Whirlpool

Whirlpool of India Limited

SERVICE AND PARTS MANUAL

Document No. WOI/GNF/……

GLOBAL NO FROST
DOUBLE DOOR REFRIGERATORS

Sap code	Model	Description
9160	**WBM 470**	220L Thailand 4G
9161	**WBM 480**	250L Thailand 4G
9162	**WBM 490**	285L Thailand 4G

This document is intended only for qualified technicians who are aware of the respective safety regulations

CONTENTS

I N T R 0 D U C T I 0 N

CFC Free

Manufacturing of a refrigerator includes certain operations like foaming, gas charging of the sealed system etc. This involves the use of certain refrigerants, which are released in the atmosphere, that contain chlorine. These are termed as CFCs (Chlorofluorocarbon).

CFC's when released in the atmosphere affect the ozone layer. It leads to the depletion of the Ozone layer. The ozone layer acts as shield against the ultra violet sun rays, which are harmful to us and cause skin diseases.

Whirlpool has responded to this required change by introducing refrigeration products that use R134a, a Hydroflorocarbon (HFC) refrigerant that is chlorine- free. This refrigerant satisfies the challenge of producing an environmentally friendly refrigeration product while meeting current energy-efficiency standards.

Whirlpool to continue their response to produce environmentally friendly refrigeration product in global level, have started producing in India “The Global No-frost “(GNF) refrigerator which is the first CFC FREE of its kind.

A new plant is set up at Pune to manufacture the environmentally friendly refrigerators in India by Whirlpool. All the refrigerators manufactured in this plant will use refrigerant R134a, which is a CFC FREE refrigerant. R134a refrigerant is, in some ways, similar to R12. There are some very important and critical differences that must be recognized. These differences require changes to some sealed system repair procedures which we will see further in this manual.

Safety Precautions & Warnings

Read all instructions before using this appliance in order to avoid risk of accident or possible damage.

Warning / Caution

Warning This symbol is intended to alert the user to the possible death or injury.

Caution This symbol is intended to alert the user to the possible injury or damage.

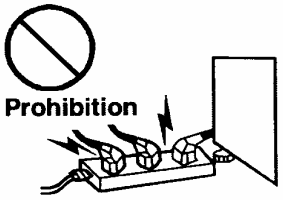
Description of symbols

- Indicates prohibition
- Do not disassemble
- Do not contact
- Adhere the instruction strictly
- Unplug from the electrical outlet
- Earth the appliance to avoid the risk of an electric shock.

Warning

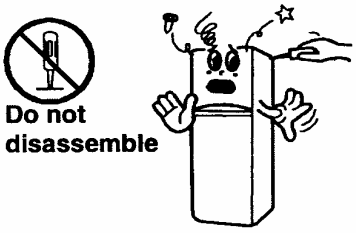
Do not plug multiple electric appliances into the same outlet.

This may cause abnormal heating or fire hazard.



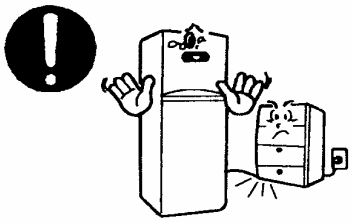
Do not disassemble repair or alter.

It may cause fire or abnormal operation which leads to injury.



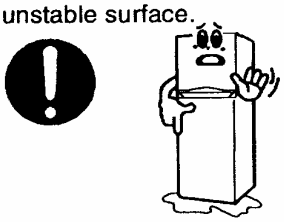
Do not bend the power cord with excessive force or do not have the power cord pressure by heavy article.

This may cause fire.



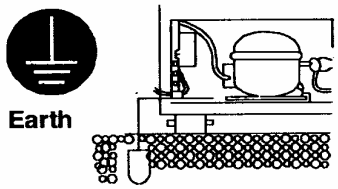
Check the operating environment

Do not install the refrigerator in a humid (with condensation) location or an unstable surface.



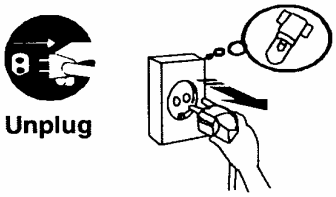
Be sure to earth.

If earthling is not done, it will cause break down and electric shock.



Pull the power plug out for exchanging the interior lam of the refrigerator.

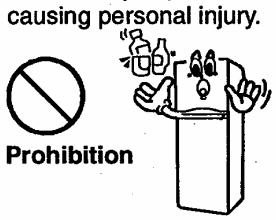
It may cause electric shock



⚠ Caution

Do not store bottled food or drinks in the freezing compartment.

Bottles may explode causing personal injury.



Prohibition

Do not store food in unstable manner.

Opening the door may trigger loose items to slip & cause injury.

Prohibition

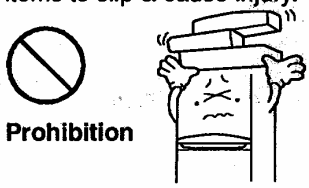
Do not store anything other than food in the refrigerator.

Medical supplies, which need to be under strict temperature control, should not be stored in the refrigerator.

Prohibition

Do not put on top of the refrigerator.

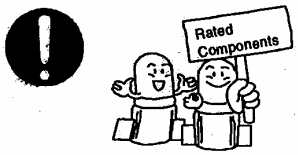
Opening or closing the door may trigger the loose items to slip & cause injury.



Prohibition

When replacing electric components, be sure to use rated components.

Check the model, rated voltage, rated current, operating temperature etc. of the component.

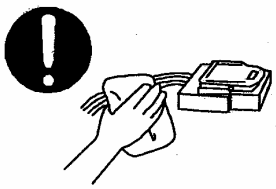


When servicing the refrigerator completely remove dust or foreign substances from the housing, electric connections etc.

This can protect against the risk of fire hazard caused by tracking and short circuit.

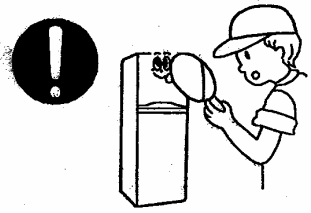
Please wipe out foreign materials of the metal option of power plug cleanly.

Use of it as it is may cause fire.



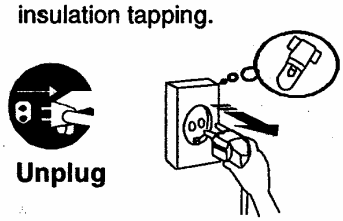
After servicing the refrigerator be sure to check the components are reassembled in a correct manner.

The service unit should be resembled & return to its original assembly state.



Check electrical ports for the trace of moisture penetration.

When the trace of moisture penetration is detected, insulation tapping.



Unplug

SPECIAL FEATURES

The special features of these refrigerators compared to the existing refrigerators are as follows:

1. Clean back refrigerator
2. CFC Free, No frost
3. Double door
4. Quick freeze compartment
5. Quick chiller compartment in refrigerator compartment
6. Heat loop for anti-condensation
7. Easy to handle crisper tray
8. Foamed in gasket and liners
9. Energy efficient compressor
10. Wheels for easy mobility
11. Galvanized and painted Steel body

TECHNICAL SPECIFICATIONS

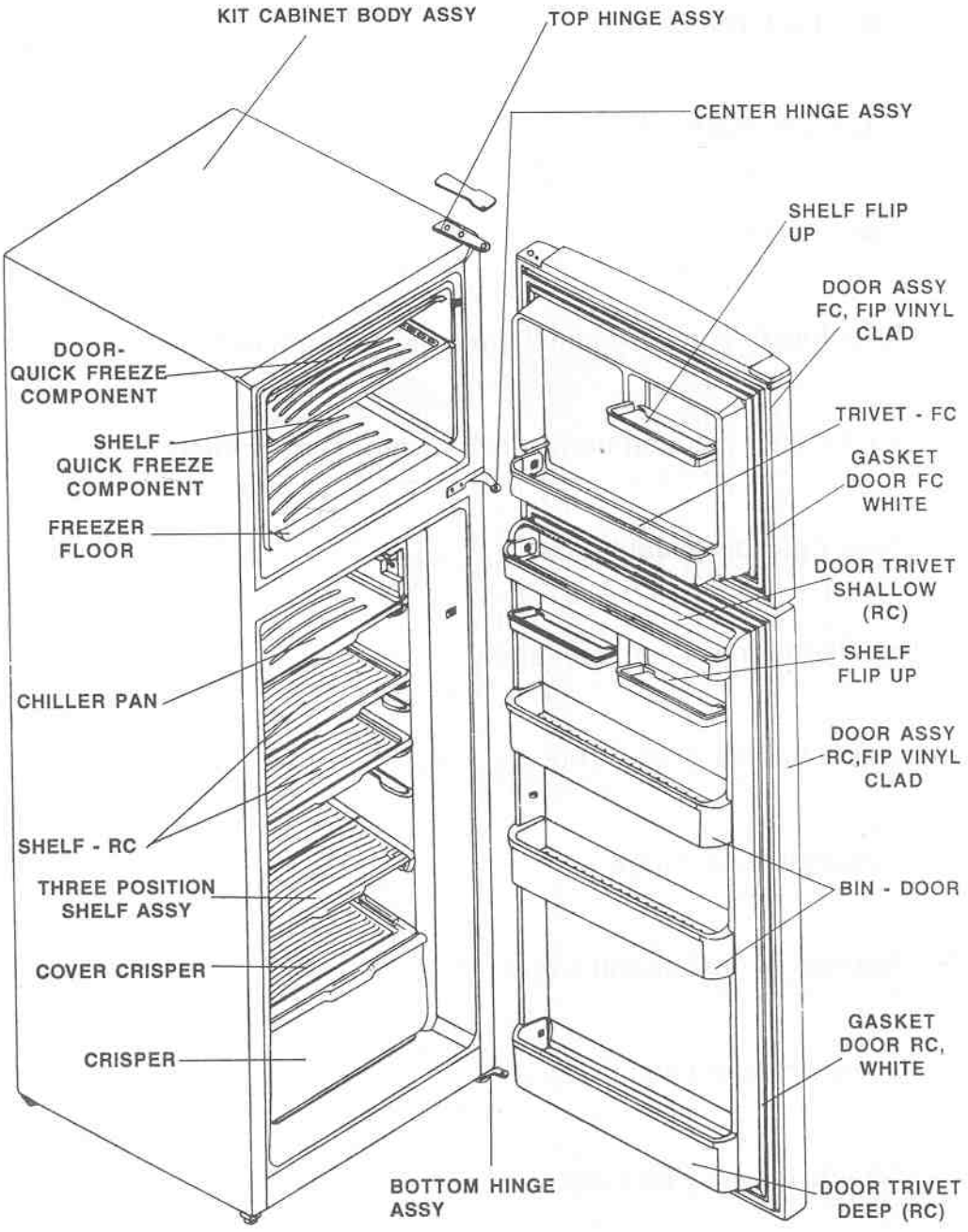
MODEL	WBM 470	WBM 480	WBM 490
12NC			
DESIGN SPECS			
Capacity(L)total Net	220L	250L	285L
Capacity(L)total gross	240L	280L	320L
Refrigerator/Freezer	150 / 70 L	180 / 70 L	215 / 70 L
Tropicalized	YES	YES	YES
ELECTRICAL			
Voltage / Hz	220-240V/50-60Hz	220-240V/50-60Hz	220-240V/50-60Hz
Voltage Range	160-260V	160-260V	160-260V
Power Consumption	245W	245W	245W
REFRIGERANT			
Type	R134a	R134a	R134a
Quantity	96 gms.	96 gms.	96 gms
COMPRESSOR			
Type	Reciprocating	Reciprocating	Reciprocating
Motor Type	RSIR	RSIR	RSIR
Compressor Cooling	Static	Static	Static

CARING FOR THE REFRIGERATOR / CLEANING THE REFRIGERATOR

Both the refrigerator and freezer sections defrost automatically, but both should be cleaned about once a month to help prevent odours from building up. To clean the refrigerator, turn the refrigerator control to OFF, unplug it, take out all removable parts and clean the refrigerator according to the following directions.

COMPONENT	WHAT TO USE	HOW TO CLEAN
Removable parts (Shelves, crisper etc)	Sponge or cloth Mild detergent Warm water	Wash Rinse and dry thoroughly
Outside	Sponge, cloth or paper towel Mild detergent Warm water Appliance wax	Wash the outside of cabinet. Do not use abrasives or harsh cleaners Rinse and dry thoroughly Wax the painted metal surfaces at least twice a year. Apply wax with a clean soft cloth. Waxing painted metal surfaces provides rust protection. Do not wax the plastic parts
Inside walls (allow freezer to warms up so cloth won't stick)	Sponge, soft cloth or paper towal Mild detergent Warm water	Wash with mixture of warm water and mild detergent Rinse and dry thoroughly
Door liners and gaskets	Sponge, soft cloth or paper towel Mild detergent Warm water	Wash Rinse and dry throughly Do not use cleaning waxes, concentrated detergents, bleaches or cleaners containing petroleum on the plastic parts
Plastic parts (covers & panels)	Soft, clean sponge or soft clean Cloth Mild detergent Warm water	Wash Rinse and dry thoroughly Do not use paper towels, window sprays, scouring cleaners or flammable fluids. These can scratch or damage the material

GNF - REFRIGERATOR PARTS IDENTIFICATION



ENERGY - SAVING TIPS

You can help your refrigerator use less electricity by

1. Making sure the gaskets are clean and are making good contact with the cabinet.
2. Opening the refrigerator and freezer doors as little as possible. Keep food well organized and remove all of what you need at one time.
3. Not overfilling the compartments so that air cannot circulate properly.
4. Not setting the refrigerator and freezer sections to at temperature higher than necessary. If ice cream is firm and drinks are as cold as you like them, which is cold enough.
5. Keeping the refrigerator away from heat sources, such as a cooking range, water heater, furnace, radiator or direct sunlight.

VACATION AND MOVING CARE SHORT VACATIONS

No need to shut off refrigerator if you will be away for less than four weeks.

LONG VACATIONS

Remove all the food if you are going for a month or more. Unplug the refrigerator and clean it, rinse well and dry.
Tape rubber or wood blocks to the top of both doors, keeping them open far enough for air to get in. This will keep odor and mold from building up.

MOVING

Remove all food. Pack frozen food in dry ice. Unplug the refrigerator and clean it thoroughly. Take out all removable parts. Wrap all parts well and tape them together so they don't shift and rattle. Screw in the leveling rollers and foot. Tape the doors shut and tape the electric cord to the cabinet.
When you get to your new home, put everything back. Reconnect the water supply line if you have an ice maker.

POWER INTERRUPTIONS

If electricity goes off, call the electricity dept. Ask how long will be off.

1. If service is to be interrupted 24 hours or less, keep both doors closed. This will help frozen food stay frozen.
2. If service is to be interrupted longer 'than 24 hours, remove all frozen food and store in frozen food locker.
3. A full freezer will stay cold longer than a partly filled one. A freezer full of meat will stay cold longer than a freezer full of baked goods. If food contains ice crystals, it may be safely refrozen, although the quality and flavor may be affected. If the condition of the food is poor or if you feel it is unsafe, dispose of it.

REFRIGERATOR SOUNDS

Your new refrigerator may make sounds that your old one didn't. Because these sounds are new, you may become concerned. However, these new sounds are normal. Hard surfaces can make the sounds seem even louder. Some of the sounds you may hear are

RUNNING SOUNDS - caused by the high efficiency compressor and motor.

A SLIGHT HUM OR A SOFT HISS - caused by the refrigerator's fan motor and moving air.

CLICKING OR SNAPPING - caused by thermostat when the refrigerator stops on starts operating. The defrost timer will click when the defrost cycle begins and ends.

WATER SOUNDS / GURGLING NOISE - caused by liquid settling in the tubing when the refrigerator stops operating. You may also hear defrost water dripping into the defrost water pan.

TROUBLE SHOOTING - GENERAL

HEAVY WARM LOAD - The amount of warm food placed in the refrigerator affects running time and power consumption. Ordinarily, when a supply of food is placed in a refrigerator, it will operate continuously until the food is down to the desired storage temperature. This continuous operation is normal. In high ambient, an excessive warm load may cause overload cycles.

EXCESSIVE DOOR OPENINGS - The length of time the door is left open and the number of times the door is opened should be held to a minimum. Excessive door openings will greatly increase running time, power consumption and frost build-up.

IMPROPER STORAGE - Uncovered foods and improper packaging materials and methods cause food to dry out. This reduces the flavor of foods and results in excessive frost build- up.

WARM ROOM -

1. A warm room or other large source of heat (such as a cooking range, heater, hot air duct, sunny window) can affect performance.
2. In general, the warmer the room, the greater the running time and power consumption.

EXTERIOR SWEATING - Refrigerators are designed to prevent "run off" moisture at 90 deg F and 90% relative humidity ambient. There may be a thin film of moisture on some areas at a lower temperature and relative humidity. This is within design specifications and is not a fault of construction.

Relocating the refrigerator in a less humid, better ventilated area will normally eliminate most moisture problems.

CHANGING THE CONTROL SETTINGS

Allow several hours for the refrigerator and freezer compartments to reach their operating temperatures, before adding food items. If the milk or juices in the refrigerator section is as cold as desired, then the thermostat is set correctly. The freezer section is set correctly when ice cream remains firm. If the refrigerator and the freezer temperatures need to be readjusted, make sure that you

1. Adjust the refrigerator compartment temperature first.
2. Wait at, least 24 hours before you make any further changes
3. When the refrigerator section is at the desired temperature, adjust the freezer section, as desired.

The reasons for certain temperature problems are given below, accordingly set the refrigerator section and freezer section

S.No.	SYMPTOMS	REASON
1.	If the refrigerator section is TOO WARM	Door opened often Large amount of food added Room temperature too warm
2.	If freezer section is TOO WARM	Door opened often Large amount of food added Very cold room temperature
3.	If refrigerator section is TOO COLD	Controls not set correctly for your conditions

4.	If ICE isn't made fast enough	Heavy ice usage Very cold room temperature
5.	If both sections are too warm	Door opened often Large amount of food added Very warm or very cold room temperature

R134a SERVICE CONSIDERATIONS

R134a systems cannot tolerate (compared to other refrigerants) even trace amounts of foreign substances, chemical contamination or moisture.

Examples of detrimental substances are wax or paraffin, silicon, greases, oils, rust preventatives, lubricants, leak detection dye or any other additives.

Do not use R12 or R22 servicing equipment to repair an R134a system.

Use new servicing equipment. Old equipment (hoses, coupler/valve seals and 0-rings) are not compatible with R134a.

Oil in R134a compressors is very sensitive and capable of absorbing large quantities of moisture. Moisture cannot be removed from the compressor oil in a service workshop.

Service replacement compressor should be checked to make sure the studs seals are in place and not tampered with.

Compressor studs should not remain open for more than ten minutes.

In any repair of R134a sealed system failure the filter-drier should always be replaced. And in any compressor failure in R134 a system always replace with a new compressor.

SERVICE INSTRUCTIONS

The GNF refrigerators 285L, 250L, and 220L all are clean back refrigerators. A clean back refrigerator incorporates the following parts foamed between the main liner and the cabinet.

1. The skin condenser - The condenser assembly is placed on the three sides of the cabinet.
2. Heat loop - The heat loop is placed along the front side of the cabinet.
3. Suction & Capillary - The suction & capillary is placed on the backside of the cabinet. The serviceable joints are available one for the Evaporator assembly in the Freezer compartment and the other to the compressor and the drier.
4. Water drainage system - The defrost water drainage gets collected on the tray kept over the compressor through the tube which is again formed at the backside of the cabinet.
5. Wiring Harness Assembly - The wiring assembly is foamed at the back side of the refrigerator in such a way providing serviceable wiring connector in three places such as (1) in the freezer compartment for the fan motor, defrost heater and bi-metal, (2) in the refrigerator compartment for the thermostat, bulb holder, timer motor and (3) in the back side dome area for the compressor, relay, overload protection and power cord. Each compartment will have small wiring assembly for connecting the electrical parts available as mentioned.
   As these above mentioned parts are foamed in they become non-serviceable parts. Great care on quality is taken to make these parts free from failure as any failure on the above parts may lead for the unit replacement as a whole.

The other parts in the freezer compartment, refrigerator compartment and the door assemblies except the liners are serviceable and the procedures for the same are given in the following pages.

Procedure for repair of sealed system failures of R134a systems.

This section has been specially introduced to explain in detail the precautions and care to be taken in repair of refrigerators, which use R134a as the refrigerant (as in the GNF refrigerator). It also explains in detail the "SWEEP CHARGING PROCEDURE" which is the recommended procedure for repair of sealed system failures.

R134a sealed system service

R134a is used as a refrigerant in the Global No Frost refrigerators to make it more environments friendly and comply with Environmental Protection Agency rules. R134a is a Hydroflorocarbon refrigerant (Non - CFC) which is chlorine free and it makes it non ozone layer depleting unlike other refrigerants like R12 which is a Chloroflorocarbon (CFC). R134a is in some way similar to R12 in refrigerating properties but there are some important and critical differences that should be always remembered.

The main Points to be remembered while servicing a R134a refrigerant based refrigerator are

i) R134a is more sensitive to contamination and it can not tolerate moisture, traces of other chlorine-based refrigerants and other chemical substances. Hence use only the tubing, equipment which is compatible with R134a and maintained exclusive for R134a and do not mix it with the other equipment meant for R12 based systems.

ii) The lubricant (Easter oil) used in R134a systems can absorb large amounts of moisture and cause contamination. Hence never open the replacement compressor stubs ends to

moisture and keeps them plugged with the right plug till it is required to be used in the repair.

iii) Do not use lubricating oil or refrigerant from chlorine based sealed system into R134a system.

iv) Use sweep charging method (explained in detail in the next section) for charging of R134a based systems after repair as it is more effective in removing the contaminants from the sealed system.

v) **Always replace the filter-drier** in all sealed system repairs of R134a based systems

vi) Do not use the replacement compressor if its stubs are not plugged properly and do not remove the plugs till it is time to braze the tubing to the stubs.

vii) Do not use manifold gauges during purging and charging of system.

CAUTION

If the above precautions are not followed it will result in the premature compressor failure or complete system failure.

SWEEP CHARGING PROCEDURE FOR SEALED SYSTEM REPAIR OF GNF REFRIGERATOR

The following are the main steps in the sweep charging of GNF refrigerator sealed system.

1) One or two access valves are attached to the sealed system. (The number of valves depend on whether the compressor is operational or not.
2) The existing refrigerant charge is purged from sealed system in to a recovery bag.
3) Repairs are made to the sealed system taking all the precautions as required in repair of a R134a refrigerant based sealed system.
4) The filter drier is replaced by a new filter drier.
5) The brazed joints on the high side are visually inspected for leaks.
6) The high side components are back flushed.
7) Four ounces of liquid refrigerant are metered into the sealed system.
8) A leak check is performed on the newly brazed joints in the high side of the system.
9) The compressor is run to circulate the sweep charge throughout the system
10) The refrigerant containing the contaminants is purged form the high side access valve in to a recovery bag.
11) The system is finally charged with the prescribed amount of new refrigerant.

The sweep charging method is superior to other charging methods in removing the contaminants (moisture and non condensable matter) from the sealed system.

The details of the sweep charging procedure is given in the flow charts No. 1 to 10

REPLACING R134a COMPRESSORS

1. CAUTION: Never open replacement compressor studs to the air for longer than 10 minutes.
2. Carefully inspect rubber plugs in the service replacement compressor studs. If the plug appears to have been removed or tampered with, DO NOT USE THE COMPRESSOR. Get another one.
3. Clean compressor studs with plugs still in them.
4. Install into system last. Braze into system within ten minutes.

CONTAMINATED R134a SEALED SYSTEM REPAIRS

NOTE: Always replace the filter - drier during ANY repair on R134a sealed system.

COMPRESSOR BURN OUT

1. Purge refrigerant from the system.
2. Flush the system
3. Replace the filter-drier.
4. Replace the compressor.
5. Leak check, sweep and recharge the system.

RESTRICTION IN THE SYSTEM

1. Purge refrigerant from the system.
2. Determine location of restriction and repair if possible.
3. Flush the system.
4. Replace the filter-drier.
5. Replace the compressor if required.
6. Leak check, sweep and recharge the system.

FREEZER COMPARTMENT

The freezer compartment comprises of the following parts:

1. Evaporator (Tube and Fin type)
2. Evaporator fan motor which is mounted on the evaporator cover assy.
3. Defrost heater
4. Bi-metal switch
5. Evaporator cover assembly.
6. Quick freezer shelf and cover.
7. Ice tray

Now let us see the replacement procedure for the above-mentioned parts. For any part replacement in the freezer compartment first remove the part mentioned above of S.No. 5 to 7.

Replacing The Bimetal

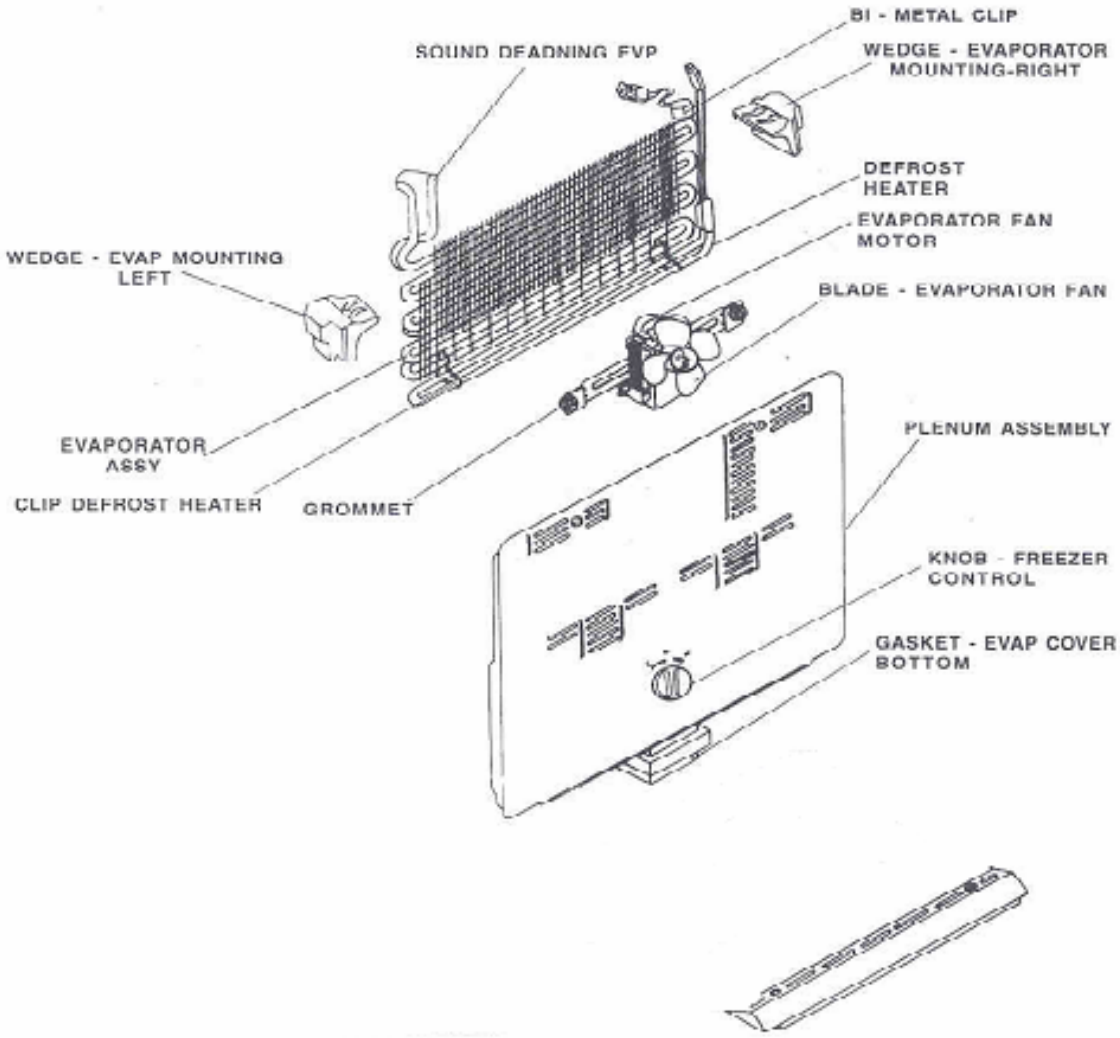
The bimetal is clipped to a small section of the evaporator inlet tube that has a coating on it. This coating prevents "galvanic action" from occurring between the dissimilar metals of the bimetal clip and the evaporator tubing, and thus, burning a hole in the tubing. When you install the new bimetal clip, make sure to install in the same location as the old one.

1 Remove the evaporator cover and remove wires from mounting clip located on evaporator cover.
2. Unclip the bimetal from the evaporator inlet tubing and unplug it from the wiring harness connector.
3. Plug the connector of the new bimetal into the wiring harness.
4. Locate the evaporator inlet tube and clip the bimetal over it.
5. Now proceed remounting the evaporator cover.

Replacing The Defrost Heater

1. Remove the evaporator cover and wire clips.
2. Unplug the defrost heater connector from the wiring harness.

FREEZER COMPARTMENT ASSEMBLY



3. Pull out the defrost heater from the evaporator clips holding the heater.
4. Install the new heater to the clips.
5. Make sure that the defrost heater leads are routed properly, and plug the connector into the wiring harness.
6. Now proceed mounting the evaporator cover.

Repairing / Replacing Evaporator

NOTE: It may be helpful to remove the freezer door if it is hinged on the same side as the evaporator heat exchanger entrance.

1. Purge the refrigerant from the system.
2. Unplug the unit from the wall receptacle
3. Remove all contents of the freezer.

4. Remove the bottom cover of the freezer compartment.
5. Remove the evaporator cover with fan motor.
6. Remove the defrost heater and the bimetal switch from the evaporator.
7. Disconnect the main wiring harness plug from the cabinet connector.
8. Unwrap the sound deadening material from the evaporator inlet. Keep it in one piece. It will need to be reinstalled later.
9. Cut away the foam stop material even with the plastic freezer compartment liner where the heat exchanger emerges from the cabinet.
10. Remove the foam blocks on each side of the evaporator - do not break.
11. Cut and fold the Flame-Guard material according to locate in the freezer compartment.
12. Place the heat trap paste on the back wall of the freezer compartment to hold the Flame - Guard in place during repairs.
13. Seal the corners and the slots cut for the heat exchanger with heat trap paste.
14. Cover the plastic liner with heat trap paste anywhere it may be exposed to an open torch flame.

EVAPORATOR REPAIRS

1. If leaks in the inlet or outlet joints of the evaporator are to be repaired in place, apply a generous amount of heat trap paste to the aluminum to copper transition of the inlet or outlet of the evaporator.
2. Repair the leaking joint.

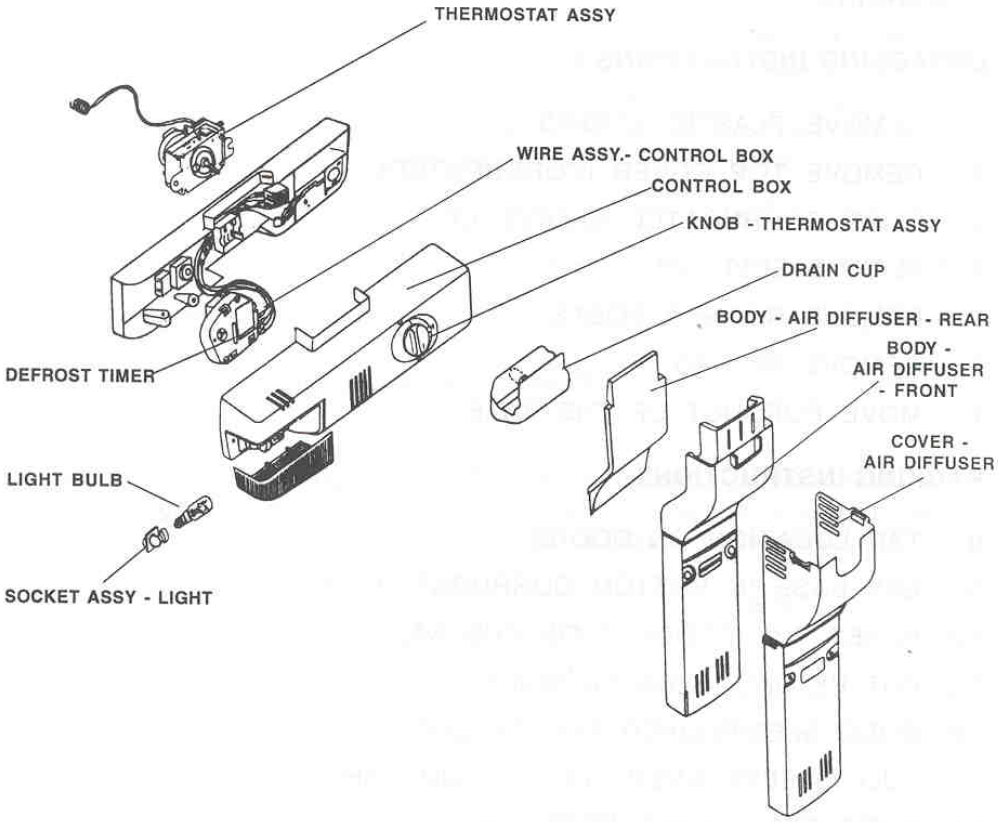
EVAPORATOR REPLACEMENTS

1. If the evaporator is to be replaced, do not put heat trap paste on the inlet or outlet joints.
2. Score the capillary tube with a file and snap it apart.
3. Cut the aluminum evaporator tubing approximately two inches below the Aluminum to copper transition at the outlet with a pair of diagonal cutters.
4. Remove the evaporator from the freezer compartment.
5. Carefully un braze the suction line from the transition.
6. Take the time to repack fresh heat trap paste on any areas where it may have dried out. Heat trap paste is only effective when moist.
7 Insert the copper suction line tubing into the outlet of the new evaporator approximately one half inch.
8. Insert the capillary tube approximately one inch into the inlet of the new evaporator.
9. Hang the new evaporator on the flanges in the back wall of the freezer compartment.
10. Apply a generous amount of heat trap paste to the aluminum to copper transition of the inlet and outlet of the evaporator.
11. Braze the outlet joint.
12. Braze the inlet joint.
13. Inspect the newly brazed joints for black spots indicating potential leaks. Braze again if necessary.
14. Do not remove the Flame-Guard at this time.

RESTORING THE UNIT TO PROPER OPERATION

1. Thoroughly leak check the newly brazed joints and correct any leaks.
2. Sweep the sealed system.
3. Finally charge the sealed system and check that unit is operating properly.
4. Remove the Flame-Guard
5. Remove all heat trap paste from inside of freezer compartment before reassembling.

CONTROL BOX ASSEMBLY



REFRIGERATOR COMPARTMENT

The refrigerator compartment comprises of the following parts:

1. Shelves and crisper
2. Thermostat
3. Bulb holder and bulb
4. Timer motor

All the shelves and trays come out by carefully pulling outwards. The electrical parts like thermostat, bulb holder, bulb and timer motor are fixed to a common control box which is fixed on top back of the refrigerator compartment.
For replacement of the parts in the control box, the procedure is as follows:

1. Remove the shelves for easy accessibility of the control box.
2. Remove the screws fastening the control box.
3. Disconnect the wiring harness connector of the refrigerator compartment.
4. Now you have the control box in hand and can replace the parts by removing the respective screws and fix it back.
5. Remount the parts in the reverse order.

SEALED SYSTEM DIAGNOSIS REVIEW

Entering and properly processing the sealed refrigeration system requires special equipment and time consuming, therefore a system should not be entered until it is determined that it is at fault.
There are four conditions that make entering the sealed system necessary. They are:

1. Incorrect amount of refrigerant
2. Restriction of refrigerant flow
3. Refrigerant leak
4. Compressor not operating correctly

INCORRECT AMOUNT OF REFRIGERANT

1. Low Charge Or No Charge Symptoms:

a. Long or continuous running
b. Partial frost or no frost on evaporator c. Low wattage
d. Starts readily after stopping without pressure equalizing wait period.
e. Intermittent hissing where cap tube enters evaporator
f. Condenser and pre cooler than normal
Comments: Low charge or no charge is probably due to a leak. Find leak and repair.

2. Overcharge Symptoms:

a. Frosting or sweating suction line
b. High freezer temperatures
c. High wattage
d. Noisy compressor
e. Long or continuous running
f. Condenser cool at outlet end, hotter than normal at inlet end
g. Compressor and pre cooler hotter than normal
Comments: If the system has ever operated properly, it isn't likely that it is overcharged unless it has been recharged or refrigerant added. If overcharge is suspected, evacuate an recharge the system with type and amount of refrigerant.

RESTRICTION OF REFRIGERANT FLOW

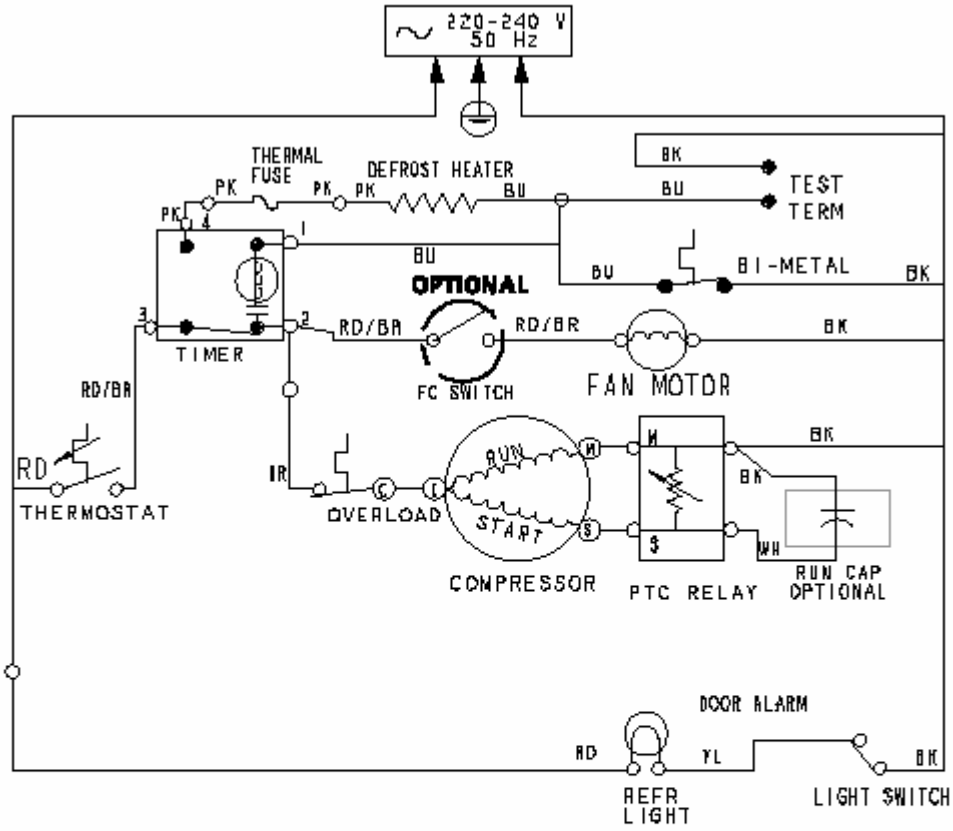
1. Complete Restriction Symptoms:

a. Continuous running
b. No cooling of evaporator
c. No sound of refrigerant flow at cap tube outlet
d. Low wattage
e. Condenser same temperature top to bottom

2. Partial Restriction Symptoms:

a. Partial frosted evaporator - slow progress of frost at start-up
b. Lower than normal evaporator temperatures
c. Low wattage
d. Long or continuous running
Comments: Look for complete restriction at entrance to cap tube drier. Also
check newly made joints. For partial restrictions, look for kinked or mashed tubing, or a clogged screen drier. Remove the restriction.

WIRING DIAGRAM



SYMBOL CODE

- ◉ = CONNECTOR - SCREW ON
- ◎ = CONNECTOR - CLOSED END
- ○ = DISCONNECT TERMINAL
- ● = PERMANENT CONNECTION
- = PLUG CONNECTOR
- = GROUND (CHASSIS)

WIRE COLOR CODE

GN	= GREEN
BU	= BLUE
BK	= BLACK
RD	= RED
WH	= WHITE
YL	= YELLOW
BR	= BROWN
PK	= PINK
RD/BR	= RED/BROWN TRACER
BR/BK	= BROWN/BLACK TRACER

TROUBLE DIAGNOSTIC CHART

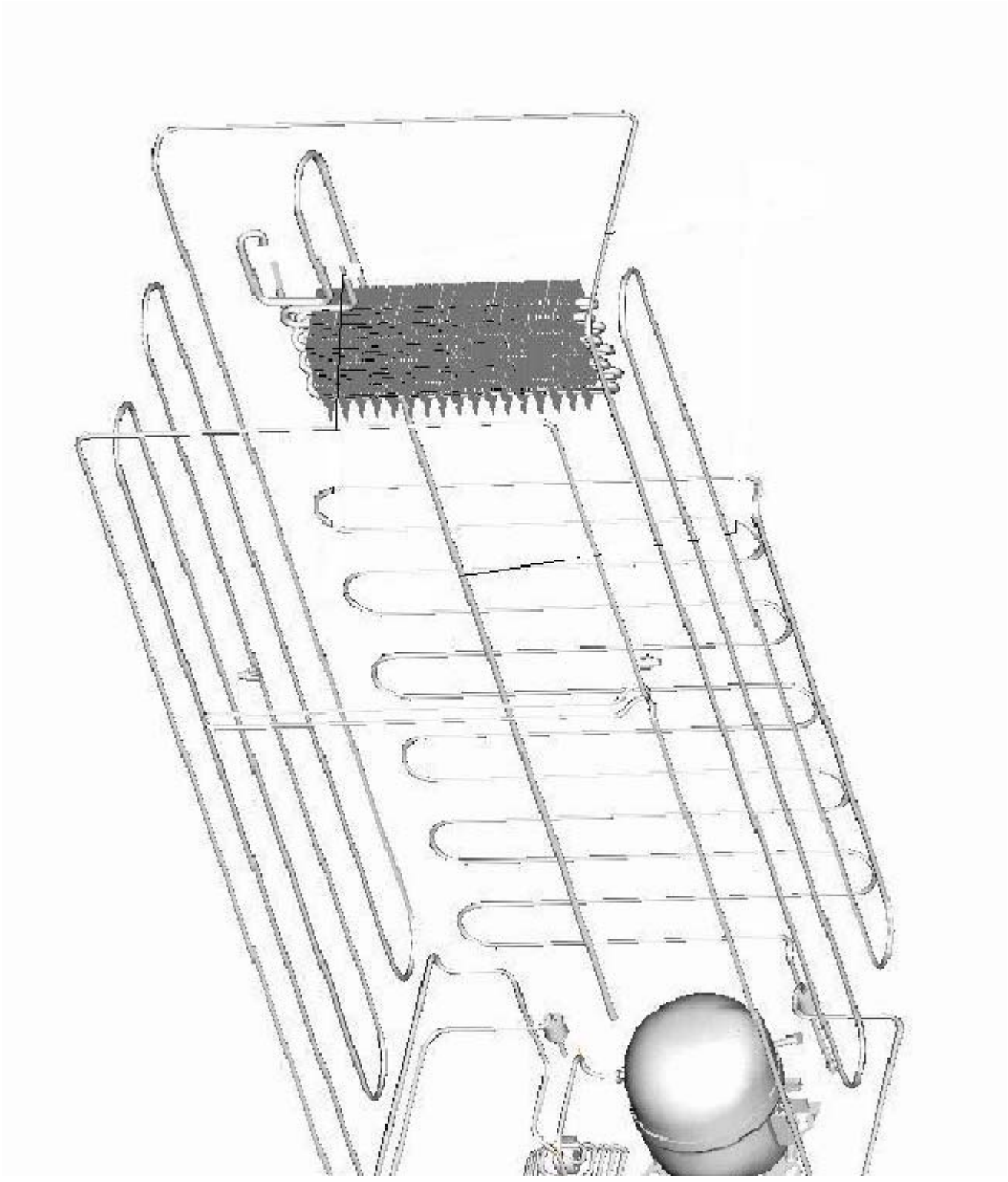
PROBLEM	POSSIBLE CAUSE	REMEDY
Compressor will not start	Service cord unplugged	Plug in electrical outlet
	No power at outlet	Check proper voltage avilability with multimeter
	Thermostat: a. Turned off b. Points not closing	Turn knob clockwise Place jumper between terminals. If compressor starts, thermostat is defective and should be replaced.
	Relay & OLP	Using starting cord, check compressor directly If compressor starts, check relay and OLP individually with mutimeter and replace one found to be defetive. If compressor doesn't start replace compressor.
	Loose connections	Check circuit from power source to compressor
	Motor winding	Check winding resistance for proper values. If found defective replace.
	Timer	Timer may be in defrost cycle. Turn clockwise past 2 o'clock. Wired wrong Check timer and replace, if defective.
	Compressor stuck	Try starting with starting cord. If compressor won't start, change compressor
Compressor runs, but no or insufficient Cooling	Moisture restriction	Characterized by heavy frost around evaproator inlet, Heat frosted area. If frost line moves farther along coil after heating, restriction was propably caused by moisture freeze up. Discharge unit evacuate, using system procedure and recharge
	Permanent restriction	First check for moisture restriction. Check for crimped or damaged tubing. Repair or replace leaking component.
	Low charge or no charge	Check for leak. Add leak charge if necessary to get internal pressure. Repair leak, or replace leaking component

Compressor kicks out on overload	High ambient and/or abnormal usage	On initial pull-down in high ambient, the compressor may cut off on overload, Instruct customer
	Low or high voltage	Check voltage with voltmeter. Voltage at outlet should be 160V to 260 V AC at the moment of start. Low voltage may cause false starts. High voltage may cause compressor to overheat
	Relay and/or OLP	Replace the defective part
	Compressor motor winding Shorted Overcharge	Check for winding resistance. Replace compressor if found defective. Check for high wattage and frosted suction line. Evacuate and recharge with correct charge.
	Compressor stuck	Change compressor
Freezer/ refrigerator compartment too warm	Thermostat: (a) Set too warm (b) Sensing tube not properly located (c) Out of caliberation or not functioning	Turn knob to higher number See that sensing tube is preperly located Check thermostat for cut-in and cutout temperatures.
	Interior Air Circulation: (a) Evaporator fan (b) Restriction in ducts (c) Air control open too wide	Check evaporator fan. Replace if defective Check for and remove obstruction in ducts
	Abnormal usage	Instruct customer
	Bad door seal or door not closing	Adjust door to obtain proper door seal Instruct customer to make sure door closes completely
	High ambient	Locate in area out of direct rays of sun and away form heat registers or other sources of heat
	Cabinet lights	Check to make sure door switch is closed. Replace, if necessary
	Excessive frost on evaportor	Check items under complaint, "Incomplete defrosting."

	Compressor won't run	Check items under complaint, "Compressor won't run."
	Compressor runs Continuously	Check items under complaint, "compressor runs but no refrigeration. or insufficient refrigeration
Freezer/ Refrigerator compartment too cold	Thermostat: (a) Set too cold (b) Sensing tube not properly positioned (c) Out of caliberation or not functioning	Turn knob to lower number Ensure proper positioning of the sensing tube. Replace if necessary
External sweating	Door seal	Adjust door for proper door seal
	Void in insulation	Voids are not likely to occur within cabinet walls. If in acessible area, fill it with fiberglass
Internal sweating	Abnormal usage	Instruct customer to cover foods and liquids
	Door seal	Check door seal and adjust door, if necessary. Instruct customer to be sure door closes completely.
	Insufficient air circulation	Make sure return air flow is not restricted. Increase cold air flow by operating refrigerator compartment as cold as possible without freezing food
Incomplete defrosting or high temperatures during defrosting	Limit switch	Check bimetal defrost control. If bimetal opens too soon defrost will be incomplete and frost will accumulate. If bimetal is struck closed or opens too late, high cabinet temperatures will result. A loose bimetal may cause the defrost heater to stay on too long. Change bimetal if defective.
	Timer	Check timer for proper operation. Timer should initiate 21 minute defrost cycle every 10 houres, Replace if defective
	Defrost heater	Check defrost heater with ohmmeter. Inoperative defrost heater will result in frost and ice acumulation on evaporator. Replace if defective.

	Drain clogged	Clogged drain may result in ice buildup in evaporator. Clear drain system.
Taste and odour	Odorous food	Keep food covered. Clean refrigerator and freezer with solution of baking soda and water. Explain to customer how odour and taste of food in refrigerator can be absorbed by ice cubes in freezer due to internal air circulation
	Hot plastic	Check for a heater in contact with plastic or sealing compound which may be causing odour.
Door will not close, or will not seal	Gasket binding	Adjust hinges, add shims if necessary Lubricate face of gasket on hinge side.
	Door warped	Loosen retainer screws and rack door to fit cabinet
	Cabinet racked	Level cabinet, make sure cabinet is setting solidly at all four corners

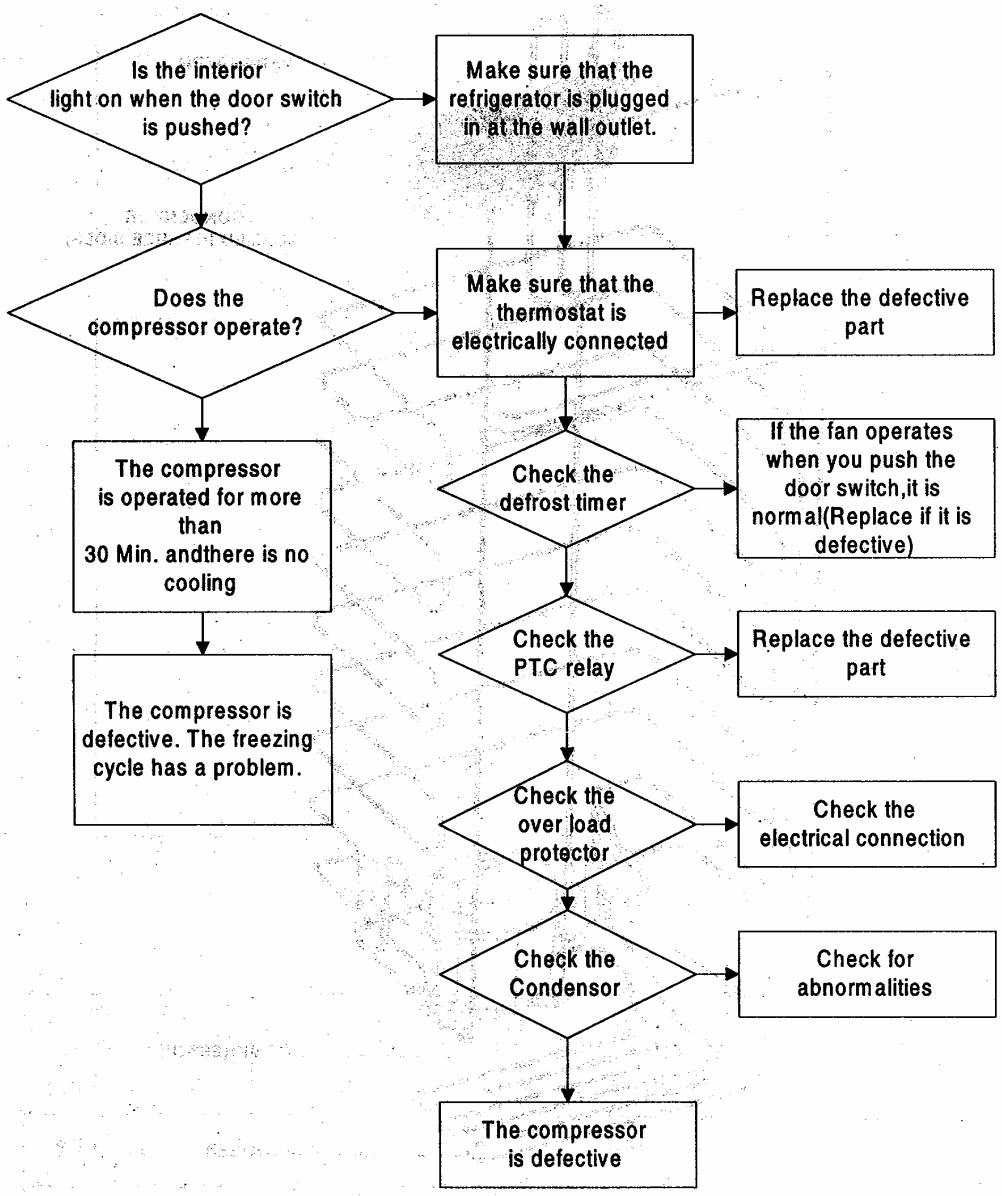
SEALED SYSTEM SCHEMATIC LAYOUT



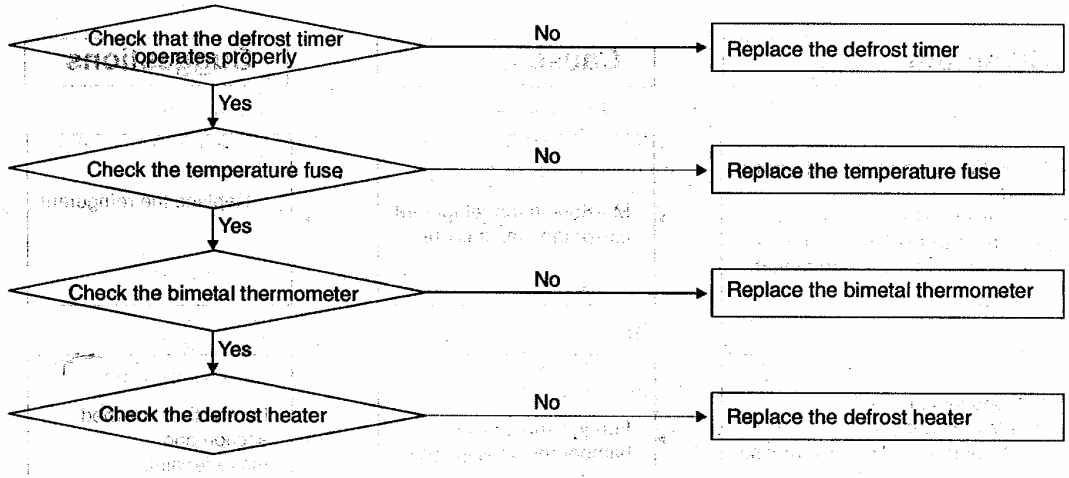
Symptom	Cause	Suggestions
• The EVAP cools down and warms again.		Replace the refrigerant

DIAGNOSTICS

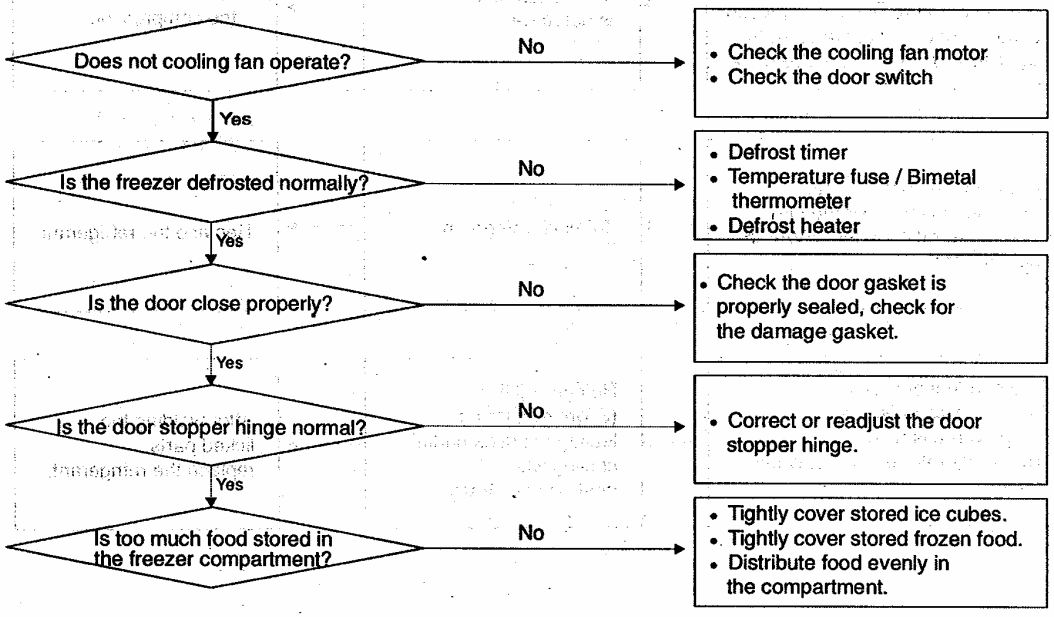
THE REFRIGERATOR DOES NOT OPERATE



DEFROSTING MECHANISM DOES NOT WORK

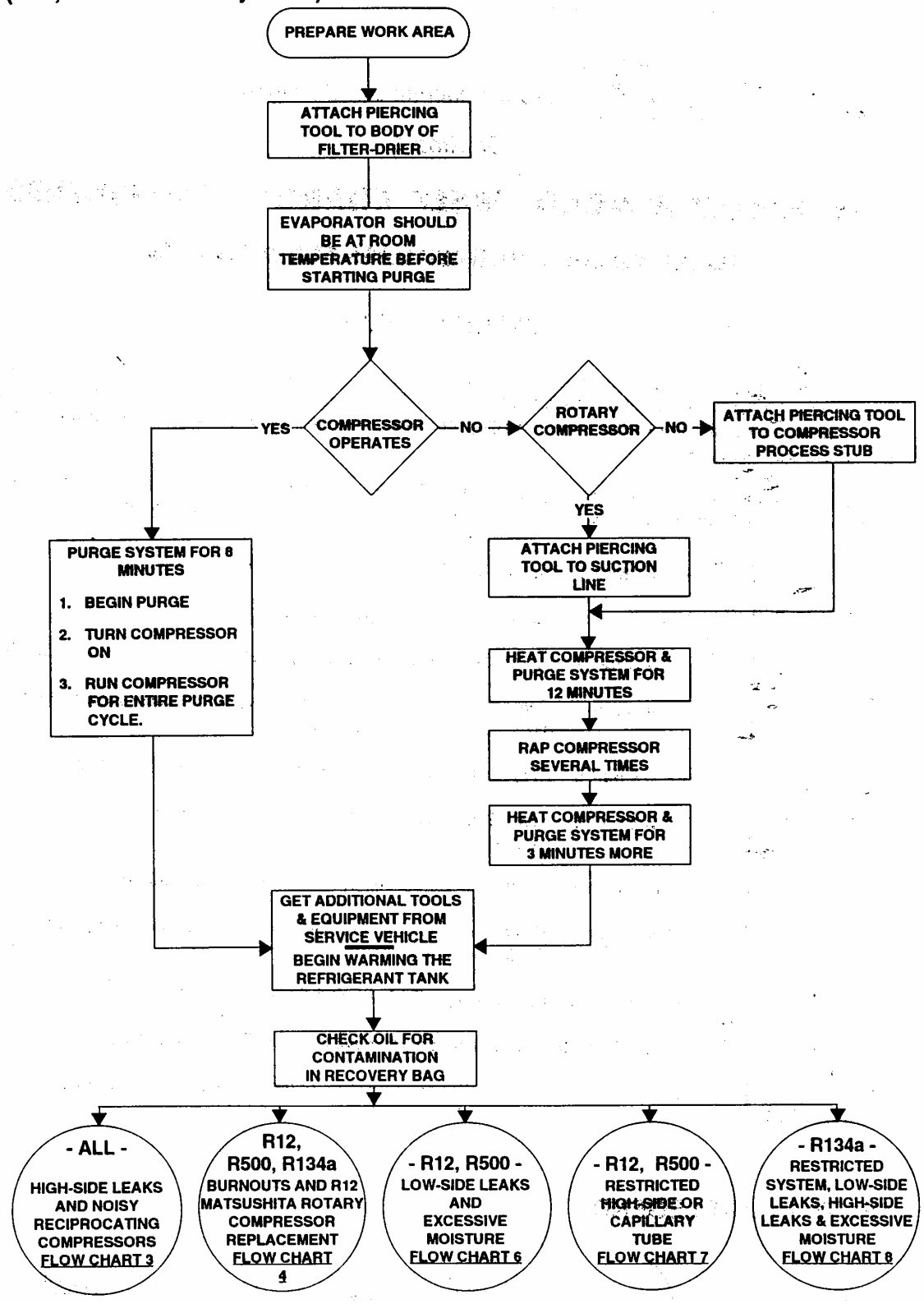


DEFROSTING MECHANISM DOES NOT WORK



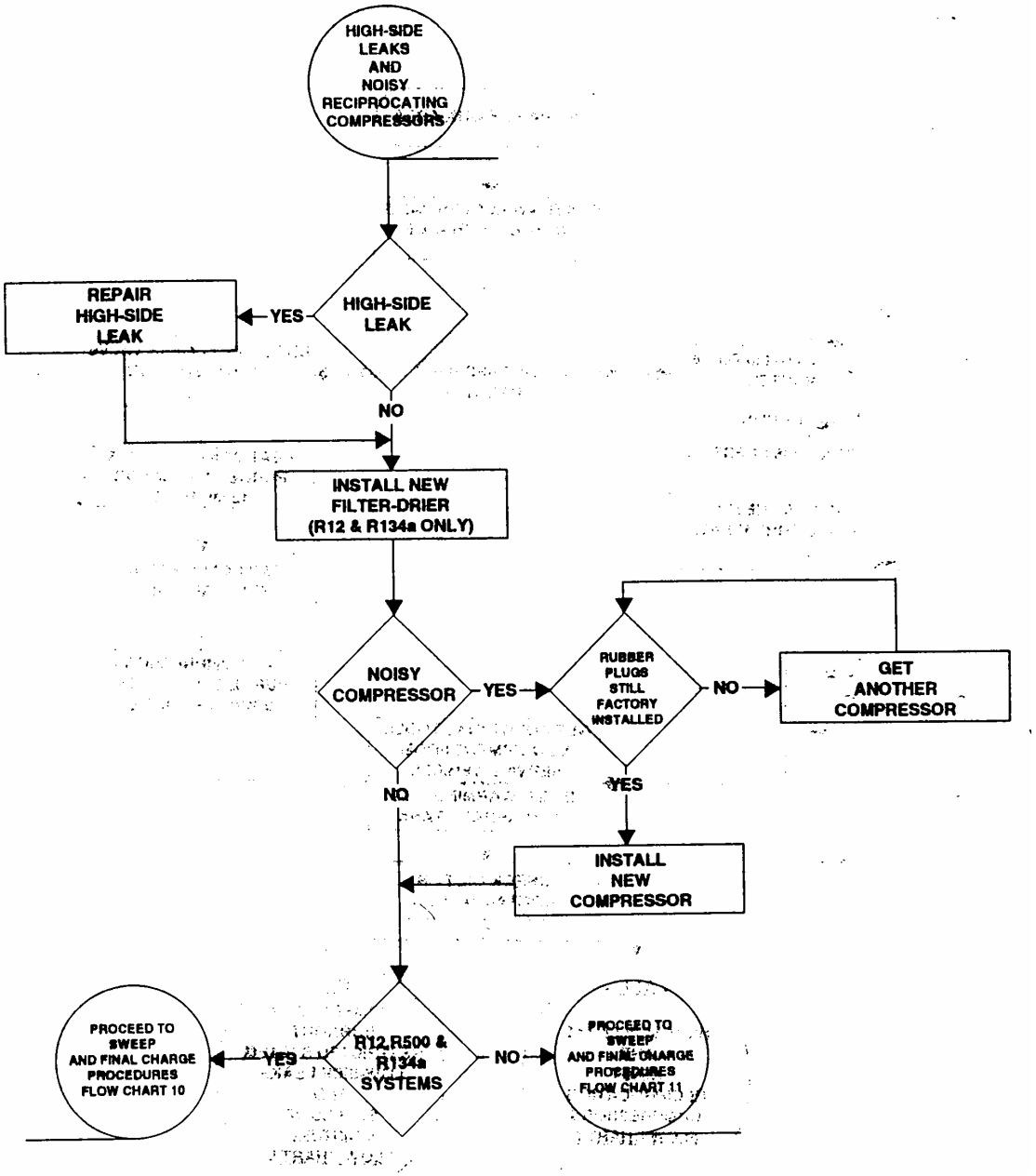
PURGING THE SYSTEM
(R12, R500 & R134a Systems)

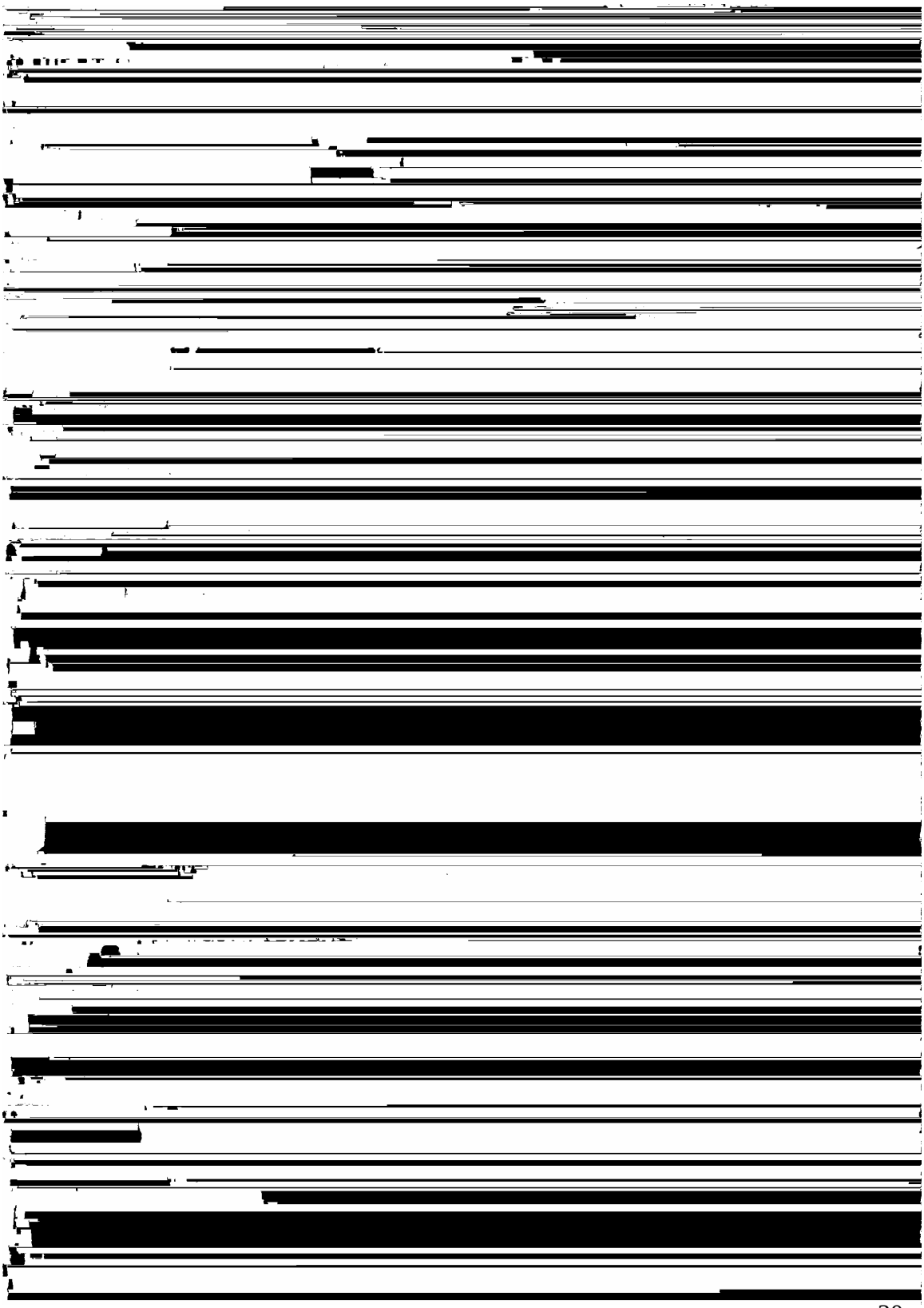
FLOW CHART 1



HIGH-SIDE LEAKS and NOISY RECIPROCATING COMPRESSORS (All Systems)

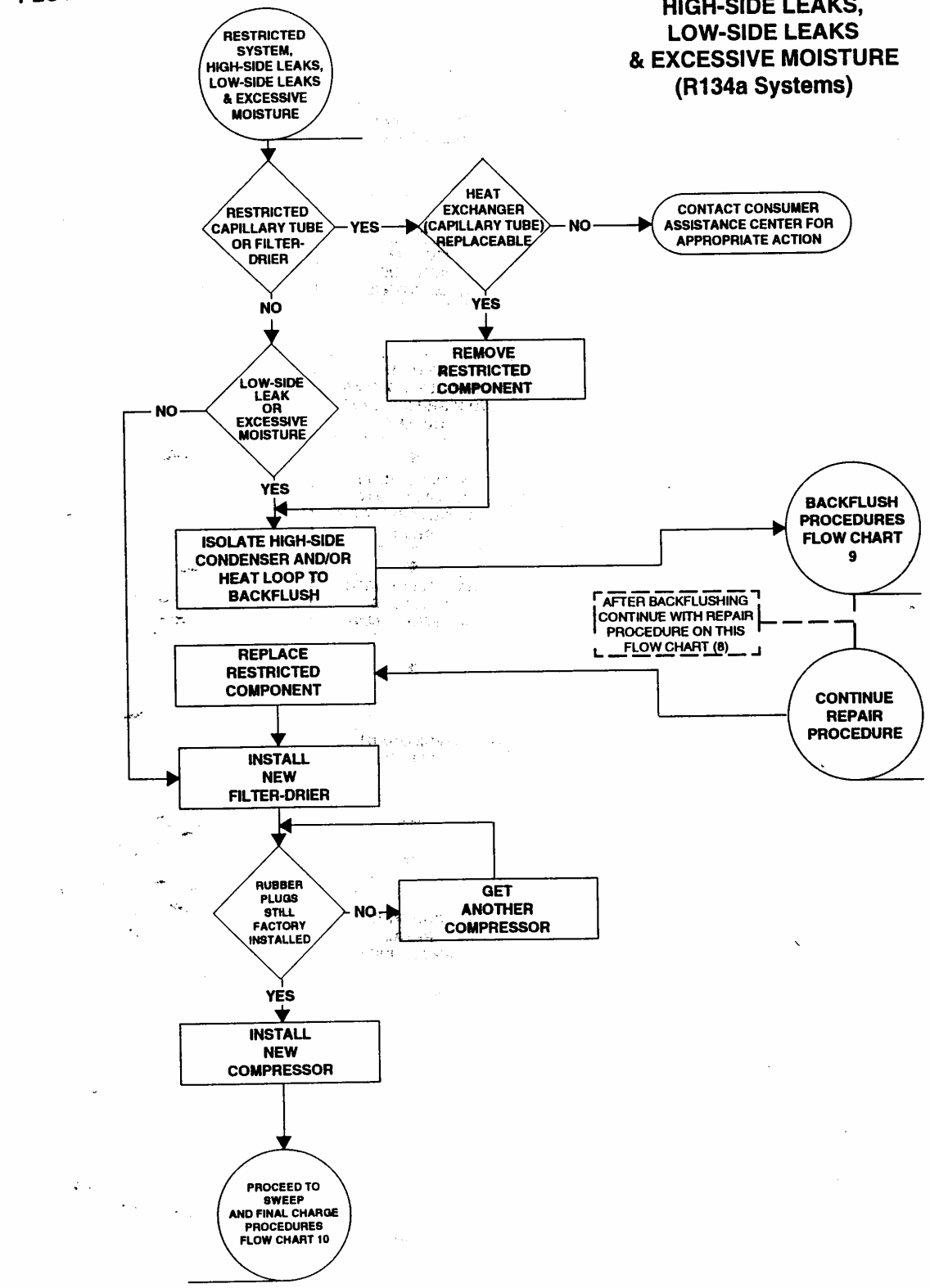
FLOW CHART 3





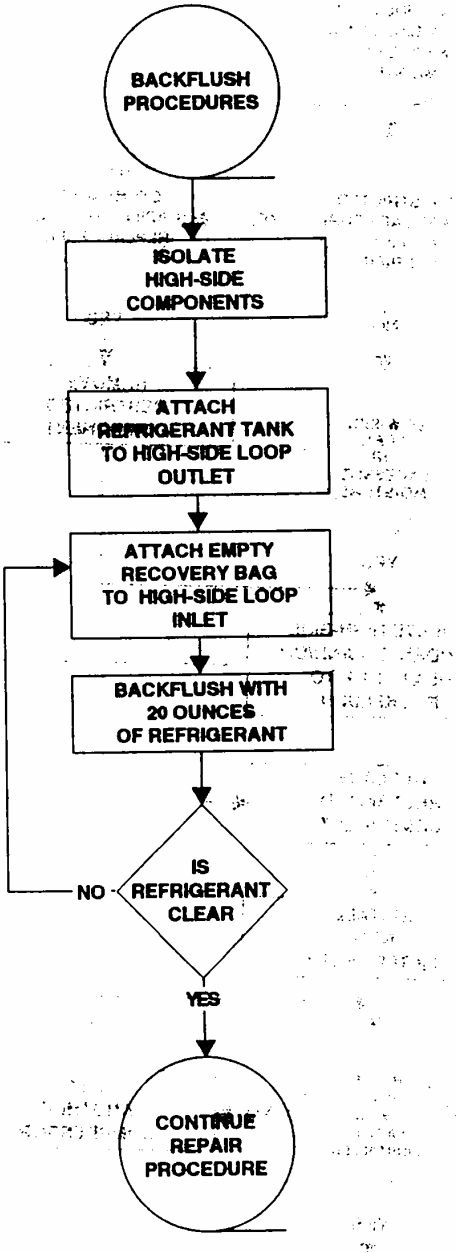
FLOW CHART 8

RESTRICTED SYSTEM, HIGH-SIDE LEAKS, LOW-SIDE LEAKS & EXCESSIVE MOISTURE (R134a Systems)



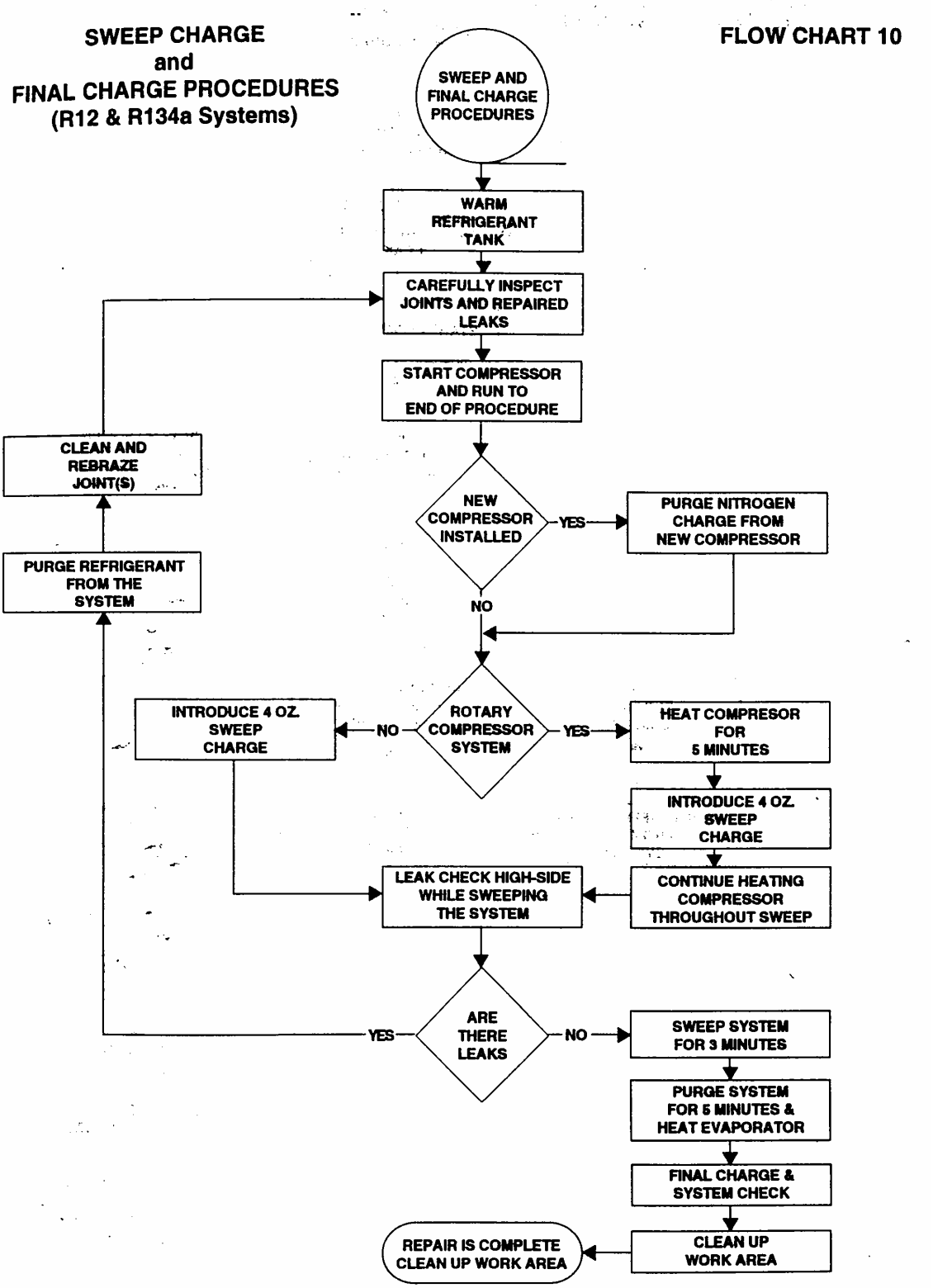
IOCEDURE
I Systems)

FLOW CHART BACKFLUSHING PF
(R12, R500 & R134a



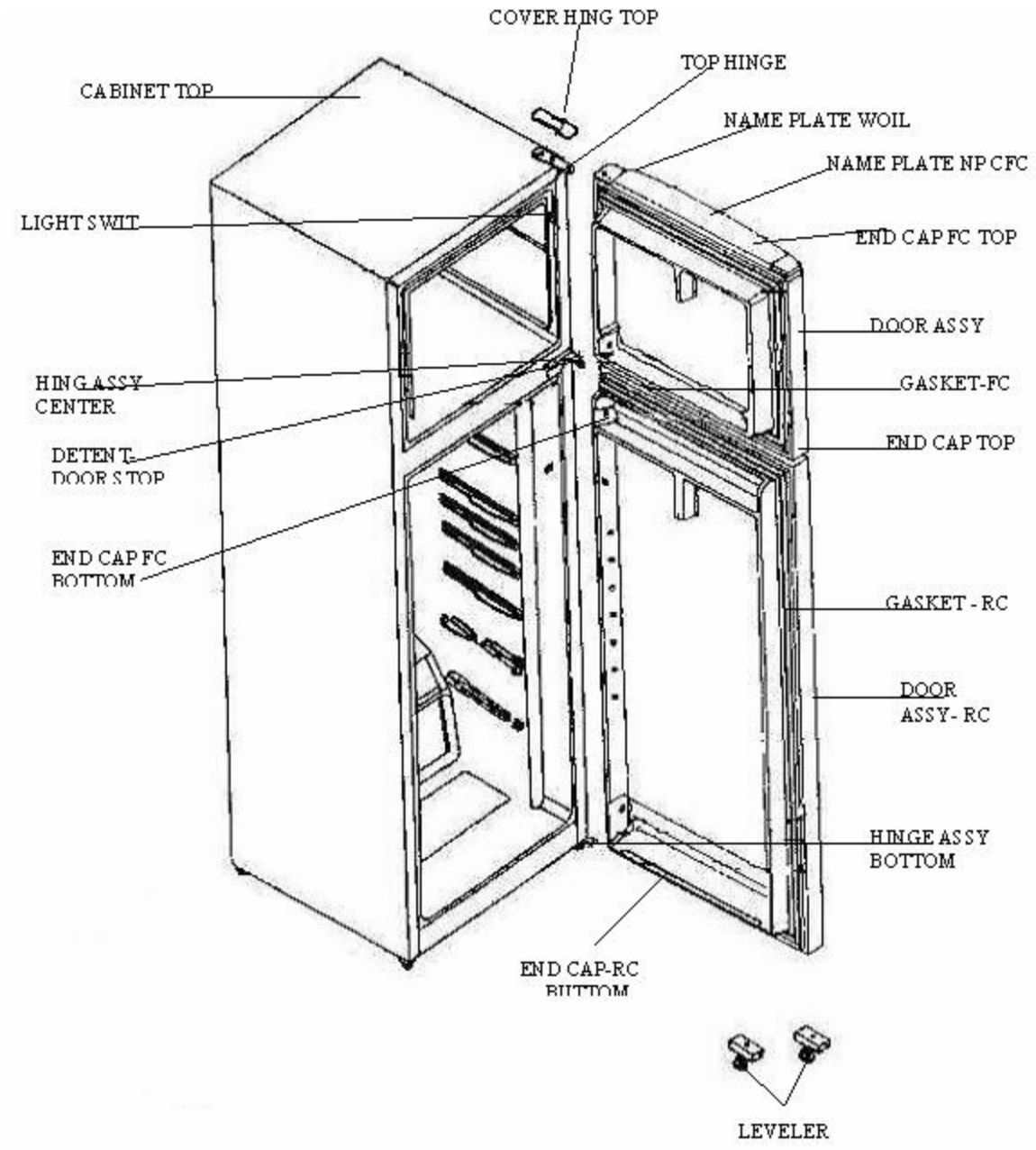
SWEEP CHARGE and FINAL CHARGE PROCEDURES (R12 & R134a Systems)

FLOW CHART 10

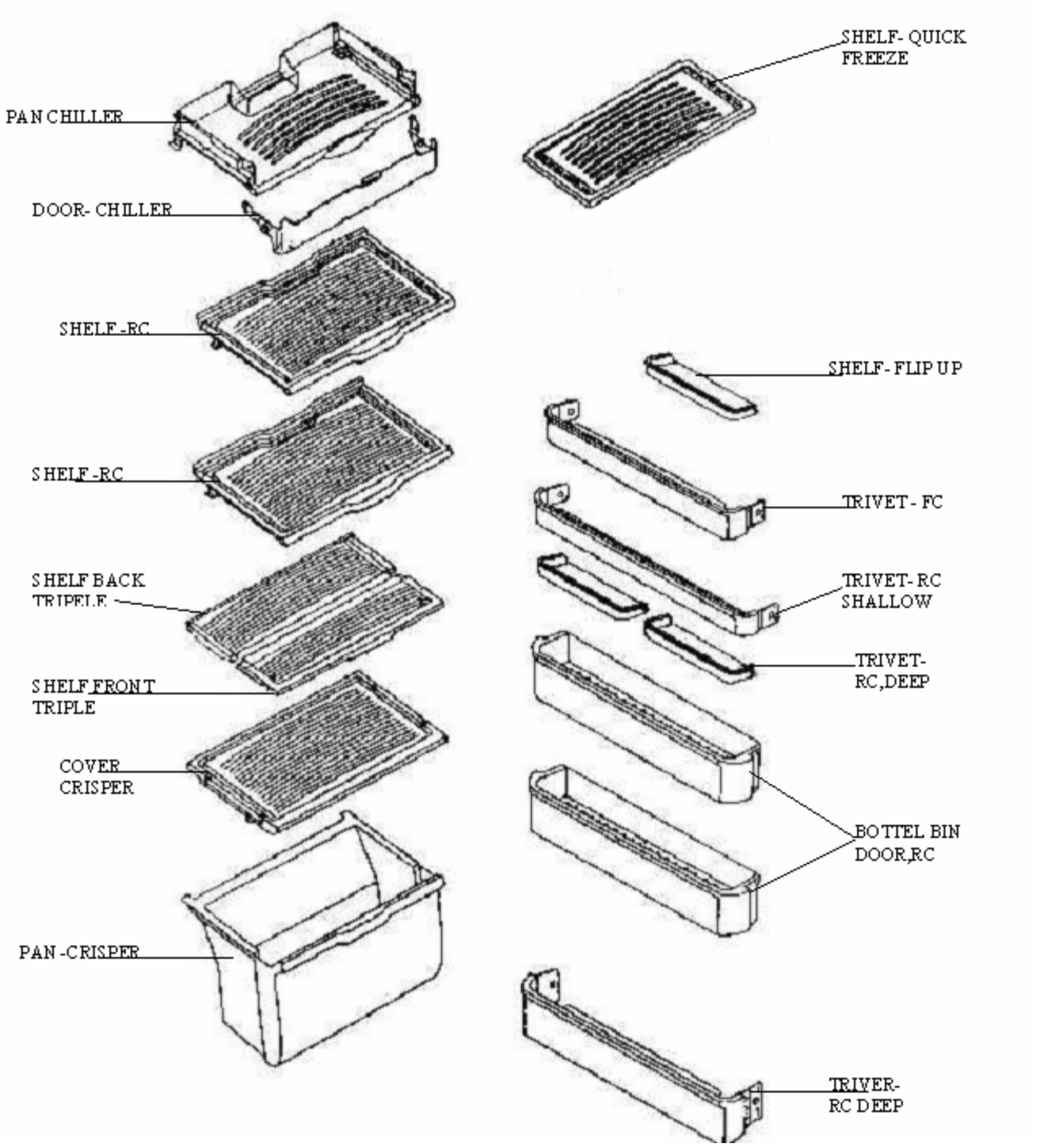


ASSEMBLY DRAWINGS

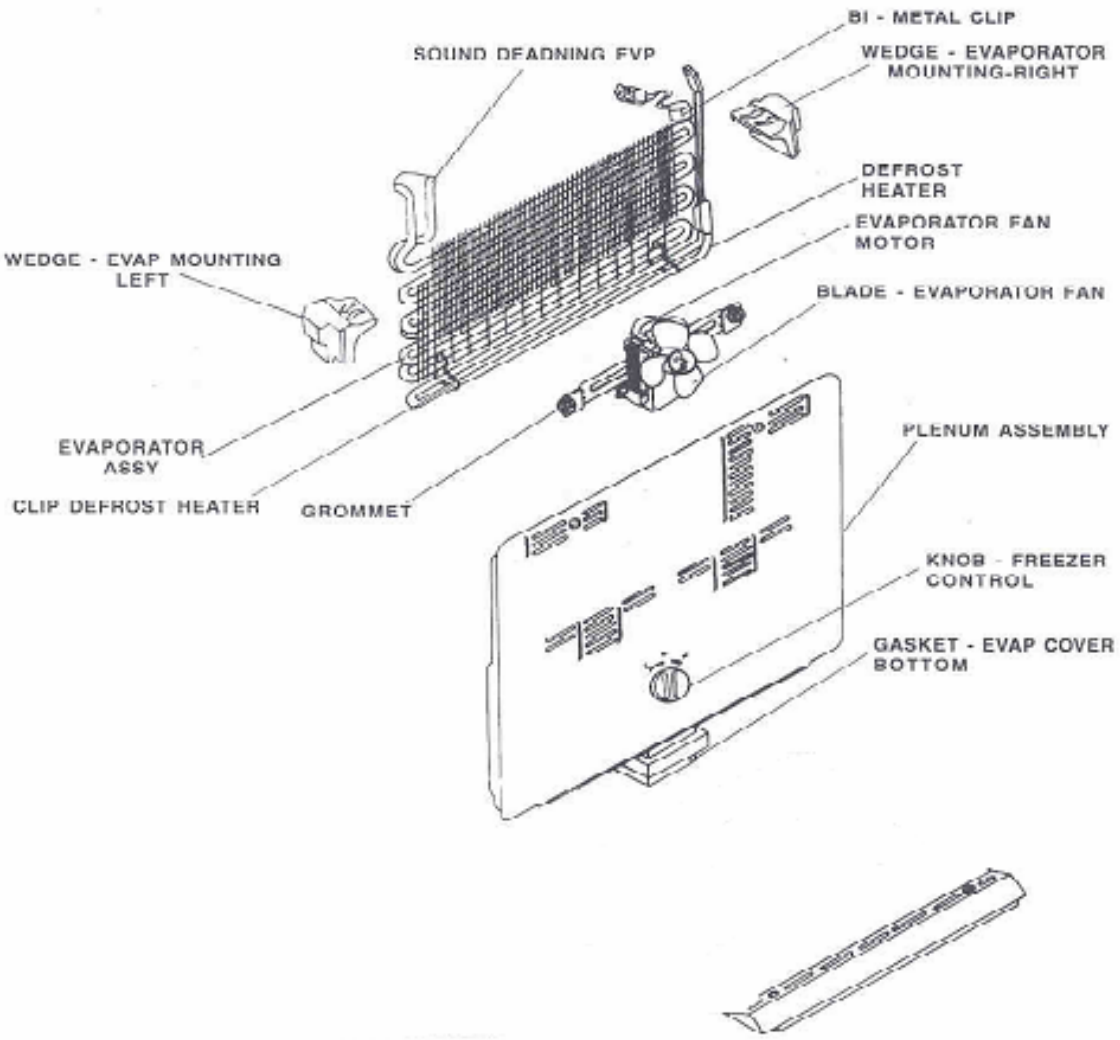
CABINET



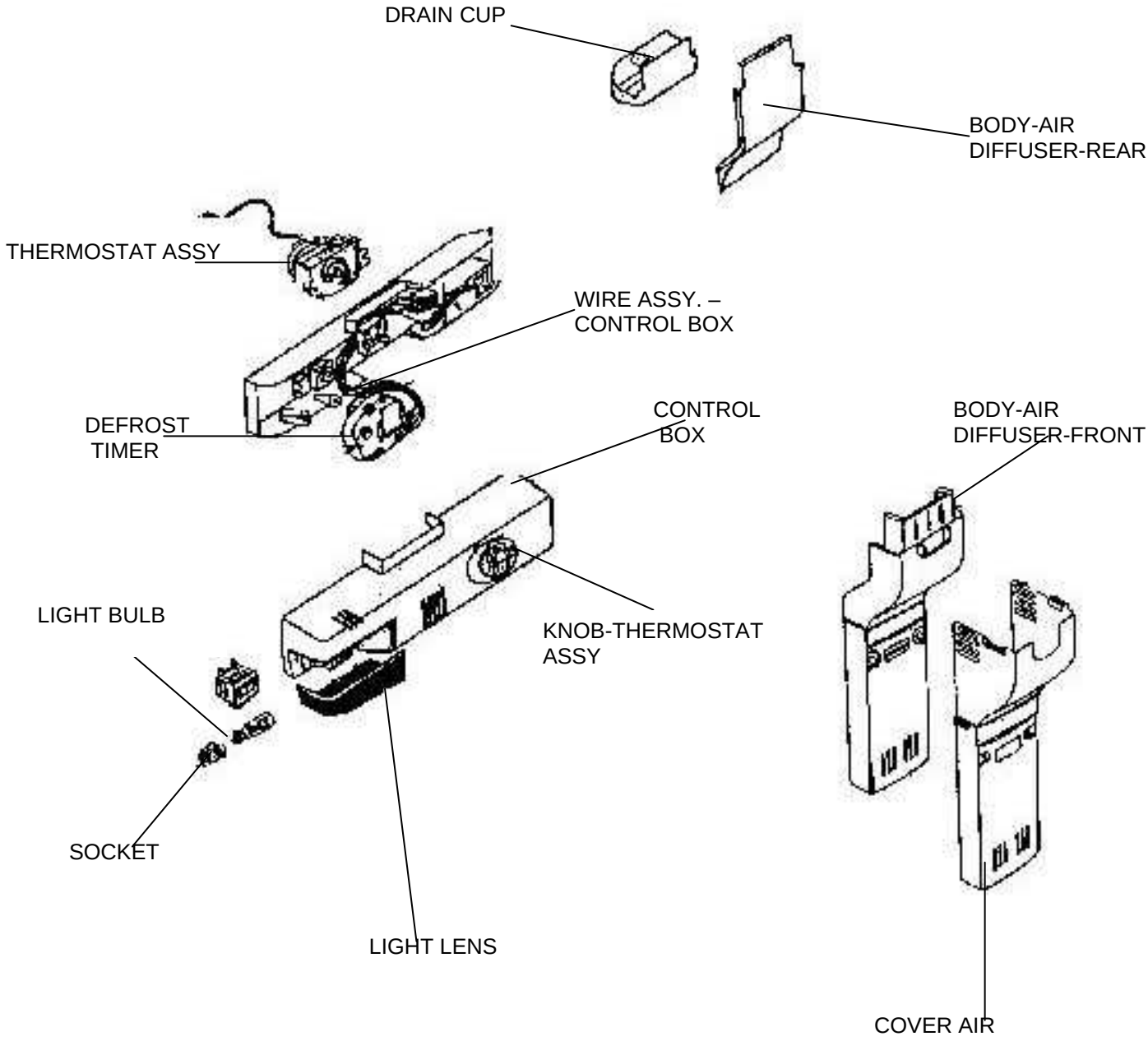
SHELVES


PAN CHILLER
DOOR- CHILLER
SHELF-RC
SHELF-RC
SHELF BACK TRIPELE
SHELF FRONT TRIPLE
COVER CRISPER
PAN-CRISPER
SHELF- QUICK FREEZE
SHELF- FLIP UP
TRIVET- FC
TRIVET- RC SHALLOW
TRIVET- RC,DEEP
BOTTEL BIN DOOR,RC
TRIVER- RC DEEP

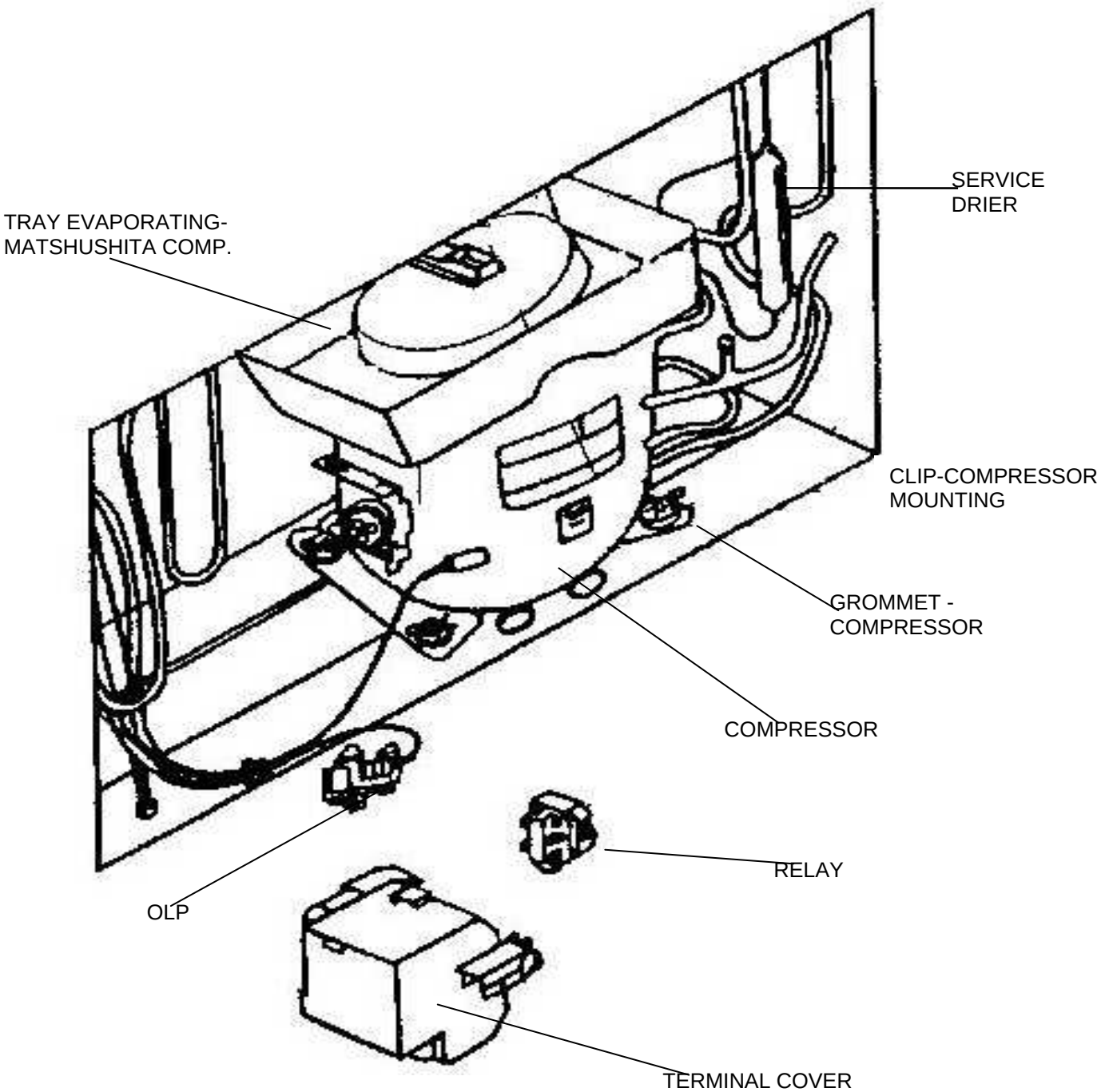
FREEZER COMPARTMENT ASSEMBLY



CONTROL BOX


DRAIN CUP
BODY-AIR
DIFFUSER-REAR
THERMOSTAT ASSY
WIRE ASSY. –
CONTROL BOX
DEFROST
TIMER
CONTROL
BOX
BODY-AIR
DIFFUSER-FRONT
LIGHT BULB
KNOB-THERMOSTAT
ASSY
SOCKET
LIGHT LENS
COVER AIR

COMPRESSOR


SERVICE
DRIER
TRAY EVAPORATING-
MATSHUSHITA COMP.
CLIP-COMPRESSOR
MOUNTING
GROMMET -
COMPRESSOR
COMPRESSOR
RELAY
OLP
TERMINAL COVER

PARTS LIST

S.No.	PART CODE	NAME OF PART	QUANTITY		
		Sap code :	9160	9161	9162
		12 NC Code :			
		Model :	WBM 470	WBM 480	WBM 490
		Description :	220L Thailand 4G	250L Thailand 4G	285L Thailand 4G
1	A2089430000	LOKRING, HT LOOP-DRIER(LR4NSt28)	1	1	1
2	A211597000A	GROMMET- COMPRESSOR MODIFIED	4	4	4
3	A201378000A	SOUND DDENING- EVAPORATOR	1	1	1
4	A201435000B	CLIP-COMPRESSOR MOUNTING	4	4	4
5	A201475000D	WEDGE, EVAP MOUNTING- RH	1	1	1
6	A2114410000	SUB ASSY WEDGE AL FOIL LH	1	1	1
7	A201612000B	RING SOLDER	1	1	1
8	A201613000B	RING SOLDER	1	1	1
9	A2116383800	COMPRESSOR SLEEVE-GNF	4	4	4
10	A201703000C	EVAPORATOR ASSY - PANASONIC	1	1	1
11	A2088730000	DRIER ASSEMBLY - LOK RING	1	1	1
12	A2035890000	COMPRESSOR PANASONIC, QB66	1	1	1
13	A211741000A	DEFROST WATER TRAY SUBASSY -New	1	1	1
14	A211762000A	DISCHARGE TUBE SUBASSY QB51,QB66,AQAw-5	1	1	1
15	A2088900000	TUBE RESTRICTOR,(0.65x1.93x2800mm	1	1	1
16	A2117700000	GROMMET CAPILLARY	1	1	1
17	A2088170000	LOKRING-COPPER TO STEEL (4NST19)	1	1	1
18	A2088160000	LOKRING-STEEL TO STEEL (4NST37)	1	1	1
19	A2089420000	LOKRING, DRIER- CAPILLARY (LR1NSt14)	1	1	1
20	A201166000C	FOIL- EVAP COVER	1	1	1
21	A2017130000	BLADE -FAN, EVAPORATOR (DIA 100)	1	1	1
22	A2013550000	SCREW- HEX HD, HI-LO SEMS	2	2	2
23	A201361000B	SCREW- PHILIPS PAN HD	5	5	5
24	A201437000A	PUSHNUT	1	1	1
25	A208641000A	PLENUM BACK ASSY	1	1	1
26	A2087670000	SUB ASSLY, PLENUM FRONT-G4G	1	1	1
27	A201495000C	KNOB -FREEZER CONTROL	1	1	1
28	A2087430000	DAMPER FREEZER CONTROL, G4G- 220L	1	1	1
29	A201637000A	GROMMET SOUND DDENING- FRONT	2	2	2
30	A2118010000	FAN MOTOR ASSLY-MI	1	1	1
31	A2016380000	GROMMET SOUND DDENING- BACK	2	2	2
32	A201207000H	COVER -CRISPER	1	1	1
33	A201206000H	CRISPER PAN	1	1	1
34	A201037000A	LIGHT LENS	1	1	1
35	A208546000C	FC GRILLE, FRAS	1	1	1

36	A201084000E	SHELF - RC	1	1	1
37	A201224000E	PAN CHILLER- 220/250L	1	1	
38	A201012000A	PAN CHILLER 285L			1
39	A201001000F	TRIVET- RC, SHALLOW	1	1	1
40	A201008000G	TRIVET- RC- DEEP	1	1	1
41	A201034000E	TRIVET, FC	1	1	1
42	A201178000B	SLIDE, HUMIDITY CONTROL BLUE	1	1	1
43	A201232000E	DOOR TRIVET- MIDDLE, RC- CLR	1	1	
44	A201021000F	DOOR BIN			2
45	A201391000C	SHELF FLIP UP 65L/ GNF	2	2	2
46	A201139000A	TRAY - EGG	2	2	2
47	A201331000C	TRAY-ICE	2	2	2
48	A201084000E	SHELF - RC	1	2	2
49	A208690550A	DOOR ASSY FC (FIP) B GREYG4G w/o Printing	1	1	1
50	A208691550A	DOOR ASSY RC 220L-B GREY-G4G EXPORT	1		
51	A208692550A	DOOR ASSY RC 250L-B.GREY-G4G EXPORT		1	
52	A208693550A	DOOR ASSY RC 285L-B GREY G4G EXPORT			1
53	A208857000A	NEW CORNER POST FRONT (Left & Right)-G4G	2	2	2
54	A208856000A	NEW CORNER POST RR- G4G	2	2	2
55	A208689000A	HANDLE EPS-G4G	1	1	1
56	A2087890000	SLEEVE FOAMED-220L G4G - EXPORT	1		
57	A2087900000	SLEEVE FOAMED-250L G4G - EXPORT		1	
58	A2087910000	SLEEVE FOAMED-285L G4G - EXPORT			1
59	A208687000B	PAD TOP-G4G	1	1	1
60	A2088325500	HANDLE COVER (GAS MOULDED),B GREY	2	2	2
61	A2088315400	HANDLE BASE (GAS MOULDED), SILVER	2	2	2
62	A211018000C	SUB ASSY - CENTRE HINGE, INTEGRATED	1	1	1
63	A2110190000	SUB ASSY, TOP HINGE - GNF/2G	1	1	1
64	A208673550A	HINGE COVER,B.GREY-G4G	1	1	1
65	A208728000A	REINFORCEMENT HANDLE-G4G	2	2	2
66	A201356000B	SCREW- PHILIPS HD,M4.8 x 16	2	2	2
67	A201358000E	PHILIPS HD SCREW, M4.0X0.7	2	2	2
68	A201670000A	SCREW- HEX WASHER HD	4	4	4
69	A201361000B	SCREW- PHILIPS PAN HD	2	2	2
70	S011320350C	SCREW-ST3.5X10-F,SPAN;STEEL	2	2	2
71	A201354000D	PHILIPS HD SCREW M5.5X1.8	10	10	10
72	A201356000B	SCREW- PHILIPS HD,M4.8 x 16	3	3	3
73	A201354000D	PHILIPS HD SCREW M5.5X1.8	5	5	5
74	A2116770000	BULB APPLIANCE, SINDOO	1	1	1
75	97918330000	BI-METAL CLIP	1	1	1
76	A201064000B	DEFROST HTER	1	1	1
77	A211405000A	CLIP-DEFROST HTER (SPIROTECH EVAP)	2	2	2
78	A2117510000	THERMAL FUSE WITH CONNECTOR	1	1	1
79	A211379000A	WIRE ASSY UNIT INTMD - GNF THAILAND EXP	1	1	1
80	A2116410000	FOIL- EVAPORATOR BACK	1	1	1
81	A2116420000	FOIL EVAPORATOR -LHS	1	1	1
82	A2116430000	FOIL EVAPORATOR -RHS	1	1	1
83	A201885000A	INNER RTH ASSY	1	1	1

84	A2117520000	BIMETAL WITH CONNECTOR	1	1	1
85	A201135000E	KNOB - THERMOSTAT, modified	1	1	1
86	A201472000A	SCREW- PHILLIPS PAN HD	2	2	2
87	A2014490000	SOCKET ASSY- LIGHT	1	1	1
88	A201594000H	CONTROL BOX, 220&250L	1	1	
89	A201593000J	CONTROL BOX -285L, DOMESTIC			1
90	A201616000B	SHIELD, ELECTRICAL LIGHT	1	1	
91	A201616000A	SHIELD, ELECTRICAL LIGHT			1
92	A2113990000	THERMOSTAT ASSY, 250/220L DOM	1	1	
93	A2087720000	THERMOSTAT WT ASSY250,285LG4G INVENSYS			1
94	A211098000B	DEFROST TIMER, 220V/50HZ, BAT, GIC	1	1	1
95	A211357000B	WIRE ASSY CONTROL BOX - BAT	1	1	1
96	A2114390000	HOLE PLUG, Dia 30mm	1	1	
97	A2014280000	FOIL, LINER- RS	1	1	1
98	A208614000B	FOIL LHS-FRAS	1	1	1
99	A201429000A	FOIL- LINER, LS	1	1	1
100	A201471000A	FOIL- CONTROL BOX	1	1	1
101	A2019250000	LABEL- WARNING, FIRE HAZARD	1	1	1
102	A201633000A	LABEL- EXTERIOR, CABINET	1	1	1
103	A2089840000	LABEL-WIRING DIAGRAM, Thailand G4G	1	1	1
104	A2035020000	LABEL- PROD DATA REGN, BLK	2	2	2
105	A2089850000	USE & CARE GUIDE, G4G THAILAND	1	1	1
106	A2080070000	LABEL - FOOD COVERING	1	1	1
107	A2089600000	RATING LABEL, 220L - Indonesia 4G	1		
108	A2089610000	RATING LABEL, 250L - Indonesia 4G		1	
109	A2089620000	RATING LABEL, 285L - Indonesia 4G			1
110	X01A41992K2	STICKER - (FIFO)	1	1	1
111	A2211090000	LOGO METALLIC WHIRLPOOL MP R 18 Dlx	1	1	1
112	A203501000A	LABEL- MODEL & SERIAL NO, BLK - SCOTT	1	1	1
113	A203501000A	LABEL- MODEL & SERIAL NO, BLK - SCOTT	2	2	2
114	A201634000A	LABEL- FC DOOR	1	1	1
115	A2089950000	ENERGY LABEL G4G Thailand- 220L	1		
116	A2089940000	ENERGY LABEL G4G Thailand- 250L		1	
117	A2089930000	ENERGY LABEL G4G Thailand- 285L			1
118	A2089830000	BACK PANEL STICKER, 220-4G THAI	1		
119	A2089820000	BACK PANEL STICKER, 250-4G THAI		1	
120	A2089810000	BACK PANEL STICKER, 285-4G THAI			1
121	A2089070000	AIR DIFFUSER SUBASSY 220L-MEPS	1	1	
122	A2088520000	AIR DIFFUSER SUBASSY G4G-285L			1
123	A2017080000	EXTN- BODY AIR DIFFUSER FRONT- 285L (L.C			1
124	A208568000A	EXTN-COVER AIR DIFFUSER, 285L-FRAS			1
125	A2086080000	AIR DEFLECTOR-FRAS	1	1	
126	A2087630000	COVER AIR DIFFUSER, DEO WITH GRAPHICS	1	1	
127	A201993000A	ASSY, PLATE - LEVELER - 2G	1	1	1
128	A201354000D	PHILIPS HD SCREW M5.5X1.8	4	4	4
129	A211571000B	SUB ASSY PLATE MOUNTING -COMPRESSOR	1	1	1
130	A201741000B	HINGE SUB ASSY, BOTTOM - 2G	1	1	1
131	A2088890000	SUB ASSY EPS BOTTOM (COMMON)	1	1	1

132	A2084290000	ICE TWISTER SUB ASSY - DOMESTIC & EXPORT	1	1	1
133	A208168000C	ICE TWISTER BRACKET	1	1	1
134	A2081860000	SUPPORT BUSH, ICE TWISTER	1	1	1
135	A208171000A	ICE COLLECTOR	1	1	1
136	A208172000A	HALF SHELF - QUICK FREEZE	1	1	1
137	A2087480000	SURROUND COOL HSG SUB ASSLY	2	2	2
138	A208666000B	ROTOR 360 COOL-G4G	2	2	2
139	A2086590000	EXTENSION 360 COOL - G4G			1
140	A208685000A	EPS for 360 Cool Ext.G4G			1
141	1111000023	FOAM PAD, 30X10X10	2	2	2
142	A2086950000	AIR SEPARATOR ASSY with two hole	1	1	1
143	A201996000A	PE FOAMSHEET, SELF ADHESIVE- CAB LINER	2		
144	11153180000	ELECTRICAL SHIELD	1	1	1
145	A2119060000	SUBASSY.CONDENSER with foam Grommets	1	1	1
146	21495450000	INSULATION LIGHT SOCKET	1	1	1
147	1111000024	FOAM PAD, 35X90X10	5	5	5
148	2153908000	GROMMET-HT EXCH	2	2	2
149	A2018890000	SCREW ANCHOR	8	8	8
150	A2117300000	DRAIN TUBE- BOTTOM ASSY	1	1	
151	A208697000D	BARRIER-SUB ASSLY	1	1	1
152	A2118770000	BOTTOM FILLER GASKET	2	2	2
153	21539110000	CLIP- HT LOOP	3	3	3
154	84233900000	GROMMET-CLOSED END	4	4	4
155	A201077550P	RAIL CENTRE, GNF- BGERY, PREPAINTED	1	1	1
156	A211808550C	CORNER - FILLER, GNF, BLACKISH GREY	2	2	2
157	A201170000B	PLATE -SCREW, CENTER HINGE	2	2	2
158	A201235000L	HEAT LOOP ASSY with foam grommets-220L	1		
159	A201370000L	HEAT LOOP ASSY with foam Grommets-250L		1	
160	A201080000L	HEAT LOOP ASSY with foam Grommets-285L			1
161	A211727000B	DRAIN TUBE ASSY-220L	1		
162	A211726000B	DRAIN TUBE ASSY - 250L		1	
163	A211725000B	DRAIN TUBE ASSY-285L			1
164	A2086680000	SURROUND COOL PIPE,220L-G4G	2		
165	A2086690000	SURROUND COOL PIPE,250L-G4G		2	
166	A2086700000	SURROUND COOL PIPE,285L-G4G			2
167	A2039575500	KIT CAB BODY ASSY 220LGNF,EXPORT B GREY	1		
168	A2097025500	KIT CAB BODY ASSY, 250L EXPORT, B. GREY		1	
169	A2097005500	KIT CAB BODYASSY 285 BGREY Prepaint-Export			1
170	A201591000A	SLING FLAP	1	1	1
171	A2016465500	HOLE PLUG PRESSFIT, B.GREY	8	10	8
172	A203550000A	SWITCH ROCKER ARM, NC- ESBEE	1	1	
173	A211774000B	CAB.WRG.HARNESS-NBAT-Non UL	1	1	1
174	9836040000	SCREW ANCHOR	3	3	3
175	A2080690000	RETAINER FOR LOCK BRACKET	1	1	1
176	A2089760000	OLP QB66	1	1	1
177	A2089770000	PTC RELAY QB66	1	1	1
178	A2089780000	PROTECTOR COVER	1	1	1