



N21

ENGEL

SERVICE MANUAL

MODEL

SR48F-G4

SR70F-G3

SR48F-U1

SR70F-G4

SB47F-E-T

SR70F-U1

SB47F-E-WH

SB70F-D1

SB47F-D-T

SB70F-E

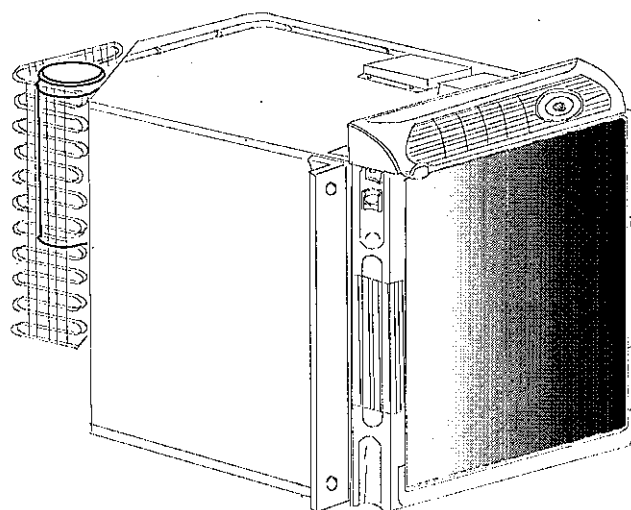


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1-1) SPECIFICATIONS

MODEL	SR48F-G4		SR48F-U1	SB47F-E-T SB47F-E-WH SB47F-D1
	(AC/DC)			(DC ONLY)
STORAGE VOLUME	ℓ(liter)	40		
EXTERIOR DIMENSIONS W×H×D	in	16.6 × 20.9 × 20.7		
	mm	423±3 × 530±3 × 526.5±3		
		SR48F-U1 ⇨	423±3 × 530±3 × 510.5±3	
BUILT-IN SIZE W×H×D	in	15.2 × 20.4 × 17.7		
	mm	386.5(MAX) × 518(MAX) × 448.5(MAX)	385.5(MAX) × 519(MAX) × 448.5(MAX)	
INPUT VOLTAGE	AC	AC185~264V 50Hz/60Hz		(DC ONLY)
	DC	DC 10.5~31V		
RATED AMPERAGE	AC	0.35A / AC240V	0.71A/120V	(DC ONLY)
	DC	2.5A/12V, 1.3A/24V	3.0A/12V, 1.5A/24V	2.5A/12V, 1.3A/24V
COMPRESSOR RATING	AC 13~16 V, 50Hz,27W			
REFRIGERANT	Dichlorodifluoromethane (R-134a)			
AVERAGE INSIDE ROOM TEMPERATURE (AT Ambi.Air Temp. 30°C)	5°C±3°C by Thermostat control NOTCH 3			
TEMPERATURE CONTROL	Electronic thermostat temperature control			
WEIGHT	LBS.	41.2	39.7	39.7
	Kg	Apprpx 18.7	Approx 18	Approx 18

1-2) SPECIFICATIONS

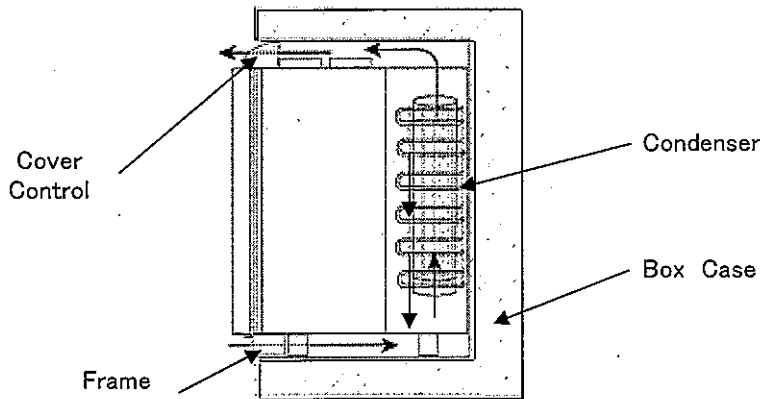
MODEL		SR70F-G3 (AC/DC)	SR70F-G4 (AC/DC)	SR70F-U1 (AC/DC)	SB70F-E,SB70F-D (DC ONLY)
STORAGE VOLUME	ℓ(liter)	57			
EXTERIOR DIMENSIONS W×H×D	in	19.9×20.9×23.1			
	mm	506±2 × 530±3 × 602±3			
	mm	SR70F-U1, SB70F-E: ⇨ 506±2 × 530±3 × 586±3			
BUILT-IN SIZE W×H×D	in	18.5×20.5×20.7			
	mm	467.6(MAX) × 520(MAX) × 524(MAX)			
INPUT VOLTAGE	AC	AC185~264V 50Hz/60Hz			(DC ONLY)
	DC	DC 10.5~31V			
RATED AMPERAGE Intersection +10% MAX	AC	0.37A/ AC230	0.35A/AC240V	0.71A/AC120V	(DC ONLY)
	DC	2.5A/DC12.V	1.3A/24V	3.0A/DC12V, 1.5A/24V	2.5A/12V, 1.3A/24V
COMPRESSOR RATING		AC 13~16 V, 50Hz,27W			
REFRIGERANT		Dichlorodifluoromethane (R-134a)			
AVERAGE INSIDE ROOM TEMPERATURE (AT Ambi.Air Temp. 30°C)		5°C±3°C by Thermostat control NOTCH 3			
TEMPERATURE CONTROL		Electronic thermostat temperature control			
WEIGHT	LBS.	Approx 44.5			Approx 43.7
	Kg	Approx 20.2			Approx 19.7

2. INSTALLING A REFRIGERATOR

1) Heat radiation flows in the direction of the arrow of the figure below by fan motor.

2) Please do not close the front of Cover Control and Frame for air circulation

Please note that if air circulation is blocked, refrigerator does not cool enough.



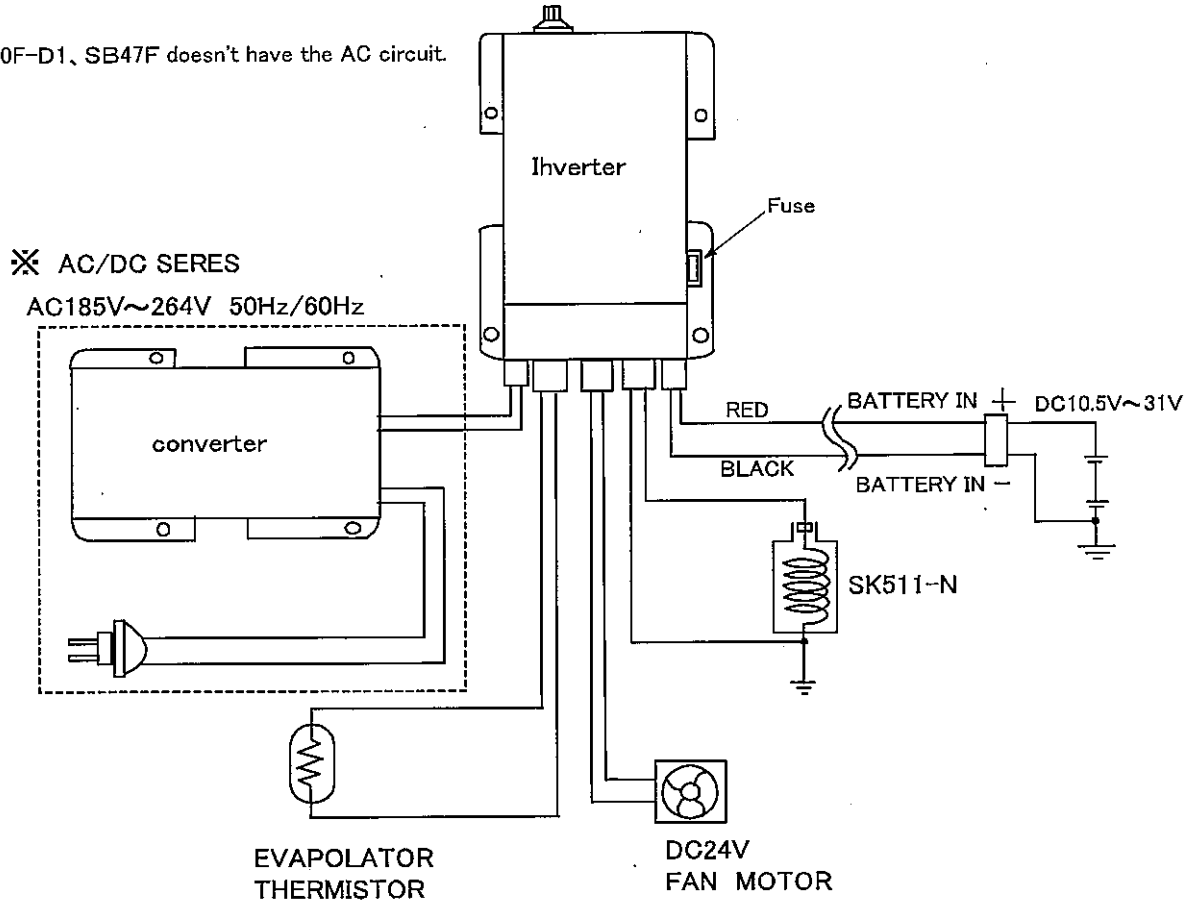
2) WIRE GAUGE IS IMPORTANT!

Connect refrigerator to battery by use of the following wire:

Distance Between Fridge and battery	Wire gauge DC 12 volt series
Less than 3.7 m (12 ft.)	SWG # 18 (AWG # 16) / 1.2mm ²
From 3.7 m (12 ft.) over to 6.1 m (20 ft.)	SWG # 16 (AWG # 14) / 2.1 mm ²
More than 6.1 m (20 ft.)(Not recommended, too long)	SWG # 14 / 3.2 mm ² (AWG # 12 / 3.3mm ²)

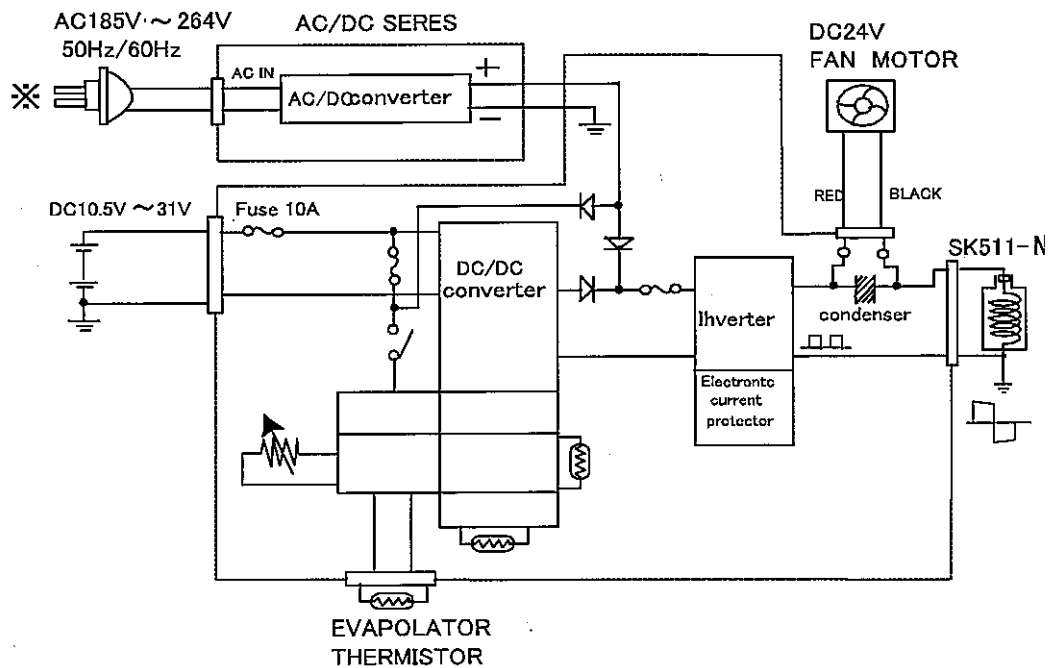
3. BLOCK DIAGRAMS (SR48F,SR70F)

※:SB70F-D1, SB47F doesn't have the AC circuit.

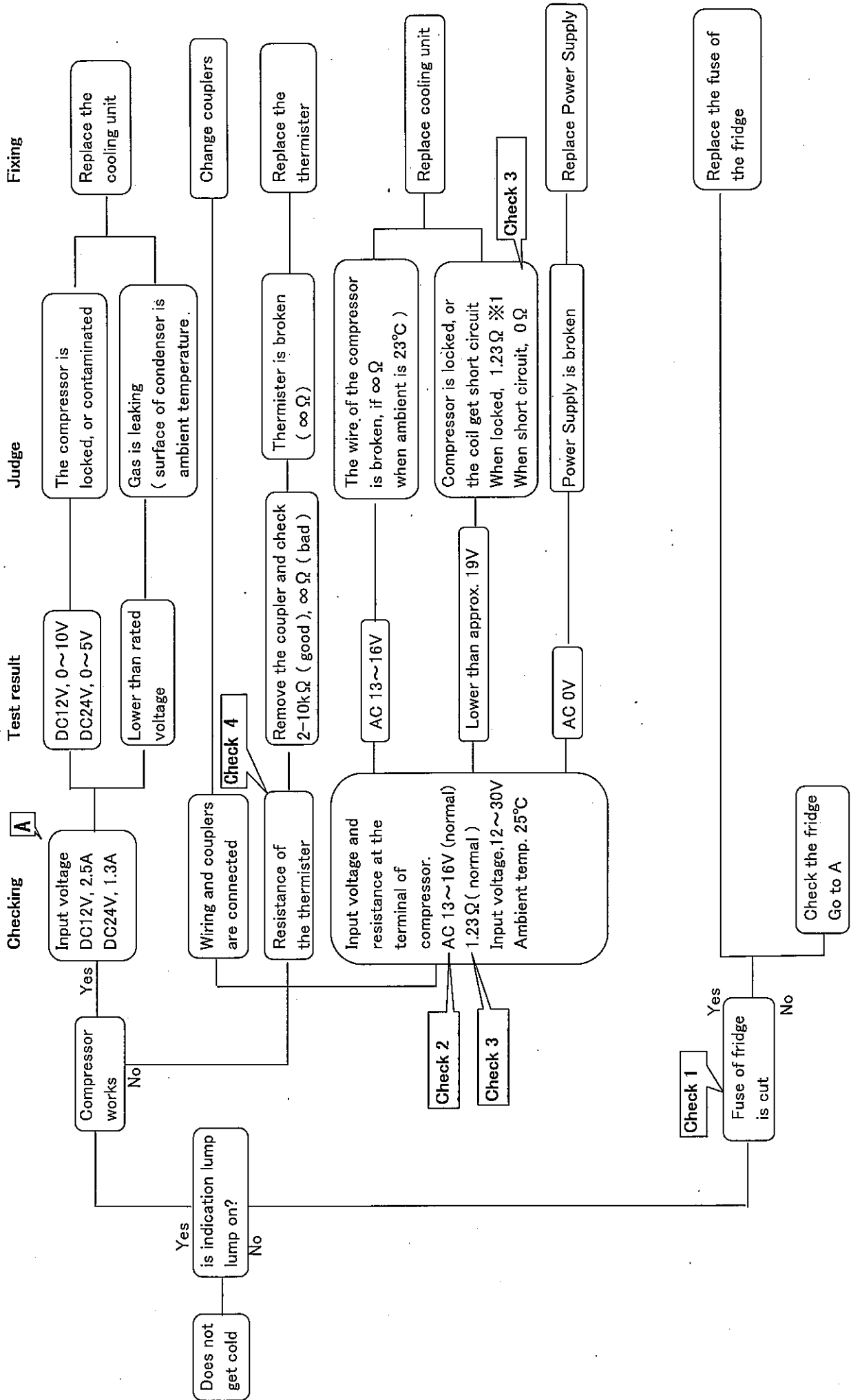


4. WIRING DIAGRAMS (SR48F,SR70F)

※:SB70F-D1, SB47F doesn't have the AC circuit.



5. TROUBLE SHOOTING



5-2-1 TYPICAL PROBLEM

Symptoms	Cause	Test Result	Treatment
Lamp of Temperature Control Assembly is lit	Coil of the compressor is open	Resistance of motor coil is $\infty \Omega$ (Normal: 1.23Ω ※1)	Replace the cooling unit
	Inverter is broken	Output voltage of Inverter is AC 0V (Normal: AC13~16V)	Replace Inverter
Compressor does not work	Wire thermistor is open	Resistance of thermistor (Normal: $2k\Omega \sim 10k\Omega$)	Replace thermister
	* Gas is leaking from Cooling Unit		Replace of cooling unit
Cooling is weak	* Fan motor is broken		Replace fan motor
	* Input voltage is lower than 10V		Charge the battery
	* Ambient temperature is higher than 30°C		Make at least 10 cm room between unit and wall
	* Ventilation at mechanical part is not enough		Make some room for cool air
Lamp of Temperature Control Assembly is not lit	* Too many things are put inside		
	* Fuse in the vehicle is open		Replace the fuse
	* Socket or other DC power line in the vehicle is bad		Check the vehicle

5-2-2 TECHNICAL DATA

※1 This figure determined using Laboratory standard equipment.

Checking items	Checking Points	Normal data
Input voltage at compressor	Between terminals of motor	Approx. AC 13V ~ 16V
Output voltage of Inverter	Between outgoing cords from Inverter (by detaching from terminal of motor)	Approx. AC 13V ~ 16V
Resistance of the motor	Between incoming cords to motor (by detaching from terminal of motor)	Approx. 1.23Ω ※1
Resistance of thermister	Between 2 pin of the coupler	Approx. $2K\Omega \sim 10K\Omega$
Fuse	Fuse at DC plug	0Ω

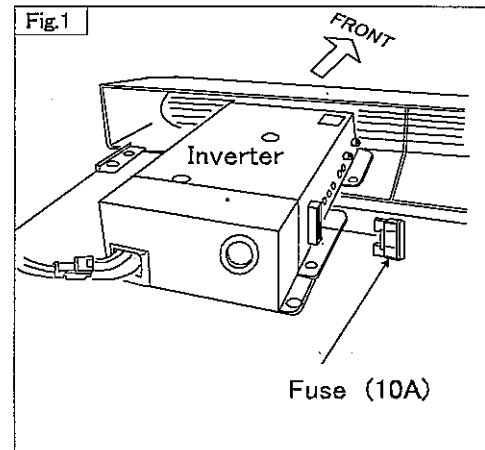
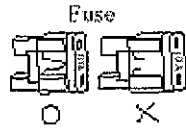
5.CHECK POINT & CHECK METHOD

Model SB70F

【Check 1】Fuse(Fig.1)

◇ Check the resistance of fuse by tester.

Test result	Judge
0 Ω	Normal
∞ Ω	Broken

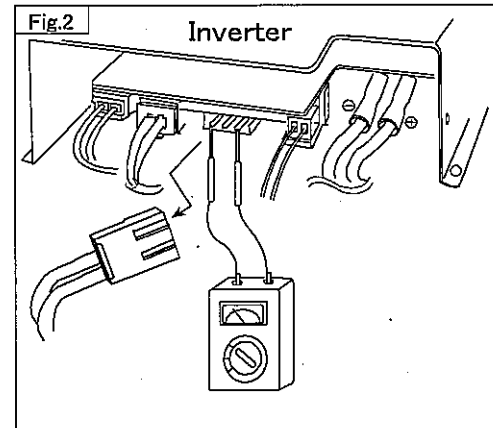


【Check 2】Output voltage measurement of Inverter

◇Checking point

- Check at 2 pin coupler of Inverter (Fig.2) or at input terminals of the compressor.

Test result	Judge
Approx. AC13~16V	Normal
AC 0 V	Inverter is broken
Approx. AC13V or lower	Compressor is locked

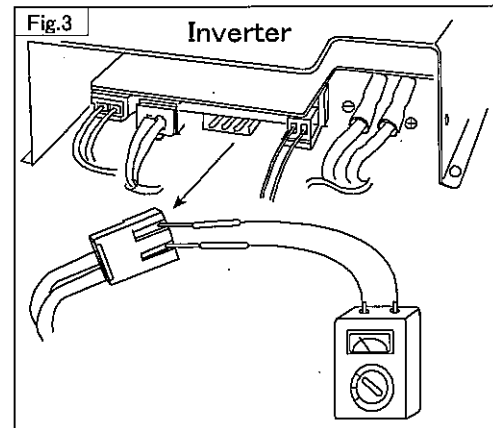


【 Check 3 】 Check the resistance at the coil if compressor.

◇Checking point

(Fig.3)
Remove 2p couplers at motor cord, and check.

Test result	Judge
約 1.23 Ω	Normal
∞ Ω	Broken
0 Ω	Coil of compressor is short circuit



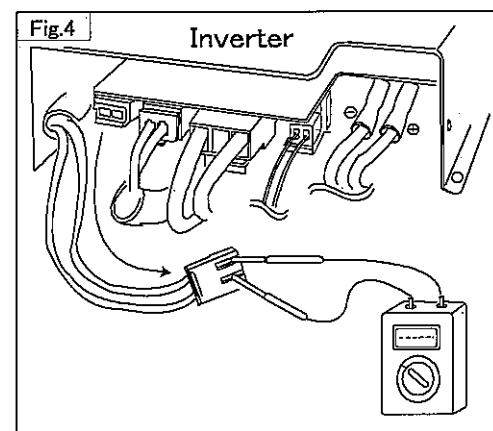
【Check 4】Resistance of thermistor (Fig.4)

◇Checking points

Remove the 3 pin couplers from Inverter, and test.

Test result	Judge
Approx. 2 kΩ ~ 10 kΩ	Normal
∞ Ω	Broken
0 Ω	Short Circuit

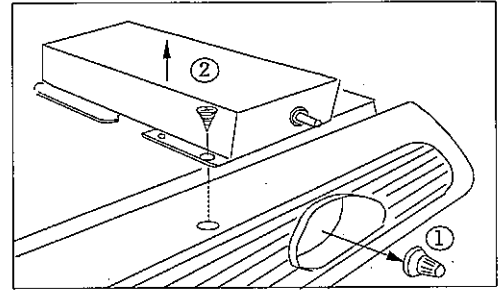
Note) When short circuit, motor runs continuously.



7.Replacing Parts (MODEL SB47F) 【How to replace Cooling unit】

1.Dial Assembly is removed. (Fig.5-1)

(Fig.5)

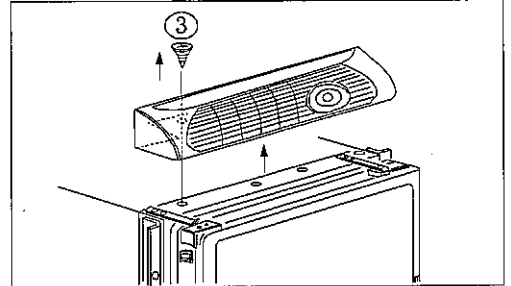


2.Inverter Assembly is removed(Fig.5-2)

The screw that stops Inverter Assembly is removed.

3.Cover Control is removed(Fig.6)

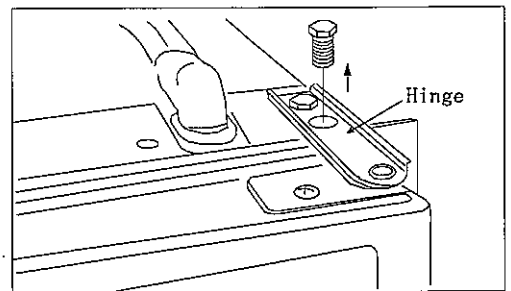
(Fig.6)



4.Right and left hinge is removed. (Fig..7)

The bolt that stops Hinge is removed.

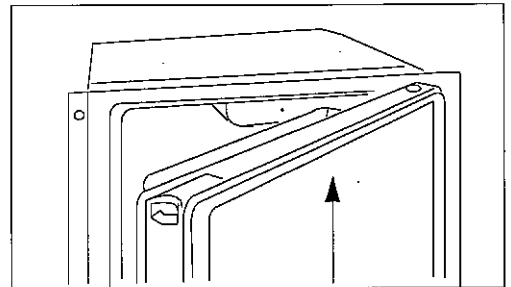
(Fig.7)



5.Door Assembly is removed. (Fig.8)

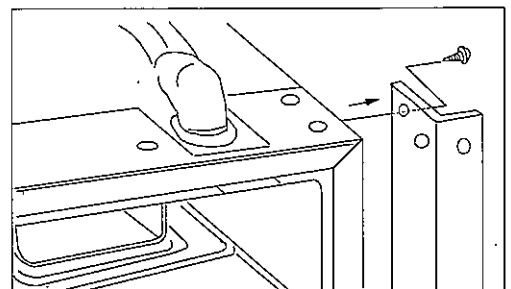
The door is lifted up and removed.

(Fig.8)



6. right and left frame is removed. (Fig.9)

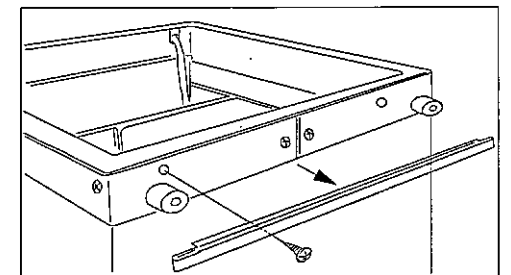
(Fig.9)



7.A lower frame is removed (Fig.10)

Two bolts that stop the frame are removed

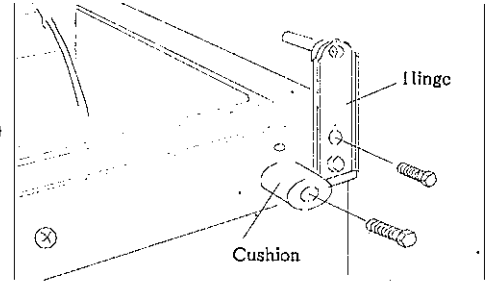
(Fig.10)



8.Two Cushion is removed. (Fig.11)

9.Lower Hinge is removed. (Fig.11)

(Fig.11)

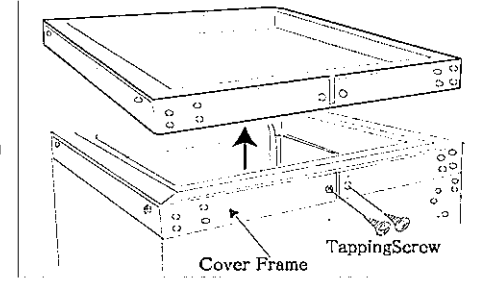


11.Cover Frame is removed. (Fig.12)

1) Six screws that stop Cover Frame are removed.

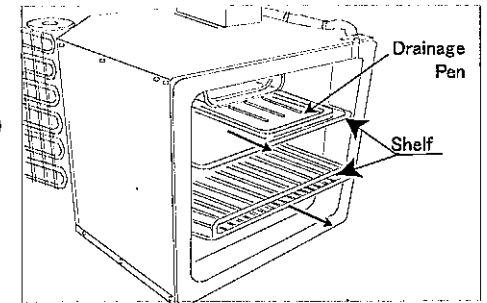
2) Cover Frame is pulled out from Cabinet Assembly.

(Fig.12)



12.Drainage Pan and Shelf are removed (Fig.13)

(Fig.13)

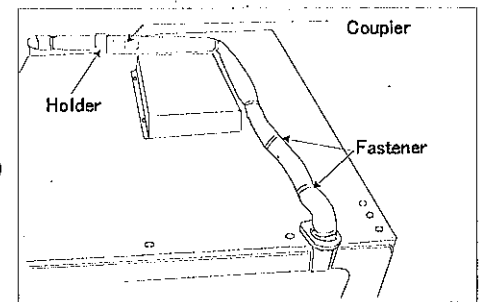


13.The fastener that stops Pipe and Cord is out (Fig.14).

Four places.

14.The holder that stops Pipe is removed (Fig.14).

(Fig.14)

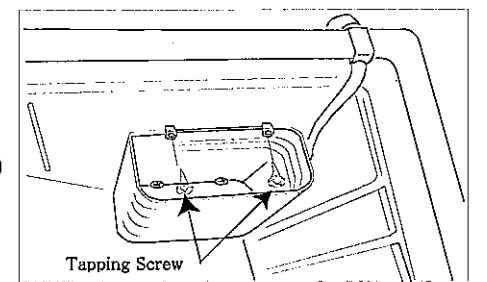


15.The coupler of the motor code is removed (Fig.14).

16.Two screws that stop Evaporator are removed (Fig.15).

This side is removed two screws.

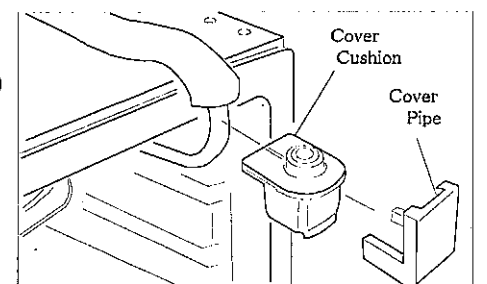
(Fig.15)



17.Cover Pipe is pulled out below (Fig.16).

18.Cover Cushion is removed (Fig.16).

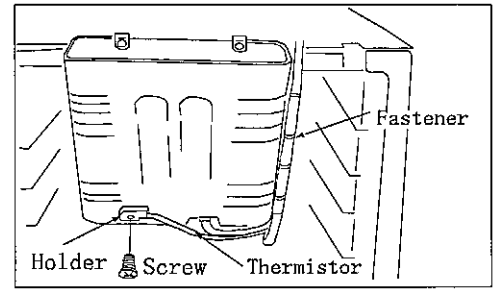
(Fig.16)



19.The holder that stops Evaporator Thermistor is removed (Fig.17).

The code is stopped.
Four fasteners are cut.

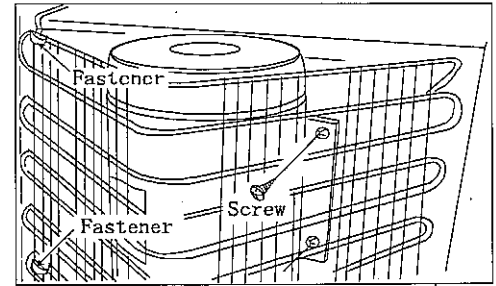
(Fig.17)



20.The fastener is cut by two places (Fig.18).

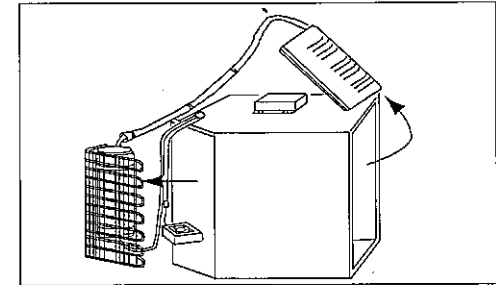
21.The fastener is cut by two places (Fig.18).

(Fig.18)



22.Cooling Unit is removed (Fig.19).

(Fig.19)



23 Two minus sides and the plus codes are removed.

(Fig.20)

