R454B OD Service Manual

Safety Signs

This is the general warning sign. It is used to alert the user to potential hazards. All safety messages that follow this sign shall be obeyed to avoid possible harm.

DANGER

Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTE

A situation that may cause damage to the equipment or loss of property.

WARNING

Work on the refrigerant circuit with flammable refrigerant in safety group A2L may only be carried out by authorized contractors. These heating contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.
Work on electrical equipment may only be carried out by a qualified electrician.
Before initial commissioning, all safety – related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.
For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.
The appliance shall be stored so as to prevent mechanical damage from occurring.
Do not stack combustible materials on the surface of the indoor unit.

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 that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
Do not pierce or burn the unit.
Be aware that refrigerants may not contain an odour.
If refrigerant gas leaks during installation, ventilate the area immediately.
Comply with national gas regulations.

Safety Precautions

WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment credential.

Servicing shall only be performed as recommended by the equipment manufacturer.

Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of a person competent in the use of flammable refrigerants.

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.

When repairing the refrigerating system, comply with the following precautions prior to conducting work on the system:

– shall be undertaken according to controlled procedures so as to minimize the risk of the presence of flammable gases or vapors while the work is being performed.

– All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

– The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable environment. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

– If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available and easily accessible. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

– When carrying out work in relation to a refrigerating system that involves exposing any pipe work, no sources of ignition shall be used in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repair, or removal and disposal of the unit, during which refrigerant can possibly be released into the surrounding space. Prior to beginning work, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be clearly displayed.

Ensure that the area is in the open or that it is adequately ventilated before opening the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the surroundings.

Where electrical components are being changed, they shall be fit according to their purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flammable refrigerants:

– The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;

– The ventilation machinery and outlets are operating adequately and are not obstructed.

– If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

– Equipment marking must remain visible and legible. Markings and signs that are illegible shall be corrected.

Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substances which may corrode refrigerant containing components, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.

Repair and maintenance of electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until the fault has been dealt with satisfactorily.

Safety Precautions

⚠ WARNING

If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so that all parties are advised. Initial safety checks shall include:
– That capacitors are discharged: this shall be done in a safe manner to avoid the possibility of sparking;
– That no live electrical components and wiring are exposed while charging, recovering or purging the system;
– That there is continuity of earthing.
Sealed electrical components shall be replaced. Intrinsically safe components must be replaced.
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
Under no circumstances shall potential sources of ignition be used while searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated for the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.
If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant which requires brazing is found, all of the refrigerant shall be recovered from the system, or isolated(by means of shut off valves) in a part of the system remote from the leak.
Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
NOTE： Examples of leak detection fluids are
-bubble method,
-fluorescent method agents.
When breaking into the refrigerant circuit to make repairs - or for any other purpose-conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:
- safely remove refrigerant following local and national regulations.
- evacuate.
-purge the circuit with inert gas .
- evacuate.
- continuously flush or purge with inert gas when using flame to open circuit, and.
- open the circuit.
The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.
For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system .When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.
The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.
Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant they contain.
Cylinders shall be kept upright. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
Label the system when charging is complete (if it is not already labeled).
Take extreme care not to overfill the refrigeration system.

Safety Precautions

⚠WARNING

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure ensure that:

– mechanical handling equipment is available, if required, for handling refrigerant cylinders;

– all personal protective equipment is available and being used correctly;

– the recovery process is supervised at all times by a competent person;

– recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that the cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate it in accordance with the manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process has been completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e.special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Do not use the air conditioner for other purposes. In order to avoid any quality deterioration, do not use the unit for the cooling of precision instruments, food, plants, animals or works of art. Before cleaning, be sure to stop the operation, turn the breaker off or unplug the supply cord. Otherwise, electric shock and injury may occur. In order to avoid electric shock or fire, make sure that an earth leak detector is installed.

Never touch the air outlet or the horizontal blades while the swing flap is in operation. Your fingers may be come caught or the unit may break down.

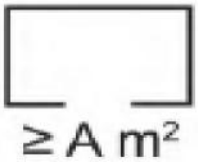
Safety Precautions

WARNING

Never put any objects into the air inlet or outlet.
Objects touching the fan at high speed can be dangerous.
Never inspect or service the unit by yourself.
Ask a qualified service person to perform this task.
Do not dispose of this product as unsorted municipal waste. This waste should be collected separately for special treatment. Do not dispose of electrical appliances as unsorted municipal waste. Use separate collection facilities. Contact your local government for information regarding the connection systems available.
If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, harming your health and well-being.
To prevent refrigerant leak, contact your dealer. When the system is installed and operates in a small room, it is required to maintain the concentration of the refrigerant below the limit, in case a leak occurs. Otherwise, oxygen in the room may be affected, resulting in a serious accident.
The refrigerant in the air conditioner is safe and normally does not leak.
If the refrigerant leaks into the room and comes into contact with the fire of a burner, a heater or a cooker, a harmful gas could be released.
Turn off any combustible heating devices, ventilate the room, and contact the dealer where you purchased the unit.
Do not use the air conditioner until a service person confirms that the refrigerant leak is repaired.
Keep ventilation openings clear of obstruction.
Be sure the air conditioner is earthed.
In order to avoid electric shock, make sure that the unit is earthed and that the earth wire is not connected to a gas or water pipe, lightning conductor or telephone earth wire.
Do not operate the air conditioner with a wet hands. An electric shock may happen.
Do not touch the heat exchanger fins. These fins are sharp and could cut you.
To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the air conditioner.
Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause wetting of the building, furniture, etc.
Never touch the internal parts of the controller.
Do not remove the blower access panel. Some parts inside are dangerous to touch, and machine troubles may occur.
Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.
Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.
All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs. The effectiveness of signs should not be diminished by too many signs being placed together. Any pictograms used should be as simple as possible and contain only essential details.
The storage of the appliance should be in accordance with the applicable regulations or instructions, whichever is more stringent.
Storage package protection should be constructed such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.
The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
Do not operate the air conditioner when using a room fumigation - type insecticide. Failure to observe this precaution could cause the chemicals to become deposited in the unit, which could endanger the health of those who are hypersensitive to chemicals. It may also cause the refrigerant sensor to alarm.
Do not place appliances which produce open flame in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion or deformation of the unit due to the heat.
Do not install the air conditioner in a location where flammable gas may leak out. If the gas leaks out and stays around the air conditioner, a fire may break out.

Safety Precautions

⚠ WARNING



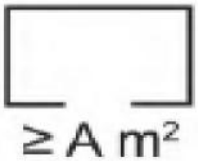
The appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area. Refer to the installation instructions for the minimum room area required to install the appliance.

⚠ WARNING

The suction pipe and liquid pipe of the indoor unit need to be protected and cannot be grabbed when moving the indoor unit.
The pipe-work including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code. inspection prior to being covered or enclosed; or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
All joints made in the installation between parts of the refrigerating system, with at least one part charged, shall be made in accordance with the following:
— A brazed, welded, or mechanical connection shall be made before opening the valves to permit refrigerant to flow between the refrigerating system parts. A vacuum valve shall be provided to evacuate the interconnecting pipe or any uncharged refrigerating system part.
— Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be refabricated.
— Refrigerant tubing shall be protected or enclosed to avoid damage.
— Flexible refrigerant connectors (such as connecting lines between the indoor and outdoor unit) that may be displaced during normal operation shall be protected against mechanical damage.
Compliance is checked according to the installation instructions and a trial installation, if necessary.
Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected.
After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements.
The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected.
— mechanical joints in compliance with ISO 14903 or UL 207 (U.S. only).
— welded or brazed joints.
— joints in enclosures that vent to the unit or to the outside. Compliance is checked by inspection and tests.
Components and accessories from the units are not part of ordinary domestic waste.
Complete units , compressors, motors etc. are only to be disposed of via qualified disposal specialists.
This unit uses flammable refrigerant R454B. Please contact the dealer when you want to dispose of this unit.
Law requires that the collection, transportation and disposal of refrigerants must conform with the regulations governing the collection and destruction of hydrofluorocarbons.

Safety Precautions

WARNING



The appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area. Refer to the installation instructions for the minimum room area required to install the appliance.

WARNING

The refrigerant leakage sensor can only use the factory model or the specified model indicated in the corresponding manual.
The R454B refrigerant leakage sensor must be used to activate the refrigerant shut-off device, the alarm device, incorporated circulation airflow or other emergency controls, which shall give an electrical signal at a predetermined alarm set point in response to leaked refrigerant.
The location of leakage sensors shall be chosen in relation to the different installation scenarios. Please refer to the indoor unit installation manual for specific requirements.
The installation of the refrigerant leakage sensor shall allow access for checking, repair or replacement by an authorized person.
The refrigerant leakage sensor shall be installed so its function can be verified easily.
The refrigerant leakage sensor shall be protected to prevent tampering or unauthorized resetting of the pre-set value.
To be effective, the refrigerant leakage sensor must be electrically powered at all times after installation, other than when servicing.
If the refrigerant leakage sensor detects a refrigerant leak, the fan will be turned on to the maximum， the compressor will stop running. you should immediately leave the leak area and notify a professional for handling.
The service life of the refrigerant sensor is 15 years, and it should be replaced after the service life.
LEAK DETECTION SYSTEM installed on indoor unit. Unit must be powered except for service.

WARNING

For appliances connected via an air duct system to one or more rooms, auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding 700° C and electric switching devices.
For appliances connected via an air duct system to one or more rooms, only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

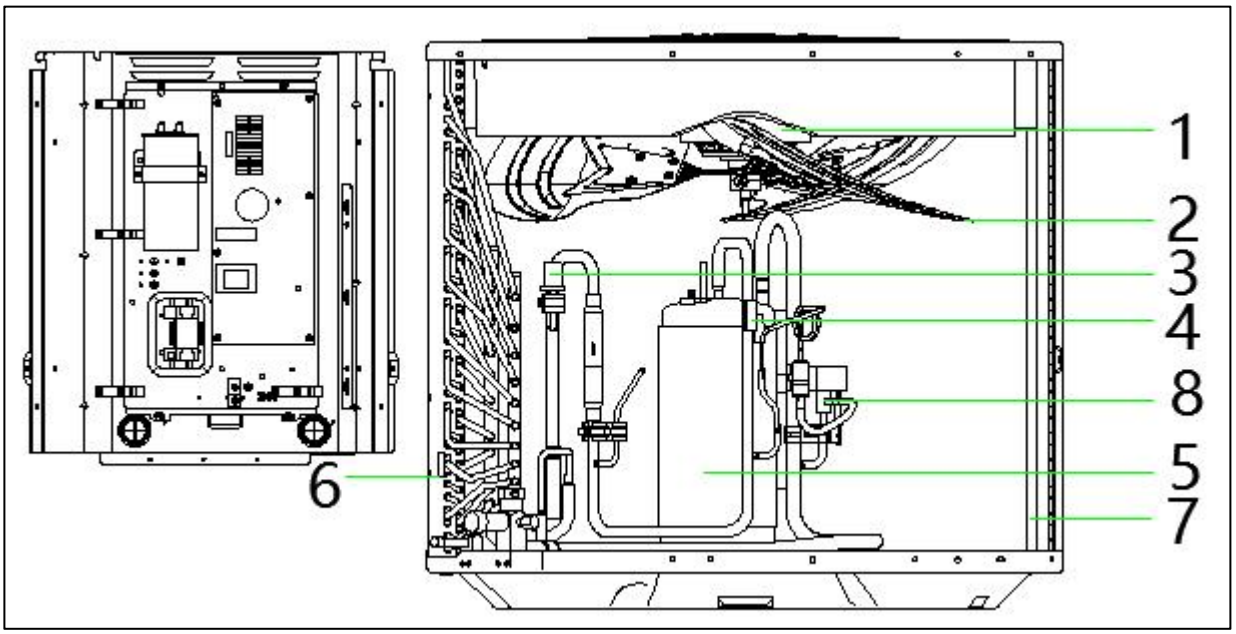
Service Manual

Series	Condenser Model	Compressor	Fan Motor	Heat Exchanger
15.2 AC FC	TAC5018A1000A	Rotary	DC Motor	Copper & Fin
	TAC5024A1000A	Rotary	DC Motor	Copper & Fin
	TAC5030A1000A	Rotary	DC Motor	Copper & Fin
	TAC5036A1000A	Scroll	DC Motor	Copper & Fin
	TAC5042A1000A	Scroll	DC Motor	Copper & Fin
	TAC5048A1000A	Scroll	DC Motor	Copper & Fin
	TAC5060A1000A	Scroll	DC Motor	Copper & Fin
15.2HP	THP5018A1000A	Scroll	DC Motor	Copper & Fin
	THP5024A1000A	Scroll	DC Motor	Copper & Fin
	THP5030A1000A	Scroll	DC Motor	Copper & Fin
	THP5036A1000A	Scroll	DC Motor	Copper & Fin
	THP5042A1000A	Scroll	DC Motor	Copper & Fin
	THP5048A1000A	Scroll	DC Motor	Copper & Fin
	THP5060A1000A	Scroll	DC Motor	Copper & Fin

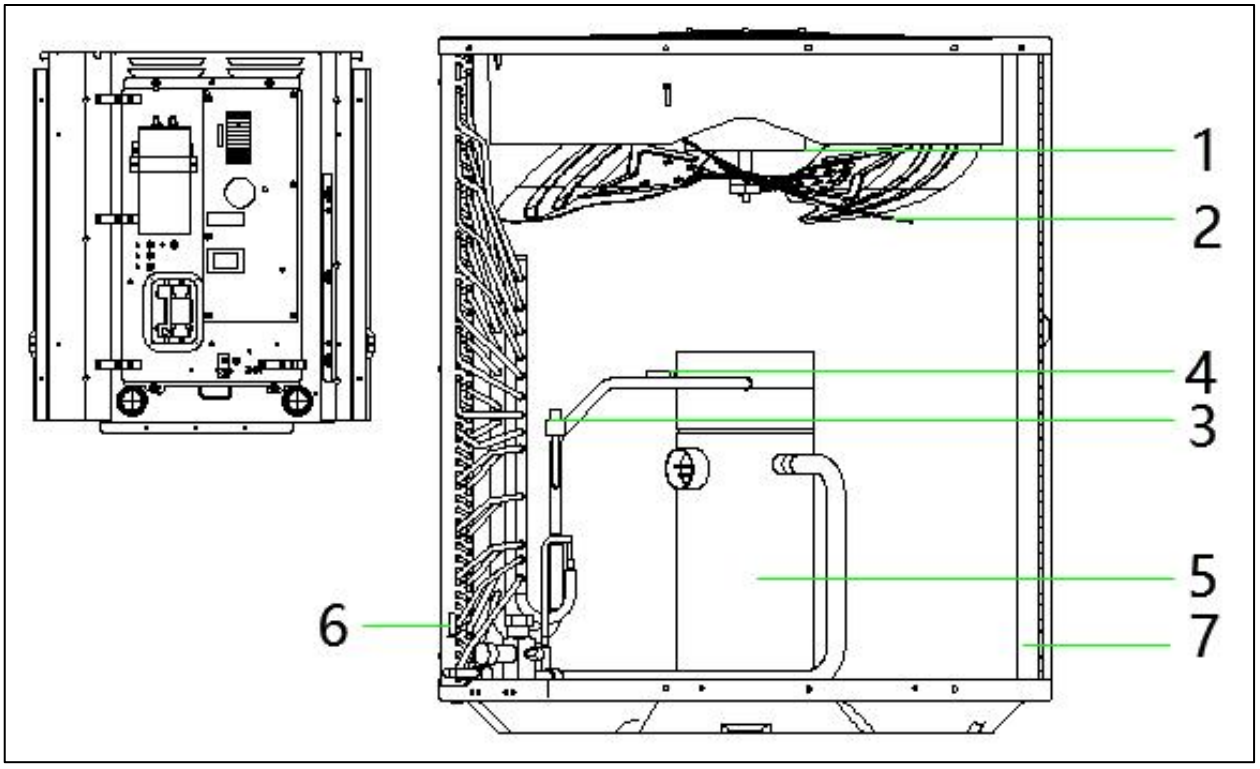
2.1 Product Outlook

2.2 Functional Part

15.2 AC FIN 53/71/105

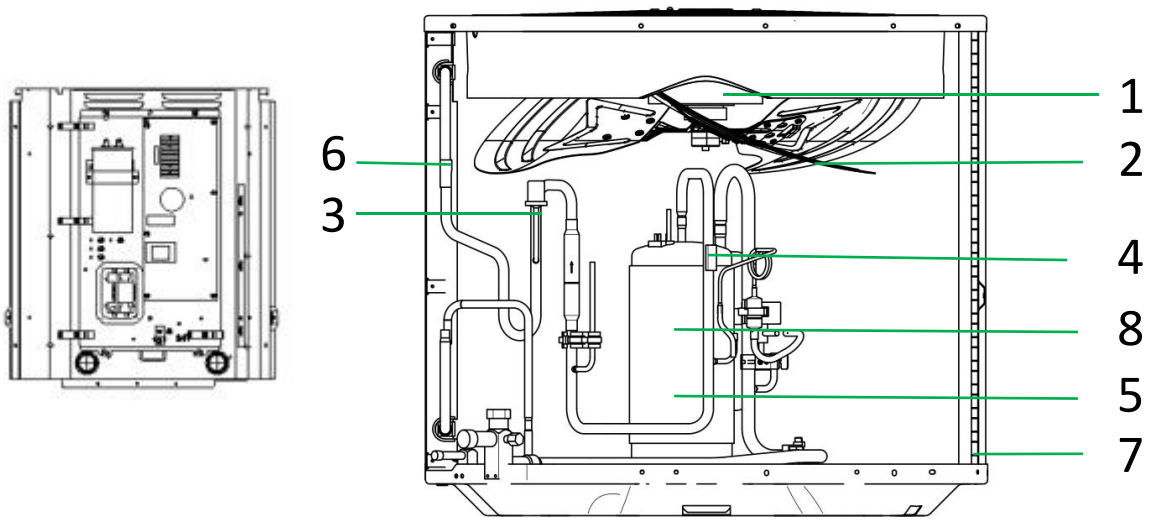


15.2 AC FIN 90/120/140/160

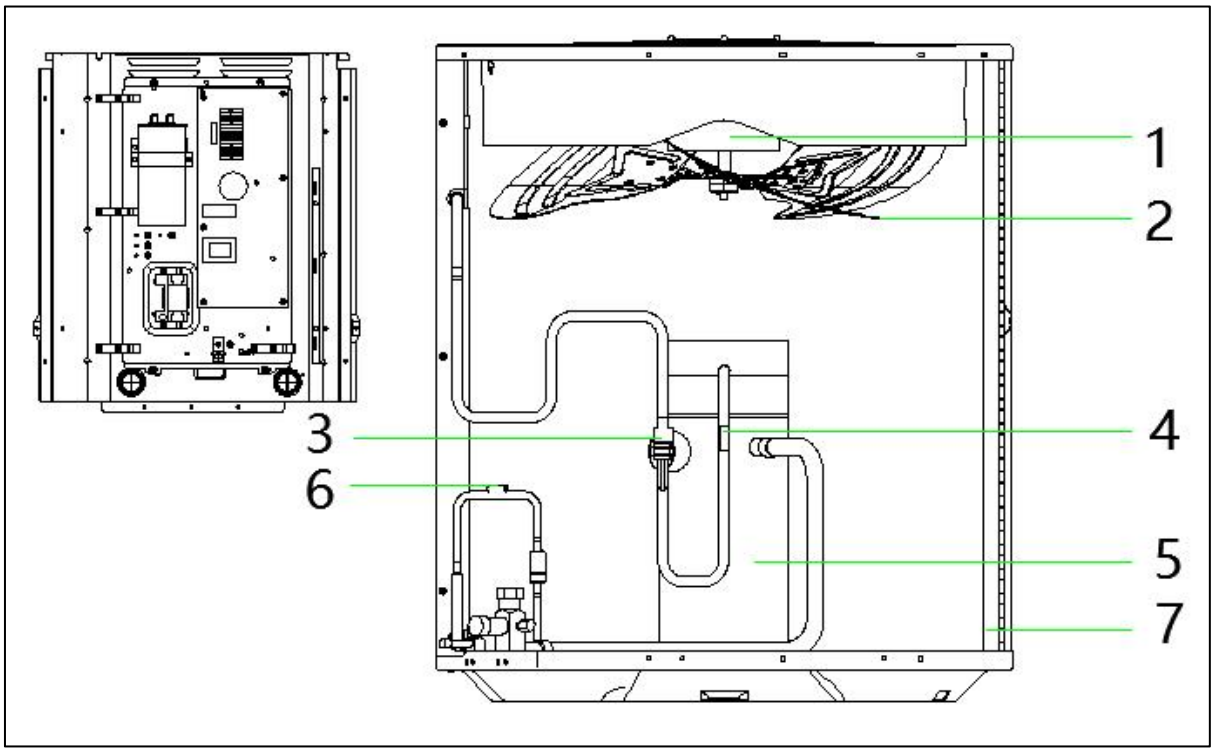


2.2 Functional Part

15.2 AC MC 53/71/90/105

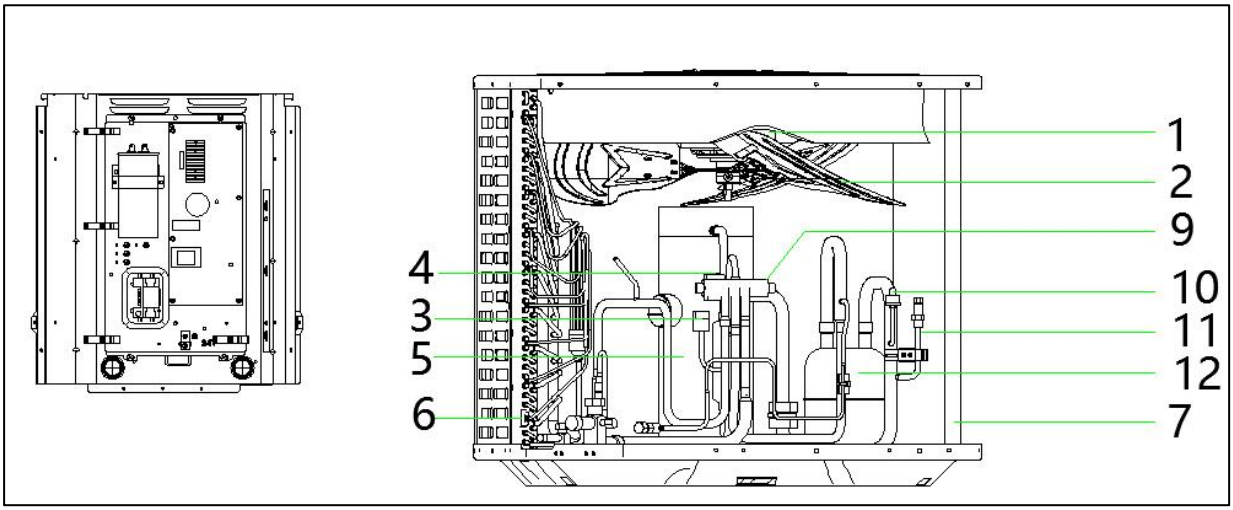


15.2 AC MC 120/140/160

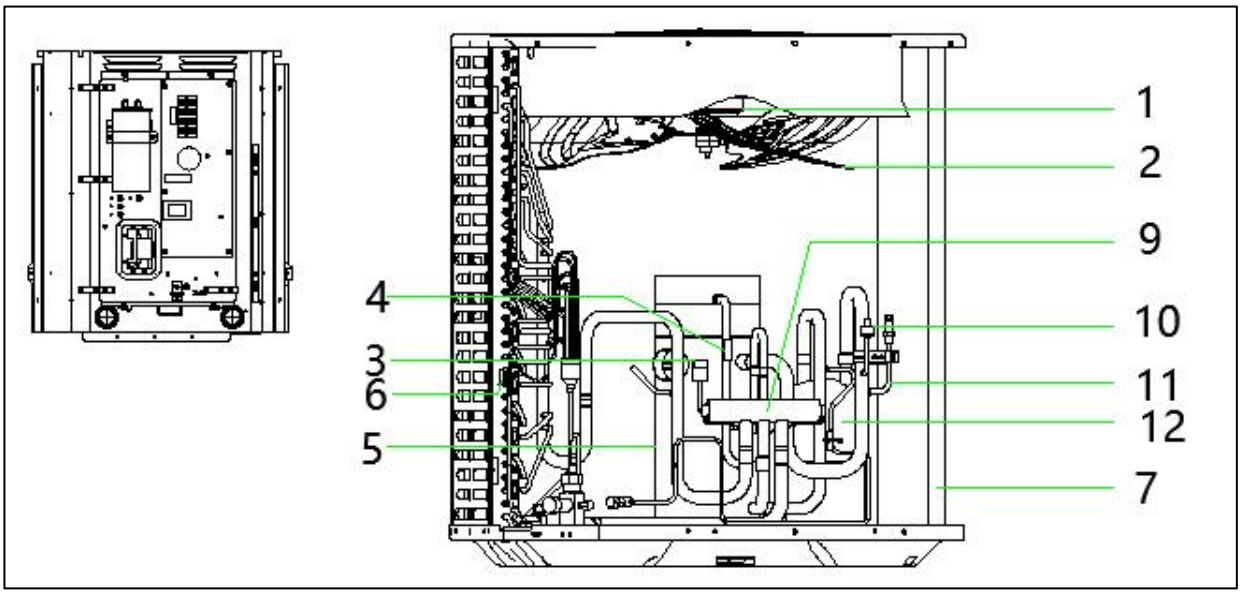


2.2 Functional Part

15.2 HP 53/71/90/105



15.2 HP 120/140/160



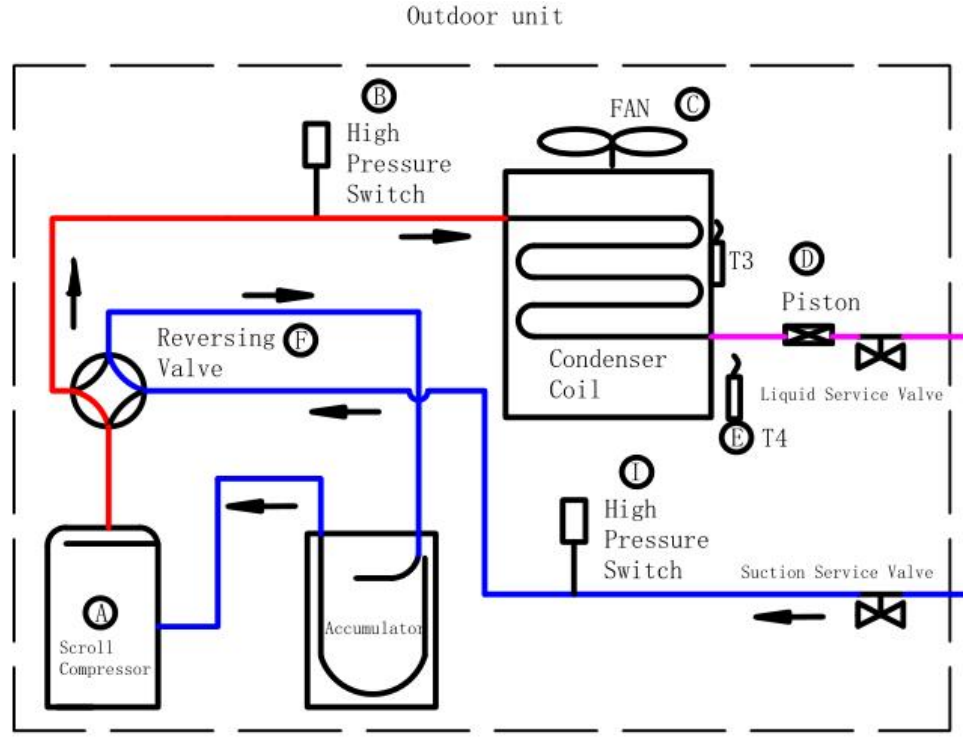
2.2 Functional Part

No. in diagram	Symbol	Part Name
1	Motor	Fan motor
2	Fan	Fan of outdoor
3	HPS	High pressure switch
4	DTS	Discharge Temperature switch
5	Comp.	Compressor
6	T3	Condenser coil temperature sensor
7	COIL	Condenser coil
8	PEV	Pressure Equalizer Valve
9	RV	The Reversing Valve
10	PS	Pressure switch
11	FPA	Fusible plug assembly
12	Accumulator	Accumulator

2.3 Refrigerant Flow Chart

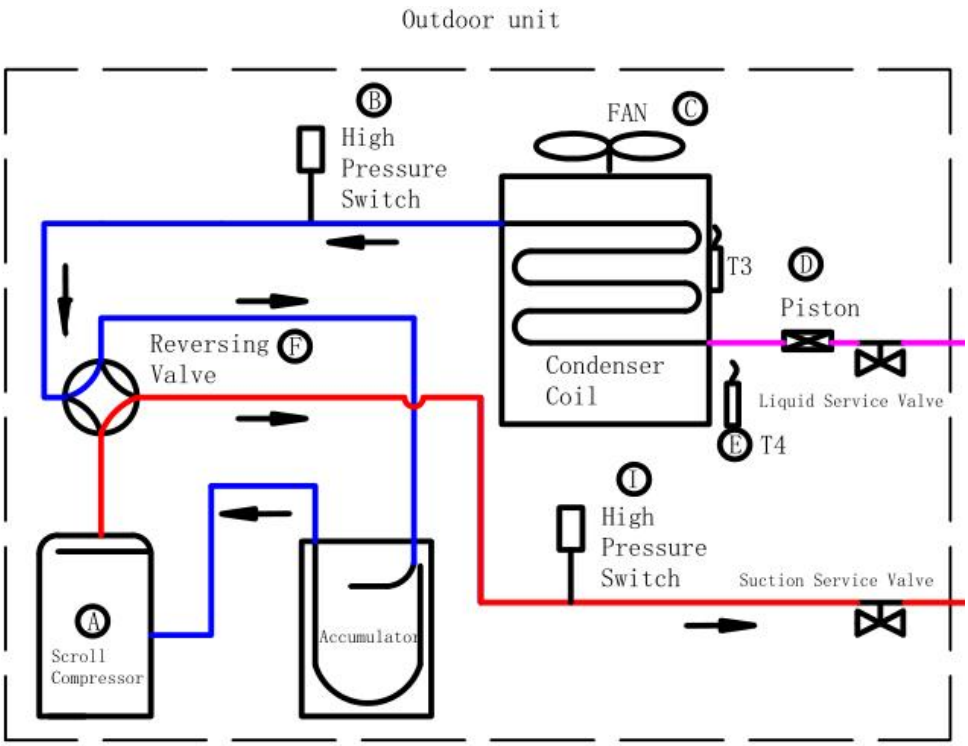
Cooling Operation/Defrost Operation

- High pressure gas
- High pressure liquid
- Low pressure

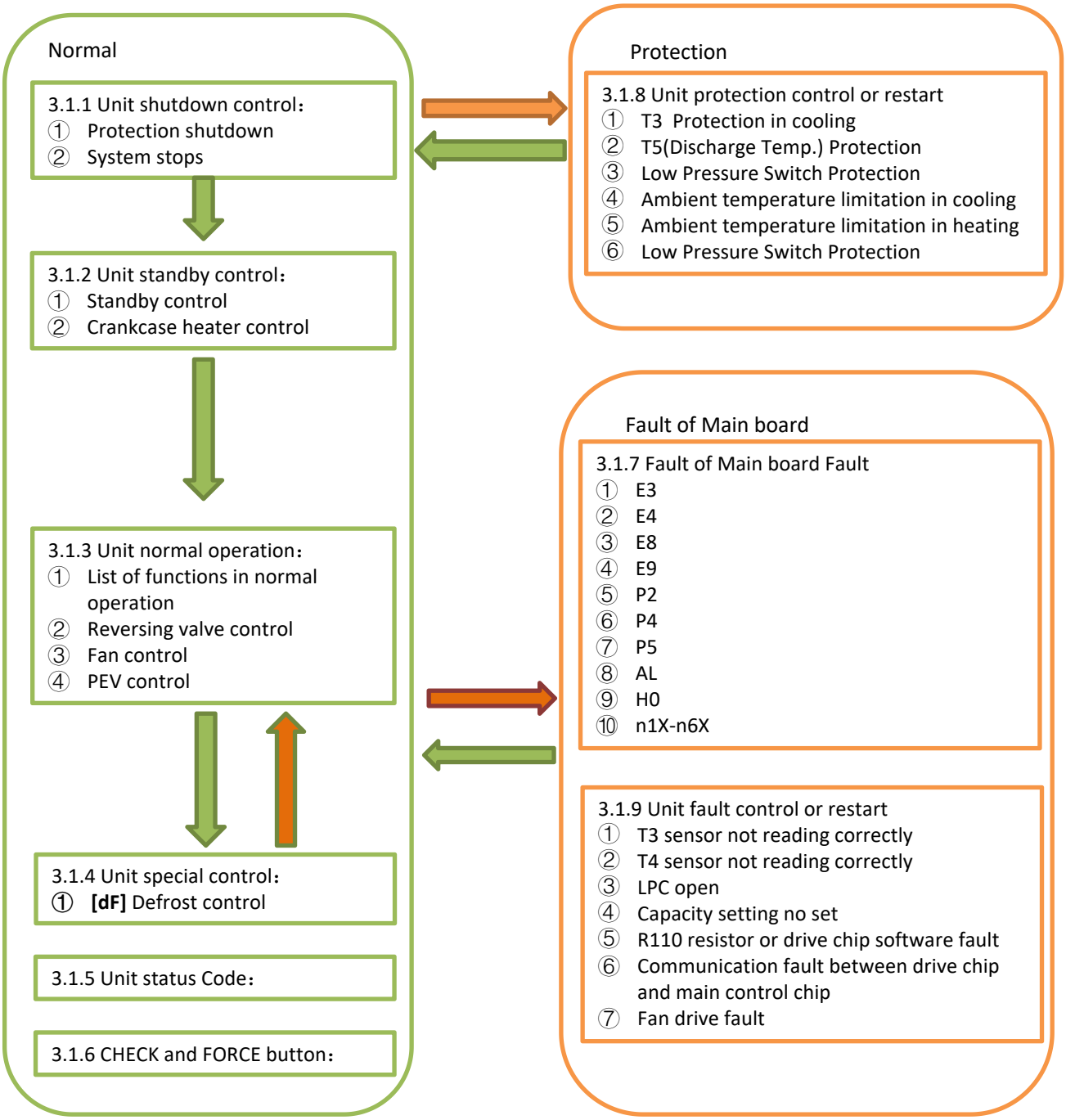


Heating Operation

- High pressure gas
- High pressure liquid
- Low pressure



3.1 Function General



3.1.1 Unit shutdown control

(1) Unit protection shutdown

To protect the outdoor unit, our system will shut down when there is something abnormal. Also the LED 1(Red) DSP would show the fault code when fault present.

(2) Thermostat satisfied shutdown

Anytime system is in unit standby, LED 1 (Red) will flash slowly (2s ON /2s off), DSP would show"——"

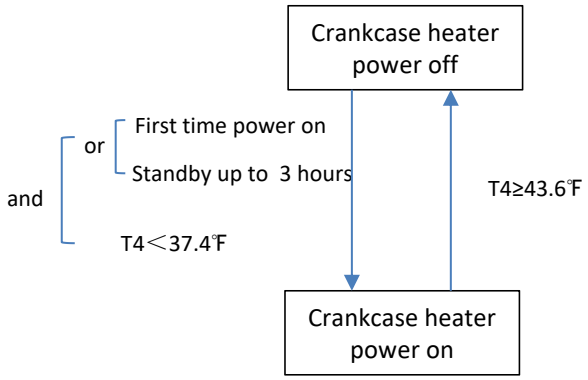
3.1.2 Unit standby control

(1) Standby control

When compressor stopped, the outdoor fan would stop immediately.
Before compressor start, the outdoor fan motor will run at least 15 seconds.

(2) Crankcase heater control

Here is the condition for crankcase heater control.



T4 is the Ambient temperature .

3.1.3 Unit normal operation

(1) List of functions in normal

[Cooling]

Symbol	Part Name	Control status
Comp.	Compressor	ON
RV	The Reversing Valve	OFF
Fan	Outdoor fan motor	10 speeds ECM Motor controlled by T3.

[Heating]

Symbol	Part Name	Control status
Comp.	Compressor	ON
RV	The Reversing Valve	ON
Fan	Outdoor fan motor	Fixed 10 speeds ECM motor.

[Defrost]

Symbol	Part Name	Control status
Comp.	Compressor	ON
RV	The Reversing Valve	OFF
Fan	Outdoor fan motor	OFF

(2) Reversing valve control control

The heat pump need “B” signal of 24V wires.

●Cooling:

The reversing valve is off during cooling.

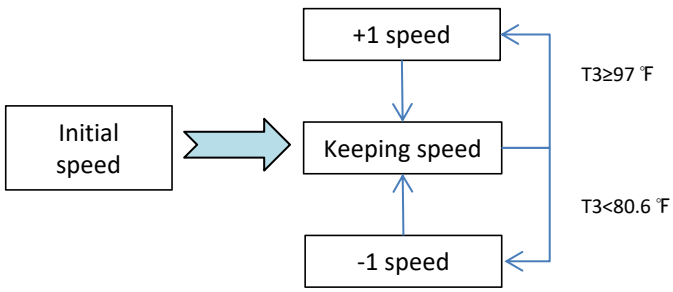
●Heating:

The reversing valve is on during heating and heating standby.

▲Special control: The reversing valve will delay about 1 minute when the first heating starting for reversing reliability.

(3) Fan control

[Cooling]



Note: ±1 speed/25 seconds,10 speeds ECM motor.

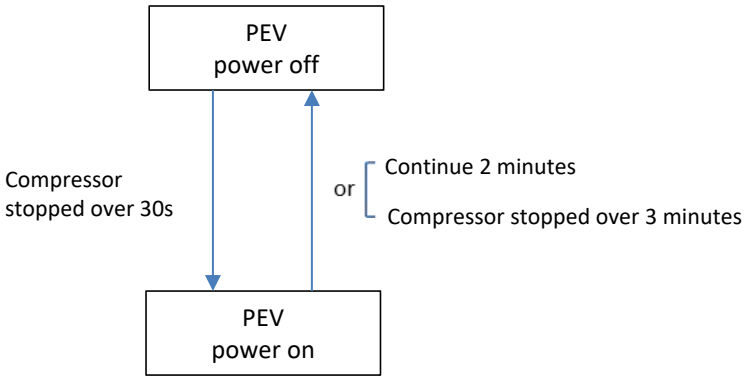
[Heating]

Fan when heating maintains 10 speed

3.1.3 Unit Normal operation

⑷ PEV control

The PEV's function is to help equalize the refrigerant pressures on the high and low sides prior to compressor operation . You will hear a "hissing" sound every time after the compressor stops, this is the PEV equalizing the pressure.



3.1.4 Unit special control

(1) **[dF] Defrost control**

● The Demand Defrost Control (DDC) monitors the ODU coil temperature using thermistor (T3). A second thermistor (T4) monitors outdoor ambient temperature. Based on these parameters, as well as accumulative running time and Standby time, the DDC calculates proper initiation of defrost.

● Any one of three conditions is required to enter defrost:

1. After T3 is achieved.
   --T4≥19℉ T3<32 ℉ and lasted for 60 minutes
2. After T4 is achieved.
   --T3<28℉ and lasted for 65 minutes
   _"Standby time" is 2 hours, T3<28℉ when starting and lasted for 15 minutes

3.1.5 Unit status Code

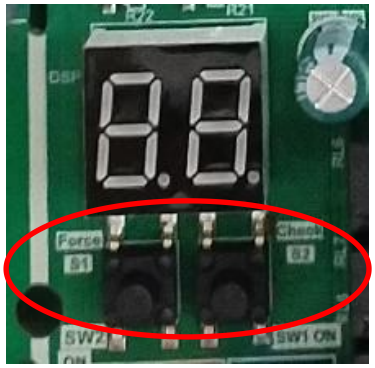
DSP: Two-digits digital tube shows the operating status. Shows operation mode when operating normally, shows error code when error occurs

Code	Description
- -	Standby
-C	Cooling mode
-H	Heating mode
FC	Forced cooling mode
dF	Defrosting mode
CH	Abnormal signal

Note: For "CH" code, it means the signal wire from indoor unit to outdoor unit isn't connected correctly. The following condition may cause this code.

Signal	B	Y	W
Status (1 for ON; 0 for OFF)	0	1	1
	1	0	1
	0	0	1

3.1.6 Check and Force Function



●Force button

Long press “Force” at least 6 seconds and enter Defrost mode

Short press “Force ” and enter Force Cooling mode

●Check button

To display system parameters, press the “Check” button to index through the series of parameters available.

The first time you press the “Check” button, it will display the sequence, and after 1 second it will display the value of the

parameter. If you press the “Check” button again, it will display the next sequence.

After 30 seconds on same parameter, the display will revert back to normal status.

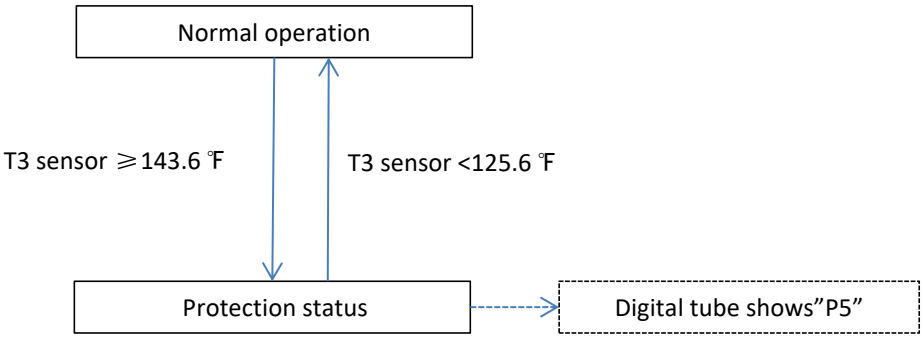
NO.	Point check content
1	Unit capacity
2	Operation mode
3	Current fan speed(Actual speed divided by 10, 560R is represented by ‘56.’, 1050R is represented by ‘A5.’)
4	Target fan speed(Actual speed divided by 10, for example, 560R is represented by‘56.’, 1050R is represented by ‘A5.’)
5	T3 temperature(°F)(if the value is less than 100, the actual value is displayed. if over 100, divided by 10, 135 is represented by‘13.’, if it is negative, ‘1.0’ means -10,‘.5’ means -5)
6	T4 temperature(°F)(if the value is less than 100, the actual value is displayed. if over 100, divided by 10, 135 is represented by ‘13.’, if it is negative, ‘1.0’ means -10,‘.5’ means -5)
7	Compressor running time(day) (if the value is less than 100, the actual number of days is displayed. if over 100 and less than 1000, 360 days are represented by ‘36.’, if over 1000, 3600 days are represented by ‘3.6.’)
8	Main control chip software version
9	Drive chip software version
10	Y1 signal state(1=ON, 0=OFF)
11	B signal state(1=ON, 0=OFF)
12	W signal state(1=ON, 0=OFF)
13	Y2 signal state(1=ON, 0=OFF)
14	RV condition (1=ON, 0=OFF)
15	High wind pattern (1=ON, 0=OFF)
16	Last fault code
17	Last second fault code
18	Last third fault code
19	- -

3.1.7 Fault of Main board：

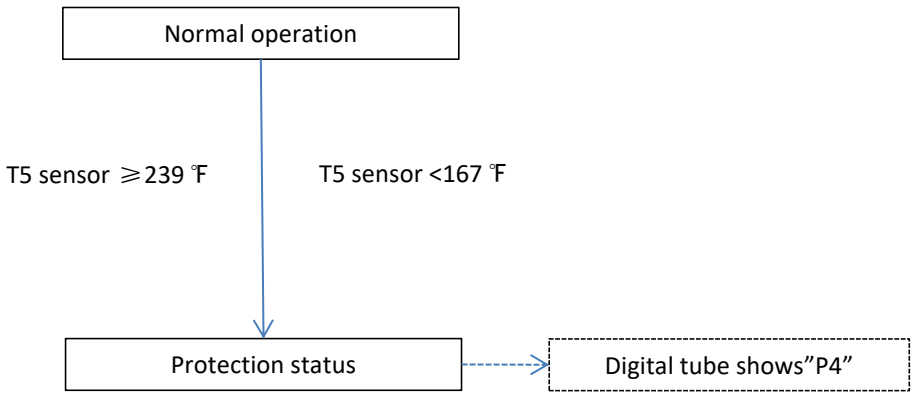
No.	Protection code	Protection control description	Possible Reason
1	E3	T3 sensor fault	T3 sensor is short circuit or open circuit
2	E4	T4 sensor fault	T4 sensor is short circuit or open circuit
3	E8	Capacity setting no set	Capacity setting(SW2) isn't set/Program error/Control board in outdoor unit is failure
4	E9	R110 resistor or drive chip software fault	Fan is failure/Control board in outdoor unit is failure
5	P2	LPC protection	Speed message isn’t wrote in main board
6	P4	Discharge temperature protection	High temperature and overload/Throttle blockage/Charging leakage (low refrigerant)/DTS fault
7	P5	T3 high-temperature protection	High temperature and overload/Poor heat exchange on condensing side/T3 fault
8	AL	Ambient temperature limitation	Ambient temperature is out of the range/There are other cooling sources around T4
9	H0	Communication fault between drive chip and main control chip	Program error/Control board in outdoor unit is failure
10	n1X-n6X	Fan drive fault	Wiring error/Fan is failure/Control board in outdoor unit is failure

3.1.8 Unit protection control or restart：

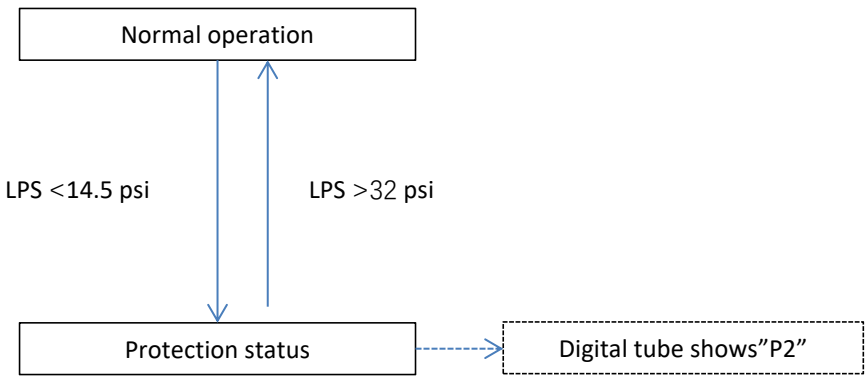
⑴ T3 Protection in cooling



⑵ T5(Discharge Temp.) Protection

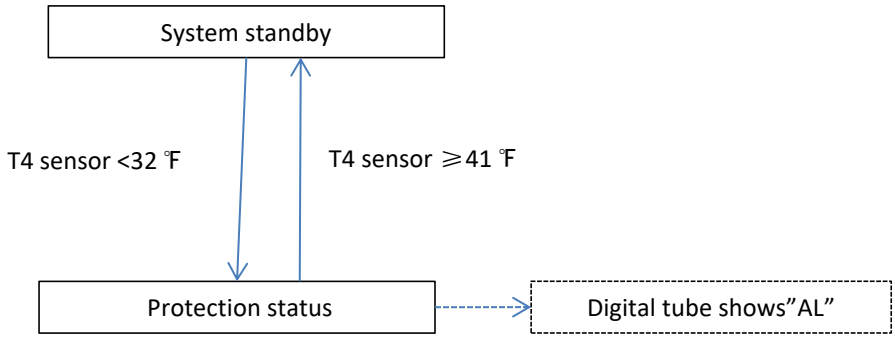


⑶ Low Pressure Switch Protection

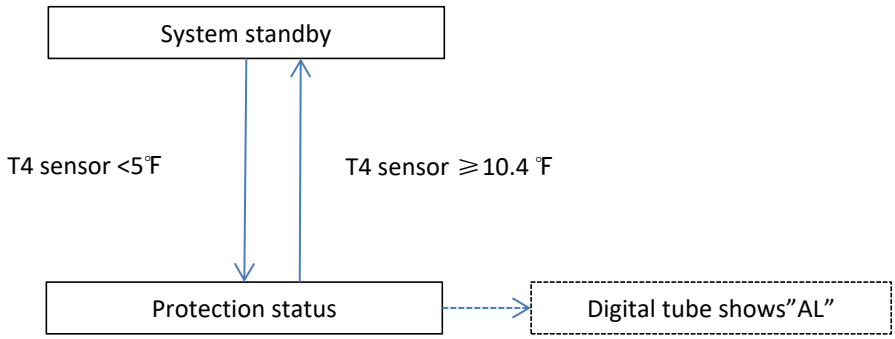


3.1.8 Unit protection control or restart：

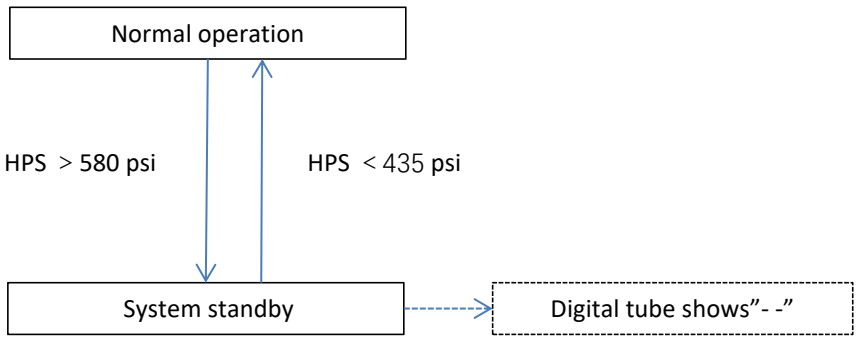
(4) Ambient temperature limitation in cooling



(5) Ambient temperature limitation in heating

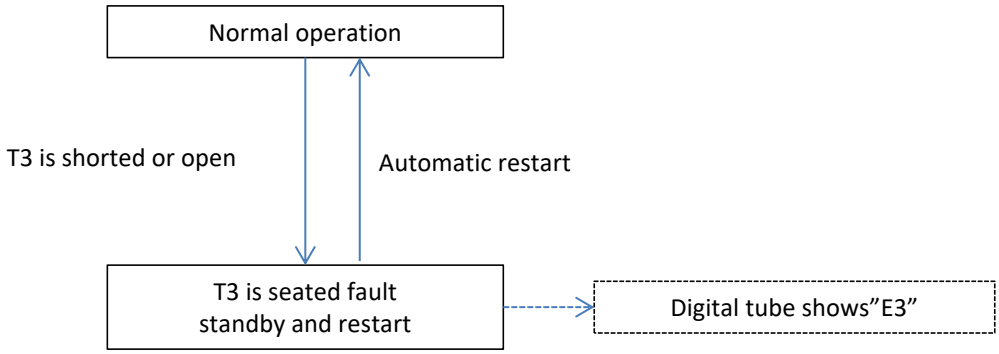


(6) High Pressure Switch Protection

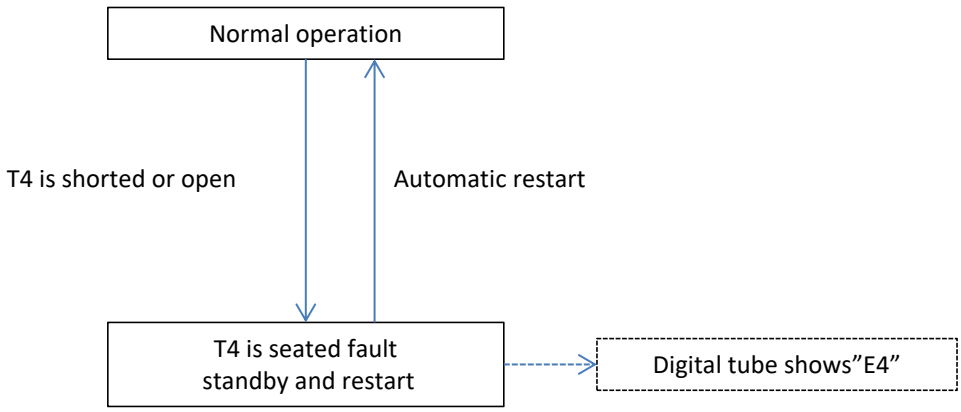


3.1.9 Unit fault control or restart：

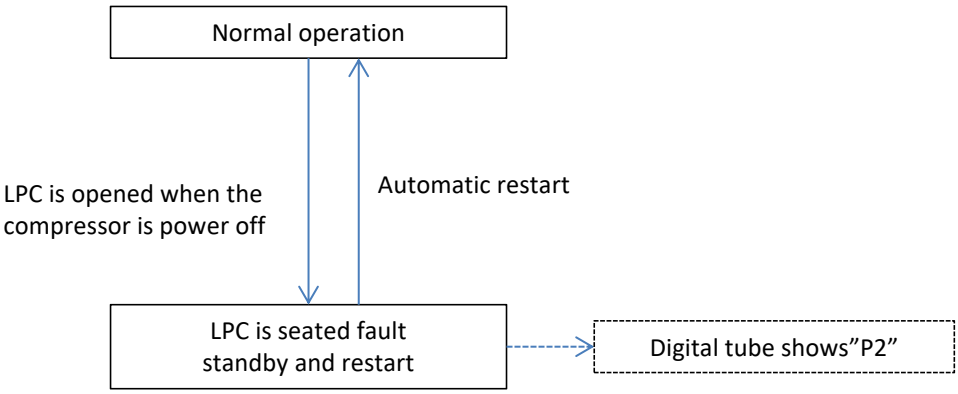
(1) T3 sensor not reading correctly



(2) T4 sensor not reading correctly

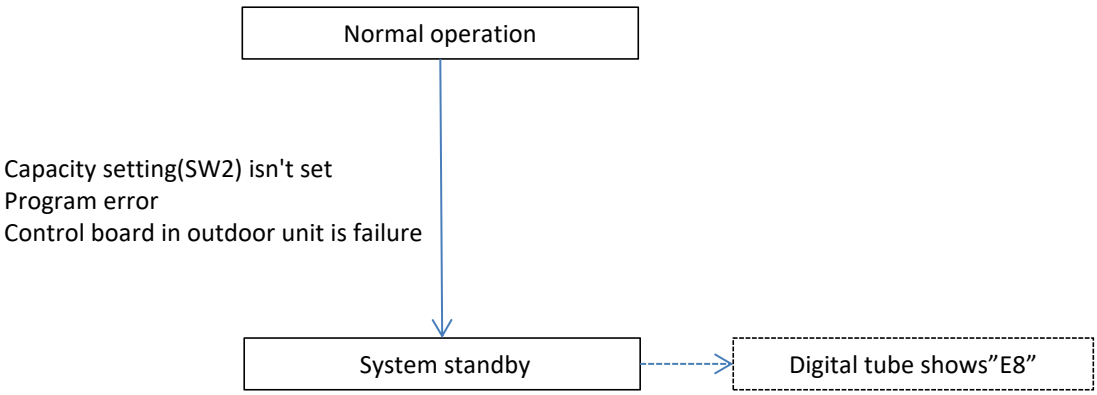


(3) LPC open

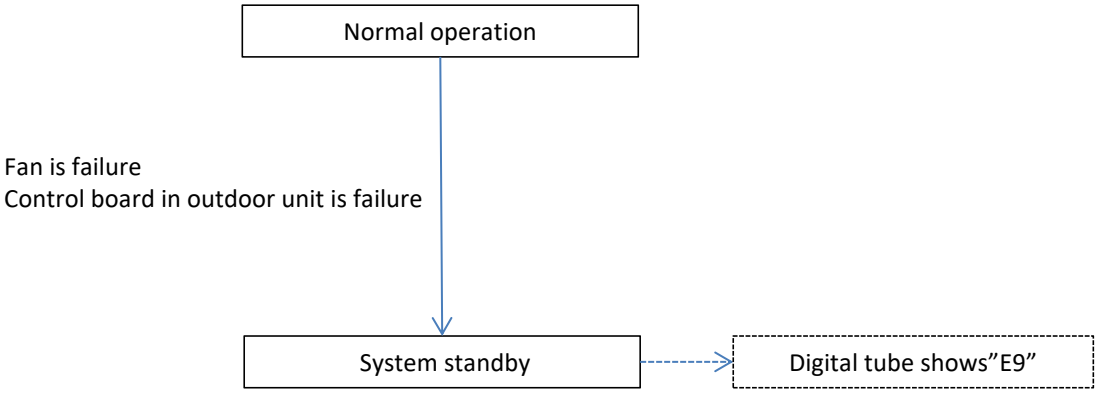


3.1.9 Unit Fault control or restart：

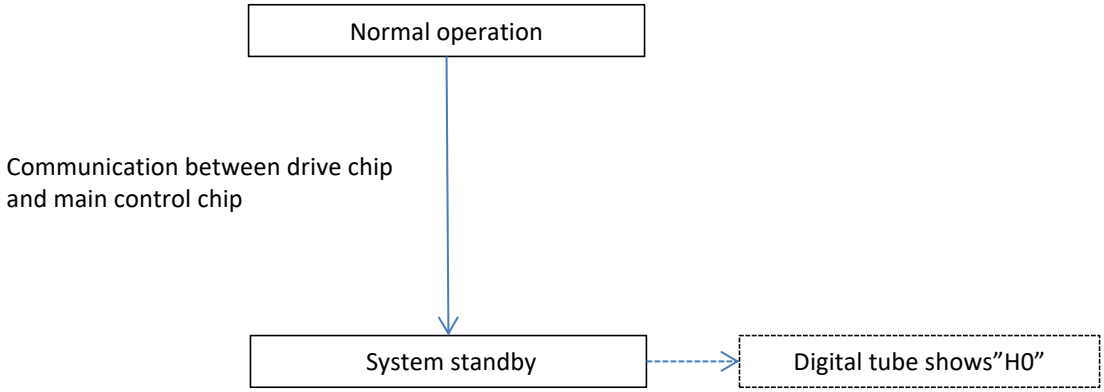
⑷ Capacity setting no set



(5) Main board or drive chip software fault

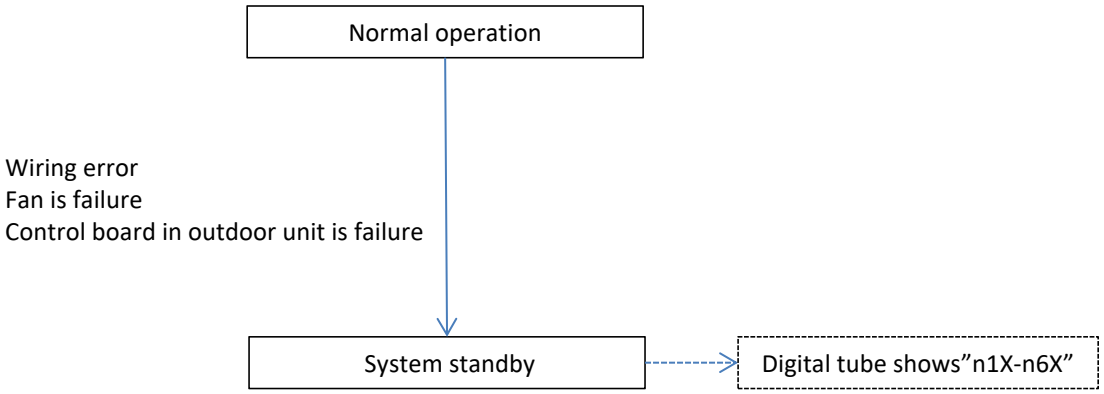


(6) Communication fault between drive chip and main control chip



3.1.9 Unit Fault control or restart：

(7) Fan drive fault



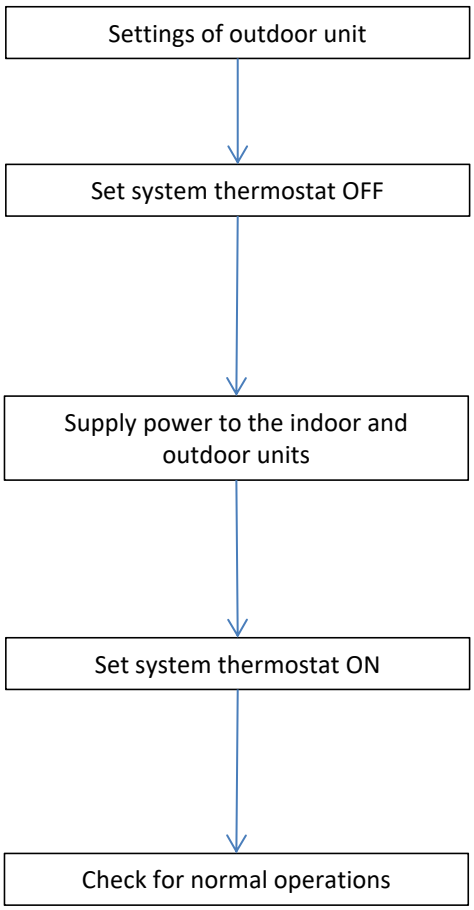
4.1 Pre-operation

4.1.1 Checks before test operation

No.	Checkpoints	Cautions or warnings
1	Are all units securely installed?	Dangerous for turning over during storm Possible damage to pipe connections
2	Is the earth wire installed according to the applicable local standard?	Dangerous if electric leakage occurs
3	Are the condenser unit installed according to location restrictions requirement?	Poor capacity abnormal operation
4	Are all air inlets and outlets of the indoor and outdoor units unobstructed?	Poor cooling Poor heating
5	Does the drain flow out smoothly?	Pipeline water leak
6	Is piping adequately heat-insulated?	Pipeline water leak Poor capacity
7	Have the connections been checked for air tight test and vacuum drying?	Poor capacity abnormal operation
8	Is a proper quantity of refrigerant charged?	Poor capacity abnormal operation
9	Are the service valve open fully?	abnormal operation
10	Do the supply power wirings connected Normally? Including the earth wiring.	Dangerous if electric leakage occurs
11	Does the earth leakage circuit breaker connected normally?	Dangerous if electric leakage occurs
12	Do the wirings of 24V signal connected according to wiring diagram? Including the thermostat wiring and setting.	abnormal operation
13	Is the supply voltage conform to the specifications on the name plate?	abnormal operation Damage unit
14	Are the cable sizes as specified and according to local regulations?	Damage of cables

4.1 Pre-operation

4.1.2 Turn power on



Note:
Make field setting if needed.
(For the setting procedure, refer to information in “4.2.2 Setting by DIP switches”)

Note:
In a normal condition, the LED1 flesh slowly (2S ON/2S OFF) and LED2 steady on.

Note:
Be sure to turn the power on 1 hour before starting operation when the ambient temperature is below **70**℉

Note:
Check operations
Check for the 24V signal from thermostat
Check for operation mode
Check for the digital display shows the compressor frequency

4.1 Pre-operation

4.1.3 Charging Refrigerant

(1) Superheating/Subcooling charging method

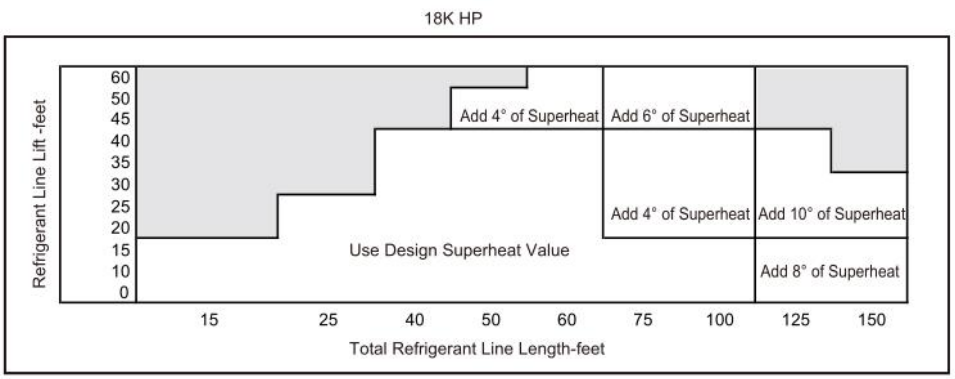
Superheating (in cooling mode) is the only recommended method of charging above 55℉ outdoor ambient temperature, especially the mixed system.

Design subcool with TXV throttle table

Outdoor DB (°F)	Indoor Unit Inlet DB/WB (°F)					
	95/79	90/75	85/71	80/67	75/63	70/58
115	8	9	11	12	14	15
110	7	8	11	12	13	15
105	5	6	11	11	12	14
100	5	6	9	10	11	13
95	5	5	6	9	10	12
90	5	5	6	8	9	11
85	5	5	6	6	8	10
80	5	5	6	6	7	12
75	5	5	5	5	5	14
70	5	5	6	6	8	15
65	5	5	6	6	10	15
60	5	5	6	6	8	13
55	5	5	5	5	5	11

Design superheat with piston throttle

Outdoor DB (°F)	Indoor Unit Inlet DB/WB (°F)					
	95/79	90/75	85/71	80/67	75/63	70/58
115	15	13	11	8	5	5
110	16	14	11	9	6	5
105	16	14	11	9	6	5
100	16	14	12	9	6	5
95	16	14	12	9	6	5
90	18	15	13	10	6	5
85	19	16	13	10	6	5
80	17	14	12	9	6	5
75	15	12	10	7	5	5
70	14	11	8	6	5	5
65	12	10	6	5	5	5
60	12	10	6	5	5	5
55	12	9	6	5	5	5



For more information, please go to read installation manual

4.1 Pre-operation

4.1.3 Charging Refrigerant

R454B Refrigerant Superheat chart							
Suction Temp (°F)	Final Superheat (°F)						
	6	8	10	12	14	16	18
	Suction Gauge Pressure (PSI)						
40	95	91	87	84	80	77	74
42	99	95	91	87	84	80	77
44	103	99	95	91	87	84	80
46	107	103	99	95	91	87	84
48	111	107	103	99	95	91	87
50	116	111	107	103	99	95	91
52	120	116	111	107	103	99	95
54	125	120	116	111	107	103	99
56	129	125	120	116	111	107	103
58	134	129	125	120	116	111	107
60	139	134	129	125	120	116	111
62	144	139	134	129	125	120	116
64	149	144	139	134	129	125	120
66	155	149	144	139	134	129	125
68	160	155	149	144	139	134	129
70	166	160	155	149	144	139	134
72	171	166	160	155	149	144	139

Notes:

1. If superheating is low, remove refrigerant. If superheating is high, add refrigerant.
2. If superheat >30℉ , please check if there are abnormal condition for insulation, high humidity, high room temperature. Also check if discharge superheat>60 ℉ or there is fault code. Replace TXV if everything is normal.
3. If superheat <5℉ , please check if there are abnormal on blower motor speed or low room temperature. Also check if discharge superheat<40 ℉ or there is fault code. Replace TXV if everything is normal.
4. Before adjusting system charge: allow the system to run for 10 minutes, then press the force button and let the system run for ~20 minutes to ramp up to 100%, then you can begin charging.

4.1 Pre-operation

4.1.3 Charging Refrigerant

(2) Weigh-in charging method

Use weigh-in charging method the initial installation, or anytime a system charge is being replaced. Weigh-in charging method can also be used when power is not available to the equipment site or operating conditions (Indoor/Outdoor temperatures) are out of range to verify with the subcooling charging method.

For mixed system, when have to use weigh-in method for charging, it is important to return in the spring or summer to accurately charge the system in the cooling mode when outdoor ambient temperature is above 55℉ .

Based charging (Condenser charging)

There is some refrigerant when unit come out from factory. The value can be found on nameplate.

Calculate additional charging of refrigerant line length

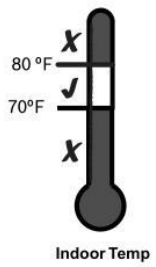
The factory charge in the outdoor unit is sufficient for 15 feet of standard size refrigerant line, need to add refrigerant if the pipe beyond 15 feet.

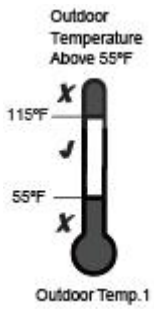
Calculate the additional refrigerant to be charged:

=(L-15)*0.6

L=Total length (feet) of liquid line (3/8``)

*If liquid line is less than 15ft, don`t need to do it.

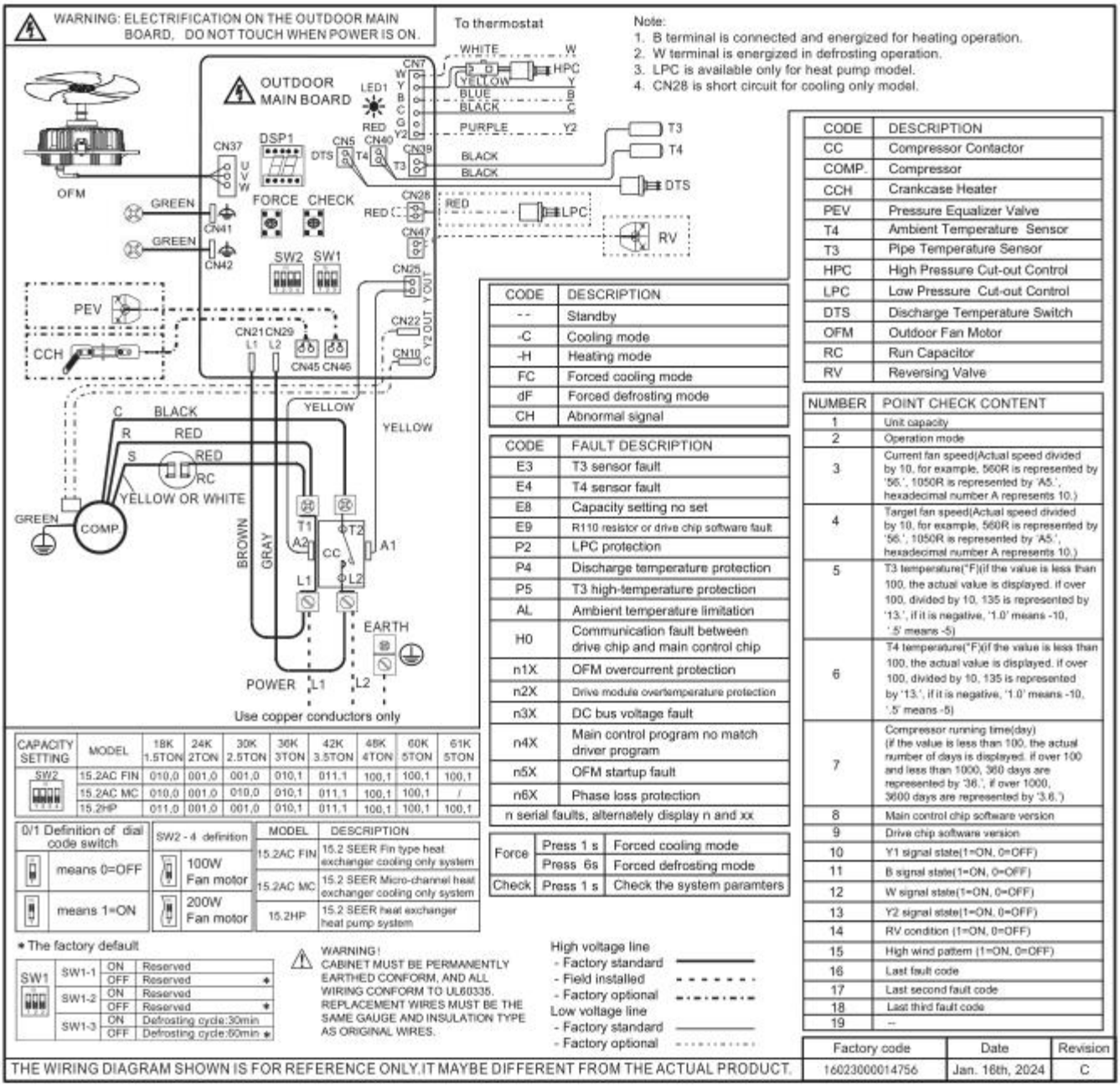




Note：. When the Outdoor temperature is ≥ 115F or ≤ 55F, it must be charged by weighing

4.2 Field setting

4.2.1 Setting by DIP switches



CODE	DESCRIPTION
--	Standby
-C	Cooling mode
-H	Heating mode
FC	Forced cooling mode
dF	Forced defrosting mode
CH	Abnormal signal

CODE	FAULT DESCRIPTION
E3	T3 sensor fault
E4	T4 sensor fault
E8	Capacity setting no set
E9	R110 resistor or drive chip software fault
P2	LPC protection
P4	Discharge temperature protection
P5	T3 high-temperature protection
AL	Ambient temperature limitation
H0	Communication fault between drive chip and main control chip
n1X	OFM overcurrent protection
n2X	Drive module overtemperature protection
n3X	DC bus voltage fault
n4X	Main control program no match driver program
n5X	OFM startup fault
n6X	Phase loss protection
n serial faults, alternately display n and xx	

Force	Press 1 s	Forced cooling mode
	Press 6s	Forced defrosting mode
Check	Press 1 s	Check the system paramters

CODE	DESCRIPTION
CC	Compressor Contactor
COMP.	Compressor
CCH	Crankcase Heater
PEV	Pressure Equalizer Valve
T4	Ambient Temperature Sensor
T3	Pipe Temperature Sensor
HPC	High Pressure Cut-out Control
LPC	Low Pressure Cut-out Control
DTS	Discharge Temperature Switch
OFM	Outdoor Fan Motor
RC	Run Capacitor
RV	Reversing Valve

NUMBER	POINT CHECK CONTENT
1	Unit capacity
2	Operation mode
3	Current fan speed(Actual speed divided by 10, for example, 560R is represented by '56.', 1050R is represented by 'A5.', hexadecimal number A represents 10.)
4	Target fan speed(Actual speed divided by 10, for example, 560R is represented by '56.', 1050R is represented by 'A5.', hexadecimal number A represents 10.)
5	T3 temperature(°F)(if the value is less than 100, the actual value is displayed. if over 100, divided by 10, 135 is represented by '13.', if it is negative, '1.0' means -10, '.5' means -5)
6	T4 temperature(°F)(if the value is less than 100, the actual value is displayed. if over 100, divided by 10, 135 is represented by '13.', if it is negative, '1.0' means -10, '.5' means -5)
7	Compressor running time(day) (if the value is less than 100, the actual number of days is displayed. if over 100 and less than 1000, 360 days are represented by '36.', if over 1000, 3600 days are represented by '3.6.')
8	Main control chip software version
9	Drive chip software version
10	Y1 signal state(1=ON, 0=OFF)
11	B signal state(1=ON, 0=OFF)
12	W signal state(1=ON, 0=OFF)
13	Y2 signal state(1=ON, 0=OFF)
14	RV condition (1=ON, 0=OFF)
15	High wind pattern (1=ON, 0=OFF)
16	Last fault code
17	Last second fault code
18	Last third fault code
19	--

CAPACITY SETTING	MODEL	18K 1.5TON	24K 2TON	30K 2.5TON	36K 3TON	42K 3.5TON	48K 4TON	60K 5TON	61K 5TON
SW2	15.2AC FIN	010,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1
	15.2AC MC	010,0	001,0	010,0	010,1	011,1	100,1	100,1	/
	15.2HP	011,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1

0/1 Definition of dial code switch	SW2 - 4 definition	MODEL	DESCRIPTION
means 0=OFF	100W Fan motor	15.2AC FIN	15.2 SEER Fin type heat exchanger cooling only system
means 1=ON	200W Fan motor	15.2AC MC	15.2 SEER Micro-channel heat exchanger cooling only system
		15.2HP	15.2 SEER heat exchanger heat pump system

* The factory default

SW1	SW1-1	ON	Reserved
		OFF	Reserved *
	SW1-2	ON	Reserved
		OFF	Reserved *
	SW1-3	ON	Defrosting cycle:30min
		OFF	Defrosting cycle:60min *

WARNING!
CABINET MUST BE PERMANENTLY EARTHED CONFORM, AND ALL WIRING CONFORM TO UL60335. REPLACEMENT WIRES MUST BE THE SAME GAUGE AND INSULATION TYPE AS ORIGINAL WIRES.

High voltage line
- Factory standard
- Field installed
- Factory optional

Low voltage line
- Factory standard
- Factory optional

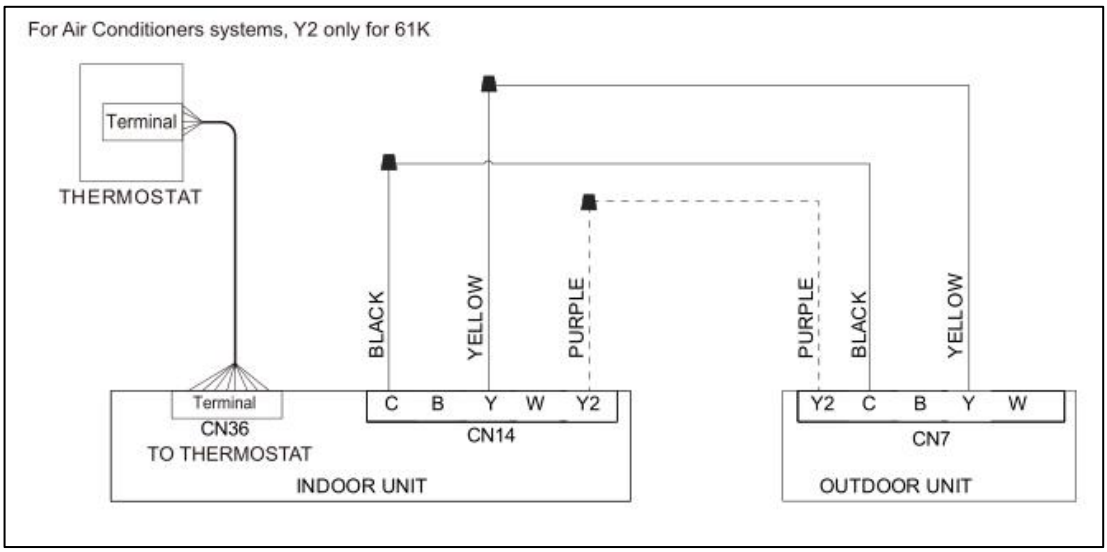
THE WIRING DIAGRAM SHOWN IS FOR REFERENCE ONLY,IT MAYBE DIFFERENT FROM THE ACTUAL PRODUCT.

Factory code	Date	Revision
16023000014756	Jan. 16th, 2024	C

4.3 Thermostat

Note: B signal need thermostat programming settings.

4.3.1 Control wiring



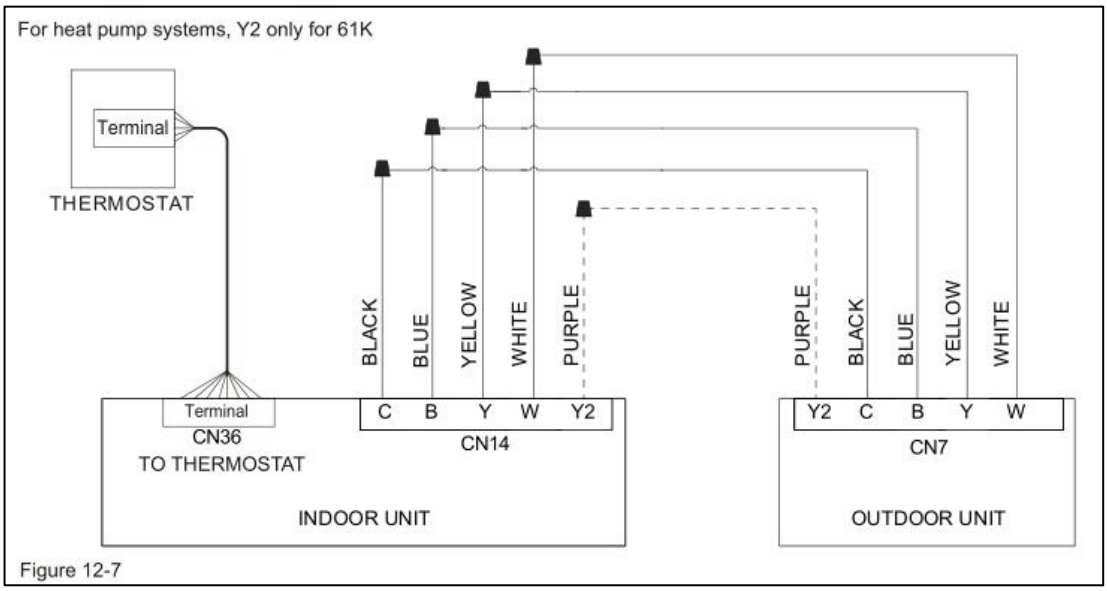


Figure 12-7

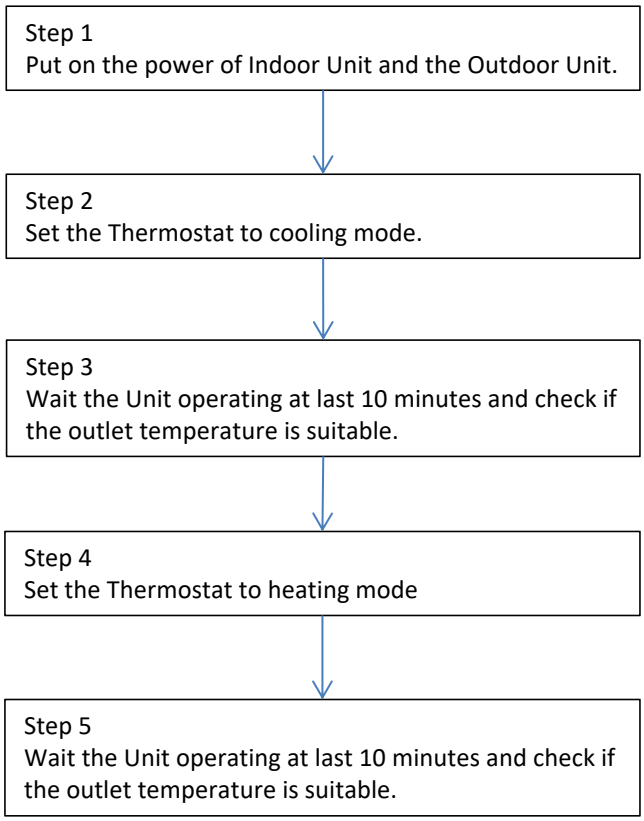
Notes:

- *Be sure power supply agrees with equipment nameplate.*
- *Power wiring and grounding of equipment must comply with local codes.*
- *Low voltage wiring to be No. 18 AWG minimum conductor.*
- *"- - - - - - - -" Field installed electric auxiliary heat connection*
- *Single-stage auxiliary heating (Supported by 2H thermostat)*

- *Twin-stage auxiliary heating (Supported by 3H thermostat)*
- *W: Electric auxiliary heat signal.*
- *W1:The first stage Field installed electric auxiliary heat signal.*
- *W2:The second stage Field installed electric auxiliary heat signal.*
- *The outdoor unit W signal is connected to the Electric auxiliary heat or the first stage Electric auxiliary heat.*

4.4 Trial Operation

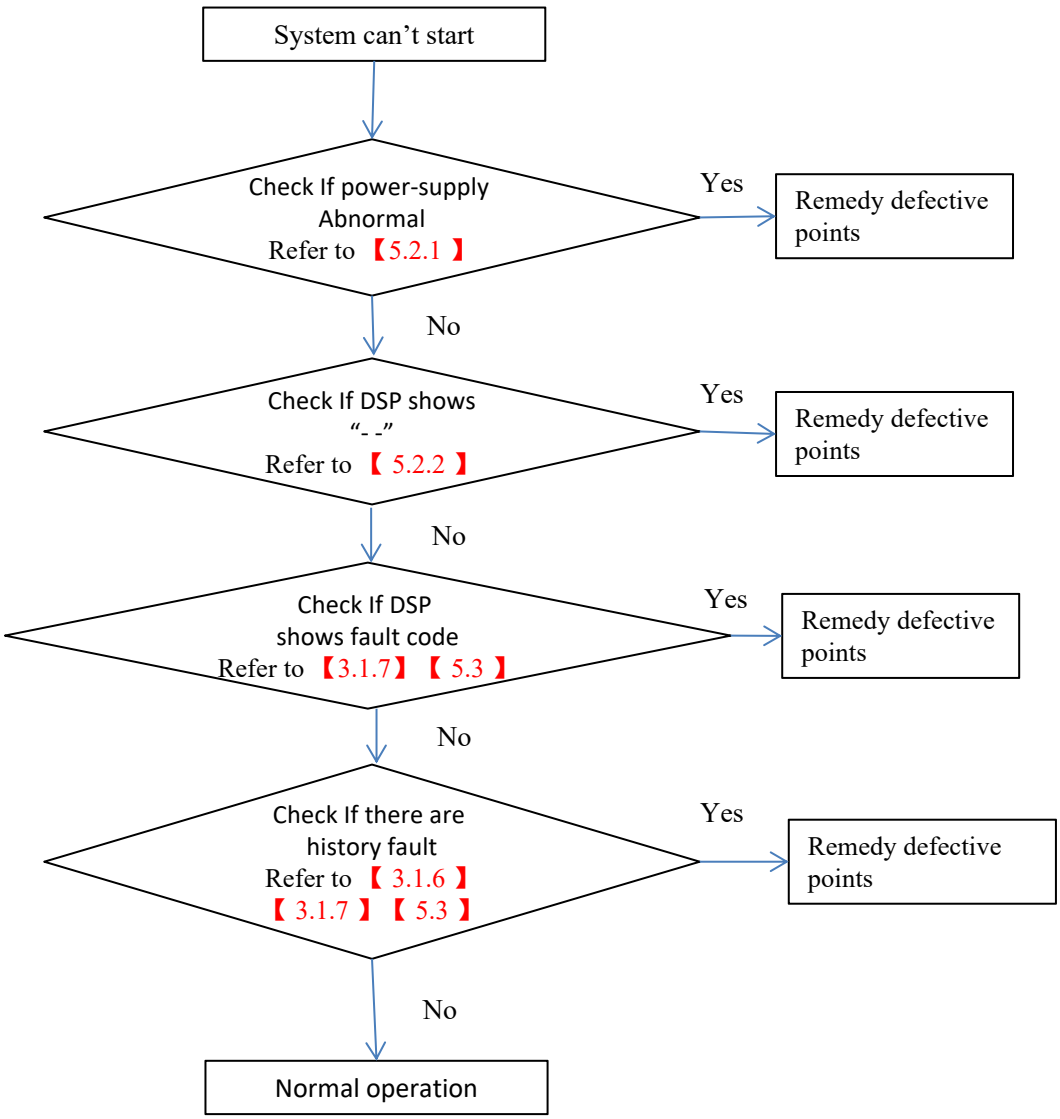
4.4.1 Trial Operation



Note:
Only for HP Unit.

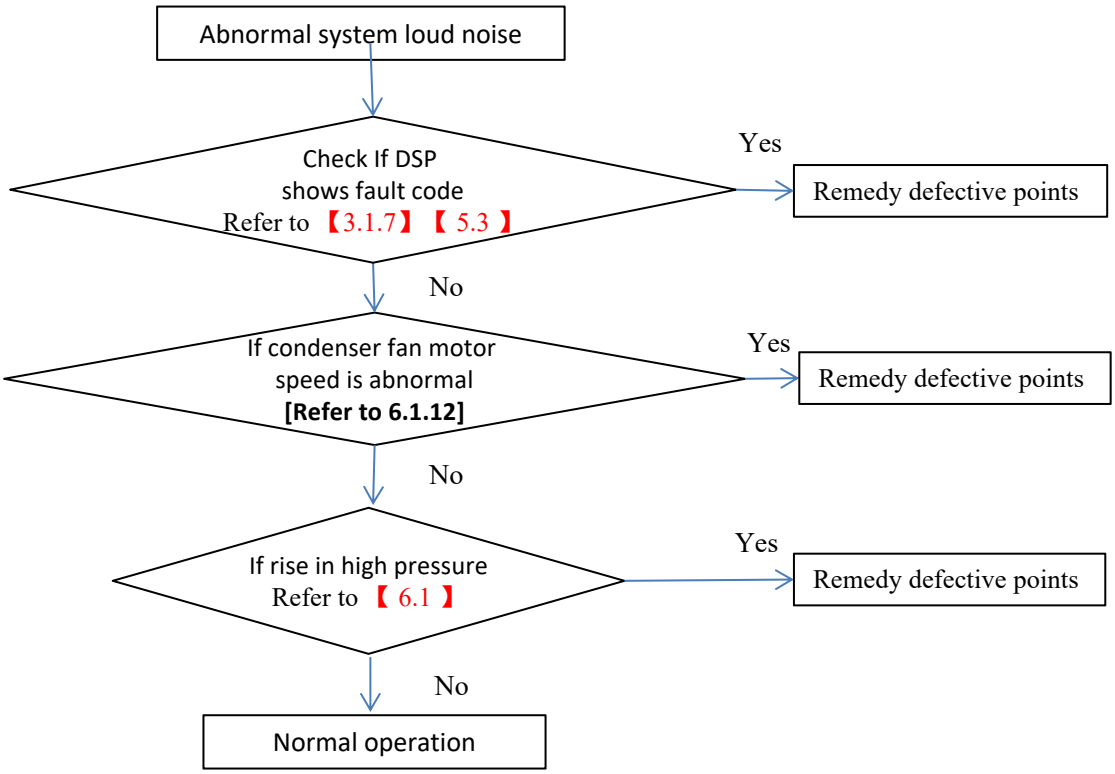
5.1 Abnormal system status checking guide

5.1.1 System can't start

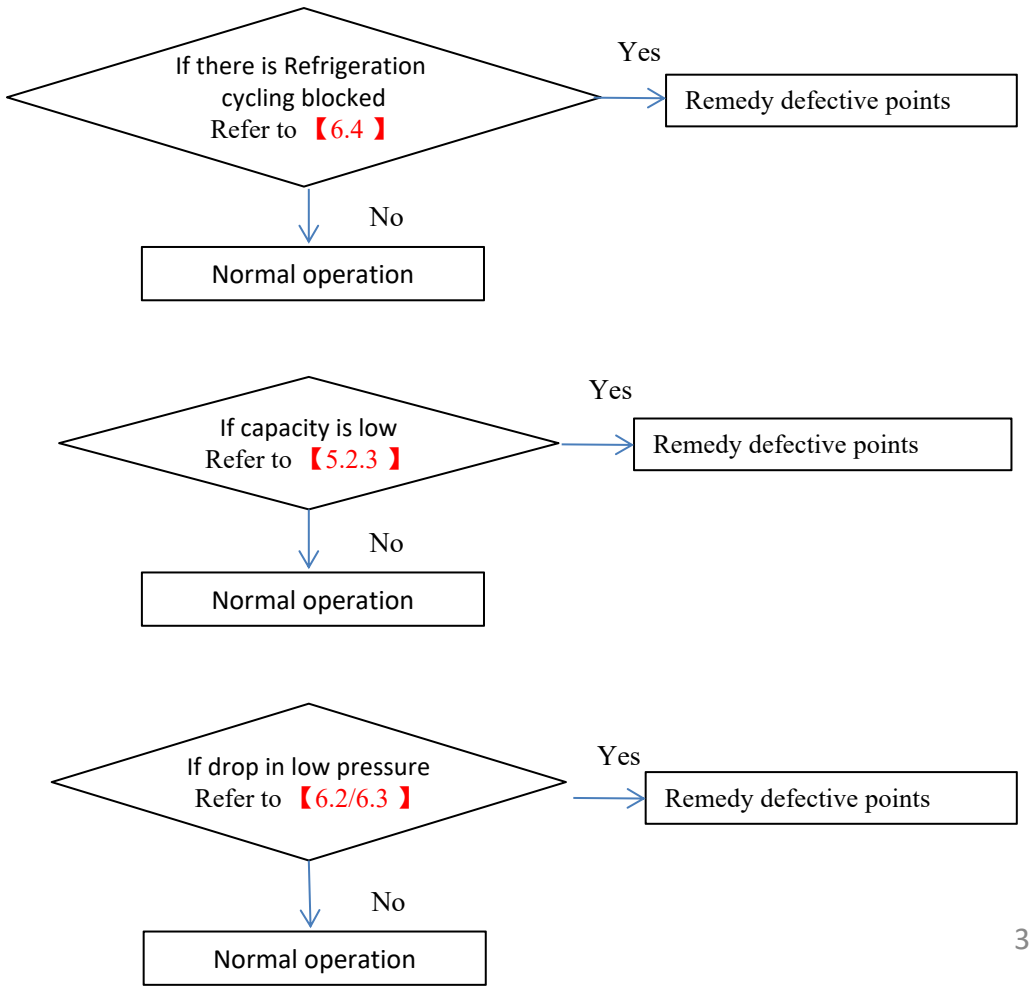


5.1 Abnormal system status checking guide

5.1.2 Abnormal system loud noise



5.1.3 Other common issues



5.2 Symptom-based Troubleshooting

5.2.1 DSP/LED1 OFF

Issue	DSP OFF/LED1 OFF
Model	All
Fault name	/
Classify	Power/electric issue
Possible cause	• Frequently power off and power on （within 3 minutes） • Abnormal power input • Abnormal wire connections
Notes:	

Troubleshooting

Check for the following 4 points:
①If frequently power off and power on(within 3 minutes)
② If the supply power is normal
③ If wiring diagram to insure all wire

Note:
① to ①
② to ②

The same below

Check If there are above conditions

Yes

Remedy defective points:
①Power off at least 3 minutes then power on
②The supply power range should **be 187V-253V**
③Refer to wiring diagram to insure all wire connections are correct.

No

Check whether the power supply is short-circuited to ground

Yes

Replace the power cord

No

Check If compressor or motor is shorted to ground
Refer to 【6.10/6.11】

Replace compressor or motor

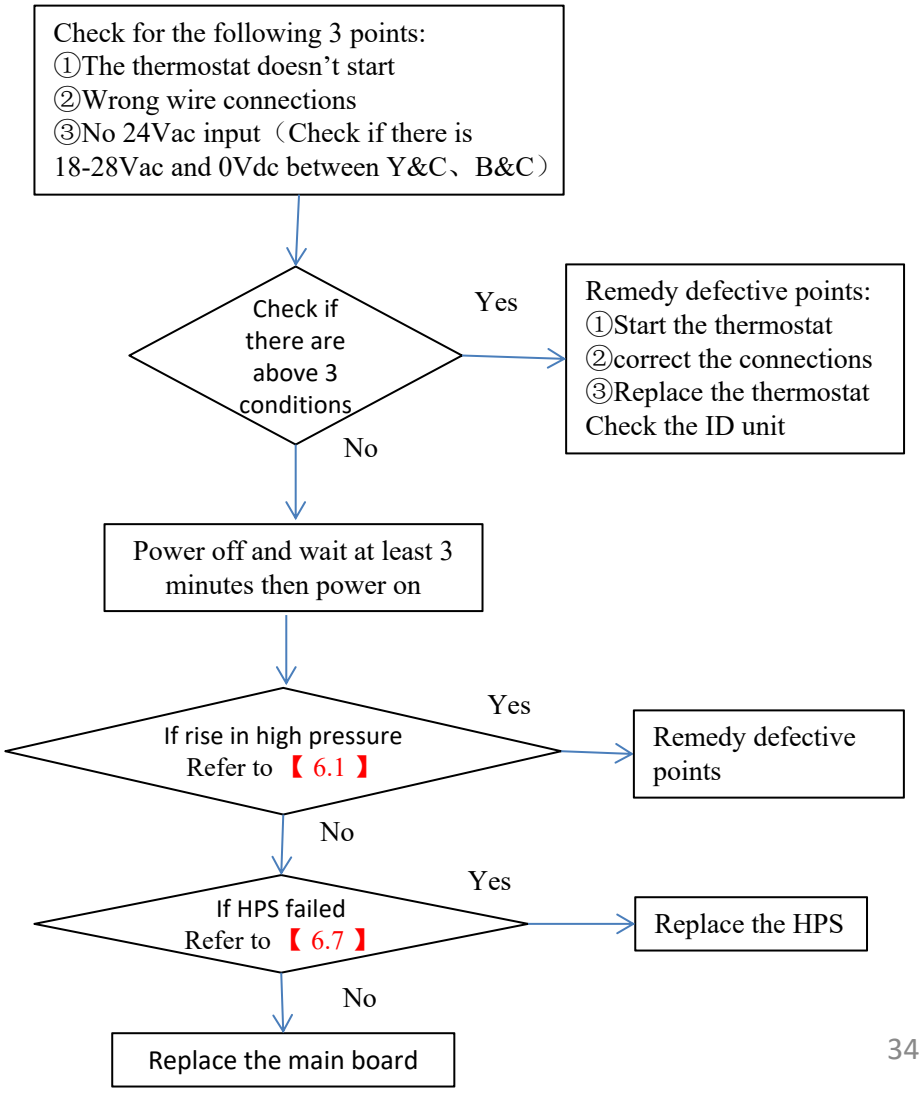
Replace the control board

5.2 Symptom-based Troubleshooting

5.2.2 System does not start operation(DSP shows "--")

Issue	System does not start operation(DSP shows "--")
Model	All
Fault name	/
Classify	Thermostat fault
Possible cause	• The thermostat doesn't start • Wrong wire connections between thermostat and unit • Damaged thermostat • Disconnect the compressor wire（could be caused after service）
Notes:	

Troubleshooting

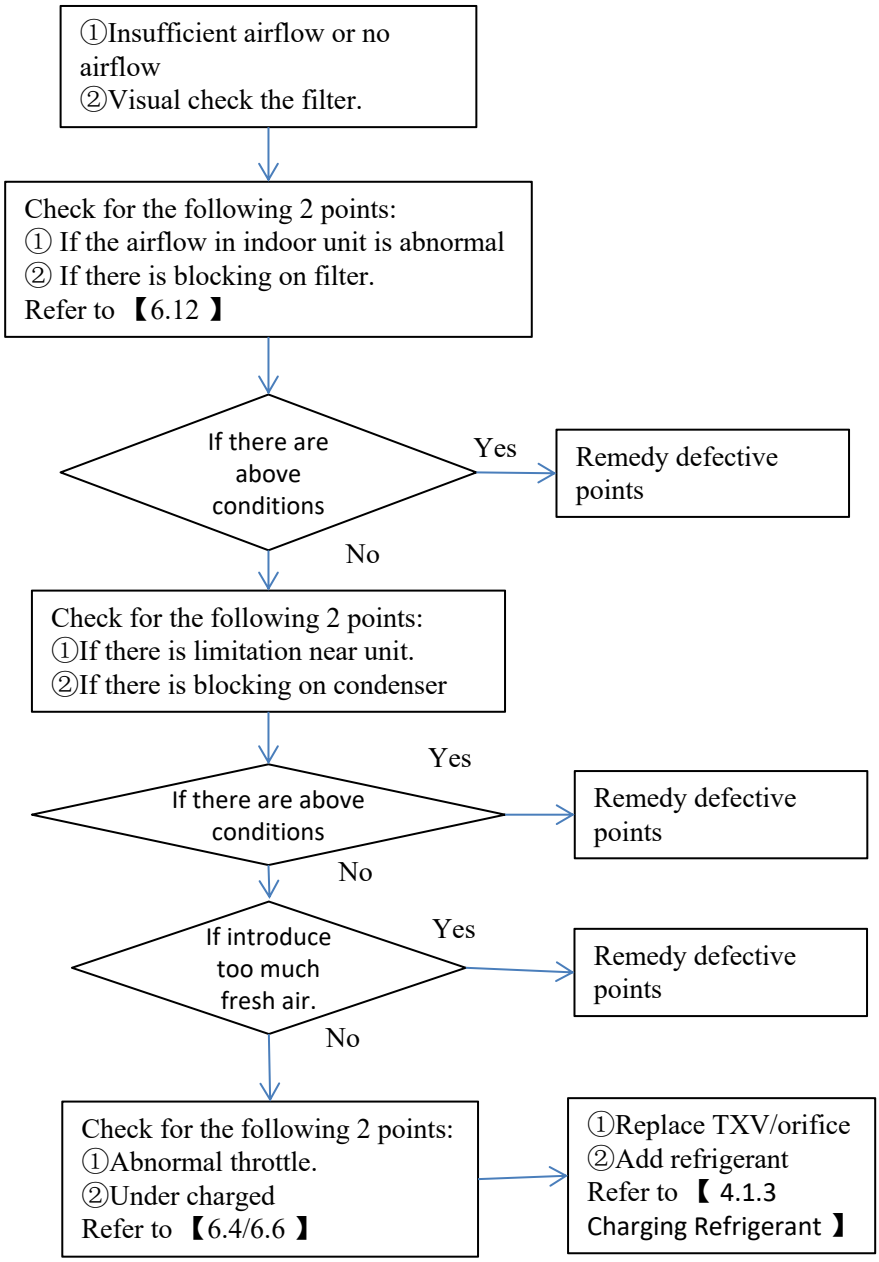


5.2 Symptom-based Troubleshooting

5.2.3 Capacity is low

Issue	Capacity is low
Model	All
Name	/
Classify	System fault
Possible cause	• Poor heat dissipation in indoor unit • Poor heat dissipation in outdoor unit • Under charged • First start

Troubleshooting

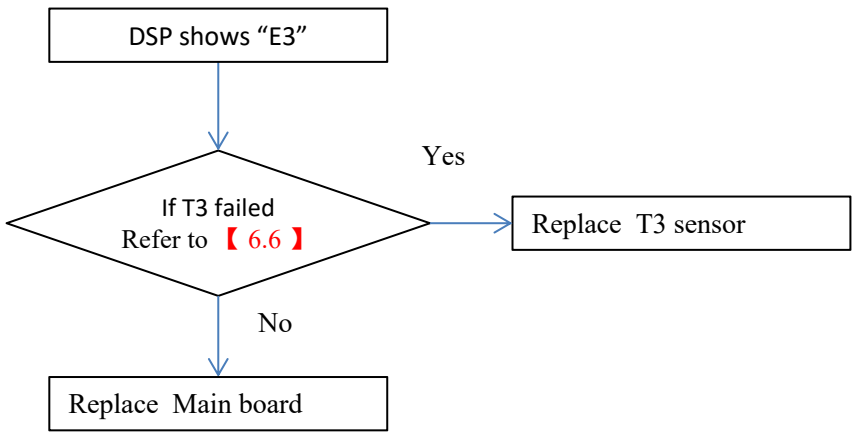


5.3 Troubleshooting by Main board Fault code

5.3.1 “E3” code

Faulty code	DSP shows “E3”
Model	All
Name	T3 sensor not reading correctly in cooling
Classify	System fault
Possible cause	• Faulty T3 sensor

Troubleshooting

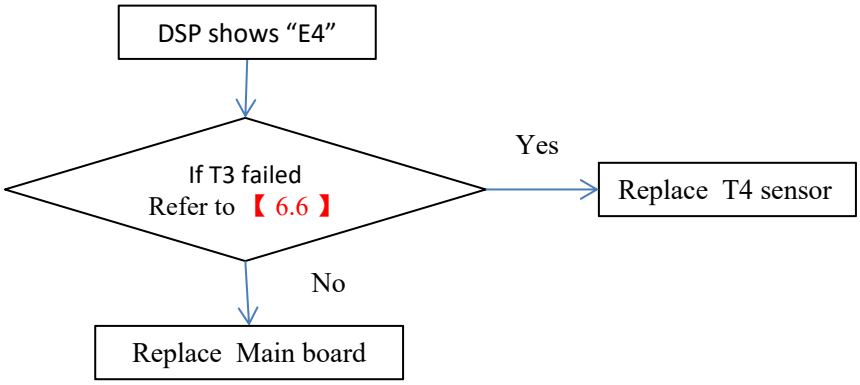


5.3 Troubleshooting by Main board Fault code

5.3.2 “E4” code

Faulty code	DSP shows “E4”
Model	All
Name	T4 sensor not reading correctly in cooling
Classify	System fault
Possible cause	• Faulty T3 sensor

Troubleshooting

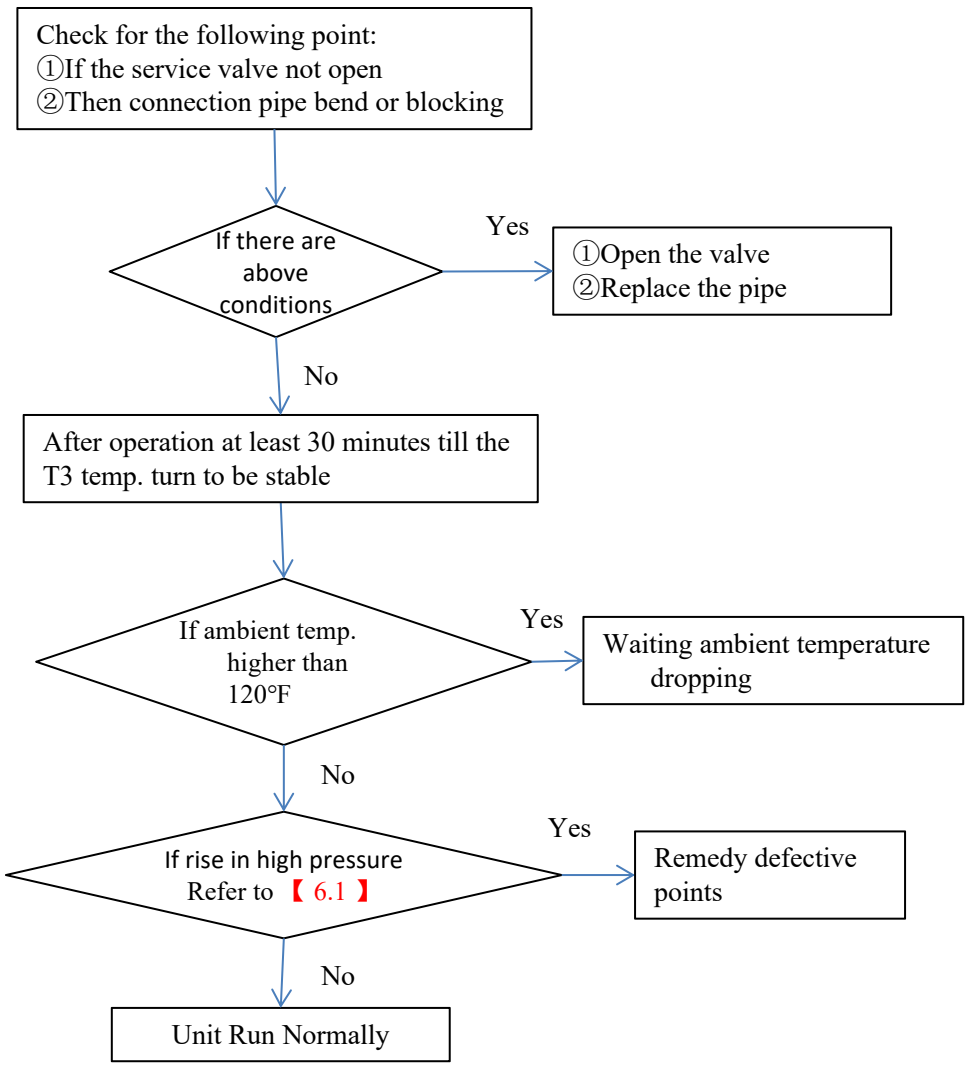


5.3 Troubleshooting by Main board Fault code

5.3.3 “P5” code

Faulty code	DSP shows “P5”
Model	All
Name	T3 sensor temperature is too high
Classify	System fault
Possible cause	• Wrong location of T3 sensor • Service valves not open ; pipe bend or blocking • Multi-refrigerant • High ambition temp.

Troubleshooting

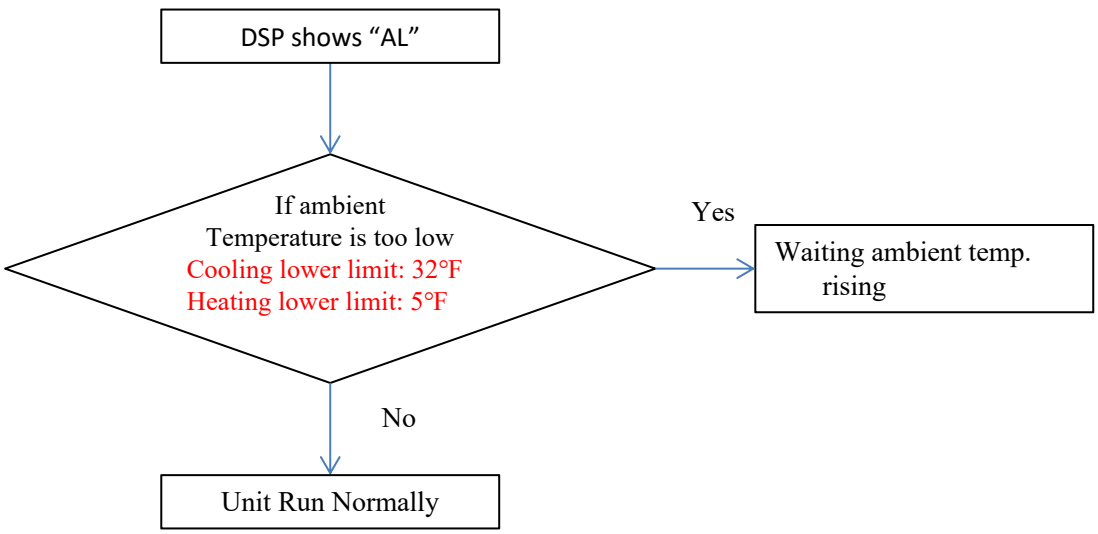


5.3 Troubleshooting by Main board Fault code

5.3.4 “AL” code

Faulty code	DSP shows “AL”
Model	All
Name	ambition temperature is beyond of the scope
Classify	System fault
Possible cause	• ambition temperature is beyond of the scope • Wrong location of T4 sensor

Troubleshooting

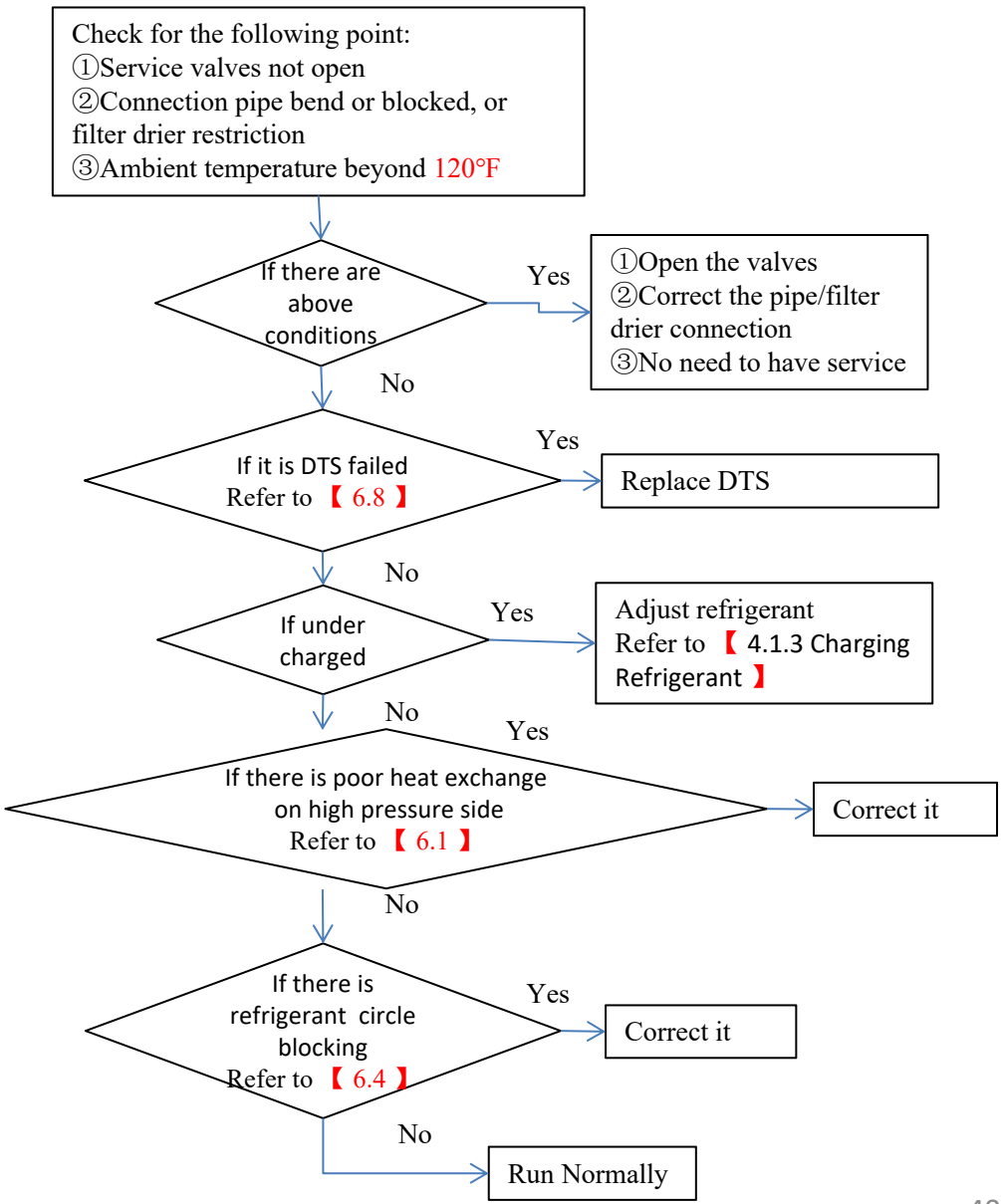


5.3 Troubleshooting by Main board Fault code

5.3.5 “P4” code

Faulty code	DSP shows “P4”
Model	All
Name	Compressor discharge temperature swtich protection
Possible cause	• **TXV/filter drier blocked** • **Under charged** • Service valves not open/filter drier restriction • Indoor unit motor stopped abnormally / poor heat exchange (**heating mode**) • **Poor heat exchange on outdoor unit（cooling mode)**

Troubleshooting

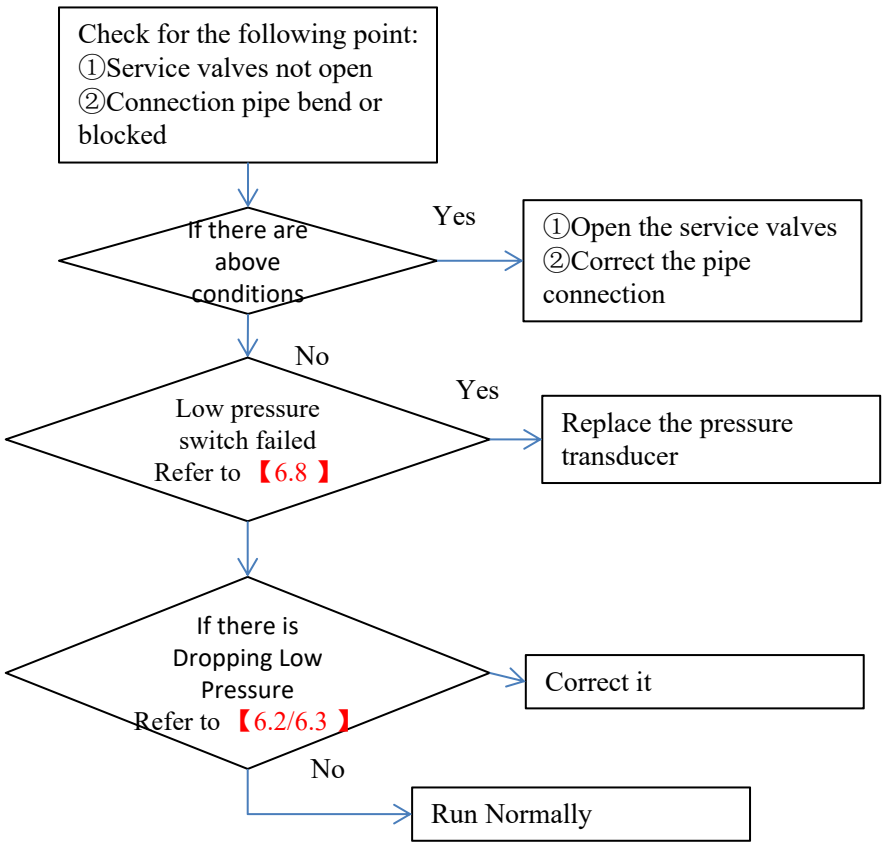


5.3 Troubleshooting by Main board Fault code

5.3.6 “P2”code

Faulty code	DSP shows “P2”
Mode	All
Name	Low pressure protection
Classify	System fault
Possible cause	• Indoor unit motor stopped abnormally / poor heat exchange • **TXV/filter drier/indoor coil blocked** • Service valves not open • Under charged

Troubleshooting

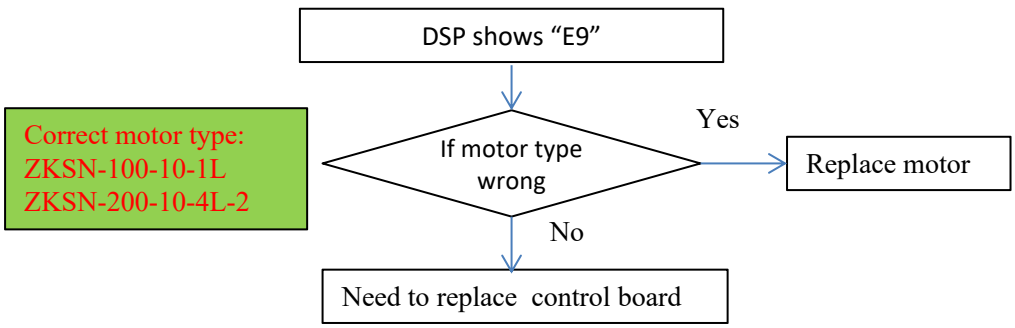


5.3 Troubleshooting by Main board Fault code

5.3.7 “E9” code

Faulty code	DSP shows “E9”
Model	All
Name	DC fan motor fault or Motor control failed
Classify	Electric issue
Possible cause	• Motor control failed • Motor failed

Troubleshooting

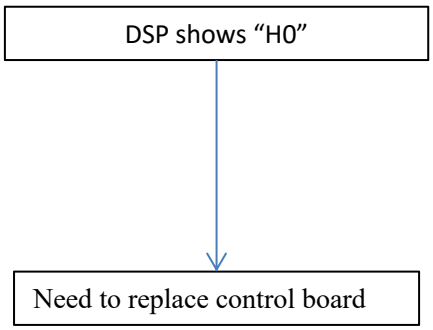


5.3 Troubleshooting by Main board Fault code

5.3.8 “H0” code

Faulty code	DSP shows “H0”
Model	All
Name	Communication fault between drive chip and main control chip
Classify	Electric issue
Possible cause	•Program error •Control board in outdoor unit is failure

Troubleshooting

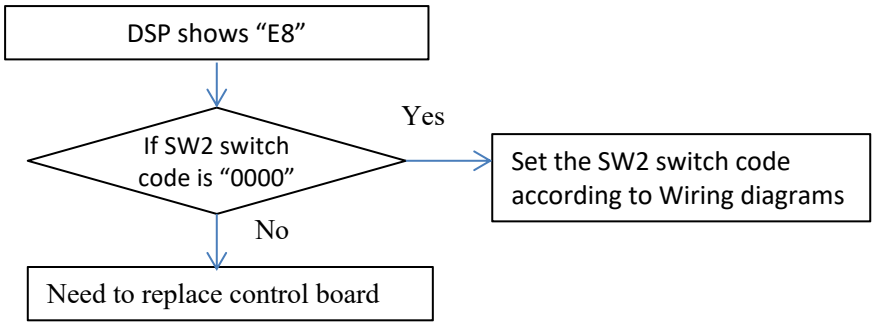


5.3 Troubleshooting by Main board Fault code

5.3.9 “E8” code

Faulty code	DSP shows “E8”
Model	All
Name	No machine type
Classify	Electric issue
Possible cause	• Speed message isn’t wrote in main board • Control board broken

Troubleshooting

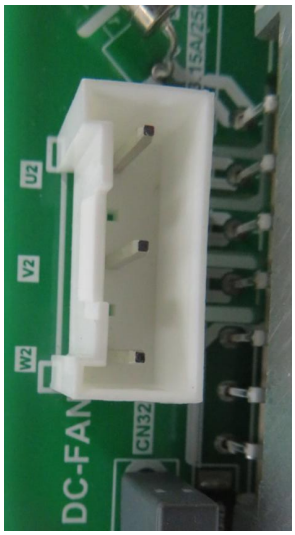


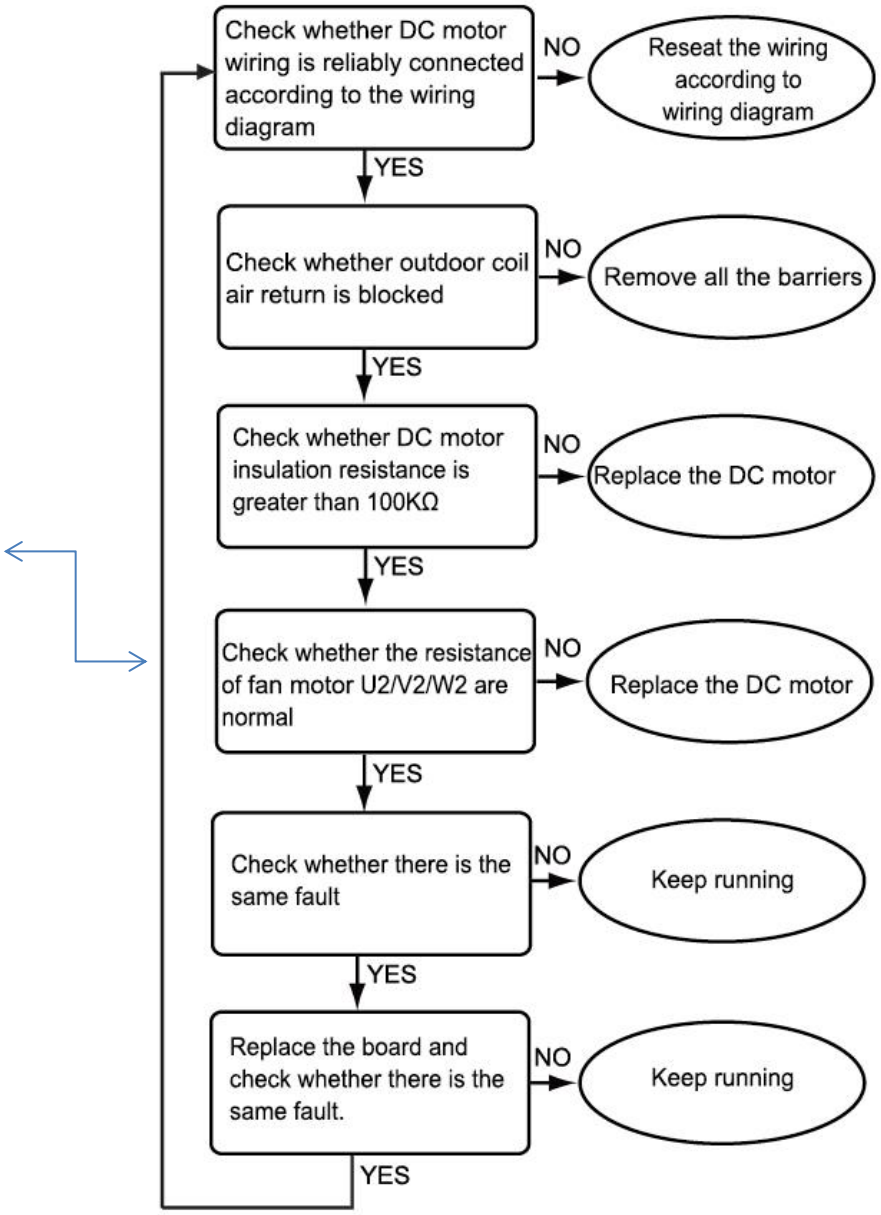
5.3 Troubleshooting by Main board Fault code

5.3.10 “n1X~n6X” code

Faulty code	DSP shows “n1X~n6X”
Model	All
Name	DC fan motor fault or Motor control failed
Classify	Electric issue
Possible cause	• Start electromagnetic interference • Motor failed • Motor control failed • Electric issue

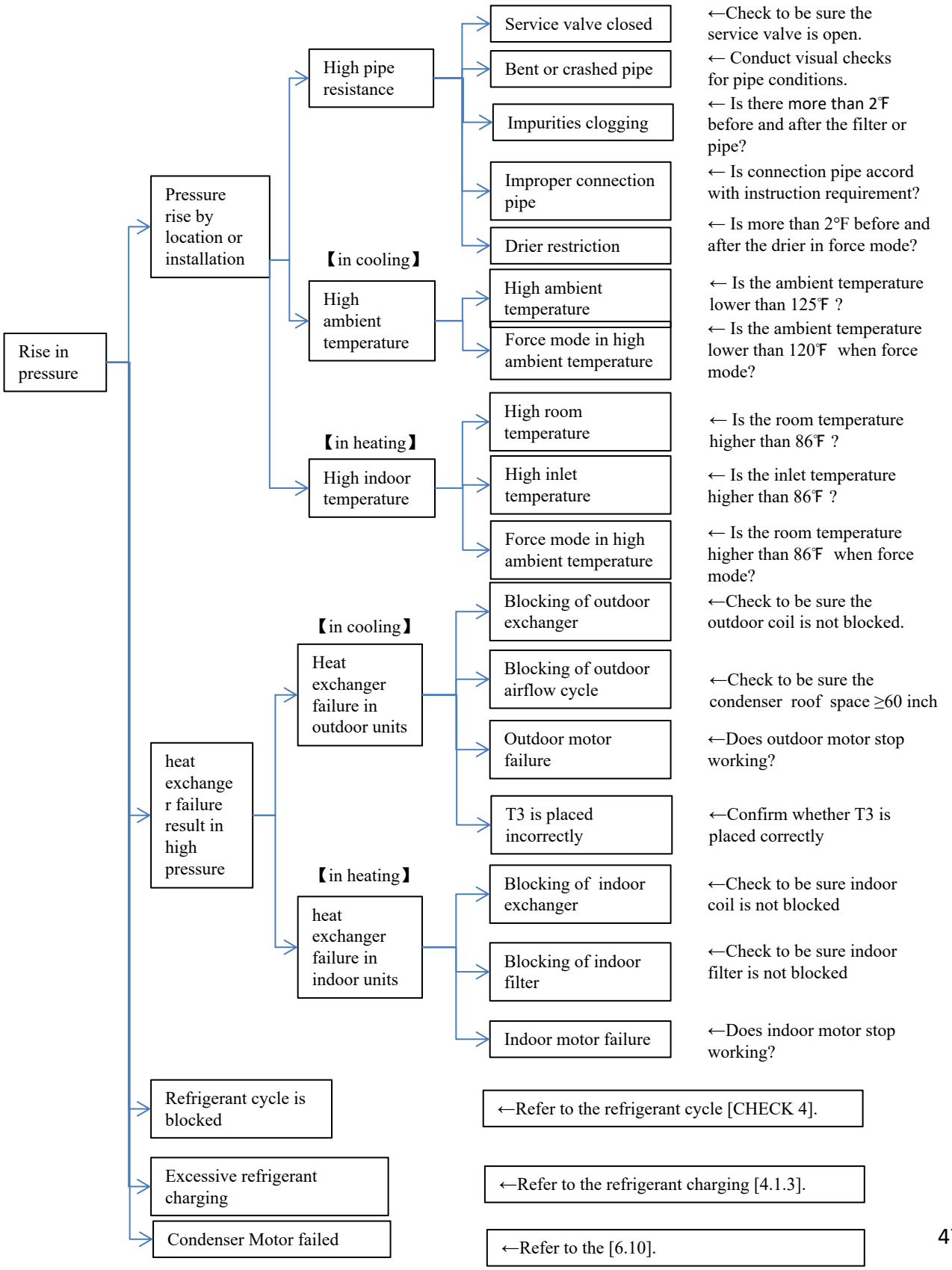
Troubleshooting





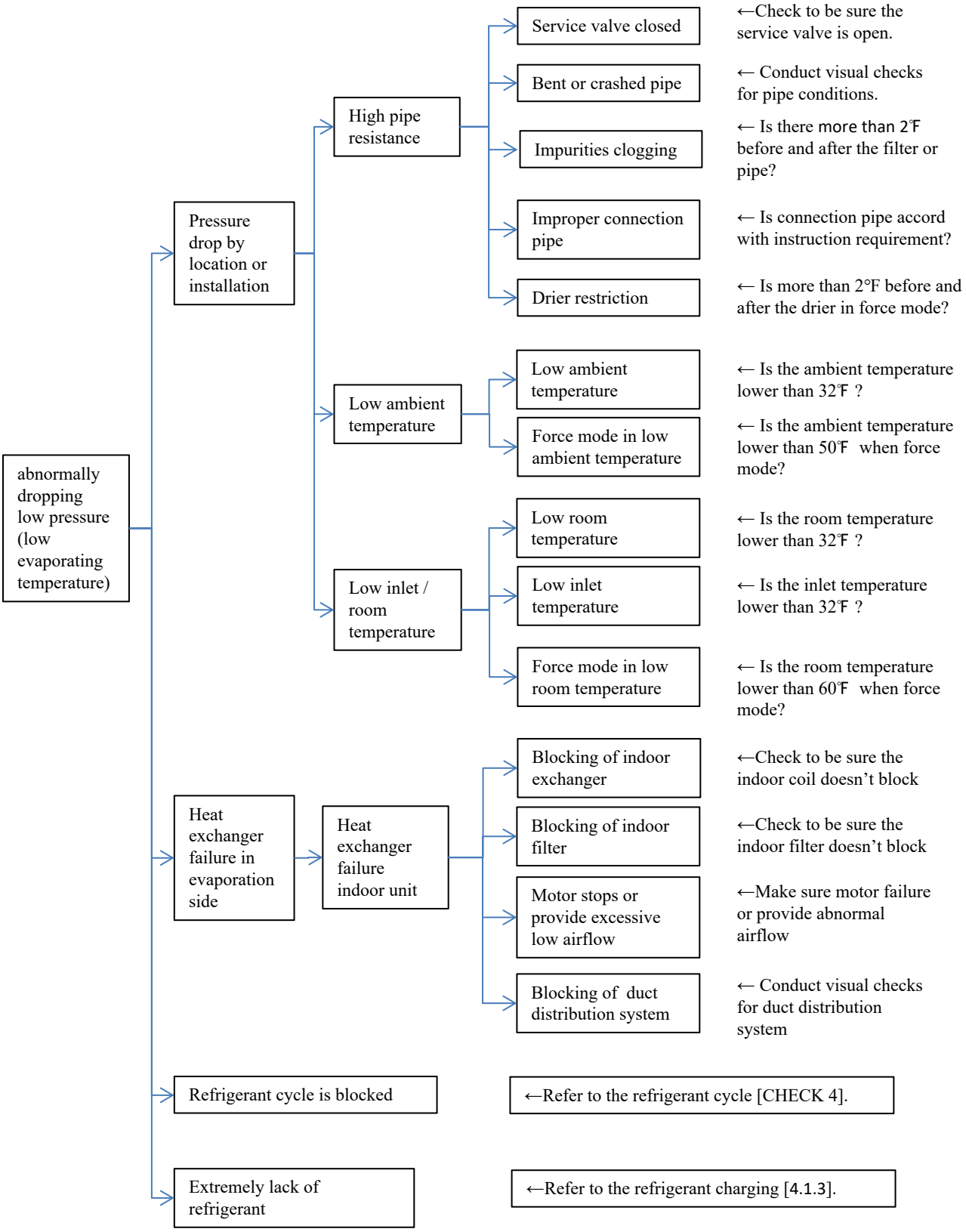
CHECK 1 6.1 Check for Causes of Rise in High Pressure

Note: 310-380PSIG head pressure is normal for heating in normal conditions operation. The pressure may be as high as 440PSIG at 40°F outdoor temperature or higher. Start-up or return oil stages during heating.

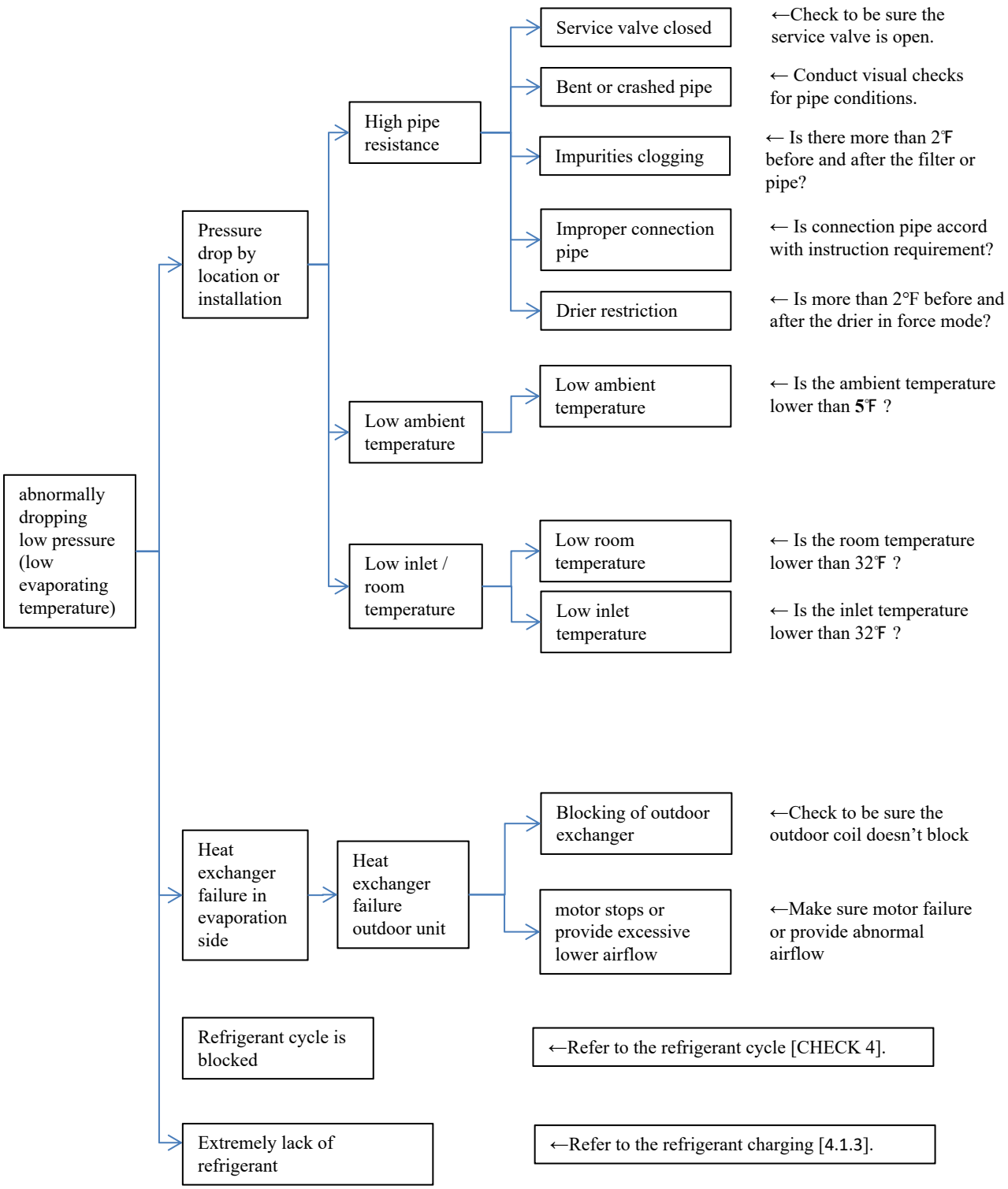


CHECK 2 6.2 Check for Causes of Dropping Low Pressure in cooling

Note: 110-140PSIG head pressure is normal in cooling conditions. The value may be lower/higher at maximum/minimum/limited frequency of compressor operation . Start-up or return oil stages.

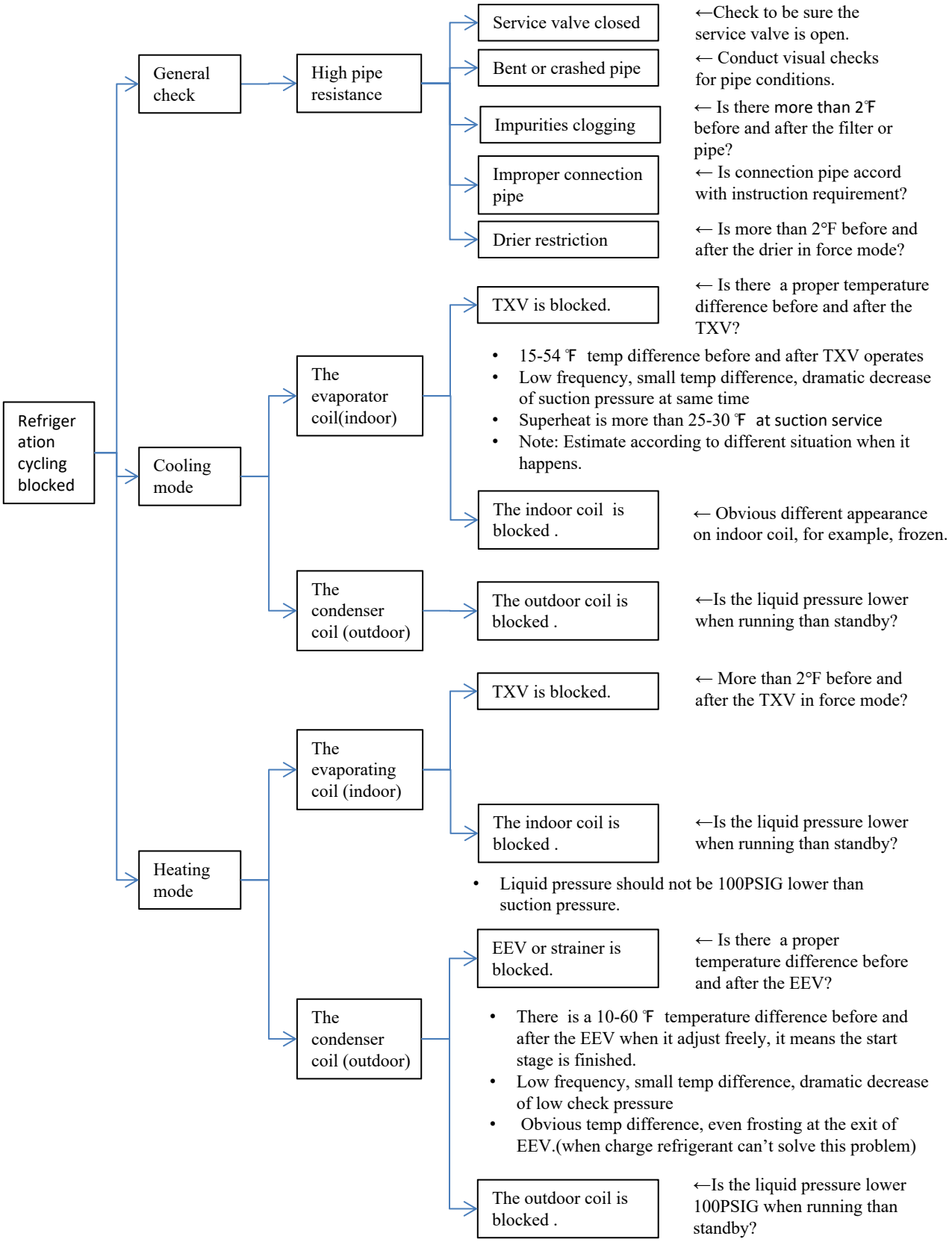


CHECK 3 6.3 Check for Causes of Dropping Low Pressure in heating

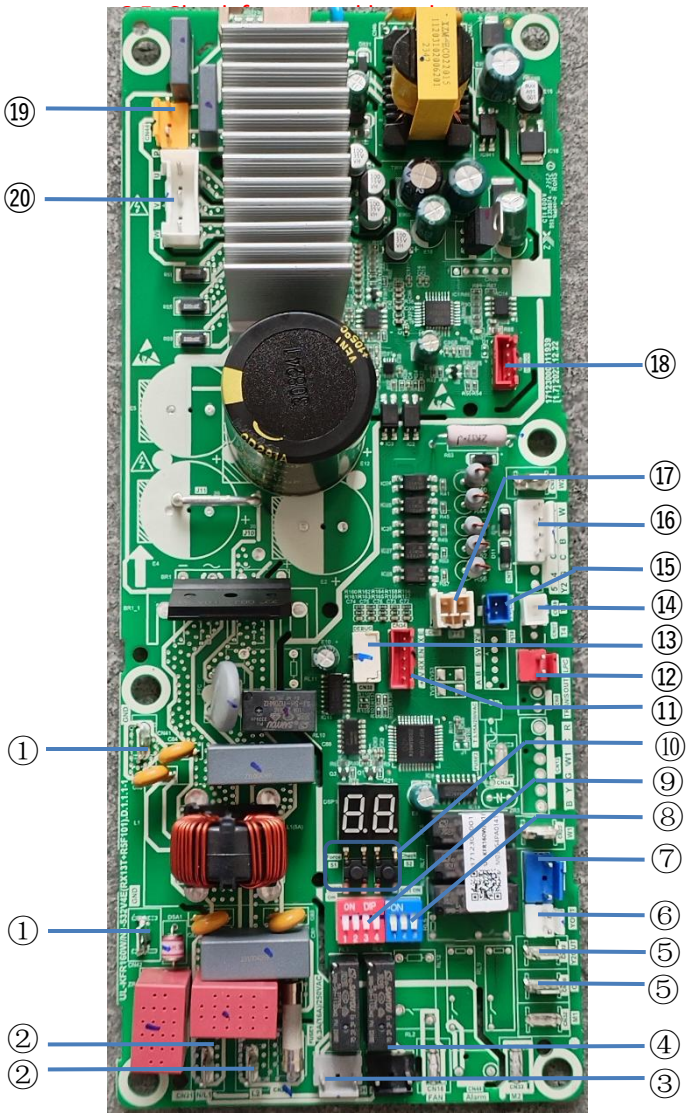


CHECK 4 6.4 Check for Causes of Refrigeration cycling blocked

Note: Check at normal and force mode operation, some problems will be more obvious.



CHECK 5 6.5 Check for Control Board



① Earth port
② Power port
③ Compressor crankcase heater port (heat pump only)
④ Pressure Equalizer Valve port
⑤ Two-stage compressor control port
⑥ Compressor contactor control port
⑦ Reversing Valve port (heat pump only)
⑧ SW1-3 dip switch : defrost logic setting
⑨ Capacity setting
⑩ Force and check
⑪ Message port
⑫ Low Pressure switch port (heat pump only)
⑬ Main control board debug port
⑭ T3 sensor port
⑮ T4 sensor port
⑯ Conventional 24VAC non-communicating thermostat control wires port
⑰ Discharge temperature switch port
⑱ Motor drive debug port
⑲ Reserve
⑳ DC motor port

CHECK 6 6.6 Check for Temperature Sensor（T3/T4）

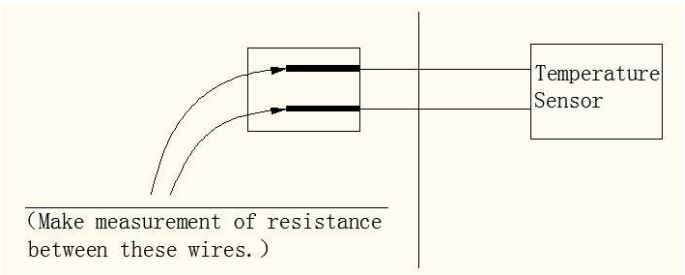
Check temp transducer（T3/T4）：
Compare the temperature checked (T3-3#/T4-4#/T5-5#, refer to 4.1.5), it's normal if the temperature difference was within 15℉ when standby.(need to avoid the waste heat affect T5/Tf when standby mode)

T3/T4: 77 ℉ --10KΩ

Normal
Yes → Work well
No

Ambient temp below 5℉ ?
Yes → Out of operating range. Do nothing
No

When power off and sensor unplugged



Resistance in thermistor beyond the chart Refer to 【 7.5 】
Yes → Replace sensor
No → Replace the control board

Note：low probability, caution in handling

CHECK 7 6.7 Check for High Pressure Switch（HPS）

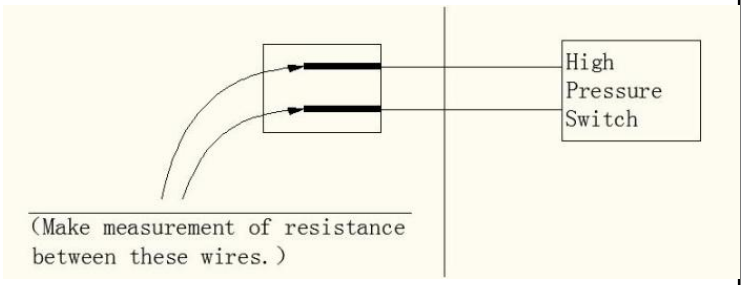
High Pressure Switch：
Whether the switch can start normally when start the machine

Start normally

Yes → Work well

No

When power off and pull up



High pressure switch secure, wiring damaged

Yes → Reconnect/fix the wiring damages

No

R ＞ 1Ω

Yes → abnormal pressure switch, replace it

No

Still in high pressure protection?

Yes → Should replace board

Note: low probability, caution in handling

No → Work well

Note:
Normal high pressure switch opens above 600PSIG, resets below 435PSIG.

CHECK 8 6.8 Check for Low Pressure Switch（LPS）

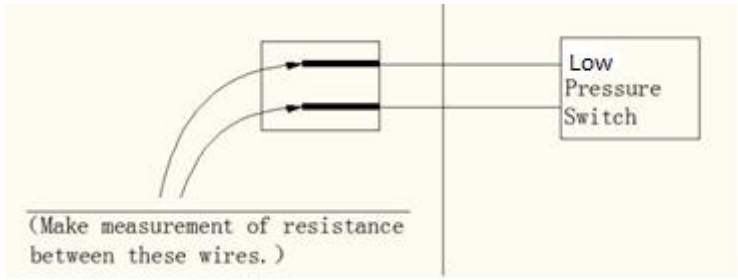
High Pressure Switch：
Whether the switch can start normally when start the machine

Start normally

Yes → Work well

No

When power off and pull up



High pressure switch secure, wiring damaged?

Yes → Reconnect/fix the wiring damages

No

R ＞ 1Ω

Yes → abnormal pressure switch, replace it

No

Still in high pressure protection?

Yes → Should replace board

Note: low probability, caution in handling

No → Work well

Note:
Normal high pressure switch opens below 21PSIG, resets above 44PSIG.

CHECK 9 6.8 Check for Discharge Temperature Switch（DTS）

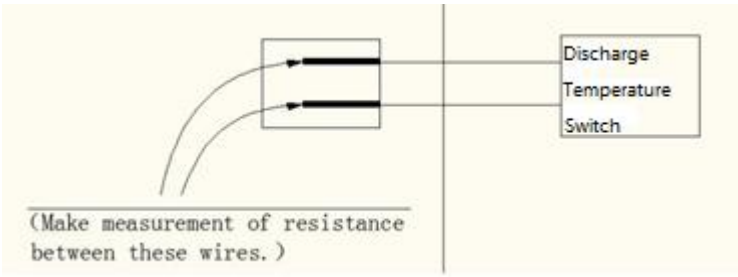
Discharge Temperature Switch：
Whether the switch can start normally when start the machine

Start normally

Yes → Work well

No

When power off and pull up



High pressure switch secure, wiring damaged?

Yes → Reconnect/fix the wiring damages

No

R ＞ 1Ω

Yes → abnormal pressure switch, replace it

No

Still in high pressure protection?

Yes → Should replace board

Note: low probability, caution in handling

No → Work well

Note:
Normal discharge temperature switch opens above 239℉ , resets below 167℉ .

CHECK 10 6.10 Check for Condenser fan motor

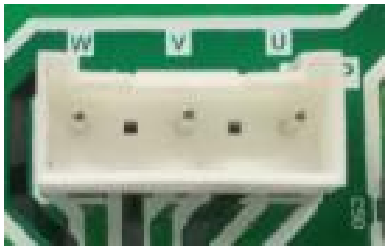
Condenser fan motor：
Whether fan can start normally

Normal? — Yes → Work well

No → When power off，after 3minutes and unplugged

Check If DSP shows fault code Refer to 【3.1.7】【 5.3 】 — Yes → Remedy defective points

No



Resistance （Ω）	100W/200W
Between U and V	<36
Between V and W	<36
Between W and U	<36
Between U/V/W and ground	>10M

motor winding abnormal — Yes → Motor replace

No → If the ground resistance is abnormal — Yes → Motor replace

No → If the motor current is abnormal — Yes → Motor replace Check the main board

If the current is pulsating violently or abnormally beyond the “B” value

No → Normal operation

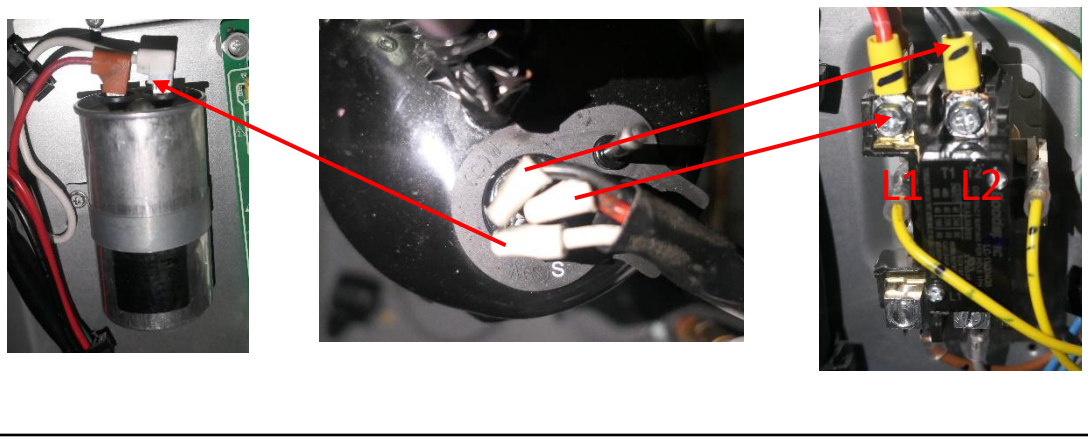
Motor output（W）	B(A)
100	<1.6
200	<2.2

CHECK 11 6.11 Check for Compressor

Compressor：
Whether compressor can start normally

Normal? — Yes → Work well

No → When power off，after 3minutes and unplugged



For Scroll compressor, supply wring is unitary, you can check it with colour (Red for L1, Black for L2, White for S)

Resistance （Ω）	Rotary	Scroll
Between R and C （L1 and L2）	<2	<2
Between C and S (L1 and S)	<2	<1
Between R and S (L2 and S)	<4	<1
Between U/V/W and ground	>10M	>10M

Normal compressor winding? — No → Compressor replace

Yes → If the ground resistance is normal? — No → Compressor replace

Yes → If the compressor current is normal — No → Compressor replace

If the current is pulsating violently or abnormally beyond the “B” value

Yes → Check according to the condition of whole unit

Model	1.5Ton	2Ton	2.5Ton	3Ton	3.5Ton	4Ton	5Ton
B(A)	10	12	13	17	20	23	30

CHECK 12 6.12 Check for indoor PSC unit status

Indoor air flow is normal/Check the capacity by BTU=△T*CFM***1.5** in force mode。

If It is normal — Yes → Work normally

No → If there is blockage of the indoor duct — Yes → Clean the blockage

Measure the power supply (L1&L2,red and black wire)

No → Check if there is 230V power supply — No → Correct the power supply

Yes → Check if there is 18-28Vac between Transformer output — No → Replace the transformer

Yes → If LED light flash — Yes → Refer to 【 7.9/7.10 】

Red and Black wire of signal

Yes → If there is 18-28Vac between R&C terminal — No → Replace the control board

Green and Black wire of signal

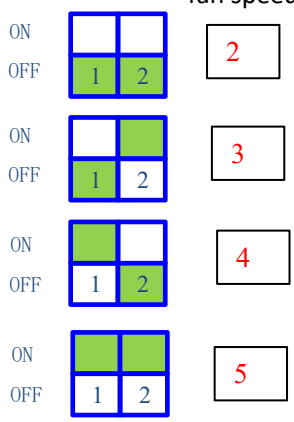
Yes → If there is 18-28Vac between G&C terminal — No → Check if the thermostat not calling or replace the thermostat

Fan speed according to the following chart

Yes → If there is 230Vac between N & FAN speed — No → Replace the control board

Yes → Replace the motor.

fan speed



CHECK 13 6.13 Check for indoor ECM unit status

Indoor air flow：
Indoor air flow is normal/Check the capacity by BTU=△T*CFM***1.5** in force mode。

If It is normal
- Yes → Work normally
- No → Check if the airflow is very small or no airflow

If LED light flash
- Yes → Remedy defective points
- No → Refer to 【 7.9/7.10 】

If there is blockage of the indoor duct
- Yes → Clean the blockage
- No

Check if there is 230V power supply
- No → Correct the power supply
- Yes → Measure the power supply (L1&L2,red and black wire)

Check if there is 18-28Vac between Transformer output
- No → Replace the transformer
- Yes

If there is 18-28Vac between R&C terminal
- No → Replace the control board
- Yes → Red and Black wire of signal

If there is 18-28Vac between G&C terminal
- No → Check if the thermostat not calling or replace the thermostat
- Yes → Green and Black wire of signal

If there is 18-28Vac between C & fan speed
- No → Replace the control board
- Yes → Fan speed according to the following chart

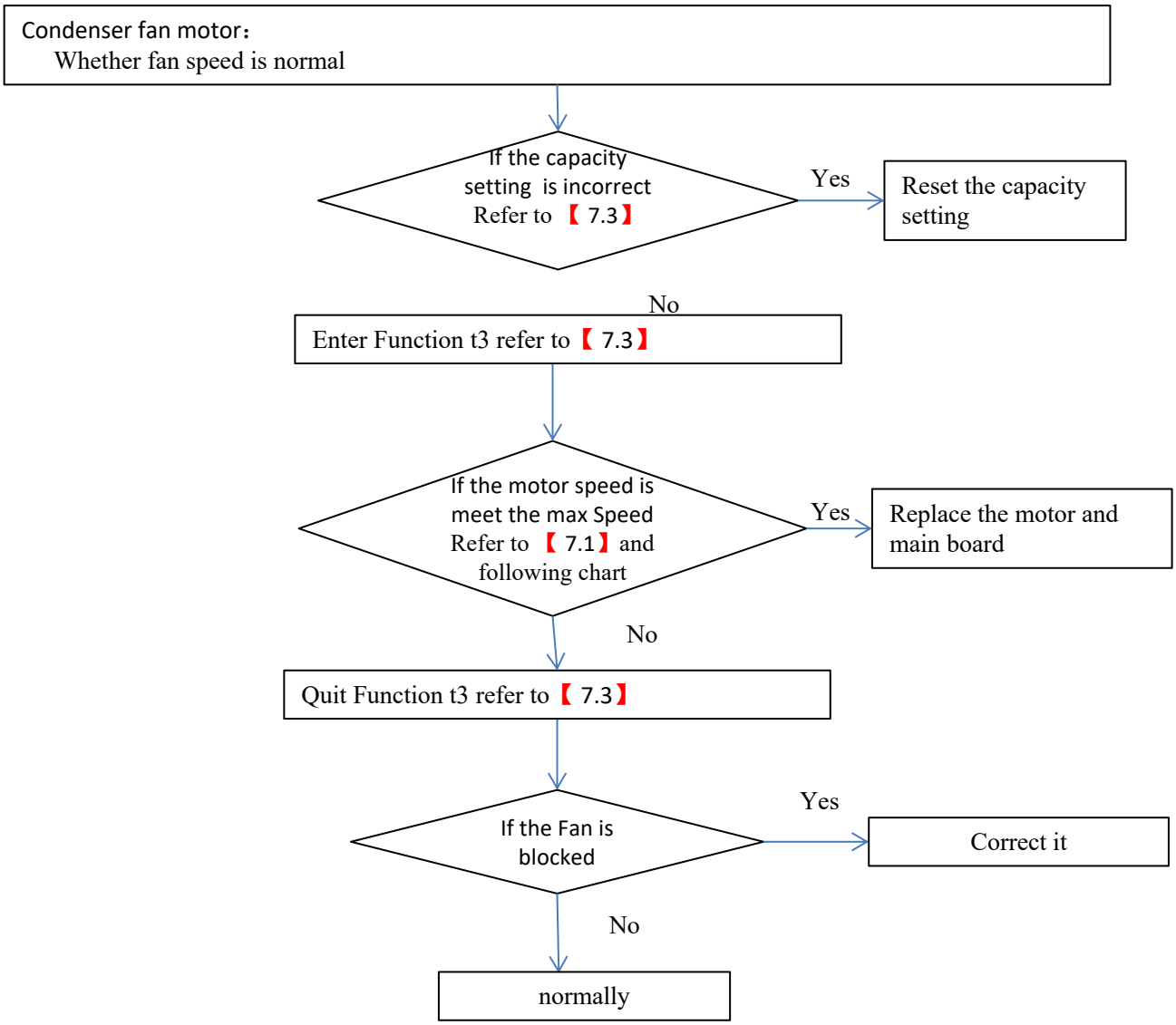
Replace the motor.

fan speed

SW6-1/2

ON / OFF 1 2	L
ON / OFF 1 2	L
ON / OFF 1 2	M
ON / OFF 1 2	H

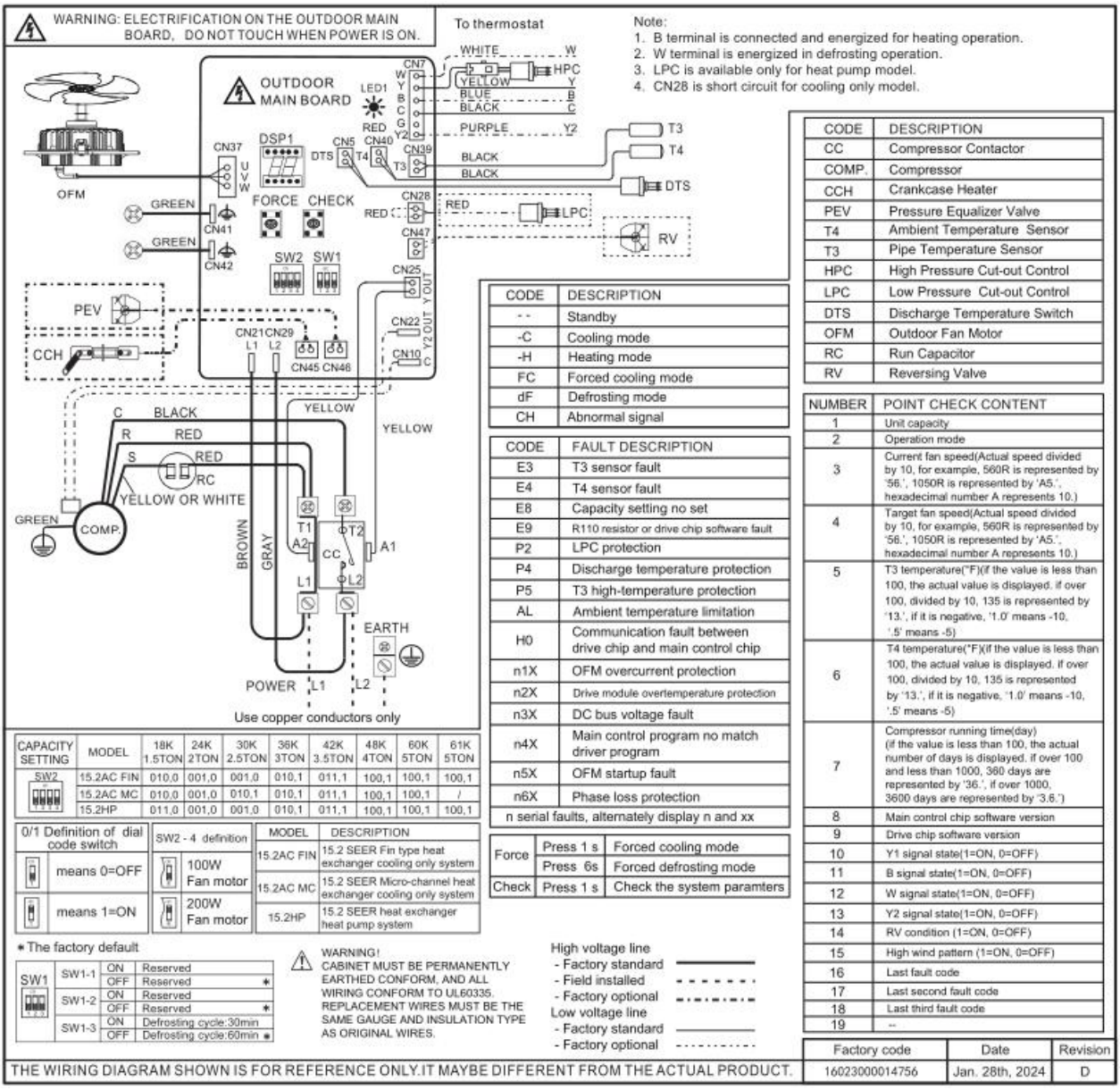
CHECK 14 6.14 Check for Condenser fan motor Speed



CAPACITY SETTING	MODEL	18K 1.5TON	24K 2TON	30K 2.5TON	36K 3TON	42K 3.5TON	48K 4TON	60K 5TON	61K 5TON
SW2	15.2AC FIN	010,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1
	15.2AC MC	010,0	001,0	010,1	010,1	011,1	100,1	100,1	/
	15.2HP	011,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1

Capacity setting	0010	0100	0110	0101	0111	1001
Max Speed	850	930	980	930	980	1050

Appendix 1 7.1 Wiring diagrams



CODE	DESCRIPTION
CC	Compressor Contactor
COMP.	Compressor
CCH	Crankcase Heater
PEV	Pressure Equalizer Valve
T4	Ambient Temperature Sensor
T3	Pipe Temperature Sensor
HPC	High Pressure Cut-out Control
LPC	Low Pressure Cut-out Control
DTS	Discharge Temperature Switch
OFM	Outdoor Fan Motor
RC	Run Capacitor
RV	Reversing Valve

CODE	DESCRIPTION
- -	Standby
-C	Cooling mode
-H	Heating mode
FC	Forced cooling mode
dF	Defrosting mode
CH	Abnormal signal

CODE	FAULT DESCRIPTION
E3	T3 sensor fault
E4	T4 sensor fault
E8	Capacity setting no set
E9	R110 resistor or drive chip software fault
P2	LPC protection
P4	Discharge temperature protection
P5	T3 high-temperature protection
AL	Ambient temperature limitation
H0	Communication fault between drive chip and main control chip
n1X	OFM overcurrent protection
n2X	Drive module overtemperature protection
n3X	DC bus voltage fault
n4X	Main control program no match driver program
n5X	OFM startup fault
n6X	Phase loss protection
n serial faults, alternately display n and xx	

NUMBER	POINT CHECK CONTENT
1	Unit capacity
2	Operation mode
3	Current fan speed(Actual speed divided by 10, for example, 560R is represented by '56.', 1050R is represented by 'A5.', hexadecimal number A represents 10.)
4	Target fan speed(Actual speed divided by 10, for example, 560R is represented by '56.', 1050R is represented by 'A5.', hexadecimal number A represents 10.)
5	T3 temperature(°F)(if the value is less than 100, the actual value is displayed. if over 100, divided by 10, 135 is represented by '13.', if it is negative, '1.0' means -10, '.5' means -5)
6	T4 temperature(°F)(if the value is less than 100, the actual value is displayed. if over 100, divided by 10, 135 is represented by '13.', if it is negative, '1.0' means -10, '.5' means -5)
7	Compressor running time(day) (if the value is less than 100, the actual number of days is displayed. if over 100 and less than 1000, 360 days are represented by '36.', if over 1000, 3600 days are represented by '3.6.')
8	Main control chip software version
9	Drive chip software version
10	Y1 signal state(1=ON, 0=OFF)
11	B signal state(1=ON, 0=OFF)
12	W signal state(1=ON, 0=OFF)
13	Y2 signal state(1=ON, 0=OFF)
14	RV condition (1=ON, 0=OFF)
15	High wind pattern (1=ON, 0=OFF)
16	Last fault code
17	Last second fault code
18	Last third fault code
19	--

CAPACITY SETTING	MODEL	18K 1.5TON	24K 2TON	30K 2.5TON	36K 3TON	42K 3.5TON	48K 4TON	60K 5TON	61K 5TON
SW2	15.2AC FIN	010,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1
	15.2AC MC	010,0	001,0	010,1	010,1	011,1	100,1	100,1	/
	15.2HP	011,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1

0/1 Definition of dial code switch	SW2 - 4 definition
means 0=OFF	100W Fan motor
means 1=ON	200W Fan motor

MODEL	DESCRIPTION
15.2AC FIN	15.2 SEER Fin type heat exchanger cooling only system
15.2AC MC	15.2 SEER Micro-channel heat exchanger cooling only system
15.2HP	15.2 SEER heat exchanger heat pump system

Force	Press 1 s	Forced cooling mode
	Press 6s	Forced defrosting mode
Check	Press 1 s	Check the system paramters

* The factory default

SW1	SW1-1	ON	Reserved
		OFF	Reserved *
	SW1-2	ON	Reserved
		OFF	Reserved *
	SW1-3	ON	Defrosting cycle:30min
		OFF	Defrosting cycle:60min *

WARNING!
CABINET MUST BE PERMANENTLY EARTHED CONFORM, AND ALL WIRING CONFORM TO UL60335. REPLACEMENT WIRES MUST BE THE SAME GAUGE AND INSULATION TYPE AS ORIGINAL WIRES.

High voltage line
- Factory standard
- Field installed
- Factory optional

Low voltage line
- Factory standard
- Factory optional

Factory code	Date	Revision
16023000014756	Jan. 28th, 2024	D

THE WIRING DIAGRAM SHOWN IS FOR REFERENCE ONLY.IT MAYBE DIFFERENT FROM THE ACTUAL PRODUCT.

Appendix 2 7.2 Control board replacement procedure

WARNING:

- Improper servicing could result in dangerous operation, injury or property damage. The operations described below must be performed by qualified personnel.

NOTICE:

- Do not directly touch the components on the control board to avoid static electricity damage.

Board Replacement Procedure

1. Turn off power to both the indoor and outdoor unit and wait AT LEAST 3 minutes before removing the outdoor unit's control board access panel.

WARNING: ELECTRICAL HAZARD 325 VOLTS DC

- Wait 3 minutes after disconnecting power, then verify DC voltage is less than 42.4 VDC at port CN44 (P-N). Components may store a dangerous electrical potential of 325 Volts DC. Failure to follow these instructions could result in personal injury or death.

NOTICE:

- Take a photo before removing any screws or wiring to use as reference when installing the new board.
- Use a screwdriver instead of an electric screwdriver/drill, otherwise the control board may be damaged.
- There is no need to disconnect the field supplied thermostat wires; directly remove the thermostat wire plug on the control board.

2. Remove all wires and plugs from the control board.
3. Remove the 6 screws on the control board and separate the board from the unit (Refer to Figure 1: items circled in yellow.)

NOTICE:

- Hold the control board before removing the last screw, otherwise the control board may be damaged because of falling.

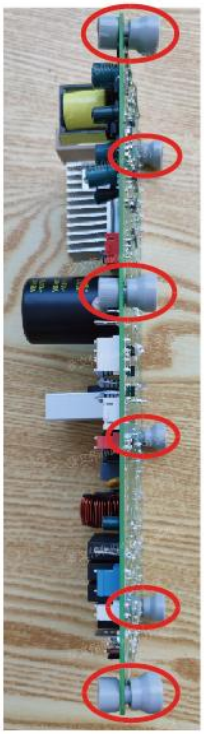
THE OUTDOOR CONTROL BOARD

*The photo shown is for reference only, the actual product may vary.

Figure 1

Appendix 2 7.2 Control board replacement procedure

4. Install the 6 pairs separation pillars removed from the old control board on the new control board (Refer to Figure 2: items circled in red.)



SEPARATION PILLAR

*The photo shown is for reference only, the actual product may vary.

Figure 2

5. Install the new board on the unit and fasten all screws removed from the old board (Refer to Figure 1 for screw location.)
6. Reconnect the wires according to the wiring diagram (Or refer to the photo before disassembly.) (Note: CN34,CN35,CN38,CN44 do not have any wire connections.)
7. Set and check SW2 switch code. Refer to Table 1 or the wiring diagram for information (Refer to Figure 3: SW2 circled in blue.)

SW2 SWITCH

Figure 3

CAPACITY SETTING	MODEL	18K 1.5TON	24K 2TON	30K 2.5TON	36K 3TON	42K 3.5TON	48K 4TON	60K 5TON	61K 5TON
SW2	15.2AC FIN	010,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1
	15.2AC MC	010,0	001,0	010,1	010,1	011,1	100,1	100,1	/
	15.2HP	011,0	001,0	001,0	010,1	011,1	100,1	100,1	100,1

0/1 Definition of dial code switch	
	means 0=OFF
	means 1=ON

SW2 - 4 definition	
	100W Fan motor
	200W Fan motor

MODEL	DESCRIPTION
15.2AC FIN	15.2 SEER Fin type heat exchanger cooling only system
15.2AC MC	15.2 SEER Micro-channel heat exchanger cooling only system
15.2HP	15.2 SEER heat exchanger heat pump system

SW2 SWITCH CODE

Table 1

8. SW1 switch is set for the defrost control mode.

∗ The factory default

SW1	SW1-1	ON	Reserved
		OFF	Reserved ∗
	SW1-2	ON	Reserved
		OFF	Reserved ∗
	SW1-3	ON	Defrosting cycle:30min
		OFF	Defrosting cycle:60min ∗

9. Double check all wire connections and screw positions before powering on.

NOTICE:

- The AC unit comes with a shorted wire group in port CN28. See red circle in below picture . This wire should be removed from the original control board then use it in the new control board. Refer to Figure 4.

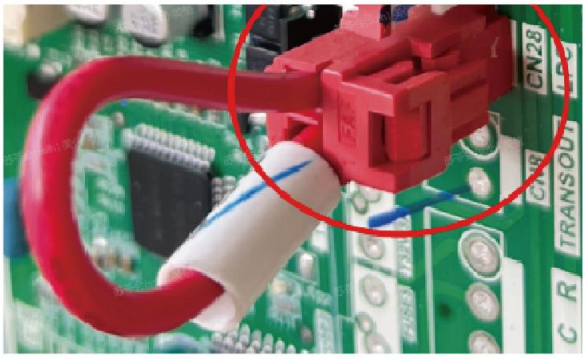
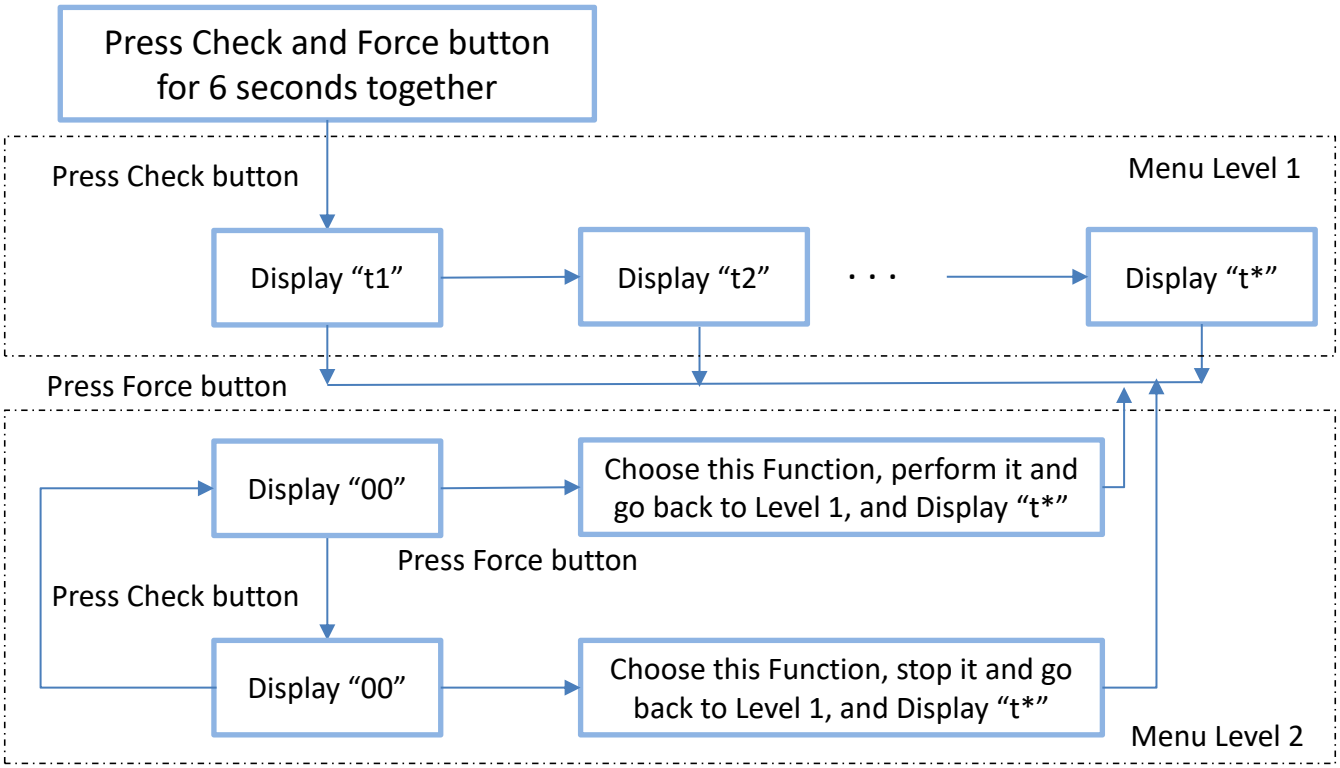


Figure 4

Appendix 3 **7.3 Menu button Function**



Display	Function Mode	Choose “00”	Choose “01”
t1	Motor self-test	Enter	Quit
t2	Compressor self-test	Enter	Quit
t3	Permanent full-speed of motor	Enter	Quit
t4	Clean history fault code	Enter	Quit
t5	Clean Compressor total operation time	Enter	Quit
t6	Reserved	Enter	Quit

Appendix 4 7.4 Troubleshooting guide

SYSTEM FAULTS		WHAT TO CHECK MODE	POWER SUPPLY	HIGH VOLTAGE WIRING	O.D. CONTROL BOARD DEF.	I.D. CONTROL DEF.	COMPRESSR CAPACITOR	O.D. FAN CAPACITOR	O.D. CONTROL BOARD DEF.	I.D. BLOWER CAPACITOR	CONTACTOR CAPACITOR	LOW VOLTAGE CONTACTS	CONTROL TRANSFORMER	THERMOSTAT	CONTACTOR COIL	LOW VOLTAGE FUSE	STUCK COMPRESSOR	INEFFICIENT COMP.	REF. UNDERCHARGE	REF. OVERCHARGE	EXCESSIVE EVAP. LOAD	NONCONDENSABLES	RES. O.D. AIRFLOW	O.D. AIR RECIRCULATION	TXV STUCK OPEN	SUPERHEAT	RES. I.D. AIRFLOW	REF. CIR. RESTRICTIONS	SOV LEAKING	SOV COIL DEFECTIVE	CHECK VALVE LEAKING	LPC SENSOR DEF.	DEFROST CONTROL DEF.	T4 TEMP. SENSOR DEF.	T3 TEMP. SENSOR DEF.	HPC/HGS SENSOR DEF.	
REFRIGERANT CIRCUIT																																					
Head Pressure Too High	C																			P	P	S	P	S				S						S		
	H																			P	P	S					P	S								
Head Pressure Too Low	C																	S	P						S	S		S	S		P					
	H																	S	P						S	S		S	S	S	P					
Suction Pressure Too High	C																	S		P	P					S			P		P					
	H																	S								S			P							
Suction Pressure Too Low	C																		P						S	P	S									
	H																		P				S	S		S		S								
Liquid Refrig. Floodback (TXV)	C																								P						P					
	H																								P						P					
I.D. Coil Frosting	C																		P				S	S												
	H																																			
Compressor Runs Inadequate or No Cooling/Heating	C																	S	P		S	S			S	P	S	S		S					
	H																	S	P			S			S	P	S	S	S	S					
ELECTRICAL																																				
Compressor & O.D. Fan Won't Start	C	P	P	S				P		S	S	P	S	P	P																					
	H	P	P	S				P			S	P	S		P																	S	S	S	S	S
Compressor Will Not Start But O.D. Fan Runs	C		P			P										P																				
	H		P			P				S				P		P																	S		S	
O.D. Fan Won't Start	C		P				P	P																												
	H		P				P	P																									S			
Compressor Hums But Won't Start	C					P				S						P																				
	H					P				S						P																				
I.D. Blower Won't Start	C	P	P	S					P		S	P	S		S																					
	H	P	P	S					P		S	P	S		S																					
DEFROST																																				
Unit Won't Initiate Defrost	C																																			
	H																													P			P		S	
Defrost Terminates on Time	C																																			
	H																			P													P		S	
Unit Icing Up	C																																			
	H																			P			S	S			S			P			P			

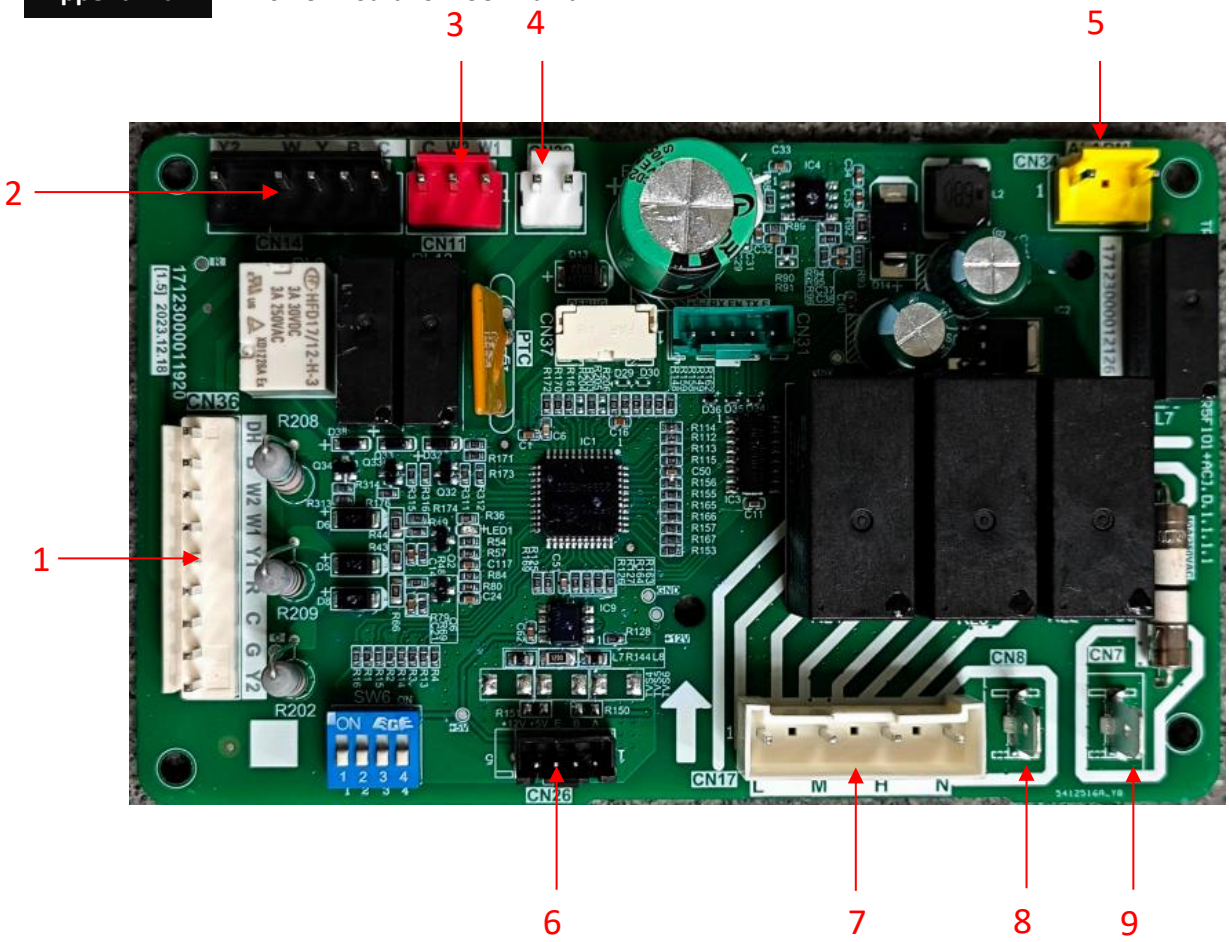
C- Cooling H - Heating P - Primary Causes S - Secondary Causes

C-cooling H-Heating P-Primary Causes S-Secondary Causes
Comp.-compressor RES.-Restrictions REF.-Refrigeration DEF.-Defective CIR.-Circuit EEV-Electronic expansion valve REV.-Reversing Valve PT-Pressure Transducer T3-Outdoor coil temp. sensor T4-Ambient temp. sensor T5-Comp. discharge temp. sensor Tf-Module radiator fin temp. sensor HPS-High pressure switch
RES I.D. AIRFLOW -Perhaps failue of fan motor or fan capacitor or filter
RES O.D. AIRFLOW -Perhaps failue of fan motor or fan capacitor or recirculation or blocking coil
RES O.D. RADIATOR-Perhaps failue of blocking radiator

Appendix 5 7.5 Temperature and Resistance Relationship Tables

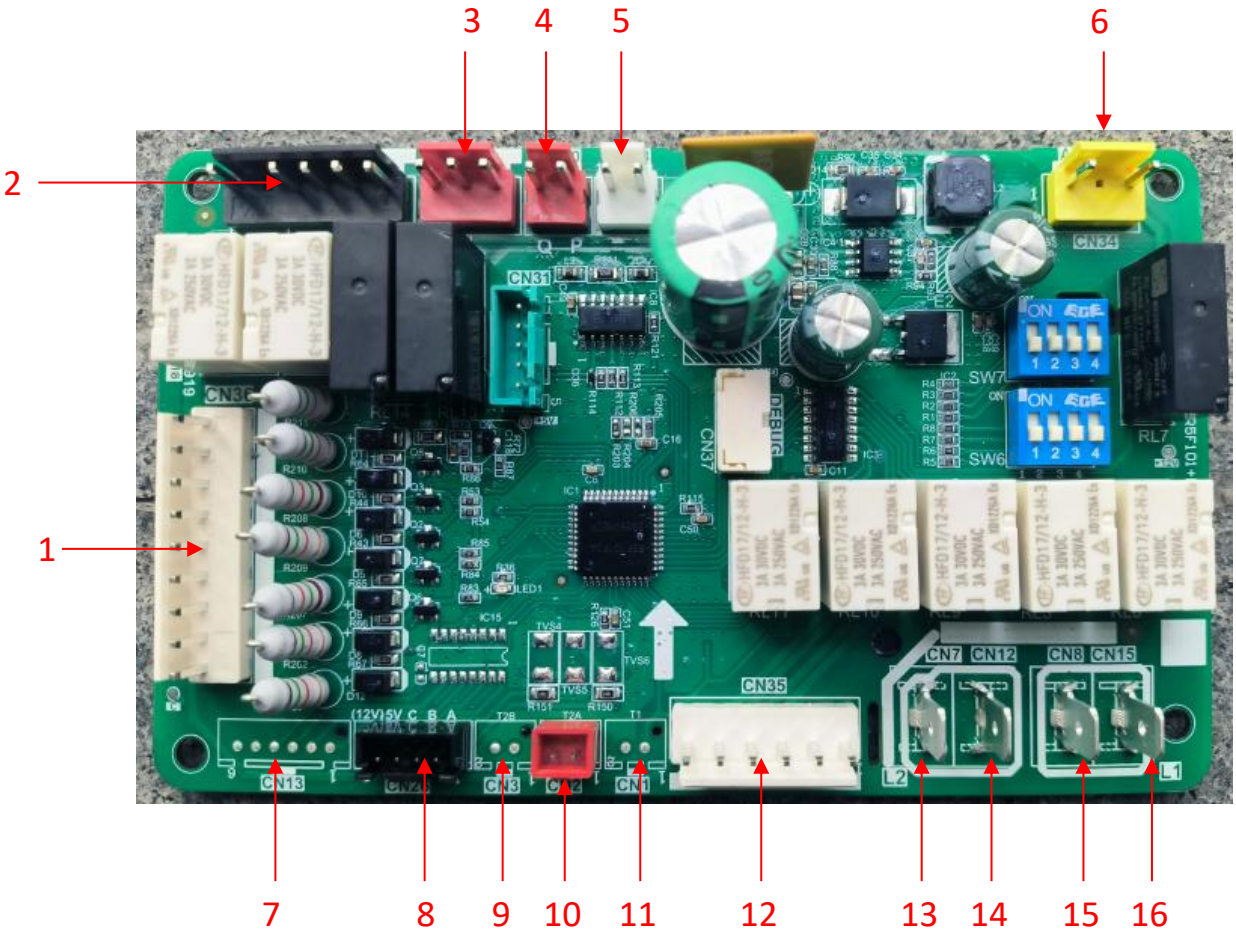
Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ
-4	106.73	37	29.87	78	10	119	3.69
-3	103.25	38	29.22	79	9.5	120	3.61
-2	99.89	39	28.19	80	9.26	121	3.53
-1	96.65	40	27.39	81	9.03	122	3.45
0	93.53	41	26.61	82	8.81	123	3.38
1	90.53	42	25.85	83	8.59	124	3.3
2	87.62	43	25.12	84	8.38	125	3.23
3	84.83	44	24.42	85	8.17	126	3.16
4	82.13	45	23.73	86	7.97	127	3.1
5	79.52	46	23.07	87	7.78	128	3.03
6	77.01	47	22.42	88	7.59	129	2.96
7	74.58	48	21.8	89	7.4	130	2.9
8	72.24	49	21.2	90	7.22	131	2.84
9	69.98	50	20.61	91	7.05	132	2.78
10	67.8	51	20.04	92	6.88	133	2.72
11	65.69	52	19.49	93	6.72	134	2.67
12	63.65	53	18.96	94	6.56	135	2.61
13	61.68	54	18.44	95	6.4	136	2.56
14	59.78	55	17.94	96	6.25	137	2.5
15	57.95	56	17.45	97	6.1	138	2.45
16	56.17	57	16.98	98	5.96	139	2.4
17	54.46	58	16.52	99	5.82	140	2.35
18	52.8	59	16.08	100	5.68	141	2.3
19	51.2	60	15.65	101	5.55	142	2.25
20	49.65	61	15.23	102	5.42	143	2.21
21	48.16	62	14.83	103	5.3	144	2.16
22	46.71	63	14.43	104	5.18	145	2.12
23	45.31	64	14.05	105	5.06	146	2.08
24	43.95	65	13.68	106	4.94	147	2.03
25	42.64	66	13.32	107	4.83	148	1.99
26	41.38	67	12.97	108	4.72	149	1.95
27	40.15	68	12.64	109	4.61	150	1.91
28	38.97	69	12.31	110	4.51	151	1.88
29	37.82	70	11.99	111	4.41	152	1.84
30	36.71	71	11.68	112	4.31	153	1.8
31	35.64	72	11.38	113	4.21	154	1.77
32	34.6	73	11.09	114	4.12	155	1.73
33	33.59	74	10.8	115	4.03	156	1.7
34	32.61	75	10.53	116	3.94	157	1.66
35	31.67	76	10	117	3.85	158	1.63
36	30.76	77	10	118	3.77	159	1.6

Appendix 6 7.6 PCB Board for PSC ID unit



1. Thermostat wire connections
2. Outdoor unit control port
3. Heating kit control port
4. Transformer output
5. Alarm connection (Reserve)
6. R454B refrigerant sensor port
7. Indoor fan motor control port
8. Power in (L2)
9. Power in (L1)

Appendix 7 7.7 PCB Board for ECM ID unit



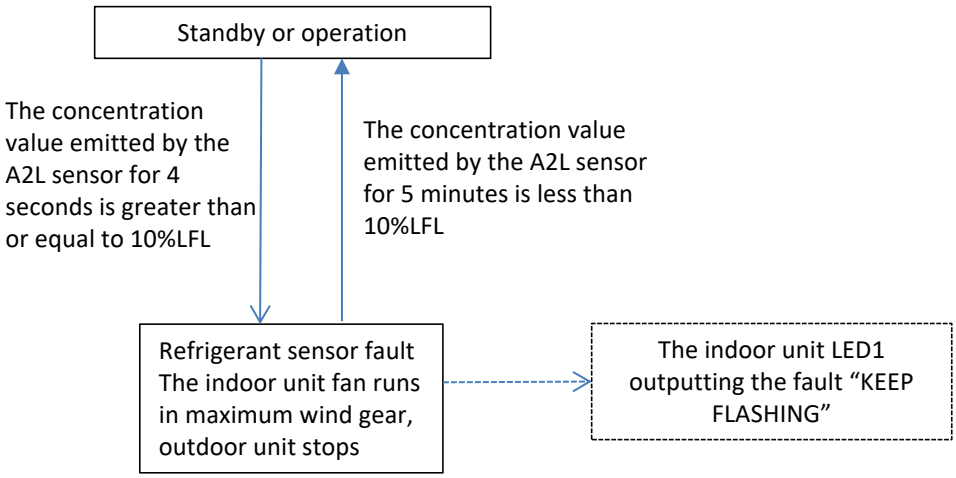
1. Thermostat wire connections
2. Outdoor unit control port
3. Heating kit control port
4. Outdoor unit communication port
5. Transformer output
6. Alarm connection (Reserve)
7. EEV port
8. R454B refrigerant sensor port
9. T2B sensor port
10. T2 sensor port
11. T1 sensor port
12. Indoor fan motor control port
13. Power in (L2)
14. Power in (L2)
15. Power in (L1)
16. Power in (L1)

Appendix 8 7.8 ID Unit fault code

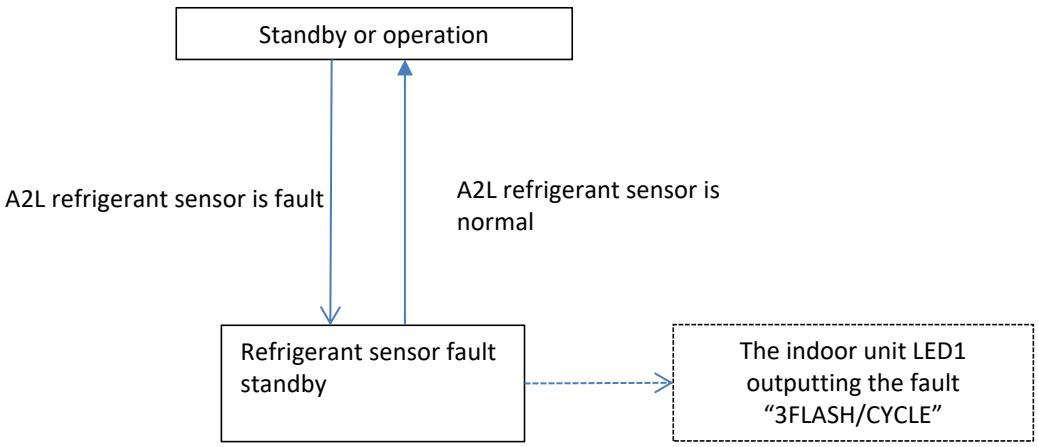
No.	LED light flash	Fault code description	Supposed cause
3	3FLASH/CYCLE	A2L REFRIGERANT SENSOR FAULT	A2L sensor fault
4	4FLASH/CYCLE	A2L REFRIGERANT SENSOR COMMUNICATION FAULT	Wiring error/ A2L sensor fault
7	KEEP FLASHING	REFRIGERANT LEAK PROTECTION	Refrigerant leak
8	8FLASH/CYCLE	A2L SENSOR OVER SERVICE LIFE	Refrigerant sensors are used for more than 15 years

Appendix 9 7.9 ID Unit fault control

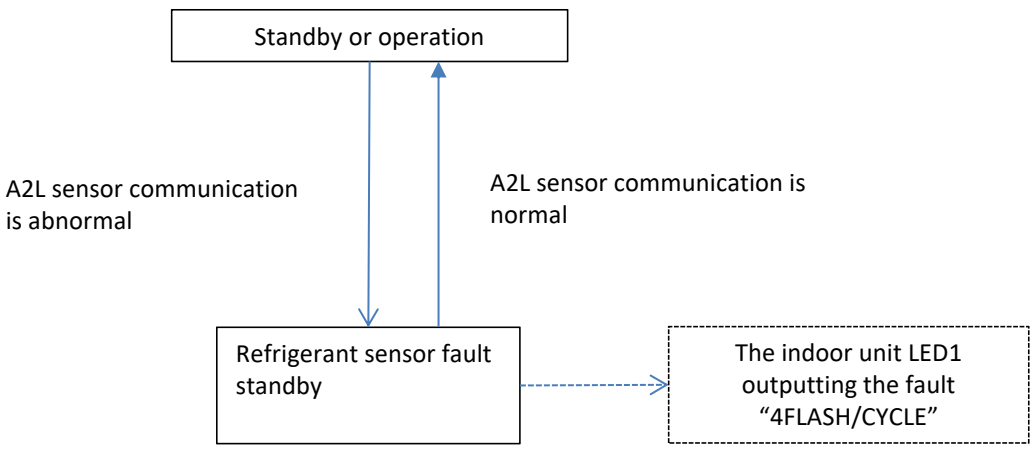
(1) Refrigerant leakage fault in indoor unit



(2) A2L refrigerant sensor fault (A2L sensor)

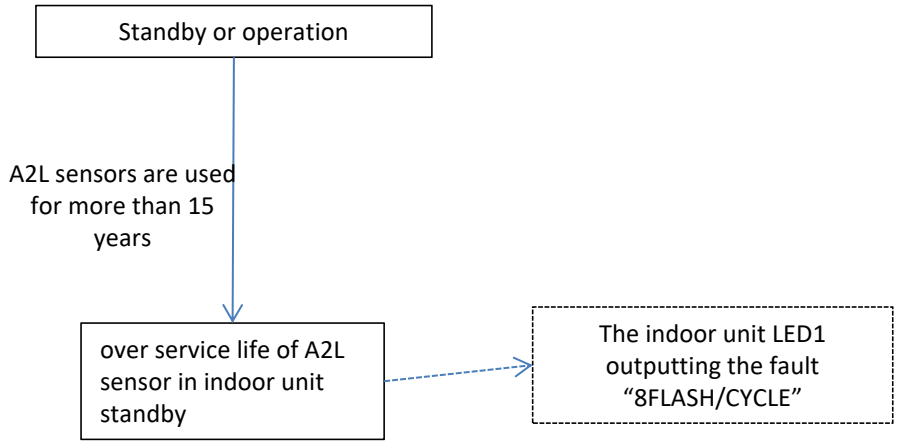


(3) A2L sensor communication fault (A2L sensor)



Appendix 9 7.9 ID Unit fault control

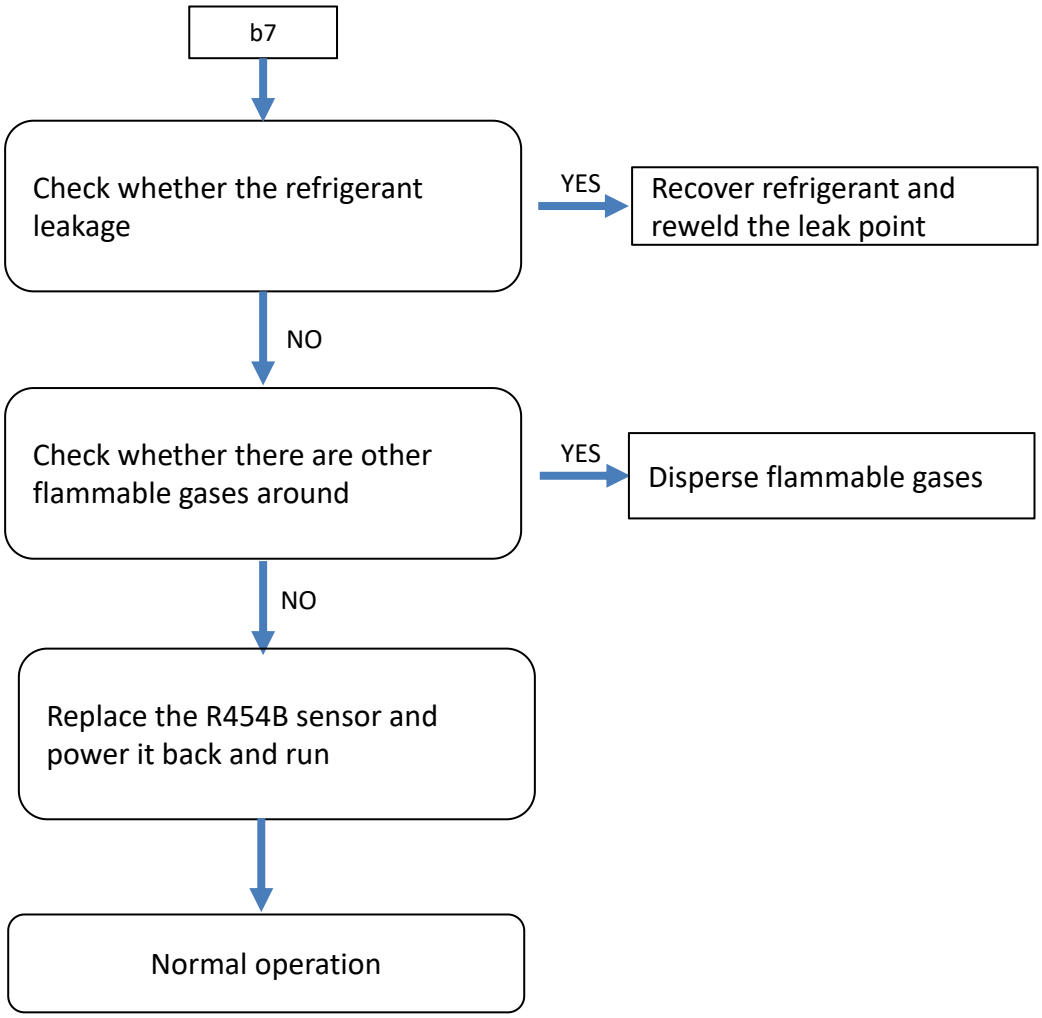
(4) A2L sensor over service life in indoor unit



Appendix 10 7.10 ID Unit fault troubleshooting

Faulty code	*Keep flashing*
Model	All
Name	Refrigerant leakage fault
Classify	Refrigerant leakage
Possible cause	• Refrigerant leakage

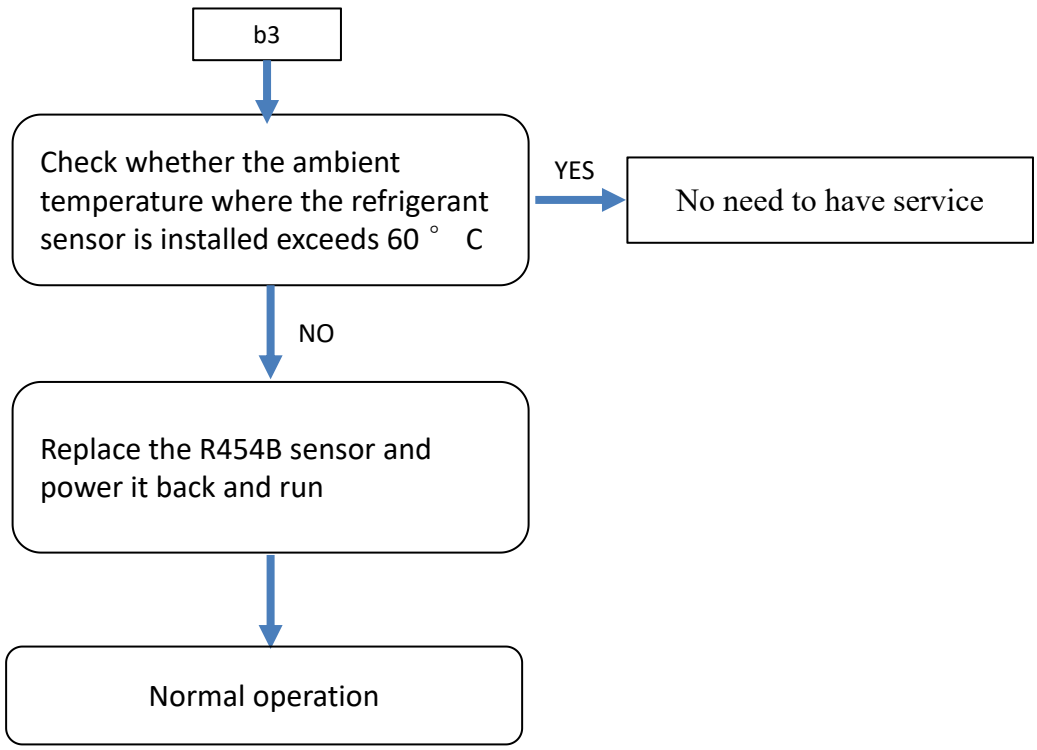
Troubleshooting



Appendix 10 7.10 ID Unit fault troubleshooting

Faulty code	3 flash/cycle
Model	All
Name	R454B sensor fault in IDU
Classify	Sensor fault
Possible cause	• Sensors failed • Beyond the normal operating temperature range

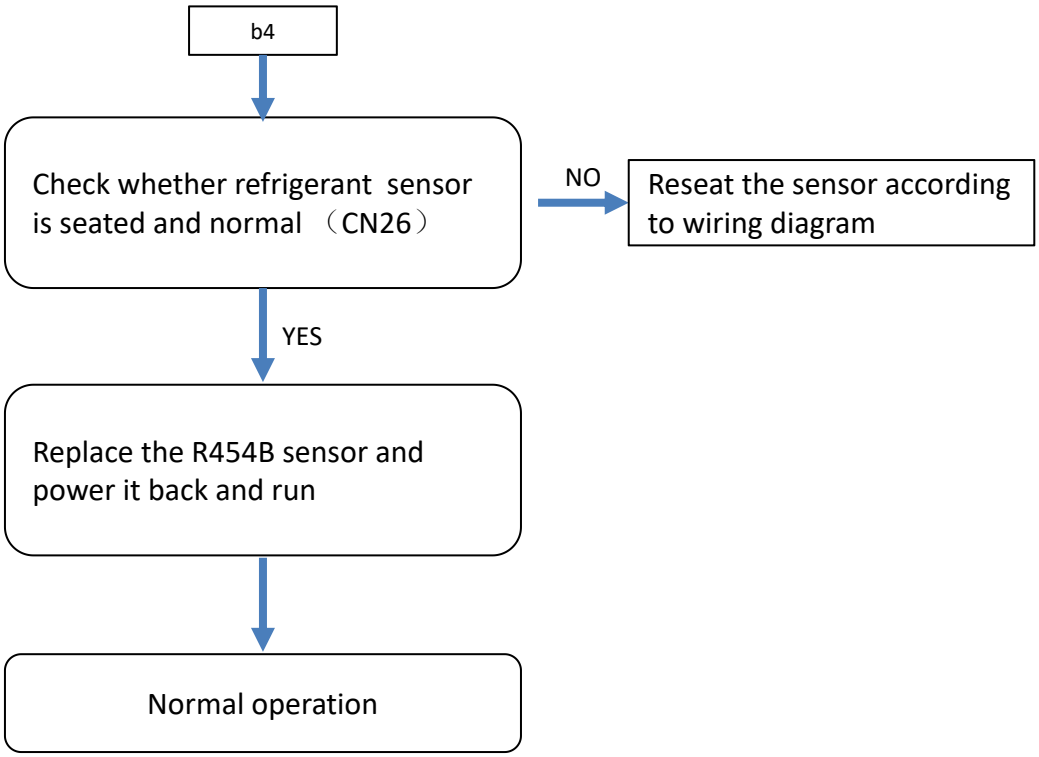
Troubleshooting



Appendix 10 7.10 ID Unit fault troubleshooting

Faulty code	4 flash/cycle
Model	IDU
Name	R454B sensor communication fault in IDU
Classify	Electric issue
Possible cause	· refrigerant sensor line connection in IDU abnormal: refrigerant sensor signal line in IDU is not properly plugged (CN26) · Refrigerant sensor in IDU abnormal: damaged

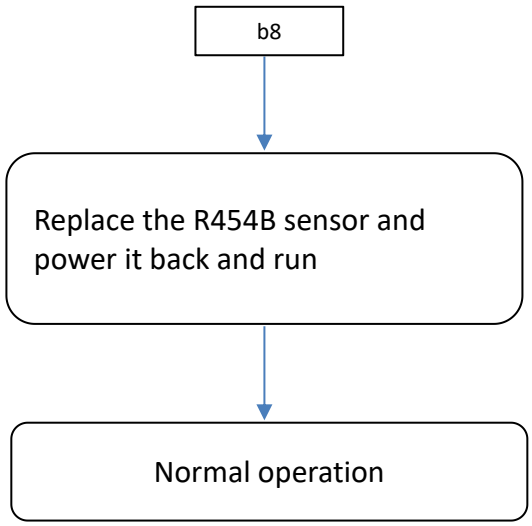
Troubleshooting



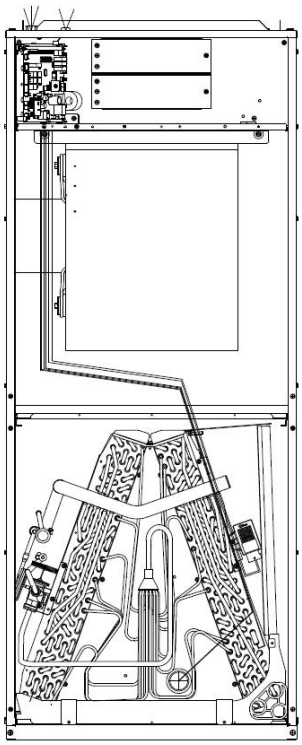
Appendix 10 7.10 ID Unit fault troubleshooting

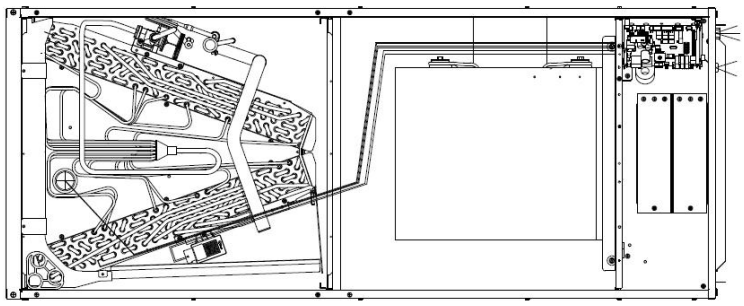
Faulty code	8 flash/cycle
Model	All
Name	R454B sensor over service life
Classify	Sensor fault
Possible cause	• **Over service**

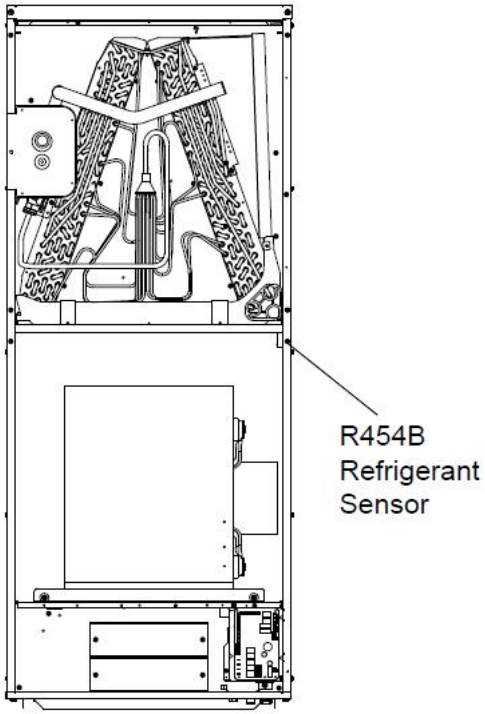
Troubleshooting

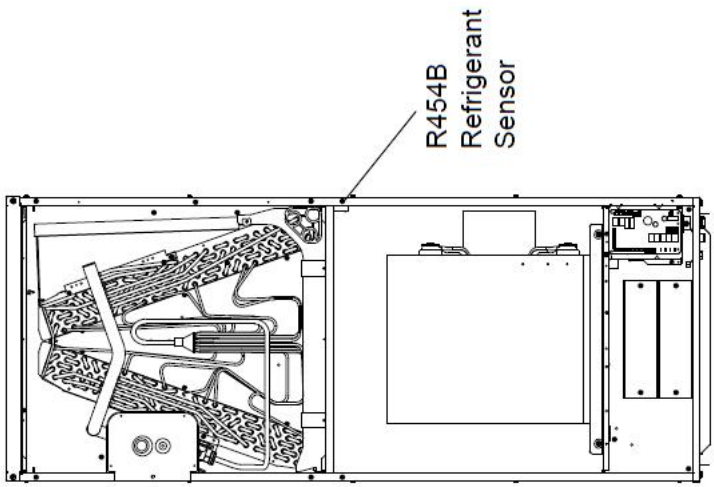


Appendix 11 7.11 Installation positions of refrigerant sensors in different installation modes









Appendix 12 7.12 Internal structural parts repair and replacement guidelines

Refrigerant sensor repair and replacement guidelines separately

Remove the screws that fix the Refrigerant sensor and replace the Refrigerant sensor.
Reuse screw to secure the Refrigerant sensor.

↓

Use zip cable ties to reattach the sensor wire body to the left side of the Refrigerant sensor and the wire buckle.

Appendix 12 7.12 Internal structural parts repair and replacement guidelines

Instructions for replacing Refrigerant sensor during reverse installation of evaporators

Remove the screws that secure the water collection tray assembly, extract the evaporator components from the box, reverse the evaporator components by 180 degrees, and push them back into the unit along the guide rails on both sides of the unit.

Remove the screws that fix the Refrigerant sensor and replace the Refrigerant sensor.
Reuse screw to secure the Refrigerant sensor.

Use zip cable ties to reattach the sensor wire body to the left side of the Refrigerant sensor and the wire buckle.