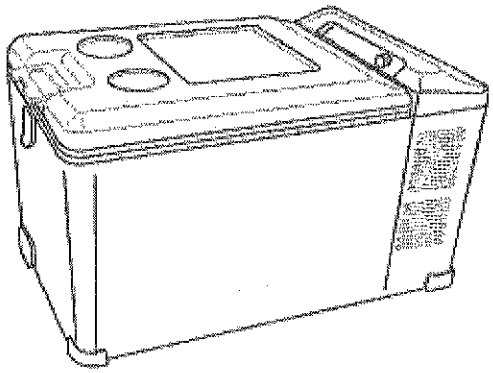
N21

ENGEL

SERVICE MANUAL

F SERIES MODEL

MT17F
MT27F
MT35F
MT45F



SAWAFUJI ELECTRIC CO.,LTD

No. SASM-010001

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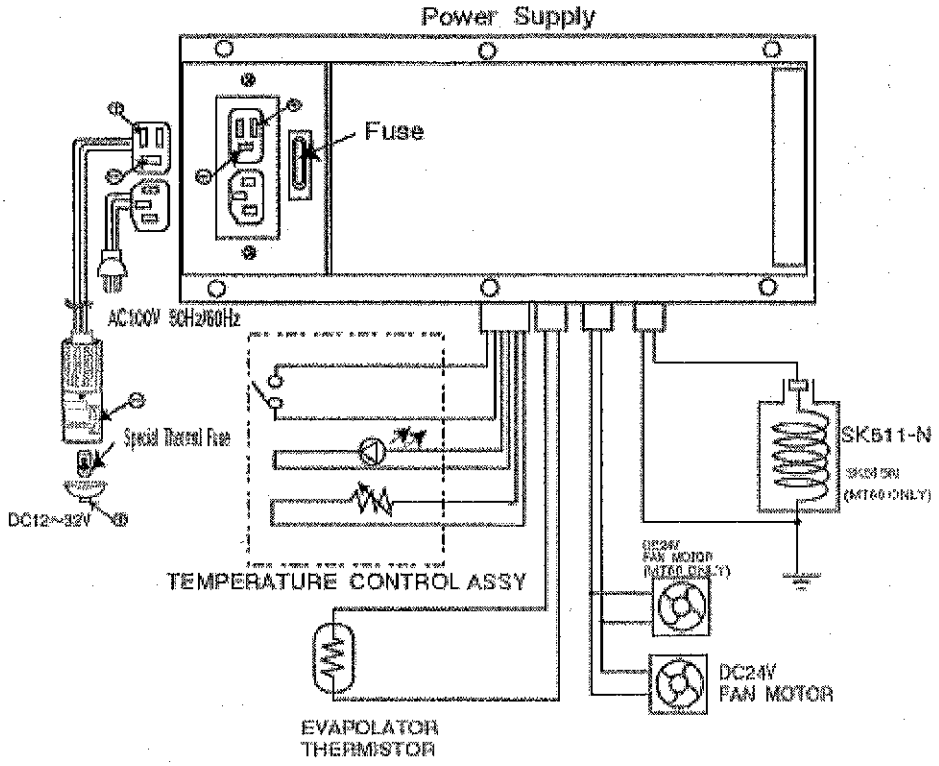
1. SPECIFICATIONS

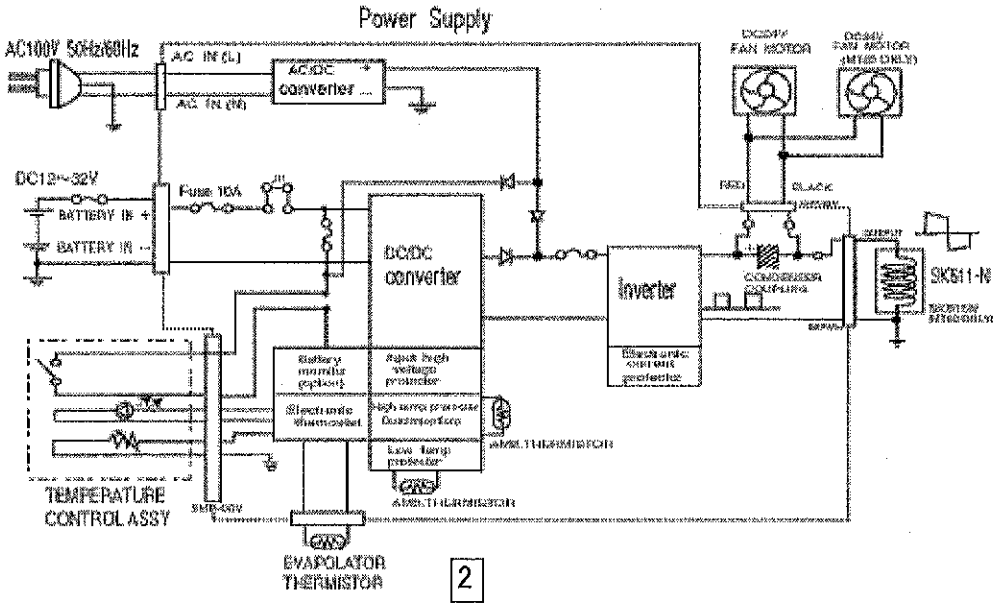
F SERIES MODEL		MT17F	MT27F	MT35F	MT45F
STORAGE VOLUME	ℓ (liter)	15	27	32	40
EXTERIOR DIMENSIONS W×H×D 注)	in	21.6×13.7×12.1	21.6×17.3×12.1	25.7×16.2×14.5	25.7×20.2×14.5
	mm	548×348×306	548×440×306	647×408×364	647×508×364
INTERIOR DIMENSIONS W×H×D	in	11.5×10.0×8.0	11.5×14.0×8.0	15.5×12.5×10.9	15.5×16.5×10.9
	mm	291×254×204	291×357×204	390×316×275	391×416×275
EXTERIOR FINISH	DOOR	A.B.S. Resin		Melamine coating steel plate	
	CABINET	Polypropylene			
INTERIOR FINISH	DOOR	High impact polystyrene	High impact polystyrene	A.B.S. Resin	
	CABINET		polystyrene		
INPUT VOLTAGE	AC	AC85～132V, 50/60Hz (US, Canada, etc.) AC185～264V, 50/60Hz (Australia, Europe,, etc.)			
	DC	DC 10.5～31V			
RATED AMPERAGE	AC	0.85A/AC100V, 0.71A/AC120V (US, Canada,, etc.) 0.37A/AC230V、0.35A/AC240V (Australia,, Europe, etc.)			
	DC	Lower than 2.5A (Input voltage DC12.8V、Ambient temparature 30℃)			
COMPRESSOR RATING		AC 13～16 V, 50Hz, 33W			
REFRIGERANT		Dichlorodifluoromethane (R-134a)			
AVERAGE INSIDE ROOM TEMPERATURE (AT Ambi.Air Temp. 30℃)		5℃±2℃ by Thermostat control NOTCH 1			
TEMPERATURE CONTROL NOTCH 5 OR FREEZE		−18 ℃ or lower			
TEMPERATURE CONTROL		Electronic thermostat temperature control			
WEIGHT	LBS.	37.5	35	56.1	64.1
	Kg	17	16	21	24

Note : We took the largest mesurement (including latch and handles)

2. BLOCK DIAGRAMS



3. WIRING DAIGRAMS



4. INSTALLATION

●INSTALLATION AND VENTING

(1) Your shockproof fridge is best installed on a solid surface .

(2) Be sure your fridge is not placed near a gas stove, heater or other heat-generating appliances.

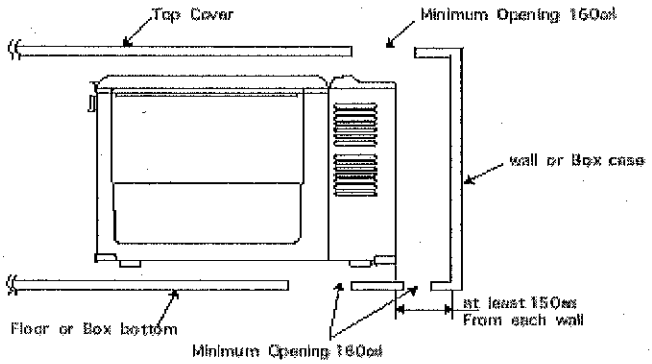
(3) Adequate ventilation and suitable distance from each wall (at least 150mm or more) is necessary for the maximum cooling efficiency and minimum electric current consumption for "free standing use"(see Fig. shown below).

(4) Avoid installing your fridge close to kitchen sink or faucet.

(5) If you use the fridge under the counter or in the fixing box, please note the following air ventilation conditions.

① Make vent opening both under fridge or bottom and above fridge top cover.

② Vent opening size must be larger than 160㎠ for each opening (the more air circulation over the condenser, the more efficiently fridge will operate).



③ [CAUTION]

Failure to provide the necessary venting will result in poor refrigeration, continuous compressor operation, accelerated battery discharge and sometimes shorten the life of fridge.

●WIRE GAUGE IS IMPORTANT !

Connect refrigerator to battery by use of the following wire:

Distance Between Fridge annd battery	Wire gauge DC 12 volt series
Less than 3.7 m (12 ft.)	SWG # 18 (AWG # 16) / 1.2㎟
From 3.7 m (12 ft.) over to 6.1 m (20 ft.)	SWG # 16 (AWG # 14) / 2.1 ㎟
More than 6.1 m (20 ft.) (Not recommended - too	SWG # 14 / 3.2 ㎟ (AWG # 12 / 3.3 ㎟)

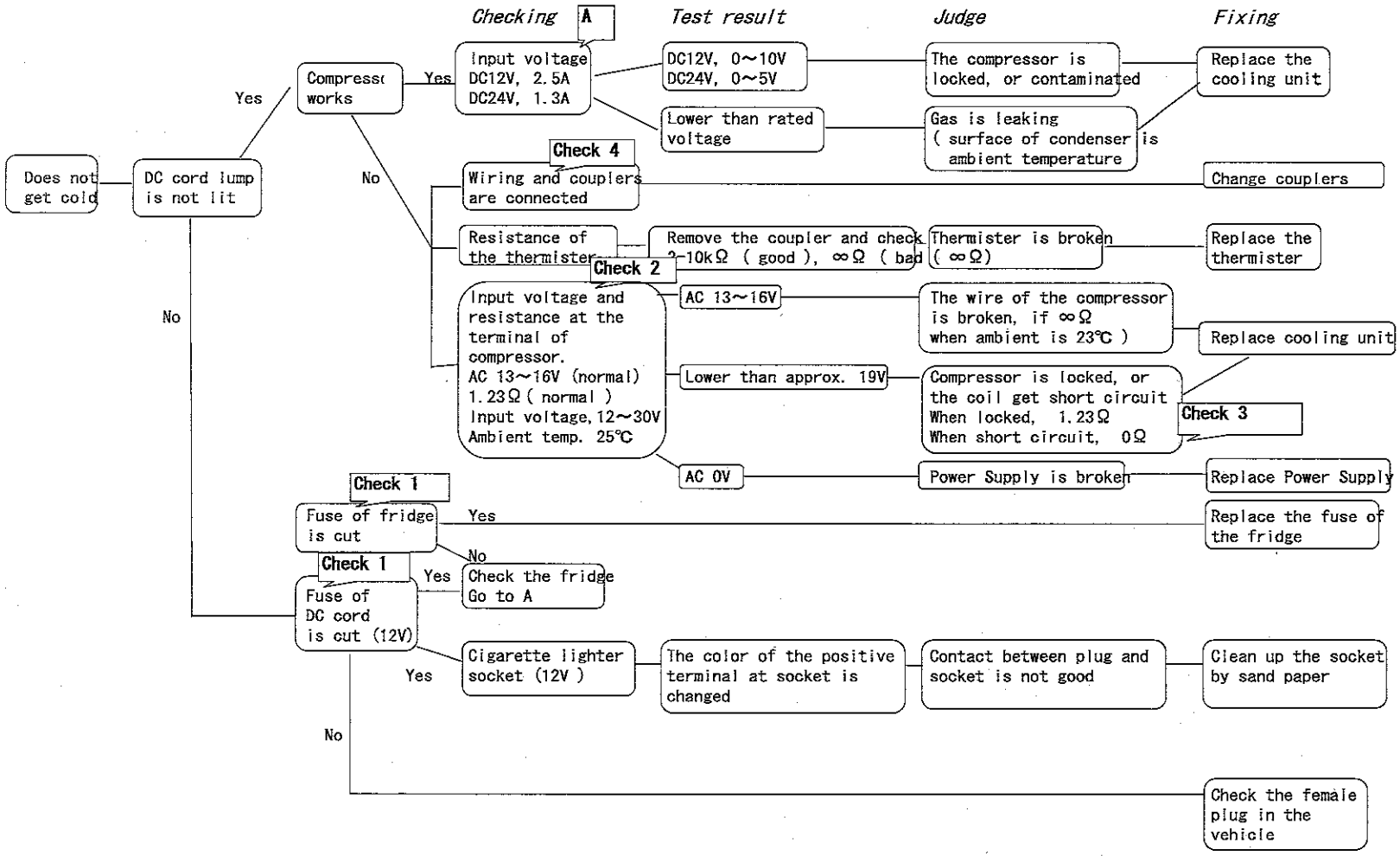
5-2-1 TYPICAL PROBLEM

	Symptoms	Cause	Test Result	Treatment
Lamp of DC cord is lit	Inside of the fridge does not get cold Compressor does not work	Coil of the compressor is open	Resistance of motor coil is ∞Ω (Normal: 1.23Ω)	Replace the cooling unit
		Power Supply is broken	Output voltage of Power Supply is AC 0V (Normal: AC13～16V)	Replace Power Supply
		Wire thermisiter is open	Resistance of thermister (Normal: 2kΩ～10kΩ)	Replace thermister
	Cooling is weak	* Gas is leaking from Cooling Unit		Replace of cooling unit
		* Fan motor is broken (MT35, 45, 60 only)		Replace fan motor
		* Input voltage is lower than 10V		Charge the bettery
		* Ambient temparature is higher than 30℃		
		* Ventilation at mechanical part is not enough		Make at leaset 10 cm room between unit and wall
		* Too many things are put inside		Make some room for cool air
Lamp of DC cord is not lit		* The special fuse inside DC cord is open		Replace the fuse
		* 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

Checking items	Checking Points	Normal data MT 17, 27, 35, 45
Input voltage at compressor	Between terminals of motor	Approx. AC 13V ~ 16V
Output voltage of Power Supply	Between outgoing cords from Power Supply (by ditaching from terminal of motor)	Approx. AC 13V ~ 16V
Resistance of the motor	Between incoming cords to motor (by ditaching from terminal of motor)	Approx. 1.23Ω
Resistance of thermister	Between 2 pin of the coupler	Approx. 2KΩ ~ 10KΩ
Fuse	Fuse at DC plug Fuse at Power Supply	0Ω 0Ω

5. TROUBLE SHOOTING



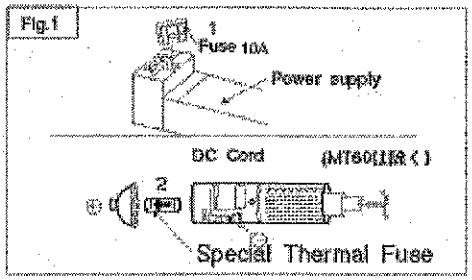
6. CHECK POINT & CHECK METHOD

【Check 1】 Fuse (Fig. 1)

◇ Check the resistance of fuse by tester.

Test result	Judge
0Ω	Normal
∞Ω	Broken

Note) When broken eye-checking in not possible.

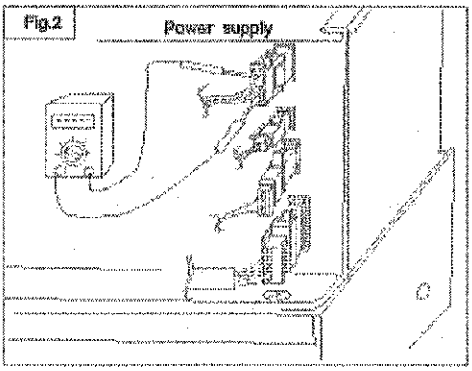


【Check 2】 Input voltage of the compressor.

◇Checking point

・Check at 2 pin coupler of Power Supply (Fig. 2)
or at input terminals of the compressor.
(Should be checked when the compressor is connected)

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

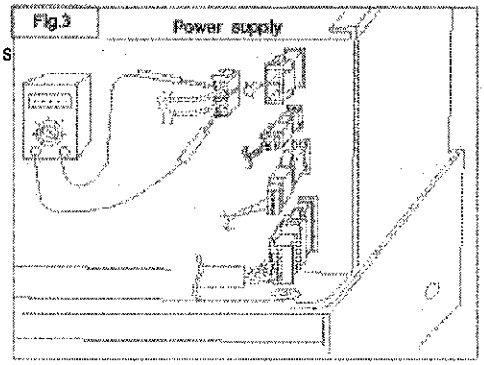


【 Check 3 】 Check the resistance at the coil if compress
(Fig. 3)

◇Checking points

Remove 2p couplers at motor cord, and check.

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



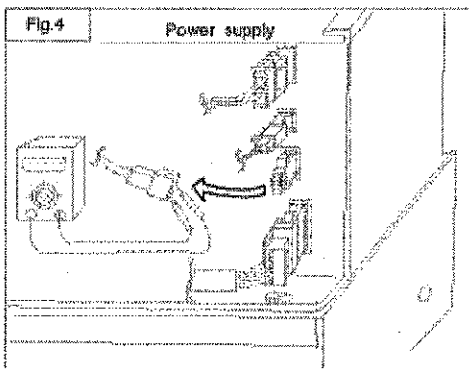
【Check 4】 Resistance of thermistor (Fig. 4)

◇Checking points

Remove the 3 pin couplers from Power Supply, and test.

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

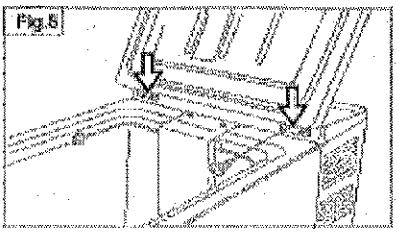
Note) When short circuit, motor runs continuously.



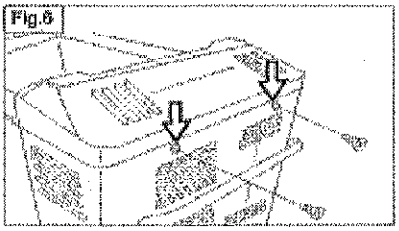
7. Replacing Parts (MODEL MT35F, MT45F)
【How to replace Cooling unit】

1. Remove the door(Fig. 5)

   Remove 4 screws which hold hinges

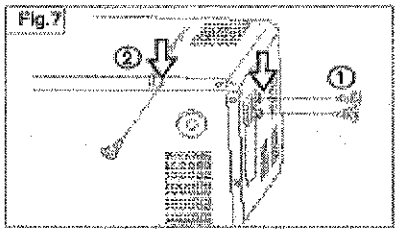


2. Remove Motor Cover (Fig. 6)



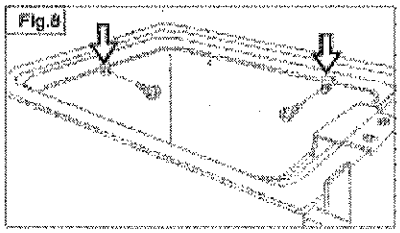
3. Remove Case Cover (Fig. 7)

   ①Remove 2 screws at terminal blocks
   ②Remove 11 screws at Case Cover



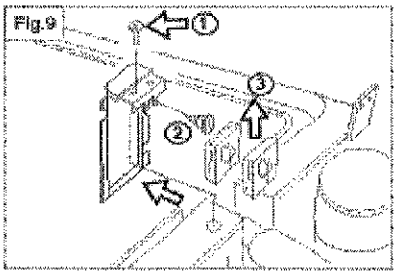
4. Remove 3 screws at Evaporator (Fig. 8)

   Take out the basket first,

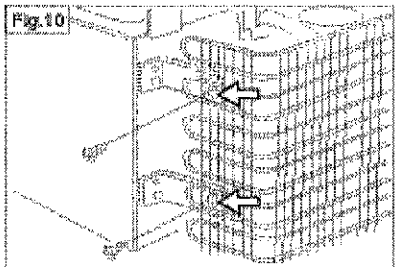


5. Take out Cover Pipe (Fig. 9)

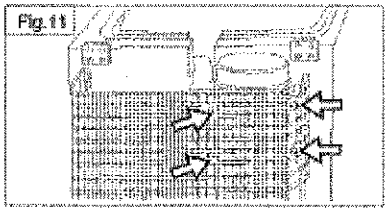
   ① Remove 2 screws
   ② Cut the fastener.
   ③ Detach the rubber holders.



6. Remove 2 screws at condenser (Fig. 10)

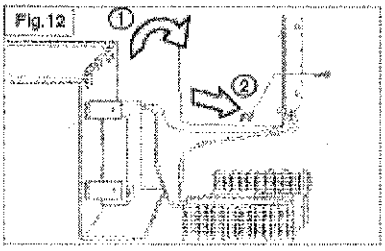


7. Remove 4 screws at the plate of the compressor (Fig. 11).



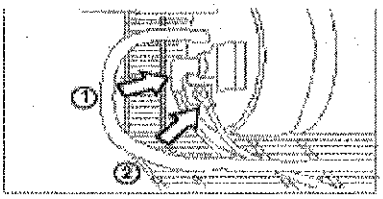
8. Pull out Cooling Unit (Fig. 12)

   ① Take out Cooling Unit from the cabinet.
   ②Remove the screw which holds thermister.



9. Pull out the input cord from the compressor.
   (Fig. 13)

① Pull out the positive side.
② Pull out the negative side.



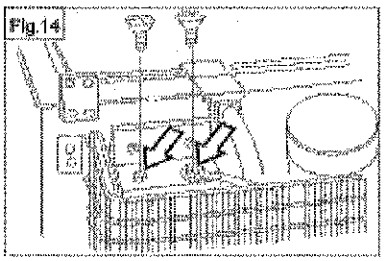
【Replacement of Power Supply 】

1. Remove the door (Fig. 5)

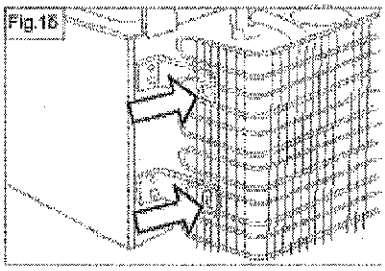
2. Remove the motor coverFig. 6)

3. Remove the case cover (Fig. 7)

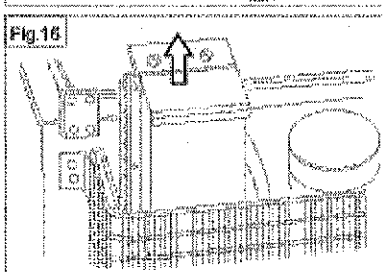
4. Remove the screws at Power Supply (Fig. 14)



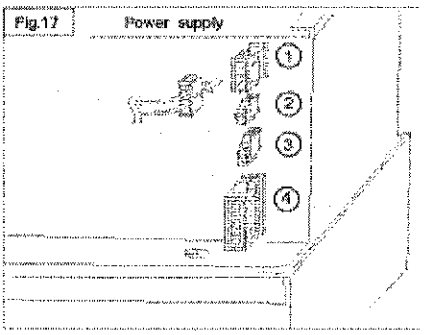
5. Unfasten the 2 screws at condenser (Fig. 15)



6. Pull out Power Supply towards the top (Fig. 16)



7. Pull out all the couplers at Power Supply (Fig. 17)



① Motor input coupler
② Fan motor coupler
③ Thermister coupler
④ Control assy coupler

8. Remove Power Supply from cover (Fig. 18)

9. Remove earth connection (Fig. 18)