

GIO

Glass door merchandiser

SERVICE Manual

Model : GKM14HC



Table of contents

1. Precautions.....	4
1. General.....	7
2. R290 SERVICING, TOOLS	8
3. DIAGNOSIS OF THE SYSTEM	11
4. ACCESS OF THE REFRIGERATION SYSTEM.....	12
5. RECOVERY & VENTING.....	13
6. SYSTEM REPAIR.....	14
2. Product Features and Specifications	17
1. Specifications.....	17
2. Exterior dimensions.....	18
3. Temperature controller.....	19
4. Exterior.....	20
3. Installation.....	21
1. Installation Guide.....	21
4. Disassembly and Assembly.....	23
1. DISPLAY PCB	23
2. MAIN PCB	24
3. Condenser FAN MOTOR.....	25
4. Parts in compressor room.....	26
5. LED LAMP	27
6. DOOR.....	28
7. EVAP FAN MOTOR	29
8. ROOM Temperature Sensor	30
5. Electric Parts Composition.....	31
1. Circuit diagram(Schematic).....	31
2. Connector placement and specification (Main Board).....	32
3. Circuit Diagram of Main PCB	33
4. Circuit Diagram of Display PCB	34
5. Room Temperature Sensor Specification.....	35

Table of contents

6. Troubleshooting	36
1. Error Mode.....	36
2. When the power does not turn on.....	37
3. When the LED does not turn on.....	38
4. Compressor won't run.....	39
5. Evaporator Fan Motor won't run.....	40
6. Condenser Fan Motor won't run	41
7. Cooling system isn't working.....	42
7. Parts exploded view	43
8. Reference - Cycle composition	45

1. Precautions

CAUTIONARY STATEMENTS



DANGER: This unit is charged with propane refrigerant(R290). Propane is a flammable and explosive gas. Read this manual/guide carefully and follow all safety precautions contained herein to reduce the risk of fire and/or explosion. Failure to follow the safety precautions may result in serious injury or death, and/or property damage. To minimize the risk of incidental ignition due to incorrect parts or improper service, component parts shall only be replaced with like components and servicing shall be done by licensed and qualified personnel.

- **DANGER: Risk of fire or explosion. Flammable refrigerant used. Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.**
- DANGER – Risk Of Fire Or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.
- WARNING – Risk Of Fire Or Explosion. Dispose of used flammable refrigerants properly according to federal or local regulations.
- DANGER – Risk Of Fire Or Explosion. Flammable Refrigerant Used. Consult Repair Manual/Owner’s Guide Before Attempting To Service This Product. All Safety Precautions Must Be Followed
- DANGER – Risk of Fire or Explosion due to Flammable Refrigerant Used. Follow Handling Instructions Carefully in Compliance with National Regulations
- WARNING – Risk Of Fire or Explosion – Store in a well ventilated room without continuously operating flames or other potential ignition
- WARNING - Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- WARNING - The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.
- WARNING - Do not pierce or burn.
- WARNING - Be aware that refrigerants may not contain an odour.
- WARNING: Do not damage the refrigerating circuit.
- WARNING: Do not use electrical appliances inside the food/ice storage compartments unless they are of the type recommended by the manufacturer.
- **WARNING : Keep clear of obstruction all ventilation openings in the appliance enclosure or in the structure for building-in.**
- **WARNING: This product can expose you to chemicals including nickel, which is known to the State of California to cause cancer (For more information go to www.p65warnings.ca.gov**

1. Precautions

Avertissements et Précautions de sécurité



Unités de réfrigération contenant des hydrocarbures (R-290) Voir ci-dessous:

- DANGER – Risque d’incendie ou d’explosion. Fluide frigorigène utilisé. Doit uniquement être réparé par un technicien de service formé. Ne pas perforer la conduite de fluide frigorigène.
- AVERTISSEMENT – Risque d’incendie ou d’explosion. Éliminez les réfrigérants inflammables usagés conformément aux réglementations fédérales ou locales.
- DANGER – Risque d’incendie ou d’explosion. Fluide frigorigène utilisé. Consulter le guide du propriétaire ou le manuel de réparations avant d’essayer d’installer ou de réparer ce produit. Toutes les précautions de sécurité doivent être suivies.
- DANGER – Risque d’incendie ou d’explosion dû à l’utilisation d’un fluide frigorigène. Suivez attentivement les instructions de manutention conformément aux règlements nationaux.
- AVERTISSEMENT – Risque d’incendie ou d’explosion – Stocker dans un local bien ventilé sans présence continue de flammes ni d’autres sources d’inflammation
- MISE EN GARDE - Ne pas utiliser de moyens autres que ceux recommandés par le fabricant pour accélérer le processus de dégivrage ou pour nettoyer l’appareil.
- MISE EN GARDE - L’appareil doit être entreposé dans un local ne contenant pas de sources d’inflammation permanentes (flammes nues, appareil à gaz ou dispositif de chauffage électrique en fonctionnement, par exemple).
- MISE EN GARDE -Ne pas percer ou brûler.
- MISE EN GARDE - Attention, les fluides frigorigènes peuvent ne pas dégager d’odeur.

1. Precautions

REPAIR GUIDELINES

It is recommended to practice safe refrigeration repair techniques when servicing R290 refrigeration systems.

Because R290 is highly flammable, the use of a combustible gas leak detector is required when servicing R290 systems.

Repair on R290 systems must always be done in a well-ventilated area.

The EPA has exempted R290 from Section 608, Venting Prohibition; however, due to safety concerns, it is recommended that R290 be recovered with a R290 recovery unit.

Technician SAFETY Precautions

Please observe the following safety precautions in order to use safely and correctly the refrigerator and to prevent accident and danger during repair

- To avoid electrical shock, disconnect power cord from wall outlet and wait for more than five minute before handling electronic components.
- **The capacitor must be discharged. Unplug the power cord from the wall outlet, disconnect the capacitor from the power source, allow it to discharge (at least 5 minutes), and voltmeter to ensure there is no residual voltage**
- Disconnect power cord from wall outlet before replacing or repairing electric components.
- After unplugging the refrigerator, wait at least 5 minutes before plugging it back.
- **That no live electrical components and wiring are exposed while charging, recovering or purging the system;**
- Position the power cord in a manner to prevent damage when moving the refrigerator back into position.
- Do not plug a damaged power cord into the electrical outlet.
- Advise the consumer when the product is not on a dedicated electrical circuit as overloading may cause fire.
- Do not plug the refrigerator or freezer into a receptacle that is not properly grounded or not properly polarized or has incorrect voltage level.
- **Make sure the outlet grounding is secure. If the outlet does not have a grounding terminal, purchase a ground fault breaker and connect it to the outlet. In order to prevent electric shock due to short circuit, Never use gas pipes, telephone lines or other potential lightning rods as grounding.**
- **That there is continuity of earth bonding.**
- **Check the electrical components for water. If flooding is confirmed, the part is replaced or repaired using insulating tape.**
- Advise the consumer when any of the installation requirements are not met.
- Use only factory authorized parts and repair procedures.
- Advise the consumer to only perform procedures listed in the owner's manual.
- When evidence of moisture is present in or on any electrical component or circuit, unplug the product. Completely dry or replace the component, determine the cause and take proper steps to prevent reoccurrence.
- To prevent physical injury, do not touch moving parts such as fan blade
- Follow all safety precautions listed in the owner's manual and advise the consumer as needed.
- **Keep away from fire and keep flammable substances (benzene, thinner, alcohol, ether, cosmetics, LP GAS, etc.) near the product. Make sure it is not used in or kept inside. There is a risk of explosion due to fire or deterioration of the contents.**
- Remove any objects on top of the product, and any open containers inside the refrigerator before moving the refrigerator.
- When scrapping any refrigerator or freezer, remove the door/drawer gaskets to prevent children from suffocation.
- This product contains flammable refrigerant. Follow all relative company, federal, and local safety guidelines

1. Precautions

1. GENERAL

A. OVERVIEW & DISCLAIMER

DANGER: Do not attempt to open the refrigeration system. R290 (Propane) is a flammable and explosive gas.

The use of special tools and proper procedures performed by licensed, trained and qualified professionals is required. Like other refrigeration systems, a unit charged with R290 is not serviceable at a consumer level.

Warning, Caution and Danger statements in this service manual identify conditions or practices that could result in personal injury or loss of life.

This manual covers the procedures used to service the refrigerant, R290, and should be read completely before performing any service or repair on the equipment. All statements and information contained herein are believed to be accurate and reliable as of the date of publication. They are presented without guarantee or warranty of any kind, expressed or implied. The information provided here does not relieve the technician of the responsibility to perform their own assessment and analysis of the situation. The user of this manual assumes all risk and liability for the use of this information. You should also review the SDS for R290 refrigerant before beginning work to ensure that the required personal protective equipment (PPE) is appropriate. The manufacturer assumes no control or responsibility for the working environment or work activities of the reader or user of the information contained in this manual.

B. R290 INFORMATION & FACTS

R290 refrigerant is flammable, but the amount of refrigerant used is relatively small and the chance of ignition in the event of refrigerant leak is extremely low. Millions of commercial and residential refrigeration products are already using similar, if not identical, refrigerants worldwide.

R290 is a high-performance refrigerant. The superior thermodynamic properties of R290 compared to R404a and R134a allow for a reduced charge per system and lower system energy use.

R290 refrigeration grade propane has a much higher purity than standard propane. The higher moisture content of standard propane will damage a refrigeration system. Standard propane also has a scent added (another impurity) that refrigeration grade propane does not.

R290 is classified as a hydrocarbon (HC) A3 refrigerant, which is a natural, non-toxic, refrigerant and the top alternative to hydrofluorocarbon (HFC) refrigerants. R290 has an Ozone Depletion Potential (ODP) of 0 and an ultra-low Global Warming Potential (GWP) of 3.

1. Precautions

2. R290 SERVICING, TOOLS

WARNING: To maintain UL certification, component parts shall only be replaced with like components. ALWAYS use OEM components as they have specific UL certification for use in flammable environments.

WARNING: Electrical and servicing work should be done by licensed professionals. Disconnect power before performing service with a hydrocarbon leak detector on and in place. manufacturer does not assume responsibility for any damage to people or things deriving from violation, improper use or in any case not in compliance with instructions.

NOTE: Wire nuts are not approved for R290. All connections must be UL approved such as a push and lock connectors for wire connections. These connectors must have sufficient strength to hold the wire in place.

Basic safety precautions must be followed when using electrical appliances as the followings.

and manufacturer strongly recommend that any servicing must be performed by a qualified technician.

- Before this appliance is used, it must be properly installed and located in accordance with the Installation Instructions.
- Use caution, the unit does remain powered when system controls are used to turn off unit.
- Unplug unit before replacing the interior light
- Do not plug several appliances into the same wall outlet.
- Unplug the appliance before cleaning and making repairs.
- Do not touch the cold surfaces in the refrigerator compartment when hands are wet. Skin may stick to these extremely cold surfaces.
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do not store pharmaceutical products, scientific materials or other temperature sensitive products in this appliance
- Do not spray inflammable gas near the refrigerator
- Do not place this equipment directly under direct heat or sunlight.
- Unplug the appliance before cleaning and making repairs.
- Do not allow children to climb, stand or hang on the shelves in the refrigerator or doors. They could damage the refrigerator and seriously injure themselves.
- Keep fingers out of the "pinch point" areas; clearances between the doors and cabinet are necessarily small; be careful closing doors when children are in the area.
- Do not allow children to touch or play with the control panel
- Any deterioration in the insulation may cause fire.
- Do not stand or lean on the base panel, pull-out parts, doors and any other parts of the unit.
- For repair and disposal, conduct operations in repairable locations or outdoors. Flammable Refrigerant Used. The refrigerant is flammable and explosive, which can cause fires or burns
- This appliance is insulated with cyclopentane.
- Refrigerated pipes are installed inside the product and in the machine room and are not subject to excessive stress due to mechanical damage, twisting or other forces.
- The indoor equipment and pipes shall be securely mounted and guarded such that accidental rupture of equipment cannot occur from such events as moving furniture or reconstruction activities.

1. Precautions

A. R290 MAINTENANCE:

While regular cleaning of the condenser and evaporator is all the unit should need for many years of dependable service, in the event of a major issue, deeper service of the R290 refrigeration system may be required.

► Installation precautions

- The product must be installed in compliance with local regulations of your country, state, or province and the refrigeration system safety standard ASHRAE 15.
- The refrigerant charge must not exceed the refrigerant amount specified in the product specifications.
- Requirements for installation space

1) Refrigerant charge

- **Refrigerant:** R-290, 55g

- 2) The refrigerant charge must not exceed refrigerant charge.
- 3) The minimum installation space must be at least 2 inches on the sides and back (refer to the installation manual image)

► To connect electricity :

The power cord of this appliance is equipped with a grounding plug which mates with a standard grounding wall outlet to minimize the possibility of electric shock hazard from the appliance.

Do not, under any circumstances, cut or remove the ground prong from the power cord. For personal safety, this appliance must be properly grounded.

Have the wall outlet and circuit checked by a qualified electrician to make sure the outlet is properly grounded. If the outlet is a 2-prong outlet, it is your personal responsibility and obligation to have it replaced with the properly grounded wall outlet before using the unit.

A 3-prong outlet ensures the best performance and also prevents overloading building wiring circuits which could cause a fire hazard from overheated wires.

Never unplug your refrigerator by pulling on the power cord.

Always grip plug firmly and pull straight out from the outlet.

Repair or replace immediately all power cords that have become frayed or otherwise damaged. Do not use a cord that shows cracks or abrasion damage along its length or at either end.

► Electrical requirements

There are many factors that affect the operation of a refrigerator, but the electrical installation is the most important of these factors and should always be checked before plugging in the refrigerator.

- 1) Make sure the electrical installation complies with national, state, and local codes.
- 2) Make sure the circuit is properly grounded.
- 3) Check circuit for proper voltage at receptacle.
- 4) Make sure that the wire gauge and breaker sizes are correct and comply with the minimum allowance for voltage drops (rated $\pm 10\%$)

Note: The use of silicon sealant can inhibit the effectiveness of some types of leak detection equipment.

► Installation precautions in unventilated areas

- Danger - Risk of fire or explosion.
- Products that use flammable refrigerant and are installed in non-ventilated areas must be installed so that the refrigerant does not stagnate in the event of a refrigerant leak.

1) It must be stored in a designated space (appliances included - 2in*2in) or more.

2) It must be stored indoors in an area free from continuous flames (running gas appliances) or other potential ignition sources (running electric heaters, hot surfaces).

1. Precautions

► Notes on cable connection status

- Danger - Risk of fire or explosion.
- When servicing the product, the connecting cables must be checked for factors that may have a negative environmental impact, such as wear, corrosion, excessive pressure, vibration, sharp edges, etc.
- You must check for the possibility of separation due to aging or continuous vibration caused by elements such as compressors and fans.

► Recommendation on terms of use

- Climate class 5, dry bulb temperature 104°F(40°C), relative humidity 40% conditions.
- Do not introduce inflammable substances. Substances like thinner, benzene, LP gas, adhesive, etc., pose a risk of ignition and explosion
- Do not store pharmaceutical products, scientific materials or other temperature sensitive products in this appliance
- The appliance must be installed in accordance with the Refrigeration System Safety Standard, ANSI/ASHRAE 15.
- The device should not be installed in public hallways or lobbies.



- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

► CAUTION

- In order to avoid a hazard due to inadvertent resetting of the THERMAL CUT-OUT, this appliance must not be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly switched on and off by the utility.

B. R290 SERVICE TOOLS:

Most refrigeration tools that would be used on a 134a or 404a system are still required along with a few extra, such as a pinch off tool, Hydrocarbon leak detector, thermocouples or infrared thermometer, saddle or piercing valve, 12" hoses or short as possible to connect to the refrigeration system, No Smoking or Open Flames sign, propane fittings and a bottle of Refrigeration grade propane. An approved fire extinguisher is a must when servicing a system that contains a flammable refrigerant along with wet rags.

WARNING: You cannot use a halide leak detector on an R-290 system. Your leak detector must be designed for combustible gas.

► Replacement of parts

- Component parts must be replaced with like components.
- Servicing shall be done by authorized service personnel, to minimize the risk of possible ignition due to incorrect parts or improper service.
- Lamps must be replaced by identical lamps only.
- If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.

1. Precautions

C. R290 LABELING:

You can identify R290 symbol, located inside the unit, towards the top of left-hand wall and rear of bottom. Warning labels are also on the back of the box, near the evaporator and compressor. You will also notice that the compressor does not have service valves, instead it has process ports with red painted to indicate that it is R290 refrigerant.

CAUTION: Label design and location may vary.

3. DIAGNOSIS OF A SYSTEM

Opening the refrigeration system should be performed as a last resort. The refrigeration system contains less than 55 grams or 1.94 oz of refrigerant. The task of connecting to the system and properly sealing the system takes more time than a proper diagnosis.

Below are steps that should be reviewed first to verify a possible failed compressor scenario or confirm that you must access the system for further diagnosis.

- 1). Ensure power to the unit and fans are operating on both the evaporator and condenser coil, (if equipped).
- 2.) Use the "touch and feel" method to verify a properly operating system. The compressor discharge line should be hot, the drier should be warm, and the suction line should be cool or cold.



CAUTION: Beware of scalding from heat.

- 3). Check the compressor for temperature, vibration and noise.
- 4). Ensure power is being supplied to the compressor from the electronic controller.
- 5). Check the compressor for locked rotor or LRA as indicated by the data plate on the condenser.
- 6). Check compressor winding resistance and possible short to ground.
- 7). Check capacitance of start capacitor (12 μ F(179V)_ microfarad).



CAUTION: **The capacitor must be discharged. Unplug the power cord from the wall outlet, disconnect the capacitor from the power source, allow it to discharge (at least 5 minutes), and voltmeter to ensure there is no residual voltage**

- 8). Check compressor external relay and overload protector for continuity.

1. Precautions

4. ACCESS OF THE REFRIGERATION SYSTEM

If you have diagnosed an issue with the refrigeration system and a repair is necessary, such as replacement of the compressor; follow the procedures below. This guide is only an outline of proper R290 refrigeration practices. While EPA training is not required it is highly recommended that the service technician have knowledge of refrigeration and has completed a Hydrocarbon refrigeration course such as the one available by Refrigeration Service Engineering

A. WORK AREA SETUP

Instruct anyone in the immediate area as to the nature of the work.

Have an approved fire extinguisher within reach.

Ensure your Hydrocarbon leak detector is turned on as work begins. Place the detector close to the floor. Do not turn the combustible gas monitor off until you leave the service area.

► Precautions for detecting flammable refrigerants

- Danger - Risk of fire or explosion.

Under no circumstances should potential ignition sources (halogen torches, other flame-based detectors) be used when checking for refrigerant leaks.

In interior locations, it is recommended that a fan be in place, so any possible leak would be pushed to an open window or the exterior of the building, away from any possible source of ignition.

Place your Danger Propane placard, in a visible area near your work site.

WARNING: Be aware that a cell phone, E- cigarettes or similar electronic devices could be a source of ignition.

We recommend using proper personal protective equipment while performing the repair. Review your R290 Safety Data Sheet for more information.

With your combustible leak detector in place and on and free of alarm, disconnect power to the unit before performing service.

- Danger - Risk of fire or explosion.

1) To detect a refrigerant leak, you must follow the method below:

- (1) Refrigerant detection using bubbles
- (2) Refrigerant detection using fluorescent liquid

1. Precautions

B. INSTALLING TEMPORARY SERVICE PIERCING VALVES

Use temporary piercing valves to access the system on the process ports, you will notice the red painted this area.

Access the system using stubby gauges or manifold gauges with as short of hoses as possible.

Note: Verify pressures per R290 Pressure Temperature Chart at the end of this document to help further diagnose the refrigeration issue before moving forward.



Caution!

When appliance connection piping parts, be sure to remove the power. Protective devices, piping, and fittings must not be subject to negative environmental influences (standing water, freezing, accumulation of dirt and debris, etc. When replacing piping, the piping must be secured to prevent excessive vibration or pulsation.

5. RECOVERY & VENTING

To remove the refrigerant from the system, recovery of R290 is not required by the EPA.

WARNING: DO NOT USE A REFRIGERANT RECOVERY MACHINE THAT IS NOT DESIGNED FOR USE WITH R290 REFRIGERANT.

► Precautions when removing refrigerant

• Danger - Risk of fire or explosion.

- 1) Remove refrigerant safely according to applicable local and national regulations.
- 2) Purge (clean) the pipes with inert gas.
- 3) After purging the pipes, evacuate from the refrigerant gas for at least 10 minutes.
- 4) Purge (clean) again with inert gas.
- 5) Open the circuit by cutting or brazing

* If ventilation is not permitted by local and national regulations, refrigerant must be recovered into cylinders.

A. RECOVERY & VENTING WITHOUT THE USE OF A RECOVERY CYLINDER (OUTDOOR PROCEDURE)

You must use the high and low side valve to release the refrigerant from the system into a well-ventilated area, such as outdoors, away from any ignition source. This will allow the refrigerant to dissipate into the air. Ensure that you are not venting into a low-lying area. R290 is heavier than air and can accumulate in floor drains, grease traps, piping trough, etc. If the leak detector goes off close the valves and wait for the detector to level off. Continue to release as above until the unit is clear of pressure.

After removing the refrigerant, purge the system with oxygen free dry Nitrogen for a minimum of 1 minute.

Only after the refrigerant has been completely removed and the unit has been purged, USE A TUBE CUTTER to cut out the bad parts. NEVER USE A TORCH as R290 refrigerant may still be present in the system.

1. Precautions

B. RECOVERY & VENTING WITH THE USE OF A RECOVERY CYLINDER (INDOOR PROCEDURE)

If the unit is indoors, the use of a proper recovery cylinder should be used, to vent the refrigerant outside later.

Evacuate an empty recovery cylinder into a vacuum. Using an accurate refrigerant scale, zero out the refrigerant scale and weigh the empty recovery cylinder prior to adding refrigerant gauges or hoses. Note this weight. Connect the evacuated cylinder to the refrigeration system using refrigerant gauges and hoses. Open both refrigerant gauges to allow refrigerant to flow through the gauges to the recovery cylinder. You must evacuate from both sides. Once the pressures have equalized, turn off refrigerant gauge valves and the recovery cylinder inlet. Carefully remove the refrigerant hose from the recovery cylinder. Zero out the refrigerant scale and weigh the recovery cylinder. Note this weight. Subtract the empty tank weight recorded from the cylinder now containing the refrigerant. This will be the amount recovered.

NOTE: You can check the serial tag to verify any leak.

A recovery cylinder containing R-290 can be vented outdoors. After venting the refrigerant, purge the recovery cylinder with nitrogen at a flow rate of 5 psig through the liquid port of the recovery cylinder for 2 minutes outdoors. Keep a 10 feet perimeter from any structures or ignition sources.

Repeat these steps until the recovery cylinder and the system equalize into a vacuum.

After removing the refrigerant, purge the system with oxygen free dry Nitrogen for a minimum of 1 minute.

Only after the refrigerant has been completely removed and the unit has been purged, USE A TUBE CUTTER to cut out the bad parts. NEVER USE A TORCH as R290 refrigerant may still be present in the system.

6. SYSTEM REPAIR

Prep your connections before you remove the plugs on a replacement compressor or drier. This will limit the amount of time the compressor is open to minimize the chance of moisture being absorbed into the refrigeration oil.

A. SYSTEM PURGE

Before and during brazing you must purge with oxygen free dry nitrogen for a minimum of 2 minutes before and during the repair. This will displace any possible trapped refrigerant in the system. Allow the nitrogen to flow through the high side process tube and exit out the suction process tube. We recommend you set the nitrogen regulator between 2-5psig.

B. SYSTEM LEAK CHECK

After the repair is complete, pressurize the system to no more than 150 psig of nitrogen to leak check.

CAUTION: Never add anything to the refrigeration system except nitrogen for leak checking.

C. SYSTEM EVACUATION

The exhaust of the vacuum pump should be vented outside with a hose. Release the nitrogen charge to less than 2 psig to keep pressure on the refrigeration system. Connect your vacuum pump and start the vacuum process as soon as possible. Continue to evacuate the system until you reach a minimum 300 μ microns. Verify that the system holds vacuum to confirm no leak in the system.

1. Precautions

D. CHARGING THE SYSTEM

Close the high and low side manifold gauge. Disconnect your vacuum and connect to refrigeration grade R290 refrigerant. **DO NOT USE RESIDENTIAL HEATING/COOKING PROPANE.**

Connect your charging hose to the R290 tank. Place the refrigerant on the charging scale. With the refrigerant bottle closed, open the charging hose to vacuum for two minutes. This will make sure the amount of refrigerant in the charging hose is accounted for. Zero the scale. Open the R290 tank and if required the charging port valve. R290 can be charged as a gas or liquid. Open your high side valve and allow all of the charge into the system. After a few minutes, if the system does not allow all the charge to be taken, close your high side valve. Plug in the system and allow it to run for one minute- after the two-minute compressor start delay. Slowly open the low side valve to pull in the remaining charge. Once the system is fully charged, close your refrigerant tank and charging port. Verify system operation. To remove the refrigerant that is part of your charge in the high side hose you must pinch off the high side process port. Open the high and low side valve to pull in the remaining refrigerant in the low side hose.(DESIGNED PRESSURE HS/ 243 ,LS/ 20 psig)

► Precautions when charging refrigerant

- Danger - Risk of fire or explosion.

- 1) When charging refrigerant, you must check the refrigerant used in the product. (Be careful not to cause contamination with other refrigerants)
- 2) Refrigerant charge hoses should be as short as possible
- 3) Before charging refrigerant, you must check the product's grounding condition.
- 4) After charging the refrigerant, the charging amount must be labeled.
- 5) When recharging refrigerant, the amount of refrigerant on the product's specification label must not be exceeded
- 6) When recharging the refrigerant, be careful not to get too much moisture in the inner casing.

E. ACCESS PORT REMOVAL & SYSTEM SEALING

After the refrigeration system function has been verified and leak checked. The temporary process ports must be removed. Using the pinch off tool, pinch the process port 2" away from the temporary process valves, towards the compressor. Leave the pinch off tool connected. Cut off the access valve. Pinch down the process port to make it easier to weld. Verify with soap bubbles you do not have a leak before welding. Repeat these steps for the low side process port.

If the pipe of identifying process red painted have been removed for the repair, they must be painted after the tubes have cooled down.

1. Precautions

F. Decommissioning

It is strongly recommended that disassembly of the device be performed by a qualified technician.

use the refrigerator sagely and properly and avoid damage to body and property during Decommissioning. Please observe the following "Safety Warning"

WARNINGS

• **DANGER: Risk of fire or explosion. Flammable refrigerant used. Do not use mechanical devices to defrost refrigerator.**

• DANGER – Risk Of Fire Or Explosion. Flammable Refrigerant Used. To Be Repaired Only By Trained Service Personnel. Do Not Puncture Refrigerant Tubing.

• WARNING – Risk Of Fire Or Explosion. Dispose of used flammable refrigerants properly according to federal or local regulations.

• WARNING - Be aware that refrigerants may not contain an odour.

CAUTION

• To avoid electrical shock, disconnect power cord from wall outlet and wait for more than five minute before handling electronic components.

• The capacitor must be discharged. Unplug the power cord from the wall outlet, disconnect the capacitor from the power source, allow it to discharge (at least 5 minutes), and voltmeter to ensure there is no residual voltage

R290 is classified as a hydrocarbon (HC) A3 refrigerant, which is a natural, non-toxic, refrigerant and the top alternative to hydrofluorocarbon (HFC) refrigerants. R290 has an Ozone Depletion Potential(ODP) of 0 and an ultra-low Global Warming Potential (GWP) of 3.

The label for flammable refrigerants can be found on the inside of the refrigerator, on the top left wall and on the back of the bottom, with the symbol r290. Warning labels are also located on the back of the appliance, near the evaporator and compressor. The appliance must be labeled as being discarded and refrigerant emptied, and must be dated and signed.

Please refer to the method of removing and recovering refrigerant using a cylinder.

- (4. Refrigeration System Access and 5. Recovery and Ventilation Items)

If you need to remove the compressor or compressor oil, purge the system with nitrogen after removing the refrigerant to ensure that no flammable refrigerant remains. If you need to return the compressor to the supplier, you will need to vacuum it. To speed up this process, only use electric heating on the compressor body. When draining oil, do so safely.

As this product uses cyclopentane as an insulating material, for safe disposal, contact the relevant to federal or local regulations for proper disposal.

Cautions !!

Refrigerators that are abandoned or scheduled for disposal are at high risk of causing accidents.

For example, children may get caught or suffocated.

For refrigerators that are scheduled for disposal, follow the guidelines below to prevent accidents.

Before disposal Refrigerator:

- Take off all of the doors or Gasket.
- Leave the shelves in place so that children may not easily stay inside.

Your old refrigerator may have a cooling system that uses "Ozone Depleting " chemicals. If you are throwing away your old refrigerator, make sure the refrigerant is removed for proper disposal by a qualified service technician. If you intentionally release any refrigerants you can be subject to fines and imprisonment under provisions of environmental regulations.

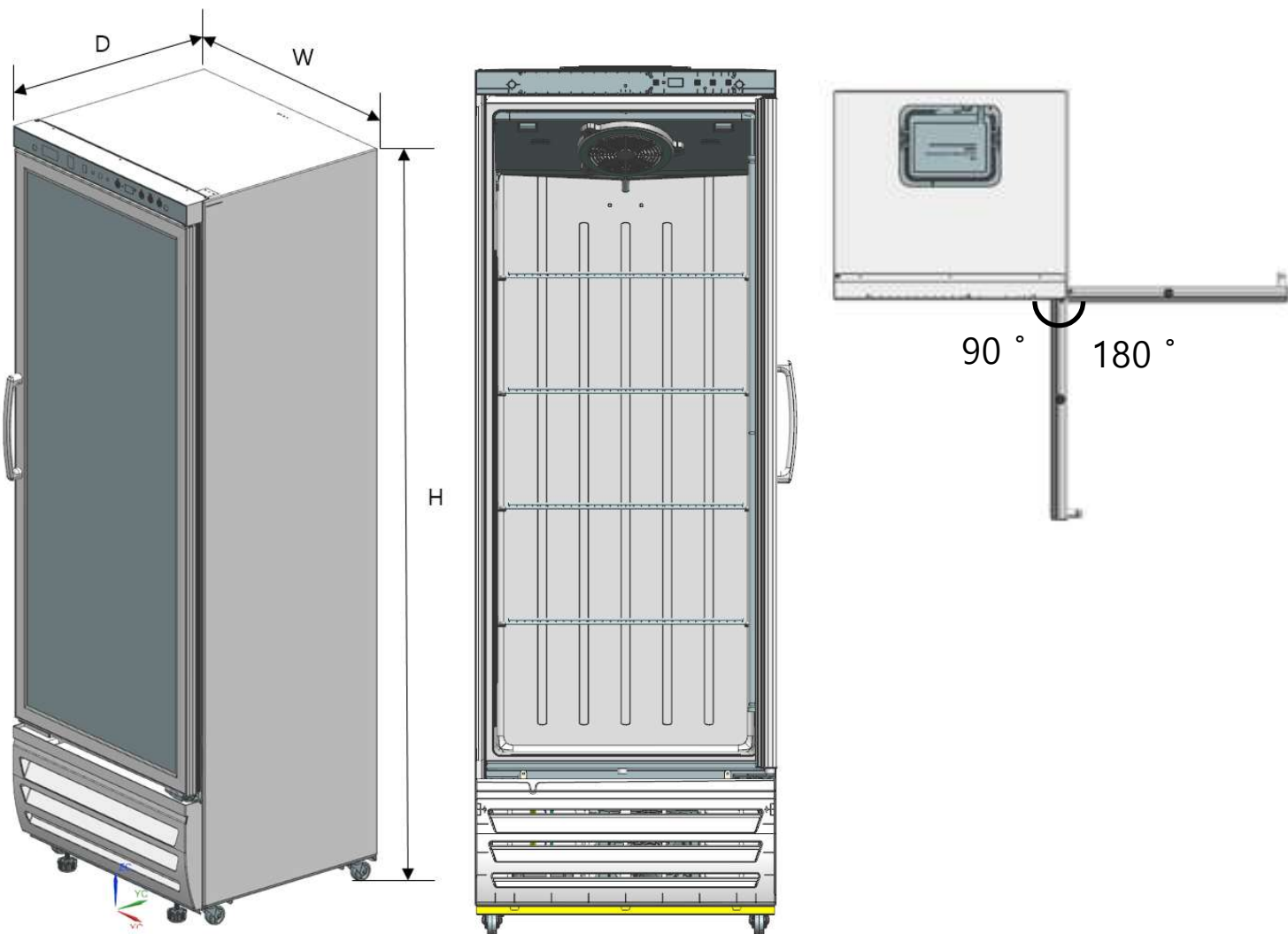
2. Product Features and Specifications

1. Specifications

Model Name		STA-490RAR-SW
Volume(ℓ)		354
External Dimension(mm) (W * D * H)		650 x 585 x 1885
Operating temperature range		34 ~ 40 °F(38 °F)
Temperature control method		Digital (Electronic)
Rated Voltage		115V 60Hz
RATED AMPERE(A)		2.2
DESIGNED PRESSURE		HS/ 243 ,LS/ 20 psig
Weight	Net	kg
Compressor		Inverter (Embraco, EMX3117U)
Refrigerant		R-290, 55g
Maximum Load capacity per shelf/ EA		Within 50Kg per WIRE coating shelf / 4EA
Condenser		Φ4.75 X 11 row, 8the column X 23m
Motor	C-Fan	O (3-wire, Newmotech DC 12V 1900RPM)
	F-Fan	O (3-wire, Newmotech DC 12V 1900RPM)
Sensor	R	28.59kΩ ~30.24kΩ (at-18°C)
R-Lamp		DC 12V 5.0W
R-Door Switch		MDCG-4, DC 5V
GLASS DOOR		Double-layered glass(tempered glass)
DOOR OPEN direct		Right

2. Product Features and Specifications

2. Exterior Dimensions



Part		GKM14HC	Remarks
Volume(ℓ)		381	Cu.ft 로 표기 : 14 cu.ft
SET Size (mm)	W	650	
	D	585	Inch 로 표기 요함 (예 650 -> 25 ½")
	H	1,885	
Door Size (mm)	Width	645	
	Depth	47	
	Height	1,452	

2. Product Features and Specifications

3. Temperature controller



Power



The product will automatically turn on when the power cord is plugged into the outlet. To turn the product's power on or off, press the power button for more than 3 seconds. Wait at least 3 minutes before turning the power button off and on again.

Temperature control



To lower or raise the internal temperature, press the temperature control button once to increase or decrease the temperature by 1°C. The internal temperature can be adjusted within the specified temperature range for each product.

LED lights



You can turn the LED light inside the product on or off by pressing the interior light button.

Rapid cooling



Pressing the rapid cooling button automatically activates the cooling system to operate continuously for 1 hour. This function is used when you want to rapidly cool the stored food inside the product.



It displays the interior temperature (set temperature or actual temperature).

- Regardless of the season, the interior temperature of the product is automatically maintained at a constant level. However, when the cooling capacity is insufficient, set it to a lower temperature, and when it is too cold, adjust it to a higher temperature. Turn off the power when not in use.
- Depending on the type and quantity, use the interior temperature adjustment button to set the appropriate temperature.

2. Product Features and Specifications

4. Exterior



① Shelf It is a multi-level adjustable shelf that can be adjusted in height according to the size of the product stored inside.

② Control Panel There are temperature control, temperature display, interior light, and power buttons on the front top of the external for electronic models

③ Machine Room Cover It is a cover for the area with the refrigeration cycle, preventing the ingress of air and debris to maintain airflow and prevent contamination.

④ Evaporator Tray This is where water that has entered from the condensation of the cooling unit

3. Installation

Installation Guide

Installation

Before installing, carefully inspect the packaging for damage. Any damage to the packaging might indicate a problem with the product. If you find any damage to the product, file a claim with the shipping carrier immediately. The manufacturer is not responsible for damage that occurs during transportation.

Due to the height and weight of the packaged product, we recommend that you have a professional remove the packaging and install it. Installation by an experienced refrigeration technician and electrician is highly recommended.

The refrigerator arrives packaged in a cardboard box placed on a wooden pallet. The refrigerator must be transported and handled care to avoid posing a hazard to persons or property. Never place a refrigerator with an in-built refrigerated unit on its side or turn it upside down as this may damage or impair operation of the refrigerated unit. We cannot be held liable for any damage or defects arising directly or in directly from improper handling of the equipment or non-compliance with the safeguards illustrated above.

Tools required

Cutting machine

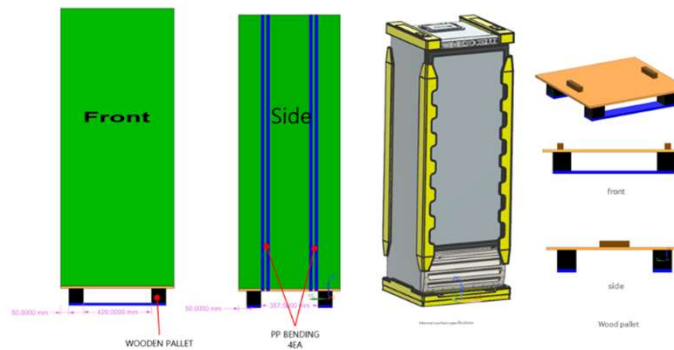


Figure1

1) Unpacking

We recommend that you move the packaging near the final installation site and then remove the packaging. Before unpacking, clean up your surroundings and remove any hazards.

Remove the packing materials Remove the PP and wooden pallet shown in Figure 1.

Place the refrigerator in the coolest and best ventilated part of the room. Do not install the refrigerator near direct heat or in sunlight sources.

2) Check if the parts accessories are included - Leg bolts * 2ea

Figure3

3) Casters

Once installed in the final location, keep the casters on the front locked. If you need to move the product, please unlock the wheels.



Figure2

Figure4

3. Installation

4) Leveling

Proper leveling is important for normal operation and maintenance.

Leveling affects effective condensate removal and door operation.

The product is level by default.

It must be leveled front to back and side to side.

Also, use the lever bolts to secure and level the product.

Make sure the drain hose is in the following location

Drain hose

Unplug the plug and cord from the product (do not power on or connect before assembly and installation).

The product must be placed close enough to electrical equipment.

Be careful not to use extension cords

WARNING

The compressor warranty is void if the device is loaded.

CAUTION

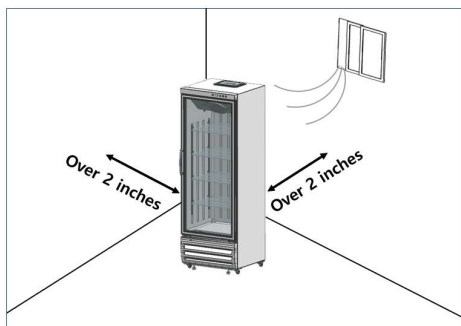
To avoid damage to the lower base and casters during horizontal movement, lower slowly when lowering.

5) Ventilation: Set unit in its final location. Be sure there is adequate ventilation in your room. you may need to install an exhaust fan under the extreme heat conditions, (100°F+, 38°C+),

Warning: Warranty is void if ventilation is insufficient.

6) Space clearance:

Ensure air circulation around unit



7) Assemble shelf clips :




- Install all the shelf clips before installing the shelves.
 - Insert the back of the clip (Shelf Support) into the pillar hole marked on the indicator.
- install the clips as shown above then install shelves.



4. Disassembly and Assembly

1. DISPLAY PCB


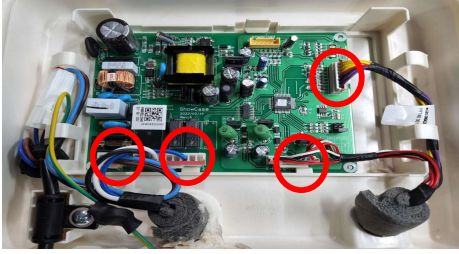

*** Caution :** When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		- Remove the two screws that are attached using a (+) driver
②		- Disconnect the CONNECTOR connected to the DISPLAY PCB
③		- Loosen the five screws attached to the PCB using a (+) screwdriver and retrieve the DISPLAY PCB.
④	◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver	

4. Disassembly and Assembly

2. MAIN PCB


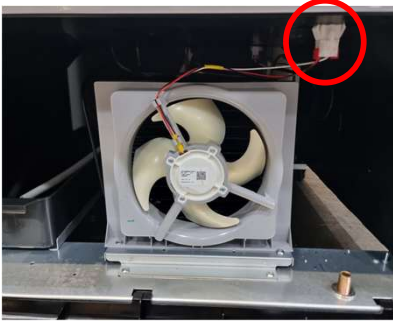
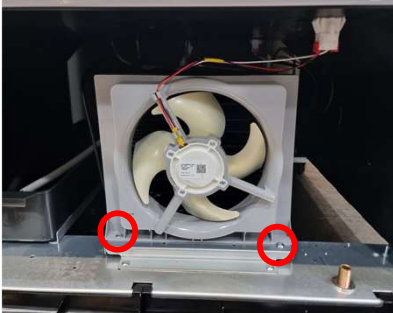
* **Caution** : When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		- Remove the five screws attached to the COVER PCB MAIN with a (+) screwdriver and open the COVER.
②		- Dismantle the four CONNECTORS attached to the main PCB.
③		- Retrieve the MAIN PCB by retracting the PCB hold-down jaws in the direction of the arrow in the direction of the arrow to retrieve the MAIN PCB.
④	◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver	

4. Disassembly and Assembly

3. Condenser FAN MOTOR


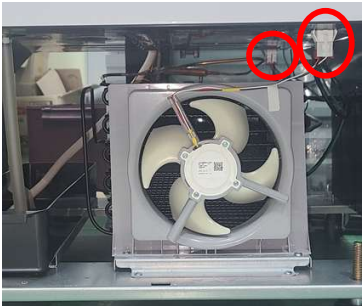
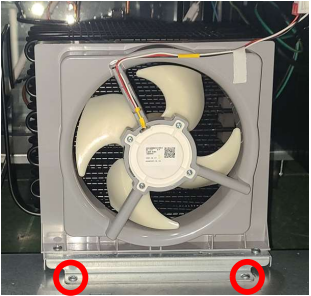
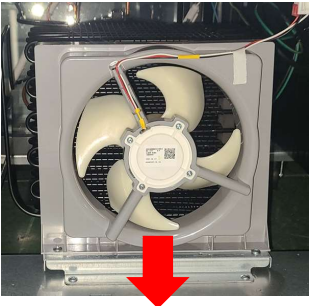
* Caution : When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		- Remove the two screws with a (+) screwdriver and pull the UNIT COVER in the direction of the arrow on the front of the unit cover to remove it.
②		- Dismantle the right MOTOR CONNECTOR
③		- Remove the two screws on the front of the BASE PLATE SCREWS on the front with a (+) screwdriver..
④	◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver	

4. Disassembly and Assembly

4. Parts in compressor room




*** Caution :** When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		<p>-Remove the two screws with a (+) screwdriver and pull the UNIT COVER in the direction of the arrow on the front of the unit cover to remove it.</p>
②		<p>- Inside the machine compartment, remove the upper right COMP housing and the upper right Fan Motor housing.</p>
③		<p>- Remove the two (2) screws on the front of the UNIT PLATE SCREWS on the front with a (+) screwdriver.</p>
④		<p>- Slowly pull the UNIT PLATE in the direction of the front arrow in the direction of the front arrow.</p> <p>※ The UNIT PLATE has CYCLE piping and wires attached to it. CYCLE piping and wires are assembled on the unit plate, so pulling it forcibly may cause damage to various parts Please be careful.</p>
⑤	<p>◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver</p>	

4. Disassembly and Assembly

5. LED LAMP





* **Caution** : When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		<ul style="list-style-type: none"> - Remove the 5 screws attached to the EVAP COVER with a (+) screwdriver and gradually remove them in the direction of the arrow. - Be careful not to pull the wiring inside the EVAP COVER forcibly as it may cause the wiring to break.
②		<ul style="list-style-type: none"> - Remove the connector connected to the LED(BLU).
③		<ul style="list-style-type: none"> - Grasp the LED and pull it away from the retaining clip in the direction of the arrow direction from the retaining clip to release it.
④	<p>◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver</p>	

4. Disassembly and Assembly

6. DOOR



*** Caution :** When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		- Remove the two screws on the top of the Top-Cover with a (+) screwdriver to remove the two screws on the top.
②		- Remove the three screws attached to the upper hinge with a (+) screwdriver and lift the hinge in the direction of the arrow. ※ When removing the glass door, be sure to fix the door before disassembling it because it is heavy and there is a risk of falling.
③		- Remove the two bolts(M4) that hold the auto lock in place using a hex wrench.
④		- Slowly lift the DOOR in the direction of the arrow to retrieve it.
⑤	<p>◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver</p>	

4. Disassembly and Assembly

7. EVAP FAN MOTOR

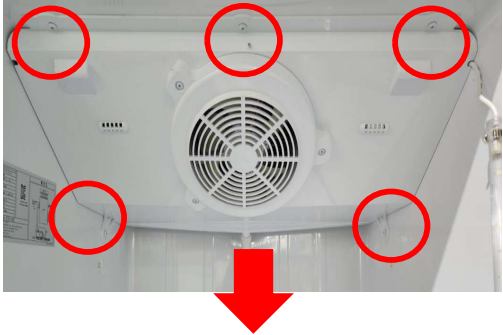
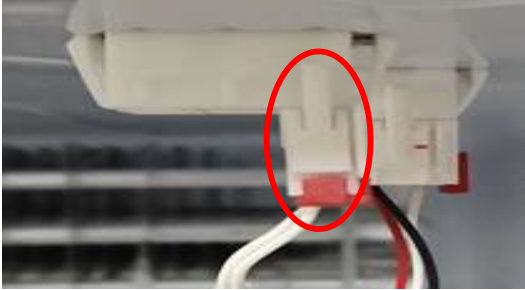

* **Caution** : When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		- Remove the three screws attached to the MOTOR COVER with a (+) screwdriver and remove them in the direction of the arrow.
②		- Replace the EVAP MOTOR by disconnecting the CONNECTOR connected to the connected to the EVAP MOTOR to replace the EVAP MOTOR.
③	◆ The assembly order is the reverse of the disassembly order. - During assembly, make sure that the wires and connectors connected to the MOTOR do not touch the rotor. ※ Required tools: (+) Screwdriver	

4. Disassembly and Assembly

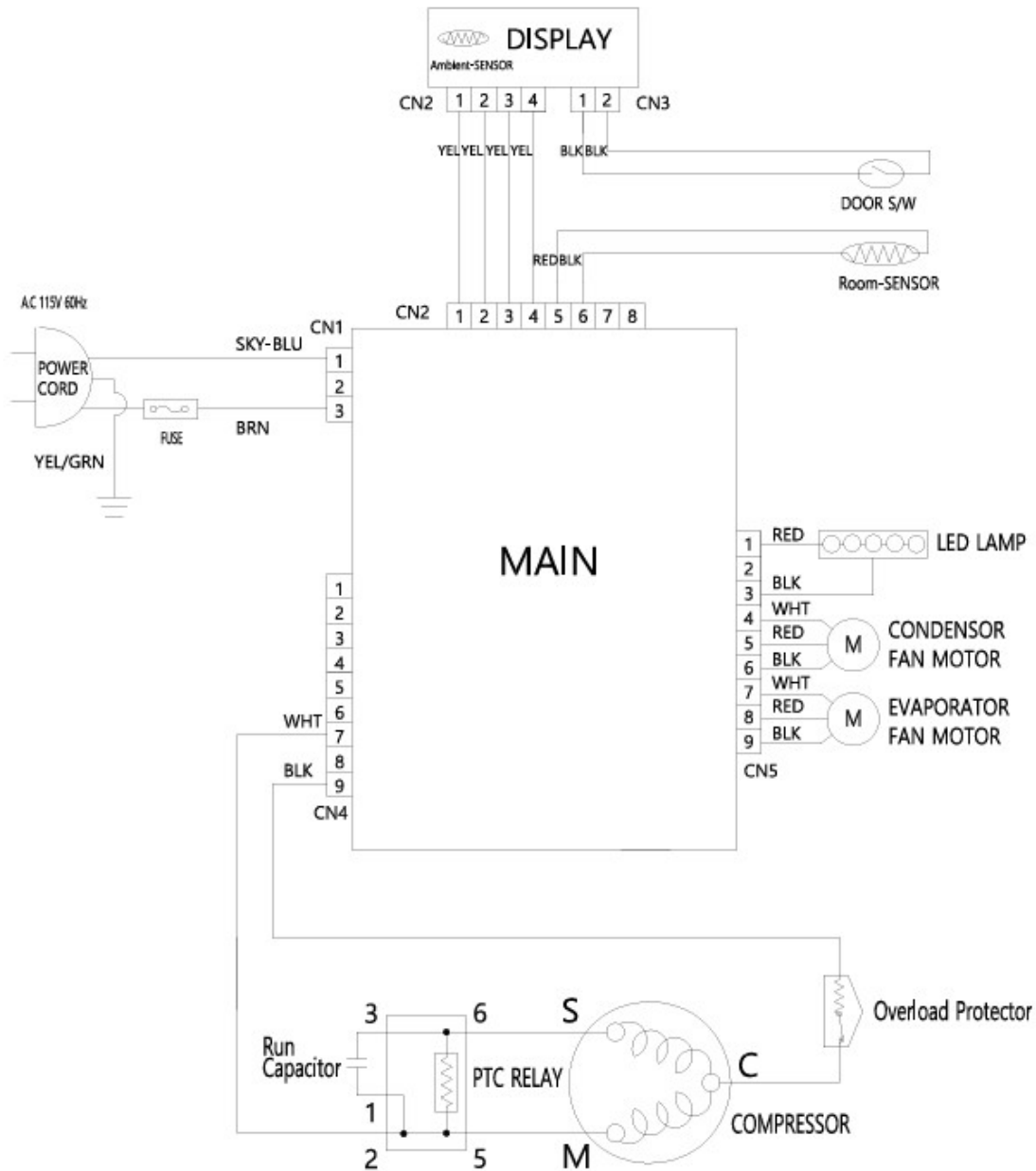
8. ROOM Temperature Sensor

* **Caution** : When disassembling/assembling the product's electronic parts and CYCLE parts, be sure to unplug the power cord, and work in the specified order.

No	Image	Procedure
①		<ul style="list-style-type: none"> - Remove the 5 screws attached to the EVAP COVER with a (+) screwdriver and gradually remove them in the direction of the arrow. - Be careful not to pull the wiring inside the EVAP COVER forcibly as it may cause the wiring to break.
②		<ul style="list-style-type: none"> - Remove the connector connected to the temperature sensor.
③		<ul style="list-style-type: none"> - Disconnect the temperature sensor
④	<ul style="list-style-type: none"> ◆ The assembly order is the reverse of the disassembly order. ※ Required tools: (+) Screwdriver 	

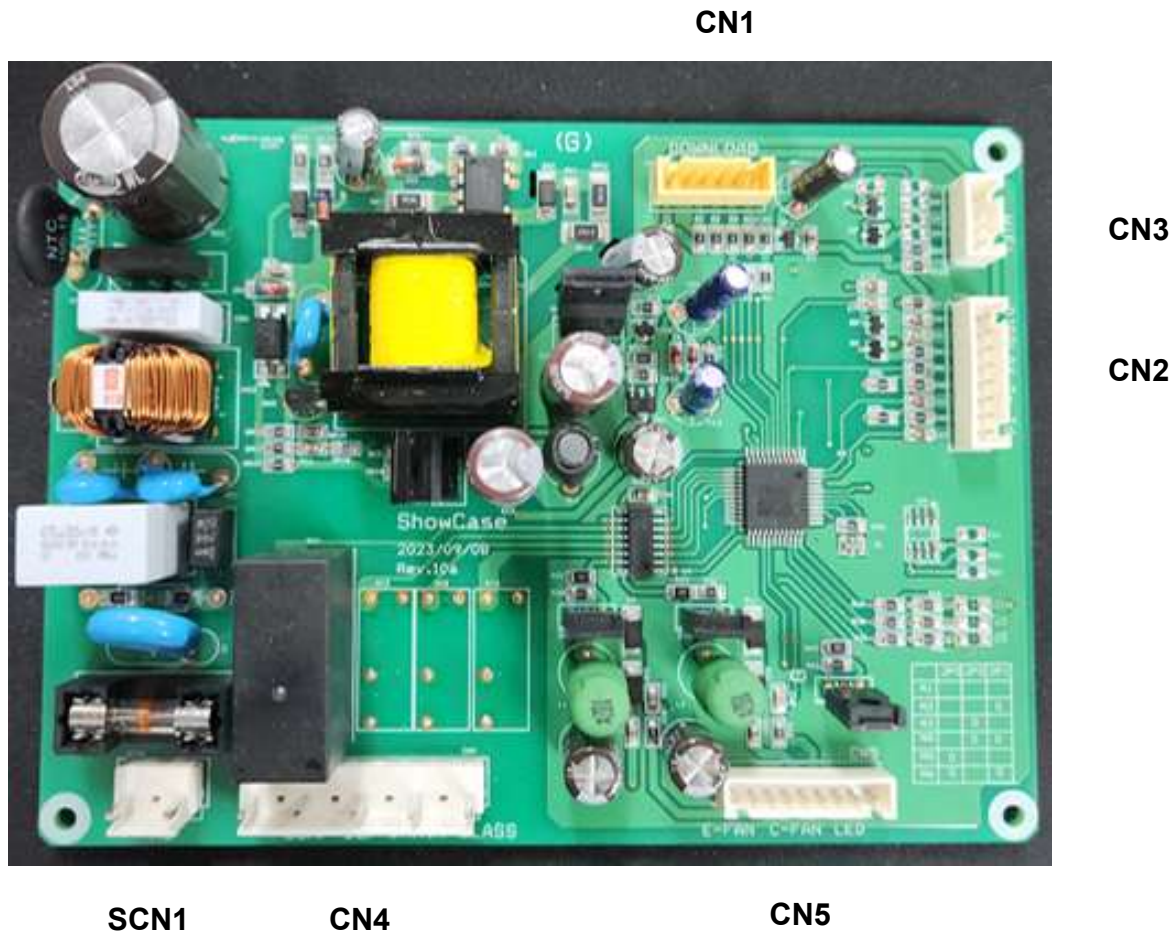
5. Electric Parts Composition

1. Circuit diagram(Schematic)



5. Electric Circuit Diagram

2. Connector placement and specification (Main Board)



CN1 : [DC] Download

CN2 : [DC] Display, Tr(Room sensor)

CN3 : Unused

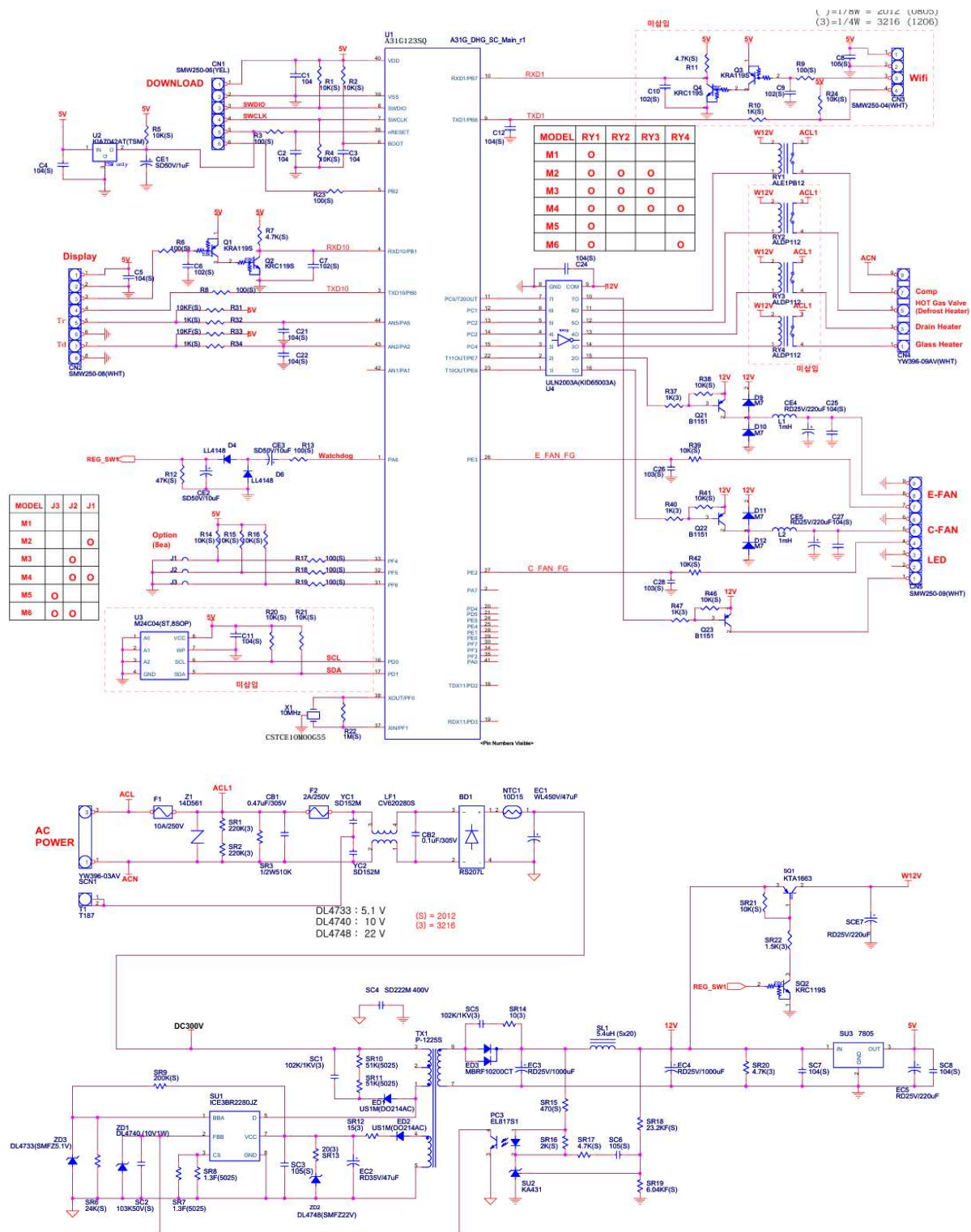
CN4 : [AC] Comp Relay

CN5 : [DC] E-fan, C-fan, LED

SCN1 : [AC] MAIN Power(115V/60Hz)

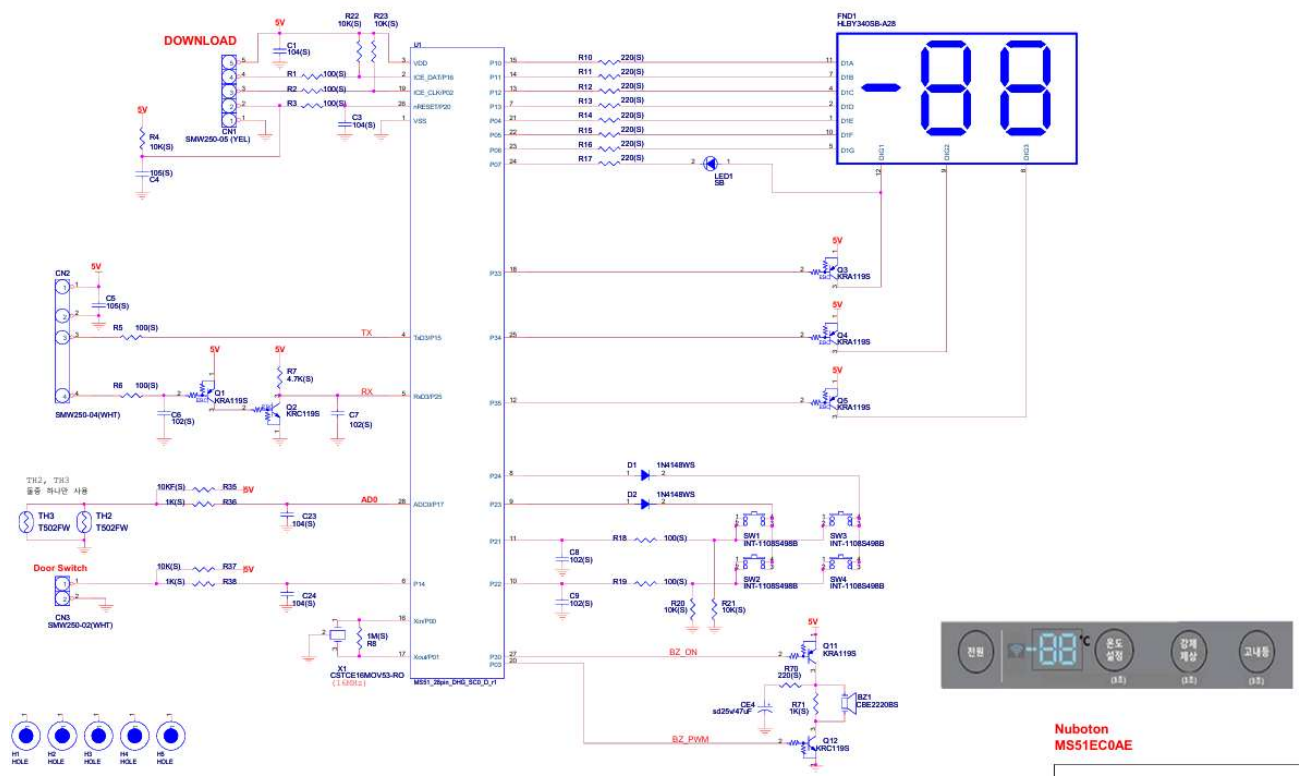
5. Electric Circuit Diagram

3) Circuit diagram of Main PCB



5. Electric Circuit Diagram

4. Circuit diagram of Display PCB



5. Electric Circuit Diagram

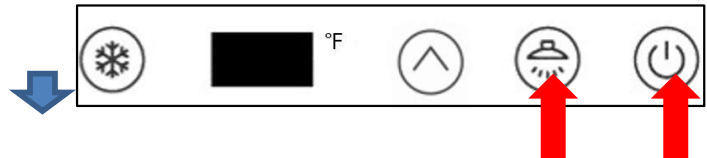
5. Room Temperature Sensor Specification

RT SENSOR					
Temp (°C)	Resis-(kΩ)	DC Volts	Temp (°C)	Resis-(kΩ)	DC Volts
-30	52.45	4.1994	0	13.29	2.8532
-29	49.90	4.1653	1	12.75	2.8022
-28	47.49	4.1303	2	12.23	2.7508
-27	45.21	4.0944	3	11.73	2.6990
-26	43.05	4.0575	4	11.26	2.6482
-25	41.01	4.0198	5	10.81	2.5973
-24	39.07	3.9810	6	10.38	2.5466
-23	37.24	3.9416	7	9.973	2.4966
-22	35.50	3.9011	8	9.581	2.4465
-21	33.85	3.8597	9	9.207	2.3968
-20	32.29	3.8177	10	8.849	2.3473
-19	30.81	3.7748	11	8.507	2.2983
-18	29.41	3.7313	12	8.180	2.2497
-17	28.08	3.6870	13	7.867	2.2015
-16	26.81	3.6417	14	7.568	2.1539
-15	25.61	3.5959	15	7.282	2.1068
-14	24.47	3.5495	16	7.008	2.0602
-13	23.39	3.5025	17	6.746	2.0142
-12	22.36	3.4549	18	6.495	1.9688
-11	21.38	3.4066	19	6.255	1.9240
-10	20.45	3.3580	20	6.025	1.8799
-9	19.56	3.3085	21	5.805	1.8364
-8	18.72	3.2591	22	5.594	1.7936
-7	17.92	3.2092	23	5.391	1.7513
-6	17.16	3.1591	24	5.197	1.7099
-5	16.43	3.1082	25	5.011	1.6691
-4	15.74	3.0575	26	4.833	1.6291
-3	15.08	3.0064	27	4.662	1.5898
-2	14.46	2.9558	28	4.498	1.5512
-1	13.86	2.9044	29	4.340	1.5132
			30	4.189	1.4761

6. Troubleshooting

1. Error Mode

Press and hold the "LED lights + Power" Key simultaneously for 3 seconds to enter Error Mode



In case of error : EC → Error Code 1 → Error Code 2 → → EC repeated in 1 second cycle.
※ In case of good product : EC → Current temperature → EC → Current temperature Repeat in 1 second cycle.



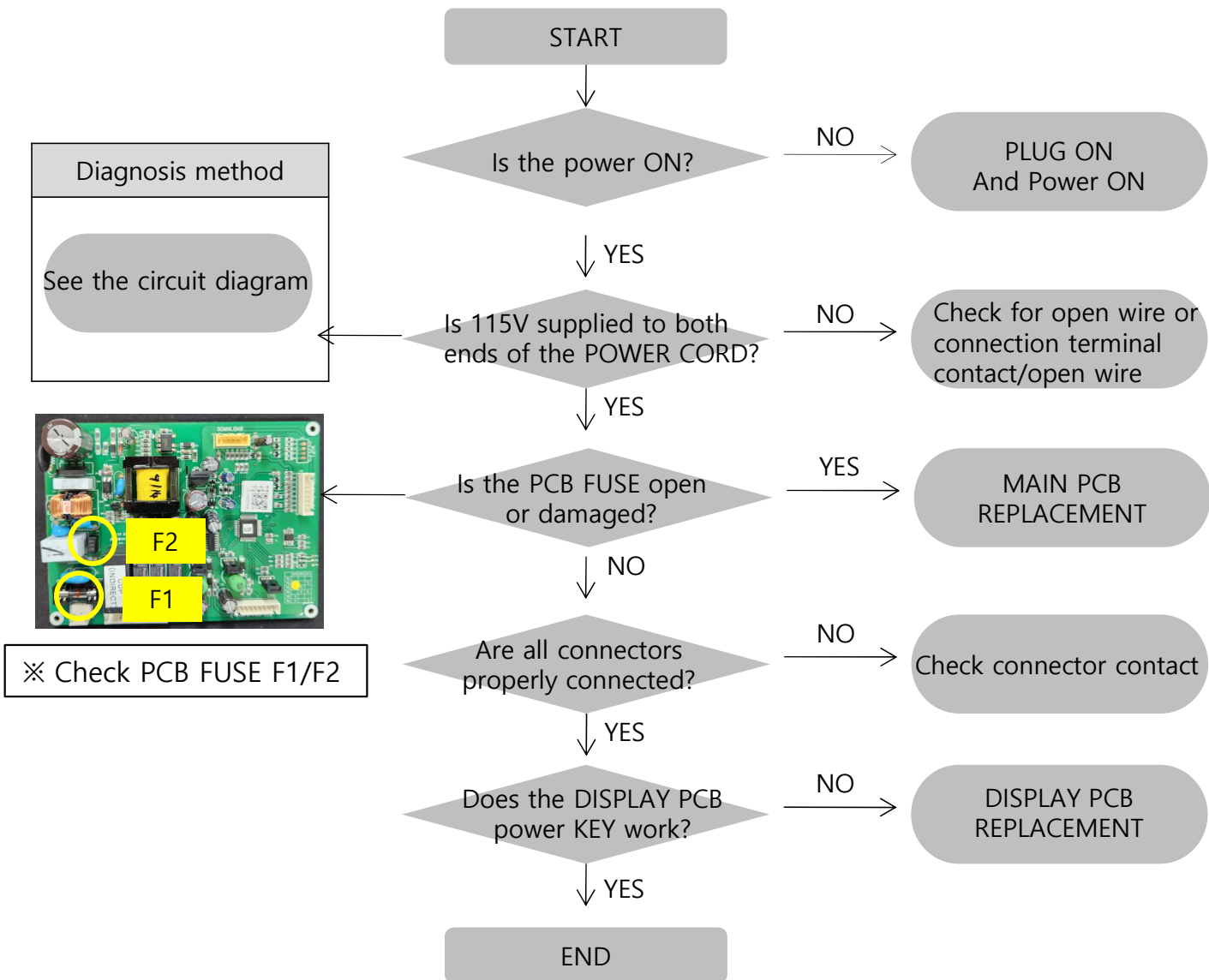
In error mode, pressing the "LED lights + Power" key simultaneously for 3 seconds will switch to normal mode, and pressing the "Power" key in error mode to turn off or power plug off will start normal mode when powering on again.

Error Code

E1	Room sensor - After disassembling the EVAP COVER, check for defective internal sensor and replace it.
E2	Out door sensor (located on the display PCB) - After disassembling the TOP COVER, check for defects in the PCB outside air sensor and replace it.
E4	Room Motor - EVAP COVER Front Motor-Cover disassembly, operation check and replacement
E5	Cond Motor - Disassemble the machine room COVER, check operation, and replace

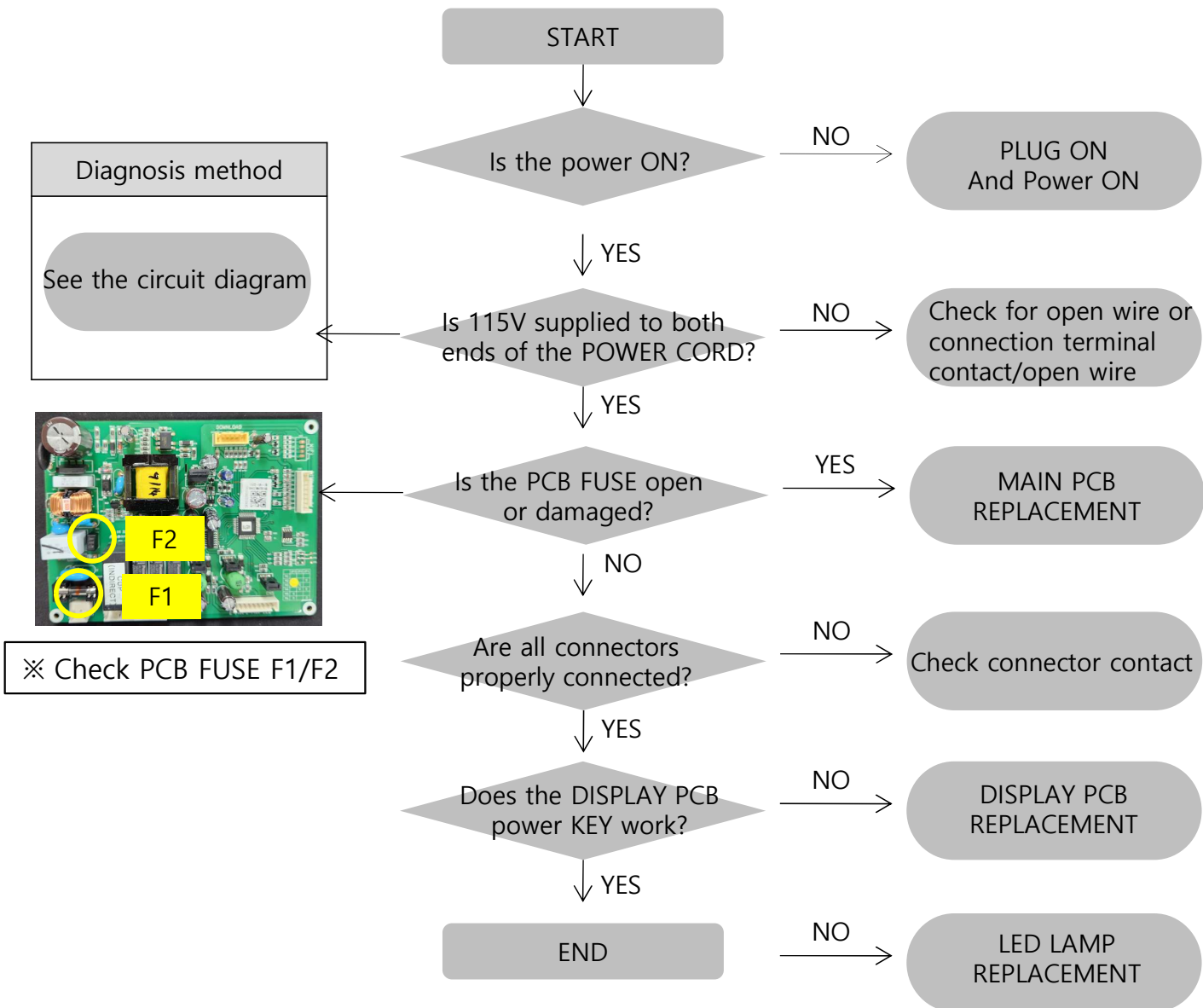
6. Troubleshooting

2. When the power does not turn on



6. Troubleshooting

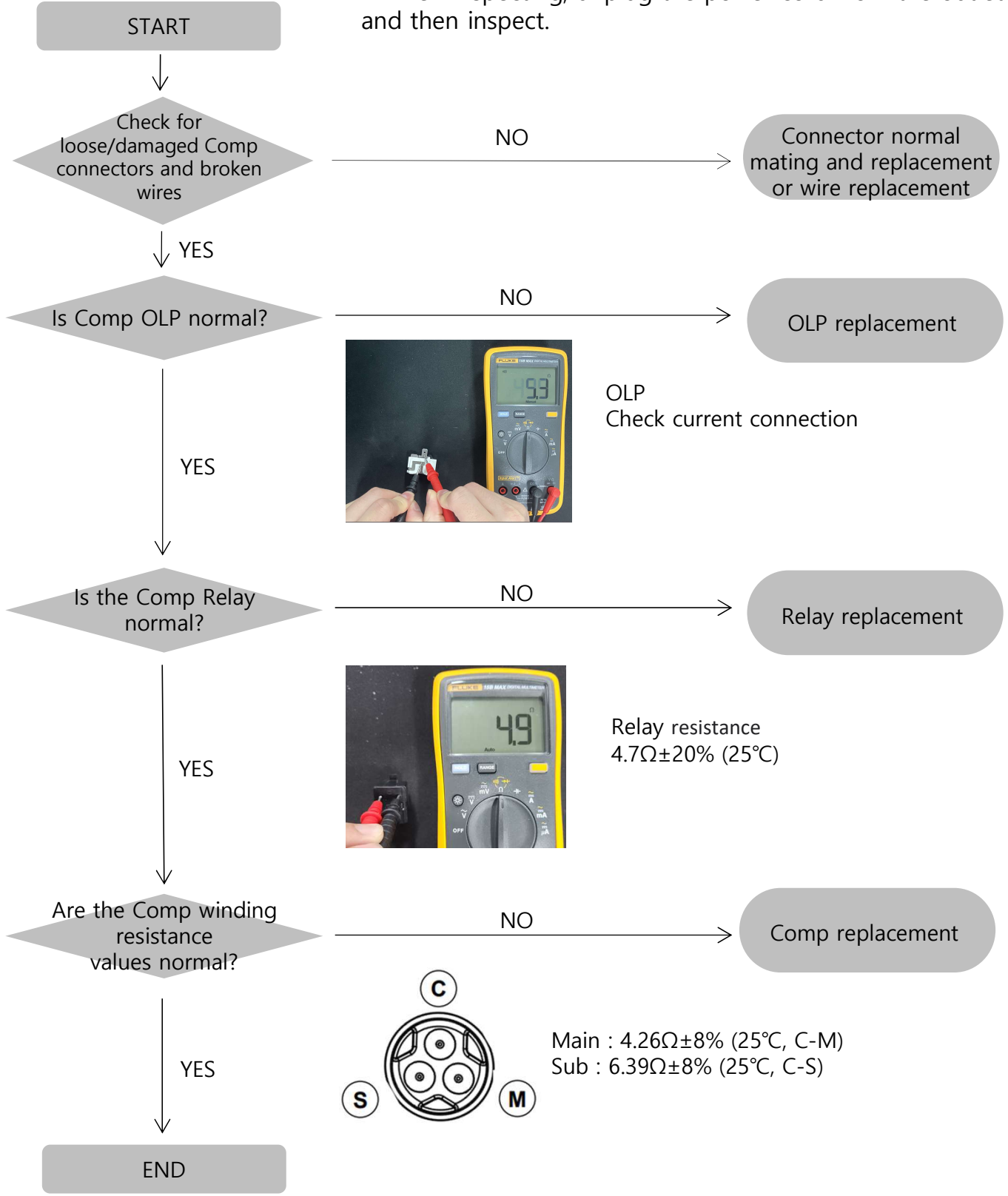
3. When the LED does not turn on



6. Troubleshooting

4. Compressor won't run

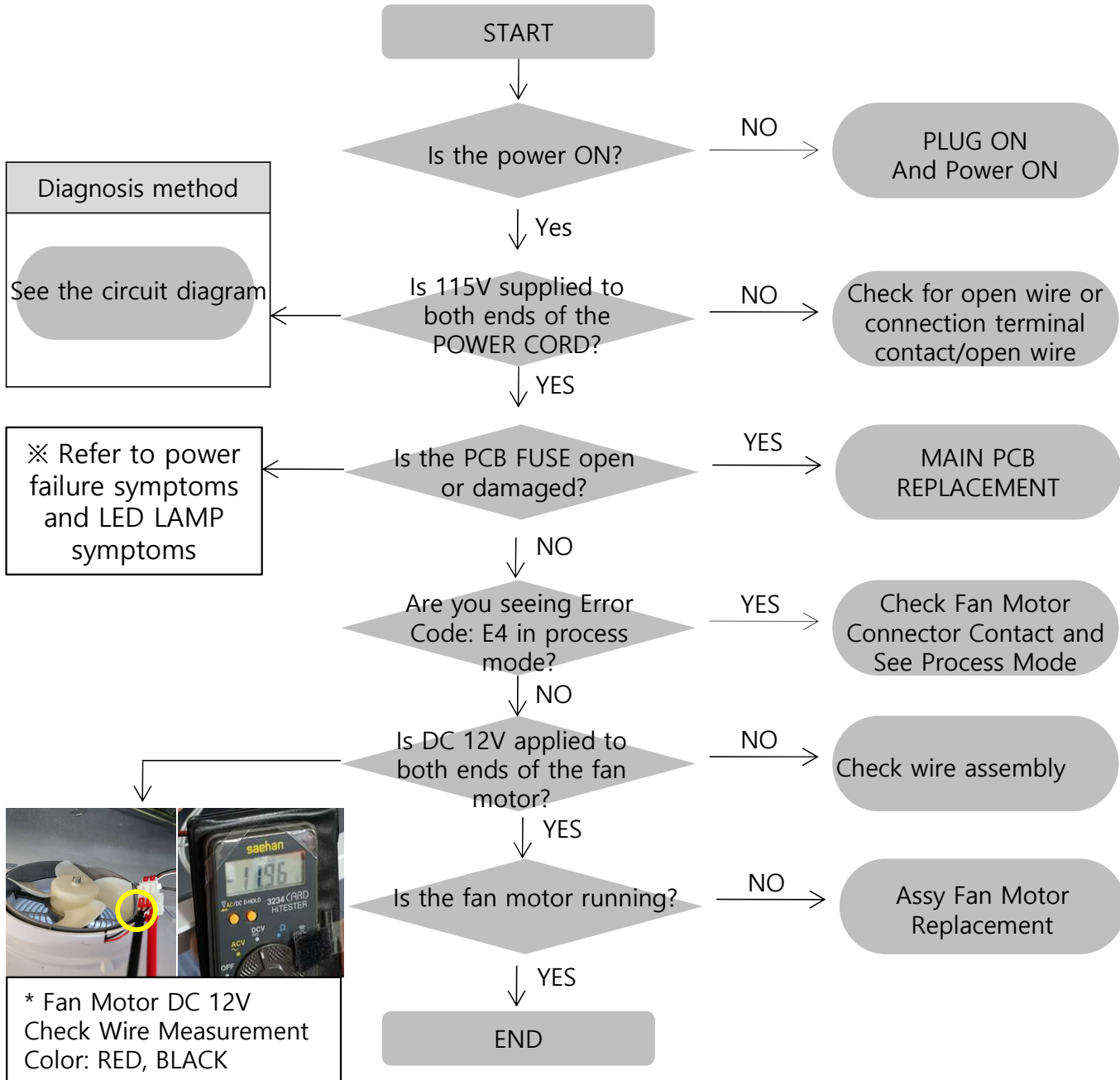
**When inspecting, unplug the power cord from the outlet and then inspect.



6. Troubleshooting

5. Evaporator Fan Motor won't run

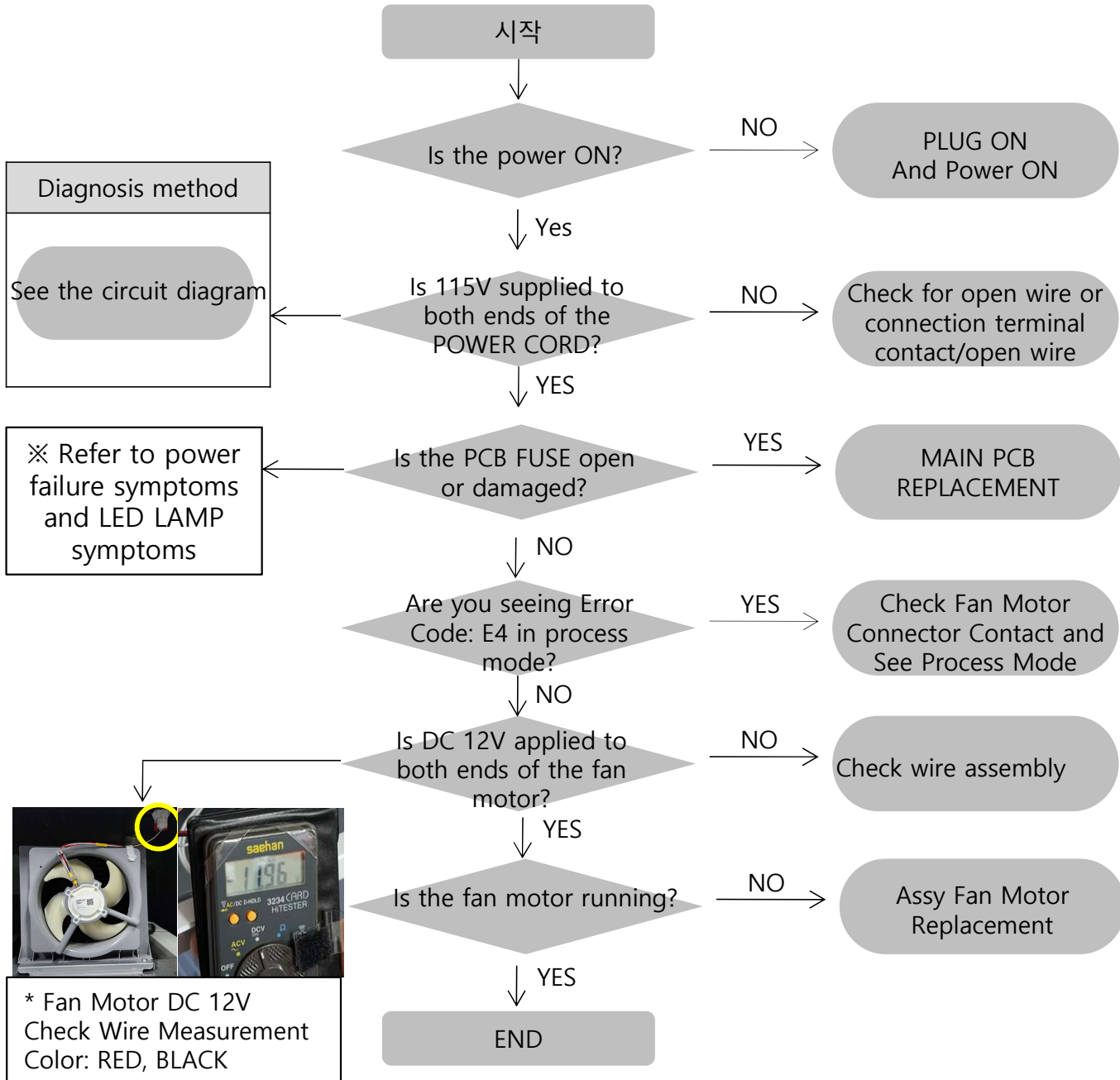
- This refrigerator is a model that uses the Evap DC Fan Motor.
- Evap DC Fan Motor operates only when COMP is started at room temperature (0°C~10°C)



6. Troubleshooting

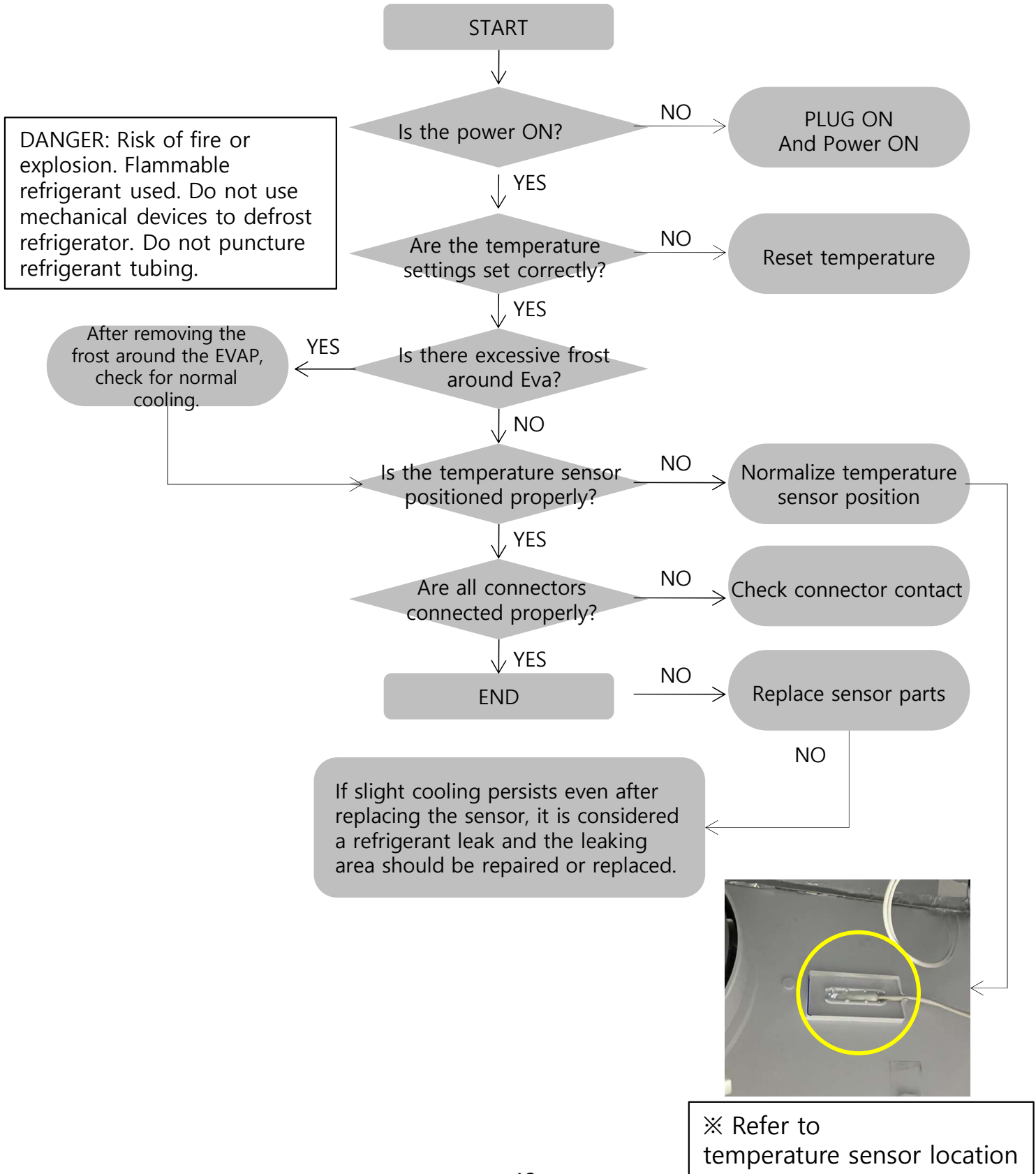
6. Condenser Fan Motor won't run

- This cooler is a model that uses a Cond DC Fan Motor.
- Normally, the Cond DC Fan Motor operates only when the COMP is started.

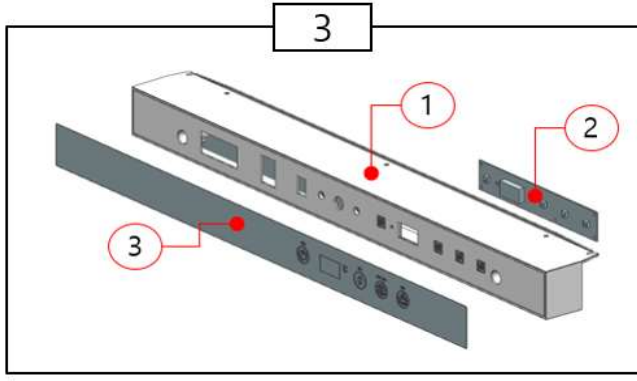
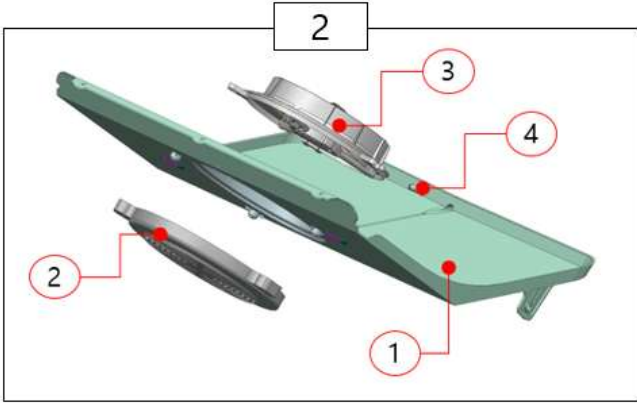
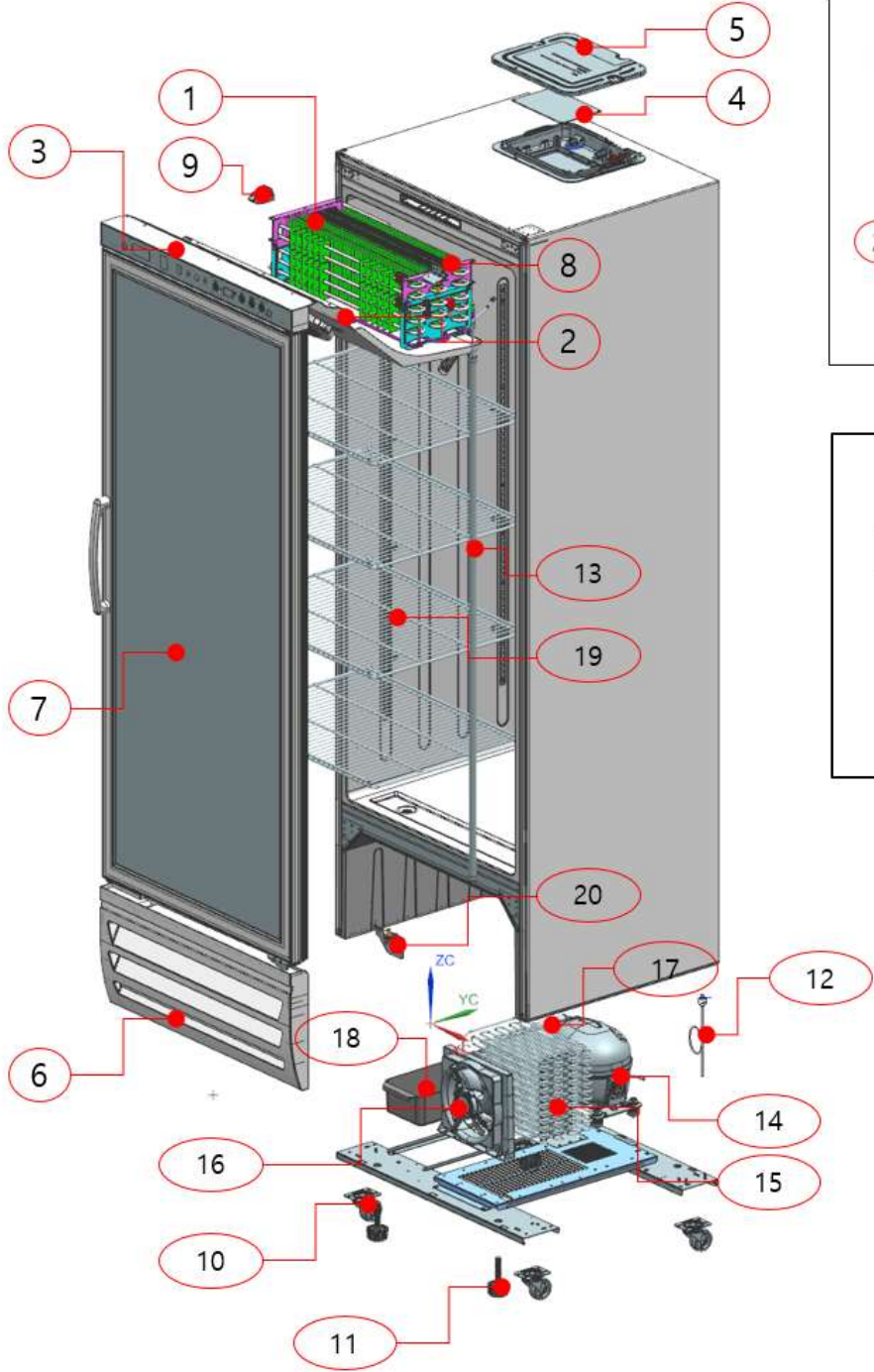


6. Troubleshooting

7. Cooling system isn't working



7. Parts Exploded View

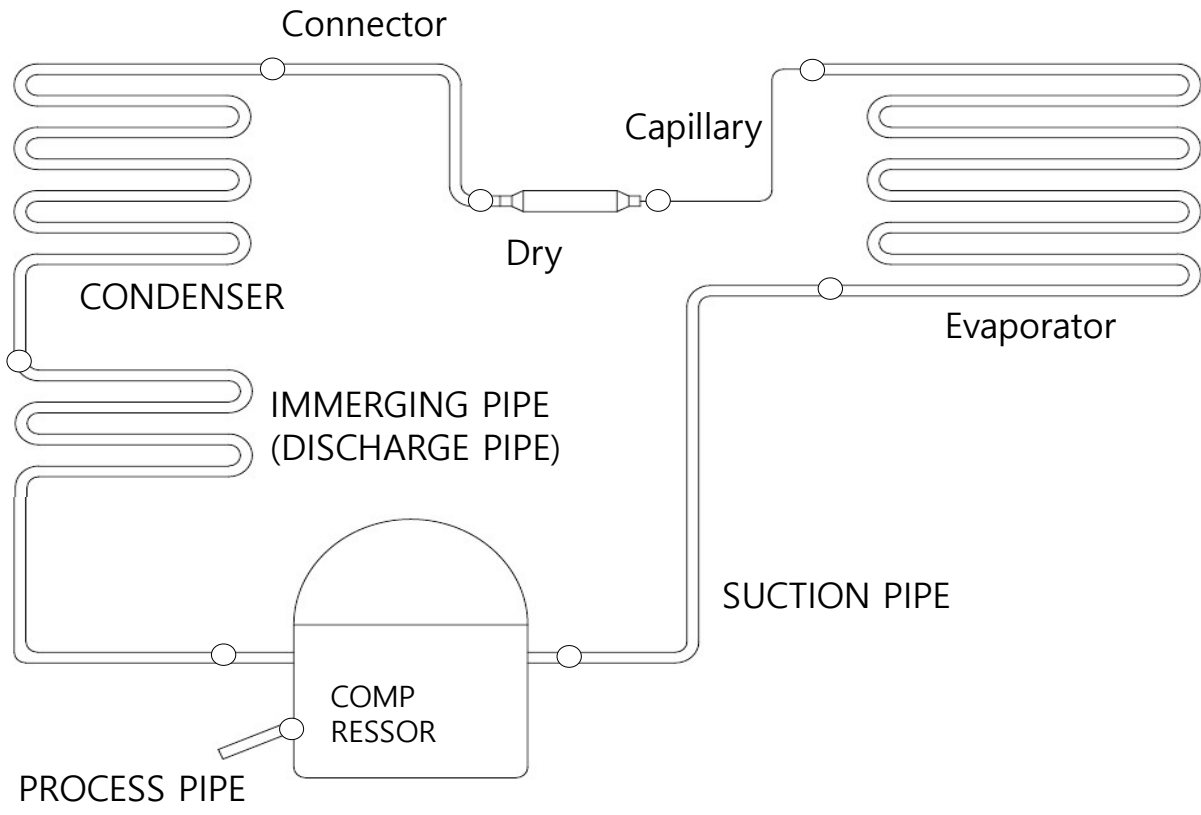


7. Parts exploded view

NO	Code	Part	Spec
1	WG25-00001C	EVAPORATOR	ASSY,AL,W434*D197,ø8.5
2	WG96-00184B	ASSY COVER EVAP	SHOW CASE(Electronic)
2-1	WG11-00143A	COVER EVAP	ABS,WHITE, Electronic(3rd EVAP)
2-2	WG52-00007A	MOTOR ASSY(EVAP)	Newmotech) EVAP, BLDC 12V, 4.3W
2-3	WG55-00010A	ROOM SENSOR	WHT, ST1329GW, -20~120C, L250
2-4	WG11-00155A	COVER FAN MOTOR	ABS,WHT
3	WG96-00179P	ASSY TOP COVER	GIO
3-1	WG11-00142A	TOP COVER	ABS,WHITE
3-2	WG62-00007A	Display pcb	
3-3	WG45-00009E	INLAY TOP	GIO_Silver
4	WG62-00045A	Main PBA	M1 PBA
5	WG10-00108A	Cover PCB Main	GI / 0.4T
6	WG96-00033N	ASSY UNIT COVER FRONT	ASSY,WHITE, Horizontal grill
7	WG96-00176C	ASSY GLASS DOOR TOTAL	T48.2*1452*645, double glass LOW-E, Right, WHT
8	WG10-00105C	ASSY HINGE UP R	PO/Plating,2.8T*70*60,Cogging
9	WG11-00164A	REINF TOP COVER	POM, NTR
10	WG96-00009C	ASSY CASTER(회전)	64MM
11	WG11-00075A	LEG BOLT(88.2MM)	M12 ,INSERT,BLACK ,88.2MM
12	WG58-00002A	POWER CORD	115V,L 2500
13	WG93-00046A	ASSY LED LAMP	ET-05DH, DC 12V, 5W, 6500K
14	AK418H	COMPRESSOR	COMP, Refrigerant:R134a/LBP
15	WG26-00006B	ASSY WIRE CONDENSER	Wire-Cond Φ4.75*11row, 8the *23m
16	WG52-00008A	MOTOR ASSY(COND)	Newmotech) COND, BLDC 12V, 4.3W
17	WG20-00033A	DRYER DOUBLE	CU, OD15.78*T0.46*L118,6g,ID2.2Ø
18	WG11-00076B	DRAIN TANK	재생PP,125*450*H70,3liter,BLACK
19	WG33-00001B	WIRE SHELF	MSWR10,PE-CO,W * D *
20	WG96-00003C	ASSY HINGE LOW	ASSY,Cogging,(W)plating,Right 20mm

8. Reference – Cycle composition

Compressor → Immerging → CONDENSER → Dry → Capillary → Evaporator → SUCTION PIPE → Compressor



(Welding part)

- : 30% For silver welding
- : 5% For silver welding

GIO

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