

# TECHNICAL & SERVICE MANUAL

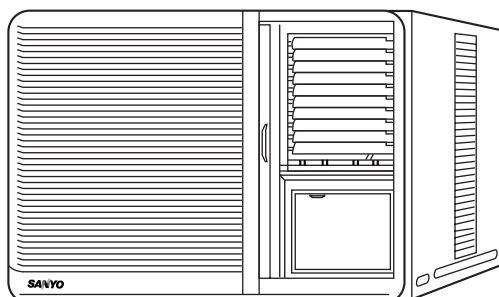
# SANYO

## SA-128S5

FILE NO. 

## WINDOW TYPE AIR CONDITIONER

Model No.	Product Code No.	Destination
SA-128S5-A	1 851 004 09	General (50Hz) & Europe



SA-128S5

## IMPORTANT!

### Please Read Before Starting

This air conditioner 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 the INSTRUCTION MANUAL and INSTALLATION INSTRUCTIONS attached to each air conditioner 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.

#### 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.**

- All wiring must conform to local electrical codes.
- Each unit must be properly grounded with a ground (or earth) wire or through the supply wiring.
- DO NOT, under any circumstances, cut or remove the third (ground) prong from the power cord plug.
- DO NOT use an adapter Plug or extension cord.
- DO NOT use a damaged power cord, plug, or wall outlet. Replace them immediately.
- DO NOT change the internal wiring or any part of the system.
- DO NOT turn the air conditioner on and off by plugging and unplugging. Use the Operation switch.

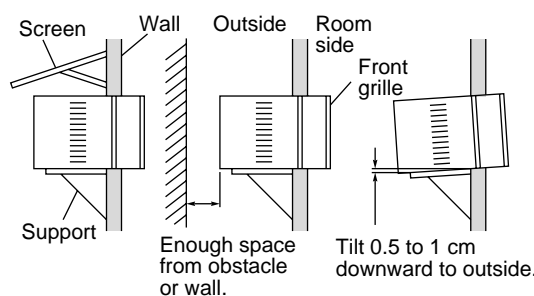
#### When Transporting

Be careful when picking up and moving the air conditioner. 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

##### Place of Installation

- If possible, install the unit in a shady location. If the site is exposed to the sun, you should provide a sun screen as shown in Fig. a.
- Install it at a spot where optimum cooling circulation can be obtained. No chairs or other obstructions are allowed in front of the air conditioner.
- The back of the air conditioner must extend outside. (Be sure the right and left intake vents are not obstructed by walls or windows.)
- Keep more than 50 cm from any outside obstruction (wall, bush, etc.).
- To provide water drainage, the unit must be tilted at a downward angle 0.5 to 1 cm to the outside.



**Fig. a**

- While installing the air conditioner, be sure to loosen the

compressor locking nuts to avoid abnormal noise and vibration. (NOTE: Locking nuts are not provided on some models.)

- As a safety measure, it is recommended that two people install the unit: one to hold and balance the unit — the other to lower the window frame to secure the unit.
- Hold the unit securely, and be careful to not drop the cabinet or any parts if the air conditioner is being installed on an upper floor of a multistory building.

#### 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 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 tools 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.

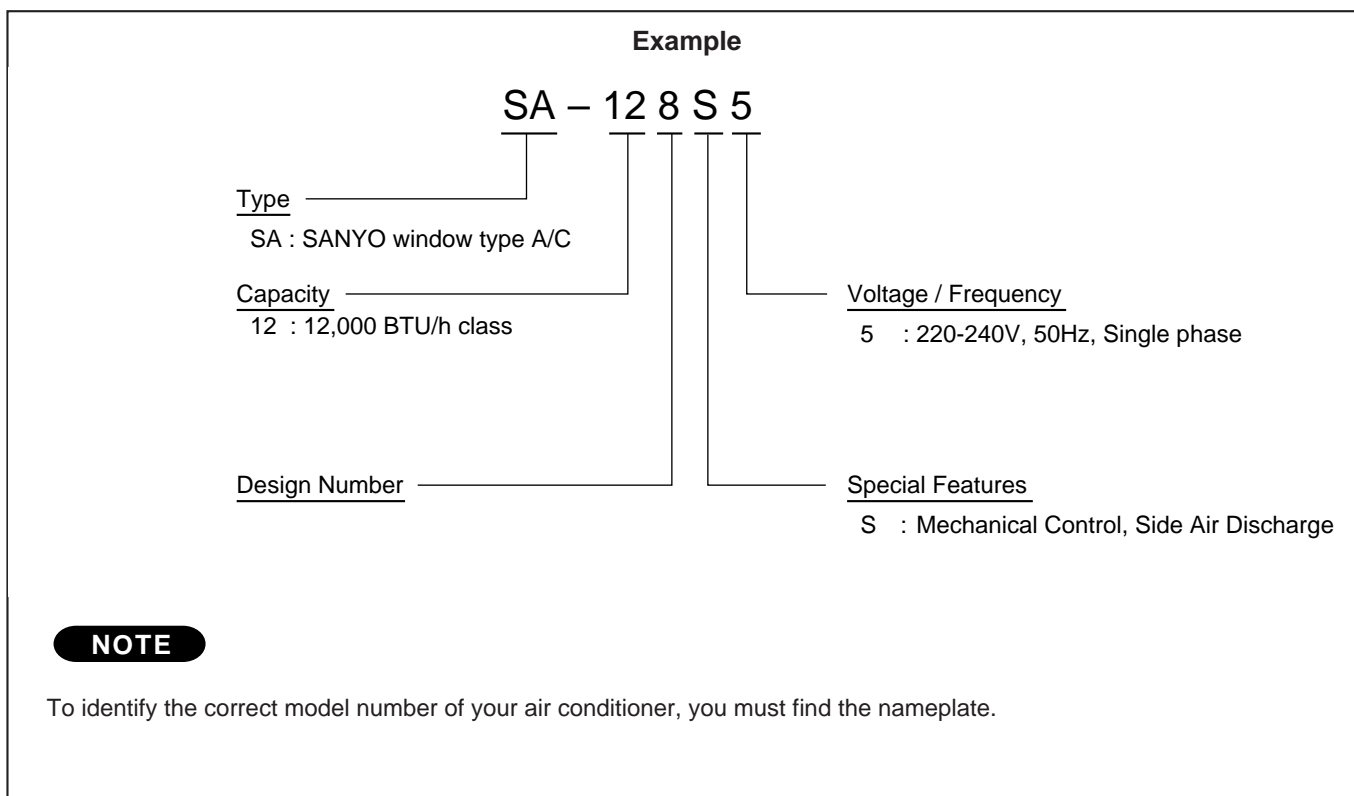
## HOW TO USE THIS MANUAL

This manual is designed to help service personnel to understand basic functions, operation and possible troubles and their remedies on SANYO window type air conditioners. You can use this manual both as a reference to find specific information about the capacity, construction of the unit, and as a source of information to help you set up and maintain the air conditioner. Please use this manual to make your work easier, keep the air conditioner functioning well, and keep your customer satisfied.

**Please read IMPORTANT ! precautional information on the previous page before you start actual work.**

## SANYO WINDOW TYPE A/C NOMENCLATURE

SANYO window type air conditioner is identified by a model number. Cooling or heating capacity, electrical information and special features included on the air conditioner are indicated on the model number.



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# 1. OPERATING RANGE

	<b>Temperature</b>	<b>Indoor Air Intake Temp.</b>	<b>Outdoor Air Intake Temp.</b>
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.

## 2. SPECIFICATIONS

### 2-1. Unit Specifications

Model SA-128S5

<b>Power Source</b>		220-240V Single phase 50Hz			
<b>Voltage rating</b>		220 / 230 / 240 V			
<b>Performance</b>		Cooling			
Capacity	kW	3.50	/	3.55	/ 3.55
	BTU/h	11,900	/	12,100	/ 12,100
Air circulation (High)		m <sup>3</sup> /h 620			
Moisture removal (High)		Liters/h 2.0			
<b>Electrical Rating</b>		Cooling			
Available voltage range		V 198 ~ 264			
Running amperes		6.3	/	6.2	/ 6.2
Power input		1,300	/	1,340	/ 1,360
Power factor		94	/	94	/ 91
C.O.P.		2.69	/	2.65	/ 2.61
Starting amperes		A 34			
<b>Features</b>					
Controls / Temperature control		Mechanical / Thermostat			
Control unit		—			
Timer		—			
Fan speeds		2			
Airflow direction (Indoor)		Horizontal		Auto	
		Vertical		Manual	
Air filter / Air exhaust		Washable / Yes			
Compressor		Rotary (Hermetic)			
Refrigerant / Amount charged at shipment		g R22 / 780			
Refrigerant control		Capillary tube			
Operation sound		Indoor : Hi / Lo		dB-A 52 / 50	
		Outdoor : Hi / Lo		dB-A 56 / 52	
Slide-out chassis		Yes			
Accessories		—			
<b>Dimensions &amp; Weight</b>					
Unit dimensions	Height	mm	375		
	Width	mm	530		
	Depth	mm	620		
Package dimensions	Height	mm	435		
	Width	mm	600		
	Depth	mm	725		
Weight	Net	kg	44.0		
	Shipping	kg	47.0		
Shipping volume		m <sup>3</sup>	0.19		

**Remarks:**

Rating conditions are:

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

Outdoor air temperature 35°C D.B. / 24°C W.B.

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## 2-2. Major Component Specifications

Model SA-128S5

<b>Controller PCB</b>			
Part No.		—	
Controls		—	
Control circuit fuse		—	
<b>Remote Control Unit</b>		—	
<b>Compressor</b>			
Type		Rotary (Hermetic)	
Compressor model		C-R110H5H 80619445	
Source		220-240V Single phase 50Hz	
Nominal output	W	1,100	
Compressor oil ... Amount	cc	SUNISO 4GSD-T ... 550	
Coil resistance (Ambient temp. 25°C)	Ω	C-R : 1.962 C-S : 5.38	
Safety devices	Type	External protector	
	Overload relay	MRA98619-9200	
	Operating temp.	Open	°C
		Close	°C
	Operating amp.(Ambient temp. 25°C)	Trip in 6 to 16 sec. at 22.5A	
Run capacitor	μF	25.0	
	VAC	400	
<b>Fan &amp; Fan Motor</b>		Indoor	Outdoor
Type		Centrifugal	Propeller
Dia. / Depth	mm	ø210 / D96	ø320 / D —
Fan motor model ... Q'ty		YSK70-4A-661 ... 1	
Source		220-240V Single phase 50Hz	
No. of poles ... rpm (230 V, High)		4 ... 1,010	
Nominal output	W	20	
Coil resistance (Ambient temp. 20°C)	Ω	WHT-BRN : 60.0 WHT-YEL : 19.6 YEL-ORG(PNK) : 62.7	
Safety devices	Type	Internal protector	
	Operating temp.	Open	°C
		Close	°C
		Automatic reclosing	
Run capacitor	μF	3.5	
	VAC	440	
<b>Heat Exch. Coil</b>		Evaporator	Condenser
Coil		2	3
Rows		1.4	1.6
Fin pitch	mm	0.095	0.155
Face area	m <sup>2</sup>		
<b>External Finish</b>		Acrylic baked-on enamel finish	

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## 2-3. Other Component Specification

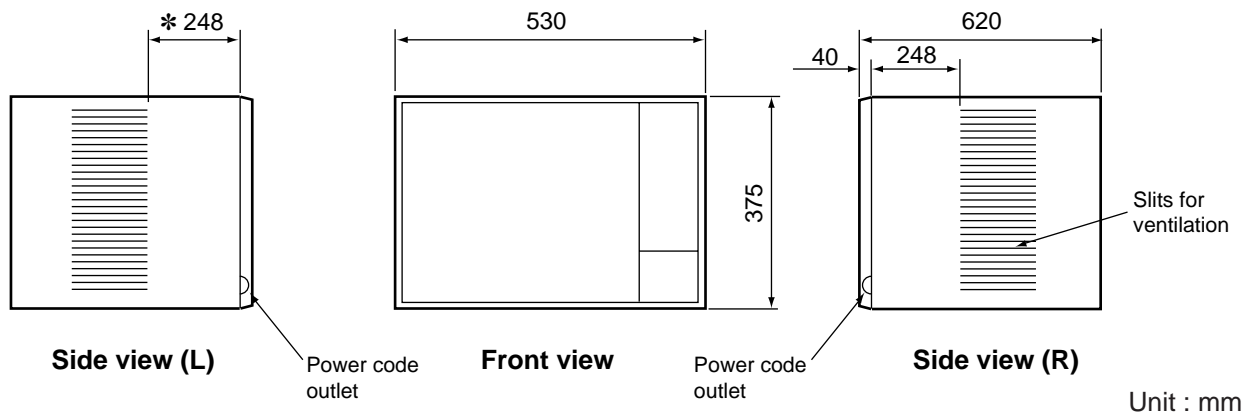
Model SA-128S5

Auto Deflector Motor	M16B
Rating	AC 220-240V, 50/60Hz, 3 W, 4.2/5.0 rpm
Coil resistance kΩ (at 25°C)	11.15 ± 5%



### 3. DIMENSIONAL DATA

Model SA-128S5

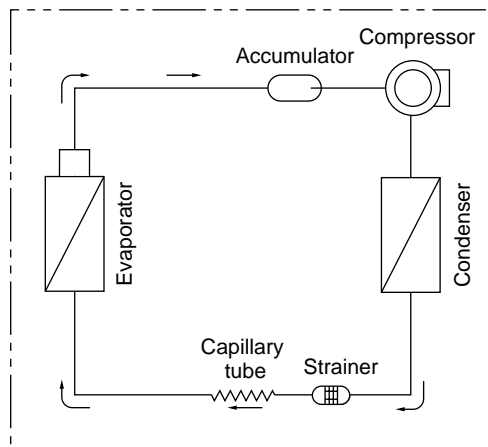


#### NOTE

Dimension with "\*" mark indicates the maximum allowable wall thickness required for ventilating the unit.

# 4. REFRIGERANT FLOW DIAGRAM

Model SA-128S5



# 5. PERFORMANCE DATA

## 5-1. Cooling Capacity

Model **SA-128S5**

240V Single Phase 50Hz

RATING CAPACITY		3.55 kW						
AIR FLOW RATE		620 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	3.58	3.42	3.27	3.11	2.92	2.69
		CM	0.90	0.98	1.04	1.12	1.26	1.40
	21	SHC	2.32	2.24	2.15	2.07	1.97	1.86
	23	SHC	2.59	2.51	2.42	2.34	2.25	2.13
	25	SHC	2.86	2.78	2.69	2.61	2.52	2.40
	27	SHC	3.13	3.05	2.97	2.88	2.79	2.67
	29	SHC	3.40	3.32	3.24	3.11	2.92	2.69
	31	SHC	3.58	3.42	3.27	3.11	2.92	2.69
17		TC	3.84	3.67	3.50	3.34	3.14	2.89
		CM	0.93	1.00	1.07	1.15	1.29	1.43
	21	SHC	2.04	1.95	1.87	1.79	1.69	1.58
	23	SHC	2.31	2.22	2.14	2.06	1.96	1.85
	25	SHC	2.58	2.50	2.41	2.33	2.23	2.12
	27	SHC	2.85	2.77	2.68	2.60	2.51	2.39
	29	SHC	3.12	3.04	2.95	2.87	2.78	2.66
	31	SHC	3.39	3.31	3.23	3.14	3.05	2.89
19		TC	4.08	3.91	3.73	# 3.55	3.34	3.07
		CM	0.96	1.03	1.11	1.19	1.33	1.47
	21	SHC	1.74	1.66	1.57	1.49	1.40	1.28
	23	SHC	2.01	1.93	1.84	1.76	1.67	1.55
	25	SHC	2.28	2.20	2.12	2.03	1.94	1.82
	27	SHC	2.55	2.47	2.39	2.31	2.21	2.09
	29	SHC	2.82	2.74	2.66	2.58	2.48	2.37
	31	SHC	3.10	3.01	2.93	2.85	2.75	2.64
21		TC	4.33	4.14	3.95	3.76	3.54	3.25
		CM	0.98	1.06	1.14	1.22	1.37	1.51
	23	SHC	1.71	1.62	1.54	1.46	1.37	1.26
	25	SHC	1.98	1.90	1.81	1.73	1.64	1.53
	27	SHC	2.25	2.17	2.09	2.01	1.91	1.80
	29	SHC	2.52	2.44	2.36	2.28	2.18	2.07
	31	SHC	2.79	2.71	2.63	2.55	2.45	2.34
23		TC	4.59	4.39	4.19	3.95	3.70	3.44
		CM	1.00	1.09	1.17	1.25	1.40	1.55
	25	SHC	1.66	1.58	1.49	1.40	1.31	1.21
	27	SHC	1.93	1.85	1.76	1.67	1.58	1.48
	29	SHC	2.20	2.12	2.04	1.94	1.85	1.75
	31	SHC	2.47	2.39	2.31	2.22	2.12	2.02

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

Model SA-128S5

		Fan Motor	Compressor	Complete Unit
Performance at		220-240V Single phase 50Hz		
Rating Conditions	Running Amps. A	0.69 / 0.73	5.6 / 5.5	6.3 / 6.2
	Power Input kW	0.152 / 0.173	1.15 / 1.19	1.30 / 1.36
Full Load Conditions	Running Amps. A	0.69 / 0.73	7.2 / 7.0	7.9 / 7.7
	Power Input kW	0.152 / 0.173	1.52 / 1.55	1.67 / 1.72

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.

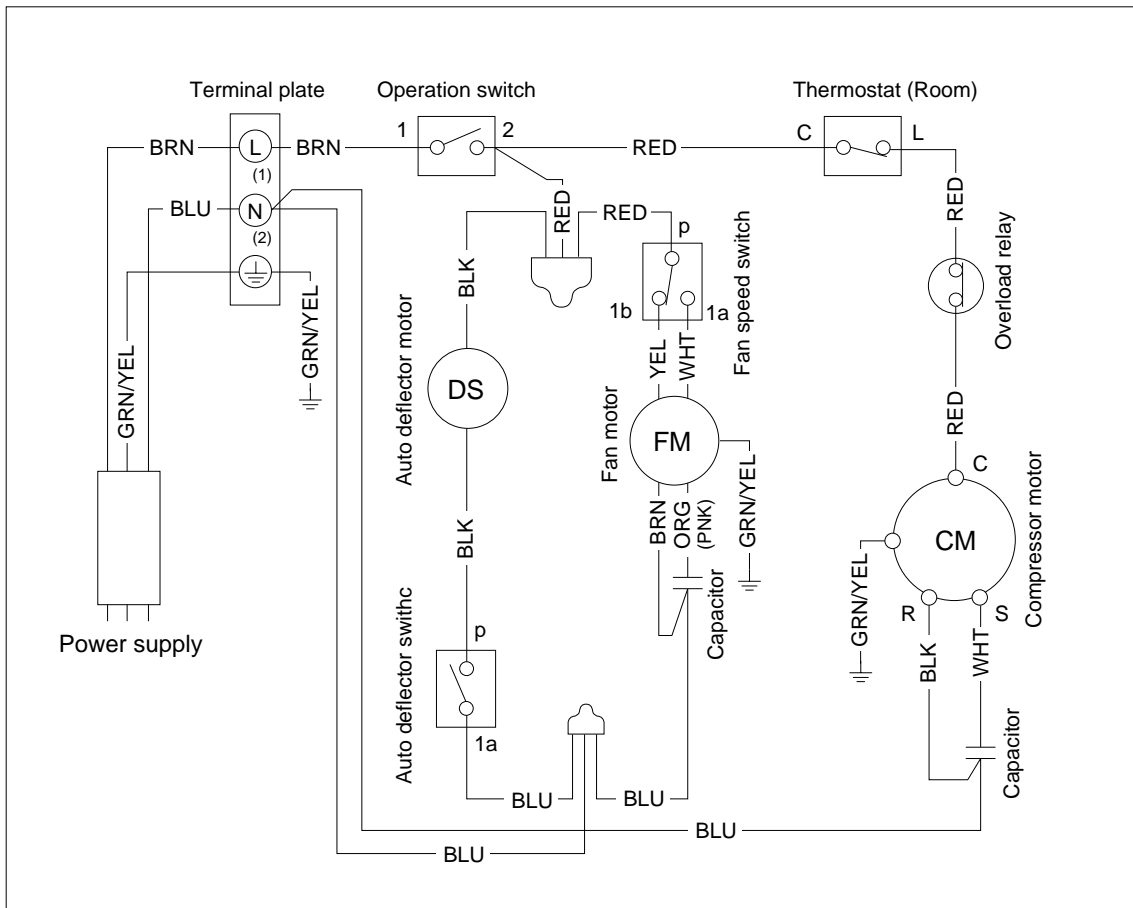
## 6-2. Electrical Wiring Diagrams

Model SA-128S5



**WARNING**

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



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## 7. TROUBLESHOOTING

### 7-1. 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.

#### 7-1-1. Check power supply.

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

#### 7-1-2. Check lead wires and connectors.

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

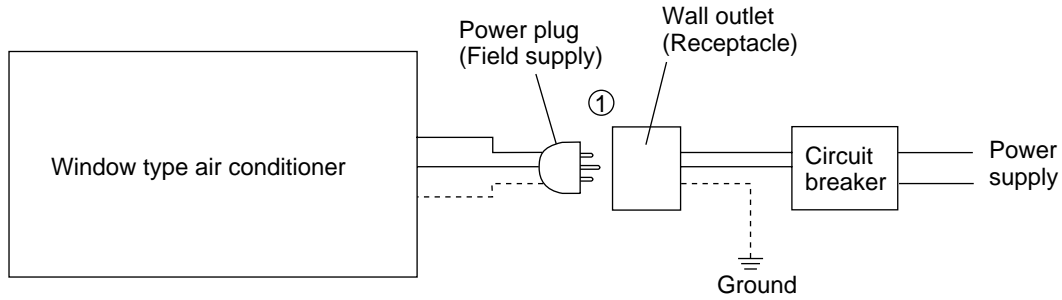
## 7-2. Air conditioner does not operate.

### 7-2-1. Circuit breaker trips (or fuse blows).

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

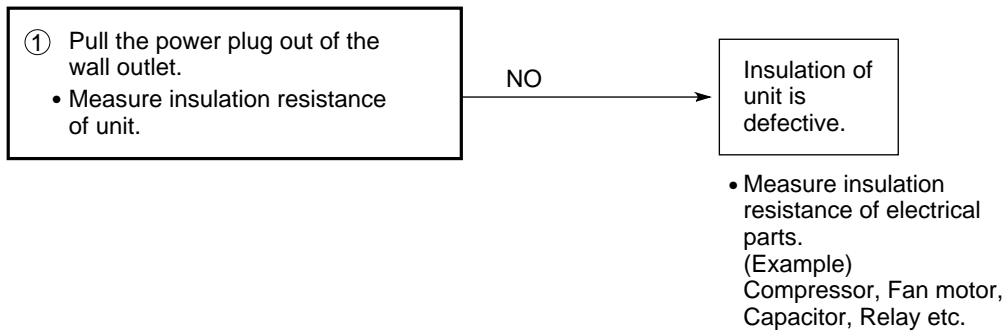
- There is a possibility of ground fault.
- Check insulation resistance.

If resistance value is  $2M\Omega$  or less, insulation is defective ("NO").



**WARNING**

\* Set circuit breaker to OFF.

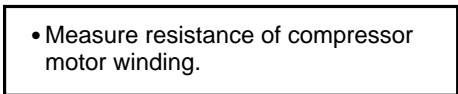
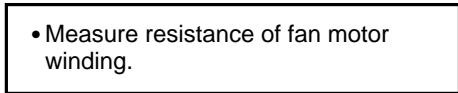
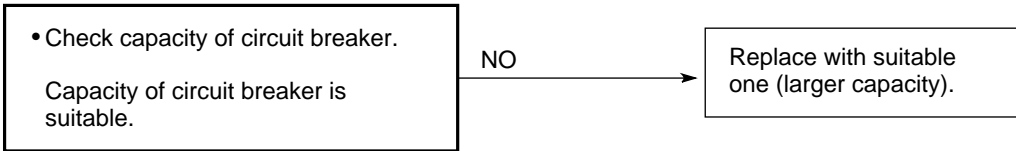


### NOTE

1. If any poorly insulated part is found, exclude that part from circuit with other parts properly connected, and then measure insulation resistance of entire air conditioner again to locate defective part.
2. Replace defective part with new one.

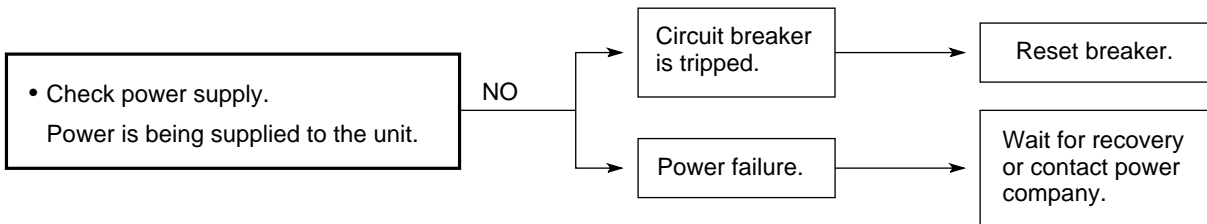
**B. Circuit breaker trips in several minutes after turning the air conditioner on.**

- There is a possibility of short circuit.

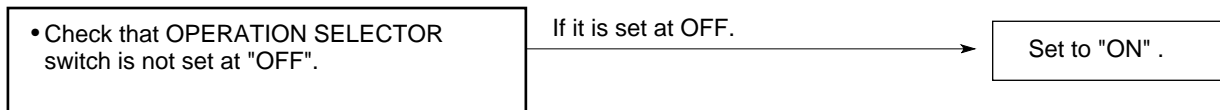


**7-2-2. Neither fan motor nor compressor motor runs.**

**A. Power is not supplied.**



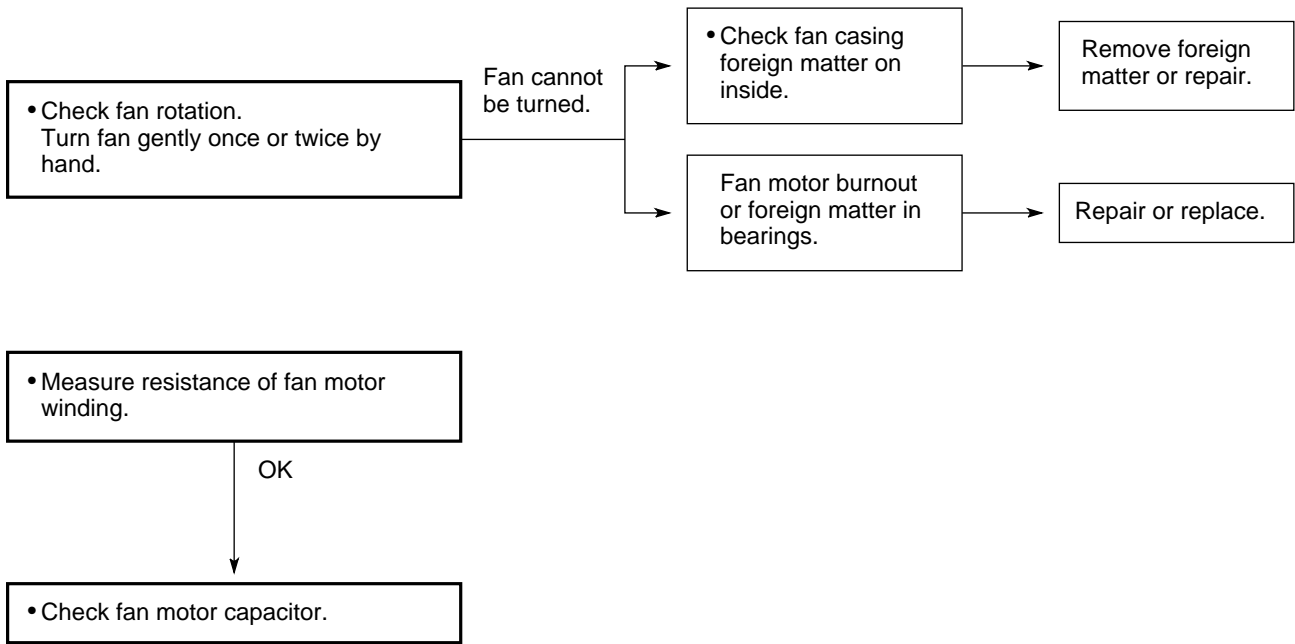
**B. Check OPERATION SELECTOR switch on the control panel.**



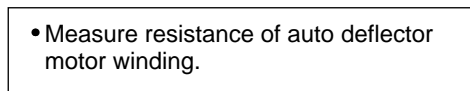


### 7-3. Some part of air conditioner does not operate.

#### 7-3-1. Only fan does not run.

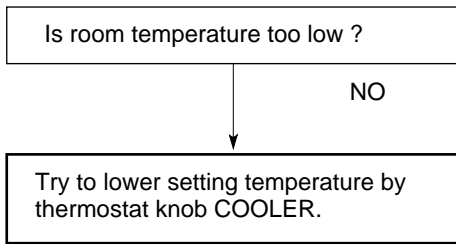


#### 7-3-2. Auto deflector switch does not work.

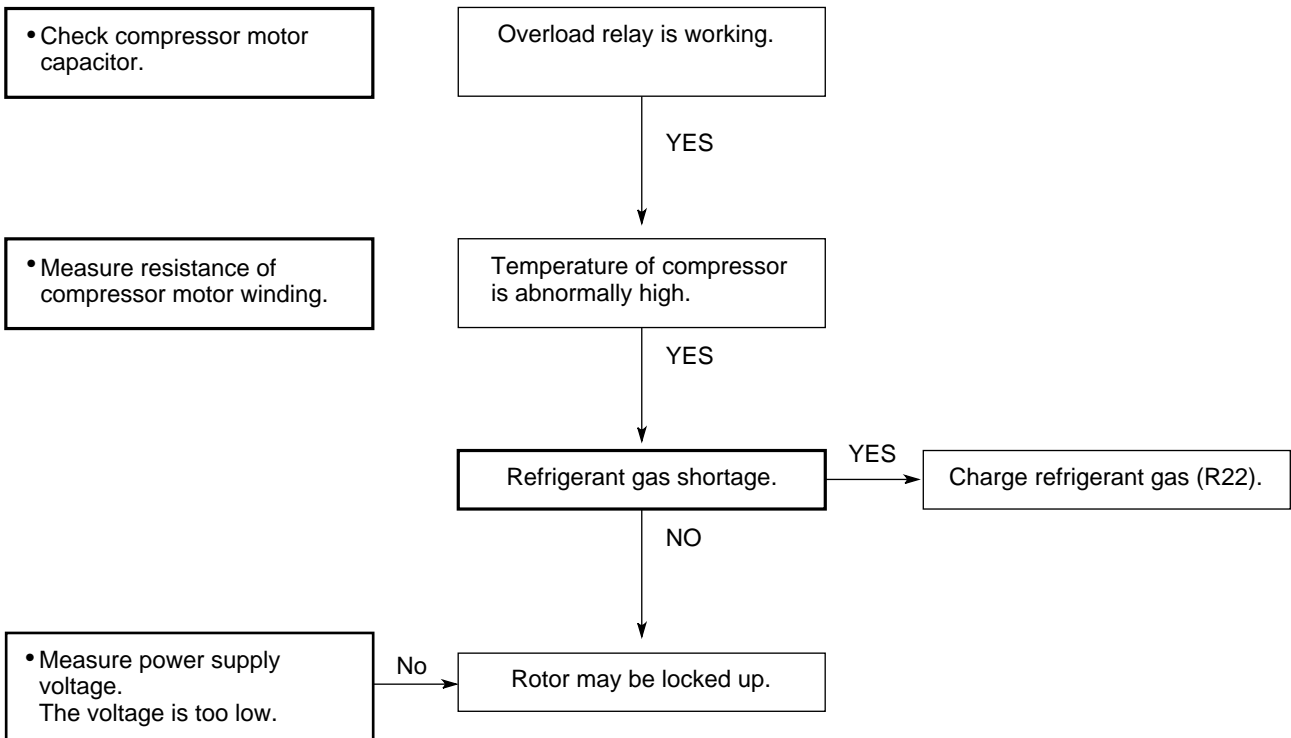


### 7-3-3. Only compressor does not run.

#### A. Check setting temperature.



#### B. Check compressor and electrical parts.

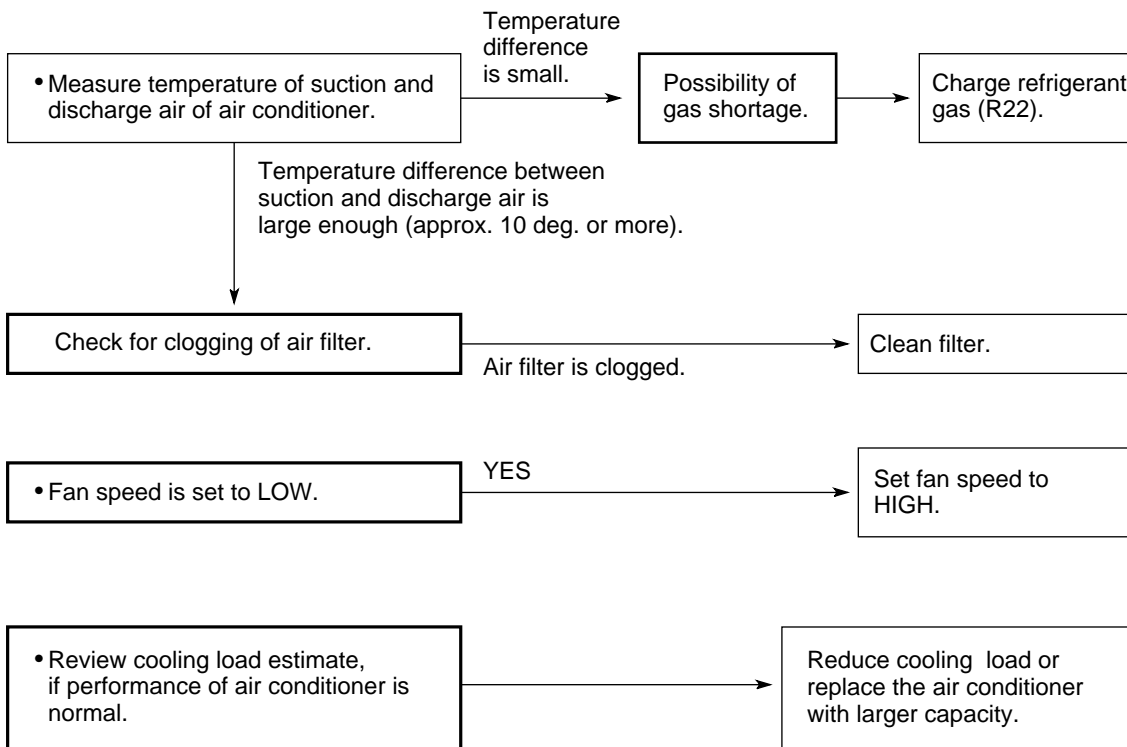


**CAUTION**

- If the unit is turned off during cooling, DO NOT restart it immediately, as this can damage it. Wait at least three minutes before starting it again.

## 7-4. Air conditioner operates, but abnormalities are observed.

### 7-4-1. Poor cooling



### 7-4-2. Excessive cooling



# 8. CHECKING ELECTRICAL COMPONENTS

## 8-1. Measurement of Insulation Resistance

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

### 8-1-1. Power Cord and Unit

Clamp the grounding prong 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 blade. (Fig. 1)

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

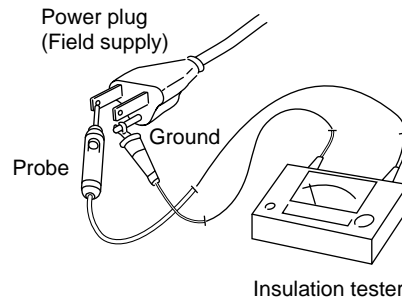


Fig. 1

#### NOTE

- The shape of the power plug may differ from that of the air conditioner which you are servicing.

### 8-1-2. Measurement of Insulation Resistance for Electrical Parts

Disconnect the lead wires of the desired electric part from terminal plate, switch, capacitor, etc. Similarly disconnect the connector. Then measure the insulation resistance. (Figs. 2 to 3)

Refer to Electric Wiring Diagram.

#### NOTE

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

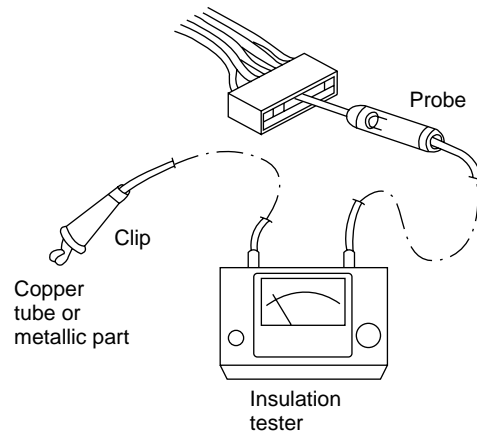


Fig. 2

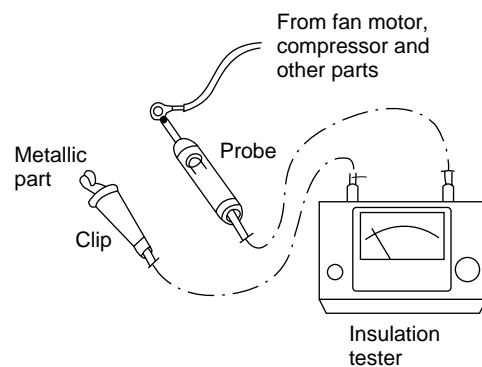


Fig. 3

## 8-2. Checking Motor Capacitor

Remove the lead wires from the capacitor terminals, and then place a probe on the capacitor terminals as shown in Fig. 4. 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.

## 8-3. Checking Fan Motor Winding

Referring to the electrical diagram, disconnect fan motor connectors, and measure the resistance between each lead wire with a tester.

The tester should be set in the X1 range. If the fan motor is hot, allow a few minutes until it gets cooled down.

When the resistances between each lead wire are those listed in "2-2. Major Component Specifications" the fan motor should be normal.

## 8-4. Checking Compressor Motor Winding

Checking compressor motor winding can be done in the similar manner.

Remove the terminal cover of the compressor motor, set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between each pair out of the 3 terminals as shown in Fig. 5.

Refer to "2-2. Major Component Specifications" for coil resistance.

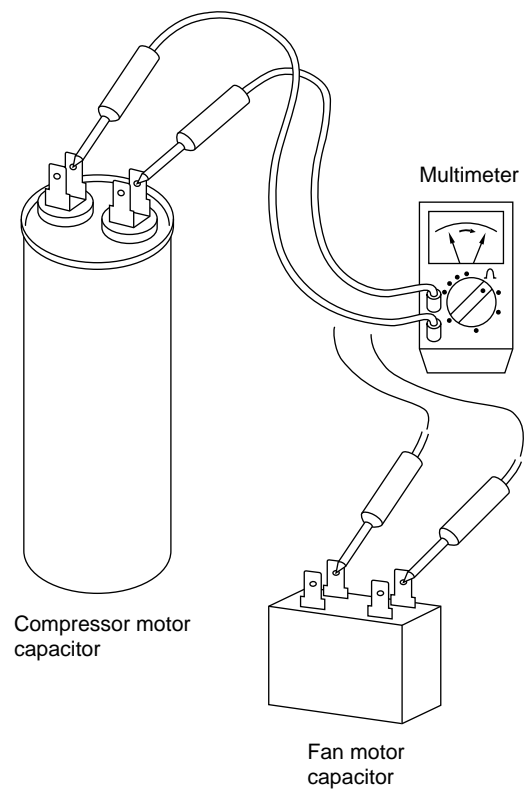


Fig. 4

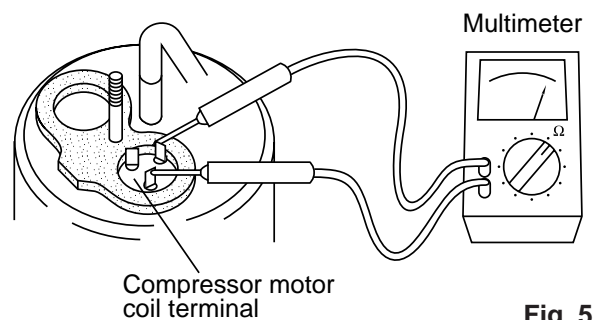


Fig. 5

# 9. DISASSEMBLY PROCEDURES

Model SA-128S5

### NOTE

These illustrations are based on typical view of a standard model. Consequently, the shape may differ from that of the air conditioner which you are servicing.

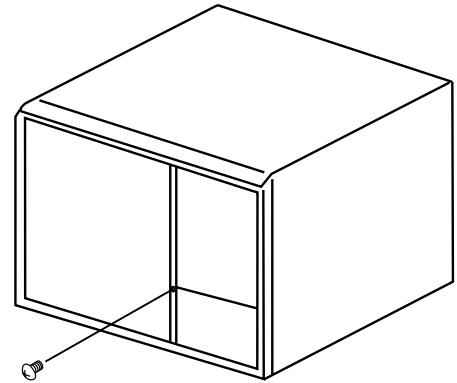
## 9-1. Removing Front Grille

- (1) Pull out the filter.
- (2) Remove the screw holding the grille in place. (Fig. 1)
- (3) Slide the side of the grille to the left and right to disengage the tabs on the left and right sides of the grille from the slots.
- (4) Pull the bottom portion of the grille toward you while paying attention to the ventilator lever. (Fig. 2 and 4)

### NOTE

Pulling out too far on the bottom of the grille at this point could damage the tabs at the top. Do not pull the grille out more than 100 mm.

- (5) After confirming that the ventilator lever has been disengaged from the grille vent, slide the grille upward to free the two tabs at the top of the grille from the rectangular holes in the top of the cabinet. (Fig. 3 and 4)



Screw holding the grille

Fig. 1

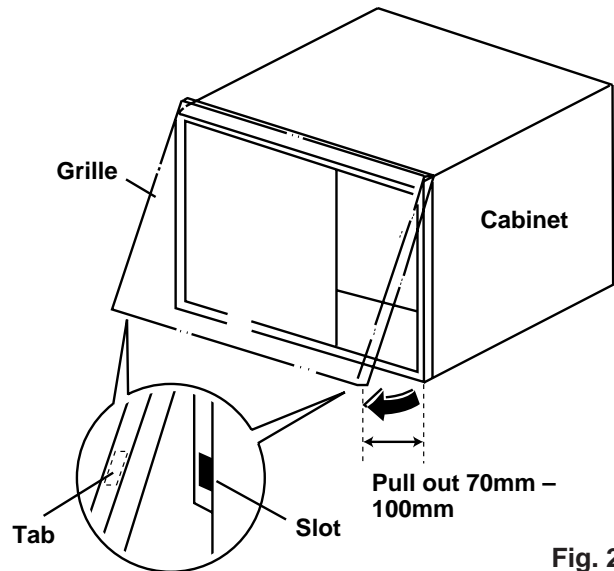


Fig. 2

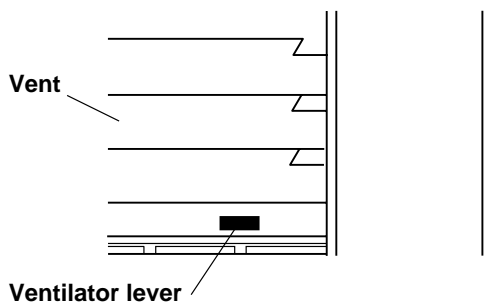


Fig. 4

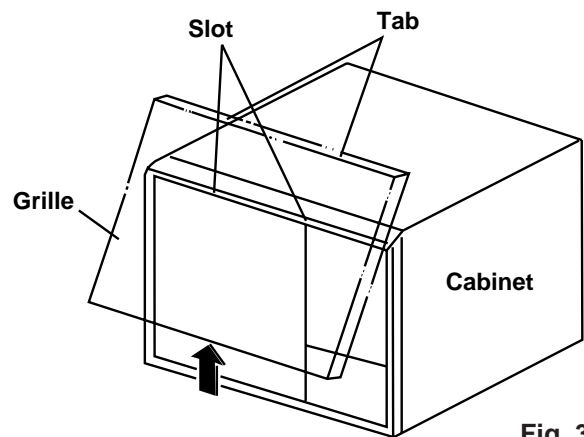


Fig. 3

## 9-2. Removing Electrical Component Box

- (1) Remove the front grille. (Fig. 5)  
Refer to "9-1. Removing Front Grille"
- (2) Remove screws securing the electrical component box. (Fig. 6)

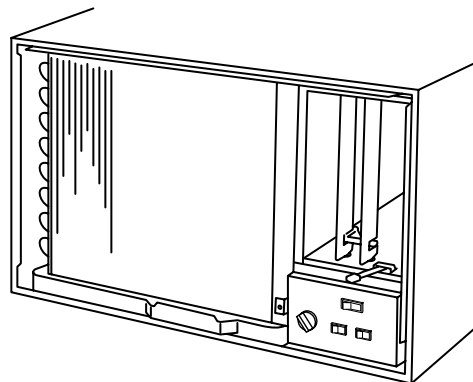


Fig. 5

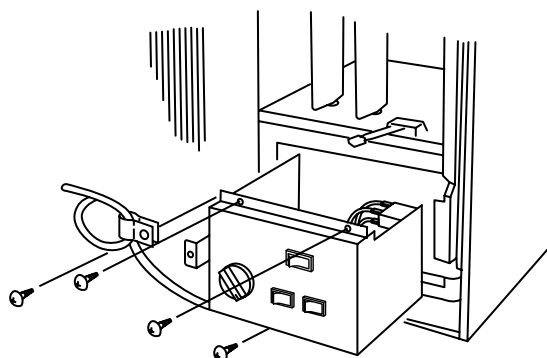


Fig. 6

## 9-3. Removing Cabinet

- (1) Remove screws holding the unit. (Fig. 7)
- (2) Remove the front grille.  
Refer to "9-1. Removing Front Grille"
- (3) Remove the stopper screw attached to the base pan of the unit (Fig. 8)
- (4) While holding top of the cabinet with one hand, grasp the handle with another hand and pull the unit toward you. (Fig. 9)

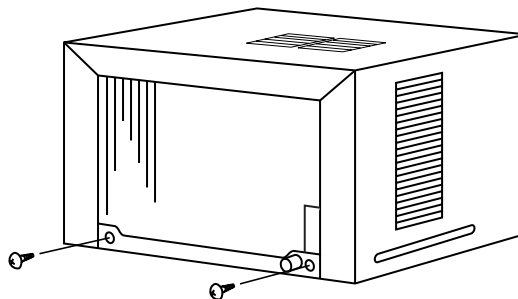


Fig. 7

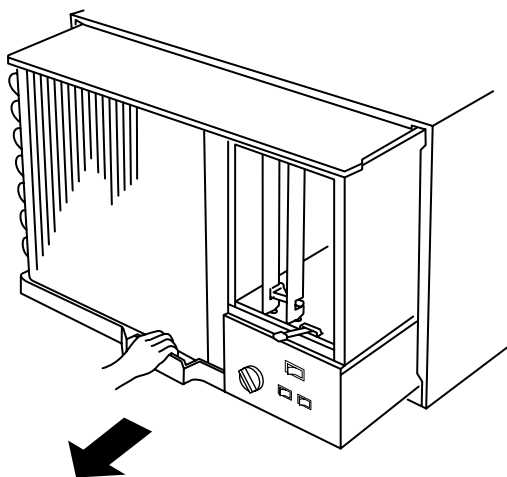


Fig. 9

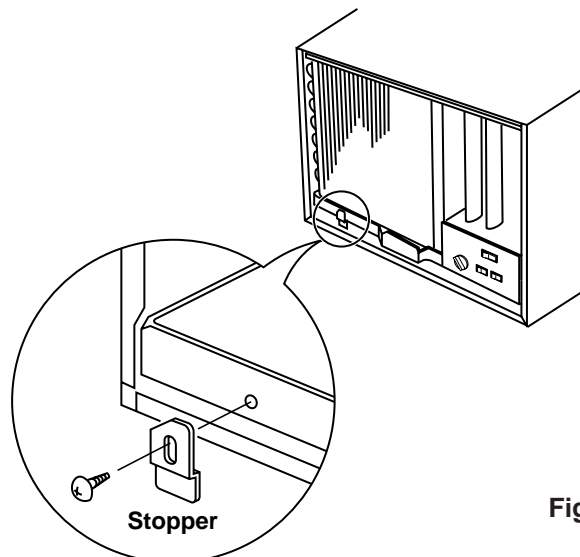


Fig. 8

## 9-4. Removing Evaporator

- (1) Remove screws holding top plate of evaporator.  
(Fig. 10)
- (2) Remove screws holding evaporator. (Fig. 10)
- (3) Grasp lower portion of the evaporator with both hands and tilt it slightly and lift it carefully from the drain pan so as not to distort the copper tube.

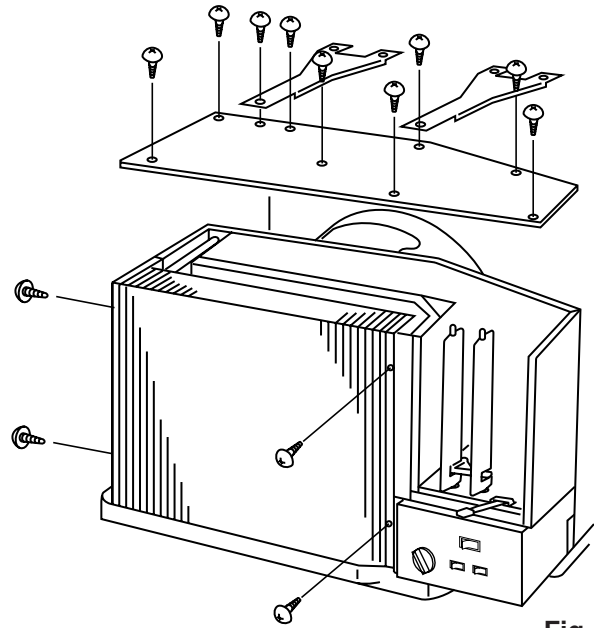


Fig. 10

## 9-5. Removing Blower Wheel

- (1) Remove the evaporator.  
Refer to "9-4. Removing Evaporator"
- (2) Loosen a nut holding blower wheel on motor shaft using hex wrench. (Fig. 11)
- (3) Remove the housing of blower wheel.
- (4) Extract the blower wheel from the motor shaft.

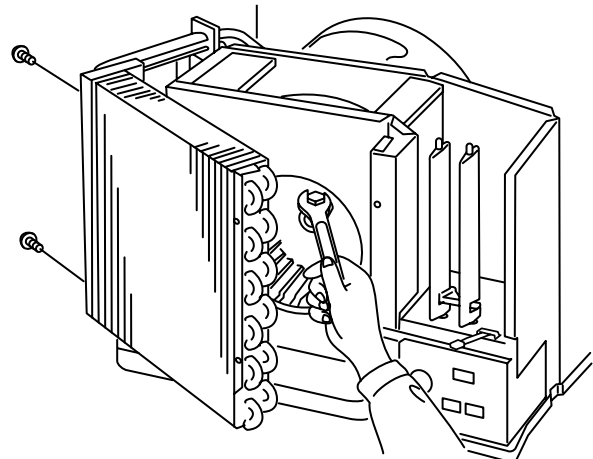


Fig. 11



## 9-6. Removing Condenser

- (1) Remove two splasher plates A and B on both side of condenser. (Fig. 12)
- (2) Remove splasher plate C at the back of condenser. (Fig. 12)
- (3) Remove other screws holding the condenser. (Fig. 12)
- (4) Grasp lower portion of the condenser with both hands and tilt it slightly and lift it carefully from the base pan so as not to distort the copper tube.

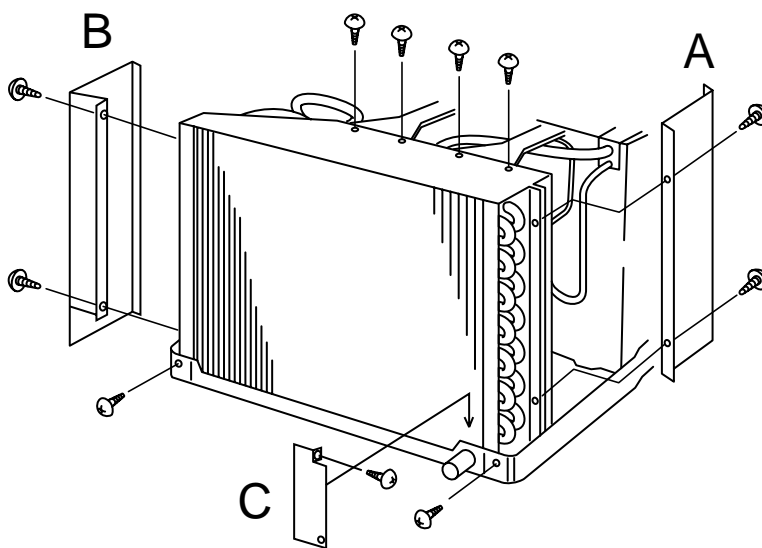


Fig. 12

## 9-7. Removing Propeller Fan

- (1) Remove the condenser.  
Refer to "9-6. Removing Condenser"
- (2) Loosen a nut holding propeller fan on motor shaft using hex. wrench. (Fig. 13)

### NOTE

To loose the nut securing the propeller fan, hold the fan with one hand and turn the nut **COUNTERCLOCKWISE** with another hand.

- (3) Extract the propeller fan from the motor shaft.

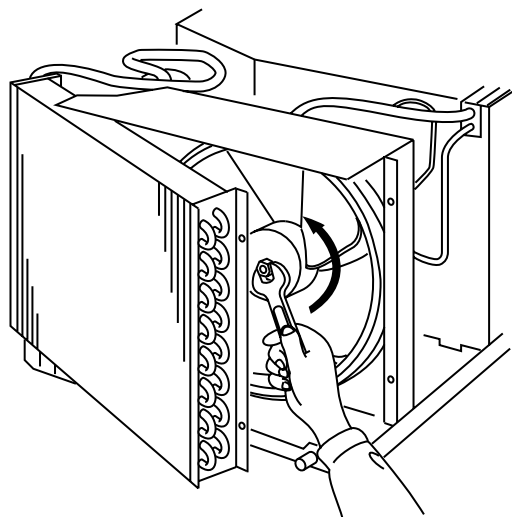


Fig. 13

## 9-8. Removing Fan Motor

- (1) Remove blower wheel.  
Refer to "9-5. Removing Blower Wheel"
- (2) Remove propeller fan.  
Refer to "9-7. Removing Propeller Fan"
- (3) Disconnect motor lead wires.  
Refer to "9-2. Removing Electrical Component Box"
- (4) Remove 4 screws of the fan motor mounting plate with a philip screwdriver. (Fig. 14)
- (5) Disengage the fan motor from the mounting plate.

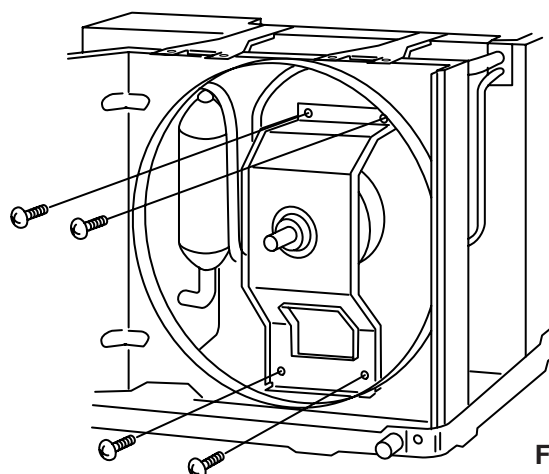
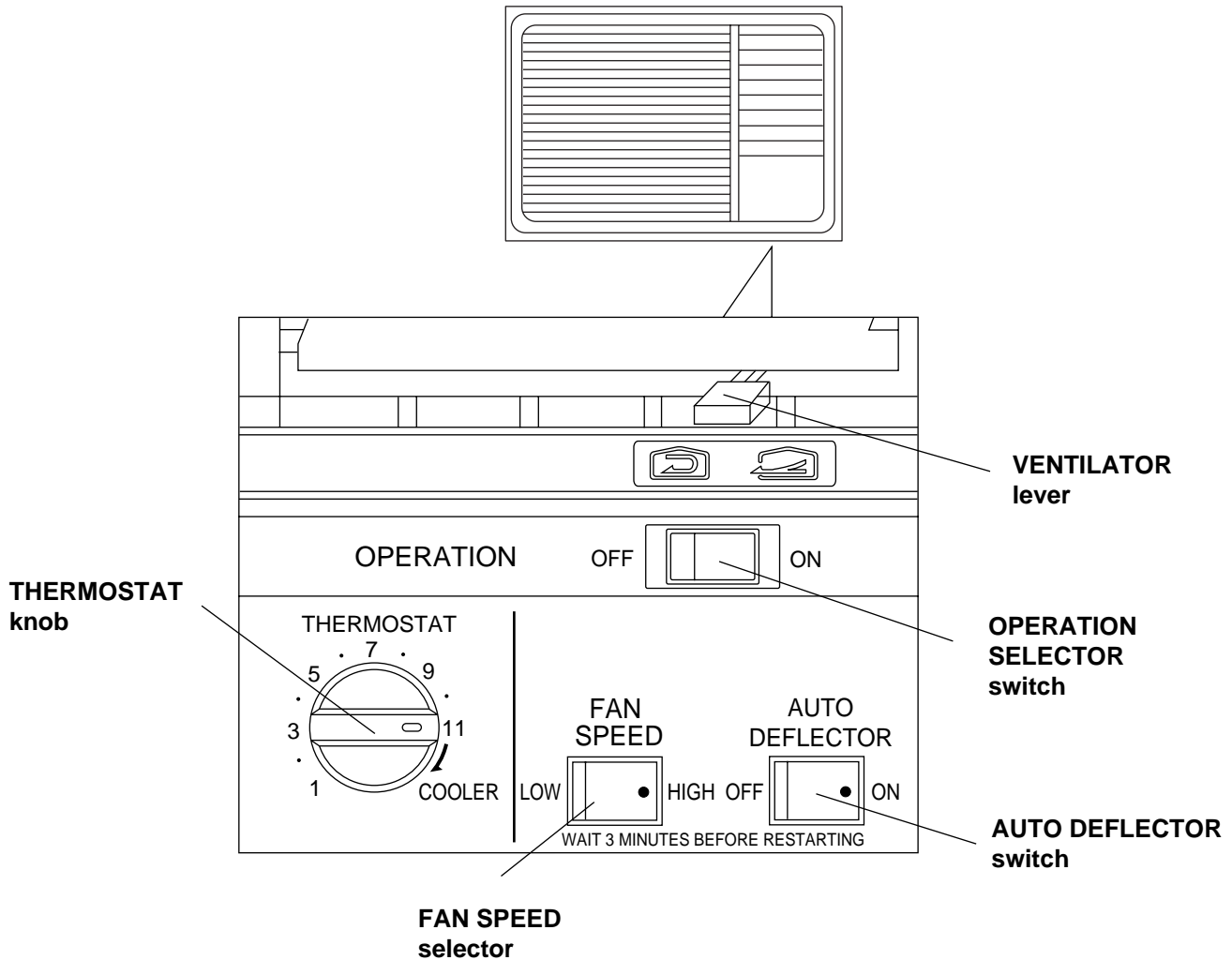


Fig. 14

# APPENDIX

Model SA-128S5

## Unit Display and Control Panel



### CAUTION

- If the unit is turned off during cooling, **DO NOT** restart it immediately, as this can damage it. Wait at least three minutes before starting it again.
- Set the selector to TEST RUN only when performing a test cooling operation. Never leave the selector in this position. Otherwise, the evaporator coil may freeze up during cooling.



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