

# TECHNICAL & SERVICE MANUAL

# SANYO

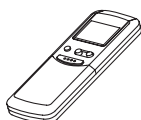
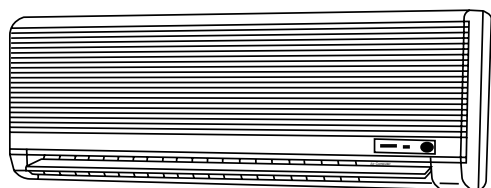
SAP-KR165QS5+ SAP-CR165G5  
SAP-KR185QS5+ SAP-CR185G5  
SAP-KR185QS5+ SAP-CR185GL5

FILE NO.

## SPLIT SYSTEM AIR CONDITIONER

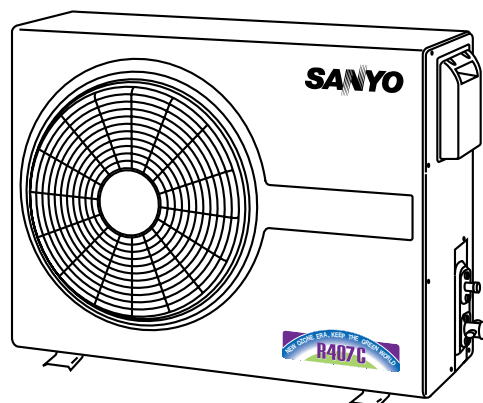
Indoor Model No.	Product Code No.	Outdoor Model No.	Product Code No.	Destination
SAP-KR165QS5-E	1 852 065 27	SAP-CR165G5-E	1 852 065 07	Europe
SAP-KR185QS5-E	1 852 065 28	SAP-CR185G5-E	1 852 065 08	
SAP-KR185QS5-E	1 852 065 28	SAP-CR185GL5-E	1 852 065 09	

Indoor Unit



SAP-KR165QS5  
SAP-KR185QS5

Outdoor Unit



SAP-CR165G5  
SAP-CR185G5  
SAP-CR185GL5

### IMPORTANT

These air conditioners employ new refrigerant R407C.

Pay special attention when servicing the unit.

→ See "10. REFRIGERANT R407C: SPECIAL PRECAUTIONS WHEN SERVICING THE UNIT".



## 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 units 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.

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# 1. OPERATING RANGE

## ● For COOLING ONLY models : SAP-CR165G5, CR185G5

	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.

## ● For LOW AMBIENT cooling models : SAP-CR185GL5

	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.

## 2. SPECIFICATIONS

### 2-1. Unit Specifications

Indoor Unit      **SAP-KR165QS5**

Outdoor Unit    **SAP-CR165G5**

Power Source				220 – 240 V ~ 50 Hz			
Performance			Cooling				
	Capacity	kW		4.60			
		BTU/h		15,695			
	Air circulation (High)		m³/h		800		
Moisture removal (High)		Liters/h		2.3			
Electrical Rating	Voltage rating		V		220 / 230 / 240		
	Available voltage range		V		198 to 264		
	Running amperes		A		8.7 / 8.7 / 8.7		
	Power input		W		1,900 / 1,950 / 1,980		
	Power factor		%		99 / 97 / 95		
	C.O.P.		W/W		2.4 / 2.4 / 2.3		
	Compressor locked rotor amperes		A		41 / 43 / 45		
Features	Controls / Temperature control			Microprocessor / I.C. thermostat			
	Control unit			Wireless remote control unit			
	Timer			ON/OFF 24-hours & Daily Program			
	Fan speeds		Indoor / Outdoor	3 and Auto / 1 (Hi)			
	Airflow direction (Indoor )	Horizontal		Manual			
		Vertical		Auto			
	Air filter			Washable, Anti-Mold			
	Compressor			Rotary (Hermetic)			
	Refrigerant / Amount charged at shipment		g	R407C / 1,950			
	Refrigerant control			Capillary tube			
	Operation sound	Indoor – Hi / Me / Lo	dB-A	45 / 41 / 36			
		Outdoor – Hi	dB-A	50			
	Refrigerant tubing connections			Flare type			
	Max. allowable tubing length at shipment		m	10			
	Refrigerant tube diameter	Narrow tube	mm (in.)	6.35 (1/4)			
		Wide tube	mm (in.)	12.7 (1/2)			
	Refrigerant tube kit / Accessories			Optional / Hanging wall bracket			
Dimensions & Weight				Indoor Unit		Outdoor Unit	
	Unit dimensions	Height	mm	360		630	
		Width	mm	1,000		830	
		Depth	mm	205		305	
	Package dimensions	Height	mm	282		713	
		Width	mm	1,080		994	
		Depth	mm	443		413	
	Weight	Net	kg	13.5		51.5	
		Shipping	kg	17.7		56.5	
	Shipping volume		m³	0.13		0.29	

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**Remarks:** Rating conditions are:

Indoor air temperature 27°C DB/19°C WB

Outdoor air temperature 35°C DB/24°C WB

Indoor Unit      **SAP-KR185QS5**  
Outdoor Unit      **SAP-CR185G5**

Power Source				220 – 240 V ~ 50 Hz			
Performance				Cooling			
	Capacity			kW			
				5.10			
			BTU/h		17,401		
Air circulation (High)		m³/h		800			
Moisture removal (High)		Liters/h		2.7			
Electrical Rating	Voltage rating		V		220 / 230 / 240		
	Available voltage range		V		198 to 264		
	Running amperes		A		10.1 / 10 / 10		
	Power input		W		2,200 / 2,260 / 2,320		
	Power factor		%		99 / 98 / 97		
	C.O.P.		W/W		2.3 / 2.3 / 2.2		
	Compressor locked rotor amperes		A		45 / 46 / 48		
Features	Controls / Temperature control			Microprocessor / I.C. thermostat			
	Control unit			Wireless remote control unit			
	Timer			ON/OFF 24-hours & Daily Program			
	Fan speeds		Indoor / Outdoor		3 and Auto / Auto (Hi , Lo)		
	Airflow direction (Indoor )		Horizontal		Manual		
			Vertical		Auto		
	Air filter			Washable, Anti-Mold			
	Compressor			Rotary (Hermetic)			
	Refrigerant / Amount charged at shipment		g		R407C / 1,915		
	Refrigerant control			Capillary tube			
	Operation sound		Indoor – Hi / Me / Lo	dB-A	45 / 41 / 36		
			Outdoor – Hi	dB-A	51		
	Refrigerant tubing connections			Flare type			
	Max. allowable tubing length at shipment		m		10		
	Refrigerant tube diameter		Narrow tube	mm (in.)	6.35 (1/4)		
			Wide tube	mm (in.)	12.7 (1/2)		
	Refrigerant tube kit / Accessories			Optional / Hanging wall bracket			
Dimensions & Weight				Indoor Unit		Outdoor Unit	
	Unit dimensions	Height	mm	360		630	
		Width	mm	1,000		830	
		Depth	mm	205		305	
	Package dimensions	Height	mm	282		713	
		Width	mm	1,080		994	
		Depth	mm	443		413	
	Weight	Net	kg	13.5		52.0	
		Shipping	kg	17.7		57.0	
Shipping volume		m³		0.13		0.29	

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**Remarks:** Rating conditions are:

Indoor air temperature 27°C DB/19°C WB  
Outdoor air temperature 35°C DB/24°C WB

Indoor Unit      **SAP-KR185QS5**  
Outdoor Unit      **SAP-CR185GL5**

Power Source				220 – 240 V ~ 50 Hz			
Performance				Cooling			
	Capacity			kW			
				5.10			
			BTU/h		17.401		
Air circulation (High)		m³/h		800			
Moisture removal (High)		Liters/h		2.7			
Electrical Rating	Voltage rating		V		220 / 230 / 240		
	Available voltage range		V		198 to 264		
	Running amperes		A		10.1 / 10 / 10		
	Power input		W		2,200 / 2,260 / 2,320		
	Power factor		%		99 / 98 / 97		
	C.O.P.		W/W		2.3 / 2.3 / 2.2		
	Compressor locked rotor amperes		A		45 / 46 / 48		
Features	Controls / Temperature control			Microprocessor / I.C. thermostat			
	Control unit			Wireless remote control unit			
	Timer			ON/OFF 24-hours & Daily Program			
	Fan speeds		Indoor / Outdoor		3 and Auto / Auto (Hi , Variable)		
	Airflow direction (Indoor )		Horizontal		Manual		
			Vertical		Auto		
	Air filter			Washable, Anti-Mold			
	Compressor			Rotary (Hermetic)			
	Refrigerant / Amount charged at shipment		g		R407C / 1,915		
	Refrigerant control			Capillary tube			
	Operation sound	Indoor – Hi / Me / Lo	dB-A	45 / 41 / 36			
		Outdoor – Hi	dB-A	51			
	Refrigerant tubing connections			Flare type			
	Max. allowable tubing length at shipment		m		10		
	Refrigerant tube diameter	Narrow tube	mm (in.)	6.35 (1/4)			
		Wide tube	mm (in.)	12.7 (1/2)			
	Refrigerant tube kit / Accessories			Optional / Hanging wall bracket			
Dimensions & Weight				Indoor Unit		Outdoor Unit	
	Unit dimensions	Height	mm	360		630	
		Width	mm	1,000		830	
		Depth	mm	205		305	
	Package dimensions	Height	mm	282		713	
		Width	mm	1,080		994	
		Depth	mm	443		413	
	Weight	Net	kg	13.5		52.0	
		Shipping	kg	17.7		57.0	
Shipping volume		m³		0.13		0.29	

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**Remarks:** Rating conditions are:

Indoor air temperature 27°C DB/19°C WB  
Outdoor air temperature 35°C DB/24°C WB

## 2-1. Major Component Specifications

### 2-2-1. Indoor Unit

Indoor Unit **SAP-KR165QS5 SAP-KR185QS5**

Controller PCB	Part No.			POW-K185QS-N	
	Controls			Microprocessor	
	Control circuit fuse			250 V – 3 A	
Remote Control Unit				RCS - 2S1	
Fan & Fan Motor	Type			Cross - flow	
	Q'ty ... Dia. and length			mm 1 ... ø100 / L760	
	Fan motor model ... Q'ty			UF2T-21A5PA-S ... 1	
	No. of poles ... rpm (230 V, High)			2 ... 1,560	
	Nominal output			W 20	
	Coil resistance (Ambient temp. 20°C)			Ω WHT – BRN : 163.7 WHT – VLT : 68.8 VLT – YEL : 33.2 YEL – PNK : 117.3	
	Safety devices	Type		Internal type	
		Operating temp.	Open	°C	130 ± 8
			Close		Automatic reclosing
	Run capacitor			μF	1.5
			VAC	440	
Louver Motor	Model			M2LJ24ZE31	
	Rating			AC 230 V, 50 Hz	
	No. of poles ... rpm			8 ... 2.5	
	Nominal output			W 3	
	Coil resistance (Ambient temp. 20°C)			kΩ 16.45 ± 15%	
Heat Exch. Coil	Coil			Aluminum plate fin / Copper tube	
	Rows			2	
	Fin pitch			mm 1.8	
	Face area			m <sup>2</sup> 0.192	

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## 2-2-2. Outdoor Unit

Outdoor Unit

**SAP-CR165G5**

Compressor	Type				Rotary (Hermetic)	
	Compressor model				C-2RN150H5W 80805045	
	Nominal output			W	1,500	
	Compressor oil ... Amount			cc	FV68S ... 800	
	Coil resistance (Ambient temp. 25°C)			Ω	C – R : 1.426 C – S : 4.119	
	Safety devices	Type			Internal protector	
		Overload relay			—	
		Operating temp.	Open	°C	Automatic opening	
			Close	°C	Automatic reclosing	
	Operating amp.(Ambient temp. 25°C)			—		
Run capacitor				μF	35.0	
				VAC	400	
Fan & Fan Motor	Type				Propeller	
	Q'ty ... Dia.			mm	1 ... ø400	
	Fan motor model ... Q'ty				SG6-51B5P ... 1	
	No. of poles ... rpm (230 V)				6 ... 910	
	Nominal output			W	50	
	Coil resistance (Ambient temp. 20°C)			Ω	WHT – BRN : 92.1 WHT – PNK : 196.4	
	Safety devices	Type			Internal type	
		Operating temp.	Open	°C	130 ± 8	
			Close		Automatic reclosing	
	Run capacitor				μF	2.0
			VAC	440		
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube	
	Rows				2	
	Fin pitch			mm	1.8	
	Face area			m²	0.508	
External Finish				Acrylic baked-on enamel finish		

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## Outdoor Unit

**SAP-CR185G5**

Compressor	Type				Rotary (Hermetic)
	Compressor model				C-2RN170H5W 80807045
	Nominal output			W	1,700
	Compressor oil ... Amount			cc	FV68S ... 800
	Coil resistance (Ambient temp. 25°C)			Ω	C – R : 1.353 C – S : 3.422
	Safety devices	Type			Internal protector
		Overload relay			—
		Operating temp.	Open	°C	Automatic opening
			Close	°C	Automatic reclosing
	Operating amp.(Ambient temp. 25°C)			—	
Run capacitor		μF		40.0	
		VAC		400	
Fan & Fan Motor	Type				Propeller
	Q'ty ... Dia.			mm	1 ... ø400
	Fan motor model ... Q'ty				SG6S-51B5P ... 1
	No. of poles ... rpm (230 V)				6 ... 910
	Nominal output			W	50
	Coil resistance (Ambient temp. 20°C)			Ω	WHT – BRN : 89.1 WHT – YEL : 111.8 YEL – PNK : 55.9
	Safety devices	Type			Internal type
		Operating temp.	Open	°C	130 ± 8
	Close			Automatic reclosing	
	Run capacitor		μF		2.0
VAC			440		
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube
	Rows				2
	Fin pitch			mm	1.8
	Face area			m²	0.508

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## Outdoor Unit

**SAP-CR185GL5**

Controller PCB		Part No.			POW-C181BL		
		Control circuit fuse			250V – 5A		
Compressor	Type				Rotary (Hermetic)		
	Compressor model				C-2RN170H5W 80807045		
	Nominal output				W	1,700	
	Compressor oil ... Amount				cc	FV68S ... 800	
	Coil resistance (Ambient temp. 25°C)				Ω	C – R : 1.353 C – S : 3.422	
	Safety devices	Type			Internal protector		
		Overload relay			—		
		Operating temp.	Open	°C	Automatic opening		
			Close	°C	Automatic reclosing		
	Run capacitor			μF	40.0		
				VAC	400		
	Crank case heater				240V 30W		
Fan & Fan Motor	Type				Propeller		
	Q'ty ... Dia.				mm	1 ... ø400	
	Fan motor model ... Q'ty				SG6-51B5P ... 1		
	No. of poles ... rpm (230 V)				6 ... 910		
	Nominal output				W	50	
	Coil resistance (Ambient temp. 20°C)				Ω	WHT – BRN : 92.1 WHT – PNK : 196.4	
	Safety devices	Type			Internal type		
		Operating temp.	Open	°C	130 ± 8		
			Close	Automatic reclosing			
	Run capacitor			μF	2.0		
VAC				440			
Heat Exch. Coil	Coil				Aluminum plate fin / Copper tube		
	Rows				2		
	Fin pitch				mm	1.8	
	Face area				m <sup>2</sup>	0.508	
External Finish					Acrylic baked-on enamel finish		

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## 2-3. Other Component Specifications

### 2-3-1. Indoor Unit

Transformer (TR)		ATR-H85	
Rating	Primary	AC 230V, 50Hz	
	Secondary	11V, 0.727A	
	Capacity	8VA	
Coil resistance	$\Omega$ (at 21°C)	Primary (WHT – WHT):	214 ± 10%
		Secondary (BRN – BRN):	1.58 ± 10%
Thermal cut-off temp.		145°C, 2A, 250V	

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Thermistor (Coil sensor TH1)		PBC-41E-S4			
Resistance	k $\Omega$	-20°C	40.1 $\pm$ 5%	20°C	6.5 $\pm$ 5%
		-10°C	24.4 $\pm$ 5%	30°C	4.4 $\pm$ 5%
		0°C	15.3 $\pm$ 5%	40°C	3.0 $\pm$ 5%
		10°C	9.9 $\pm$ 5%	50°C	2.1 $\pm$ 5%

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Thermistor (Room sensor TH2)		KTEC-35-S6			
Resistance	k $\Omega$	10°C	10.0 $\pm$ 4%	30°C	4.0 $\pm$ 4%
		15°C	7.9 $\pm$ 4%	35°C	3.3 $\pm$ 4%
		20°C	6.3 $\pm$ 4%	40°C	2.7 $\pm$ 4%
		25°C	5.0 $\pm$ 4%	50°C	1.8 $\pm$ 4%

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## 2-3-2. Outdoor Unit

Power Relay (PR)		G7L-2A-TUB
Coil rating		AC 200–240V, 50/60Hz
Coil resistance	$\Omega$ (at 23°C)	21 $\pm$ 15%
Contact rating		AC 220V, 25A

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Thermostat (Fan Speed Control 23S)		MQT5S-27YZJ
Switching temp.	°C	high LOW 23.5°C $\pm$ 1.5
		low HIGH 27.0°C $^{+0}_{-3}$
Contact rating		AC 220V, 3A

<CR185G5>

Transformer (TR2)		ATR-J65
Rating	Primary	AC 230V, 50Hz
	Secondary	19V, 0.315A
	Capacity	6VA
Coil resistance	$\Omega$ (at 22°C)	Primary (WHT – WHT): 455 $\pm$ 10%
		Secondary (BRN – BRN): 2.85 $\pm$ 10%
Thermal cut-off temp.		145°C

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Power Relay		HH62S DC24V
Coil rating		DC 24V
Coil resistance	k $\Omega$ (at 23°C)	650 $\pm$ 10%
Contact rating		AC 250V, 10A

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Solid State Relay (SSR)		G3L-205TL-TS1
Input		
	Rated voltage	DC 12V
	Control voltage range	DC 0V to 6.4V
Load voltage range		AC 75V to 264V, 50Hz

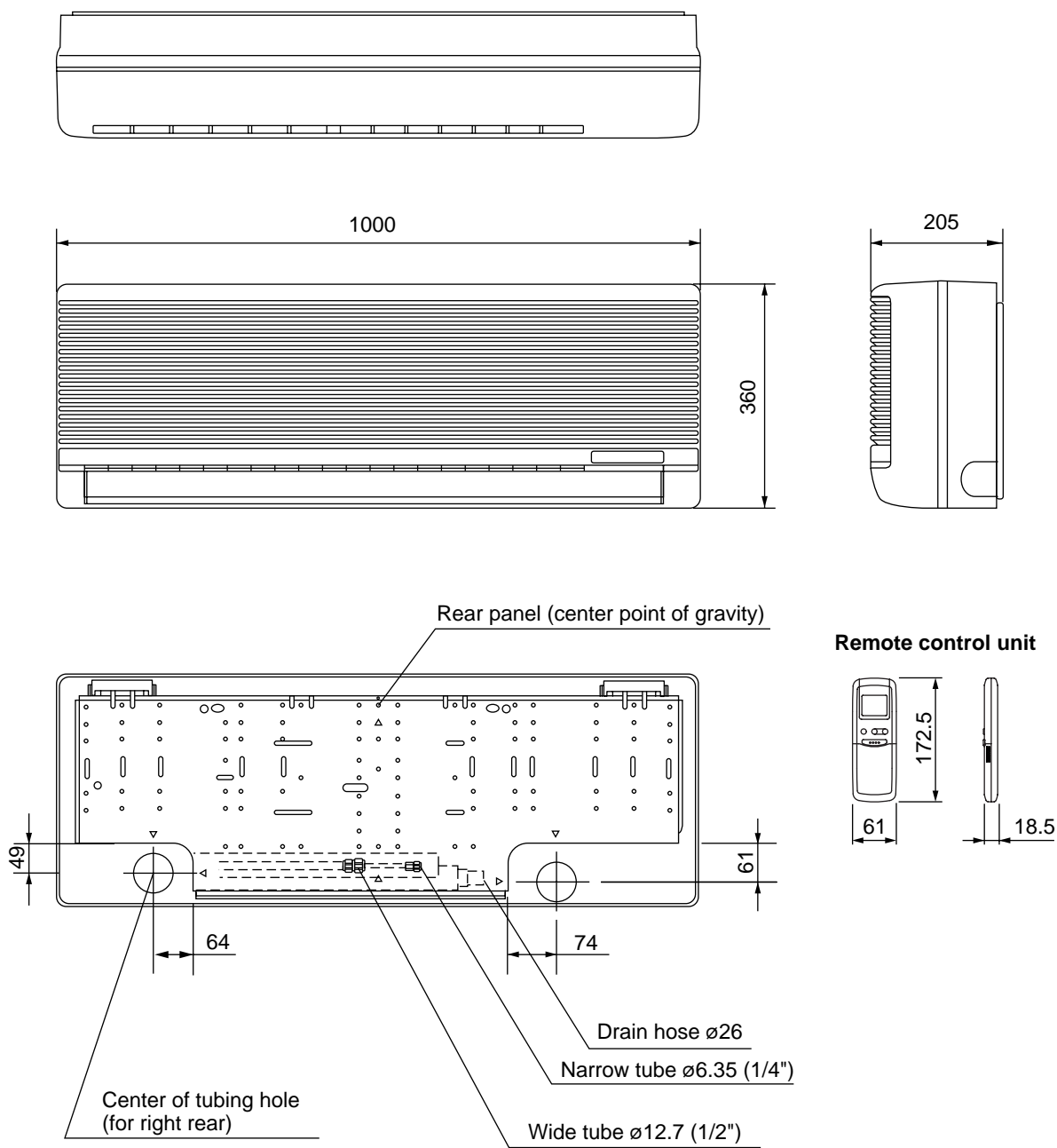
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Thermistor (Coil sensor TH3 / Air sensor TH4)		PBC-41E-S4 / PBC-41E-S8			
Resistance	kΩ	−20℃	40.1 ± 5%	20℃	6.5 ± 5%
		−10℃	24.4 ± 5%	30℃	4.4 ± 5%
		0℃	15.3 ± 5%	40℃	3.0 ± 5%
		10℃	9.9 ± 5%	50℃	2.1 ± 5%

<CR185GL5>

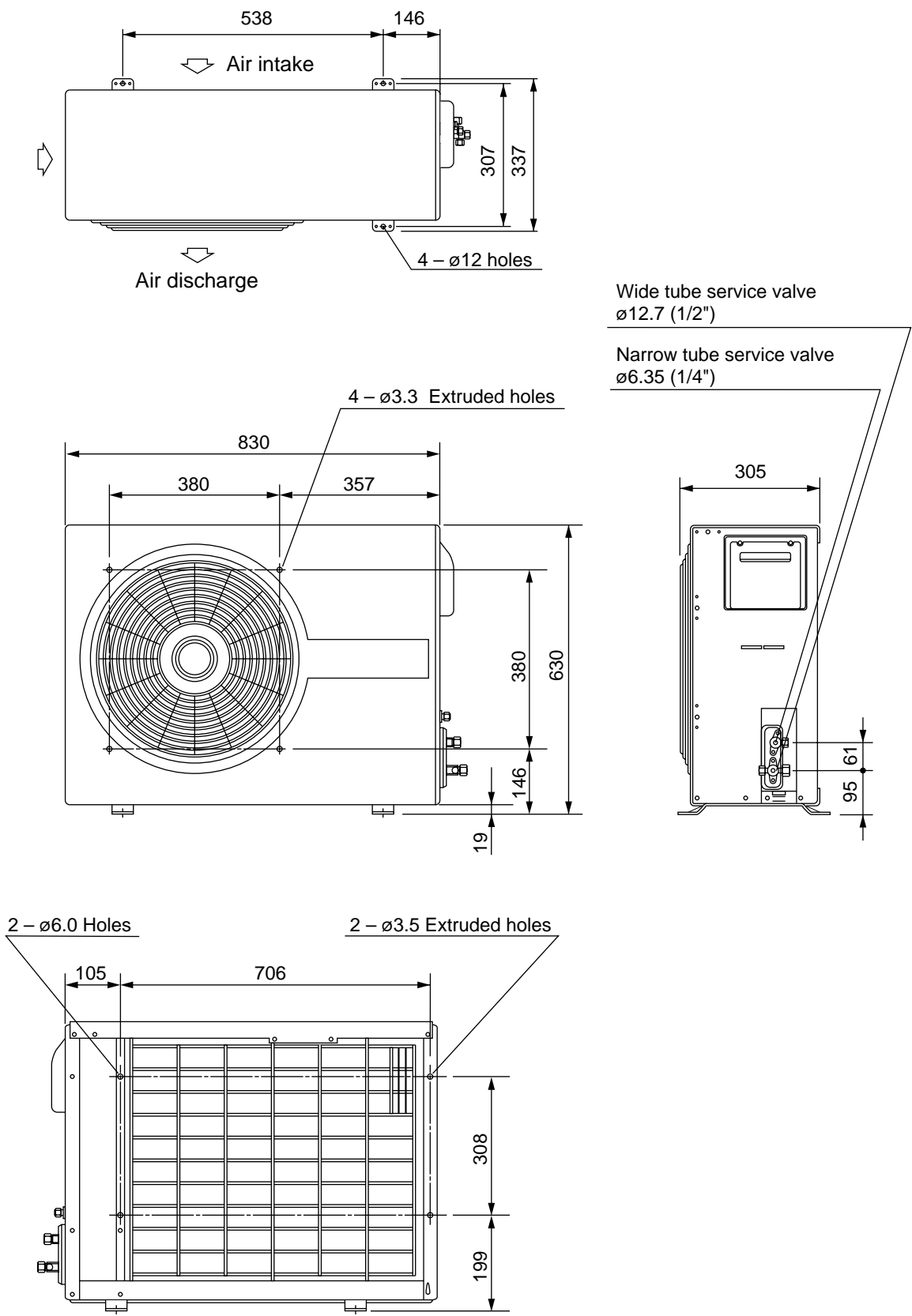
# 3. DIMENSIONAL DATA

Indoor Unit      **SAP-KR165QS5    SAP-KR185QS5**



Unit : mm

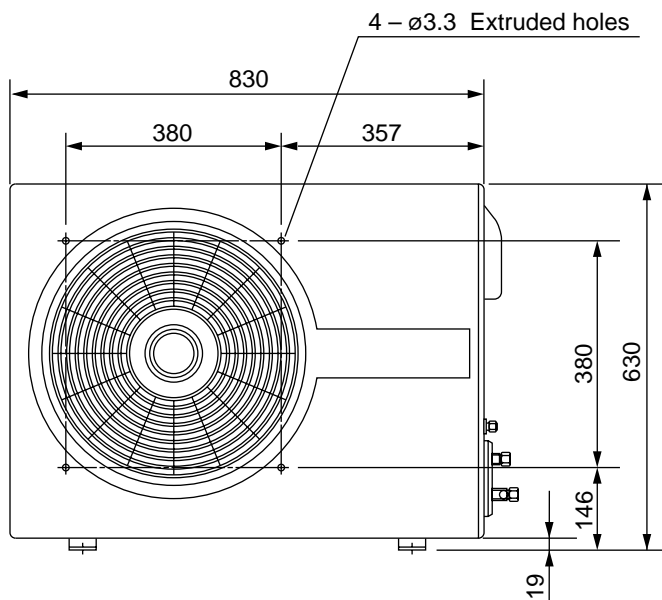
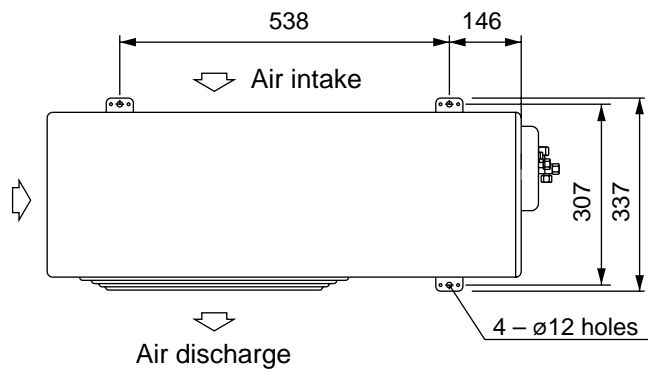
Outdoor Unit      **SAP-CR165G5    SAP-CR185G5**



Unit : mm

Outdoor Unit

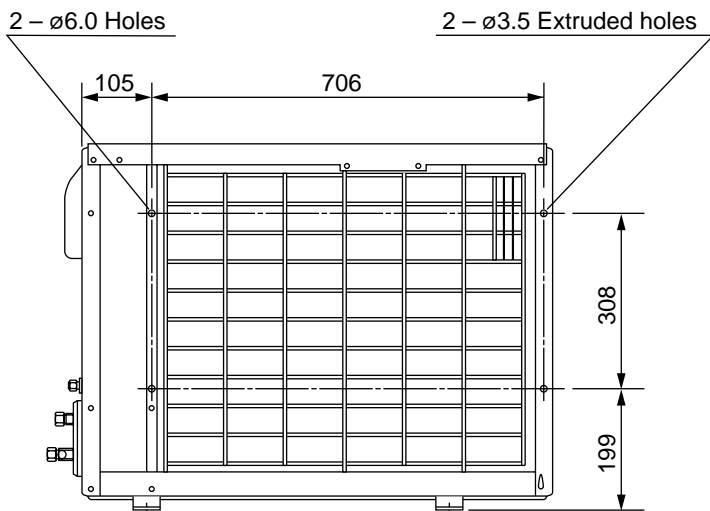
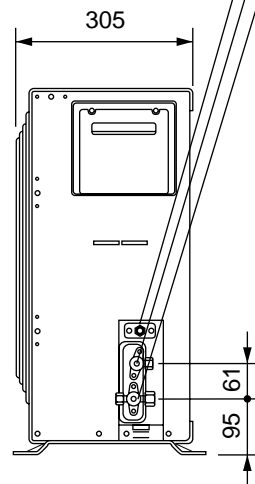
SAP-CR185GL5



Wide tube service valve  
 $\varnothing 12.7$  (1/2")

Narrow tube service valve  
 $\varnothing 6.35$  (1/4")

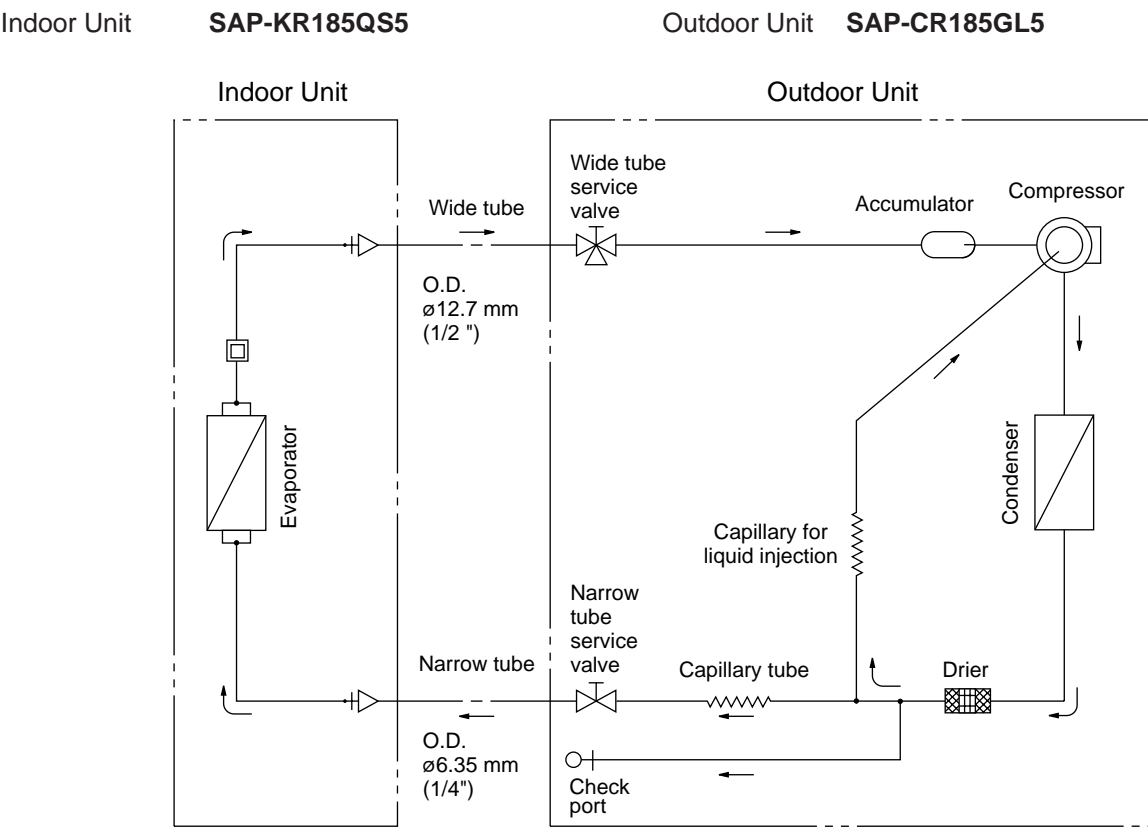
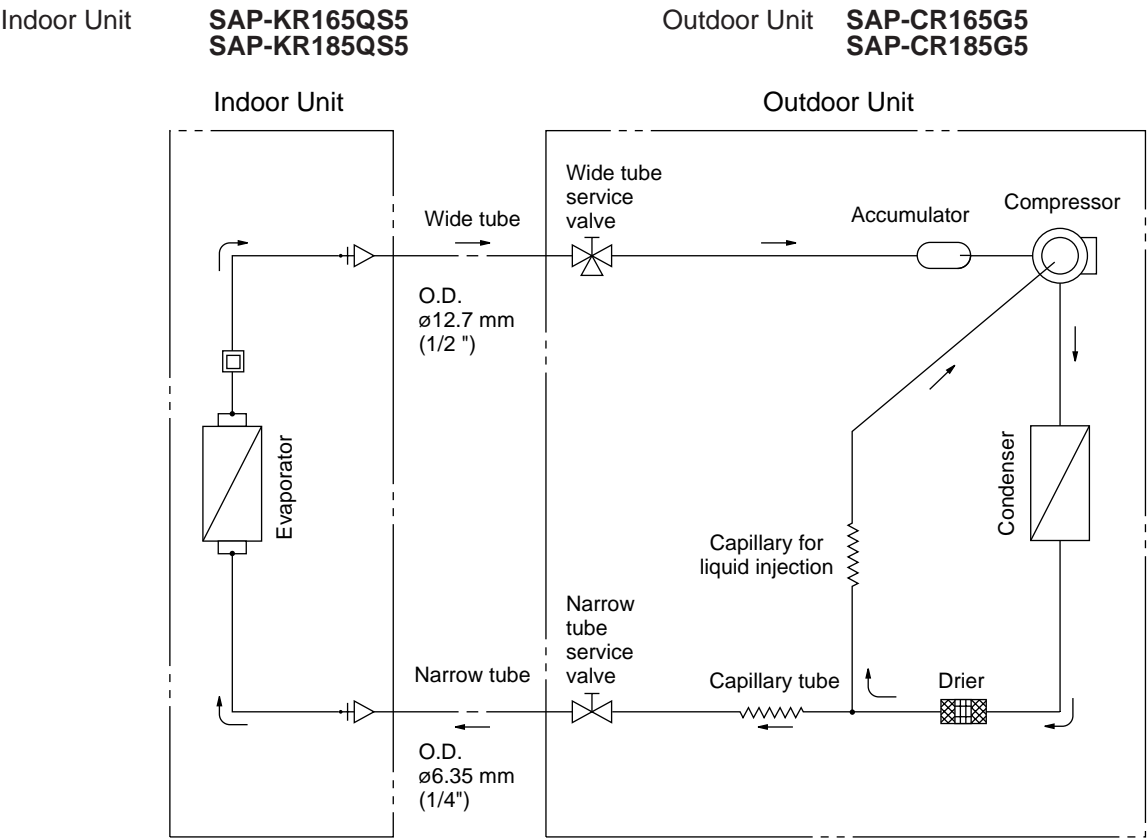
Check port  $\varnothing 6.35$  (1/4")



Unit : mm



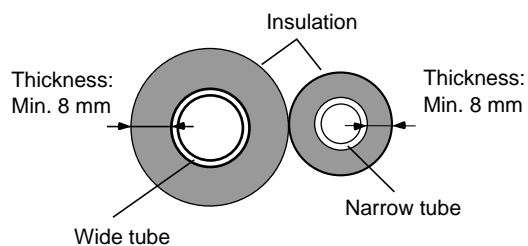
# 4. REFRIGERANT FLOW DIAGRAM



## 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

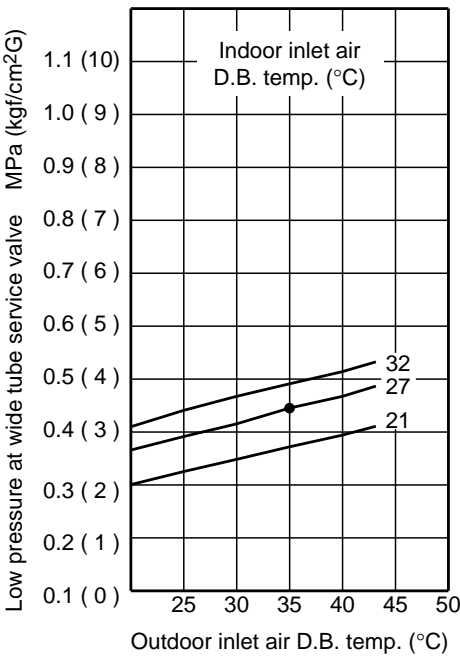
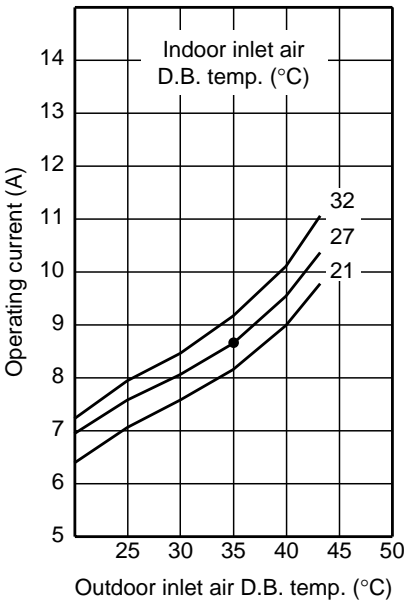
After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.

# 5. PERFORMANCE DATA

## 5-1. Performance charts

Indoor Unit      **SAP-KR165QS5**  
Outdoor Unit    **SAP-CR165G5**

### ■ Cooling Characteristics

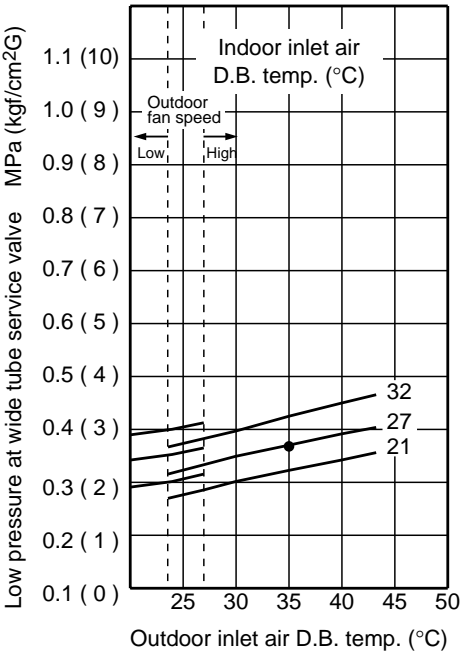
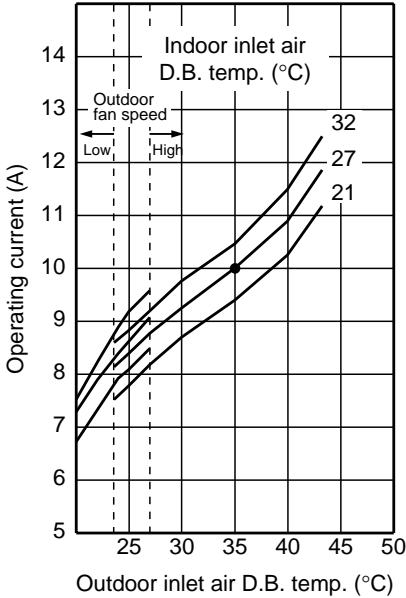


### NOTE

- ..... 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.

Indoor Unit      **SAP-KR185QS5**  
Outdoor Unit    **SAP-CR185G5**

■ Cooling Characteristics

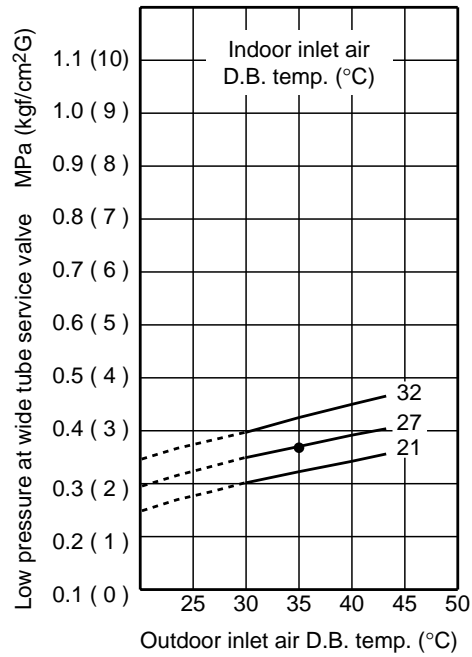
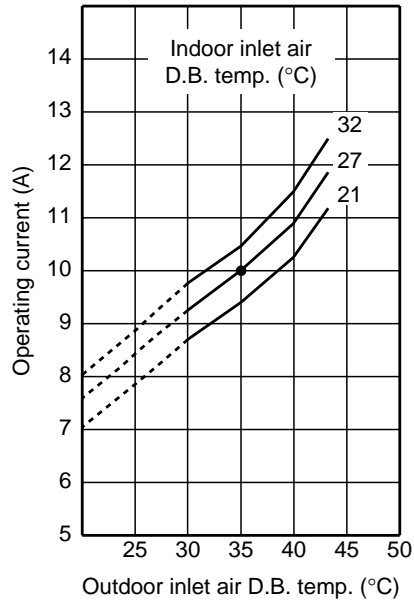


**NOTE**

● ..... 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.

Indoor Unit      **SAP-KR185QS5**  
Outdoor Unit    **SAP-CR185GL5**

■ Cooling Characteristics



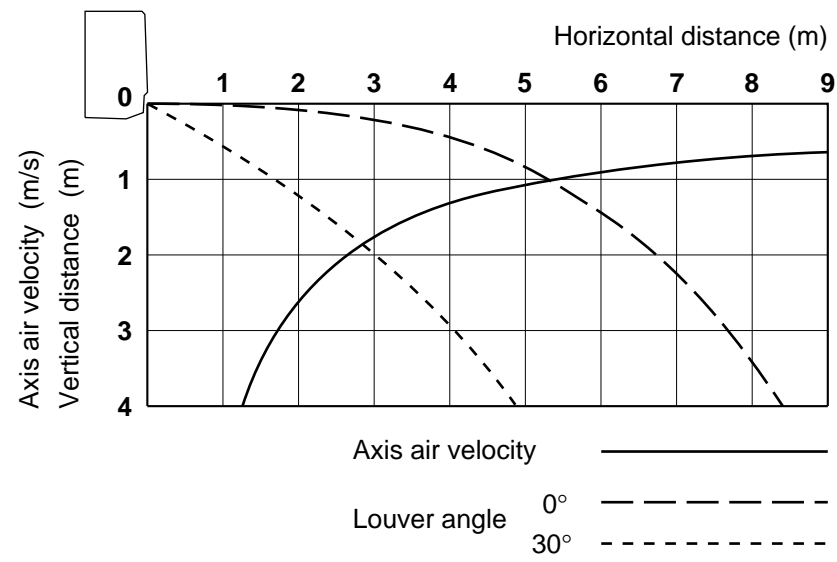
**NOTE**

● ..... 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.

5-2. Air Throw Distance Chart

Indoor Unit      **SAP-KR165QS5**  
                      **SAP-KR185QS5**

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



## 5-3. Cooling Capacity

Indoor Unit **SAP-KR165QS5**

Outdoor Unit **SAP-CR165G5**

240V Single Phase 50Hz

RATING CAPACITY		4.60 kW						
AIR FLOW RATE		800 m <sup>3</sup> /h						
EVAPORATOR		CONDENSER						
ENT. TEMP. °C		OUTDOOR AMBIENT TEMP. °C						
W.B.	D.B.		20	25	30	35	40	45
15		TC	4.63	4.43	4.23	4.03	3.78	3.49
		CM	1.38	1.50	1.60	1.72	1.87	2.03
	21	SHC	3.14	3.04	2.93	2.83	2.71	2.57
	23	SHC	3.52	3.42	3.32	3.22	3.10	2.96
	25	SHC	3.91	3.81	3.70	3.60	3.48	3.34
	27	SHC	4.30	4.19	4.09	3.99	3.78	3.49
	29	SHC	4.63	4.43	4.23	4.03	3.78	3.49
17		TC	4.97	4.76	4.54	4.32	4.06	3.74
		CM	1.42	1.53	1.64	1.76	1.92	2.08
	21	SHC	2.74	2.64	2.54	2.44	2.32	2.17
	23	SHC	3.13	3.03	2.92	2.82	2.70	2.56
	25	SHC	3.52	3.41	3.31	3.21	3.09	2.94
	27	SHC	3.90	3.80	3.69	3.59	3.47	3.33
	29	SHC	4.29	4.18	4.08	3.98	3.86	3.71
19		TC	5.29	5.06	4.83	# 4.60	4.32	3.98
		CM	1.46	1.58	1.69	1.82	1.98	2.14
	21	SHC	2.33	2.22	2.12	2.02	1.90	1.76
	23	SHC	2.71	2.61	2.51	2.41	2.29	2.15
	25	SHC	3.10	2.99	2.89	2.79	2.68	2.53
	27	SHC	3.48	3.38	3.28	3.18	3.06	2.92
	29	SHC	3.87	3.77	3.66	3.56	3.45	3.30
21		TC	5.61	5.36	5.12	4.88	4.58	4.22
		CM	1.50	1.63	1.74	1.87	2.04	2.20
	23	SHC	2.29	2.19	2.09	1.99	1.87	1.73
	25	SHC	2.68	2.57	2.47	2.38	2.26	2.12
	27	SHC	3.06	2.96	2.86	2.76	2.65	2.50
	29	SHC	3.45	3.34	3.24	3.15	3.03	2.89
	31	SHC	3.83	3.73	3.63	3.53	3.42	3.28
23		TC	5.95	5.69	5.42	5.12	4.79	4.46
		CM	1.53	1.67	1.79	1.92	2.09	2.26
	25	SHC	2.23	2.13	2.03	1.92	1.80	1.68
	27	SHC	2.62	2.52	2.41	2.30	2.18	2.06
	29	SHC	3.00	2.90	2.80	2.69	2.57	2.45
	31	SHC	3.39	3.29	3.19	3.07	2.95	2.84

TC : Total Cooling Capacity (kW)

SHC : Sensible Heat Capacity (kW)

CM : Compressor Input (kW)

Rating conditions (#Mark) are

Outdoor Ambient Temp. 35°C D.B.

Indoor Unit Entering Air Temp. 27°C D.B. / 19°C W.B.

Indoor Unit **SAP-KR185QS5**  
 Outdoor Unit **SAP-CR185G5**      **SAP-CR185GL5**

240V Single Phase 50Hz

RATING CAPACITY		5.10 kW				
AIR FLOW RATE		800 m <sup>3</sup> /h				
EVAPORATOR		CONDENSER				
ENT. TEMP. °C		OUTDOOR AMBIENT TEMP. °C				
W.B.	D.B.		30	35	40	45
15		TC	4.69	4.47	4.20	3.86
		CM	1.90	2.04	2.15	2.25
	21	SHC	3.17	3.05	2.92	2.75
	23	SHC	3.55	3.44	3.30	3.14
	25	SHC	3.94	3.82	3.69	3.52
	27	SHC	4.33	4.21	4.07	3.86
	29	SHC	4.69	4.47	4.20	3.86
17		TC	5.03	4.79	4.51	4.15
		CM	1.95	2.09	2.21	2.31
	21	SHC	2.77	2.66	2.52	2.36
	23	SHC	3.16	3.04	2.91	2.74
	25	SHC	3.55	3.43	3.29	3.13
	27	SHC	3.93	3.81	3.68	3.51
	29	SHC	4.32	4.20	4.06	3.90
19		TC	5.36	# 5.10	4.79	4.41
		CM	2.01	2.16	2.28	2.38
	21	SHC	2.36	2.24	2.11	1.94
	23	SHC	2.74	2.63	2.49	2.33
	25	SHC	3.13	3.01	2.88	2.71
	27	SHC	3.51	3.40	3.26	3.10
	29	SHC	3.90	3.78	3.65	3.48
21		TC	5.68	5.41	5.08	4.68
		CM	2.07	2.22	2.34	2.45
	23	SHC	2.32	2.21	2.07	1.91
	25	SHC	2.70	2.59	2.46	2.30
	27	SHC	3.09	2.98	2.84	2.68
	29	SHC	3.48	3.36	3.23	3.07
	31	SHC	3.86	3.75	3.61	3.45
23		TC	6.01	5.68	5.31	4.94
		CM	2.12	2.28	2.41	2.52
	25	SHC	2.25	2.12	1.99	1.85
	27	SHC	2.64	2.51	2.37	2.24
	29	SHC	3.03	2.90	2.76	2.62
	31	SHC	3.41	3.28	3.14	3.01

TC : Total Cooling Capacity (kW)

SHC : Sensible Heat Capacity (kW)

CM : Compressor Input (kW)

Rating conditions (#Mark) are

Outdoor Ambient Temp. 35°C D.B.

Indoor Unit Entering Air Temp. 27°C D.B. / 19°C W.B.



## 6. ELECTRICAL DATA

### 6-1. Electrical Characteristics

Indoor Unit **SAP-KR165QS5**

Outdoor Unit **SAP-CR165G5**

			Indoor Unit	Outdoor Unit		Complete Unit
			Fan Motor	Fan Motor	Compressor	
Performance at			220 / 240V Single phase 50Hz			
Rating Conditions	Running Amps.	A	0.28 / 0.30	0.40 / 0.42	8.02 / 7.99	8.7 / 8.7
	Power Input	kW	0.062 / 0.072	0.082 / 0.091	1.756 / 1.817	1.90 / 1.98
Full Load Conditions	Running Amps.	A	0.28 / 0.30	0.40 / 0.42	10.22 / 9.69	10.9 / 10.4
	Power Input	kW	0.062 / 0.072	0.082 / 0.091	2.226 / 2.257	2.37 / 2.42

Rating Conditions : Indoor Air Temperature 27°C D.B. / 19°C W.B.

Outdoor Air Temperature 35°C D.B.

Full Load Conditions : Indoor Air Temperature 32°C D.B. / 23°C W.B.

Outdoor Air Temperature 43°C D.B.

Indoor Unit **SAP-KR185QS5**

Outdoor Unit **SAP-CR185G5**

			Indoor Unit	Outdoor Unit		Complete Unit
			Fan Motor	Fan Motor	Compressor	
Performance at			220 / 240V Single phase 50Hz			
Rating Conditions	Running Amps.	A	0.28 / 0.30	0.40 / 0.42	9.42 / 9.29	10.1 / 10.0
	Power Input	kW	0.062 / 0.072	0.082 / 0.091	2.056 / 2.157	2.20 / 2.32
Full Load Conditions	Running Amps.	A	0.28 / 0.30	0.40 / 0.42	11.32 / 10.79	12.0 / 11.5
	Power Input	kW	0.062 / 0.072	0.082 / 0.091	2.486 / 2.517	2.63 / 2.68

Rating Conditions : Indoor Air Temperature 27°C D.B. / 19°C W.B.

Outdoor Air Temperature 35°C D.B.

Full Load Conditions : Indoor Air Temperature 32°C D.B. / 23°C W.B.

Outdoor Air Temperature 43°C D.B.

Indoor Unit **SAP-KR185QS5**

Outdoor Unit **SAP-CR185GL5**

			Indoor Unit	Outdoor Unit		Complete Unit
			Fan Motor	Fan Motor	Compressor	
Performance at			220 / 240V Single phase 50Hz			
Rating Conditions	Running Amps.	A	0.28 / 0.30	0.40 / 0.42	9.42 / 9.29	10.1 / 10.0
	Power Input	kW	0.062 / 0.072	0.082 / 0.091	2.056 / 2.157	2.20 / 2.32
Full Load Conditions	Running Amps.	A	0.28 / 0.30	0.40 / 0.42	11.32 / 10.79	12.0 / 11.5
	Power Input	kW	0.062 / 0.072	0.082 / 0.091	2.486 / 2.517	2.63 / 2.68

Rating Conditions : Indoor Air Temperature 27°C D.B. / 19°C W.B.

Outdoor Air Temperature 35°C D.B.

Full Load Conditions : Indoor Air Temperature 32°C D.B. / 23°C W.B.

Outdoor Air Temperature 43°C D.B.

## 6-2. Electric Wiring Diagrams

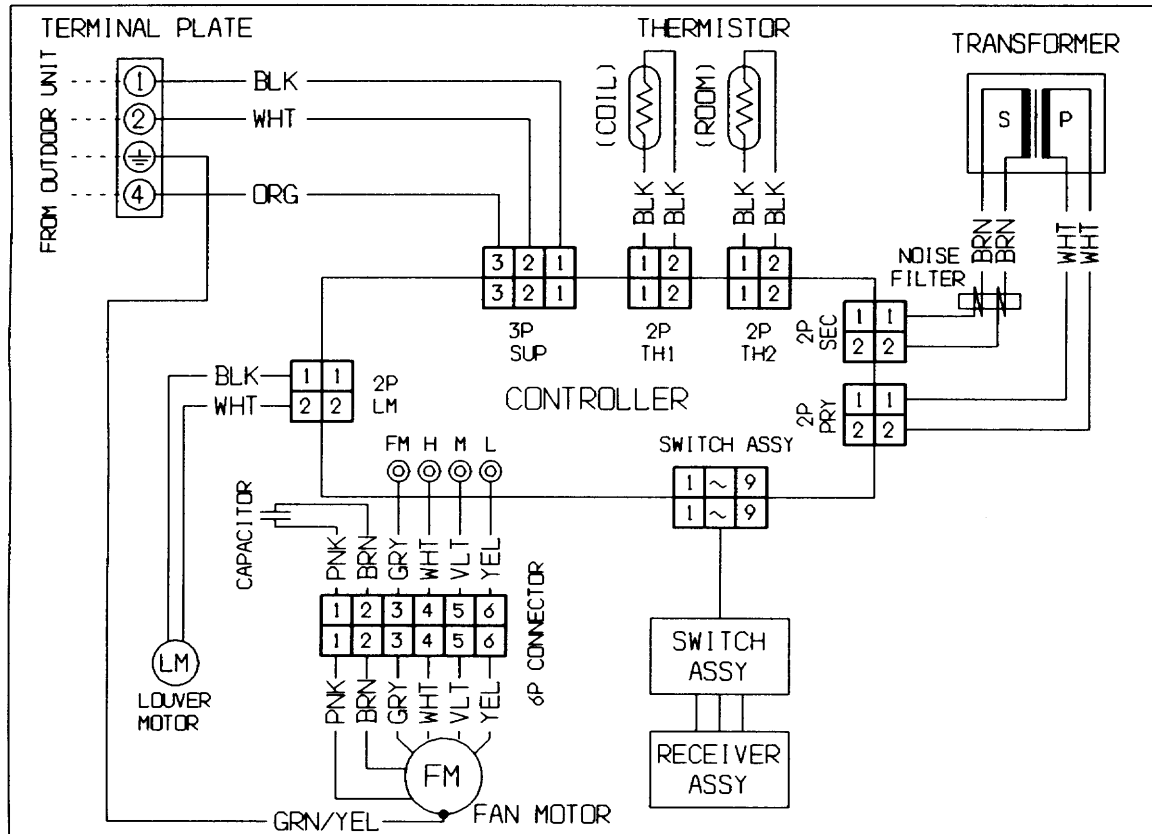
Indoor Unit

SAP-KR165QS5  
SAP-KR185QS5



**WARNING**

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

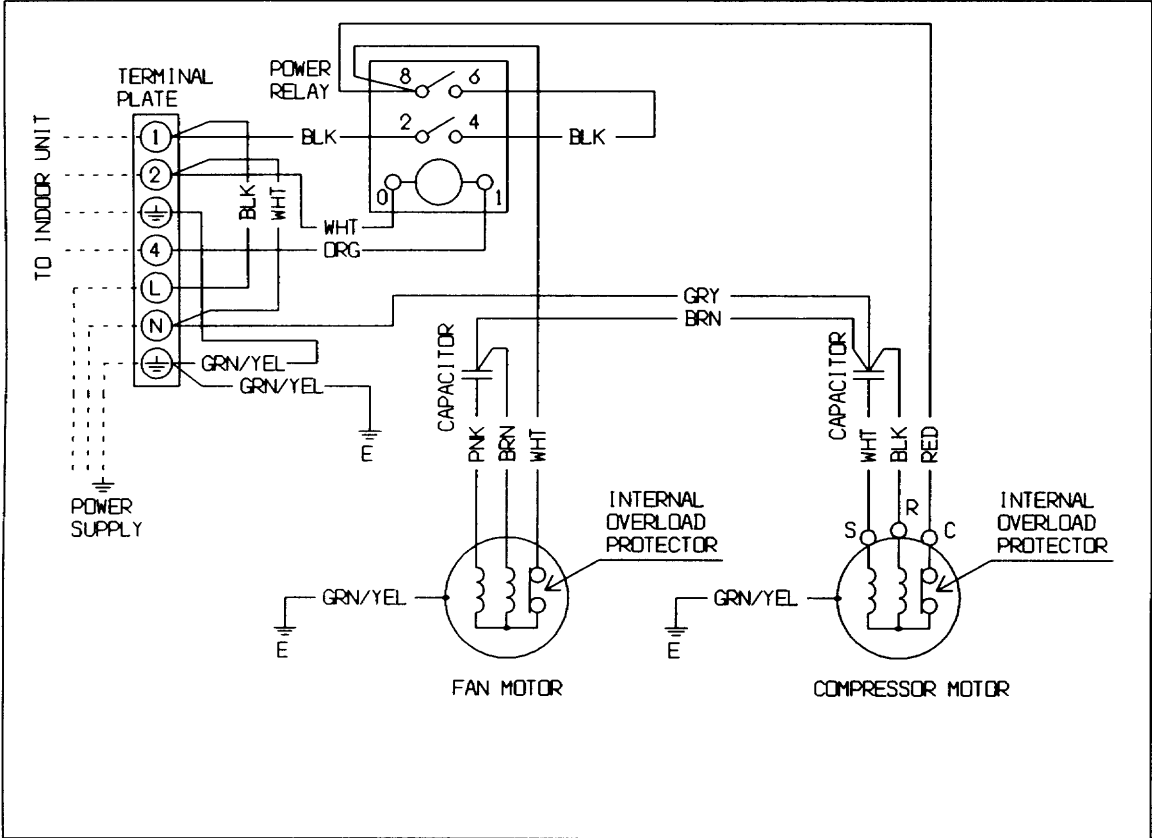


8512-5253-167XX-0



**WARNING**

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

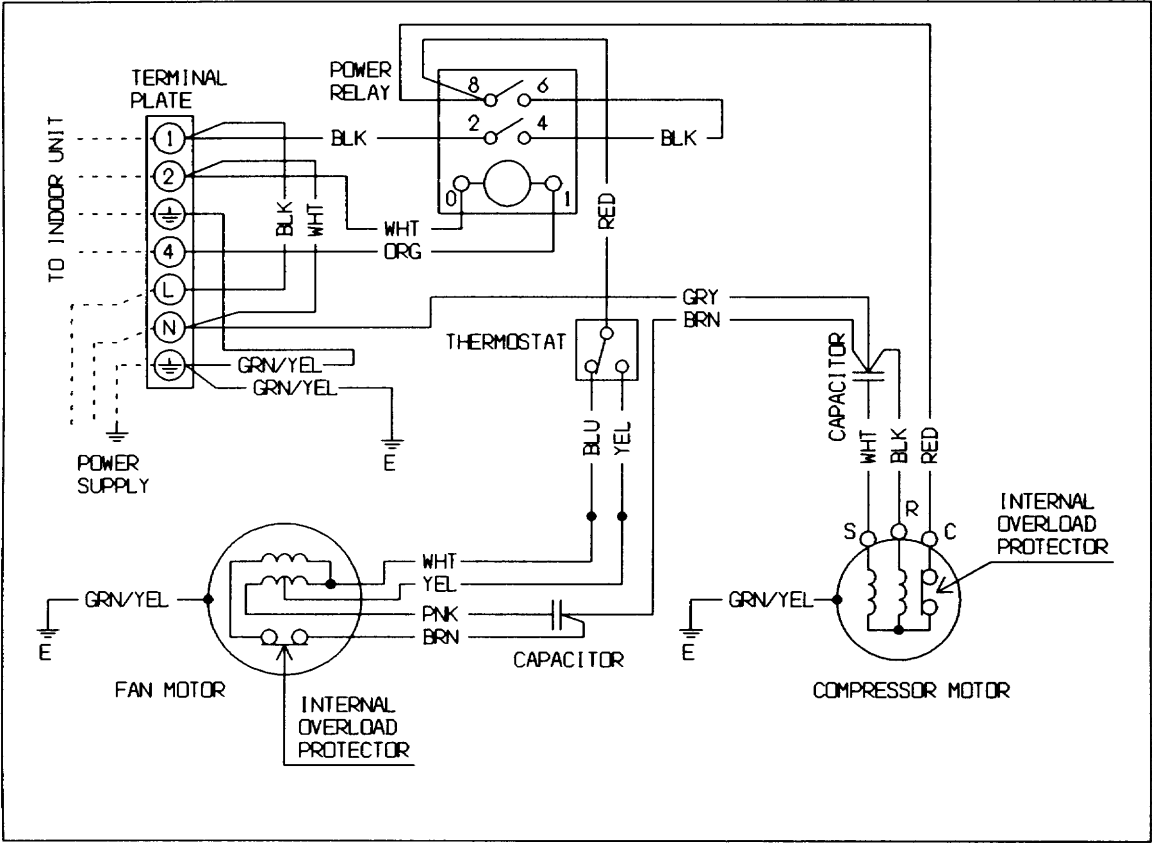


8512-5253-114XX-0



**WARNING**

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

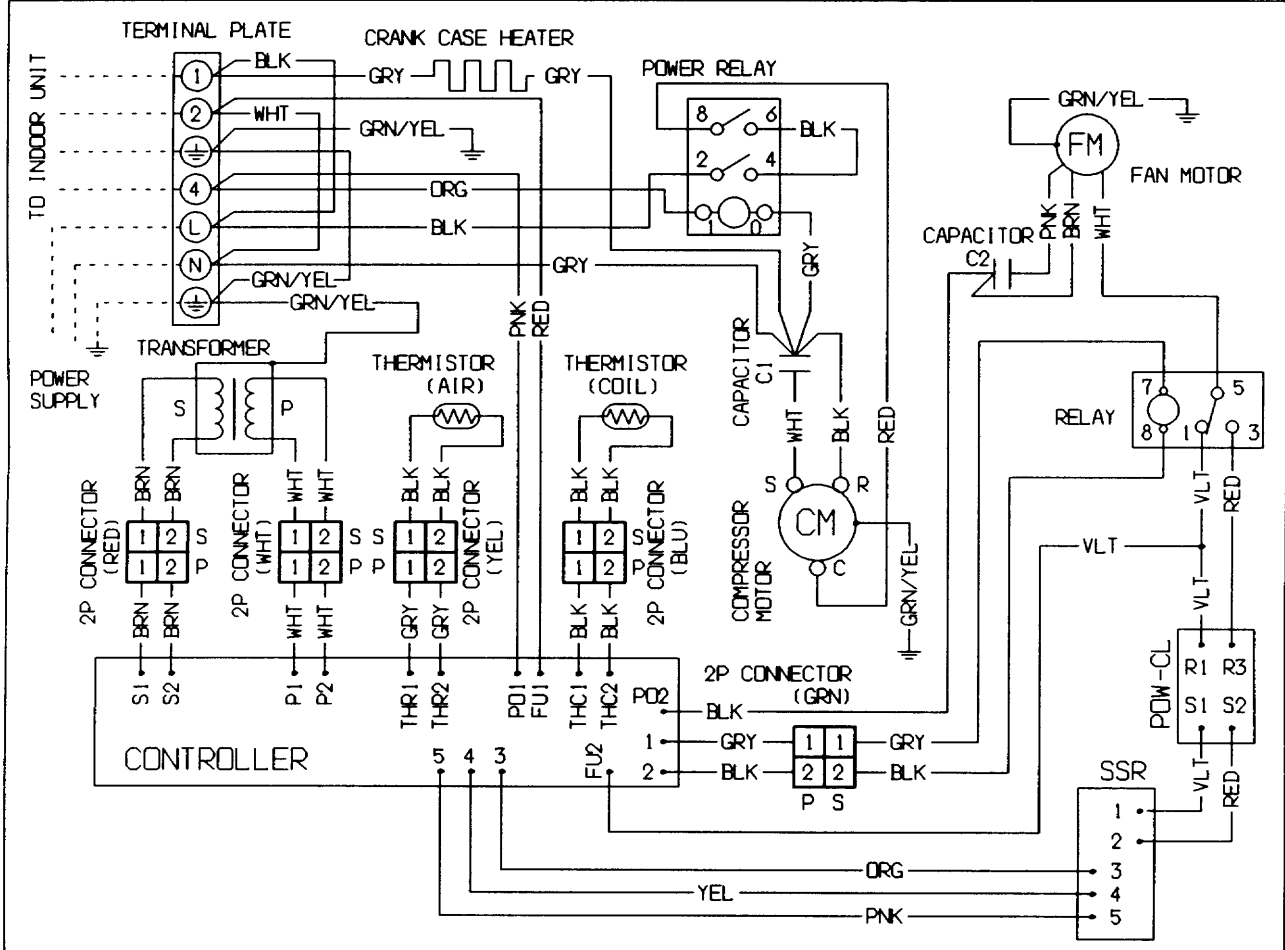


8512-5253-115XX-0



**WARNING**

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



8512-5253-116XX-2

# 7. INSTALLATION INSTRUCTIONS

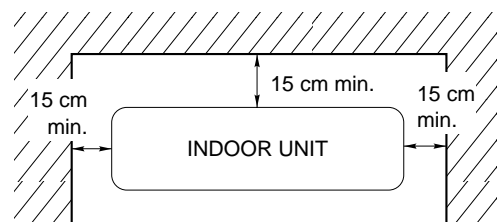
## 7-1. Installation Site Selection

Indoor Unit



### WARNING

To prevent abnormal heat generation and the possibility of fire, don't place obstacles, enclosures and grills in front of or surrounding the air conditioner in a way that may block air flow.



Front View  
Fig.1

### 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 air-conditioned. (High on a wall is best)
- select a location that will hold the weight of the unit.
- select a location where tubing and drain pipe 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 Table 1 and Fig. 2a.

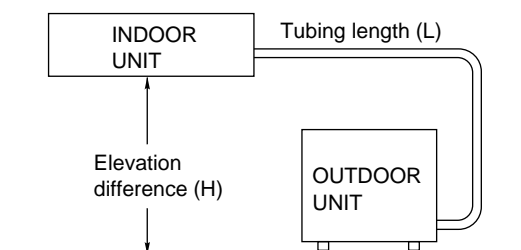


Fig. 2a



### CAUTION

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

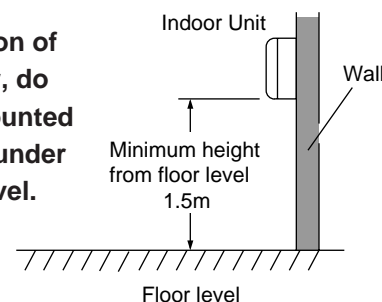


Fig. 2b

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)*
KR165,185	10	20	7	25

\* If total tubing length becomes 10 to 20 m (max.), charge additional refrigerant (R407C) by 25 g/m. No additional charge of compressor oil is necessary.

## Outdoor Unit

### AVOID:

- heat sources, exhaust fans, etc. (Fig. 3)
- 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. (Figs. 4b and 4c)
- provide a solid base (concrete block, 10 X 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.5b)
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

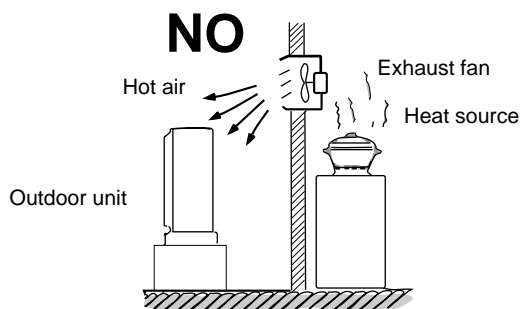
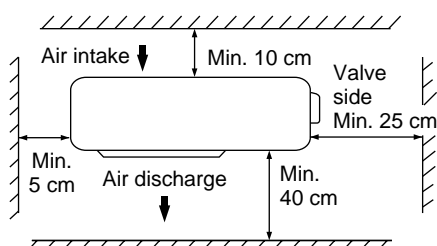


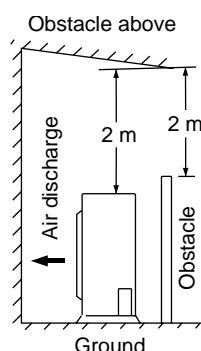
Fig. 3

### Required space around the unit.



Top View

Fig. 4b



Side View

Fig. 4c

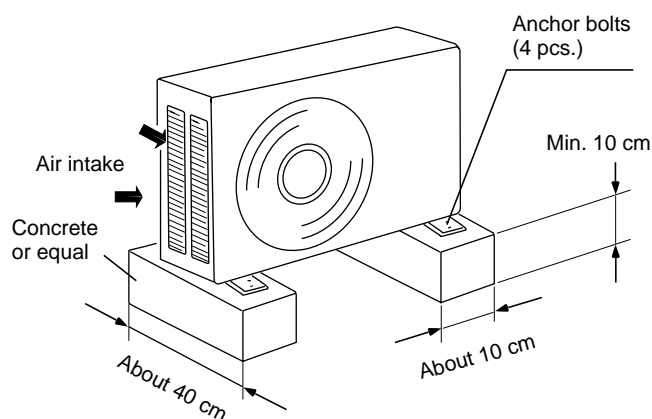


Fig. 5b

## Baffle Plates for the Outdoor Unit (for CRXXGL models)

### NOTE

It is recommended to use baffle plates for low ambient models. The baffle plates are not normally required for the other models.

### (1) General

When the outdoor unit is installed in a position exposed to strong wind (such as seasonal winds with low air temperature in winter), baffle plates must be installed on the outdoor unit. (Fig.6a)

This unit is designed so that the fan of the outdoor unit runs at low speed when the air conditioner is operated at low outdoor air temperatures. When the outdoor unit is exposed to a strong wind, the system pressure drops because of the freeze protector.

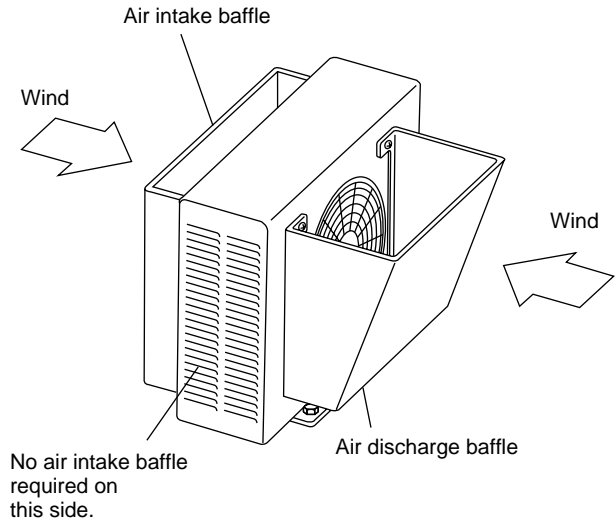


Fig.6a

### NOTE

Install a pair of wind baffle plates at the front and back of the outdoor unit if it will be subject to strong wind during the winter. (Figs.6a, 6b and 6c)

### (2) Recommended dimensions of the baffle plates

Air Intake Baffle

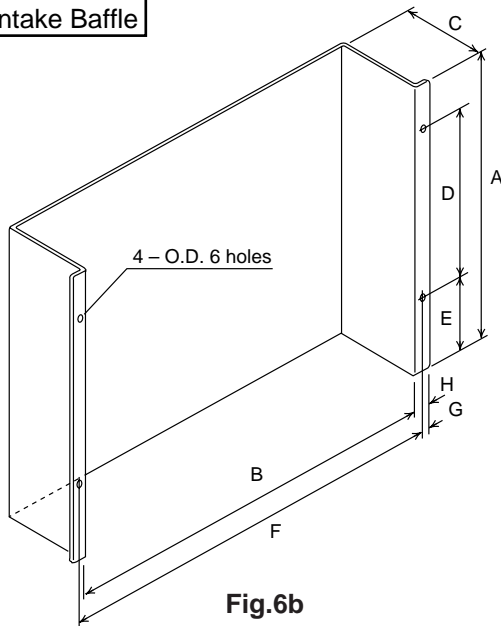


Fig.6b

Air Discharge Baffle

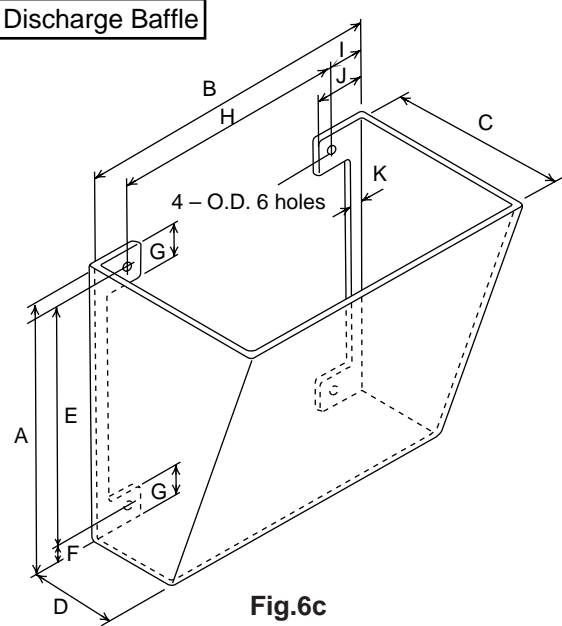


Fig.6c

Table 2 For air intake

mm

Dimension Model	A	B	C	D	E	F	G	H
CR165,185	525	686	150	300	135	706	10	20

Table 3 For air discharge

mm

Dimension Model	A	B	C	D	E	F	G	H	I	J	K
CR165,185	450	500	300	150	380	35	55	380	60	85	25

Material to be used : Metal plate with corrosion protection treatment

Plate thickness : 1.0 to 1.2 mm



### (3) Parts required (field supply except for screws)

**Table 4** Air intake baffle

Item	Q'ty	Remarks
Baffle plate	1	
Screw (4×12,tapping)	2	Attached to the outdoor unit

**Table 5** Air discharge baffle

Item	Q'ty	Remarks
Baffle plate	1	
Screw (4×12,tapping)	4	Attached to the outdoor unit

### 4) Installation procedure

#### Intake baffle

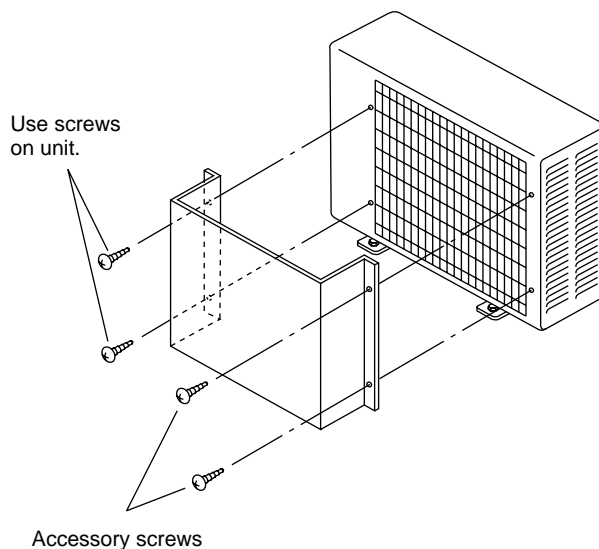
1. Use the 2 screws on the unit for installation on the left side. (Fig.6d)
2. Use the 2 accessory screws for installation on the right side.

#### Discharge baffle

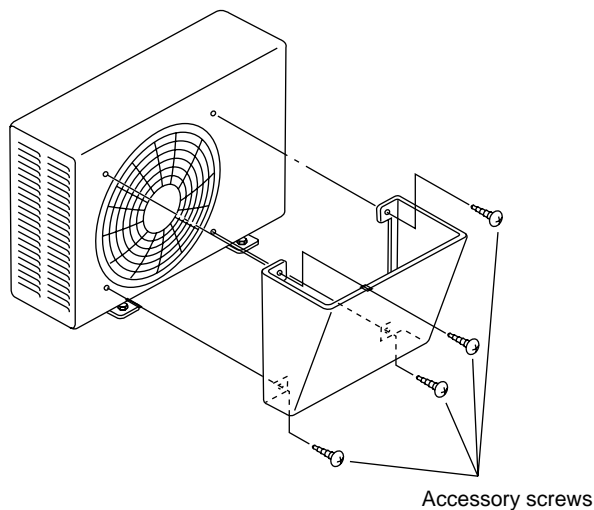
1. Install with the 4 accessory screws as shown below. (Fig.6e)

### (5) Precautions for manufacture and installation

1. Take care not to damage painted surfaces.
2. Finish the edges of the baffle plates so that you will not get cut.
3. Use only the accessory screws or the supplied tapping screws, as too long screws may damage internal parts like copper tubes, etc.



**Fig.6d**



**Fig.6e**

## 7-2. 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

### Mounting on a Wall

#### a) Removable mounting

- 1) Momentarily hold the remote control unit at the desired mounting position.
- 2) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.
- 3) After confirming correct operation, use a screwdriver to screw the supplied special mounting screw into the wall. (Fig.7a)
- 4) Hang the remote control unit from the mounting screw.

#### b) Non-removable mounting

- 1) Momentarily hold the remote control unit at the desired mounting position.
- 2) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.
- 3) After confirming correct operation, use a screwdriver to screw the supplied special mounting screw into the wall. (Fig.7a)
- 4) Remove the remote control cover by sliding it downward.
- 5) Remove the batteries of the remote control unit.
- 6) Use a screwdriver to screw the remote control unit securing screw into the wall through the hole in the battery compartment. (Fig.7b)
- 7) Replace the batteries.
- 8) Again confirm that the remote control unit operates correctly.

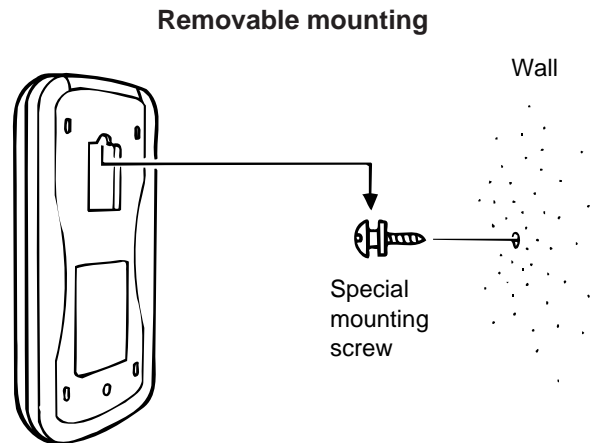


Fig.7a

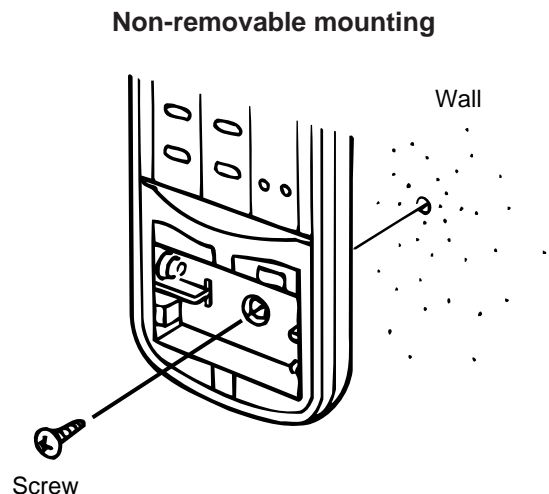


Fig.7b

## 7-3. 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 lists recommended wire lengths and cross section area for power supply systems.

### NOTE

Refer to the WIRING SYSTEM DIAGRAM for the meaning of "A" and "B" in Table 6.

**Table 6**

Cross Sectional Area (mm <sup>2</sup> ) Model	(A) Power Supply Wiring Length (m)	(B) Power Line (m)	Fuse or Circuit Breaker Capacity
	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	
CR165G5	24	20	15A
CR185G5,185GL5	22		20A



### 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

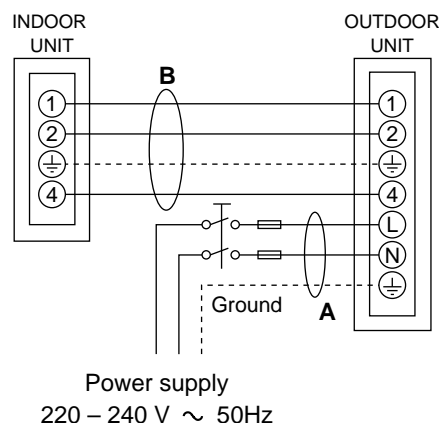
To avoid the risk of electric shock, each air conditioner unit must be grounded.



### 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.

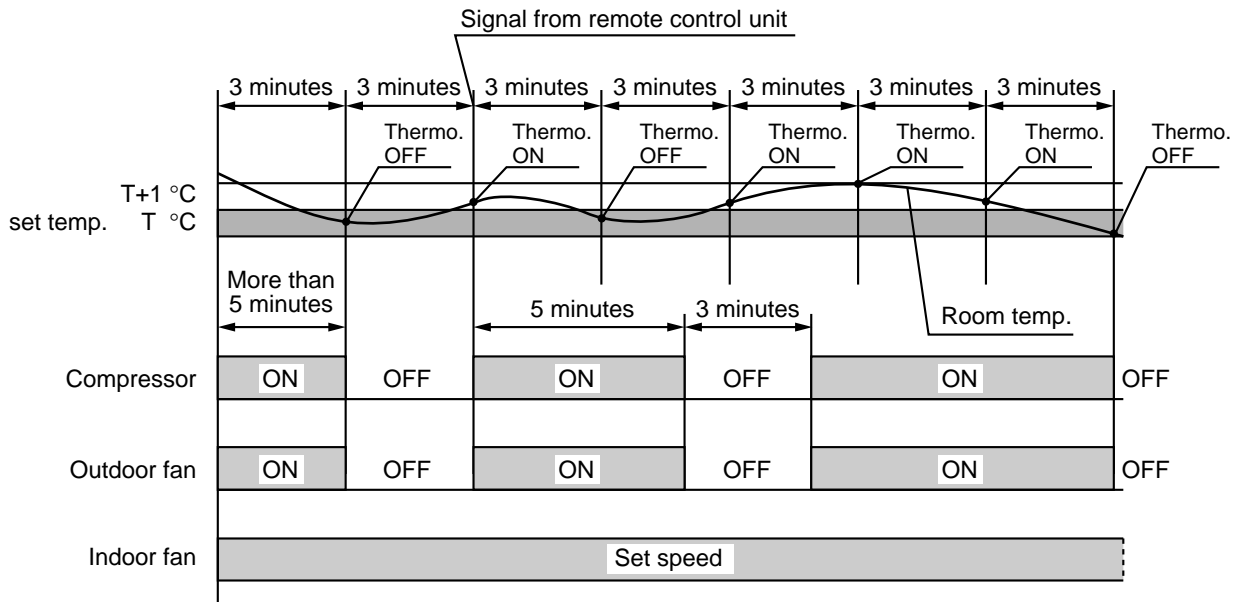
### WIRING SYSTEM DIAGRAM



## 8. FUNCTION

### 8-1. Room Temperature Control

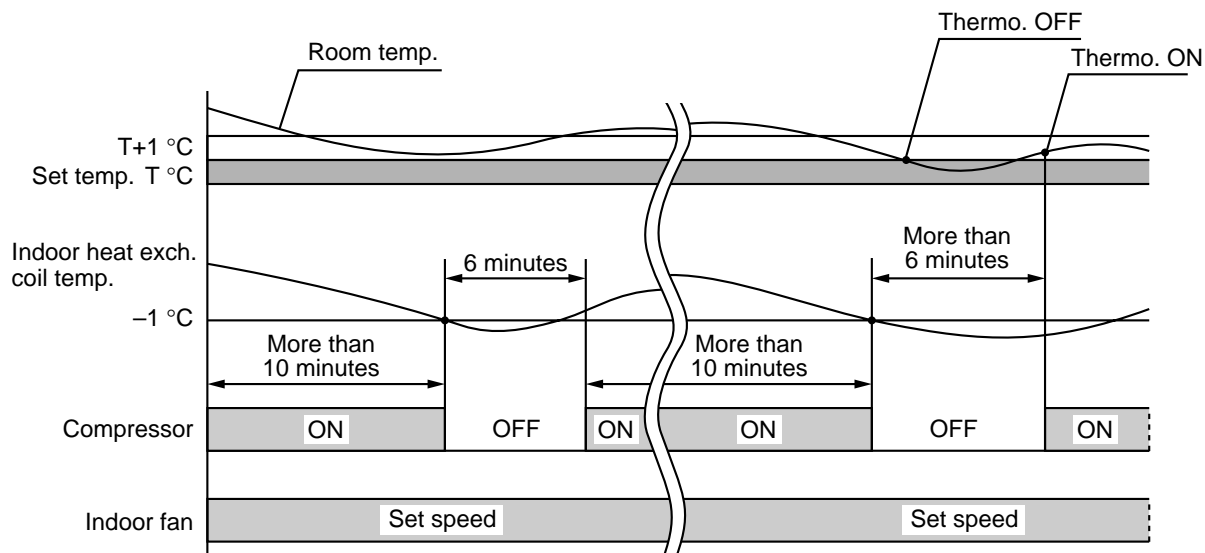
- Room temperature control is obtained by cycling the compressor ON and OFF under control of the room temperature sensor in the remote control unit.
- The room temperature (and other information) is transmitted every 3 minutes by the remote control unit to the controller in the indoor unit.



- The control circuit will not attempt to turn the compressor ON until the compressor has been OFF for at least 3 minutes. To protect the compressor from stalling out when trying to start against the high side refrigerant pressure, the control circuit has a built-in automatic time delay to allow the internal pressure to equalize.
- As a protective measure, the control circuit switches the compressor OFF after 5 minutes or more of compressor operation.
- Thermo. ON : When the room temperature is above  $T + 1^{\circ}\text{C}$  ( $T^{\circ}\text{C}$  is set temperature).  
Compressor → ON
- Thermo. OFF : When the room temperature is equal to or below set temperature  $T^{\circ}\text{C}$ .  
Compressor → OFF

## 8-2. Freeze Prevention

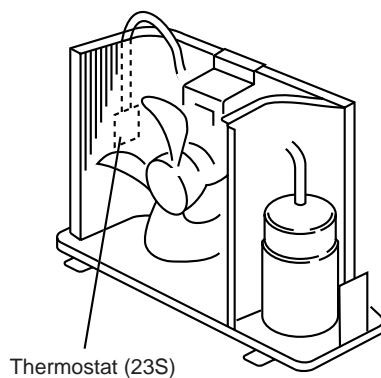
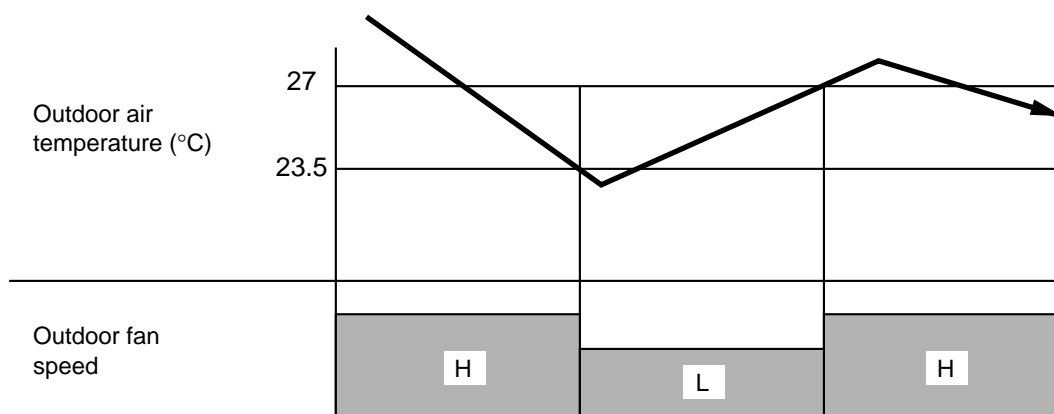
- This function prevents freezing of the indoor heat exchange coil.
- When the compressor has been running for 10 minutes or more and the temperature of the indoor heat exchange coil falls below  $-1^{\circ}\text{C}$ , the control circuit stops the compressor for at least 6 minutes. The compressor does not start again until the temperature rises above  $8^{\circ}\text{C}$  or 6 minutes has elapsed.



## 8-3. Outdoor Fan Speed Control

### 8-3-1. Switching to either HIGH or LOW speed (SAP-CR185G5 only)

- To optimize performance of the air conditioner, the outdoor fan speed is switched automatically either to HIGH or LOW speed according to the outdoor temperature detected by the thermostat (23S).
- If the outdoor air temperature falls below 23.5°C, the fan speed switches to LOW.
- If the outdoor air temperature rises above 27°C, the fan speed switches to HIGH.

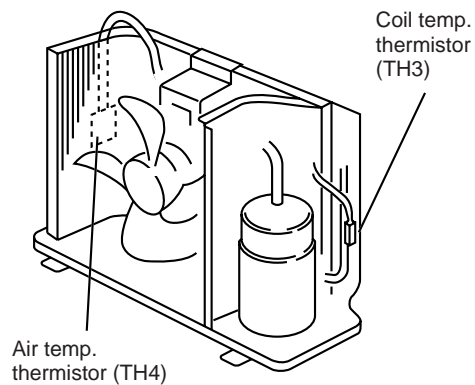
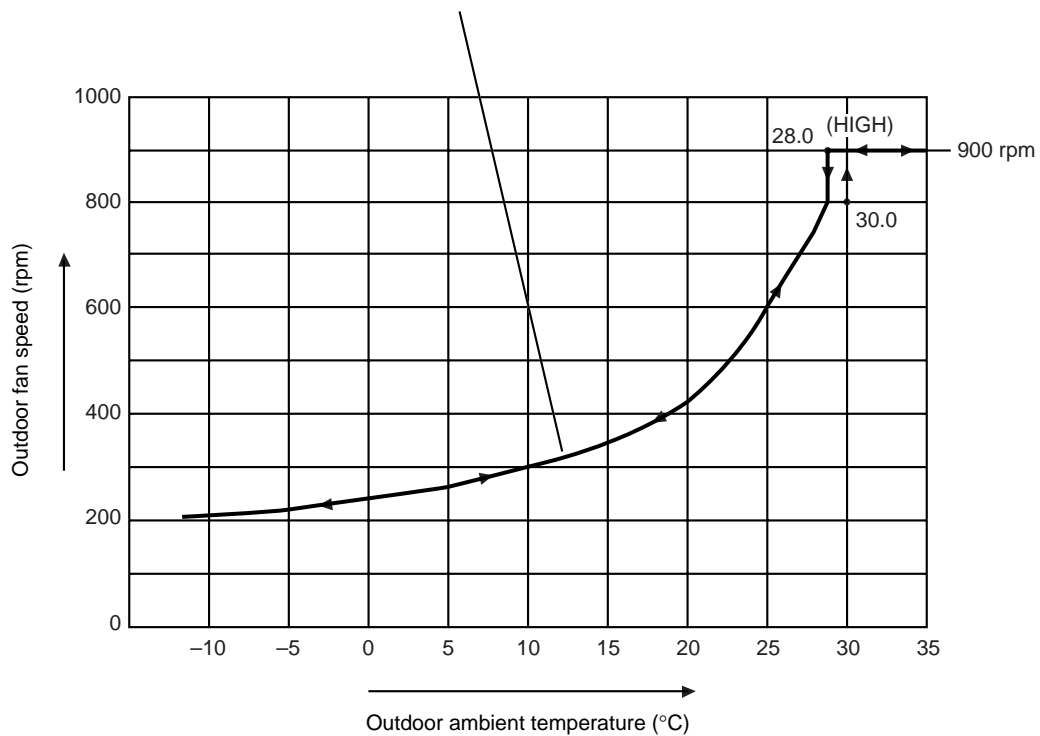


(SAP-CR185G5)

### 8-3-2. Low ambient fan speed control(SAP-CR185GL5 only)

- This function protects the compressor from being damaged due to flowback of the liquid refrigerant to the compressor when the outdoor temperature is very low.
- When the air temp. thermistor (TH4) on the outdoor units detects a change in temperature, the solid state relay (SSR) inside the electrical component box activates to control the fan speed accordingly.
- As the outdoor temperature decreases and drops below 28.0°C, the outdoor fan speed starts to gradually slow down following an oblique line as in the diagram below.
- Outdoor fan speed changes more or less according to the room temperature.
- When the outdoor temperature goes above 30.0°C, the outdoor fan speed control does not work.

Conditions: Room temperature 19.4°C DB/13.9°C WB



(SAP-CR185GL5)

## 9. TROUBLESHOOTING

### 9-1. Check before and after troubleshooting



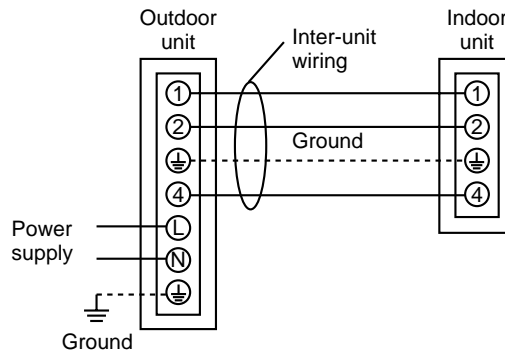
#### WARNING

Hazardous voltage can cause **ELECTRIC SHOCK** or **DEATH**. Disconnect power or turn off circuit breaker before you start checking or servicing.

#### 9-1-1. Check power supply wiring.

- Check that power supply wires are correctly connected to terminals **L** and **N** on the terminal plate in the outdoor unit.

Power supply:  
50Hz, single-phase  
220-240V



#### 9-1-2. Check inter-unit wiring.

- Check that inter-unit wiring is correctly connected to the outdoor unit from the indoor unit.

#### 9-1-3. Check power supply.

- Check that voltage is in specified range ( $\pm 10\%$  of the rating).
- Check that power is being supplied.

#### 9-1-4. Check lead wires and connectors in indoor and outdoor units.

- Check that coating of lead wires is not damaged.
- Check that lead wires and connectors are firmly connected.
- Check that wiring is correct.



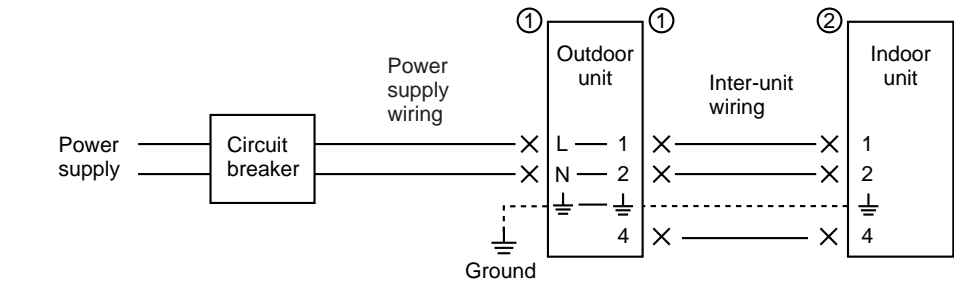
9-2. Air conditioner does not operate.

9-2-1. Circuit breaker trips (or fuse blows).

A. When the circuit breaker is set to ON, it is tripped soon. (Resetting is not possible.)

- There is a possibility of ground fault.
- Check insulation resistance.

If resistance value is 2MΩ or less, insulation is defective (“NO”).



**WARNING**

\* Set circuit breaker to OFF.

① Remove both power supply wires and inter-unit wires from terminal plate in outdoor unit.

- Measure insulation resistance of outdoor unit.

NO → Insulation of outdoor unit is defective.

Insulation of outdoor unit is defective.

- Measure insulation resistance of electrical parts in outdoor unit.

② Remove inter-unit wires from terminal plate in indoor unit.

- Measure insulation resistance of indoor unit.

NO → Insulation of indoor unit is defective.

Insulation of indoor unit is defective.

- Measure insulation resistance of electrical parts in indoor unit.

B. Circuit breaker trips in several minutes after turning the air conditioner on.

- There is a possibility of short circuit.

- Check capacity of circuit breaker.

Capacity of circuit breaker is suitable.

NO → Replace with suitable one (larger capacity).

Replace with suitable one (larger capacity).

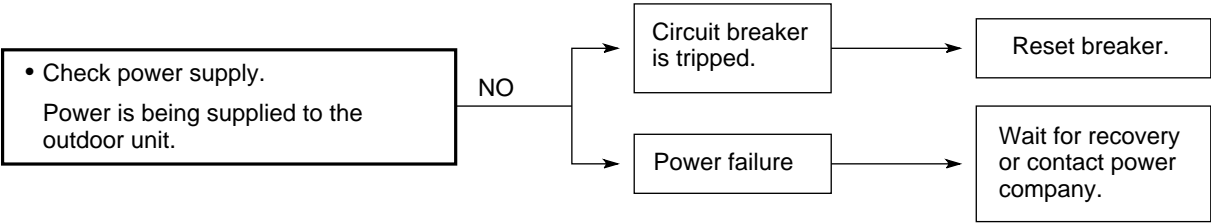
- Measure resistance of compressor motor winding.

(Except SAP-CR185GL5)

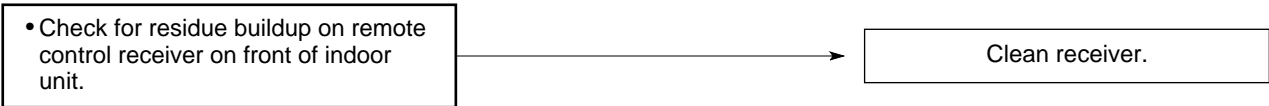
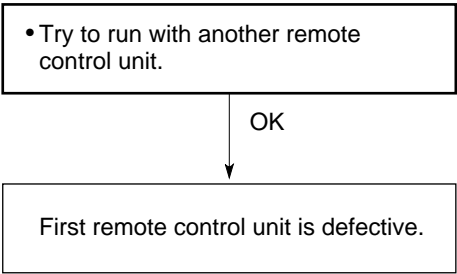
- Measure resistance of outdoor fan motor winding.

**9-2-2. Neither indoor nor outdoor unit runs.**

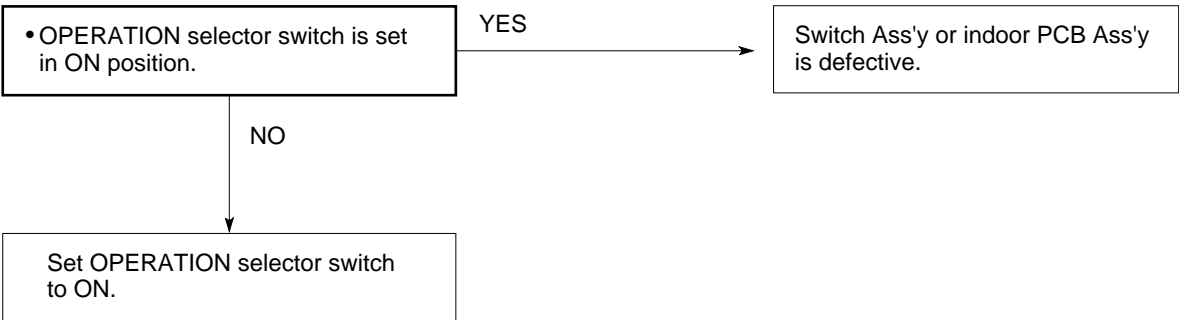
**A. Power is not supplied.**



**B. Check remote control unit.**



**C. Check "OPERATION selector" switch in the indoor unit.**

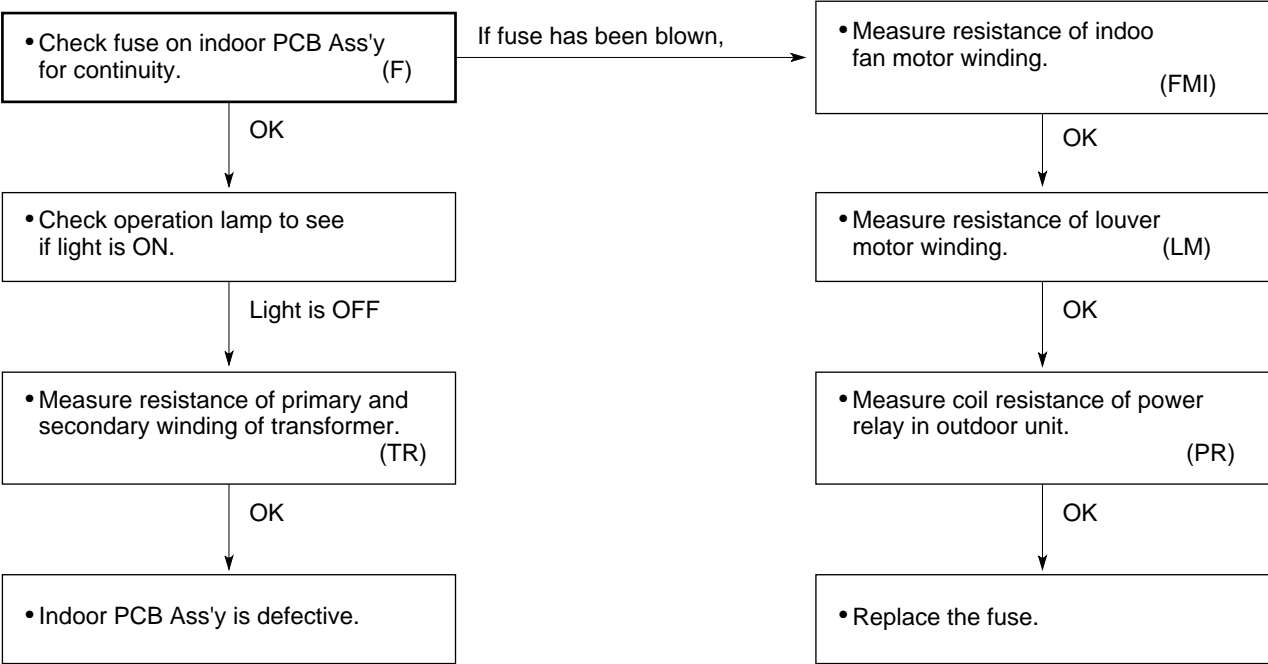


**D. Check transformer in indoor unit.**

- Measure resistance of primary and secondary winding.

(TR)

**E. Check fuse on the indoor PCB Ass'y.**

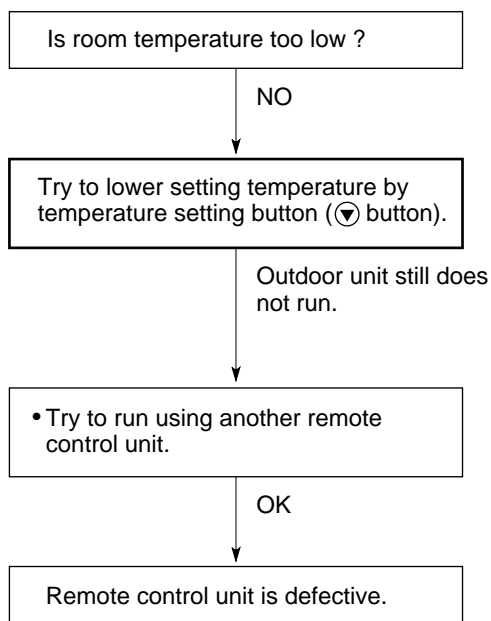


**F. Check TIMER on the remote control unit.**

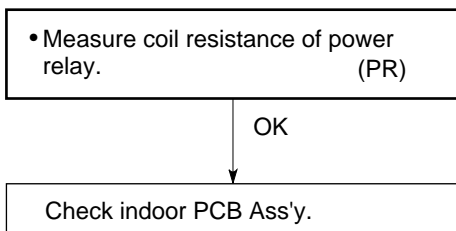


### 9-2-3. Only outdoor unit does not run.

#### A. Check setting temperature.

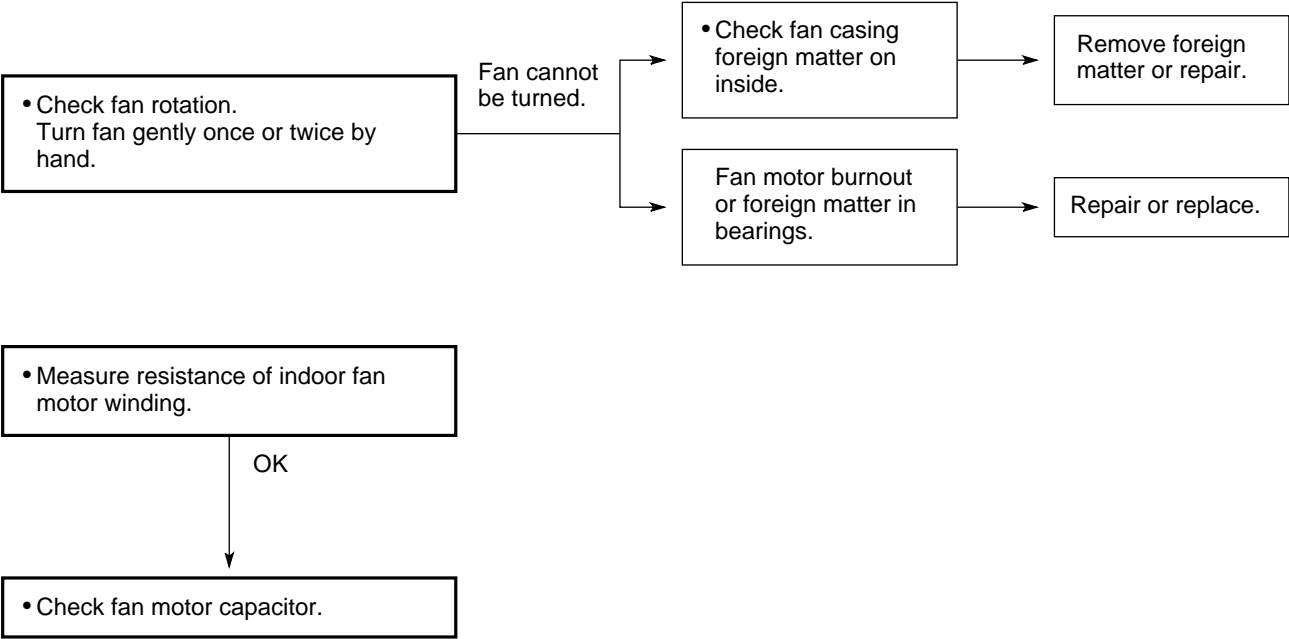


#### B. Check power relay in outdoor unit.

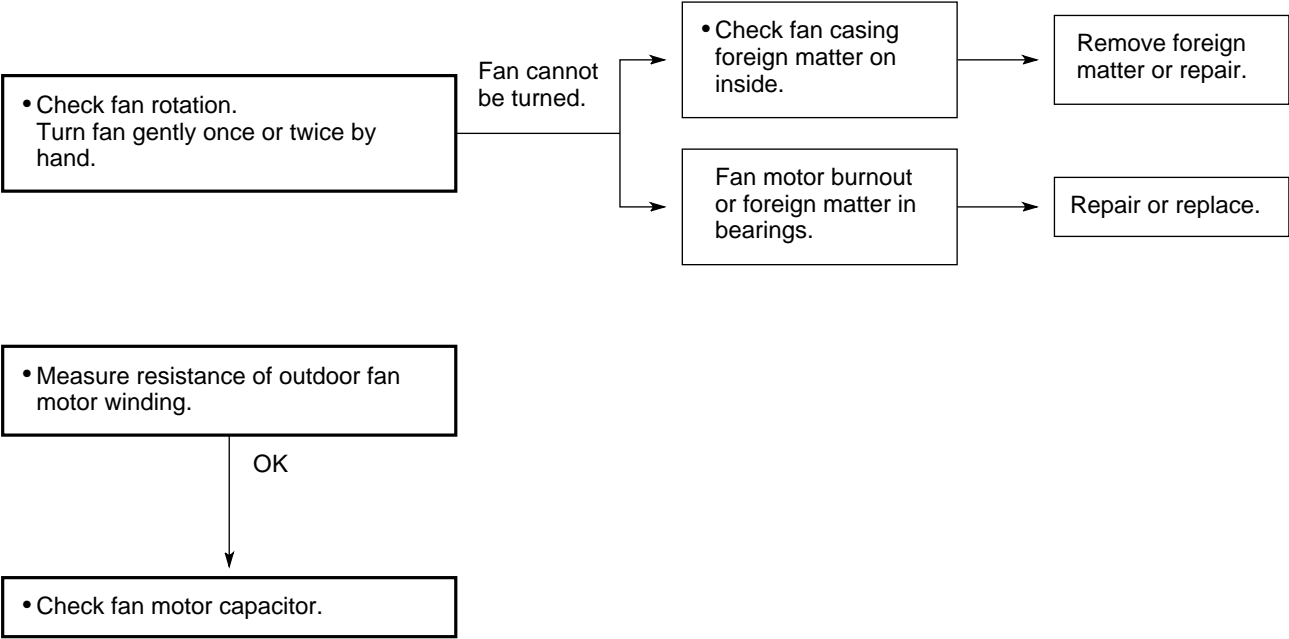


9-3. Some part of air conditioner does not operate.

9-3-1. Only indoor fan does not run.



9-3-2. Only outdoor fan does not run.



● **Check transformer in outdoor unit.** (SAP-CR185GL5 Only)

- Measure resistance of primary and secondary winding. (TR2)

● **Check fuse on outdoor PCB Ass'y.** (SAP-CR185GL5 Only)

- Check fuse on outdoor PCB Ass'y for continuity. (F)

If fuse blows,

- Measure resistance of primary winding of transformer. (TR2)

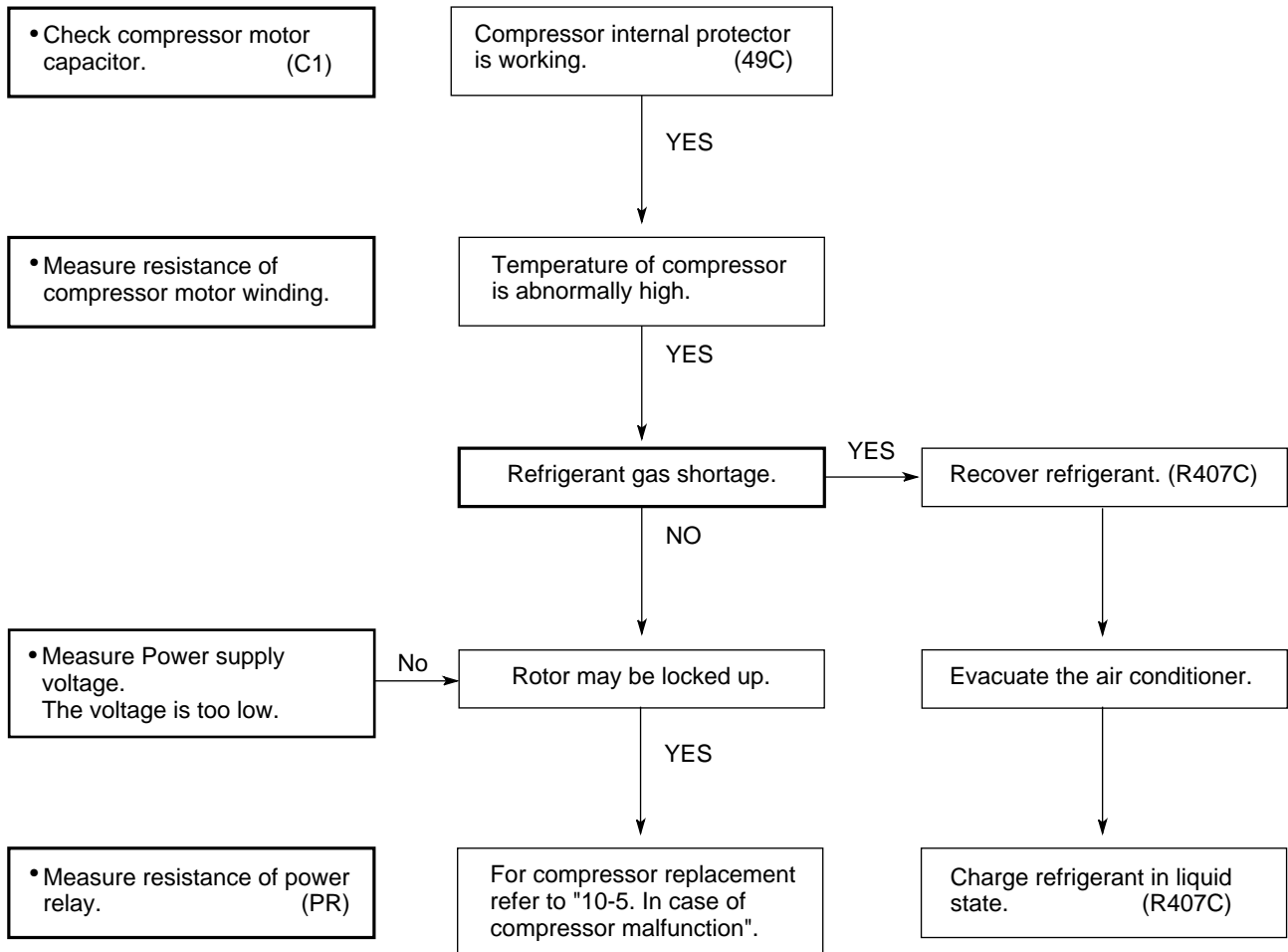
OK

- Measure resistance of outdoor fan motor winding.

OK

- Outdoor PCB Ass'y is defective.

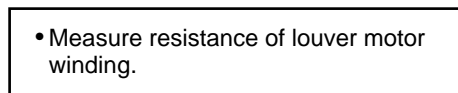
### 9-3-3. Only compressor does not run.



#### CAUTION

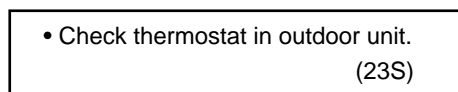
In case of leakage, do not add refrigerant. The unit must be vacuumed and recharged. This is because composition of refrigerant in the unit has been changed due to leakage. See "10-6. In case refrigerant is leaking".

### 9-3-4. Only louver motor does not run.

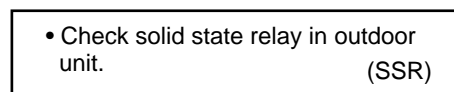


### 9-3-5. Function of outdoor fan speed control does not work properly. (Except SAP-CR165G5)

(SAP-CR185G5 only)



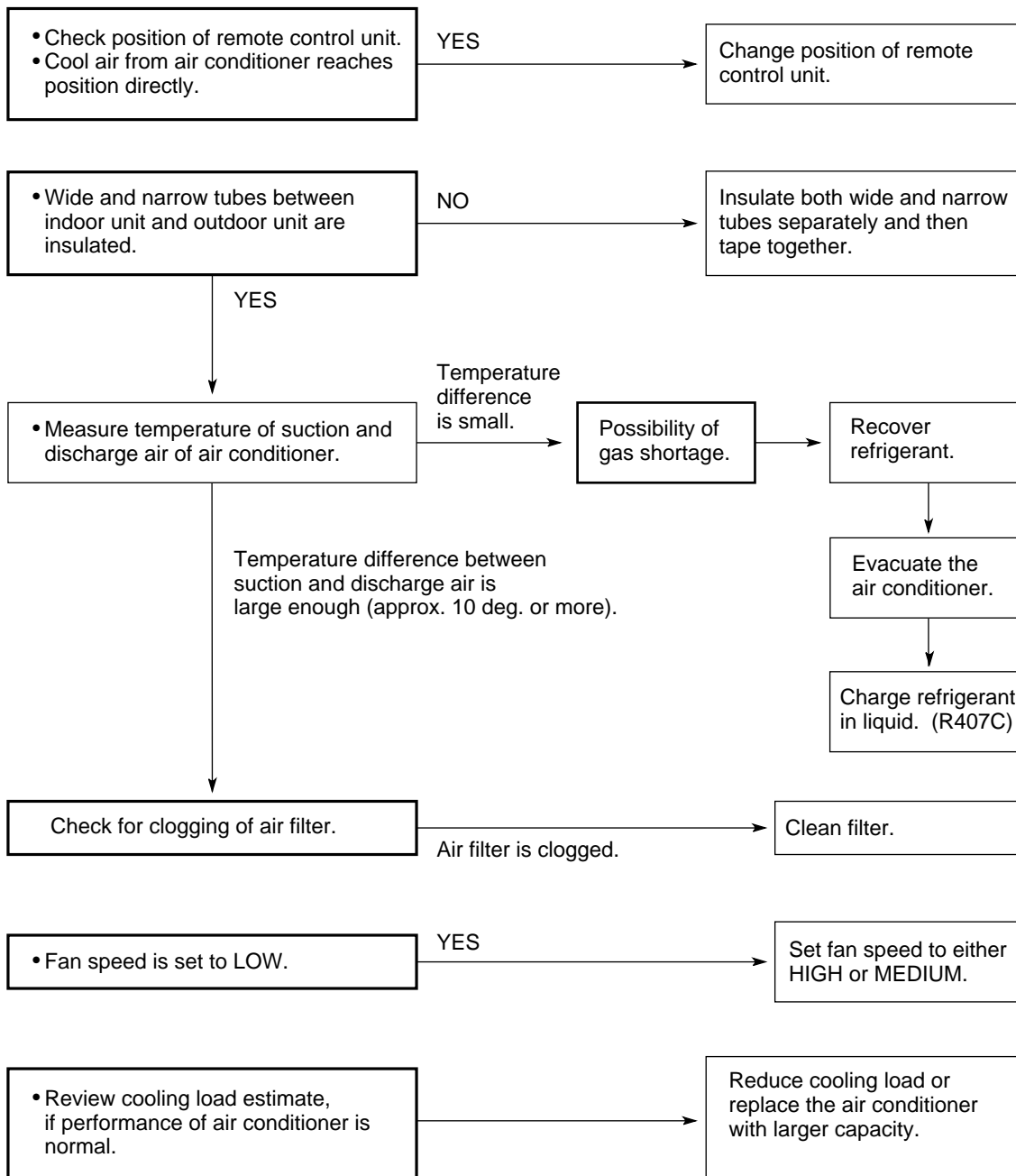
(SAP-CR185GL5 only)



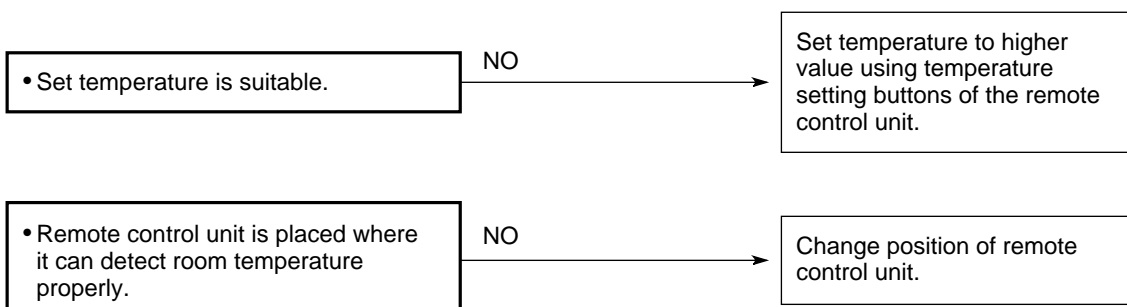
Refer to 8-3 "Outdoor Fan Speed Control."

## 9-4. Air conditioner operates, but abnormalities are observed.

### 9-4-1. Poor cooling.



### 9-4-2. Excessive cooling.





## 9-5. If a sensor is defective.

### 9-5-1. Indoor coil temp. thermistor (TH1) is defective.

#### A. Open

When thermistor opens, the air conditioner will be in the following conditions as the controller tries to detect extremely low indoor coil temperature.

In Cooling mode: Function of freeze prevention continues to work. That is, the controller turns both compressor and outdoor fan motor periodically ON and OFF for several minutes.  
(Refer to "8-2. Freeze Prevention")

#### B. Short

When thermistor is short, the air conditioner will be in the following conditions as the controller tries to detect extremely high indoor coil temperature.

In Cooling mode: Function of freeze prevention will not work even when the frost builds up on indoor heat exchanger coil

### 9-5-2. Room temp. thermistor (TH2) is defective.

#### A. Open

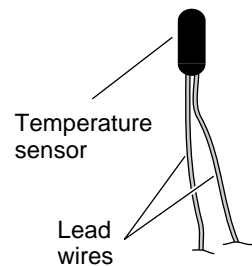
When thermistor opens, the air conditioner will be in the following conditions as the controller tries to detect extremely low room temperature.

In Cooling mode: The air conditioner soon stops and will not start again. (Thermo.OFF)  
Neither outdoor fan nor compressor runs.

#### B. Short

When thermistor is short, the air conditioner will be in the following conditions as the controller tries to detect extremely high room temperature.

In Cooling mode: The air conditioner continues to operate (Thermo.ON). Both the outdoor fan and compressor do not stop. As a result, the room becomes too cold.



#### NOTE

#### Definition of Open or Short Circuit of Sensor (Thermistor)

#### Thermistor Structure

Open ... A lead wire is broken or disconnected or the circuit inside the temperature sensor is open .

Short ... The protective cover of a lead wire has been damaged, and the exposed wire is touching another metal part, or both lead wires have become exposed and are touching each other. Alternatively, the circuit inside the temperature sensor is closed.

# 10. REFRIGERANT R407C : SPECIAL PRECAUTIONS WHEN SERVICING UNIT

## 10-1. Characteristics of new refrigerant R407C

### 10-1-1. What is new refrigerant R407C

R407C is a new refrigerant that contains three types of non-azeotropy-type mixed refrigerant which does not adversely affect the Earth's ozone layer. Its refrigeration capacity and energy efficiency are about the same level as the conventional refrigerant R22

### 10-1-2. Components (mixing proportions)

HFC32 (23%) / HFC125 (25%) / HFC134a (52%)

### 10-1-3. Characteristics

- Less toxic, more chemically stable refrigerant.
- Composition of refrigerant R407C changes whether it is in gaseous phase or liquid phase. Thus, when there is a refrigerant leak the basic performance of the air conditioner may be degraded because of a change in composition of the remaining refrigerant. **Therefore, do not add new refrigerant.** Instead, recover the remaining refrigerant with the refrigerant recovery unit. Then, after evacuation, totally recharge the specified amount of refrigerant with the new refrigerant at its normal mixed composition state (liquid phase).
- When refrigerant R407C is used, the composition will differ depending on whether it is in gaseous or liquid phase, and the basic performance of the air conditioner will be degraded if it is charged while the refrigerant is in gaseous state. **Thus, always charge the refrigerant while it is in the liquid phase.**



CAUTION

- Ether-type oil is used for the compressor oil for R407C-type units, which is different from the mineral oil used for R22. Thus more attention to moisture prevention and faster replacement work compared with conventional models are required.

## 10-2. Checklist before servicing

### ● Tubing precautions

Refrigerant R407C is more easily affected by dust or moisture compared with R22, thus be sure to temporarily cover the ends of the tubing with caps or tape prior to installation.

### ● No addition of compressor oil for R407C

No additional charge of compressor oil is permitted.

### ● No use of refrigerant other than R407C

Never use a refrigerant other than R407C.

### ● If refrigerant R407C is exposed to fire

Through welding, etc., toxic gas may be released when R407C refrigerant is exposed to fire. Therefore, be sure to provide ample ventilation during installation work.

### ● Caution in case of R407C leak

Check for possible leak points with the special leak detector for R407C. If a leak occurs inside the room, immediately provide thorough ventilation.

### 10-3. Tools specifically for R407C

● For servicing, use the following tools for R407C

Tool Distinction	Tool Name
Tools specifically for R407C	<ul style="list-style-type: none"><li>• Gauge manifold</li><li>• Charging hose</li><li>• Gas leak detector</li><li>• Refrigerant cylinder</li><li>• Charging cylinder</li><li>• Refrigerant recovery unit</li><li>• Vacuum pump with anti-reverse flow (*1) (Solenoid valve-installed type, which prevents oil from flowing back into the unit when the power is off, is recommended.)</li><li>• Vacuum pump (*2) ..... can be used if the following adapter is attached.</li><li>• Vacuum pump adapter (reverse-flow prevention adapter) (*3). (Solenoid valve-installed adapter attached to a conventional vacuum pump.)</li><li>• Electronic scale for charging refrigerant</li><li>• Flare tool</li></ul>
Tools which can be commonly used for R22 and R407C	<ul style="list-style-type: none"><li>• Bender</li><li>• Torque wrench</li><li>• Cutter, Reamer</li><li>• Welding machine, nitrogen gas cylinder</li></ul>



**CAUTION**

- The above tools specifically for R407C must not be used for R22. Doing so will cause malfunction of the unit.
- For the above vacuum pump (\*1, \*2) and vacuum pump adapter (\*3) , those for R22-type units can be used for R407C-type. However, they must be used exclusively for R407C and never alternately with R22.

### 10-4. For tubing installation procedures

- When the tubes are connected, ***always apply HAB oil on the flare portions to improve the sealing of tubing.***

The following is the **HAB oil** generally used:

Esso: ZERICE S32

**NOTE**

For details on tubing installation procedures, refer to the installation manuals attached to the indoor unit and outdoor unit.

## 10-5. In case of compressor malfunction



### CAUTION

- Should the compressor malfunction, be sure to replace compressor as quickly as possible.
- Use only the tools indicated exclusively for R407C. → See "10-3. Tools specifically for R407C".

### 10-5-1.Procedure for replacing compressor

#### (1) Recovering refrigerant

- Any remaining refrigerant inside the unit should not be released to the atmosphere, but recovered using the refrigerant recovery unit for R407C.
- Do not reuse the recovered refrigerant, since will contain impurities.

#### (2) Replacing compressor

- Soon after removing pinched pipes of both discharge and suction tubes of the new compressor, replace it quickly.

#### (3) Checking for sealing

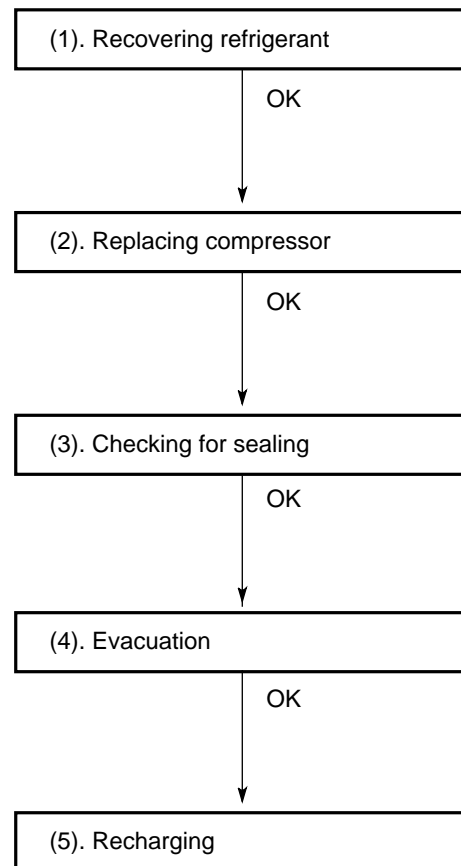
- Use nitrogen gas for the pressurized gas, and never use a refrigerant other than R407C. Also do not use oxygen or any flammable gas.

#### (4) Evacuation

- **Use a solenoid valve-installed vacuum pump** so that even if power is cut off in the middle of evacuation of air due to a power interruption, the valve will prevent the pump oil from flowing back.
- The equipment may be damaged if moisture remains in the tubing, thus carry out the evacuation thoroughly.
- When using a vacuum pump with exhaust air volume more than 25L/min. and ultimate vacuum pressure rate of 0.05Torr:

Standard time of evacuation

Length of tubing	Less than 10 m	More than 10 m
Time	More than 10 min.	More than 15 min.



## (5) Recharging

- **Be sure to charge the specified amount of refrigerant in liquid state** using the service port of wide tube service valve. The proper amount is listed on the unit's nameplate.

When the entire amount cannot be charged all at once, charge gradually while operating the unit in Cooling Operation.



**CAUTION**

- **Never charge a large amount of liquid refrigerant at once to the unit. This may cause damage to the compressor.**

- When charged with a refrigerant cylinder, use the electronic scale for charging refrigerant. In this case, if the volume of refrigerant in the cylinder becomes less than 20% of the fully-charged amount, the composition of the refrigerant starts to change. Thus, **do not use the refrigerant if the amount in the refrigerant cylinder is less than 20%.**

Also, charge the minimum necessary amount to the cylinder before using it for charging the air conditioning unit.

### Example:

In case of charging refrigerant to a unit requiring 0.76Kg using a capacity of 10Kg-cylinder, the minimum necessary amount for the cylinder is:

$$0.76 + 10 \times 0.20 = 2.76\text{Kg}$$

**For the remaining refrigerant, refer to the instructions of the refrigerant manufacturer.**

- If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

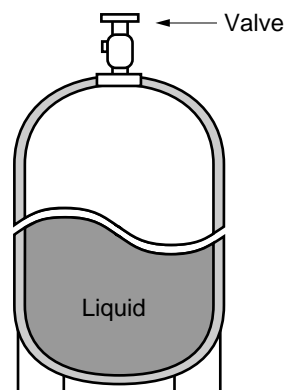
Prepare an evacuated charging cylinder beforehand.



**CAUTION**

- **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 3)**

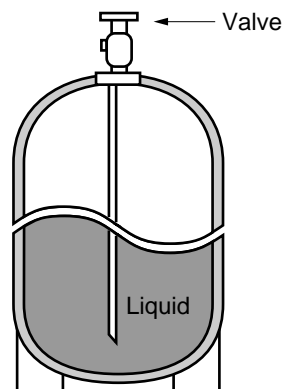
**Do not use the refrigerant if the amount in the charging cylinder is less than 20%.**



### Single valve

Charge the liquid refrigerant with the cylinder in the up-side-down position.

**Fig. 1**

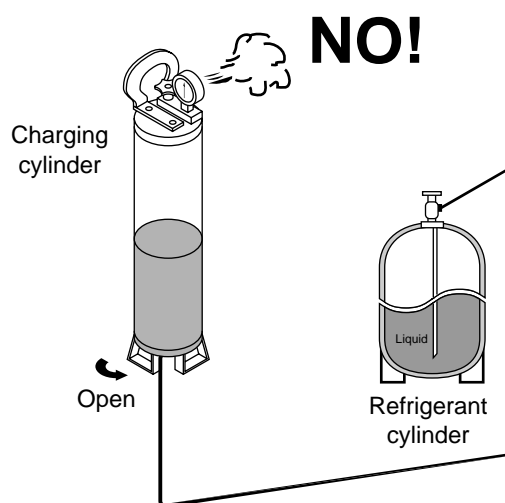


### Single valve (with siphon tube)

Charge with the cylinder in the normal position.

**Fig. 2**

## Configurations and characteristics of cylinders



**Fig.3**

## 10-6. In case refrigerant is leaking



### CAUTION

- Never attempt to charge additional refrigerant when refrigerant has been leaking from the unit. Follow the procedure described below to locate points of leaks and carry out repairs, then recharge the refrigerant.

#### (1) Detecting Leaks

- Use the detector for R407C to locate refrigerant leak points.

#### (2) Recovering refrigerant

- Never release the gas to the atmosphere, recover residual refrigerant using the refrigerant recovery unit for R407C, instead.
- Do not reuse the recovered refrigerant because its composition will have been altered.

#### (3) Welding leaking points

- Confirm again that no residual refrigerant exists in the unit before starting welding.
- Weld securely using flux and wax for R407C.
- Prevent oxide film from forming inside the tubes utilizing substitution with nitrogen (N<sub>2</sub>) in the refrigerant circuit of the unit. Leave ends of tubes open during welding.

#### (4) Checking for sealing

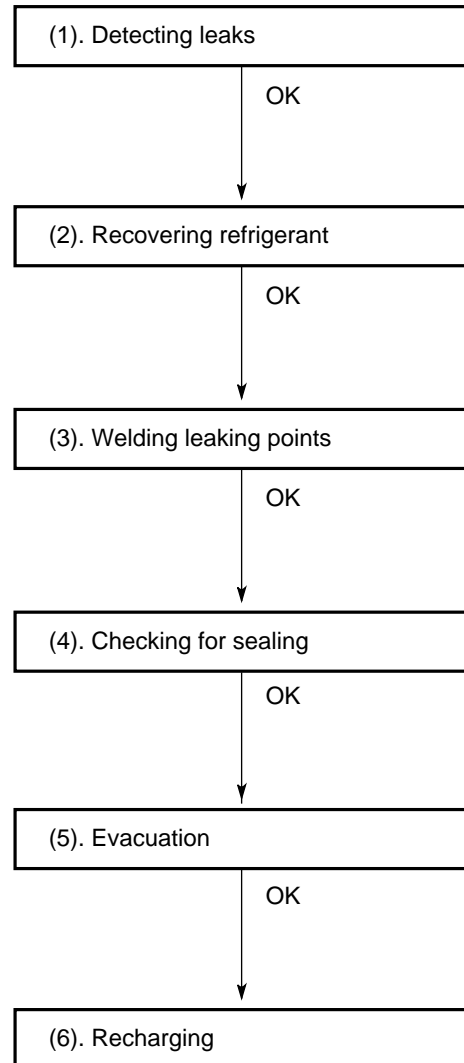
- Use nitrogen gas for the pressurized gas, and never use a refrigerant other than R407C. Also do not use oxygen or any flammable gas.

#### (5) Evacuation

- **Use a solenoid valve-installed vacuum pump** so that even if power is cut off in the middle of evacuation of air due to a power interruption, the valve will prevent the pump oil from flowing back.
- The equipment may be damaged if moisture remains in the tubing, thus carry out the evacuation thoroughly.
- When using a vacuum pump with exhaust air volume more than 25L/min. and ultimate vacuum pressure rate of 0.05Torr:

Standard time of evacuation

Length of tubing	Less than 10 m	More than 10 m
Time	More than 10 min.	More than 15 min.



## (6) Recharging

- **Be sure to charge the specified amount of refrigerant in liquid state** using the service port of wide tube service valve. The proper amount is listed on the unit's nameplate.

When the entire amount cannot be charged all at once, charge gradually while operating the unit in Cooling Operation.



**CAUTION**

- **Never charge a large amount of liquid refrigerant at once to the unit. This may cause damage to the compressor.**

- When charged with a refrigerant cylinder, use the electronic scale for charging refrigerant. In this case, if the volume of refrigerant in the cylinder becomes less than 20% of the fully-charged amount, the composition of the refrigerant starts to change. Thus, **do not use the refrigerant if the amount in the refrigerant cylinder is less than 20%.**

Also, charge the minimum necessary amount to the cylinder before using it for charging the air conditioning unit.

### Example:

In case of charging refrigerant to a unit requiring 0.76Kg using a capacity of 10Kg-cylinder, the minimum necessary amount for the cylinder is:

$$0.76 + 10 \times 0.20 = 2.76\text{Kg}$$

For the remaining refrigerant, refer to the instructions of the refrigerant manufacturer.

- If using a charging cylinder, transfer the specified amount of liquid refrigerant from the refrigerant cylinder to the charging cylinder.

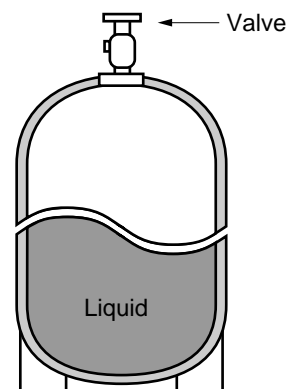
Prepare an evacuated charging cylinder beforehand.



**CAUTION**

- **To prevent the composition of R407C from changing, never bleed the refrigerant gas into the atmosphere while transferring the refrigerant. (Fig. 6)**

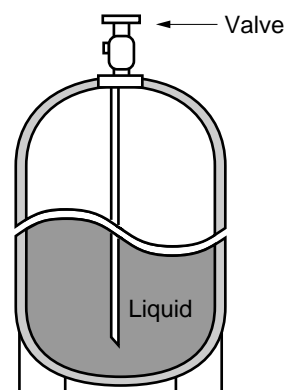
**Do not use the refrigerant if the amount in the charging cylinder is less than 20%.**



### Single valve

Charge the liquid refrigerant with the cylinder in the up-side-down position.

**Fig. 4**

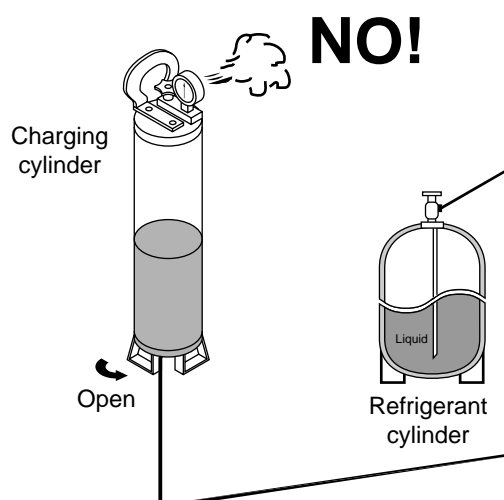


### Single valve (with siphon tube)

Charge with the cylinder in the normal position.

**Fig. 5**

## Configurations and characteristics of cylinders



**Fig. 6**

## 10-7. Charging additional refrigerant

### 10-7-1. When tubes are extended

- Observe the proper amount of refrigerant as stated in this service manual or the installation manual that came with the indoor unit. ***Charge additional refrigerant in liquid state.***



#### CAUTION

- Never charge additional refrigerant if refrigerant is leaking from the unit. Follow instructions given in "10-6. In case refrigerant is leaking" and completely carry out repairs. Only then should you recharge the refrigerant.

## 10-8. Retro-fitting existing systems

### 10-8-1 Use of existing units

- ***Never use new refrigerant R407C for existing units which use R22.*** This will cause the air conditioner to operate improperly and may result in a hazardous condition.

### 10-8-2 Use of existing tubing

- If replacing an older unit that used refrigerant R22 with a R407C unit, ***do not use its existing tubing.*** Instead, completely new tubing must be used.



# 11. CHECKING ELECTRICAL COMPONENTS

## 11-1.Measurement of Insulation Resistance

- The insulation is in good condition if the resistance exceeds  $2M\Omega$ .

### 11-1-1. Power Supply Wires

Clamp the grounding terminal of the power plug with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the two power terminals. (Fig. 1)

Then, also measure the resistance between the grounding and other power terminals. (Fig. 1)

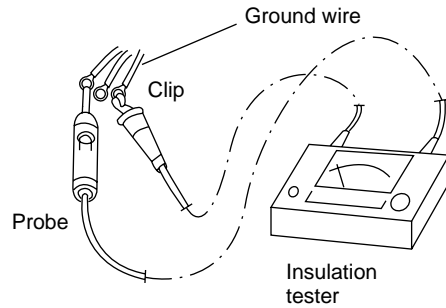


Fig. 1

### 11-1-2. Indoor Unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw on the terminal plate. (Fig. 2)

Note that the ground line terminal should be skipped for the check.

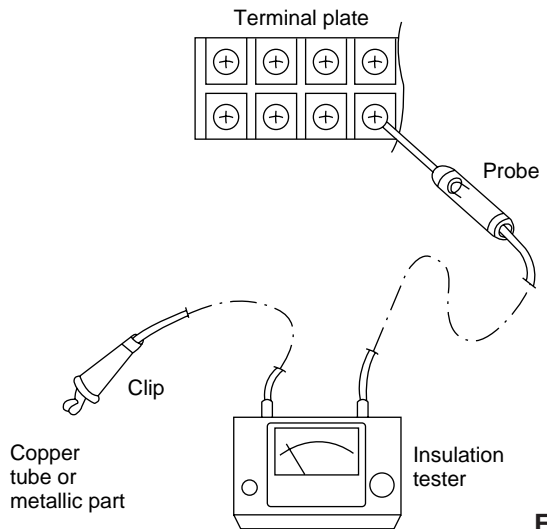


Fig. 2

### 11-1-3. Outdoor Unit

Clamp an aluminum plate fin or copper tube with the lead clip of the insulation resistance tester and measure the resistance by placing a probe on each terminal screw where power supply lines are connected on the terminal plate. (Fig. 2)

### 11-1-4. Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Figs. 3 and 4)

#### NOTE

Refer to Electric Wiring Diagram.

If the probe cannot enter the poles because the hole is too narrow then use a probe with a thinner pin.

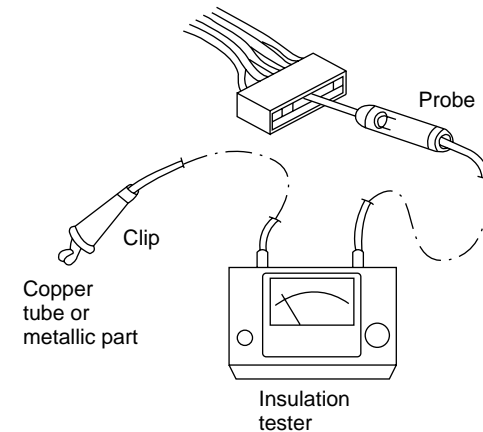


Fig. 3

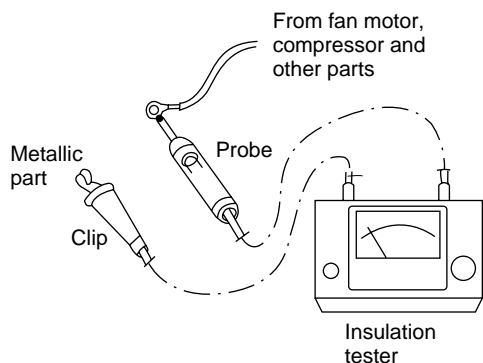


Fig. 4

## 11-2. Checking Continuity of Fuse on PCB Ass'y

- Remove the PCB Ass'y from the electrical component box. Then pull out the fuse from the PCB Ass'y. (Fig. 5)
- Check for continuity using a multimeter as shown in Fig. 6.

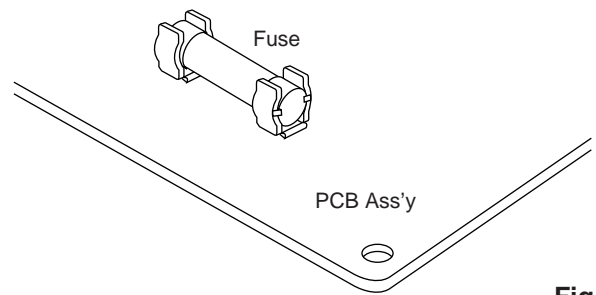


Fig. 5

## 11-3. Checking Motor Capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 7. Observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

The capacitor is “good” if the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

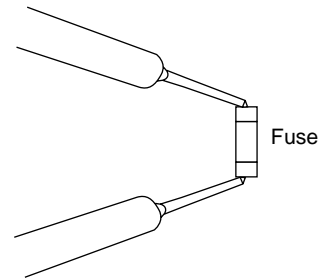


Fig. 6

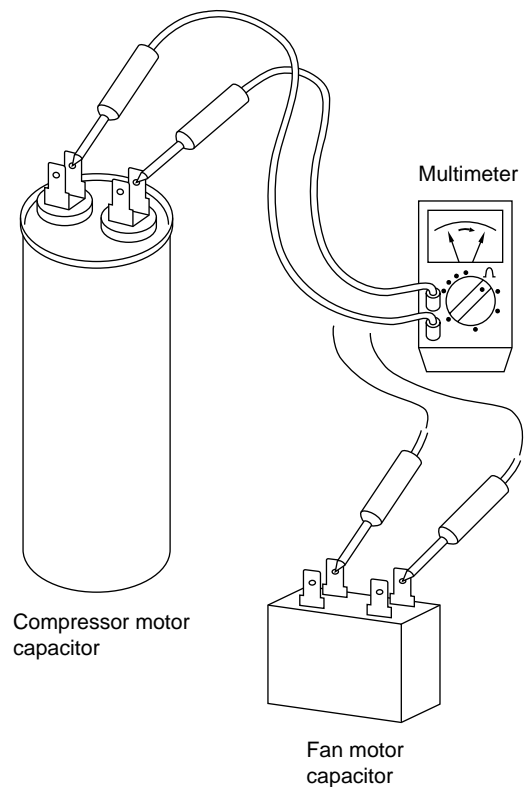


Fig. 7

## **APPENDIX** **INSTRUCTION MANUAL**

**SAP–KR165QS5+ SAP–CR165G5**

**SAP–KR185QS5+ SAP–CR185G5**

**SAP–KR185QS5+ SAP–CR185GL5**

---

# Features

This air conditioner is equipped with cooling function. Details on this function are provided below; refer to these descriptions when using the air conditioner.

- **Microprocessor Controlled Operation**  
The interior compartment of the remote control unit contains several features to facilitate automatic operation, easy logically displayed for easy use.
- **Air Sweep Control**  
This function moves a flap up and down in the air outlet, directing air in a sweeping motion around the room and providing comfort in every corner.
- **Simple One-touch Wireless Remote Control**  
The remote control unit has several features to facilitate automatic operation.
- **Automatic Restart Function for Power Failure**  
Even when power failure occurs, preset programmed operation can be reactivated once power resumes.
- **24-hour ON or OFF Timer**  
This timer can be set to automatically turn the unit on or off at any time within a 24 hour period.
- **Anti-Mold Filter**  
This unit is equipped with an anti-mold filter that inhibits the growth of mold and bacteria.
- **1-Hour OFF Timer**  
This timer can be set to automatically turn off the unit at any time after one hour.
- **Optional Air Clean Filter**  
An air filter that uses activated charcoal to eliminate unpleasant odors and clean the air is available (sold separately).
- **Night Setback**  
Pressing this button changes the setting of the room temperature thermostat, allowing you to set the temperature at whatever level that you find comfortable.
- **Automatic and 3-step Fan Speed**  
Auto/High/Medium/Low

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## Product Information

If you have problems or questions concerning your Air Conditioner, you will need the following information. Model and serial numbers are on the nameplate on the bottom of the cabinet.

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Date of purchase \_\_\_\_\_

Dealer's address \_\_\_\_\_

Phone number \_\_\_\_\_

---

## Alert Symbols

The following symbols used in this manual, alert you to potentially dangerous conditions to users, service personnel or the appliance:



**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.

---

# Installation Location

- We recommend that this air conditioner be installed properly by qualified installation technicians in accordance with the Installation Instructions provided with the unit.
- Before installation, check that the voltage of the electric supply in your home or office is the same as the voltage shown on the nameplate.



## WARNING

- Do not install this air conditioner where there are fumes or flammable gases, or in an extremely humid space such as a greenhouse.
- Do not install the air conditioner where excessively high heat-generating objects are placed.

## Avoid:

To protect the air conditioner from heavy corrosion, avoid installing the outdoor unit where salty sea water can splash directly onto it or in sulphurous air near a spa.

---

# Electrical Requirements

1. All wiring must conform to the local electrical codes. Consult your dealer or a qualified electrician for details.
2. Each unit must be properly grounded with a ground (or earth) wire or through the supply wiring.
3. Wiring must be done by a qualified electrician.

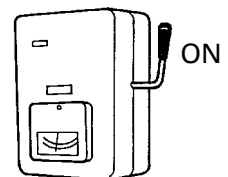
Applicable only for models: -C185, -C225



## CAUTION

To warm up the system, the power mains must be turned on at least five (5) hours before operation. Leave the power mains ON unless you will not be using this appliance for an extended period.

Power mains



---

# Safety Instructions

- Read this Instruction Manual carefully before using this air conditioner. If you still have any difficulties or problems, consult your dealer for help.
- This air conditioner is designed to give you comfortable room conditions. Use this only for its intended purpose as described in this Instruction Manual.



## WARNING

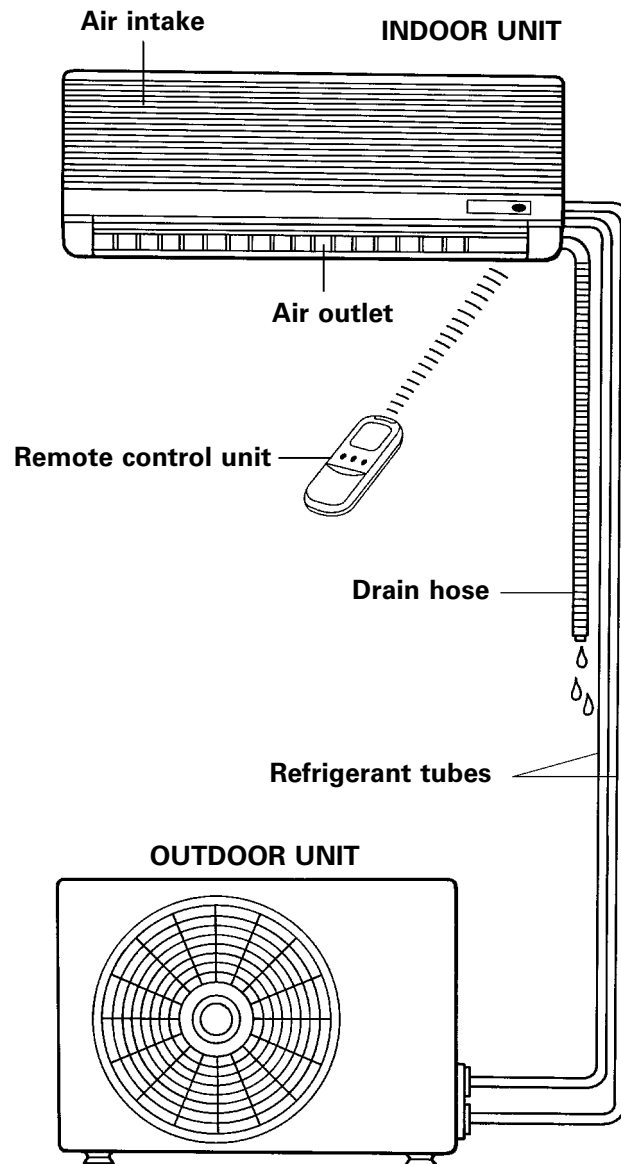
- Never use or store gasoline or other flammable vapor or liquid near the air conditioner — it is very dangerous.
- This air conditioner has no ventilator for intaking fresh air from outdoors. You must open doors or windows frequently when you use gas or oil heating appliances in the same room, which consume a lot of oxygen from the air. Otherwise there is a risk of suffocation in an extreme case.



## CAUTION

- Do not turn the air conditioner on and off from the power mains switch. Use the ON/OFF operation button.
- Do not stick anything into the air outlet of the outdoor unit. This is dangerous because the fan is rotating at high speed.
- Do not let children play with the air conditioner.
- Do not cool the room too much if babies or invalids are present.

# Names of Parts



EG

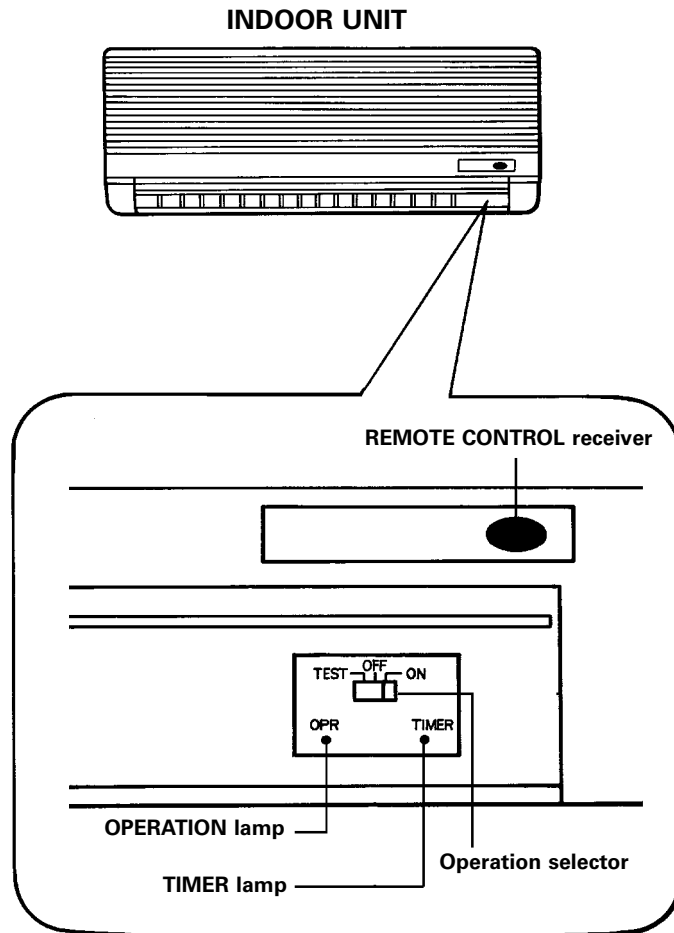
## NOTE



This illustration is based on the external view of a standard model. Consequently, the shape may differ from that of the air conditioner which you have selected.

This air conditioner consists of an indoor unit and an outdoor unit. You can control the air conditioner with the remote control unit.

<b>Air Intake</b>	Air from the room is drawn into this section and passes through air filters which remove dust.
<b>Air Outlet</b>	Conditioned air is blown out of the air conditioner through the air outlet.
<b>Remote Control Unit</b>	The wireless remote control unit controls power ON/OFF, operation mode selection, temperature, fan speed, timer setting, and air sweeping.
<b>Refrigerant Tubes</b>	The indoor and outdoor units are connected by copper tubes through which refrigerant gas flows.
<b>Drain Hose</b>	Moisture in the room condenses and drains off through this hose.
<b>Outdoor (Condensing) Unit</b>	The outdoor unit contains the compressor, fan motor, heat exchanger coil, and other electrical components.

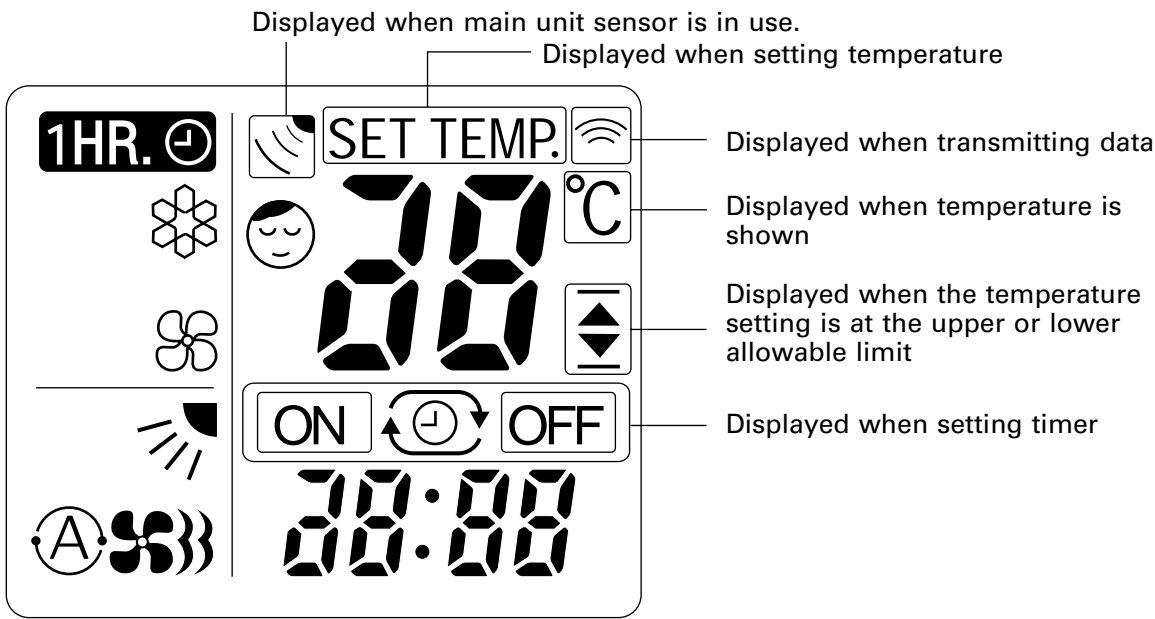
# Unit Display and Operation Selector



<b>REMOTE CONTROL receiver</b>	This section picks up infrared signals from the remote control unit (transmitter).
<b>Operation selector ON position</b>	This position is for operating the air conditioner with the wireless remote control unit. Set the selector normally in this position.
<b>OFF position</b>	Switch the selector to the OFF position if you are not going to use the air conditioner for a few days or longer.
 <b>WARNING</b>	<b>The OFF position does not disconnect the power. Use the main power switch to turn off power completely.</b>
<b>TEST position</b>	This position is used only when servicing the air conditioner.
 <b>CAUTION</b>	<b>Do not set at the TEST position for normal operation.</b>
<b>OPR (operation) lamp</b>	This lights when the system is in the continuous COOL or FAN mode.
<b>TIMER lamp</b>	This lamp lights when the system is being controlled by the timer.



# Remote Control Unit (Display)



EG

## Symbols

### (1) Operation mode

COOL .....



FAN .....



### (2) Fan speed

Automatic operation .....



HIGH .....



MEDIUM .....



LOW .....



### (3) Set temperature

16–30 °C

When set to 28 °C .....

Current temperature  
indication .....



### (4) Timer

24-hour clock with ON/OFF

Program Timer .....



24-hour ON Timer .....



24-hour OFF Timer .....



1-hour OFF Timer .....



### (5) NIGHT SETBACK .....



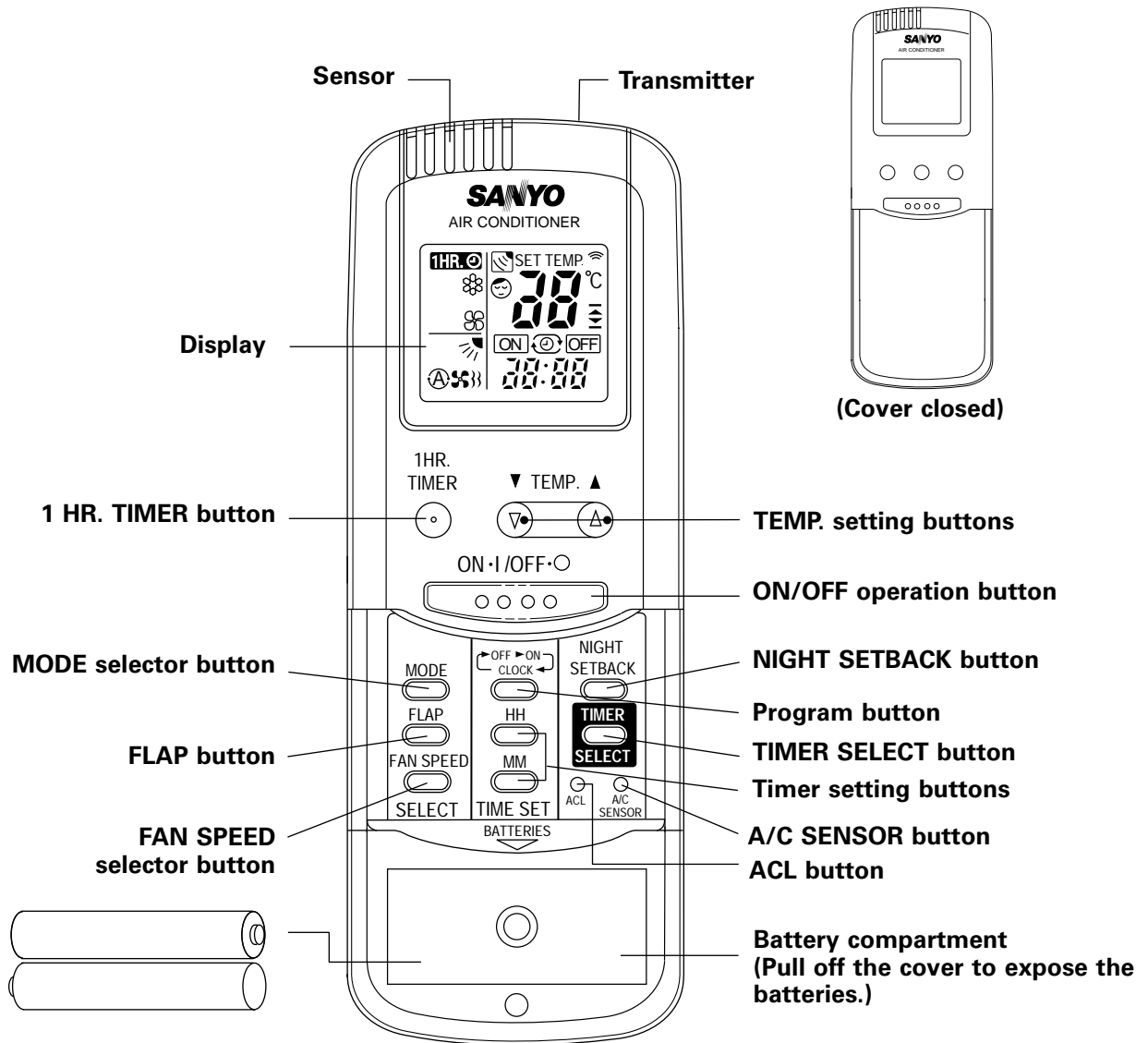
### (6) Confirmation of transmission .....



### (7) Sweep indication .....







# Remote Control Unit















## NOTE

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

<b>Transmitter</b>	When you press the buttons on the remote control unit, the  mark appears in the display to transmit the setting changes to the receiver in the air conditioner.
<b>Sensor</b>	A temperature sensor inside the remote control unit senses the room temperature.
<b>Display</b>	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.
<b>NIGHT SETBACK button</b>	For details, see "Night Setback Mode". When you press this button in the COOL mode, the  mark appears in the display, and the remote control unit will automatically adjust the set temperature to save energy.
<b>TEMP. setting buttons</b>	Press the  button to increase the set temperature. Press the  button to reduce the set temperature.
<b>ON/OFF operation button</b>	This button is for turning the air conditioner on and off.
<b>Timer setting buttons</b>	First, press the PROGRAM button to select the mode you want. Each time you press the "HH" button, the hours advance by one. Each time you press the "MM" button, the minutes advance by one.
<b>PROGRAM button</b>	For details, see "Setting the Timer". Press this button to select the mode you want to program.

## Remote Control Unit (continued)

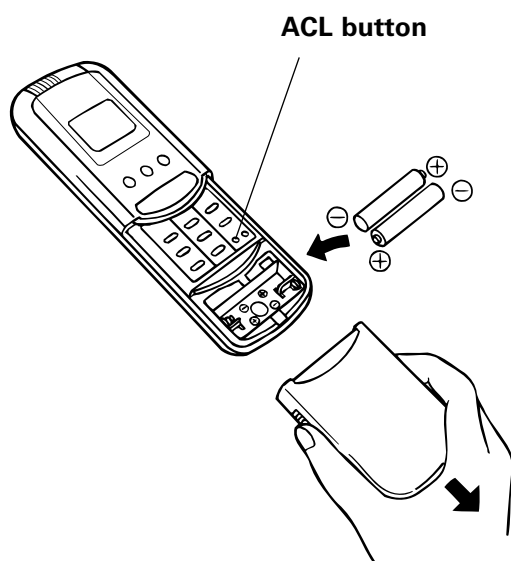
<b>TIMER SELECT button</b>	<p>No display : The timer does not operate.</p> <p> : The air conditioner stops at the set time.</p> <p> : The air conditioner starts at the set time.</p> <p> : The air conditioner stops and starts, or starts and stops, at the set times every day.</p>
<b>MODE selector button (COOL) (FAN)</b>	<p>Use this button to select COOL or FAN mode</p> <p> : The air conditioner makes the room cooler.</p> <p> : The air conditioner works only as a circulation fan.</p>
<b>FLAP button</b>	<p>Press this button to select the sweep function, which moves the flap up and down automatically.</p> <p> : The flap moves up and down automatically.</p>
<b>FAN SPEED selector button</b>	<p> : The air conditioner automatically decides the fan speeds.</p> <p> : High fan speed</p> <p> : Medium fan speed</p> <p> : Low fan speed</p>
<b>1 HR. TIMER button (1-HOUR OFF TIMER)</b>	<p> : When you press this button, regardless of whether the unit is operating or stopping, the unit operates for one hour and then shuts down.</p>
<b>ACL button (ALL CLEAR)</b>	<p>Puts the remote control unit into pre-operation status. Always press this button after replacing the batteries.</p>
<b>A/C SENSOR button</b>	<p>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.</p> <p><b>NOTE</b> 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.</p>

### NOTE

The remote control unit sends the temperature signal to the air conditioner regularly at three 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.

# Using the Remote Control Unit

## How to Install Batteries



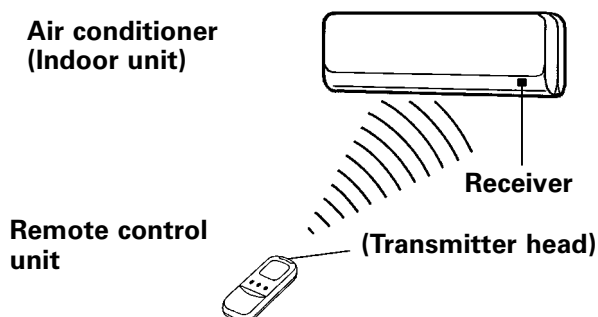
1. Slide the cover in the direction indicated by the arrow and remove it.
2. Install two AAA alkaline batteries. Make sure the batteries point in the direction marked in the battery compartment.
3. Use a thin object such as the tip of a pen to press the ACL button.

### 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 light, 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.



## Remote Control Unit Installation Position

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

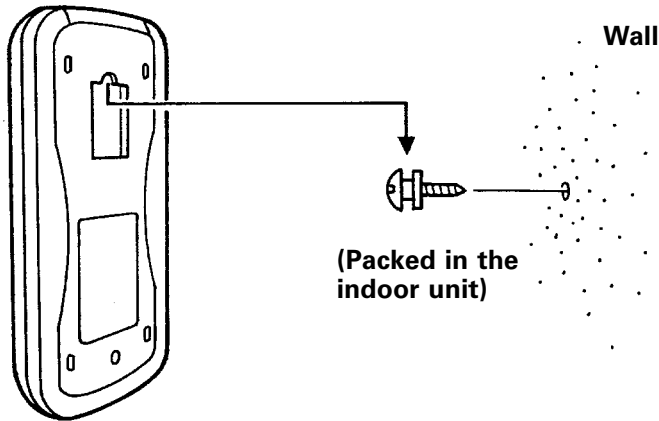
### DO NOT

- In direct sunlight
- Behind a curtain or other places 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 noise
- Where there is an obstacle between the remote control unit and air conditioner (since a check signal is sent from the remote control unit every 3 minutes)

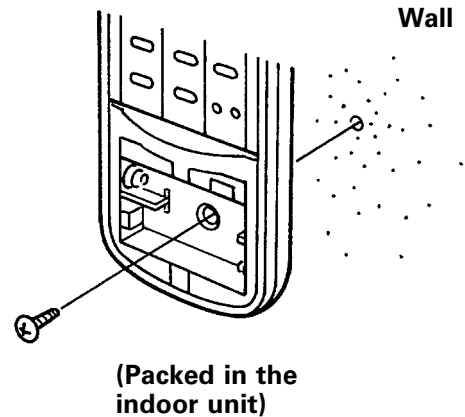
## Using the Remote Control Unit (continued)

### Mounting the Remote Control Unit

#### Removable mounting



#### Non-removable mounting



EG

### Mounting on a wall

#### A. Removable mounting

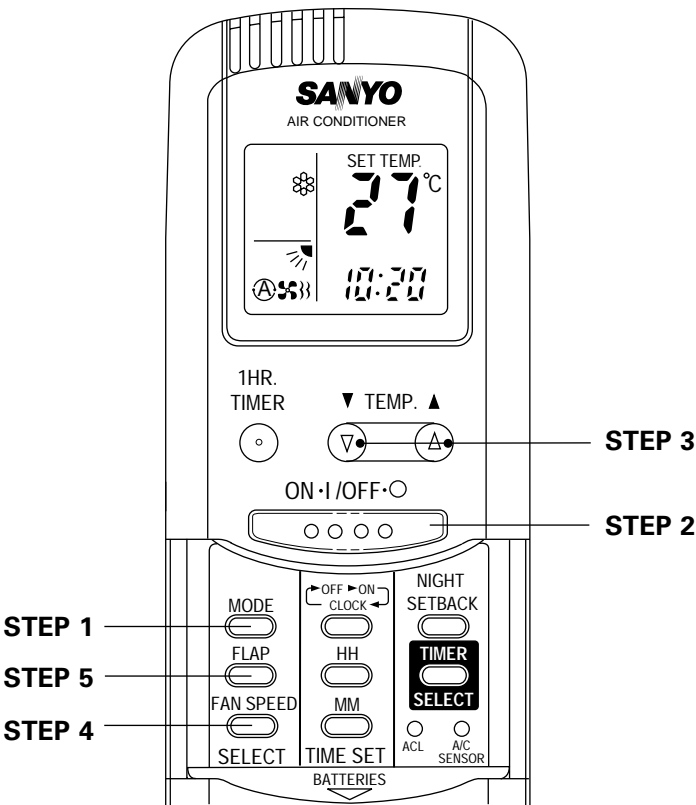
- 1) Momentarily hold the remote control unit at the desired mounting position.
- 2) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.
- 3) After confirming correct operation, use a screwdriver to screw the mounting screw into the wall.
- 4) Hang the remote control unit from the mounting screw.

#### B. Non-removable mounting

- 1) Momentarily hold the remote control unit at the desired mounting position.
- 2) Confirm that the air conditioner responds correctly when you press keys on the remote control from that position.
- 3) After confirming correct operation, use a screwdriver to screw the mounting screw into the wall.
- 4) Remove the batteries of the remote control unit.
- 5) Use a screwdriver to screw the remote control unit securing screw into the wall through the hole in the battery compartment.
- 6) Replace the batteries.
- 7) Again confirm that the remote control unit operates correctly.

# Operation with the Remote Control Unit

## 1. 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.

Press the setting buttons as described below and change the settings as desired.

<b>STEP 1</b>	Set the MODE selector button to COOL. For cooling operation → ☼
<b>STEP 2</b>	To start the air conditioner, press the ON/OFF operation button.
<b>STEP 3</b>	Press the TEMP. setting buttons to change the temperature setting to the desired temperature. Adjustable temperature range: 30 °C max. 16 °C min.
<b>STEP 4</b> <b>NOTE</b>	Set the FAN SPEED selector button to the setting you want.  If the fan speed is set to Ⓐ☼ (Automatic), the fan speed switches automatically, according to the difference between the actual room temperature and the temperature setting.
<b>STEP 5</b>	Press the FLAP button and set the airflow direction as desired. (Refer to “Adjusting the Airflow Direction” on page 19.)

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

## Operation with the Remote Control Unit (continued)


### NOTE


- Choose the best position in the room for the remote control unit, which also acts as the sensor for room comfort and transmits the operating instructions. Once you've found this best position, always keep the remote control unit there.
- 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. When the power is restored, the unit will restart automatically after three minutes.

EG

## 2. Adjusting the Fan Speed

### A. Automatic


Simply set the FAN SPEED selector to the  position.

A microcomputer in the air conditioner automatically controls the fan speed when the  mode is selected. When the air conditioner starts operating, the difference between the room temperature and the set temperature is detected by the microcomputer which then automatically switches the fan speed to the most suitable level.

Cooling mode:




When difference between room temperature and set temperature is	FAN SPEED
2 °C and over	High
Between 2 °C and 1 °C	Medium
Below 1 °C	Low

### NOTE

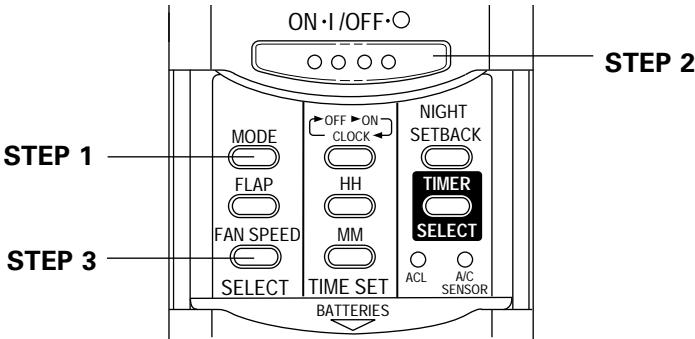
The above table assumes that the sensor on the remote control is being used. If the sensor on the indoor unit is being used (the  indicator is on), actual operation may differ slightly from the operation described in the table.

(Refer to "A/C SENSOR button" on page 9.)


### B. Manual

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




## 3. Fan Only



If you want to circulate air without any temperature control, follow these steps:

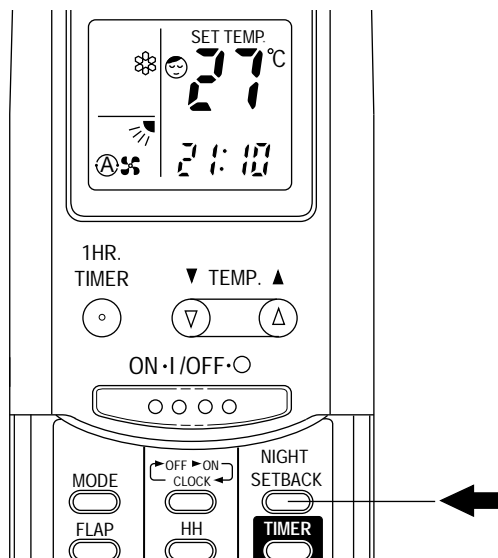
**STEP 1:** Press the MODE selector button to switch to the fan mode. (  )

**STEP 2:** Press the ON/OFF button.

**STEP 3:** Press the FAN SPEED button to select the fan speed of your choice ( , , or  ).

## Operation with the Remote Control Unit (continued)

### 4. Night Setback Mode



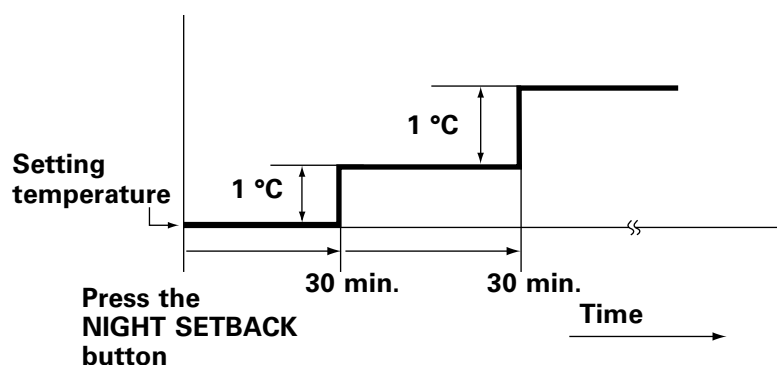
**Night Setback Mode is used for saving energy.**

Press the NIGHT SETBACK button while operation.  
The ☺ mark appears in the display.

To release the night setback function, press the NIGHT SETBACK button again.

#### In Cooling Mode: (✳)

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.





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# Special Remarks

**Power failure  
during operation**

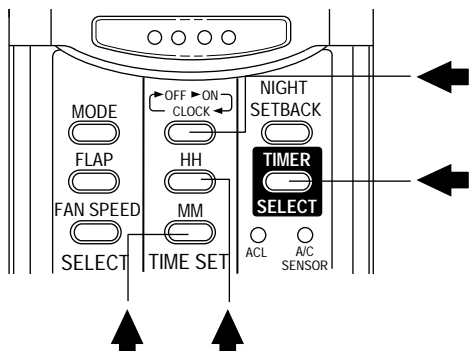
- In the event of power failure, the unit will stop. When the power is resumed, the unit will restart automatically after three minutes.

**Remote control unit**

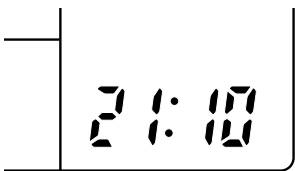
- The remote control unit sends the setting condition to the air conditioner regularly at three minute intervals.

EG

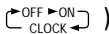
# Setting the Timer



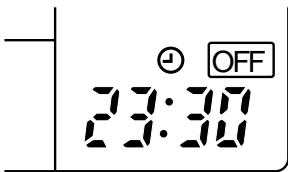
## 1. How to set the present time



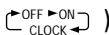


(Example) To set to 21:10

Operation	Indication
1. Press the Program button (  ) three times.	The time indication alone flashes.
2. <ul style="list-style-type: none"><li>• Press the HH button until 21 is displayed.</li><li>• Press the MM button until 10 is displayed.</li></ul>	The display will automatically stop flashing except for the “:” symbol after 10 sec.

## 2. How to set the OFF time



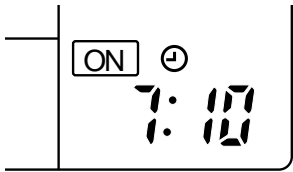
(Example) To stop the air conditioner at 23:30



1. Press the Program button (  ) once.	The timer  OFF and time indications flash.
2. <ul style="list-style-type: none"><li>• Press the HH button until 23 is displayed.</li><li>• Press the MM button until 30 is displayed.</li></ul>	The display will change automatically back to show the present time after 10 sec.
3. Press the ON/OFF button to start the air conditioner.	The present time is displayed.
4. Press the TIMER SELECT button to set OFF time.	The present time and  OFF are displayed.

Setting the Timer (continued)

3. How to set the ON time

(Example) To start operation at 7:10

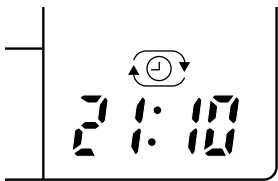



Operation	Indication
1. Press the Program button (  ) twice.	The timer ON and time indications flash.
2. <ul style="list-style-type: none"><li>• Press the HH button until 7 is displayed.</li><li>• Press the MM button until 10 is displayed.</li></ul>	The display will change automatically back to show the present time after 10 sec.
3. Press the ON/OFF button to start the air conditioner.	The present time is displayed.
4. Press the TIMER SELECT button to set ON time.	The present time and  are displayed.

EG

4. How to set a program for daily ON/OFF operation

(Example) To start operation at 7:10 and stop the air conditioner at 23:30



1. Set the timer ON/OFF times as shown in 2 and 3.	
2. Press the ON/OFF button to start the air conditioner.	
3. Press the TIMER SELECT button to set the ON/OFF combination timer.	 is displayed.

NOTE

You can check the timer ON/OFF times after you have set them by pressing the PROGRAM button.

# Using the 1-Hour OFF Timer

## 1. 1-Hour OFF Timer



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.

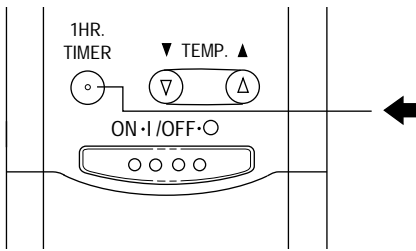
### Setting procedure:

Regardless of whether the unit is operating or stopped, press the 1 HR. TIMER button.

**1HR.** ⌚ appears in the display.

### Cancellation procedure:

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.

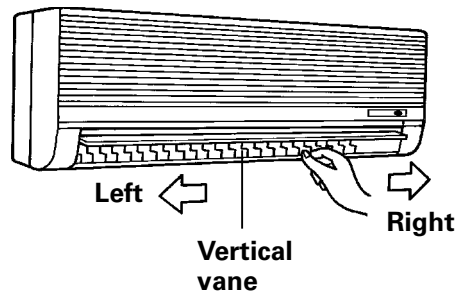
## 2. Operation Together with the Program Timer

- The Program Timer and 1-Hour OFF Timer may be used together.
- It is not possible to use the OFF Timer and 1-Hour OFF Timer 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.

# Adjusting the Airflow Direction

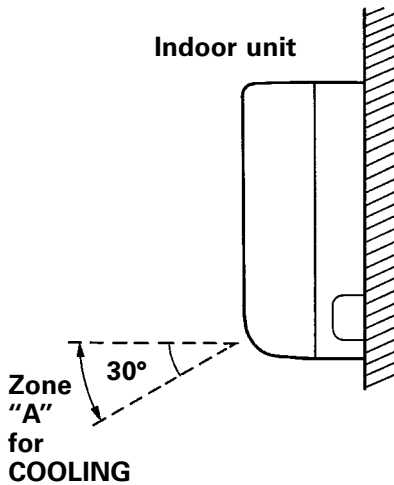
## A. Horizontal

The horizontal airflow can be adjusted by moving the vertical vane to the left or right.



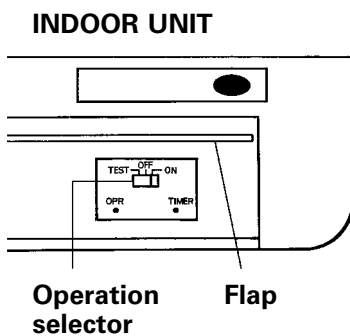
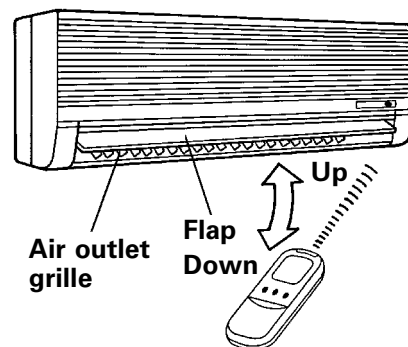
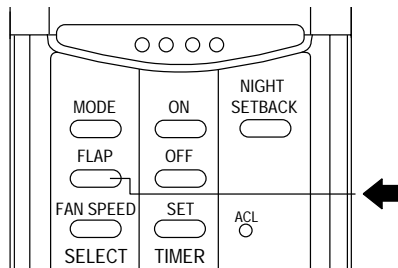
## B. Vertical

Confirm that the remote control unit has been turned on. Press the FLAP button to start the flap moving up and down ( ). If you want to stop the flap movement and to direct the air in the desired direction, press the FLAP button again. In the COOL mode, don't direct the flap down more than 30° otherwise, condensation may drip on to the floor. Zone "A" is the recommended flap position for cooling.



**CAUTION**

Do not move the flap with your hands.



## Operation without the Remote Control Unit

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

### 1. When the air conditioner is stopped

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.

# 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.



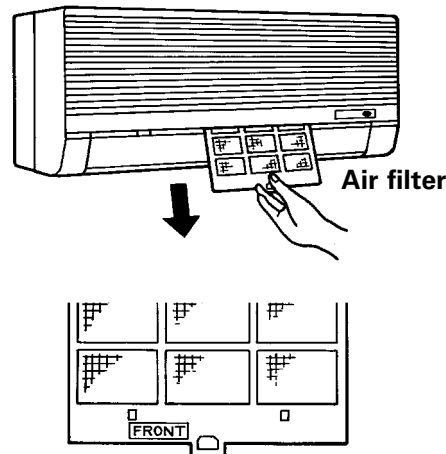
## CAUTION

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.

① Push up

then,

② Pull down



### Air Filter

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

### How to remove the filter

1. Move the flap on the air outlet grille to its lowest position with the remote control unit.
2. The filter is disengaged by pushing the tab up gently. Hold the air filter by the tab at the bottom, and pull downward.

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. When replacing the filter, make sure that the FRONT mark is facing you. Push it up until you hear it click back into position.

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# Troubleshooting

If your air conditioner does not work properly, first check the following points before requesting service. If it still does not work properly, contact your dealer or service center.

Trouble	Possible Cause	Remedy
Air conditioner does not run at all.	1. Power failure. 2. Leakage breaker tripped. 3. Line voltage is too low. 4. Operation button is OFF. 5. Batteries in remote control unit have run down.	1. Restore power. 2. Contact service center. 3. Consult your electrician or dealer. 4. Press the button again. 5. Replace batteries.
Compressor runs but soon stops.	Obstruction in front of condenser coil.	Remove obstruction.
Poor cooling performance.	1. Dirty or clogged air filter. 2. Heat source or many people in room. 3. Doors and/or windows are open. 4. Obstacle near air intake or air discharge port. 5. Thermostat is set too high.	1. Clean air filter to improve airflow. 2. Eliminate heat source if possible. 3. Shut them to keep the heat out. 4. Remove it to ensure good airflow. 5. Set the temperature lower.

EG

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## 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.



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