

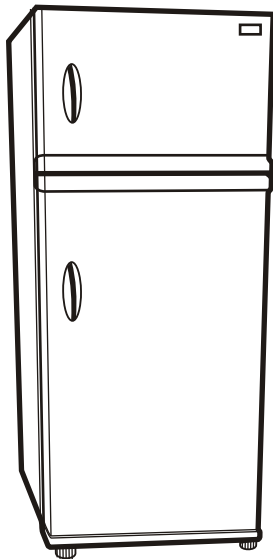


Icebeam
Door Cooling



ELECTRONIC REFRIGERATOR SERVICE MANUAL

CAUTION
BEFORE SERVICING THE UNIT, READ THE "SAFETY
PRECAUTIONS" IN THIS MANUAL



**MODEL : GL/GR- S392DM
GL/GR- S432DM**

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SAFETY PRECAUTIONS

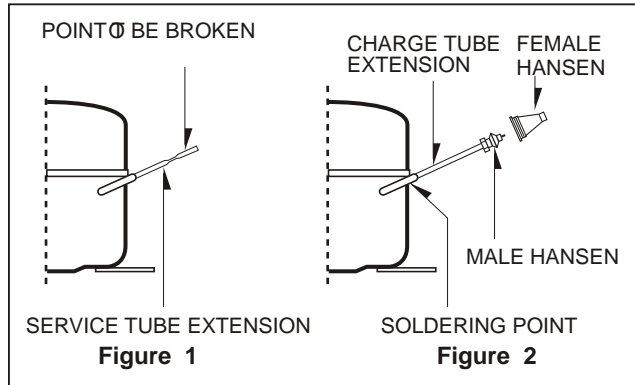
Please read the followings before servicing your refrigerator.

1. Check if an electric leakage occurs in the set.
2. To prevent electric shock, unplug prior to servicing.
3. In case of testing with power on, wear rubber gloves to prevent electric shock.
4. If you use any appliances, check regular current, voltage and capacity.
5. Don't touch metal products in cold freezer with wet hand . It may cause frostbite.
6. Prevent water flowing to electric elements in mechanical parts.
7. When you stand up during observing the lower part with the upper door open, move with care to prevent head wound which may happen by hitting the upper door.
8. When sloping the set, remove any materials on the set, especially thin plate type. (ex.: glass shelf or books.)
9. When servicing evaporator part, wear cotton gloves without fail. It is to prevent wound by sharp fin of evaporator.
10. Leave a breakage of refrigerating cycle to a heavy service center. The gas in cycle inside may soil ambient air.

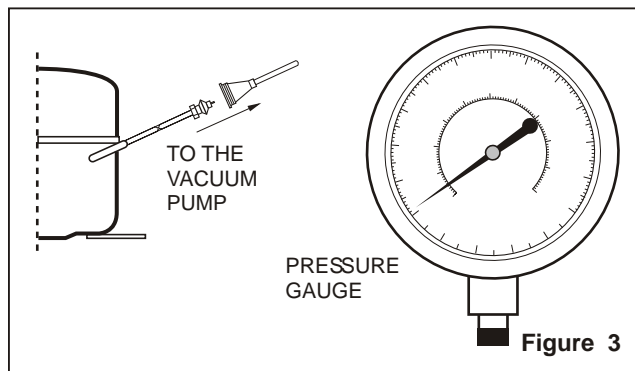
SERVICING PRECAUTIONS

RECHARGING IN COMPRESSOR

Test the refrigeration system by connecting it electrically before refilling operation. It is necessary to ascertain the function of the motor-compressor and identify the defects immediately. If defects have been found, empty the old system of possible R134a residue by breaking off the end of the extension piece at its narrow point. (Figure 1) Replace the filter and any damaged components. Unsolder and pull off the piece remaining inside the service tube and then attach an complete extension completely with male Hansen and at last, solder it to the same tube again (Figure 2)



It is necessary to execute the soldering operation with valve open so that the fumes caused by oil residue can come out freely without blowholes between two tubes during the heating of the point to be soldered. The extension fitted with the male Hansen is connected to the female fitting of the vacuum pump tube. (Figure 3)



Air evacuating from the system begins as soon as the pump starts. The refrigeration system must be kept under vacuum until the reading on the low-pressure gauge indicates vacuum (0 absolute, -1 atm., -760 Hg) in any case it is advisable to keep the pump running for about 30 minutes. (Figure 3)

In case that a considerable leakage occurs it will be necessary to stop the vacuum pump and to add a small quantity of Freon to the system, if vacuum should not be obtained (pressure gauge can't fall to 1 atmosphere), start the refrigeration unit and find the leakage with the special leak-finder. When the defective soldering point is visible, re-do it after opening the extension tube valve and reestablishing the normal outside pressure inside the group.

Because the melted alloy is sucked into the tubes and block them, the pressure must be rebalanced when vacuum is in the system in soldering. As soon as the

vacuum operation is over, add the quantity in grams of R134a to the refrigeration system. Remember that every system has an exact quantity of R134a with a tolerance of ± 5 grams that can be added. (Figure 4)

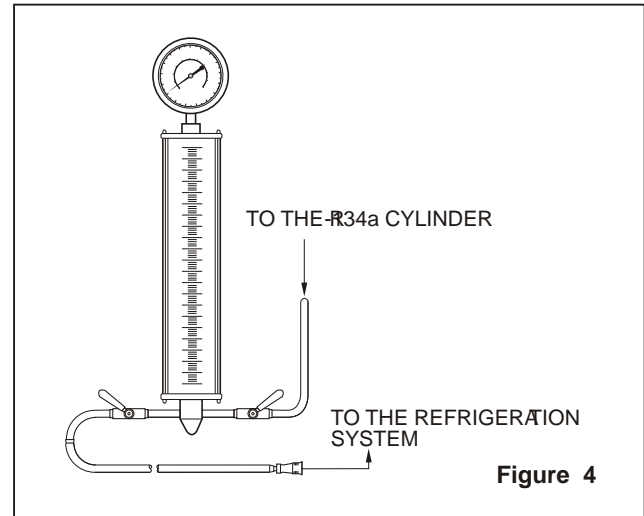


Figure 4

Before performing this operation (if the vacuum pump and refilling cylinder are connected), make sure that the valve placed between the vacuum pump and the refilling tube are closed in order to keep the Freon for addition to the system. (Figure 5)

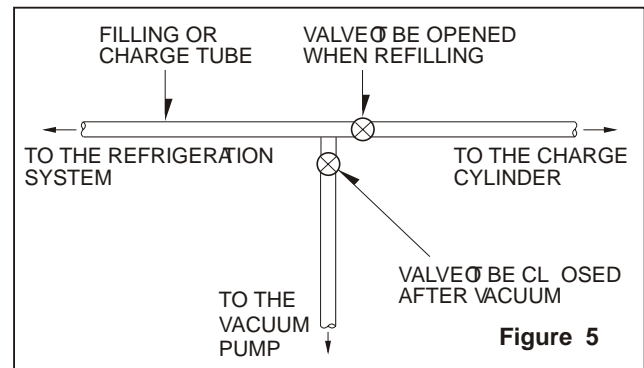


Figure 5

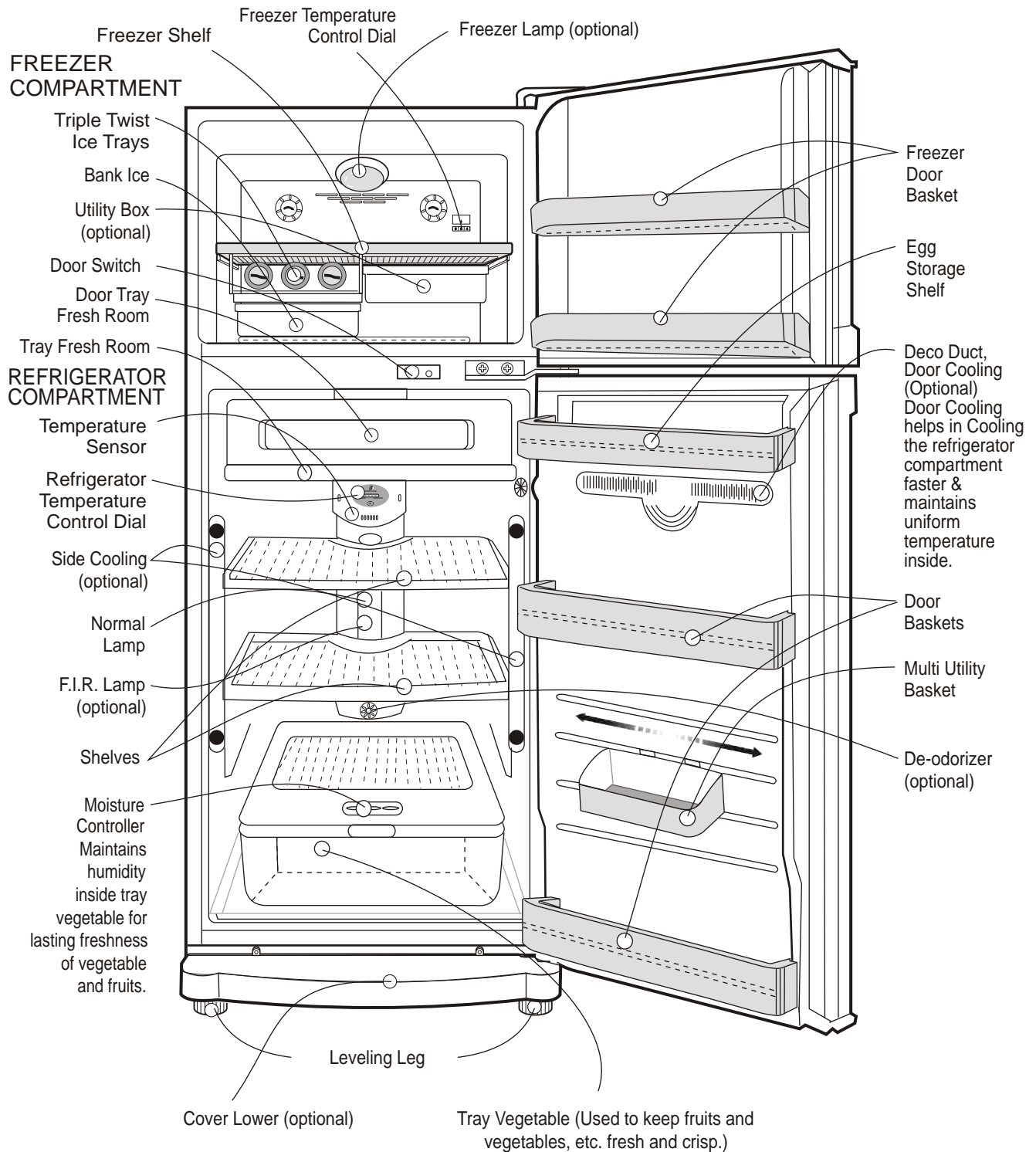
In addition, check the graduated scale on the cylinder for the quantity of R134a to be added, for example, if we have 750 grams of Freon in the cylinder and must add 165 grams to the group, this amount will be reached when R134a has dropped to 585 grams, remembering that the indicator shows a lower limit of meniscus. Do this after choosing the scale corresponding to the gas pressure different scales reported as the same gas pressure indicated by the pressure gauge on the top of the column. To make R134a flow into the system, open the valve placed at the base of the cylinder and connected to the filling tube. The amount of Freon cannot be added to the system all at once because it may cause a blocking of motor-compressor. Therefore, proceed by adding the original quantity of about 20-30 grams and close the valve immediately.

The pressure rises and the motor compressor must start sucking the gas and lowering the pressure again. Regulate the valve again, maintaining the same manner until reaching to the quantity of R134a established for the system being charged. When the system is running, the suction pressure must be stabilized between 0.30 to 0.6 atmosphere.

1. SPECIFICATIONS

SPECIFICATION				
Model Number			GL-S392DM	GL-S432DM
			GR-S392DM	GR-S432D M
			PCM	PCM
Dimension (mm)	Net	Width	640	640
		Height	1680	1832
		Depth	730	730
		Weight(Kg)	69	73
		Gross Capacity (Lit)	350	390
General features	Temp. Control	Electronic	✓	✓
	Display	Internal	✓	✓
	Temp. function	Icebeam Door Cooling	✓	✓
		Door Cooling	✓	✓
	Memory Back-up		✓	✓
	Super Cool		✓	✓
	Fuzzy Logic		✓	✓
	Key & Lock		✓	✓
Refrigerator Compartment	Air Flow	Multi-Flow	✓	✓
		Z4 Flow	✓	✓
	Shelf	Crystal	✓	✓
	Door Basket	Transparent	✓	✓
		2 ltr Bottle Storage	✓	✓
	Fresh Zone	Tray Fresh Room	✓	✓
	Lamp	Normal	✓	✓
	Vegetable Tray	Normal	One	One
		Humidity Controller	✓	✓
	Deodoriser		✓	✓
	FIR Lamp		No	No
	Egg Tray		✓	✓
Freezer Compartment	Shelf	Wire	✓	✓
	Door Basket	Transparent	✓	✓
	Ice Maker	Triple Twist Ice Tray	✓	✓
External	Door Finish	PCM	✓	✓
		Super Inox, Super White, Bright Silver	✓	✓
	Handle	Delta Type	✓	✓
Miscellaneous	Compressor	P.T.C. Starting Type	✓	✓

1. PARTS IDENTIFICATION

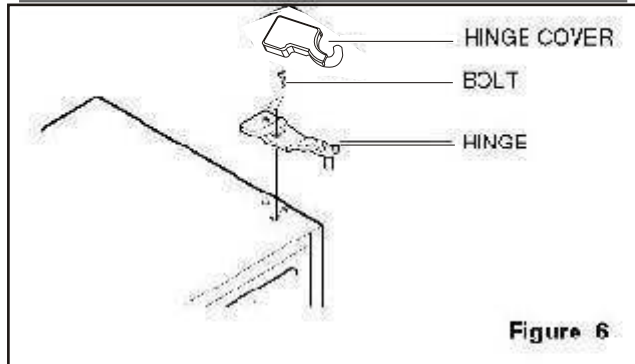


3. DISASSEMBLY

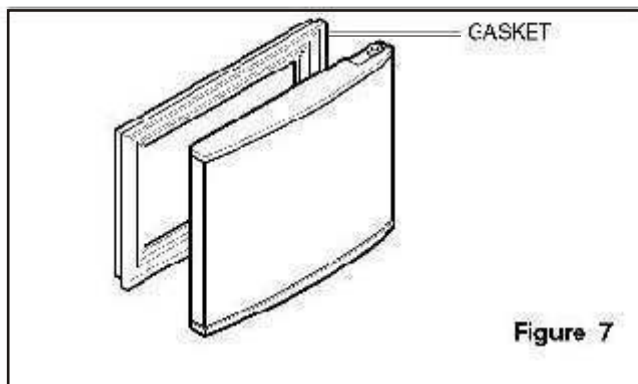
3-1 DOOR

I Freezer Door

1. Remove the hinge cover by pulling it upwards .
2. Loosen hexagonal bolts fixing the upper hinge to the body and lift the freezer door.

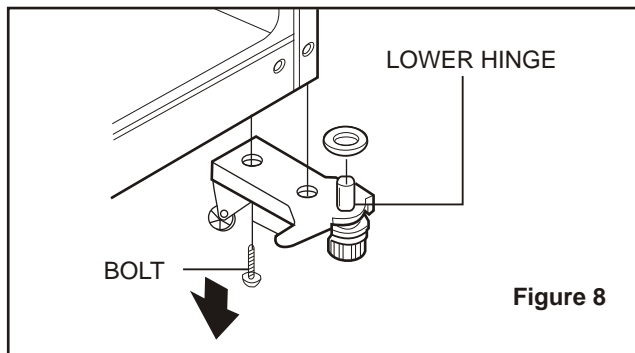


3. Pull out the door gasket to remove from the door foam Ass'y



I Refrigerator Door

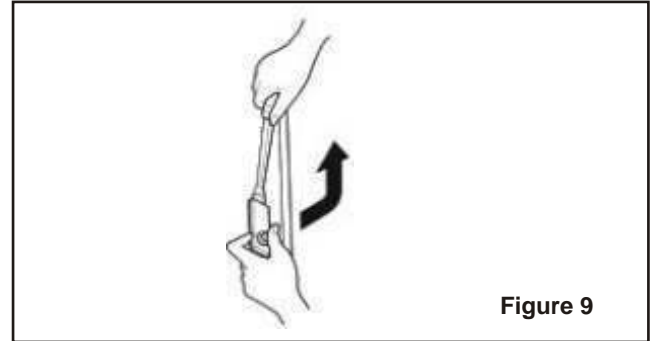
1. Loosen hexagonal bolts fixing the lower hinge to the body to remove the refrigerator door only.



2. Pull out the door gasket to remove from the door foam Ass'y

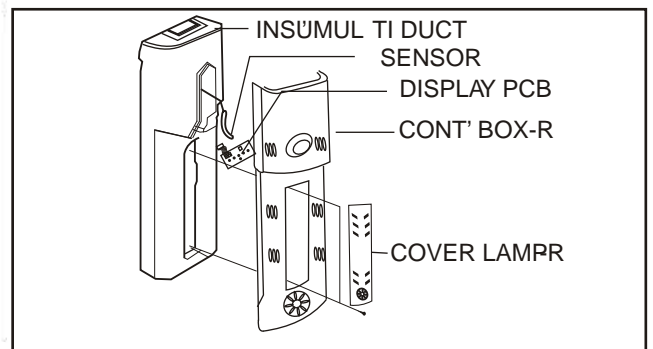
3-2 DOOR SWITCH

1. To remove the door switch, pull out it with a '—' type driver as shown in (Figure 9).
2. Disconnect the lead wire from the switch.



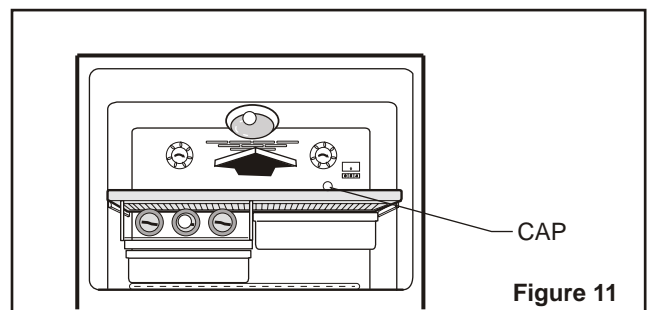
3-3 SENSOR & DISPLAY PCB

1. Remove the cover Lamp-R by the use of '—' type driver inserting in the low holes of the cover.
2. Loose 2 screw.
3. Pull the Control Box-R.
4. Disconnect the Housing of lead wire.
5. Separate the INSU'Multi Duct and Control Box-R.
6. Remove the cotton tape and foam PU.
7. Disconnect the lead wire.
8. Separate the sensor & display PCB

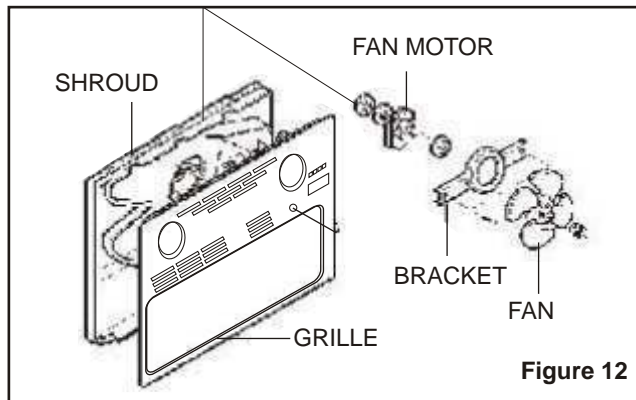


3-4 FAN AND FAN MOTOR

1. Remove the freezer shelf assembly.
2. Loosen 1 cap screw fixing the Grille Fan.
3. Pull out the Grille Fan and Shroud-F.



6. Disconnect the housing of lead wire.
7. Separate the Fan Assy.
8. Loose 2 screw fixed to the Bracket.
9. Pull out Shroud-F remove the Fan Motor Assy.
10. Separate the Motor Bracket and Rubber.



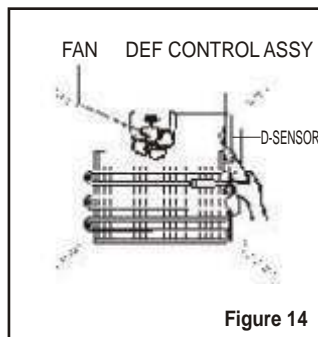
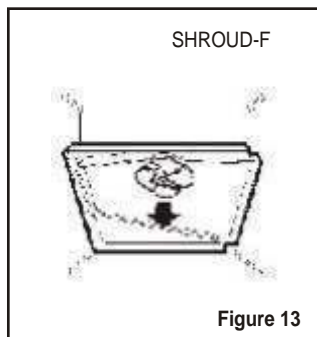
3-5 DEF' CONTROL ASSY

Def control Assy consists of Defrost Thermostat and FUSE-M. Defrost Thermostat functions to defrost automatically and it is attached to metal side of the Evaporator and senses Temp.

Fuse-M is a kind of safety device for preventing over-heating of the Heater when defrosting.

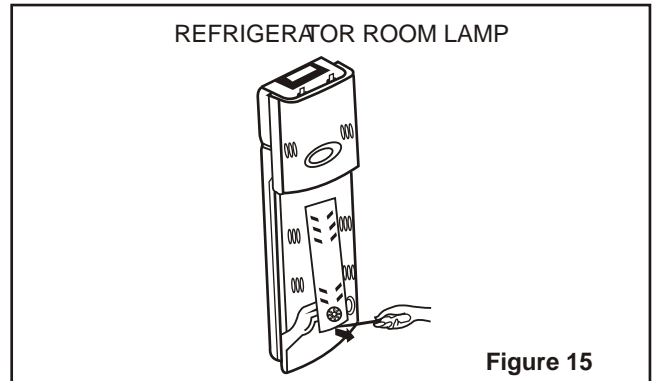
At the temperature of 77°C, it stops the emission of heat from the heater.

1. Pull out the Shroud after removing the Grille.
2. Separate the connector connected with the Def Control Assy and replace the Def Control Assy after cutting the Tie Wrap and removing the Holder Fuse. (Figure 14)



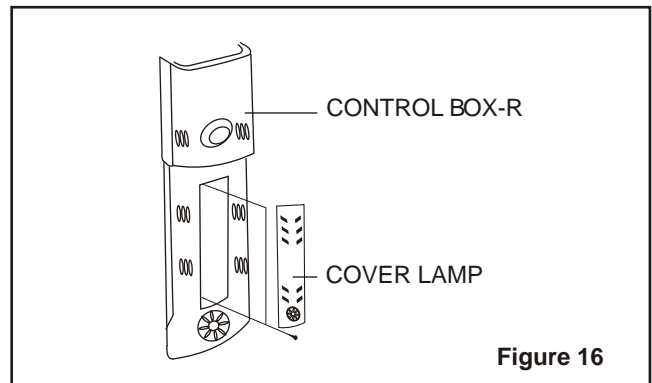
3-6 REFRIGERATOR ROOM LAMP

1. Remove the cover lamp-R by pulling with a (-)' type driver.
2. Remove the lamp , vacuum & lamp , FIR by turning.



3-7 CONTROL BOX-R

1. Remove the Cover Lamp-R. by pulling with a (-) type driver



2. Loosen 2 screws.
3. Pull the Control Box-R.
4. Separate the lead wire Housing.

4-3 OLP (OVER LOAD PROTECTOR)

4-3-1 Definition of OLP

- (1) OLP (OVERLOAD PROTECTOR) is attached to Hermetic Compressor and protects Motor by cutting off current in Compressor Motor by Bimetal in the OLP in case of over-rising temperature.
- (2) When over-voltage flows to Compressor motor, Bimetal works by heating the heater inside OLP and OLP protects Motor by cutting off current which flows to Compressor Motor.

4-3-2 Role of OLP

- (1) OLP is attached to Hermetic Compressor used to Refrigerator and Show Case and prevents Motor Coil from being started in the Compressor.
 - (2) Do not turn the Adjust Screw of OLP in any way for normal operation of OLP.
- (Composition and connection Diagram of OLP)

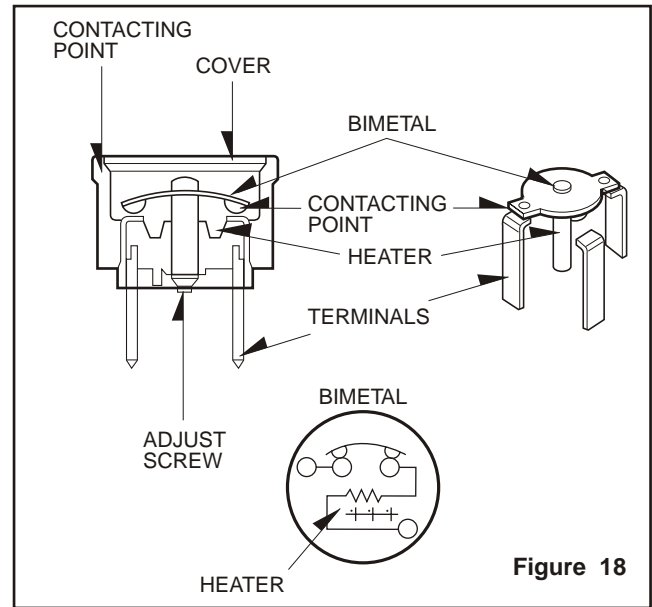
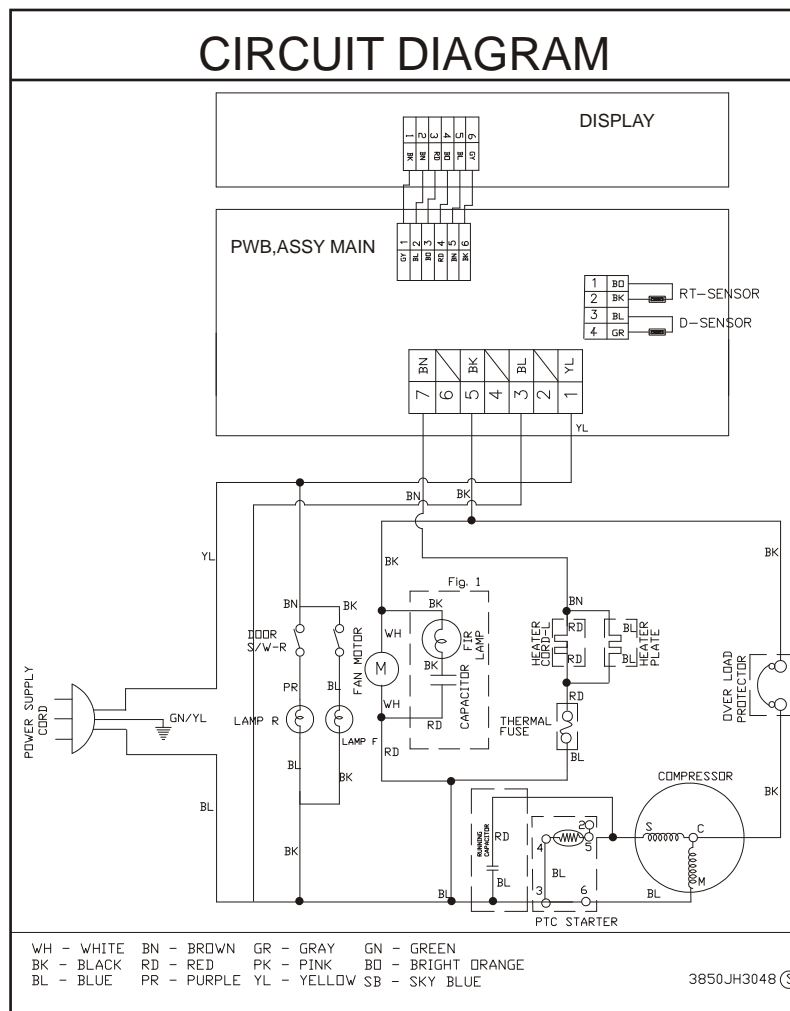


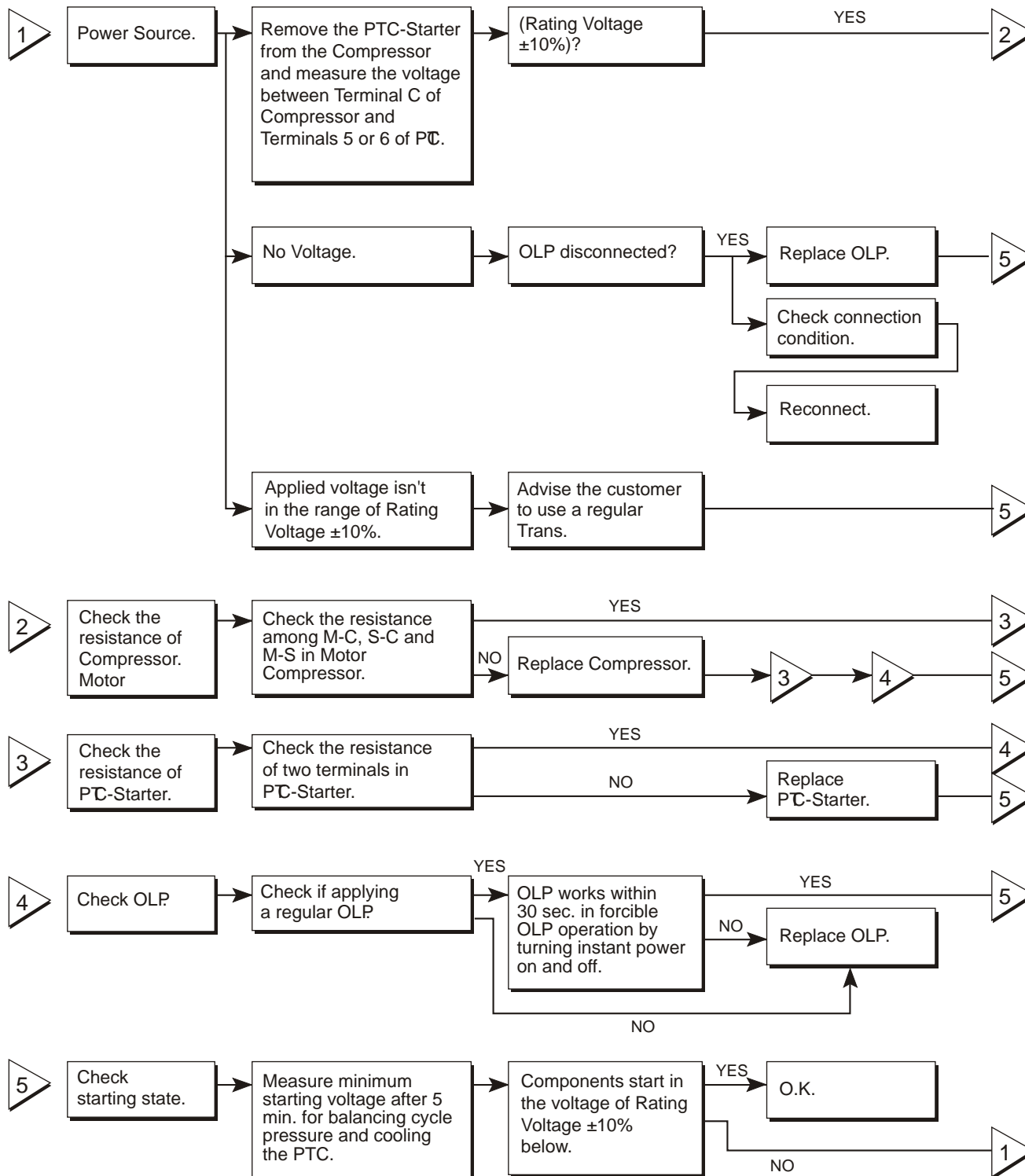
Figure 18

5. CIRCUIT DIAGRAM

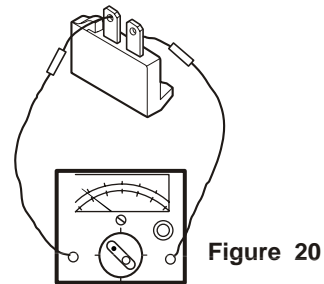
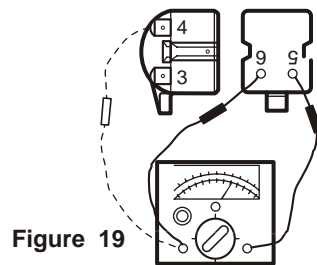
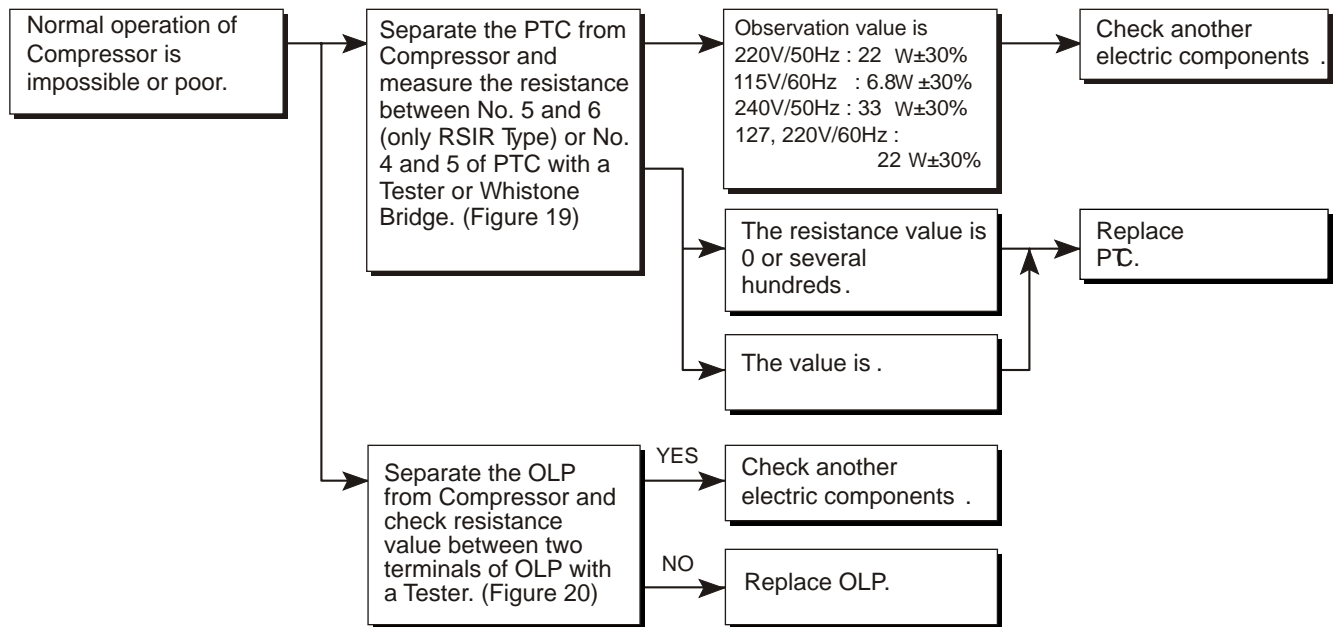


6. TROUBLESHOOTING

6-1 COMPRESSOR AND ELECTRIC COMPONENTS

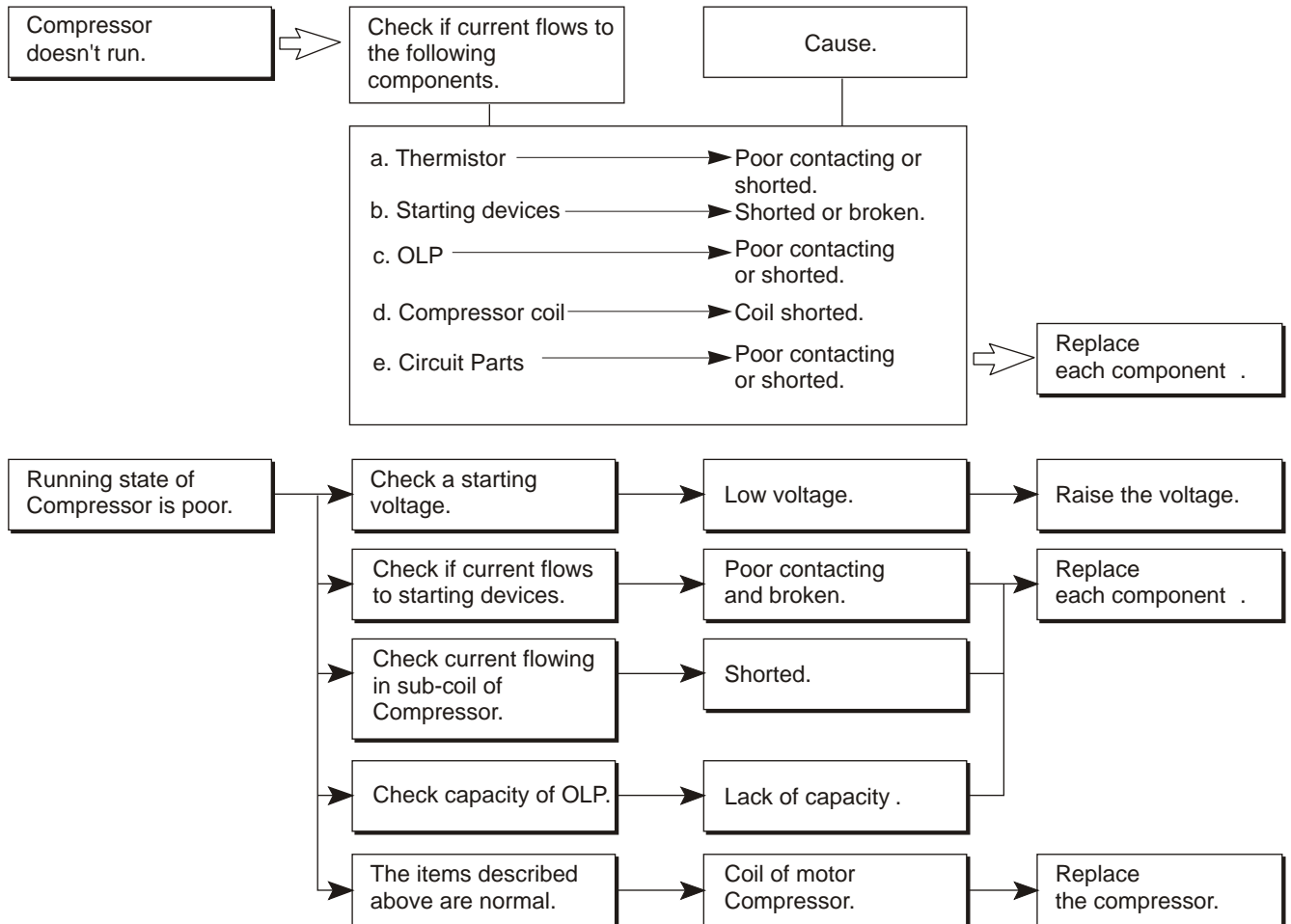


6-2 PTC AND OLP

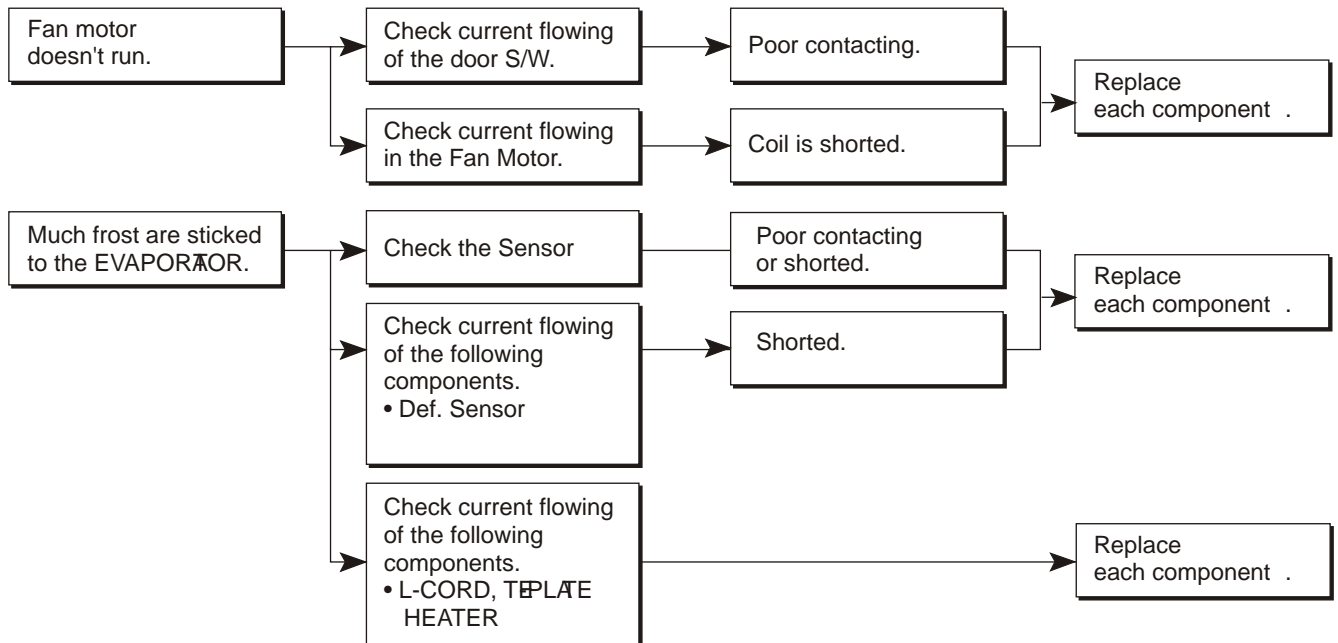


6-3 OTHER ELECTRIC COMPONENTS

▼ Cooling is impossible



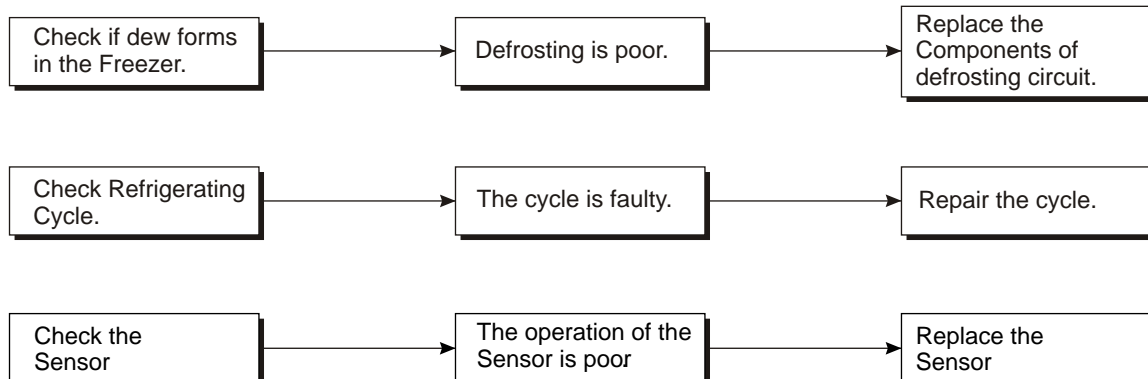
▼ Cooling ability is poor



6-4 SERVICE DIAGNOSIS CHART

COMPLAINT	POINTS TO BE CHECKED	REMEDY
Cooling is impossible.	<ul style="list-style-type: none"> Is the power cord unplugged from the outlet? Check if the power S/W is set to OFF. Check if the fuse of power S/W is shorted. Measure the voltage of power outlet . 	<ul style="list-style-type: none"> Plug to the outlet. Set the switch to ON. Replace a regular fuse. If voltage is low, wire newly.
Cooling ability is poor.	<ul style="list-style-type: none"> Check if the set is placed close to wall . Check if the set is placed close to stove , gas cooker and direct rays. Is the ambient temperature high or the room door closed? Check if putting in hot foods . Did you open the door of the set too often or check if the door is closed up? Check if the Control is set to "Cold". 	<ul style="list-style-type: none"> Place the set with the space of about 10cm . Place the set apart from these heat appliances. Make the ambient temperature below. Put in foods after they get cold. Don't open the door too often and close it firmly. Set the control to mid-position. (3LEDs are on)
Foods in the Refrigerator are frozen.	<ul style="list-style-type: none"> Are foods placed in cooling air outlet? Check if the Display LED is set to "Coldest". Is the ambient temperature below 5°C? 	<ul style="list-style-type: none"> Place foods in high temperature section . (Front Part) Set the Display LED to "Mid". (3 LEDs are on) Set the Display LED to "Cold".
Dew or ice forms in the chamber of the set.	<ul style="list-style-type: none"> Is watery foods kept? Check if putting in hot foods . Did you open the door of the set too often or check if the door is closed up. 	<ul style="list-style-type: none"> Seal up watery foods with wrap. Put in foods after they get cold. Don't open the door too often and close it firmly.
Dew forms in the Out Case.	<ul style="list-style-type: none"> Check if ambient temperature and humidity of surrounding air are high. Is the gap in the door packed? 	<ul style="list-style-type: none"> Wipe dew with a dry cloth. This happening is solved in low temperature and humidity naturally. Fill up the gap.
Abnormal noise generates.	<ul style="list-style-type: none"> Is the set positioned in a firm and even place? Does any unnecessary objects exist in the back side of the set? Check if the Drip Tray is not firmly fixed. 	<ul style="list-style-type: none"> Adjust the Adjust Screw, and position in the firm place. Remove the objects. Fix it firmly on an original position.
To close the door is not handy.	<ul style="list-style-type: none"> Check if the door packing becomes dirty Is the set positioned in a firm and even place? Is too much food putted in the set? 	<ul style="list-style-type: none"> Clean the door packing . Position in the firm place and adjust the Adjust Screw. Keep foods not to reach the door.
Ice and foods smell unpleasant.	<ul style="list-style-type: none"> Check if the inside of the set becomes dirty. Did you keep smelly foods without wrapping? It smells plastic. 	<ul style="list-style-type: none"> Clean the inside of the set. Wrap smelly foods. The new products smell plastic, but it is removed after 1-2 weeks.

- In addition to the items described left, refer to the followings to solve the complaint.



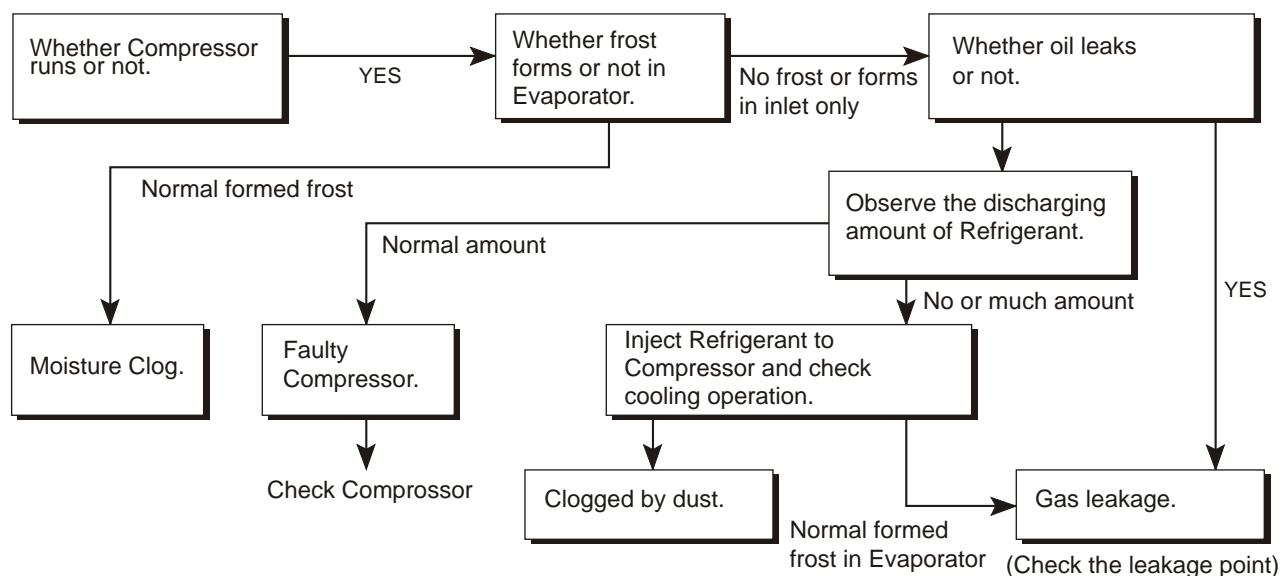
6-5 REFRIGERATING CYCLE

▼ Troubleshooting Chart

CAUSE		STATE OF THE SET	STATE OF THE EVAPORATOR	TEMPERATURE OF THE COMPRESSOR	REMARKS
LEAKAGE	PARTIAL LEAKAGE	Freezer and Refrigerator don't get cold normally.	Low flowing sound of Refrigerant is heard and frost forms in inlet only	A little high more than ambient temperature.	<ul style="list-style-type: none"> A little Refrigerant discharges. Normal cooling is possible when injecting Refrigerant of regular amount.
	WHOLE LEAKAGE	Freezer and Refrigerator don't get cold at all.	Flowing sound of Refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	<ul style="list-style-type: none"> No discharging of Refrigerant. Normal cooling is possible when injecting Refrigerant of regular amount.
CLOGGED BY DUST	PARTIAL CLOG	Freeze room and Refrigerator don't get cold normally.	Flowing sound of Refrigerant is heard and frost forms in inlet only.	A little high more than ambient temperature.	<ul style="list-style-type: none"> Normal discharging of refrigerant. The capillary tube is faulty.
	WHOLE CLOG	Freezer and Refrigerator don't get cold.	Flowing sound of Refrigerant is not heard and frost isn't formed.	Equal to ambient temperature.	<ul style="list-style-type: none"> Normal discharging of Refrigerant.
MOISTURE CLOG		Cooling operation stops periodically.	Flowing sound of Refrigerant is not heard and frost melts.	Low than ambient temperature	<ul style="list-style-type: none"> Cooling operation restarts when heating the inlet of capillary tube.
DEFECTIVE COMPRESSION	COMP-RESSION	Freezer and Refrigerator don't get cold.	Low flowing sound of Refrigerant is heard and frost forms in inlet only.	A little high than ambient temperature.	<ul style="list-style-type: none"> The pressure of high pressure part in compressor is low.
	NO COMP-RESSION	No compressing operation.	Flowing sound of Refrigerant is not heard and no frost.	Equal to ambient temperature.	<ul style="list-style-type: none"> No pressure of high pressure part in compressor.

▼ Leakage Detection

Observe discharging point of refrigerant which may be in oil discharging part in compressor and hole of evaporator.




▼ General Control of Refrigerating Cycle

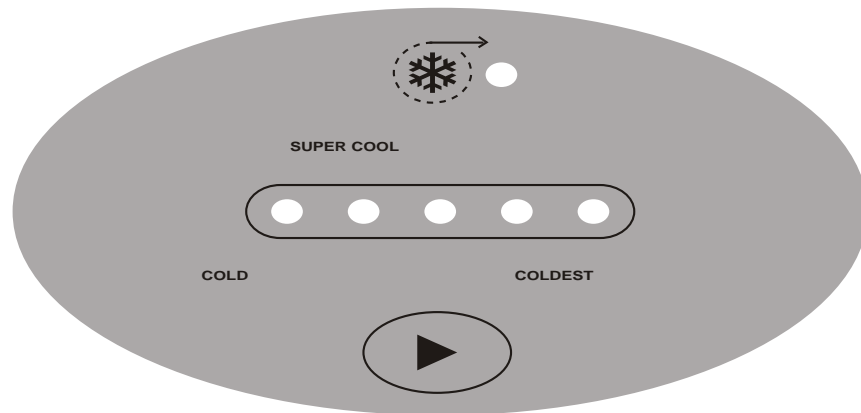
NO.	ITEMS	CONTENTS AND SPECIFICATIONS	REMARKS
1	WELDING ROD	(1) H 30 <ul style="list-style-type: none"> • Chemical Ingredients Ag: 30%, Cu: 27%, Zn: 23%, Cd: 20% • Brazing Temperature: 710~840 °C (2) Bcup-2 <ul style="list-style-type: none"> • Chemical Ingredients Cu: About 93% P: 6.8~7.5% The rest: within 0.2% • Brazing Temperature: 735~840 °C 	<ul style="list-style-type: none"> • Recommend H34 containing 34% Ag in the Service Center.
2	FLUX	<ul style="list-style-type: none"> • Ingredients and how to make Borax 30% Borax 35% Fluoridation kalium: 35% Water: 4% Mix the above ingredients and boil until they are transformed into liquid. 	<ul style="list-style-type: none"> • Make amount for only a day. Holding period: 1 day • Close the cover of container to prevent dust putting in the FLUX. • Keep it in a stainless steel container.
3	DRIER ASM	(1) Assemble the drier within 30min. after unpacking. (2) Keep the unpacked drier at the temperature of 80~100°C.	<ul style="list-style-type: none"> • Don't keep the drier in a outdoor because humidity damages to it.
4	VACUUM	(1) When measuring with pirant Vacuum gauge of charging M/C , vacuum degree is within 1 Torr. (2) If the vacuum degree of the cycle inside is 10 Torr. below for low pressure and 20 Torr. for high pressure, it says no vacuum leakage state. (3) Vacuum degree of vacuum pump must be 0.05 Torr. below after 5 min. (4) Vacuum degree must be same to the value described item (2) above for more than 20 min.	<ul style="list-style-type: none"> • Apply M/C Vacuum Gauge without fail . • Perform vacuum operation until a proper vacuum degree is built up. • If a proper vacuum degree isn't built up , check the leakage from the Cycle Pipe line part and Quick Coupler Connecting part.
5	DRY AND AIR NITROGEN GAS	(1) The pressure of dry air must be more than 12~16Kg/cm ² (2) Temperature must be more than -20~-70°C. (3) Keep the pressure to 12~6Kg/cm ² also when substituting dry air for Nitrogen Gas.	
6	NIPPLE AND COUPLER	(1) Check if gas leaks with soapy water. (2) Replace Quick Coupler in case of leak age.	<ul style="list-style-type: none"> • Check if gas leaks from connecting part of Coupler.
7	PIPE	<ul style="list-style-type: none"> • Put all Joint Pipe in a clean box and cover tightly with the lid so that dust or humidity is not inserted. 	

7. DESCRIPTION OF FUNCTION & CIRCUIT OF MICOM

7-1 FUNCTION

7-1-1 FUNCTION

1. When the appliance is plugged in , it is set to 'Normal' (3 LEDs are on)As we press the  button LEDs glow from cold to coldest.
2. When the power is initially applied or restored after a power failure, it is automatically restored the previous settings because a Memory Back-up is provided for all settings.



Temp Control	Low	Medium/ Low	Medium	Medium/ High	High
TEMP(°C)	6	5	3	2	0
ROOM	REFRIGERATOR				

7-1-2 SUPER COOL

1. This feature is to shorten the cooling time of the refrigerator by keeping the comp , fan running for a while. When the Super Cool button is pushed, the Super Cool LED turns on in order and the comp keeps on running. In 2 hours, the Super Cool mode will be cleared . For latter settings, LED continue to glow for half hour mode, though internally the machine behaves at previous refrigerator notch value .
2. When the Defrosting mode starts while in the Super Cool mode, defrosting is performed. After that, the Super Cool mode resumes for the remaining time.
3. When the Super Cool button is pushed while in the Defrosting mode, the Super Cool mode starts in 7 minutes after the completion of the defrosting even though the Super Cool LED turns on.
4. If a power failure occurs while in the Super Cool mode, the Super Cool mode will be cancelled when the power is restored.
5. If the Super Cool mode is selected when it has not passed 7 minutes since the comp stopped , the comp will ~~stt~~ running after the remaining time elapses.

7-1-3 CONTROL OF COOLING FAN IN THE FREEZER COMPARTMENT

1. A fan motor in the freezer compartment is provided which operate continuously as long as compressor operates.
2. The fan motor is stoped as compressor stoped.

7-1-4 DEFROSTING

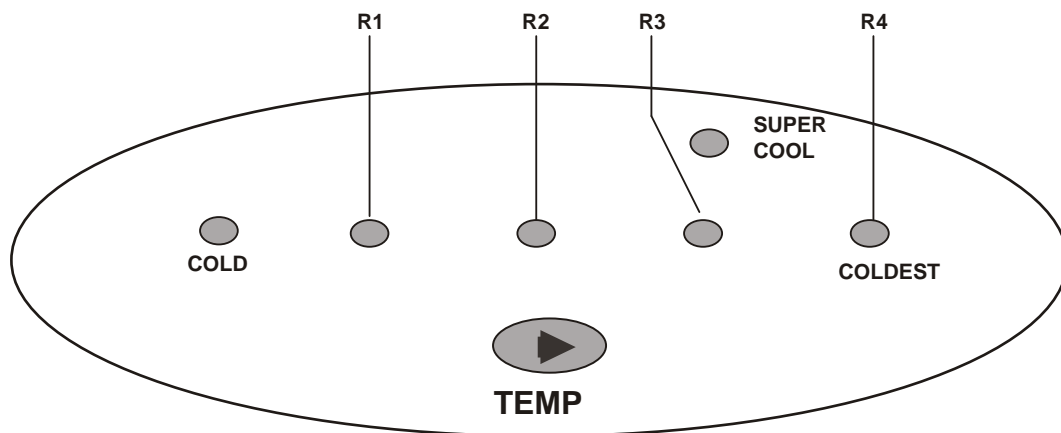
1. The defrosting is performed each time when the total running time of the compressor reaches 8 hours .
2. After the power is turned on (or restored after a power failure), the defrosting starts when the total running time of the compressor reaches 4 hours.
3. When the temperature of the defrosting sensor reaches 13 °C or above, the defrosting stops. If the temperature does not reach 13 °C in 2 hours after the defrosting starts, machine will come out of defrost cycle and report defrost failure . (Refer to 7-1-10. Error Diagnostic Mode.)
4. With the defective defrosting sensor (cut or short-circuited wire), the defrosting will not be performed.

7-1-5 SEQUENTIAL OPERATION OF ELECTRIC COMPONENTS

The electric components, such as the comp, defrosting heater , and cooling fan , start sequentially to avoid the noise and damage to the part , which may result from the simultaneous start of various components on turning the power on or after the completion of a test .

Condition of Operation		Operating Sequence			
When the power is turned on	If refrigerator compartment temperature is sensed greater than 25°C (First time plugged; long time disconnected and plug again)	POWER ON	in 0.5 sec →	COMP ON	in 0.5 sec → COOLING FAN ON
	If refrigerator compartment temperature is sensed lower than 25°C and unplugged the refrigerator and plug again for test defrost on line production ir service.	POWER ON	in 0.5 sec →	DEFROSTING HEATER ON	in 10 sec → DEFROSTING HEATER OFF
			in 0.5 sec →	COMP ON	in 0.5 sec → COOLING FAN ON
When returned from the Test mode		ALL LOADS OFF	in 7 min →	COMP ON	in 0.5 sec → COOLING FAN ON

7-1-6 ERROR MODE INDICATION :



○ Operate Normal

#	Item	Error Code display	Defect Information	Operation with Error	
		R1 R2 R3 R4		Comp	DF Heater
1	Faulty R sensor	○ ● ○ ○	The R sensor is open or short circuit	15 Min ON/ 15 Min OFF	○
2	Faulty D sensor	○ ○ ● ○	The D. sensor is open or short circuit.	○	No Defrost
3	Defrost problem	● ● ● ● ● ON ○ Off	The defrost time is >2 hrs and the temperature is not 13℃ in evaporator area.	○	○

ERRORS EXPLANATION

1. When 2 error are present at the same time, the Micom only shows one on display.
2. When fix all error the Micom reset the refrigerator and work normally at Last Notch.
No backup for super cool.
3. During the error, Switch does not work, Setting change not possible. However the Key recognition beep sounds.
4. When the Refrigerator is in test mode and one error occur at that moment, the Micom finish the test Mode.
5. If the Refrigerator is working at Max/Mid/min. Notch and one error occurs.
When the problem is solved, the Micom reset the refrigerator to start work at the Max/Mid/Min. Notch resp.

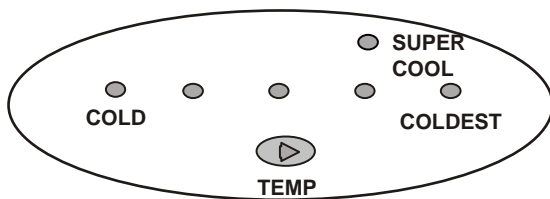
7-1-7 SEQUENTIAL OPERATION :

Function	Sequence	Remarks
R Temperature sensed is $>25^{\circ}\text{C}$ (first time plugged, long time disconnected and Plugged again)	<pre> graph LR A[Power ON] -- 0.5 sec. --> B[Comp. and FAN ON] </pre>	
R Temperature Sensed is lower than 25°C and unplugged the Refrigerator and plug again for Test Defrost on line Production, or service .	<pre> graph LR A[Power ON] -- 0.5 sec. --> B[Electric heater ON] B -- 10 sec --> C[Electric heater OFF] C -- 0.5 sec. --> D[Comp. and FAN ON] </pre>	

7-1-8 TEST MODE

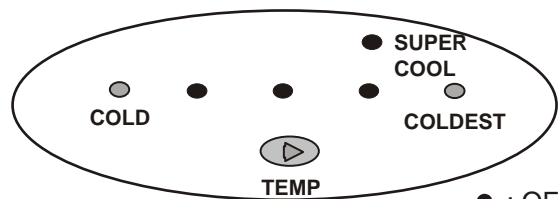
- The Test Mode is useful for checking functionality also helps to find out the defective part in case of fault.
- The Test Key is on Main PCB, The Test Mode will be clear in 2 Hrs. After Test Mode, System Reset is must .
- During Test Mode if any error is detected, the error code is displayed and Test Mode is cleared.
- If an error code is displayed, Test Mode can not be active even if Test Button is pushed.

Mode	Operation	Contents	Remarks
TEST 1	Push the Test Key Once.	<ul style="list-style-type: none"> •Continuous comp . And Freezer fan Operation. •Defrost Heater OFF. •All Display LED ON 	
TEST 2	Push the Test Key Once in Test Mode 1.	<ul style="list-style-type: none"> •Comp . And Freezer fan OFF •Defrost Heater ON. •All Display LED Except Refrigerator temp status LEDs off. 	Reset if the temp. of The defrost sensor is 10 ⁰ C or above.
Reset	Push the Test Key Once in Test Mode 2.	Reset to the Previous Setting.	Comp. Will start in 7 Min delay.



All Display LED ON

Display Status : Test Mode 1

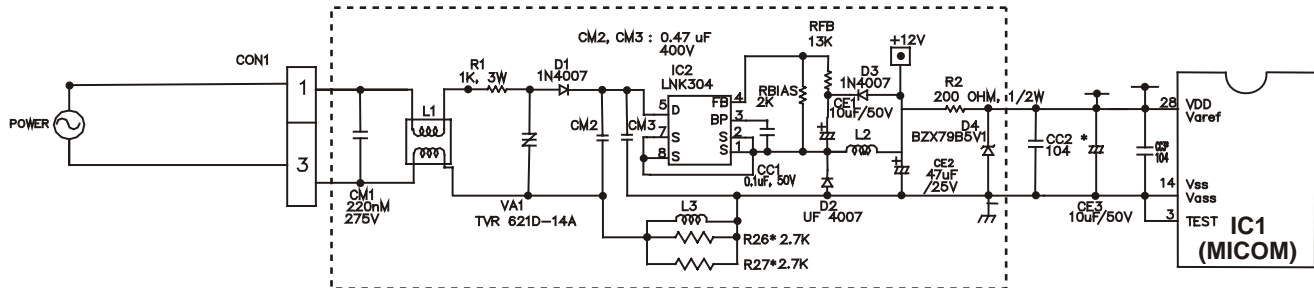


● : OFF

Display Status : Test Mode 2

7-2 PCB FUNCTION

7-2-1 POWER CIRCUIT



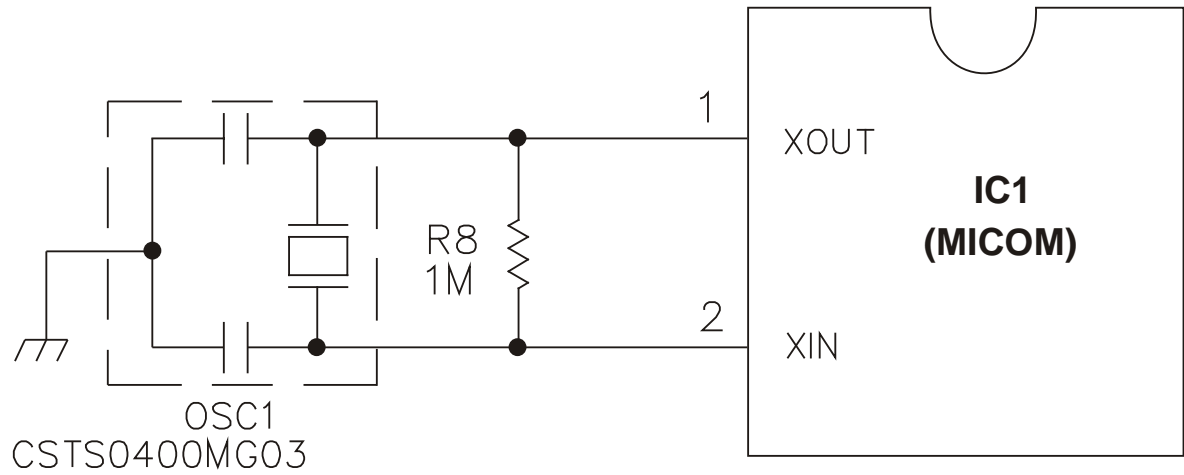
The secondary part of the TRANS is composed of the power supply for the display and relay and that for the MICOM and IC (5Vdc).

The voltage for each part is as follows.

PART	CM1	CE2	CE3
VOLTAGE	220V (AC)	12V	5V

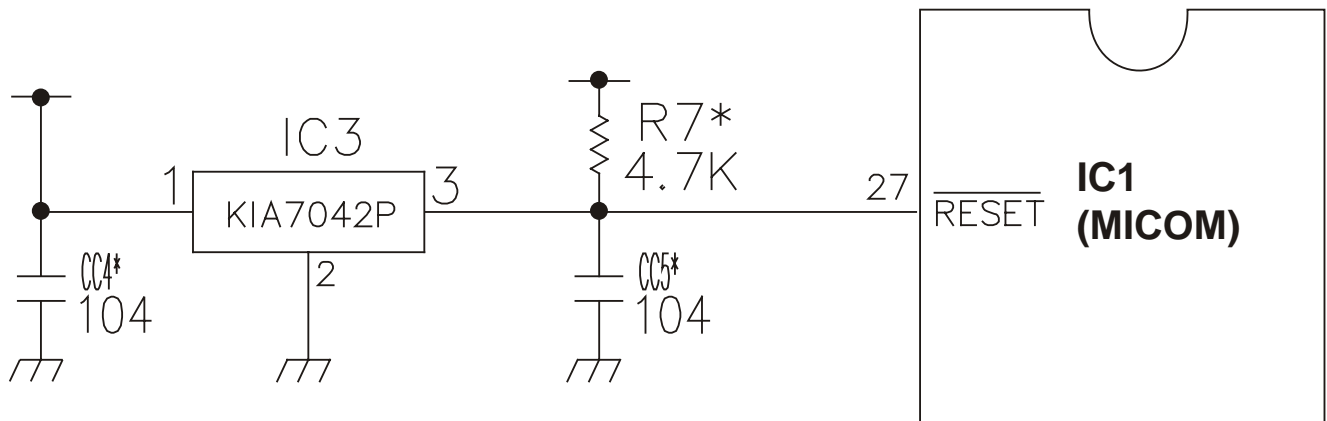
VA1 is a part for preventing the over voltage and noise. When 385V or higher power is applied, the inside elements are short-circuited and broken, resulting in the blowout of the fuse in order to protect the elements of the secondary part of the TRANS.

7-2-2 OSCILLATION CIRCUIT



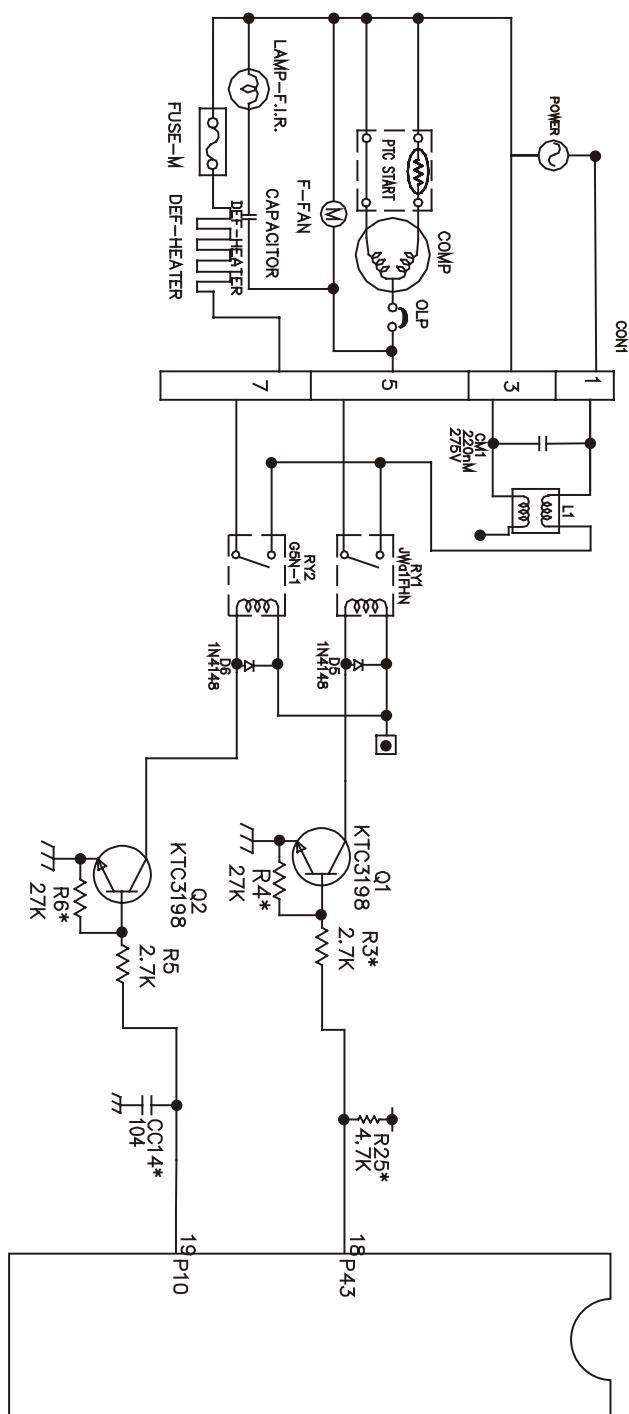
This circuit is to generate the base clock for calculating time and the synchro clock for transmitting data from and to the inside logic elements of the IC1(MICOM). Be sure to use the authentic parts since the calculating time by the IC1 may be changed or it will not work if the OSC1 SPEC is changed.

7-2-3 RESET CIRCUIT



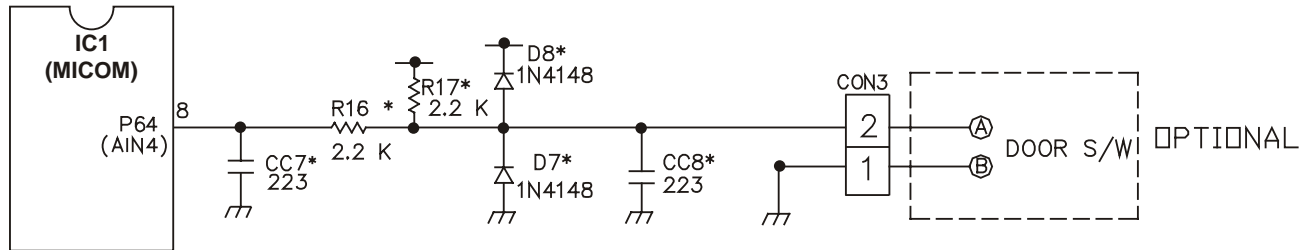
The RESET circuit is for allowing all the functions to start at the initial conditions by initializing various parts including the RAM inside the MICOM (IC1) when the power is initially supplied or the power supply to the MICOM is restored after a momentary power failure. For the initial 10ms of power supply, 'LOW' voltage is applied to the MICOM RESET terminal. During a normal operation, 5V is applied to the RESET terminal (If a trouble occurs in the RESET line, the MICOM will not work.)

1. Load Drive Condition Check



Load Type		Compressor	Defrosting Heater
Measurement Location		Q1 Collector	Q2 Collector
Condition	ON	1V or Below	
	OFF	12V	

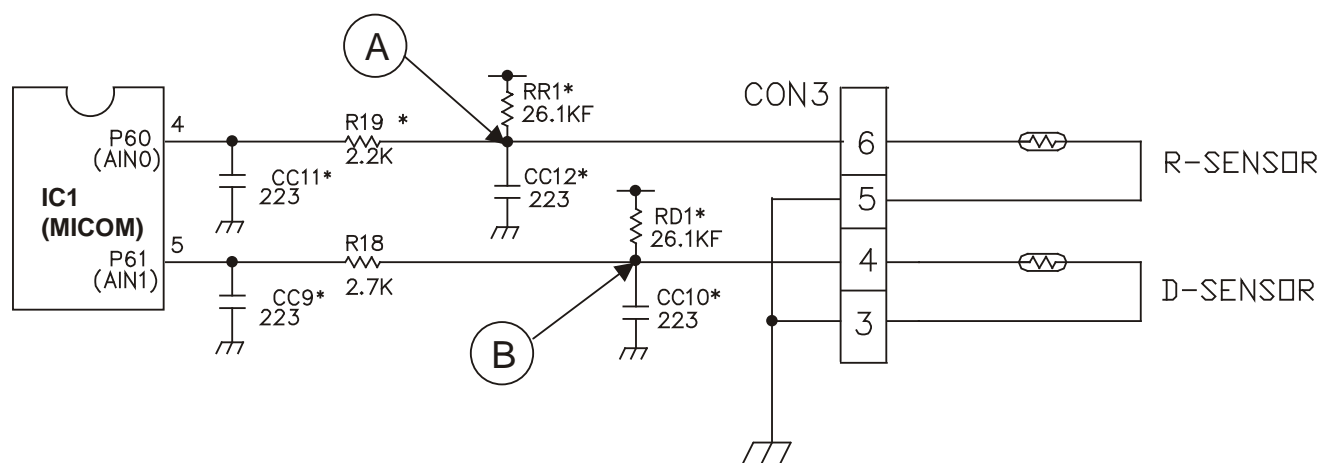
2. Open Door Detection Circuit Check



Freezer/ Refrigerator Door	Measurement Location	(PIN NO. 8)
Closed		0 V
Open		5 V

7-2-5 TEMPERATURE SENSOR CIRCUIT

<LED MODEL>

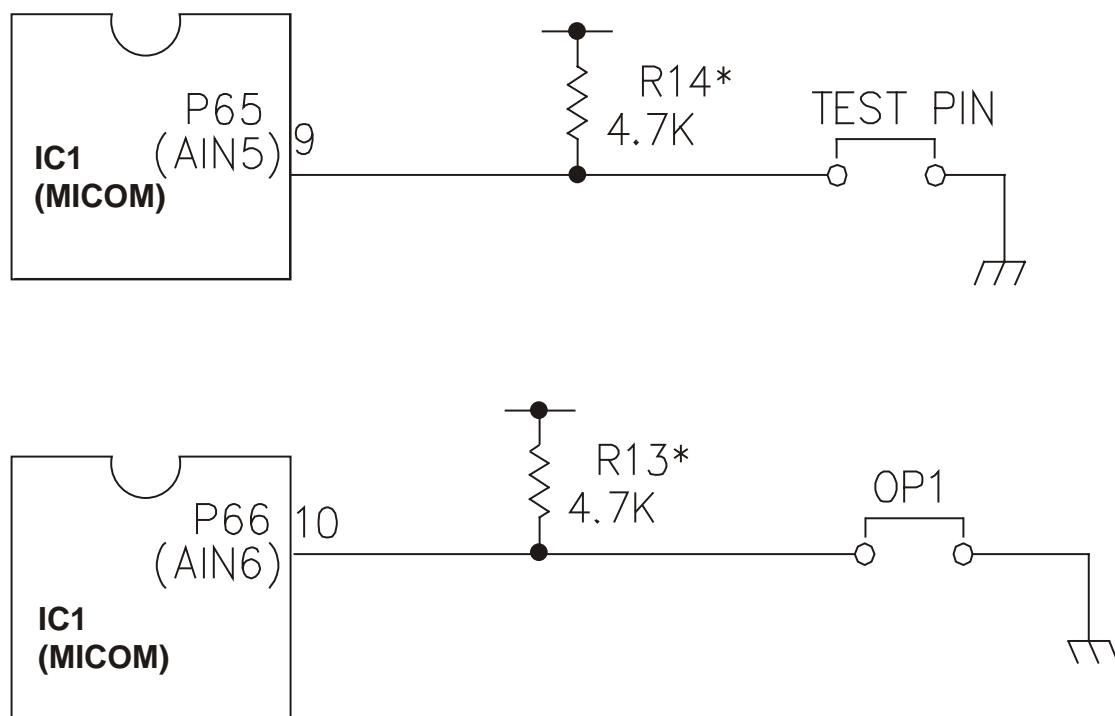


The upper CIRCUIT reads REFRIGERATOR temperature, and DEF-SENSOR temperature for defrosting and the indoor temperature for compensating for the surrounding temperature, into MICOM. OPENING or SHORT state of each TEMPERATURE SENSOR are as follows

SENSOR	CHECK POINT	NORMAL(-30 °C ~ 50 °C)	SHORT-CIRCUITED	OPEN
Refrigerator Sensor	POINT (A) Voltage	0.5 V ~ 4.5 V	0 V	5 V
Defrosting Sensor	POINT (B) Voltage			


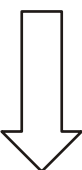
7-2-6 SWITCH INPUT CIRCUIT

* The circuit shown below is the input circuit to detect the signals of the test S/W for checking the refrigerator.



7-2-7 TEMPERATURE COMPENSATION & OVERCOOLING/UNDERCOOLING COMPENSATION CIRCUIT



Refrigerator		REMARKS
Value R(RCR1)	Temp. Compensate.	
180 K ohms	+ 2.5	
56 K ohms	+ 2.0	
33 K ohms	+ 1.5	
18 K ohms	+ 1.0	
12 K ohms	+ 0.5	
10 K ohms	0	Tem. Std.
8.2 K ohms	-0.5	
5.6 K ohms	-1.0	
3.3 K ohms	-1.5	
2 K ohms	-2.0	
470 ohms	-2.5	

♦ Table of Temperature Compensation by adjusting the resistance (Difference with the current temperature)
 E.g.) If the refrigerator compensation resistance (RCR) is changed from 10K (the current resistance) to 18K (the adjustment resistance), the temperature of the refrigerator rises +1 °C.

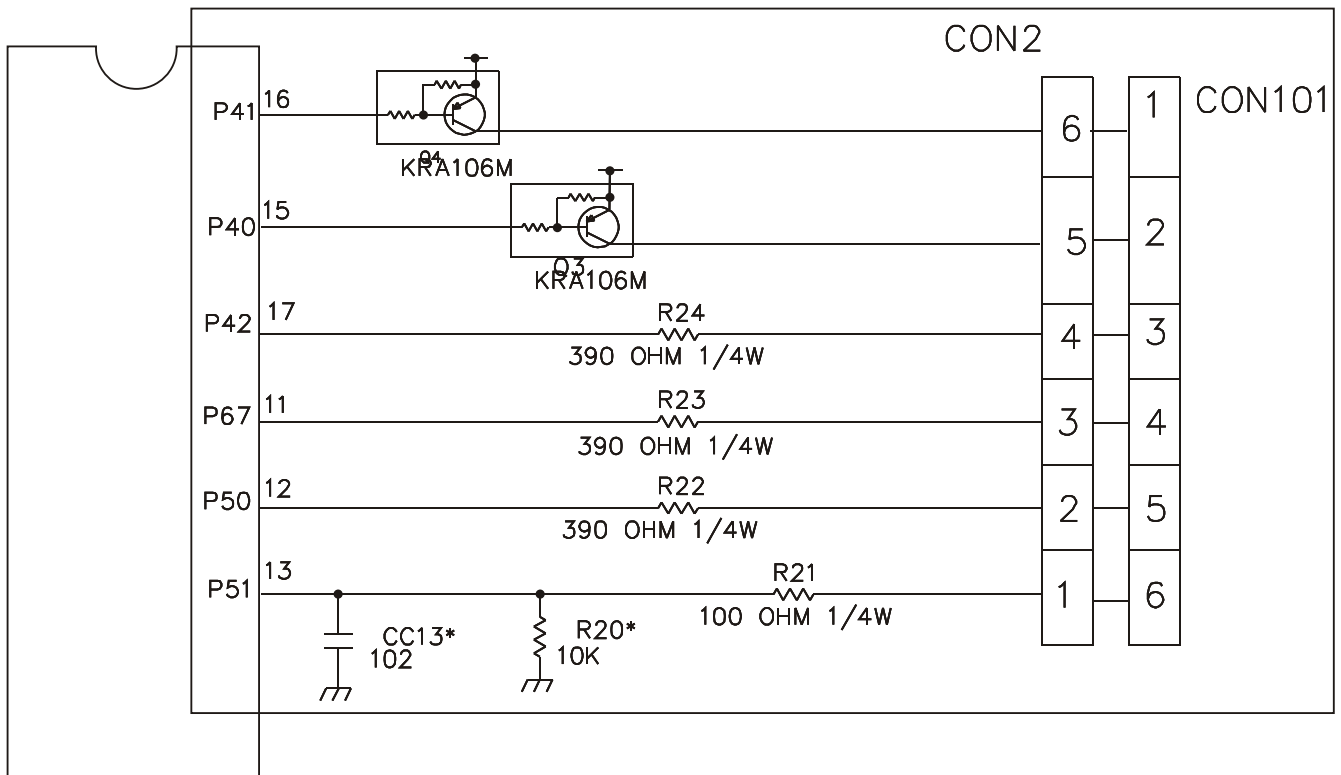
Warm Compensation

Cold Compensation

- This circuit is aimed to input the necessary temperature compensation values into the MICOM in order to adjust the refrigerator temperature which is different in each model .

7-2-8 KEY BUTTON INPUT & DISPLAY LIGHT ON CIRCUIT

The circuit shown above is to determine whether a function control key on the operation display is pushed and to turn on the corresponding function indication LED (LED Module). The drive type is the scan type.



7-3. RESISTANCE SPECIFICATION OF SENSOR

TEMPERATURE SENSOR	RESISTANCE OF REFRIGERATOR (DEFROST) SENSOR
- 20 °C	77 K W
- 15 °C	60 K W
- 10 °C	47.3 K W
- 5 °C	38.4 K W
0 °C	30 K W
+ 5 °C	24.1 K W
+ 10 °C	19.5 K W
+ 15 °C	15.9 K W
+ 20 °C	13 K W
+ 25 °C	11 K W
+ 30 °C	8.9 K W
+ 40 °C	6.2 K W
+ 50 °C	4.3 K W

- The resistance of SENSOR has + 5% common difference.
- Measure the resistance of SENSOR after leaving it over 3 minutes in measuring temperature
This postponing is necessary because of perceiving speed .

7-4. TROUBLE SHOOTING

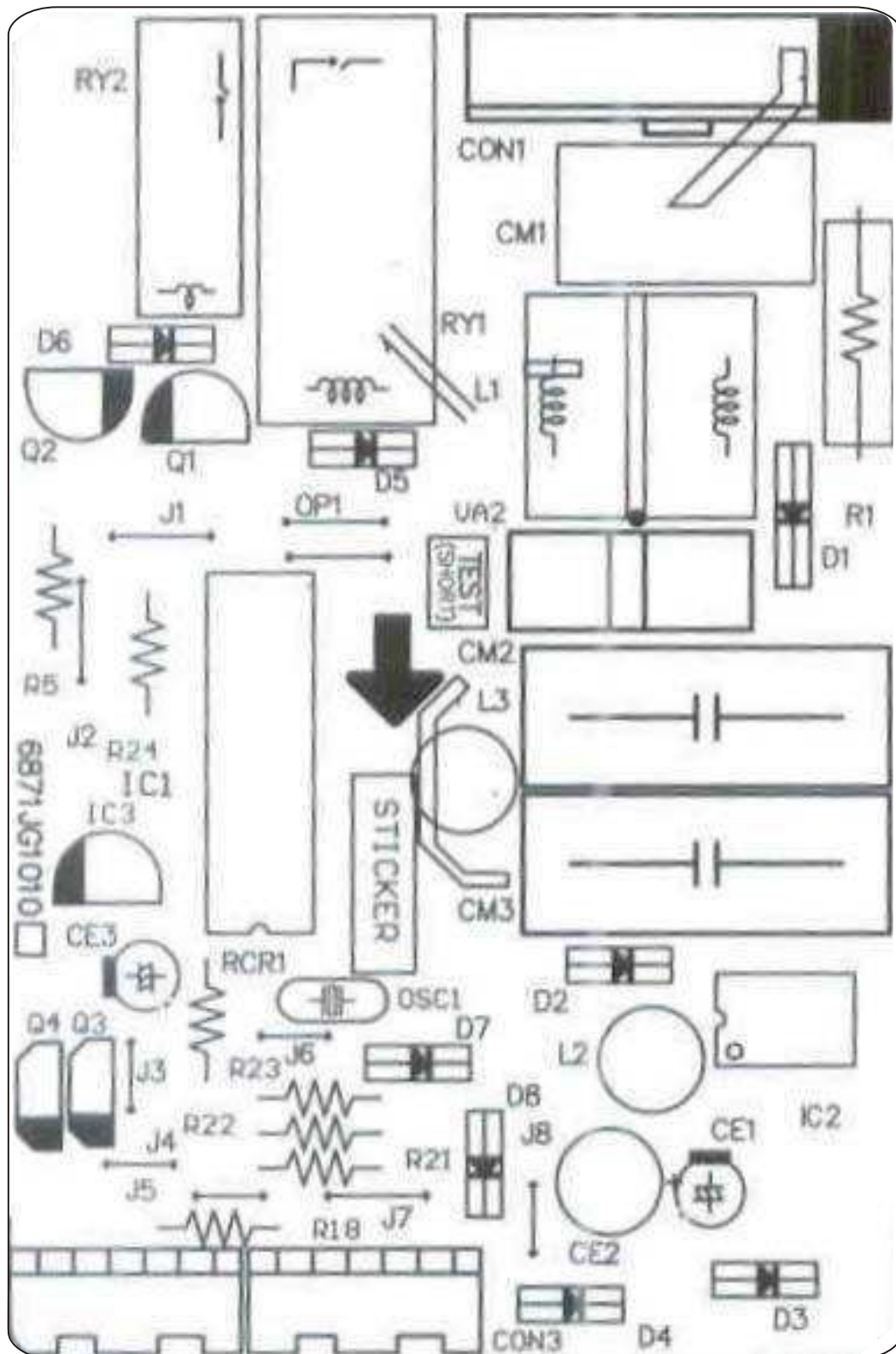
- Replace PCB when no trouble after checking the contents of trouble.

CLASSIFICATION	STATE OF TROUBLE	POINT BE CHECKED	CHECKING METHOD	CONTENT	REMEDY
POWER SOURCE is poor	1. All the DISPLAY LEDOFF 2. DISPLAY LED represents abnormal operation.	1. FREEZER/ REFRIGERATOR	FREEZER/REFRIGERATOR DOOR OPEN	POWER SOURCE is poor	Certify Fuse. Certify outlet Voltage.
		2. LAMP is dim.	CHECK the light intensity.	Applied voltage mistake	Use boosting TRANS.
		3. Connection of MAIN PWD Connector.	Certify connection of CONNECTOR.	CONNECTOR connection is poor.	Reconnect CONNECTOR.
COOLING is poor	NO COOLING	1. COMPRESSOR operates?	Power ON the refrigerator. Check for comp ON after 10 sec.	COMPRESSOR lock or blocked.	Replace COMPRESSOR.
				OLP, PTC is poor.	Replace OLP, PTC.
				COMPRESSOR RELAY is poor	Replace MAIN PWB RY1
				THE CONNECTING WIRE is poor.	Reconnect connectors, check the connector
				Refrigerant leakage.	Remedy the leaking part and reaching Refrigerant.
FREEZER TEMPERATURE is poor		2. Whether refrigerant leaks or leaks or not.	Measure the amount of frost sticking on EVA and the surface temperature of condenser pipe.		
	1. Whether FAN MOTOR operates or not.		Power ON the refrigerator. Check for comp ON after 10 sec.	FAN MOTOR is poor	Replace FAN MOTOR.
				Compressor relay is poor	Replace MAIN PWB RY1
				CONNECTING WIRE is poor.	Reconnect connectors, check the connector
		2. DEFROSTING normal?	Certify the amount of frost sticking on EVA.	DEFROSTING is poor.	See the DEFROSTING trouble.
				SENSOR RESISTANCE is poor.	Replace SENSOR

CLASSIFICATION	STATE OF TROUBLE	POINT BE CHECKED	CHECKING METHOD	CONTENT	REMEDY
COOLING is poor.	REFRIGERATOR TEMPERATURE is poor.	1. FREEZER TEMPERATURE is normal?	See "FREEZER TEMPERATURE is poor".		Certify the attaching state of DOOR.
		2. Cool air of FAN MOTOR is sufficient?	Certify the amount of cool air and its speed touching check supplied into REFRIGERATOR	Passage of cool air blocking. EVA frozen.	Remove impurities. See "DEFROSTING is poor".
		3. Check for refrigerator sensor error	Check the error indication as per "Error mode indication".	If any error related to faulty R sensor or Faulty D sensor appears	Replace sensor as per indication
DEFROSTING is poor.	NO DEFROSTING.	1. HEATER emit heat?	Power ON the refrigerator. Check for comp ON after 10 sec.	HEATER disconnection.	Replace HEATER.
				THERMAL FUSE disconnection.	Replace THERMAL FUSE.
				DEF-SENSOR is poor.	Replace DEF-SENSOR.
				HEATER RELAY is poor.	Replace RY5 of MAIN PWB.
		2. DRAIN PIPE blocking?	Certify DRAIN PIPE.	DRAIN PIPE blocking.	Remove ice and impurities. Certify HEATER PLATE resistance.
		3. Remain ice at DEFROSTING?	Certify the attaching of DEF-SENSOR.	Attaching is poor.	Reassemble DEF-SENSOR.
			Certify the attaching state(gap) of FREEZER/ REFRIGERATOR DOOR.	DOOR sticking is poor.	Reassemble DOOR. Replace GASKET.

7-5 MAIN PWB ASS'Y AND PARTS LIST

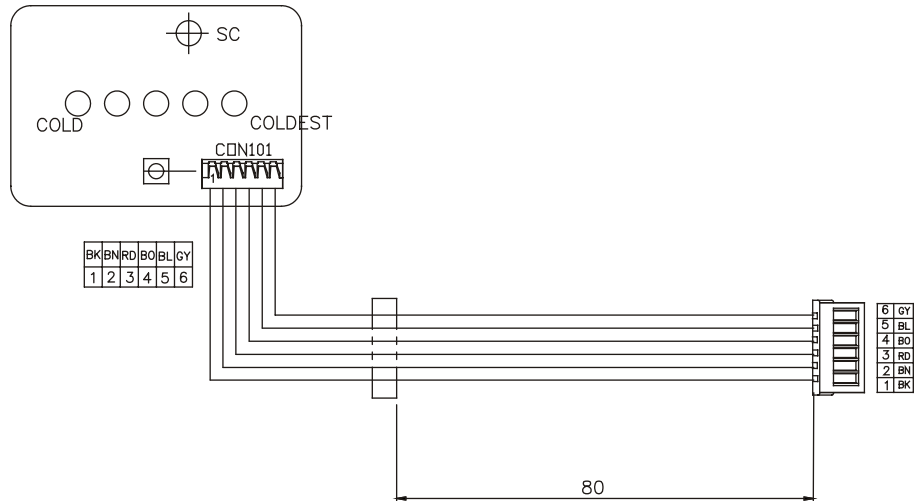
7-5-1 MAIN PWB ASS'Y



7-5-2 REPLACEMENT PARTS LIST

QTY.	NO.	PART NUMBER	DESCRIPTION	SPECIFICATION	REMARK	MAKER
2	1	0CF4741V420	CAPACITOR, FIXED FILM	0.47UF D 440V 5% M/PE BULK	CM2, CM3	VISHAY
1	2	0CE4766H638	CAPACITOR, FIXED ELECT.	47UF SMS, SG 25V 20% FM5 TP 5	CE2	SAMHWA
6	3	0CK223DK96A	CAPACITOR, FIXED CERAMIC(HIGH DIE)	22NF 2012 50V 80%, -20% R/TP X7R	CC7~CC12	SAMHWA
1	4	0CK102DK96A	CAPACITOR, FIXED CERAMIC(HIGH DIE)	1NF 2012 50V 80%, -20% R/TP X7R	CC13	SAMHWA
7	5	0CK104DK94A	CAPACITOR, FIXED CERAMIC(HIGH DIE)	100NF 2012 50V 80%, -20% R/TP F(Y5V)	CC1 ~ CC6, 14	SAMHWA
2	6	0CE1061K638	CAPACITOR, FIXED ELECTROLYTIC	10UF SM, SA 50V 20% FM5 TP 5	CE1, CE3	SAMHWA
1	7	0CQ22418670	CAPACITOR, FIXED FILM	0.22MF D 275V M M/PP NI R	CM1	PILKO
1	8	6630AQ9106C	CONNECTOR (CIRC), WAFER	YW396-07AV YEDNHD 7PIN 3.96MM STRAIGHT SN	CON1	YEDNHD
1	9	6630JB8004E	CONNECTOR (CIRC), WAFER	SMW250 YEDNHD 6P 2.5MM STRAIGHT SN	CON2	YEDNHD
1	10	0DD400709CB	DIODE, RECTIFIERS	UF4007 G.I TP D0204AL 1000V 1A 30A 75NS 10UA	D2	VISHAY
2	11	0DRSB00029A	DIODE, RECTIFIERS	1N4007 VISHAY TP D041 1000V 1.0A 30A 0SEC 30UA	D1, D3	VISHAY
1	12	0DZGS00039A	DIODE, ZENERS	BZX55C5V1, GENERAL SEMICONDUCTOR, TP, D035 1/2 W 5.1V 80mA OPF	D4	VISHAY
1	13	6200JB8003A	FILTER (CIRC), NOISE	3A 3MH 250V CV430030	L1	TNC
1	14	0IPMG00026A	IC, POWER MANAGEMENT	LNK304 POWER INTEGRATION 7 PIN BK SWITCHING IC	IC2	POWER INT.
1	15	0IKE704200A	IC, KEC	KIA7042P KEC 3P BK RESET	IC3	KEC
1	16	0IRH934600D	IC, ROHM	BR93LC46RF -W 8PIN SDP BK EEPROM	IC4	ROHM
1	17	0LR1001K400	INDUCTOR	INDUCTOR 1mH, 125A	L3	SUPREME
1	18	0ITD878090A	MICOM CHIP	IC, DRAWING	IC1	Toshiba
1	19	6920JB2003A	RELAY	G5N-1A DMRON 250VAC 1.5A 12VDC 1A JAPAN	RY2	DMRON
1	20	6920000001A	RELAY	ALE15B12 MATSUSHITA 250VAC 16A 12VDC 1A	RY1	NAIS
1	21	0RH2001L622	RESISTOR, METAL GLAZED(CHIP)	2K OHM 1 / 8 W 5% 2012 R/TP	RB1AS	SMART
1	22	0RH1302C622	RESISTOR, METAL GLAZED(CHIP)	13K OHM 1/8 W 5% 2012 R/TP	RFB	SMART
1	23	0RD2000H609	RESISTOR, FIXED CARBON FILM	200 OHM 1/2 W 5.00% TA52	R2	SMART/CHOYANG
8	24	0RH4701L622	RESISTOR, FIXED CARBON FILM	4.7K OHM 1/8 W 5% 2012 R/TP	R7, R9~R12, 13, 14, 25	ROHM
3	25	0RD3900G609	RESISTOR, FIXED CARBON FILM	390 OHM 1/4 W 5.00% TA52	R22~24	SMART
1	26	0RD1000G609	RESISTOR, FIXED METAL FILM	100 OHM 1/4 W 5.00% TA52	R21	SMART
1	27	0RW1001L600	RESISTOR, FIXED POWER COATED WW	1000 OHM 3 W 5% A	R1	RMC
2	28	0RH1002L622	RESISTOR, METAL GLAZED(CHIP)	10KOHM 1/8 W 5% 2012 R/TP	R15, R20	ROHM
1	29	0RN1002G409	RESISTOR, FIXED METAL FILM	10K OHM 1/4 W 1.00% TA26	RCR1	SMART
3	30	0RH2701L622	RESISTOR, METAL GLAZED(CHIP)	2.7K OHM 1/8 W 5% 2012 R/TP	R3, 26, 27	ROHM
2	31	0RD2701G609	RESISTOR, FIXED CARBON FILM	2.7K OHM 1/4 W 5% TA26	R5, R18	SMART
2	32	0RH2702L622	RESISTOR, METAL GLAZED(CHIP)	27000 OHM 1/8 W 5% 2012 R/TP	R4, 6	ROHM
1	33	0RH1004L622	RESISTOR, METAL GLAZED(CHIP)	1MOHM 1/8 W 5% 2012 R/TP	R8	ROHM
3	34	0RN2201E472	RESISTOR, METAL GLAZED(CHIP)	2.2K OHM 1/8 W 1% 2012 R/TP	R16, 17, R19	ROHM
2	35	0RJ2612E472	RESISTOR, METAL GLAZED(CHIP)	26.1K OHM 1/8 W 1% 2012 R/TP	RR1, RD1	ROHM
1	36	6212W5M002A	RESONATOR, CERAMIC	CST50400 MURATA 4MHZ +/-0.5% TP 15PF	OSC1	MURATA
4	37	0DD414809AA	SWITCHING DIODE	1N4148 TP26 D035 100V 450MA 2A 3NS 5UA	D5, 6, 7, 8	DELTA
2	38	0TR319809AA	TRANSISTOR, BIPOLAR	KTC3198(KTC1815) KEC TP T092 50V 150MA	Q1, Q2	KEC
2	39	0TR106009AC	TRANSISTOR, BIPOLAR	KRA106M (KRA2206) KEC TP T092M 50V 100MA	Q3, Q4	KEC
1	40	164-003G	VARIATOR	TVR 621D 14A THINKING 620V, 10%U	VA1	THINKING
1	41	6870JG1005A	PCB	XPC-FR-1 LGEIL D1-PJT	--	EPITOME
1	42	6854B50001A	JUMP WIRE	JUMP WIRE	J1~J8, DP1, Test	DAE A LEAD
--	43	49111004	SOLDER, SOLDERING	H63A	--	--
--	44	9VWF0120000	SOLDER (ROSN WIRE) RSD	D120	--	--
--	45	59333105	FLUX	SGI0.825-0.830 KOREA F.H-206	--	--
1	46	6630V9015A	CONNECTOR (CIRC), WAFER	917783-1 TYCO 5PIN, 2.5MM STRAIGHT SN	CON 3	TYCO
1	47	0LR2201K4M0	INDUCTOR, RADIAL LEAD	2200UH 10% R 10 X 16 BULK	L2	SUPREME

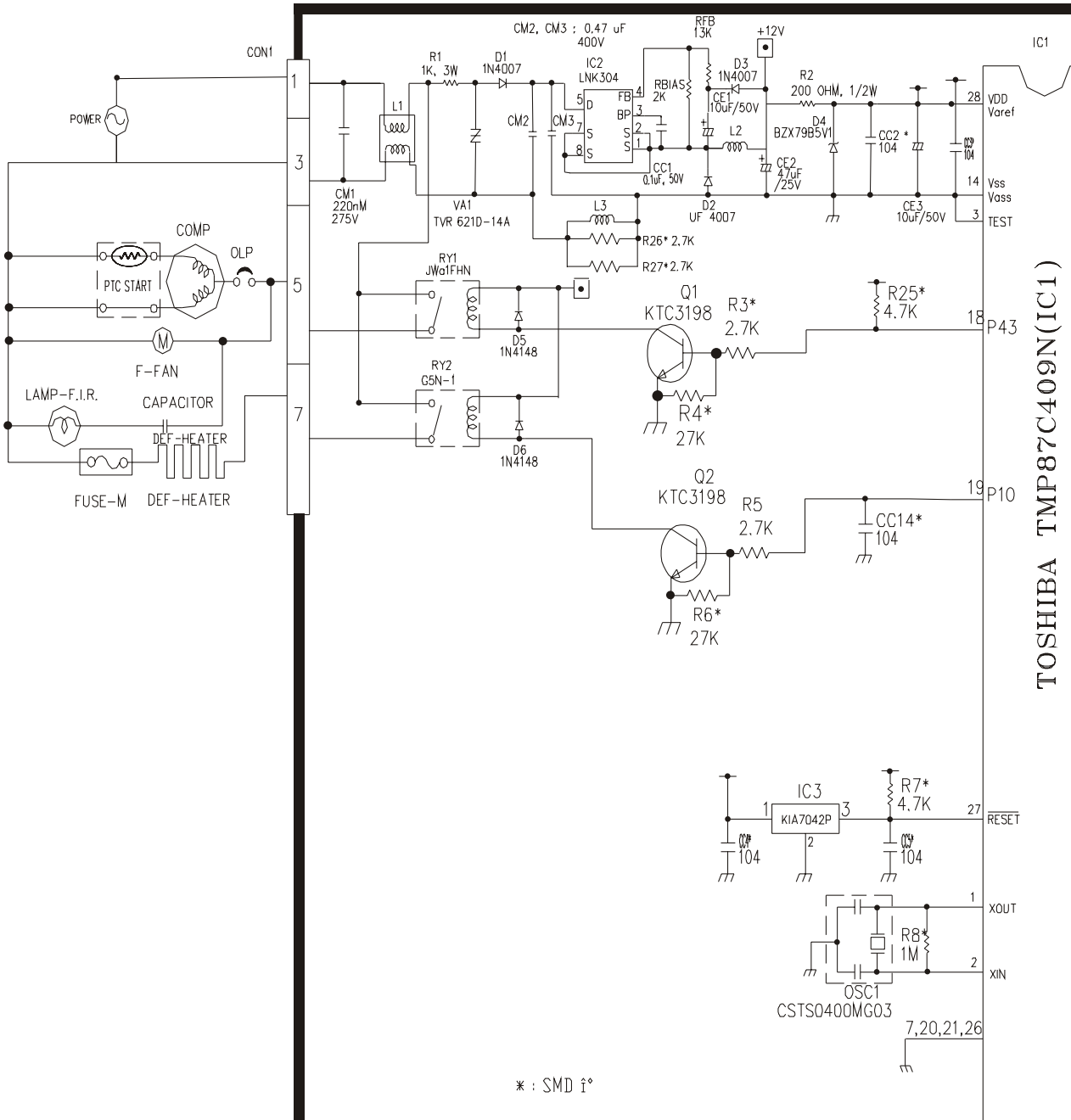
7-5-3 PWB ASS'Y, DISPLAY AND PARTS LIST



Qty	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	1	6870JB1005A	PWB(PCB)	FR-1(DS-1107A)	EPITOME	T=1.6
1	2	6600RRT001Z	SWITCH,TACT	JTP1280A6 JEIL 12V DC 50MA	JEIL	SW101
0	3	0DLSY0030AB	LED	SINYOUNG SLG1312N-A BK GREEN 565	SINYOUNG	L101~L106
1	4	0DD414809AA	DIODE,SWITCHING	1N4148 26MM TP GRANDE - - - -	ROHM,PYUNG CHANG	D101
1	5	-	LEAD WIRE	UL1007AWG24 <DR VSF0.18/12/0.3	-	-
1	6	-	LEAD WIRE	UL1007AWG24 <DR VSF0.18/12/0.3	-	-
1	7	-	LEAD WIRE	UL1007AWG24 <DR VSF0.18/12/0.3	-	-
1	8	-	LEAD WIRE	UL1007AWG24 <DR VSF0.18/12/0.3	-	-
1	9	-	LEAD WIRE	UL1007AWG24 <DR VSF0.18/12/0.3	-	-
1	10	-	LEAD WIRE	UL1007AWG24 <DR VSF0.18/12/0.3	-	-
1	11	-	HOUSING	#35022-0006	MOLEX	WHITE
8	12	-	CONTACT	#35021-1101(PBT)	MOLEX	-
	13	-	-	-	-	-
1	14	-	HOUSING	HOUSING SMH-250 06P	YEDNHO	WHITE
6	15	-	CONTACT	CONTACT YST-025	YEDNHO	-
1	16	-	TAPE,VINYL	<W19*L60MM=1>	-	-
2	17	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	-	J1~J2
0.0005	18	9VWF0120000	SOLDER<ROSIN WIRE> RS0	D1.20	HEESUNG	-
0.001	19	49111004	SOLDER,SOLDERING	H63A	-	-
0.003	20	59333105	FLUX	SGJ0.825-0.830 KOREA F.H-206	KOKI	-
0.002	21	7245ZB0002A	FLUX	SCC3-DCA200H ELECTROLUBE CONFORMAL COATING AER	-	-
6	22	0DLSY0020AA	LED	SINYOUNG SLG1504N-B BK GREEN 565	SINYOUNG	L101~L106

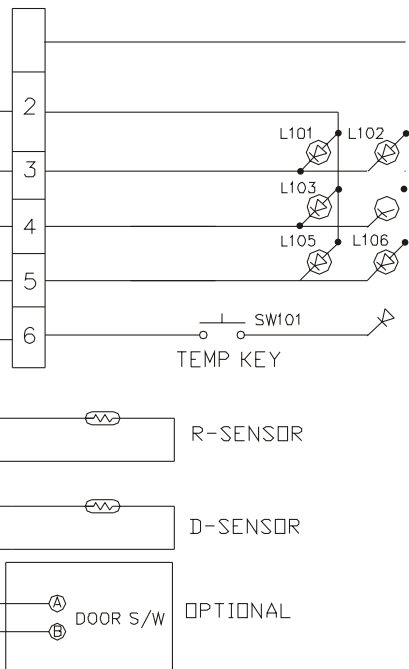
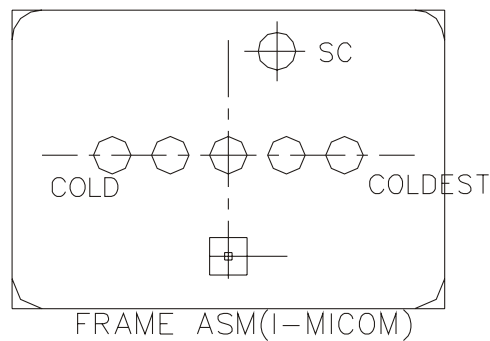
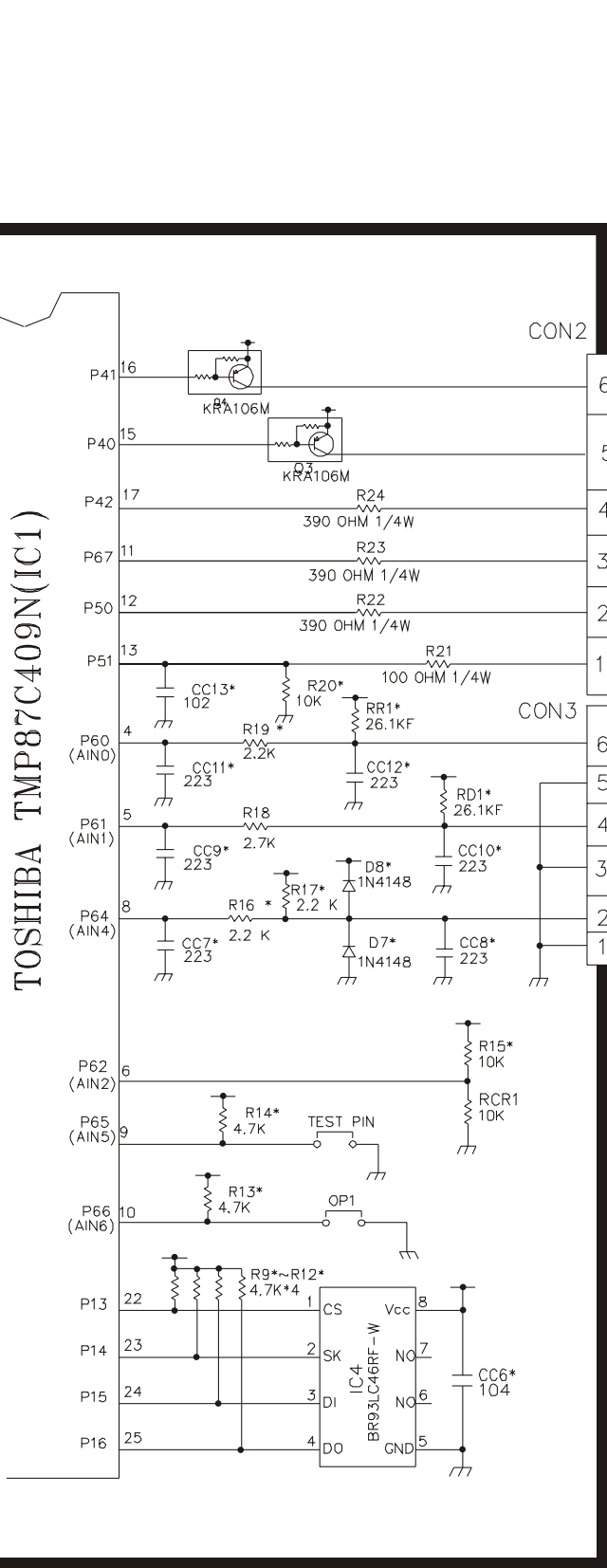
7-6 PWB DIAGRAM

7-6-1 PWB ASSEMBLY, MAIN



CIRCUIT DIAGRAM

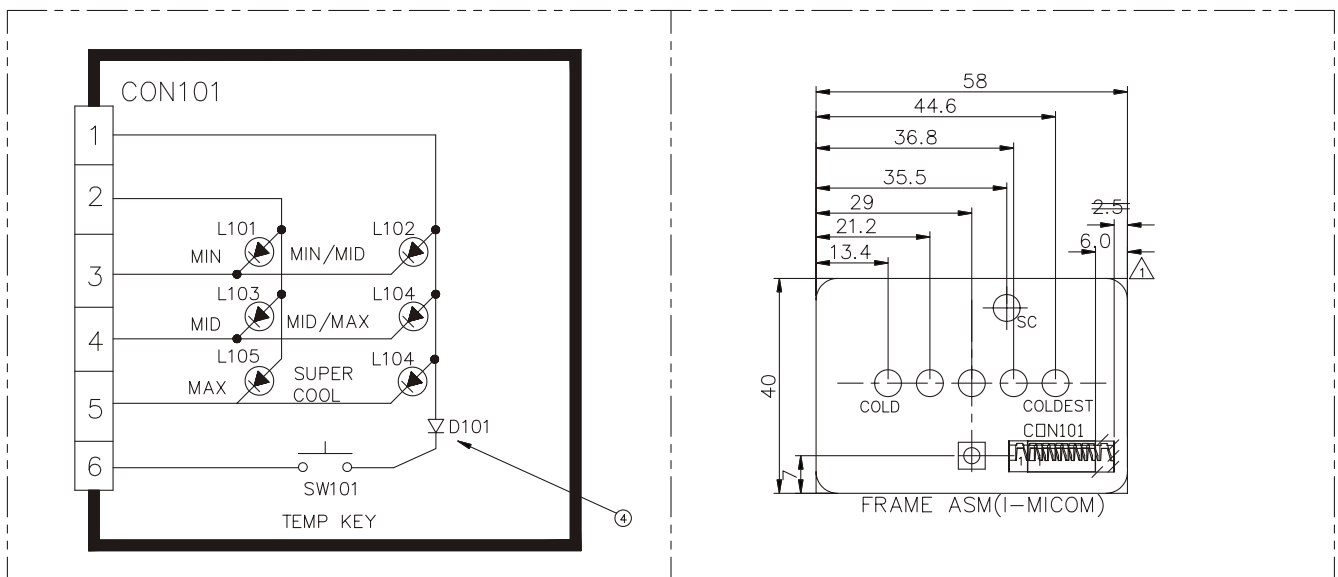
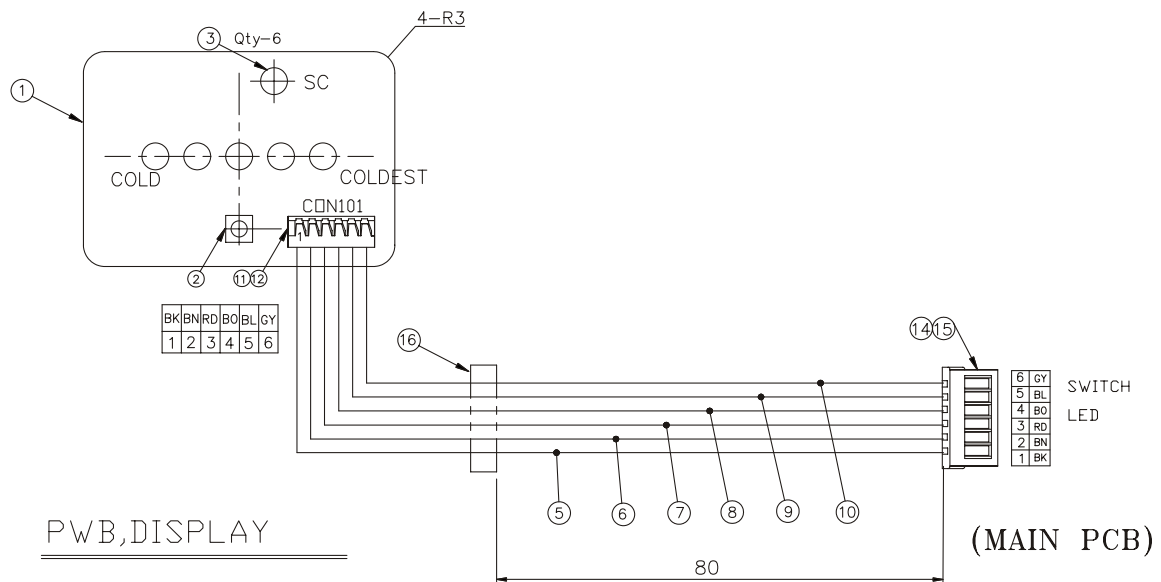
TOSHIBA TMP87C409N(IC1)

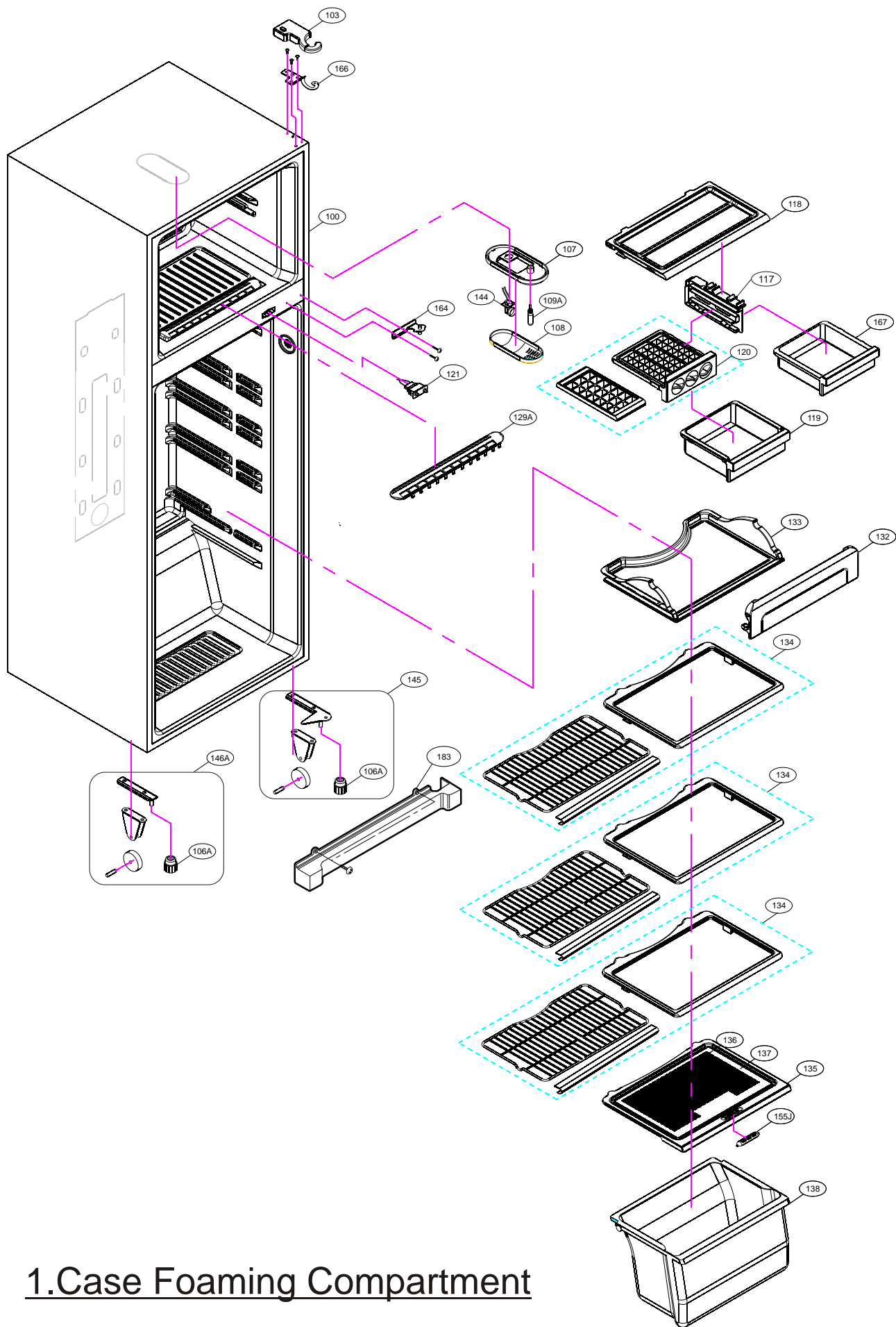


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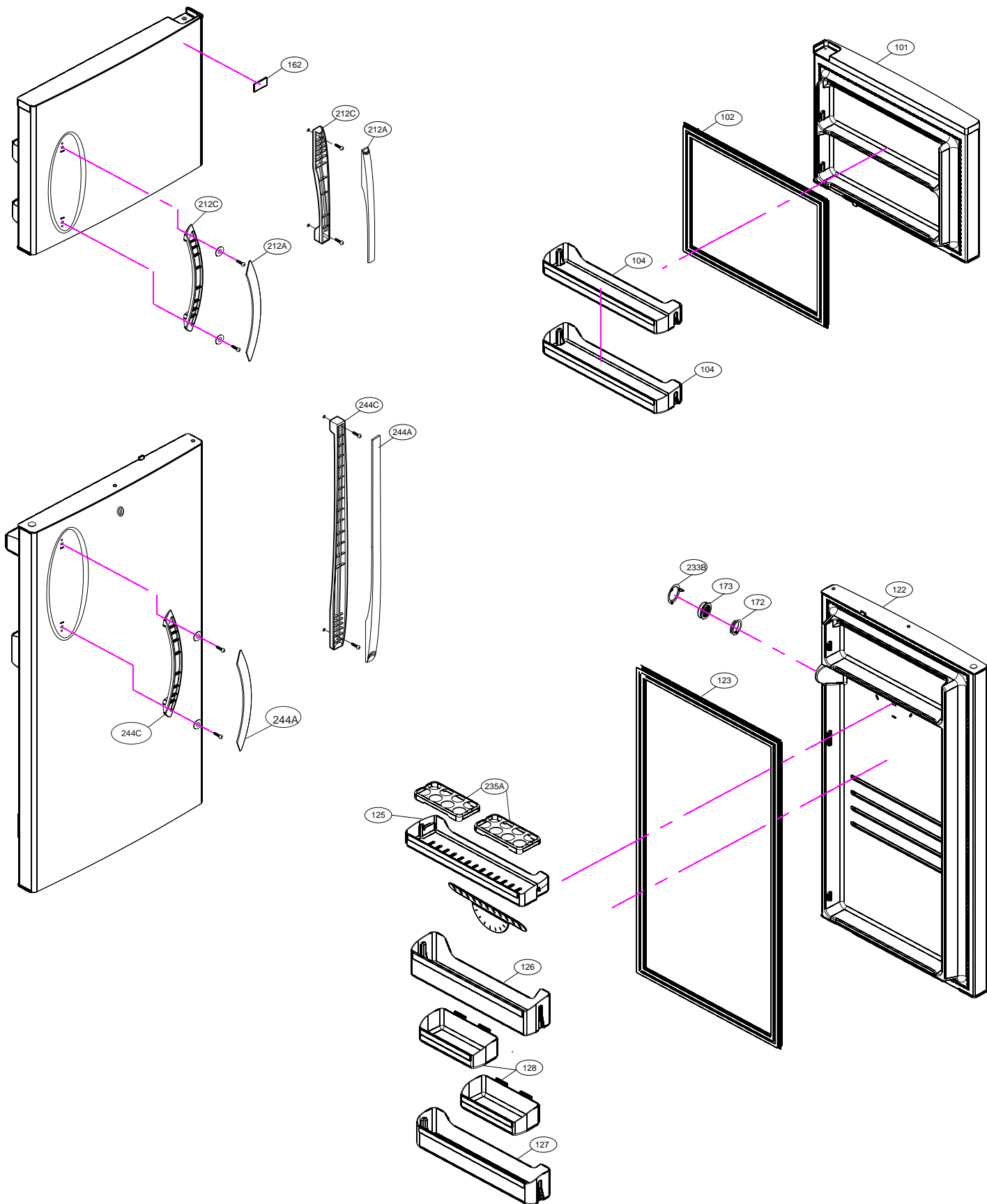
?? ?	Ã & Ç	? ?
? Z Z	RCR1	?
180KJ	+2.5°C	↑ ???
56KJ	+2.0°C	
33KJ	+1.5°C	
18KJ	+1.0°C	
12KJ	+0.5°C	
10KJ	0°C	
8.2KJ	-0.5°C	↓ ???
5.6KJ	-1.0°C	
3.3KJ	-1.5°C	
2KJ	-2.0°C	
470J	-2.5°C	

7-6-2 PWB ASSEMBLY, DISPLAY



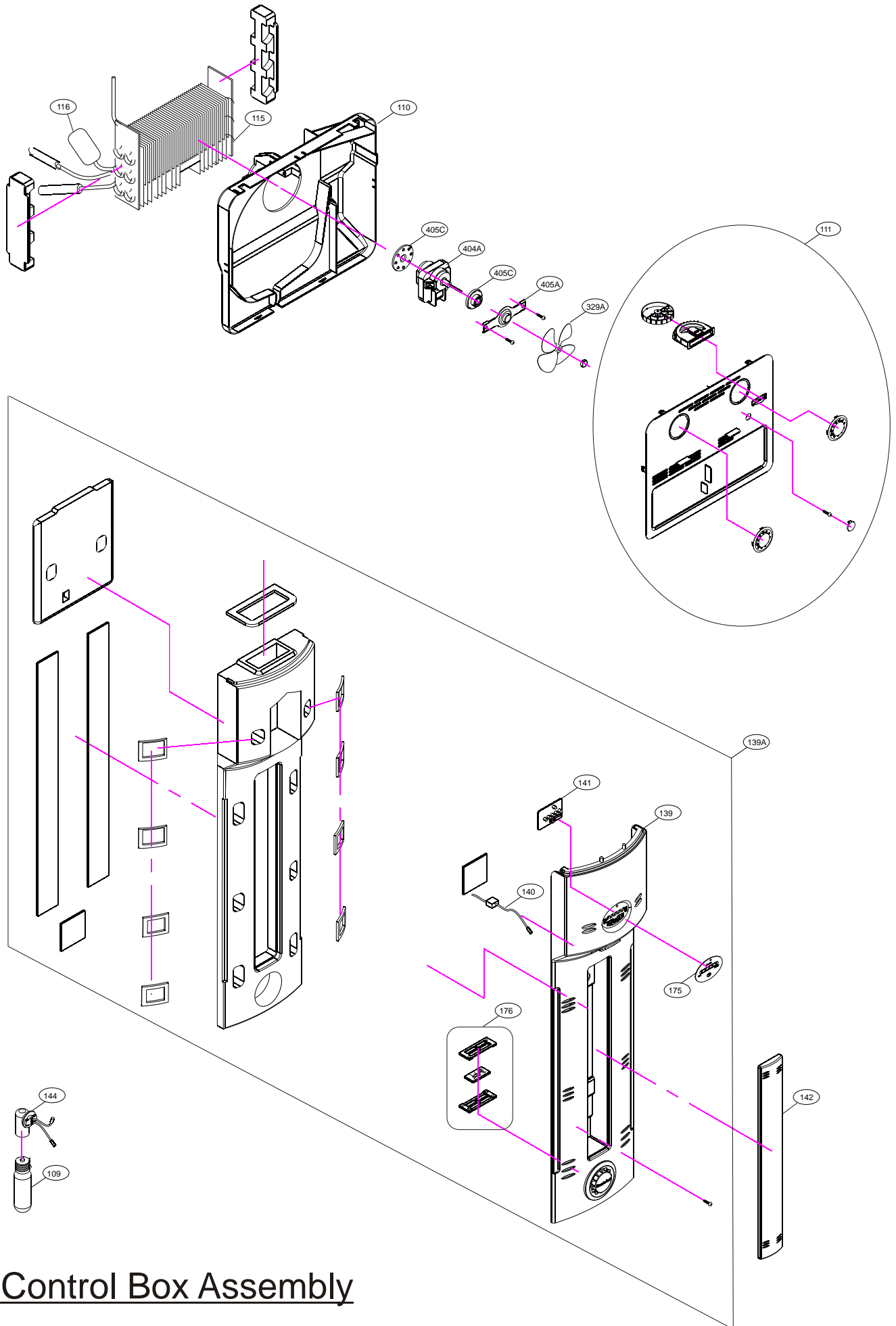


1. Case Foaming Compartment

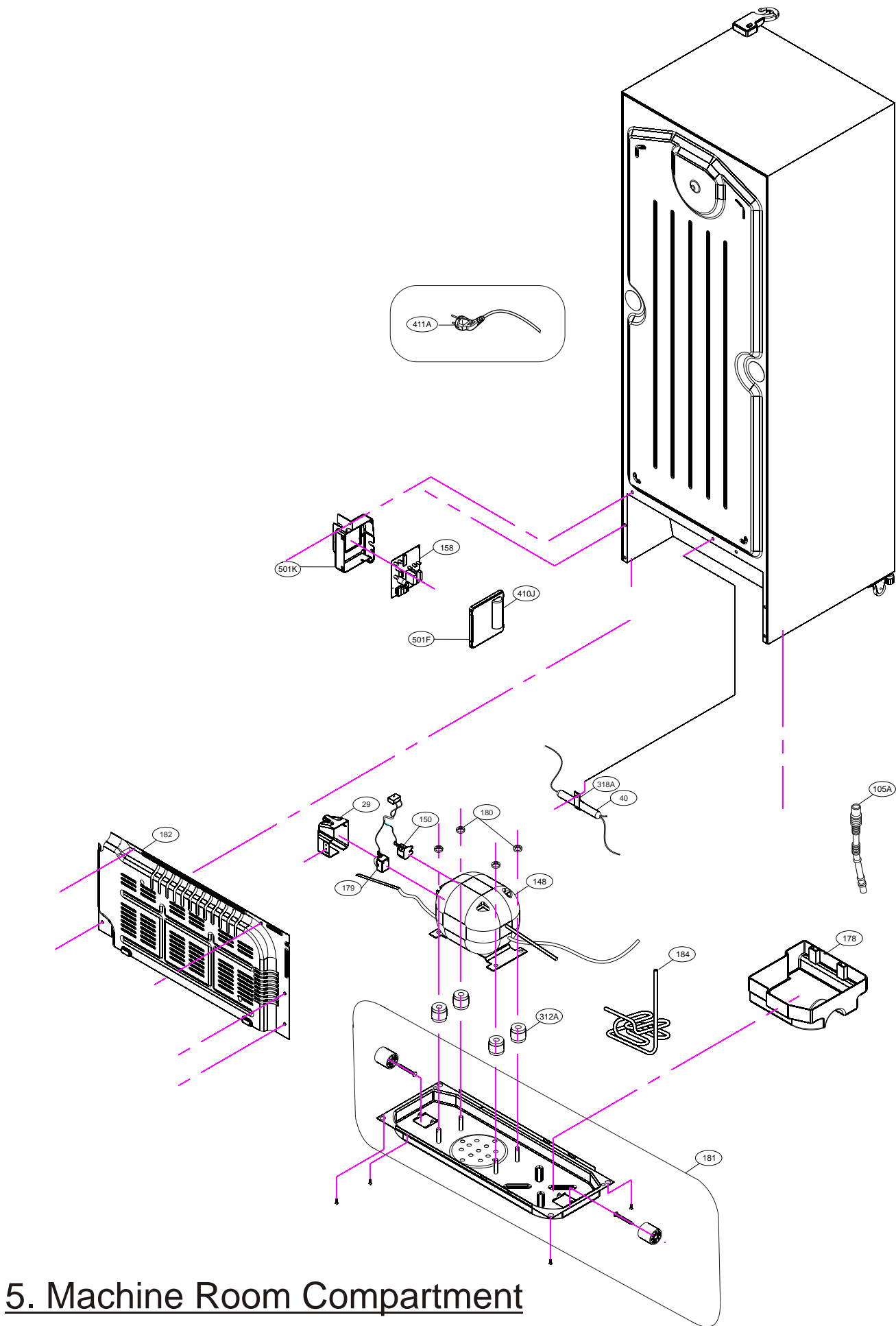


2. Door Foaming Compartment

3.Shroud & Grill Compartment



4.Control Box Assembly



5. Machine Room Compartment

