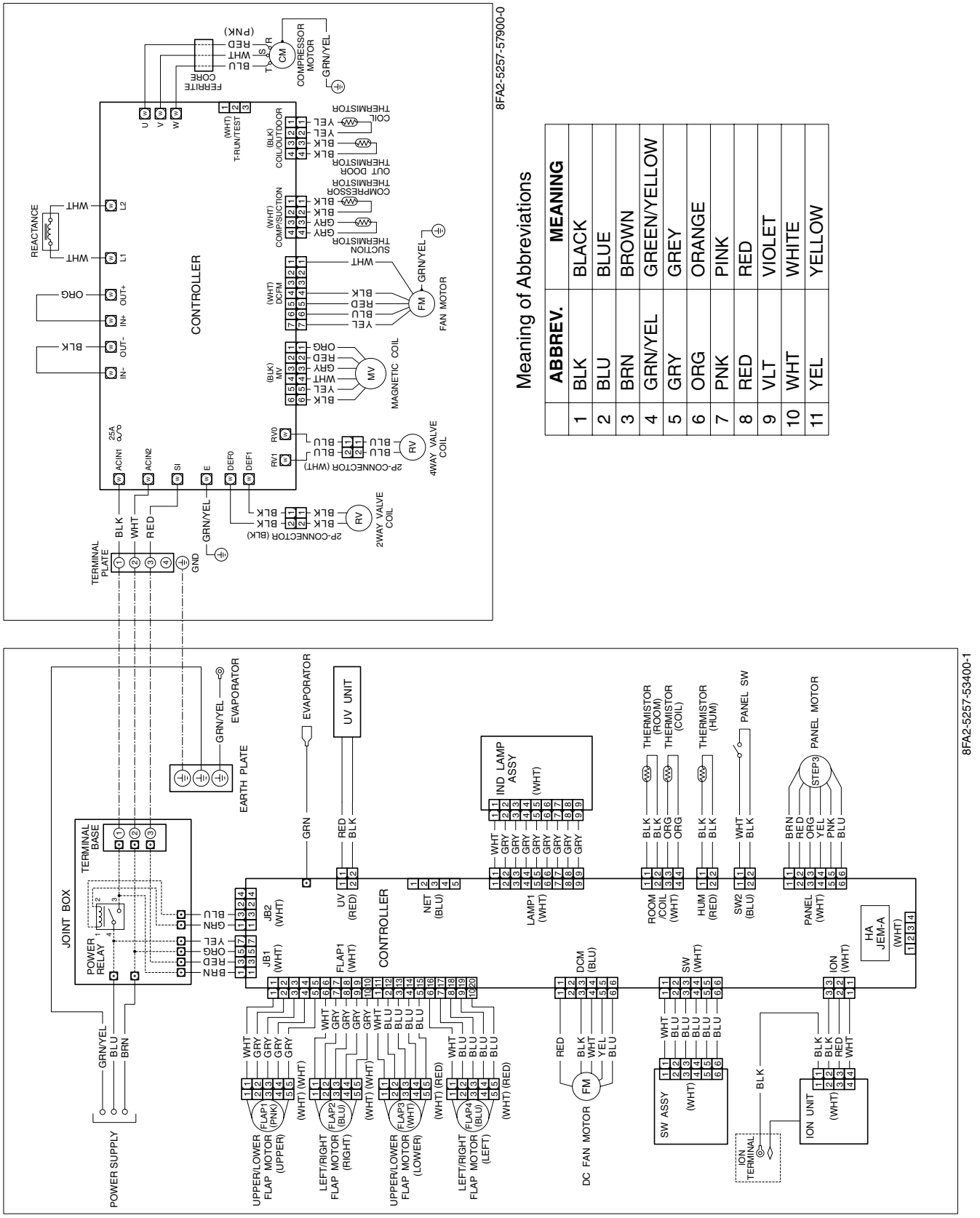
			Indoor Unit	Outdoor Unit	Complete Unit
			Fan Motor	Fan Motor + Compressor	
Performance at			230V Single-phase 50Hz		
Rating conditions	Running amp.	A	0.35	4.85	5.2
	Power input	kW	0.028	1.112	1.140

Rating conditions: Indoor air temperature: 20 °C D.B.
Outdoor air temperature: 7 °C D.B. / 6 °C W.B.

6-2. Electric Wiring Diagrams

Indoor Unit **SAP-KRV94EHDX SAP-KRV124EHDX**
Outdoor Unit **SAP-CRV94EHDX SAP-CRV124EHDX**

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



Meaning of Abbreviations

	ABBREV.	MEANING
1	BLK	BLACK
2	BLU	BLUE
3	BRN	BROWN
4	GRN/YEL	GREEN/YELLOW
5	GRY	GREY
6	ORG	ORANGE
7	PNK	PINK
8	RED	RED
9	VLT	VIOLET
10	WHT	WHITE
11	YEL	YELLOW

7. INSTALLATION INSTRUCTIONS

7-1. Installation Site Selection

7-1-1. Indoor Unit

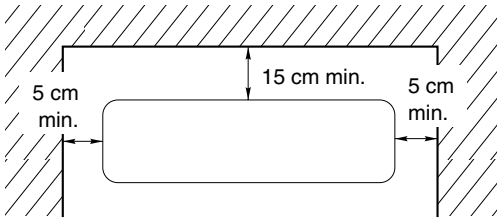
WARNING **To prevent abnormal heat generation and the possibility of fire, do not place obstacles, enclosures and grilles in front of or surrounding the air conditioner in a way that may block air flow.**

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.
- allow room for operation and maintenance as well as unrestricted air flow around the unit. (Fig. 1)
- install the unit within the maximum elevation difference (H) above or below the outdoor unit and within a total tubing length (L) from the outdoor unit as detailed in Table 1 and Fig. 2.
- Install the indoor unit 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.



Front View

Fig. 1

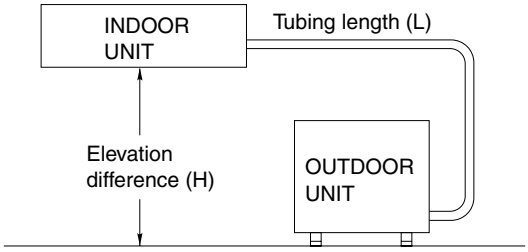


Fig. 2

CAUTION

For stable operation of the air conditioner, do not install wall-mounted type indoor units less than 1.5 m from floor level.

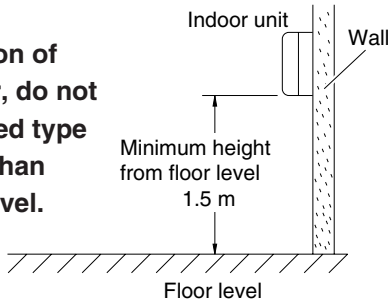


Fig. 3

Table 1

Model	Max. Allowable Tubing Length at Shipment (m)	Limit of Tubing Length (L) (m)	Limit of Elevation Difference (H) (m)	Required Amount of Additional Refrigerant (g/m)*
KRV94 / 124	7.5	15	10	15

* If total tubing length becomes 7.5 to 15 m, charge additional refrigerant (R410A) by 15 g/m.
No additional charge of compressor oil is necessary.

7-1-2. Outdoor Unit

AVOID:

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

DO:

- position the outdoor unit in a protected location where snow will not blow into it.
- 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, 10 × 40 cm beams or equal), a minimum of 10 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.
- Install in a location where no antenna of a television or radio exists within 3 meters.

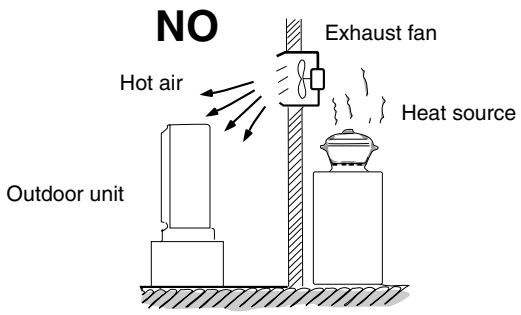
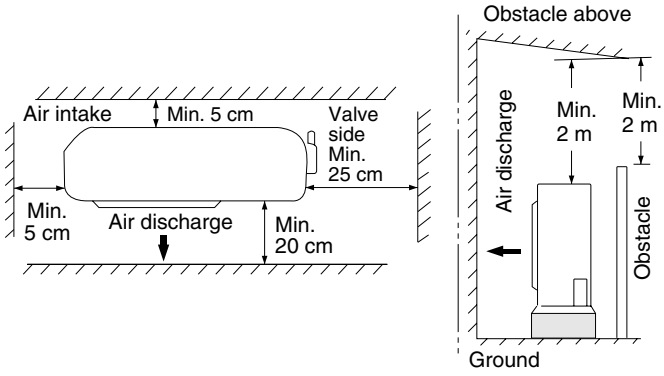


Fig. 4



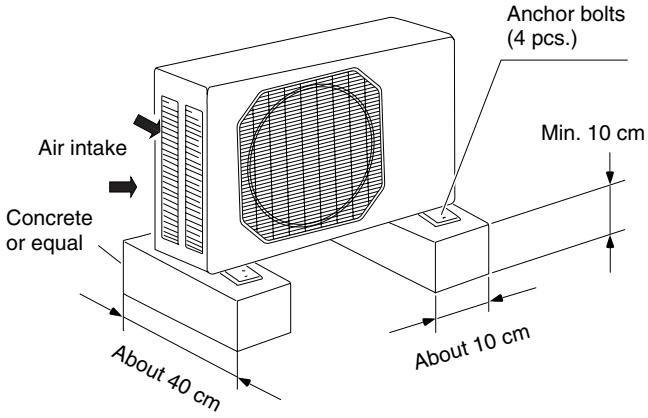


Fig. 5a

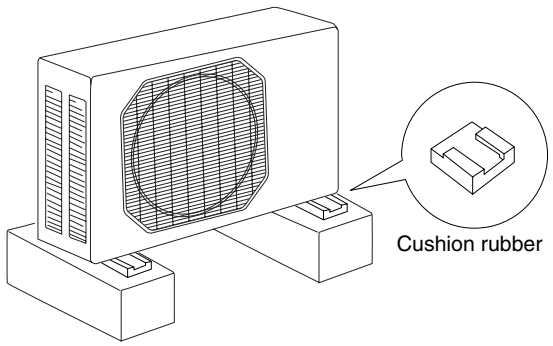


Fig. 5b

7-2. 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 2 lists recommended wire lengths and diameters for power supply systems.

NOTE

Refer to the wiring system diagram (Fig. 6) for the meaning of (A), (B) and (C) in Table 2.

Table 2

Cross-Sectional Area (mm^2) / Model	(A)+(B) (A) Power Supply Wiring Length (m) (B) Power Line Length (m)		(C) Control Line Length (m)	Fuse or Circuit Breaker Capacity
	2	3.5	2	
CRV94	33	51	20	15A
CRV124	33	51	20	

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.**

WARNING

- **To avoid the risk of electrical shock, each air conditioner unit must be grounded.**
- **For the installation of a grounding device, please observe local electrical codes.**
- **Grounding is necessary, especially for units using inverter circuits, in order to release charged electricity and electrical noise caused by high tension. Otherwise, electrical shock may occur.**
- **Place a dedicated ground more than 2 meters away from other grounds and do not have it shared with other electric appliances.**

CAUTION

- **Be sure to connect the power supply line to the indoor unit as shown in the wiring diagram. The outdoor unit draws its power from the indoor unit.**
- **Do not run wiring for antenna, signal, or power lines of television, radio, stereo, telephone, security system, or intercom any closer than 1 meter from the power cable and wires between the indoor and outdoor units. Electrical noise may affect the operation.**

WIRING SYSTEM DIAGRAM

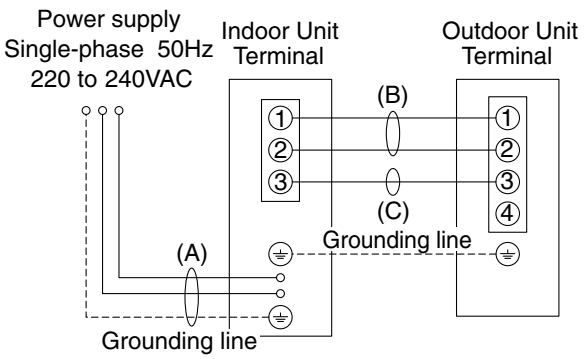


Fig. 6

7-3. Remote Control Unit Installation Position

The remote control unit can be operated from either a non-fixed position or a wall-mounted position.
To ensure that the air conditioner operates correctly, do not install the remote control unit in the following places:

- In direct sunlight
- Behind a curtain or other place where it is covered
- More than 8 m away from the air conditioner
- In the path of the air conditioner's airstream
- Where it may become extremely hot or cold
- Where it may be subject to electrical or magnetic interference
- Where there is an obstacle between the remote control unit and the air conditioner (since a check signal is sent from the remote control unit every 5 minutes)

7-3-1. Mounting on a Wall

Before mounting the remote control unit, press the ON/OFF operation button at the mounting location to make sure that the air conditioner operates from that location. The indoor unit should make a beeping sound to indicate that it has received the signal.

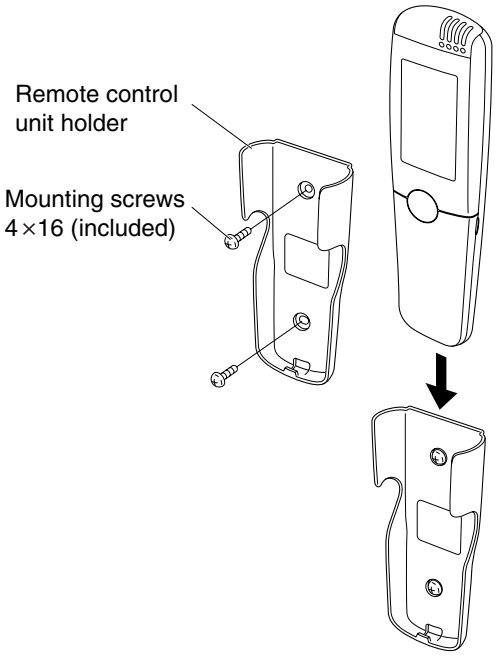


Fig. 7

7-4. How to Test Run the Air Conditioner

IMPORTANT

Use a sharp object when accessing ON/OFF and TEST buttons in the indoor unit.

After turning on power to the air conditioner, use the remote controller and follow the steps below to conduct the test run.

(1) Either press the ON/OFF button on the indoor unit or use the remote controller to start the Air Conditioner. (Figs. 8a and 8b)

(2) Press and hold down the TEST RUN button on the indoor main unit controller until a beep is heard. At this time, all indicator lamps begin blinking.(Figs. 8a and 8c)

- If the outdoor unit has not started approximately 5 minutes after the start of the test run, execute self diagnostics.

  To execute self diagnostics, while the unit is stopped press and hold down the TEST RUN button until a beep is heard. Self diagnostics begins when the TEST RUN button is released.

(3) Press the ON/OFF operation button to end the test run. At this time, operation from the remote controller becomes possible.

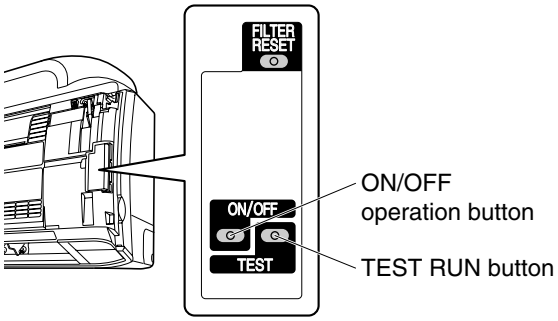


Fig. 8a

Fig. 8b

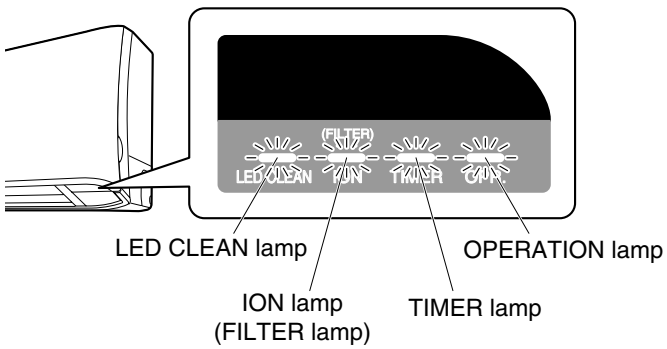


Fig. 8c

7-5. Remove the Grille to Install the Indoor Unit

Basically, these models can be installed and wired without removing the grille. If access to any internal part is needed, follow the steps as given below.

How to remove the grille

(1) Open the front panel until it is nearly horizontal, grasp the sections near the front panel arms on both sides, and then pull forward to remove the front panel. (Fig. 9)

(2) Remove the screw from the top right of the main unit. Also remove the screws where the screw covers are open. (Fig. 10)

(3) Press the 3 tabs on the top of the grille to disengage them. (Fig. 10)

(4) Pull the grille toward you to remove it. (Fig. 10)

How to replace the grille

(1) Insert the bottom of the grille into the flap, with the flap at a more-or-less horizontal position.

(2) While aligning both edges of the grille with the frame, move the panel horizontally and insert the top and bottom into the frame.

(3) Press the air outlet firmly with your hand to ensure no gap exists between the main unit and grille.

(4) Tighten the screws and close the screw covers.

(5) Grasp the sections near the front panel arms on both sides, hold the front panel so that it is nearly horizontal, bring the arm shafts into contact with the top of the grooves on the right and left sides of the air conditioner, and then push firmly until the arm shafts click into place. (Fig. 11)

(6) After closing the front panel, press firmly on the parts indicated by the arrows to securely fasten the panel in place. (Fig. 12)

NOTE

Check that no gap exists between the main unit and grille.

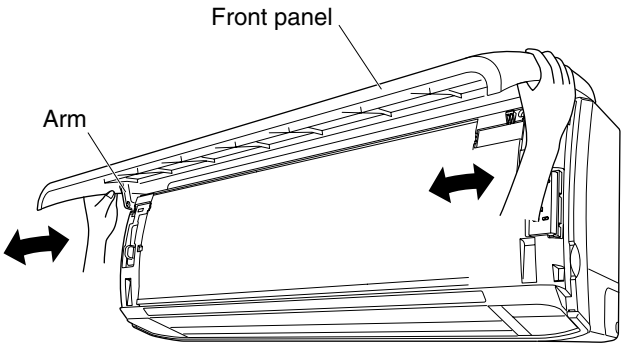


Fig. 9

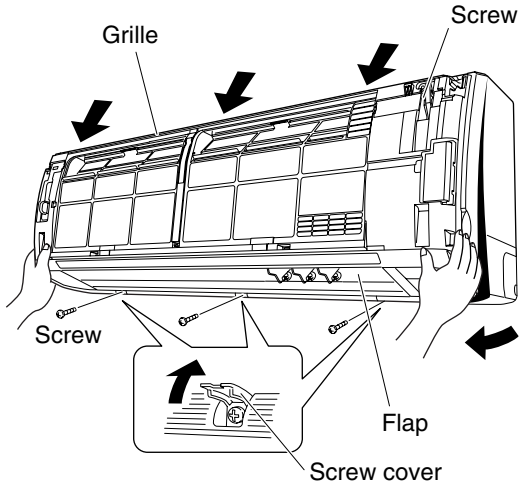


Fig. 10

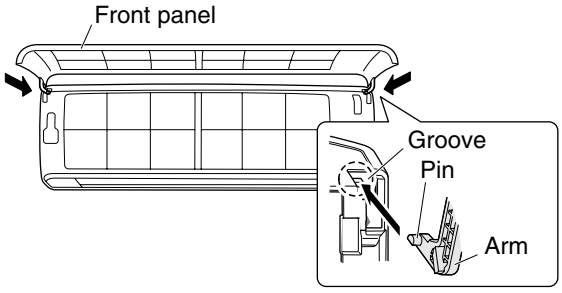


Fig. 11

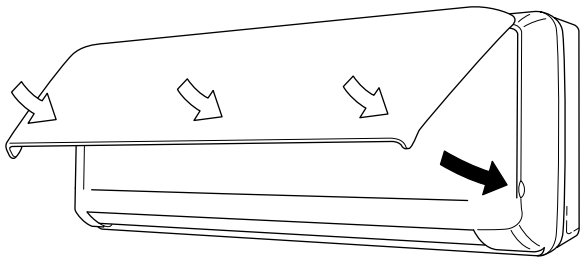


Fig. 12

8. MAINTENANCE

8-1. Address Setting of the Remote Control Unit

The address can be set in order to prevent interference between remote controllers when two Sanyo indoor units are installed near each other. The address is normally set to "A." To set a different address, it is necessary to change the address on the second remote controller.

NOTE

Once changed, you cannot restore the original address setting of the air conditioner.

Switching the remote controller address

(1) Open the cover on the bottom of the remote controller. Break the address change tab to switch the address to B. (Fig. 13)

(2) Insert dry cell batteries into the remote controller and attach the cover.

(3) Open the front panel on the stopped indoor unit, and use a sharp object to press the TEST button on the main unit controller. Verify that the indoor unit produces the "beep beep" signal-reception sound, then release the button. (Fig. 14)

(4) Next, within 5 seconds after the beep sound is heard from the indoor unit, press the remote con troller ON/OFF button and verify that the 5 beeps signal-reception sound occurs again. (Fig. 15)

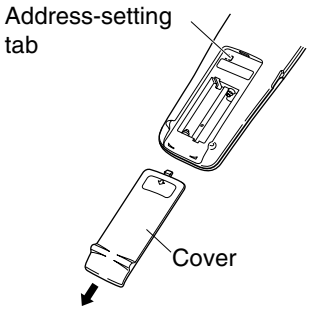


Fig. 13

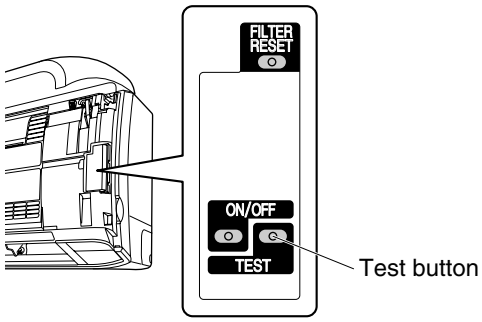


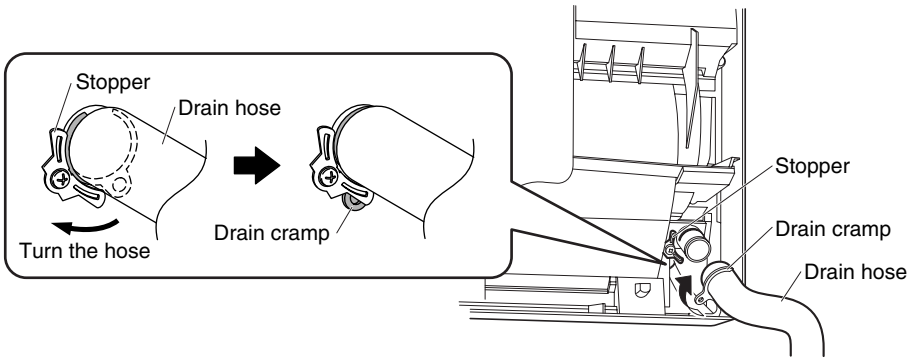
Fig. 14

Fig. 15

8-2. Removing and Mounting the Drain Hose

(1) Before removing the drain hose, remove the cramp from the stopper to check the location of the drain cramp at the end of the hose, and pull the hose out while turning it.

(2) To mount the drain hose, insert the hose all the way into the outlet of the drain pan with the drain cramp face down. Then put it in place so that the drain cramp is placed beneath the stopper.
After mounting it, be sure to check that the drain hose is firmly mounted.



8-3. Removing the Electrical Component Box

(Before replacing the P.C.Board with another, remove the electrical component box from the main body and its cover plate.)

(1) Remove the grille.

(2) Prior to remove the electrical component box, carry out the following:

(2-1) Remove the operating box of the main body and electrical component box pad plate 1.

(2-2) Disconnect all the connectors located on the P.C.Board.

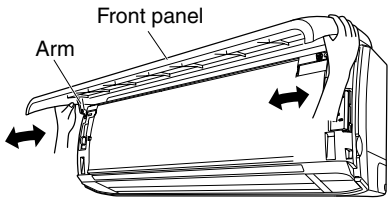
(2-3) Take wiring out of the electrical component box.

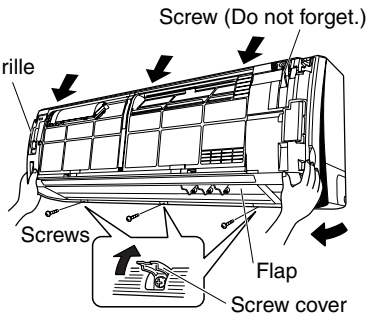
(2-4) Fold down the electrical component box pad plate 2 forward and remove the electromagnetic valve coil connector.

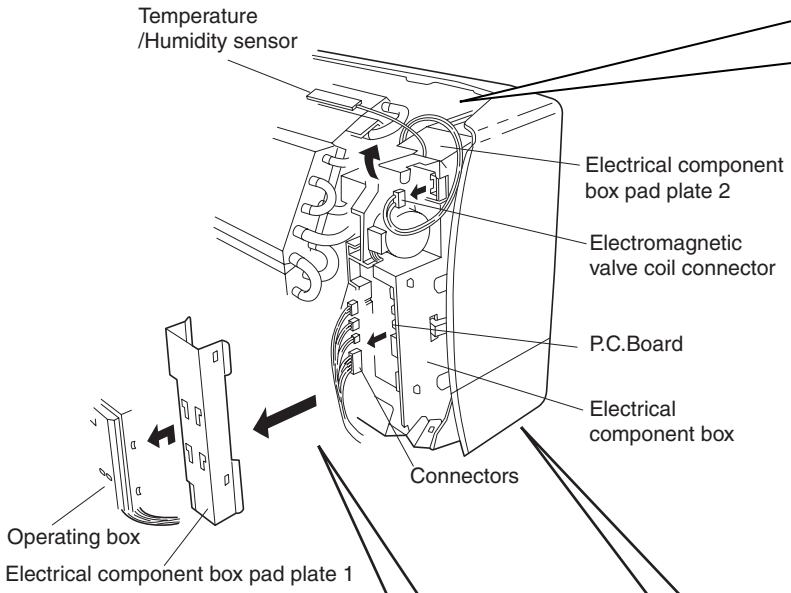
(2-5) Remove the temperature/humidity sensor.

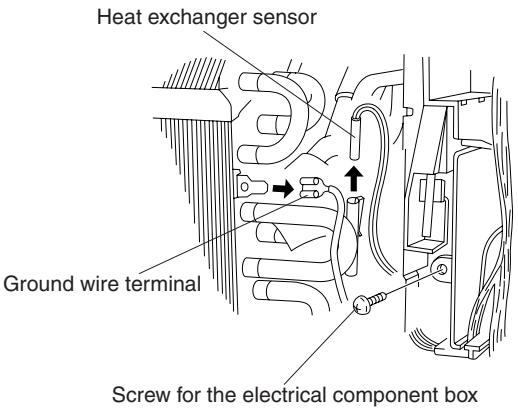
Removing the grille

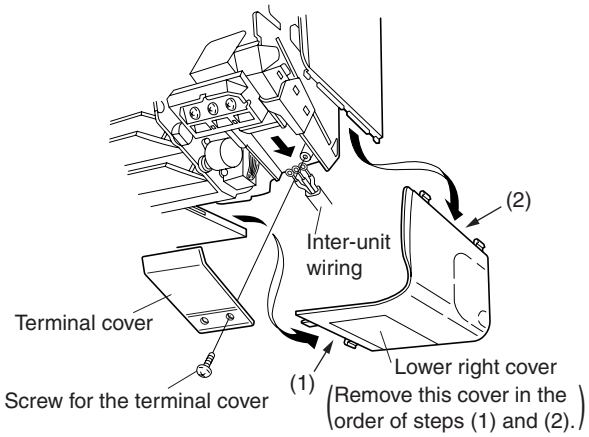
1. Fully open the front panel, pulls the front panel while holding its part adjacent to the arm, and remove the front panel.
2. Remove the screw on top right of the main body. Also remove the screw found when the screw cover is opened.
3. Push three tabs on top side of the ornamental panel to remove them.
4. Pull the grille forward to remove it as it is.











(2-6) Remove the heat exchanger sensor and ground wire terminal.

(2-7) Remove screws for the electrical component box.

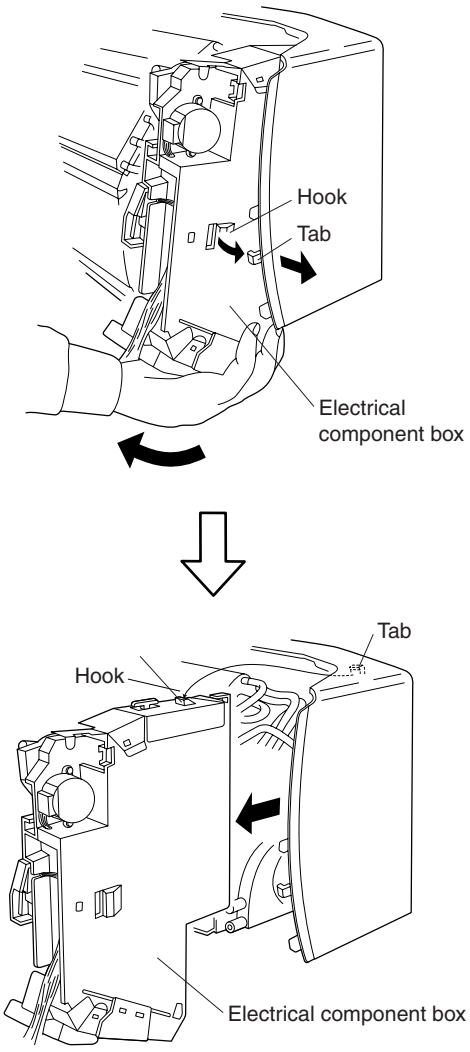
(2-8) Remove the lower right cover.

(2-9) Remove the terminal cover and remove the inter-unit cables.

(3) Removing the electrical component box.

(3-1) Slightly expand the side of the main body to the right side and unhook the tabs.

(3-2) Holding the bottom of the electrical component box while keeping the main body as it is in (3-1) above, release the tab at the top of the electrical component box.

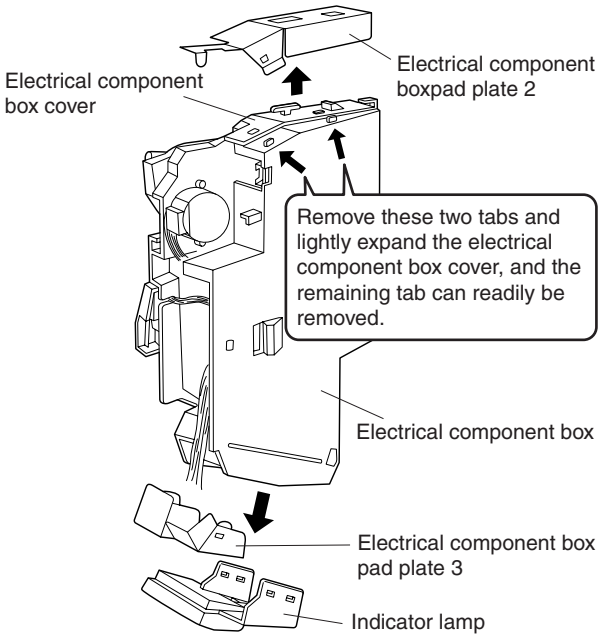


(4) Removing the P.C.Board

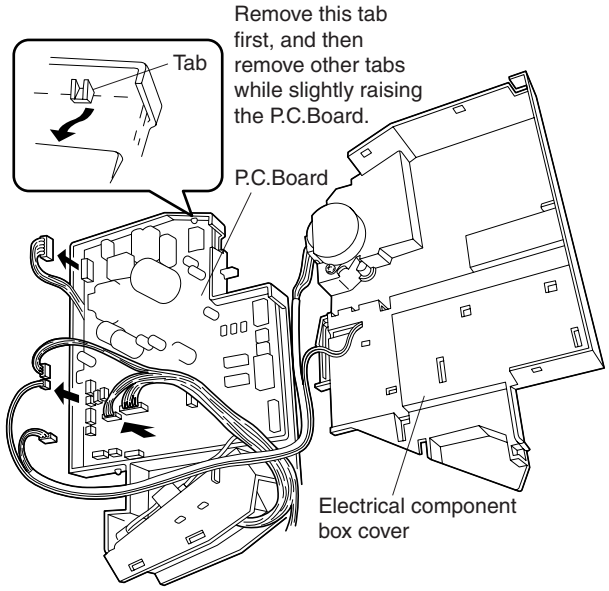
(4-1) Remove the indicator lamp, electrical component box pad plates 3 and 2.

(4-2) Remove the electrical component box cover.

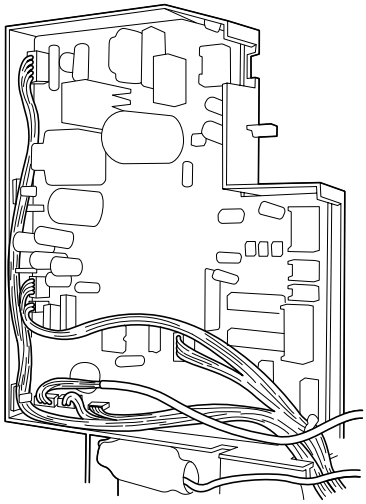
NOTE **To replace the panel motor, proceed to "8-4. Removing the Panel Motor".**



(4-3) Disconnect all the connectors on the P.C.Board.
(4-4) Replace the P.C.Board.



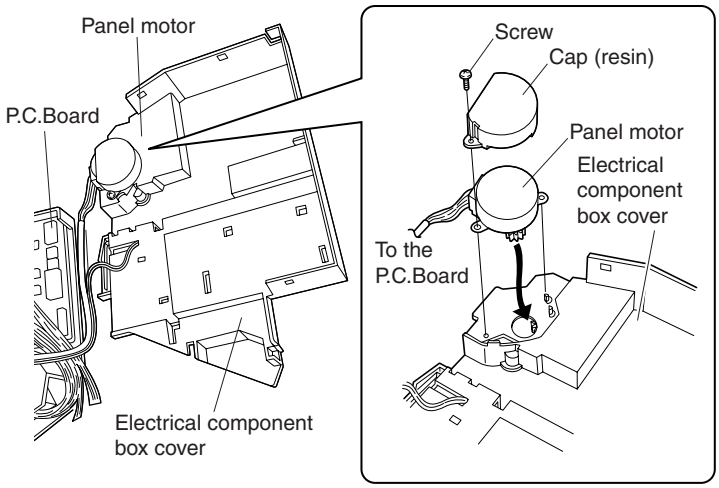
(4-5) Pulling out the lead wire after replacing the P.C.Board.



8-4. Removing the Panel Motor

Remove the electrical component box cover according to the previous section.
And carry out the procedure up to the "step (4-2) in 8-3. Removing the electrical component box."

(1) Disconnect and remove the connector for the lead wire of the panel motor at the P.C.Board side.
(2) Remove the screw on the panel motor and cap (resin).



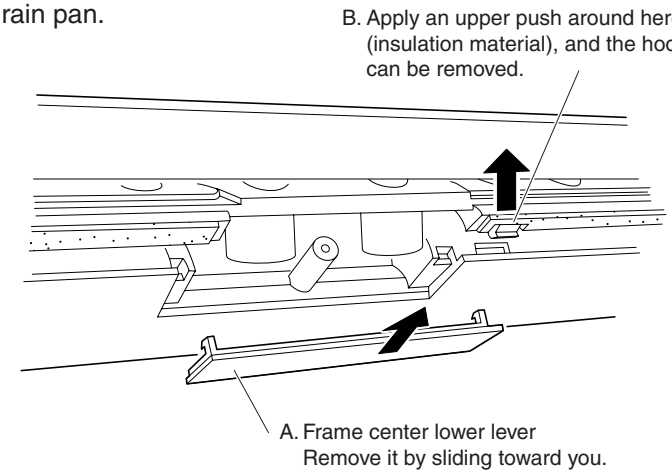
NOTE **When mounting a new panel motor, make sure that the gear of the panel motor and that of the electrical component box cover firmly engage with each other.**

8-5. Removing and Mounting the Drain Pan (Air Outlet Ass'y)

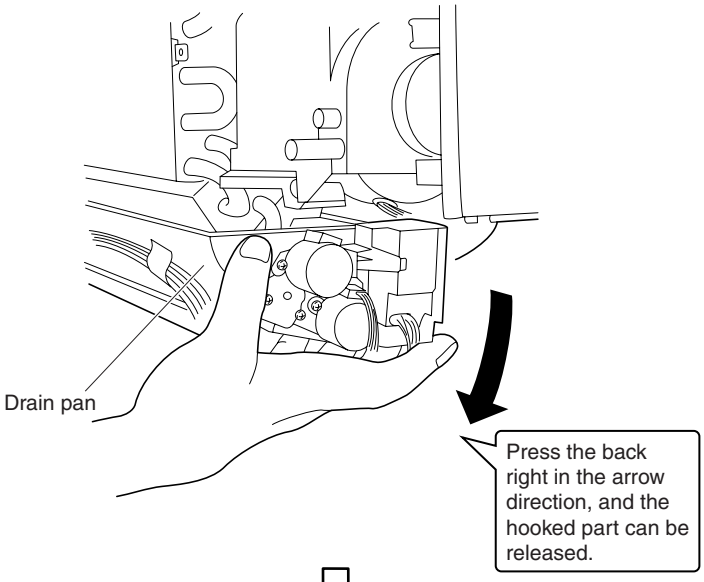
8-5-1. Removing the Drain Pan (Air Outlet Ass'y)

(1) Remove the hooks (1-1) to (1-3) which secure the drain pan.

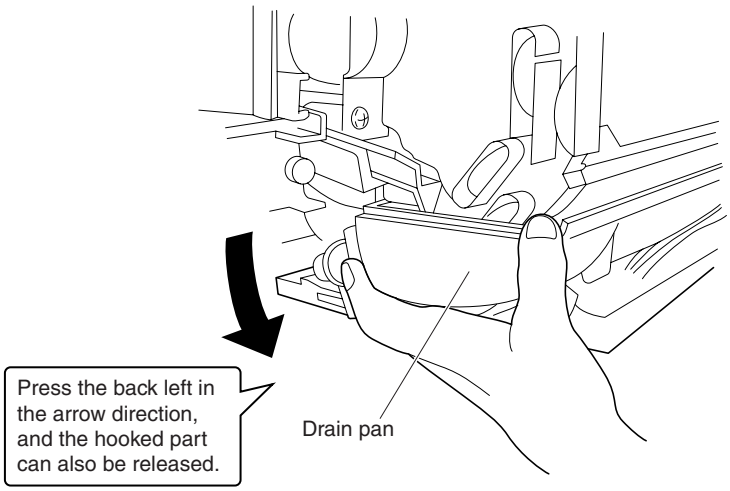
(1-1) Center part below the air outlet



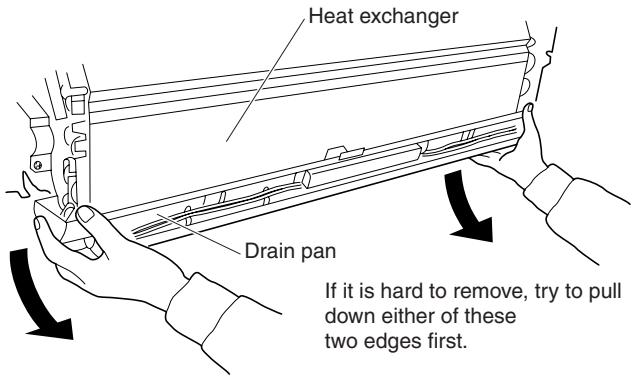
(1-2) Right side drain pan



(1-3) Left side drain pan



(2) Remove the drain pan from the main body so as to roll over the left side first toward you.

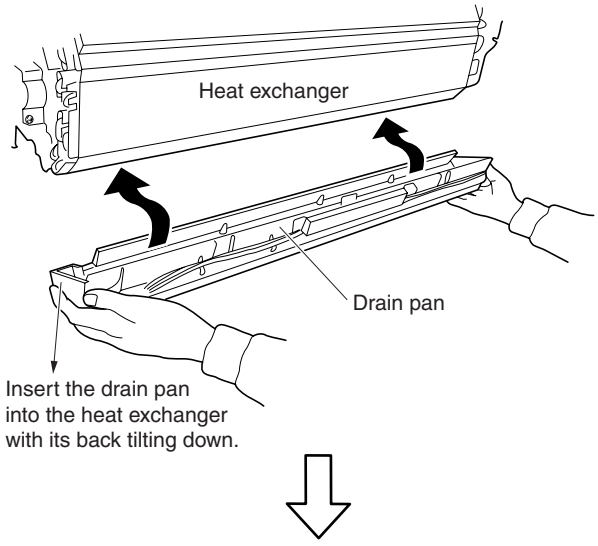


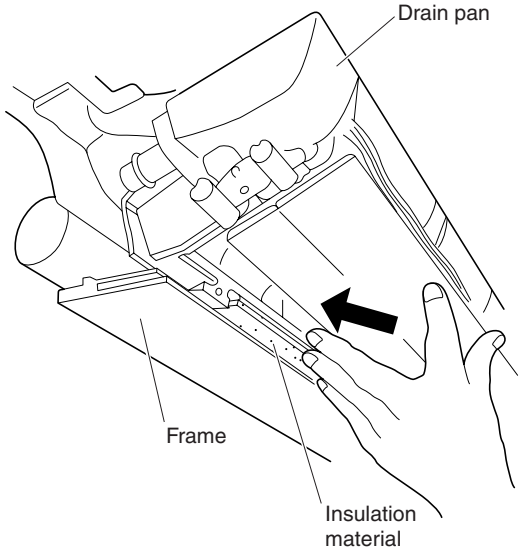
(3) Remove the drain hose according to "(1) of 8-2. Removing and Mounting the Drain Hose."

NOTE **Be careful not to spill the remaining water in the drain pan.**

8-5-2. Mounting the Drain Pan (Air Outlet Ass'y)

(1) Insert the drain pan from the bottom of the heat exchanger.





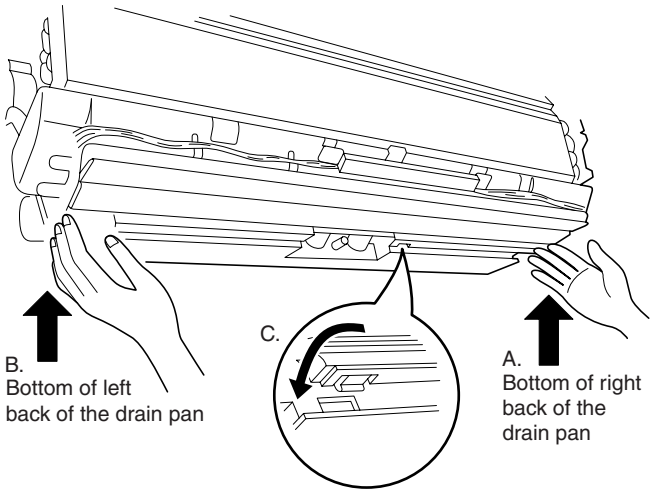
NOTE

While the drain pan is being inserted,
part of insulation material will touch the frame.

⇩

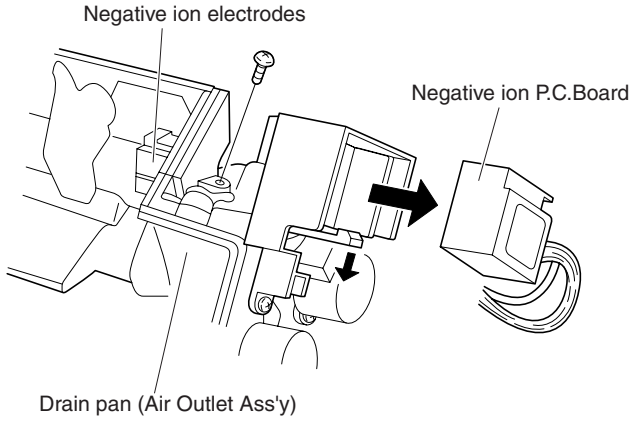
Push up the insulation material
with your finger so that it is put into place (for both sides).

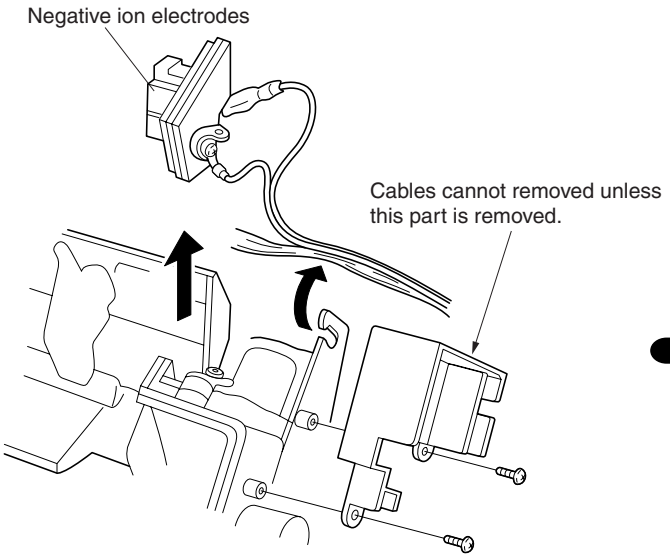
(2) Secure the drain pan to the hook.
(2-1) Push up A and B in the figure one by one from underneath to secure them to the hook.
(2-2) Also secure C to the hook.

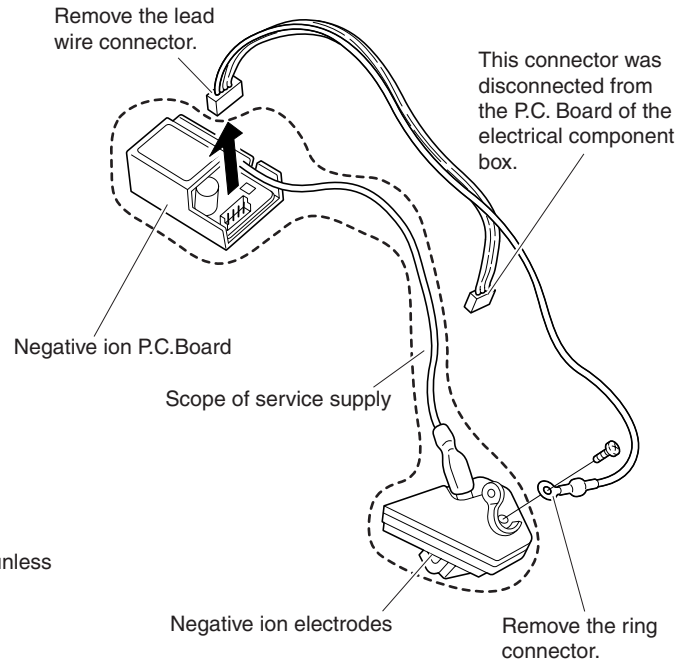


8-6. Removing the Negative Ion Generator

Remove the negative ion electrodes and negative ion P.C.Board from the drain pan (Air Outlet Ass'y).







NOTE **The negative ion generator is supplied with a set of negative ion electrodes and negative ion P.C.Board.**

8-7. Removing and Mounting the Fan Motor

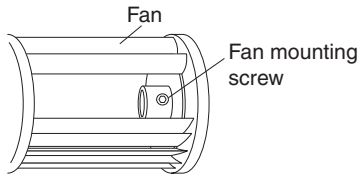
8-7-1. Removing the Fan Motor

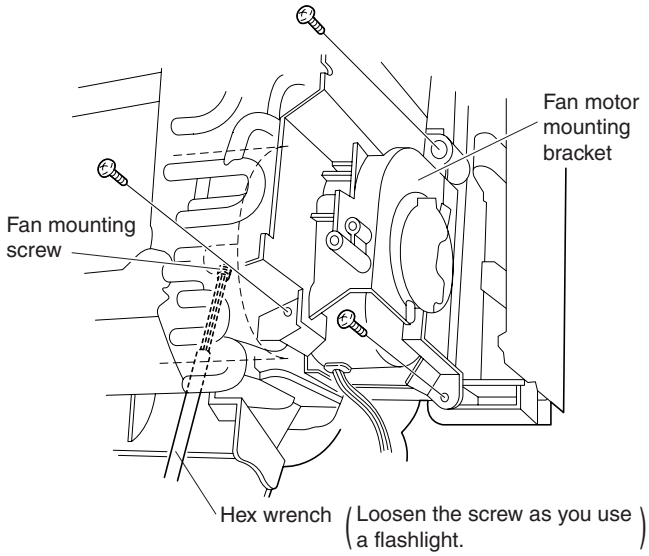
Remove the electrical component box cover according to the previous section.

(1) Loosen the fan mounting screw with a hex wrench of 2.5mm opposite side distance.

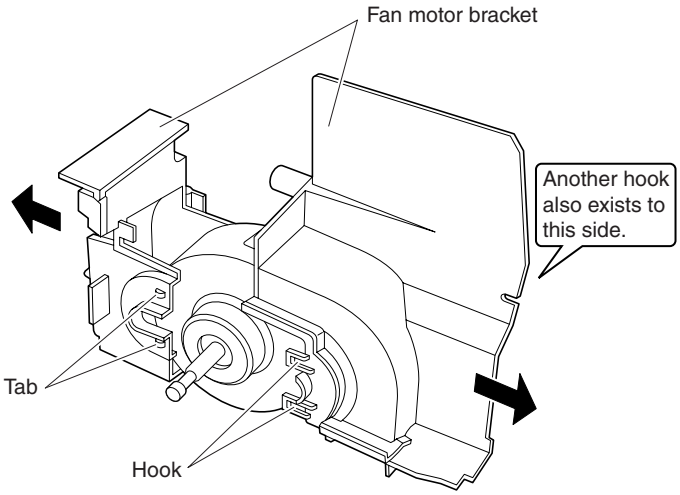
(2) Remove three screws which secure the fan motor.

(3) While removing the fan motor mounting bracket, pull out the fan motor shaft as well.



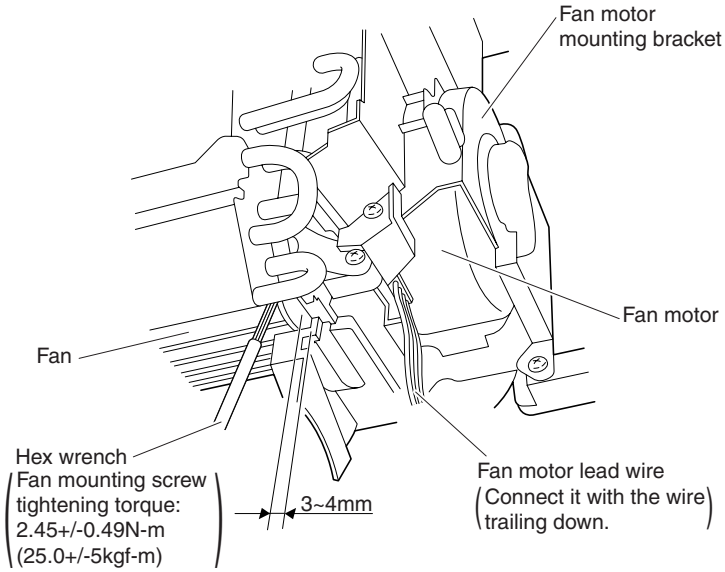


(4) Remove the tab of the fan motor bracket and separate into two parts.



8-7-2. Mounting the Fan Motor

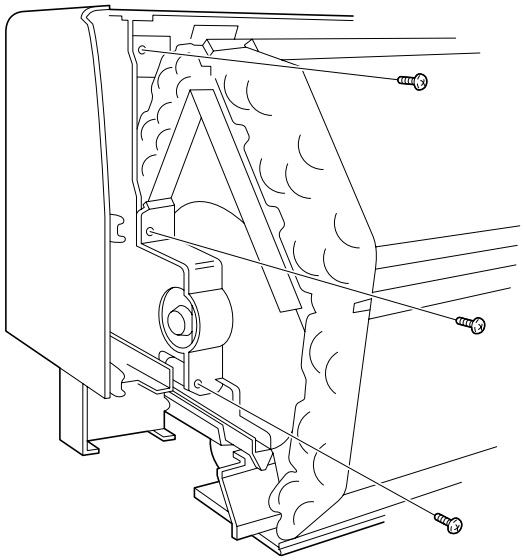
To mount the fan motor, reverse the steps for removal.



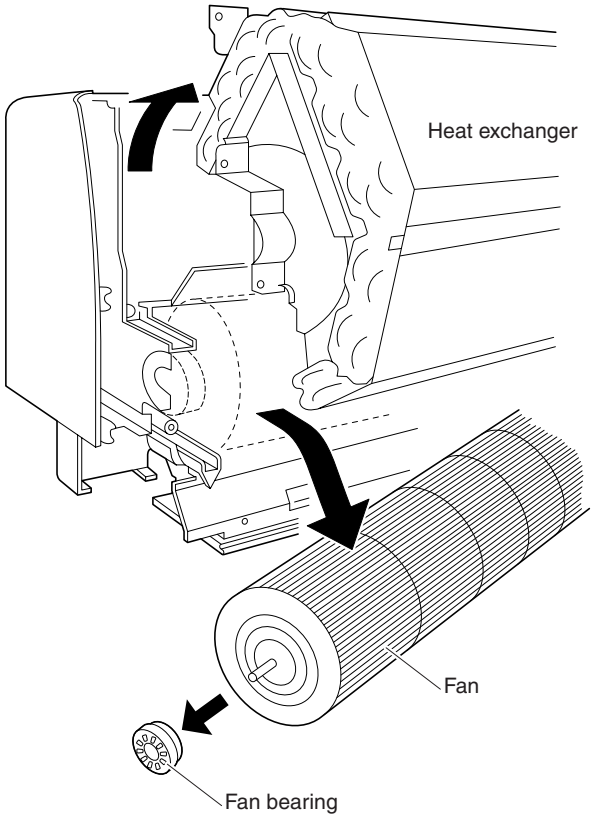
8-8. Removing the Fan

NOTE **Be sure to proceed after having removed the drain pan (Air Outlet Ass'y) and fan motor according to sections "8-5. and 8-7."**

(1) Remove three screws.

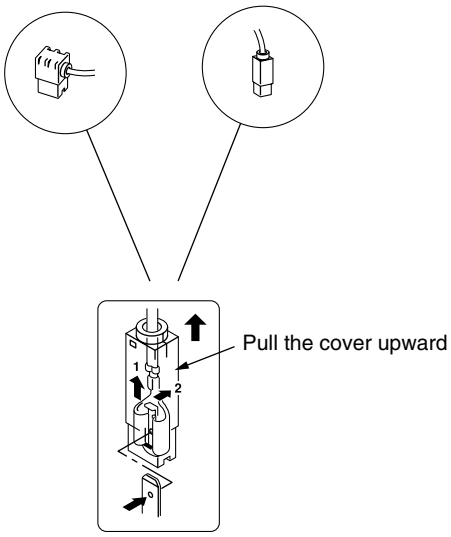


(2) Uphold the left side of the heat exchanger so that it is not seated anywhere (so as to remove the fan). Pull the fan bearing toward you and remove it, and remove the fan as pulling it from underneath.



NOTE **When sliding the heat exchanger or removing the fan, be sure to wear work gloves so as not to injure your hands by fins of the heat exchanger.**

8-9. Disconnecting and Connecting Positive Connector for Outdoor Unit



When the cover is pulled upward, the lock is released with the sequence of 1 and 2.

One of the two types of connectors illustrated at left is used. Their basic structure is the same for each.

How to Disconnect

Hold the resin connector cover, and pull the connector off. You cannot disconnect the connector by pulling the wire since it is locked inside. Always hold the cover to disconnect. (See illustration at left.) For the connector without the resin cover, push the lock in the direction of "2" while pulling it off.

How to Connect

In order to connect, hold the resin cover of the connector and push it in. Confirm the click sound for the inside lock.

9. FUNCTIONS

9-1. Operation Functions

■ Emergency operation

Emergency operation is available when the remote controller malfunctions, has been lost, or otherwise cannot be used.

To operate the system, press the OPERATION button, which is also used as the receiver, below the unit display. Each time this button is pressed, the OPERATION lamp changes color to indicate the type of operation. Select the desired type of operation.

COOL (GREEN) → **HEAT** (RED) → **STOP** (Lamp Off)

- The set temperature is 2 °C below the detected room temperature in the case of cooling operation, and 2 °C above the room temperature in the case of heating operation. The flap and fan speed settings are AUTO.

■ AUTO cooling/heating operation

● **Selecting the operation mode**

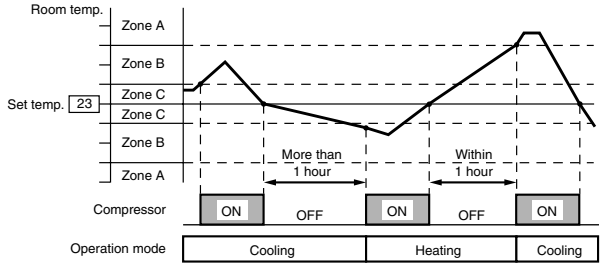
- When AUTO mode is selected, the microprocessor calculates the difference between the set temperature and the room temperature, and automatically switches to Cooling or Heating mode.

  Room temp. ≥ Set temp. → COOL
  Room temp. < Set temp. → HEAT

- As shown by the example in the figure below, with AUTO cooling/heating operation, the mode changes between Heating and Cooling mode according to changes in the relationship between the current room temperature and the set temperature.

Example

Example of operation in AUTO mode with the set room temperature at 23 °C.

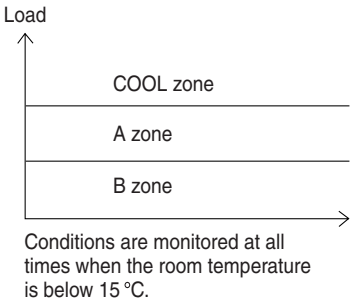


■ SENSOR DRY

During DRY operation, the system adjusts the room temperature 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.



Conditions are monitored at all times when the room temperature is below 15 °C.

DRY A

The compressor operation frequency varies.
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, or more than 3 °C below the set temperature.
- When the monitoring range is entered, the compressor stops, and the indoor fan operates with 1/f fluctuation.

NOTE

The Sensor Dry operation during the Low Ambient Cooling Mode (outside air temperature:15 °C or lower) is as follows.

DRY A and **DRY B**

The compressor operates a cycle of 3 minutes ON and 6 minutes OFF repeatedly.

■ PAM-α control

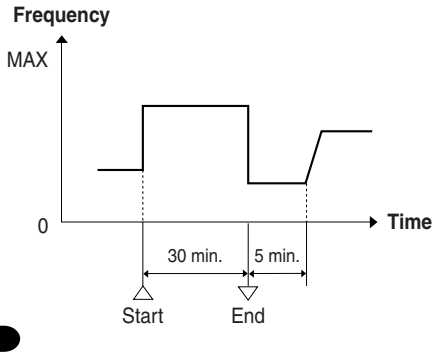
- In order to further improve inverter performance, control is switched between PWM control at low operation speeds, and PAM control at high operation speeds, making the most effective use of power.

■ HIGH POWER

This function acts to raise the power but keeps the AC system in the same operating mode.
This function is set with the HIGH POWER button on the remote controller.
(It can be set regardless of the temperature and fan speed settings.)

● HIGH POWER operation from remote controller

The unit operates at maximum output for 30 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.

■ Lamp colors

OPERATION lamp	
HEAT operation	Red
DRY operation	Orange
COOL operation	Green
FAN operation	Green
DEFROSTING operation	Red and Orange alternately
TIMER lamp	Green
ION lamp	Green
ION lamp (FILTER)	Red
LED CLEAN lamp	Green

■ Timer backup

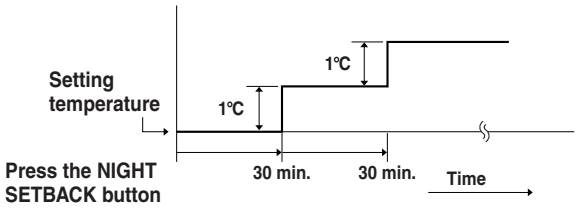
- Operation stops if there are no operator controls for 25 hours or longer after unit operation switched from OFF to ON by use of ON timer operation.

■ NIGHT SETBACK

- When NIGHT SETBACK operation is set, the temperature and fan speed settings will be adjusted automatically to allow comfortable sleep.
- When NIGHT SETBACK operation is set, "mark" appears on the remote controller. The main unit display lamp also becomes dimmer.

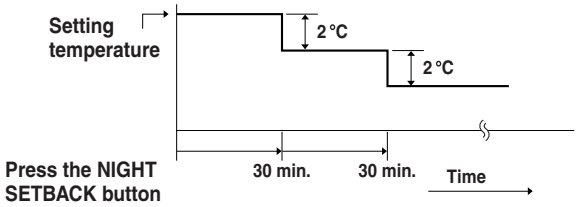
● COOL and DRY modes

When the night setback mode is selected, the air conditioner automatically raises the temperature setting 1°C when 30 minutes have passed after the selection was made, and then another 1°C after another 30 minutes have passed, regardless of the indoor temperature when night setback was selected. This enables you to save energy without sacrificing comfort. This function is convenient when gentle cooling is needed.



● HEAT mode

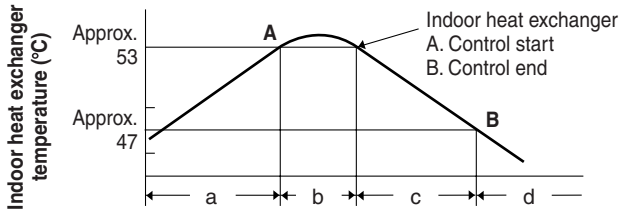
When the night setback mode is selected, the air conditioner automatically lowers the temperature setting 2 °C when 30 minutes have passed after the selection was made, and then another 2 °C after another 30 minutes have passed, regardless of the indoor temperature when night setback was selected. This enables you to save energy without sacrificing comfort. This function is convenient when gentle heating is needed.



9-2. Protective Functions

■ Overload prevention during heating

During HEAT operation, the temperature of the indoor heat exchanger is used to control the frequency and lessen the load on the compressor before the protective device is activated.

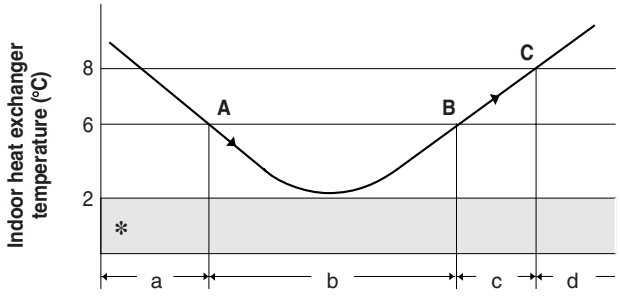


a. Area: Automatic capacity control
b. When Point A has been exceeded, the operation frequency is reduced by a certain proportion.
c. Area: Frequency increase is prohibited.
d. At Point B and below, overload prevention is ended and control is the same as in the a area.

■ Freeze prevention

During COOL or DRY operation, freezing is detected and operation is stopped when the temperature of the indoor heat exchanger matches the conditions below.

1. Freeze-prevention operation is engaged when the temperature of the indoor heat exchanger is below 6 °C.
2. Restart after freeze-prevention operation occurs when the temperature of the indoor heat exchanger reaches 8 °C or above.



a. Area: Automatic capacity control
b. When the temperature drops below Point A, the operation frequency is reduced by a certain proportion.
c. Area: Frequency increase is prohibited.
d. When the temperature reaches Point C or above, freezing prevention is ended and control is the same as in the a area.

* When the temperature drops to below 2 °C (continuously for 2 minutes or longer), the compressor stops.
Once the freeze condition is detected, the air conditioner will work less than the maximum frequency until it is turned off.

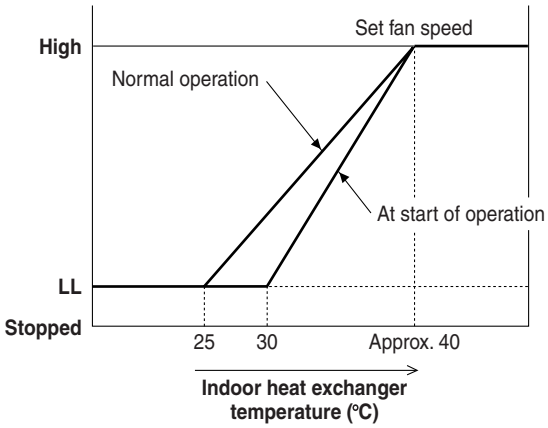
NOTE

The Freeze Prevention Control during the Low Ambient Cooling Mode (outside air temperature:15 °C or lower) is as follows.

- The compressor stops when the temperature of indoor heat exchanger becomes less than 2 °C.
- The compressor restarts when the temperature of indoor heat exchanger becomes 8 °C or higher.

■ Cold-air prevention during heating

During heating, the fan speed is set to "LL" (very low) or stopped. As the temperature of the indoor heat exchanger rises, the fan speed is changed to the set speed.

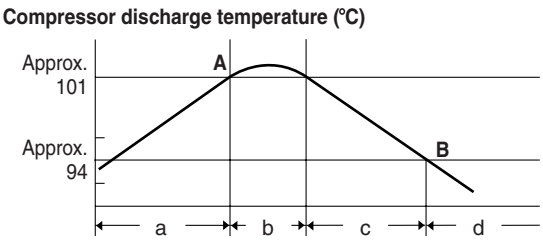


NOTE

- The fan speed is forcibly changed to "LL" beginning 30 seconds after the thermostat turns OFF.
- Normal operation refers to operation when the room temperature has approached the set temperature.
- When HEAT operation starts, the indoor fan is stopped until the temperature of the indoor heat exchanger reaches 20 °C or higher, or until the room temperature reaches 15 °C or higher.

■ Compressor discharge temperature control

This function controls the operation frequency to prevent the compressor discharge temperature from rising more than a specified temperature.



a. Area: Automatic capacity control.
b. When the temperature rises above Point A, the operation frequency is reduced at a specified rate.
c. Area: Further frequency increase is prohibited.
d. When the temperature falls below Point B, prevention of a rise in frequency is released and the air conditioner operates as in a area.

* The compressor will stop if the temperature of the compressor discharge exceeds 120 °C due to shortage of gas or other reason.

■ Defrost detection and release

● **Non-Stop Defrosting**

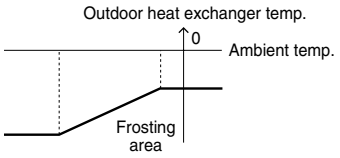
Defrosting Sequence

Heating operation

- Outdoor fan ON
- 4-way valve Heating mode

Frost sensing

- Frosting is assumed according to the outdoor temp.,outdoor heat exchanger temp.,and operation time.



Non-stop defrosting

- Compressor ➞ON
- Outdoor fan ➞ OFF
- Indoor fan ➞ OFF
- 4-way valve ➞ Heating mode
- 2-way valve ➞ ON

Releasing of defrosting

- Outdoor heating exchanger temp. is over 14 °C.
- Defrosting operation lasts 12 minutes (maximum). 4-way valve is Heating mode. Outdoor fan is ON.
- 2-way valve ➞ OFF

NOTE

If the air conditioner is turned off during the defrosting cycle, it will continue defrosting and turn itself off after defrosting is completed.

■ CT (Peak current cut-off control)

- This function prevents the circuit breaker or fuse from operating to open the circuit. This function works when electrical current has increased due to an increase in the cooling / heating load, or to a decrease in the power supply voltage. In these cases, operation frequency is reduced or operation is interrupted automatically to control the electrical current for operation.
- When the cause of the increase in electrical current is rectified, the system will resume operation in the original mode.

(A)

	Cooling • Dry	Heating
Peak current cut-off trips	17.5	
Hz down	12.2	14.0

NOTE Electrical current setting for COOL operation is used during DEFROST operation.

■ Operation Cut-Off Control in abnormal ambient temperature

- The following three protective actions are available to prevent the compressor from operating with abnormal loads. At that time, they initiate thermo-off (stopping the outdoor unit) of the air conditioner.

● **Mode : Cooling**

Cut-off action	Thermo-off t : ambient temp	Thermo-on t : ambient temp
Low ambient temp. cut-off	t ≦ −22 °C	t > −18 °C

● **Mode : Heating**

Cut-off action	Thermo-off t : ambient temp	Thermo-on t : ambient temp
High ambient temp. cut-off	t ≧ 25 °C	t < 24 °C
Low ambient temp. cut-off	t ≦ −20 °C	t > −16 °C