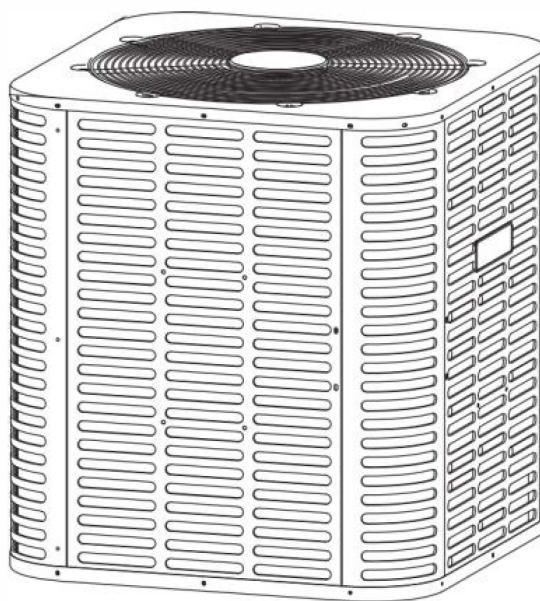


SPLIT AIR CONDITIONERS

Service Manual

ComfortStar®

BAR5 SERIES



IMPORTANT NOTE:



Read this manual carefully before operating your new air conditioning unit. Make sure to save this manual for future reference.

Please check the applicable models, technical data, F-GAS(if any) and manufacturer information from the "Owner's Manual - Product Fiche " in the packaging of the outdoor unit. (European Union products only)

Service Manual

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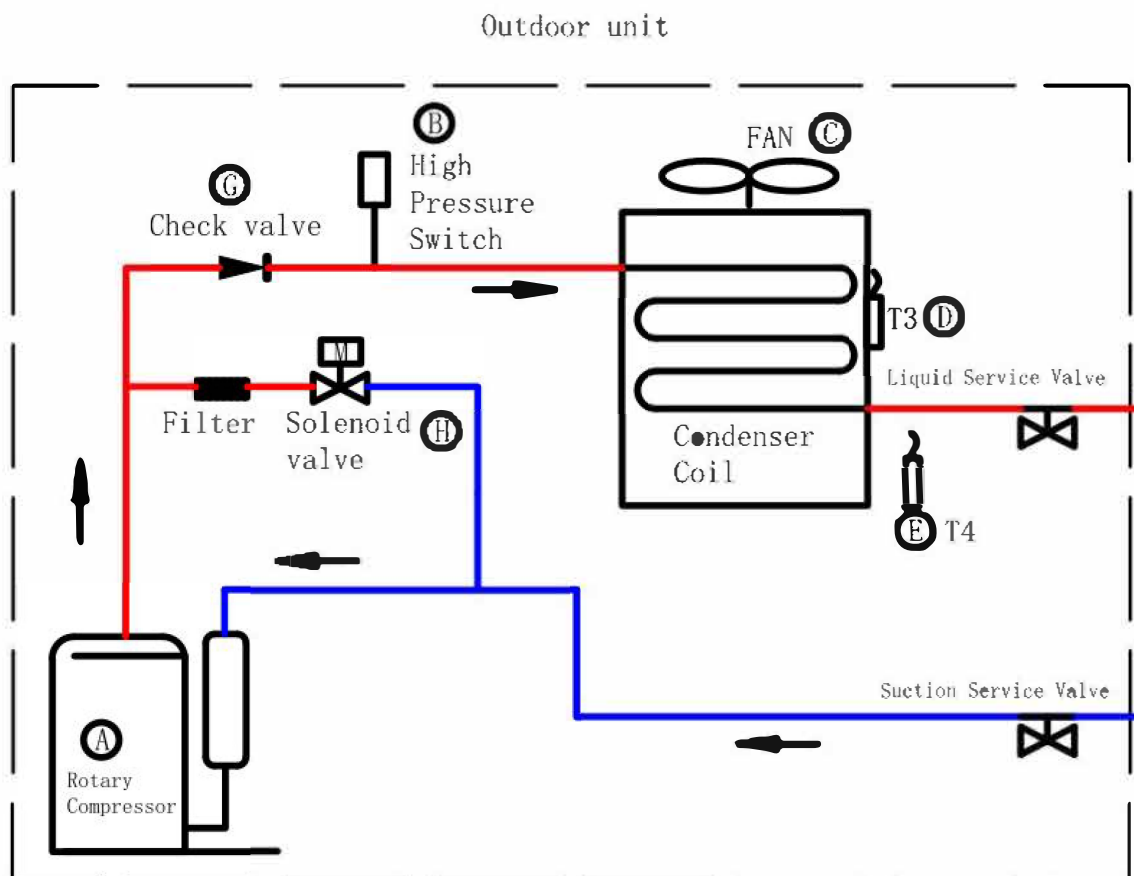
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2. System Instruction

2.1 Refrigerant Circuit

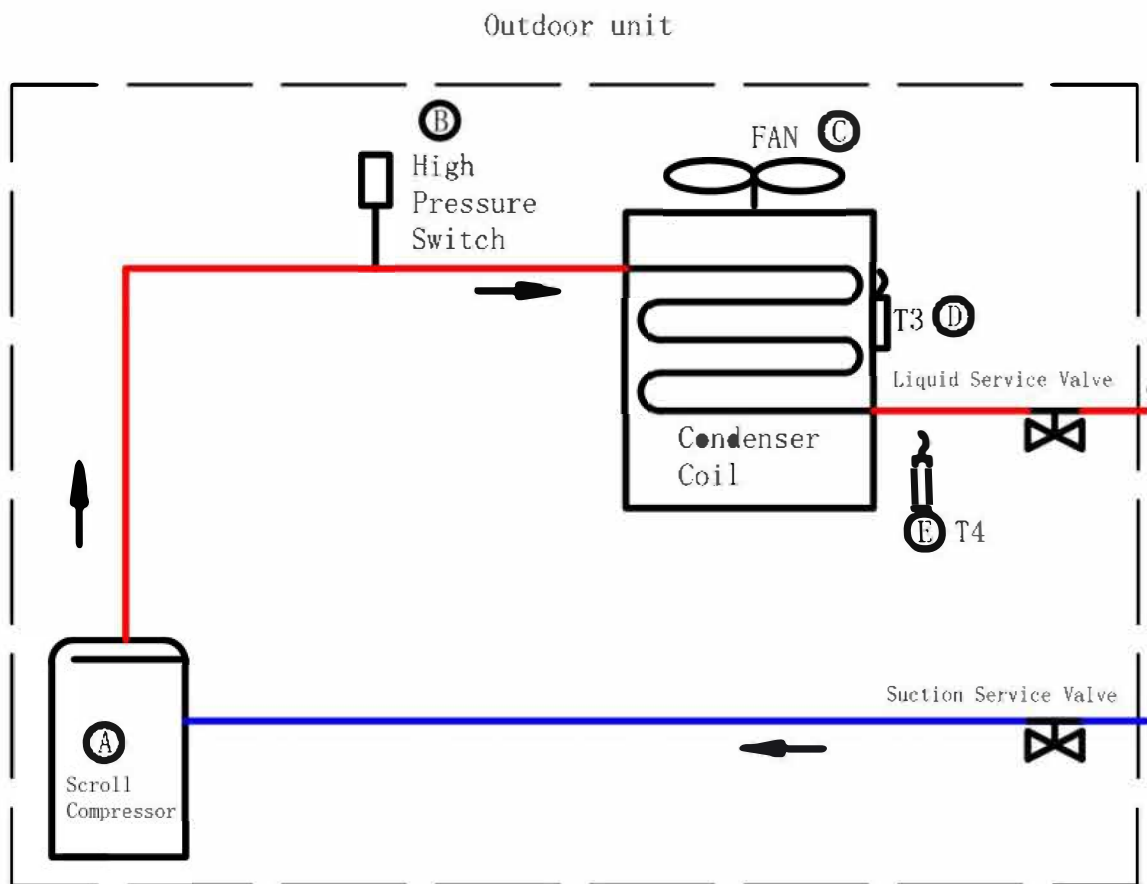
No. in diagram	Symbol	Part Name	Major function
A	Rotary Comp.	Rotary Compressor	Inverter compressor is operated in multi-steps according to PT.
B	HPS	High pressure switch	Used to high pressure protection when up to 580 PSIG and recovery when below to 435PSIG.
C	Fan	Fan of outdoor	Used to help heat exchange by 10-speeds ECM motor.
D	T3	Condenser coil temperature sensor	Used to discharge temperature protection and Fan control in cooling mode, and defrost control.
E	T4	Ambient temperature sensor	Used to ambient protection and Fan control in cooling mode, and defrost control.
F	RV	The Reversing Valve	Used to switch mode between cooling and heating.
G	CV	Check Valve	Open during cooling and shutoff during heating by itself.
H	PEV	Pressure Equalizer Valve	To ensure pressure balance before compressor starts
I	LPS	Low pressure switch	Used to low pressure protection when below to 20 PSIG and recovery when up to 43.5PSIG.

AC system with Rotary compressor

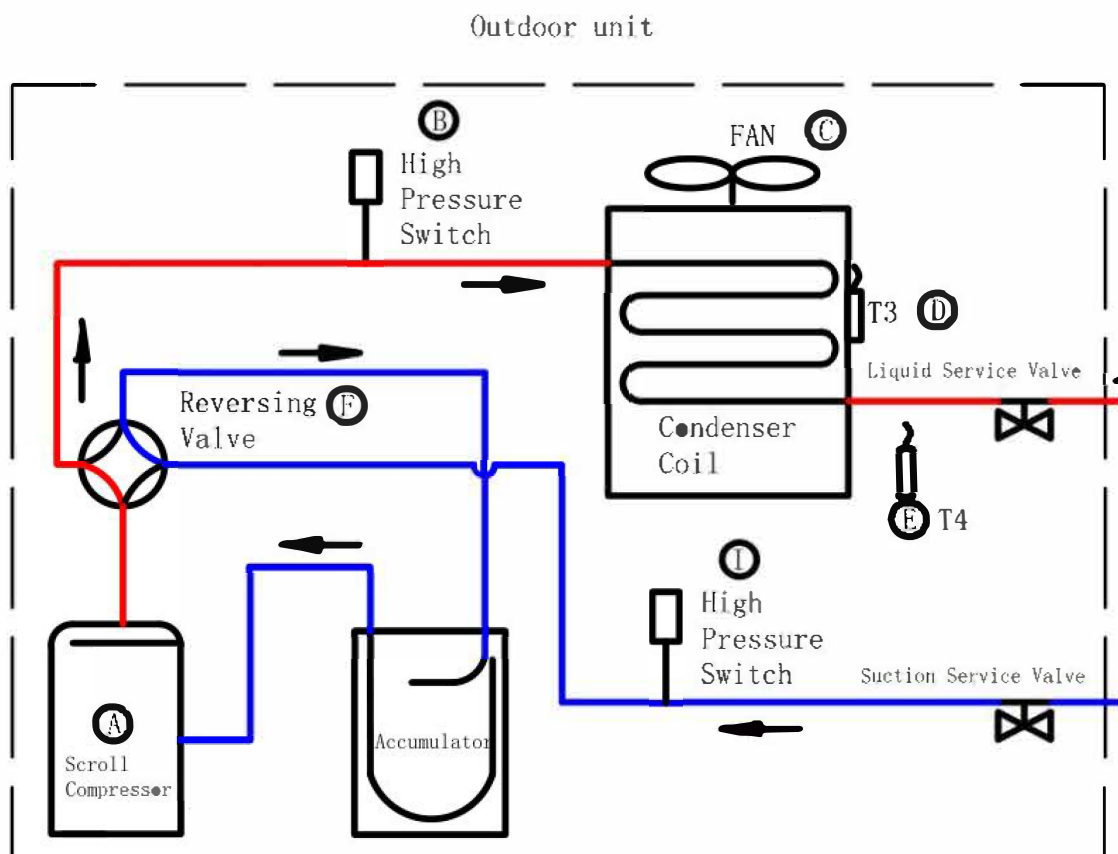


2.1 Refrigerant Circuit

AC system with Scroll compressor

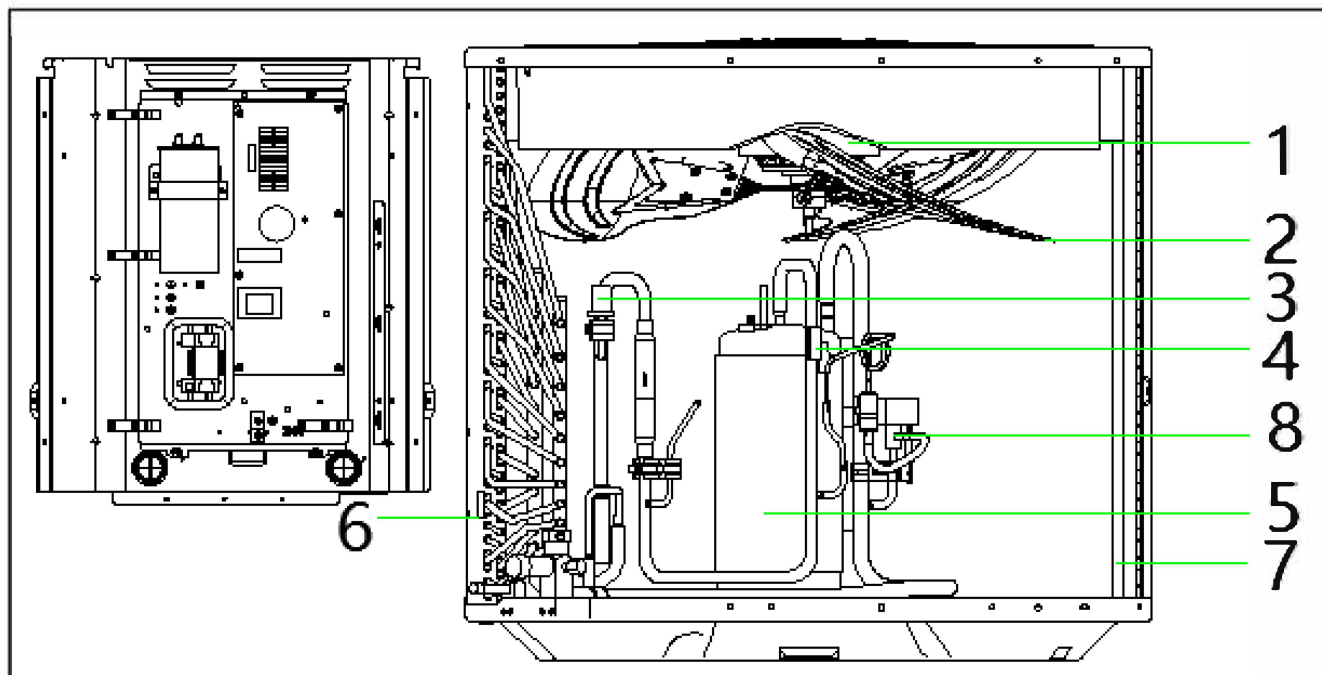


HP system with Scroll compressor

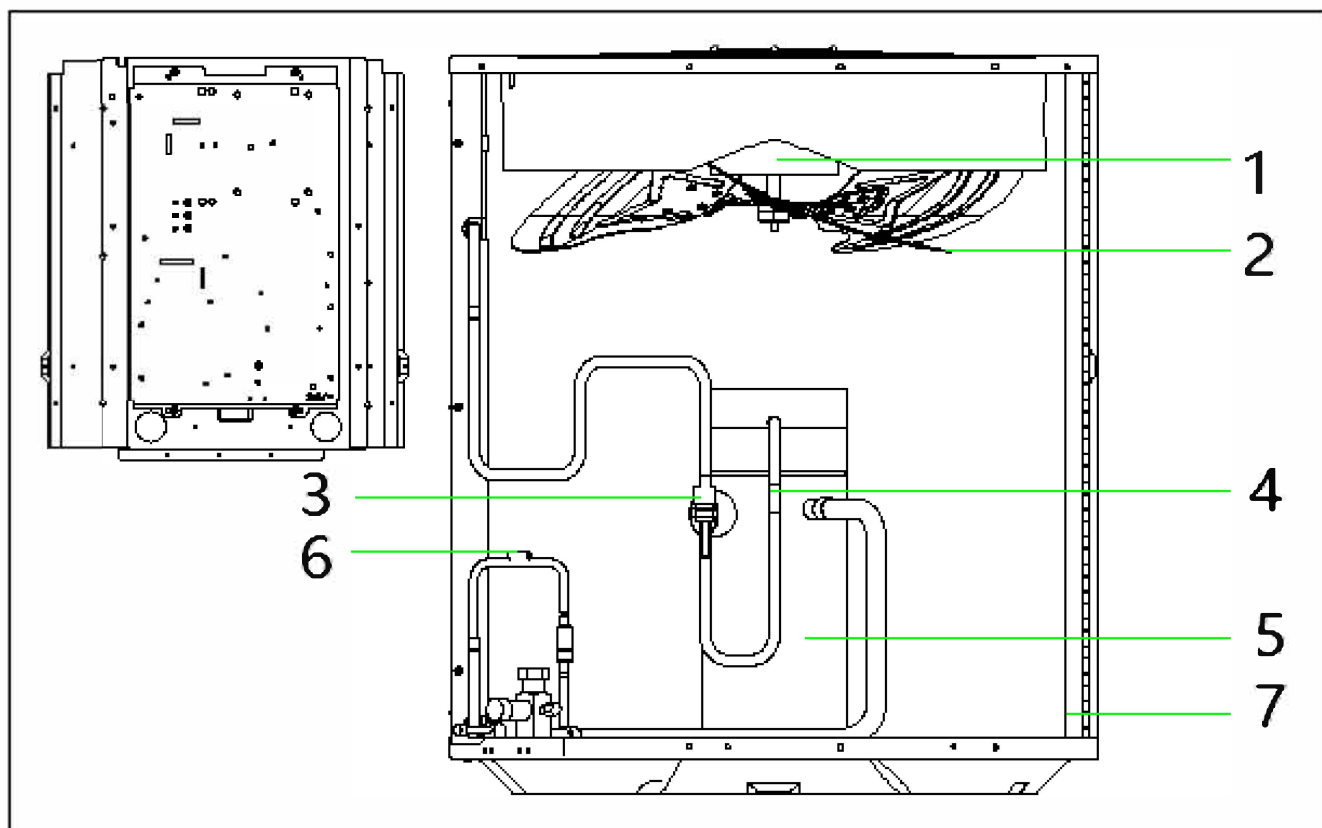


2.2 Functional Part

13.4 AC 53/71/90/105, 14.3AC 53/71/90

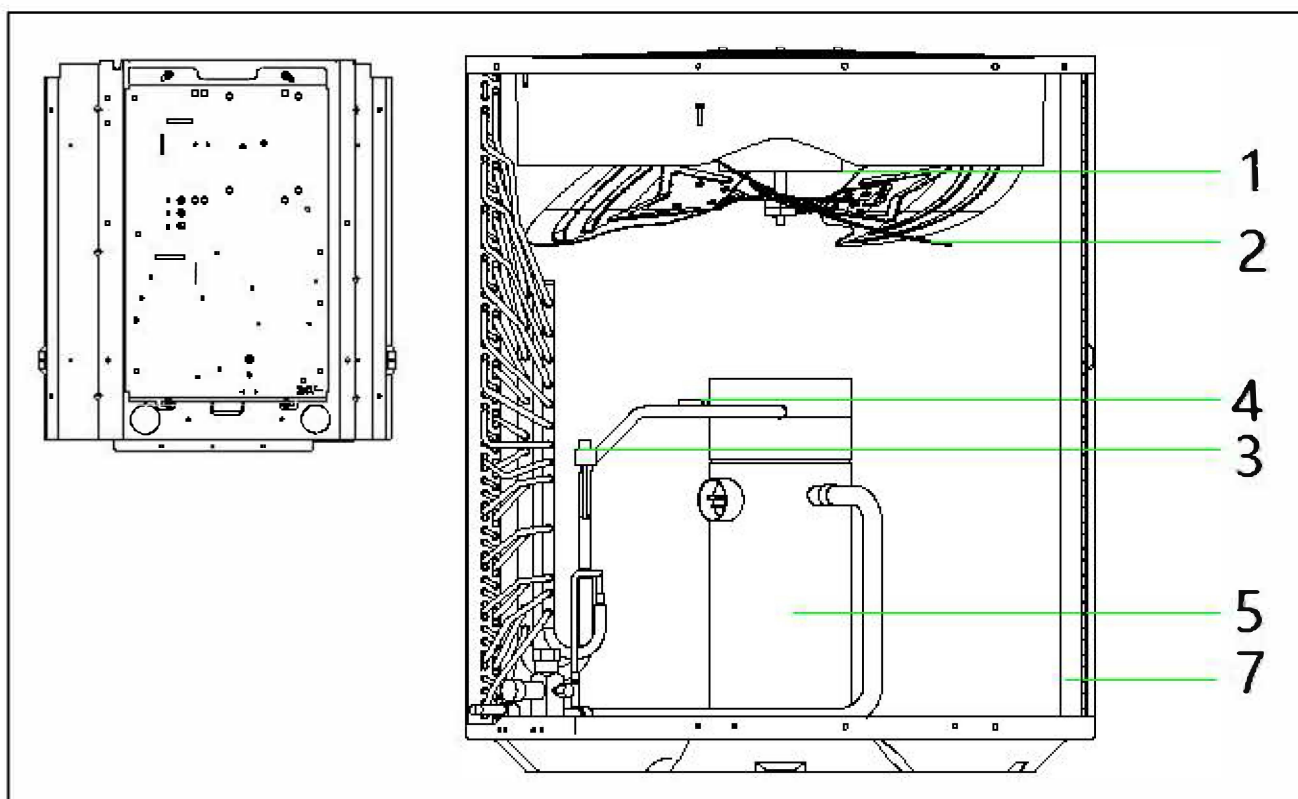


13.4 AC 160

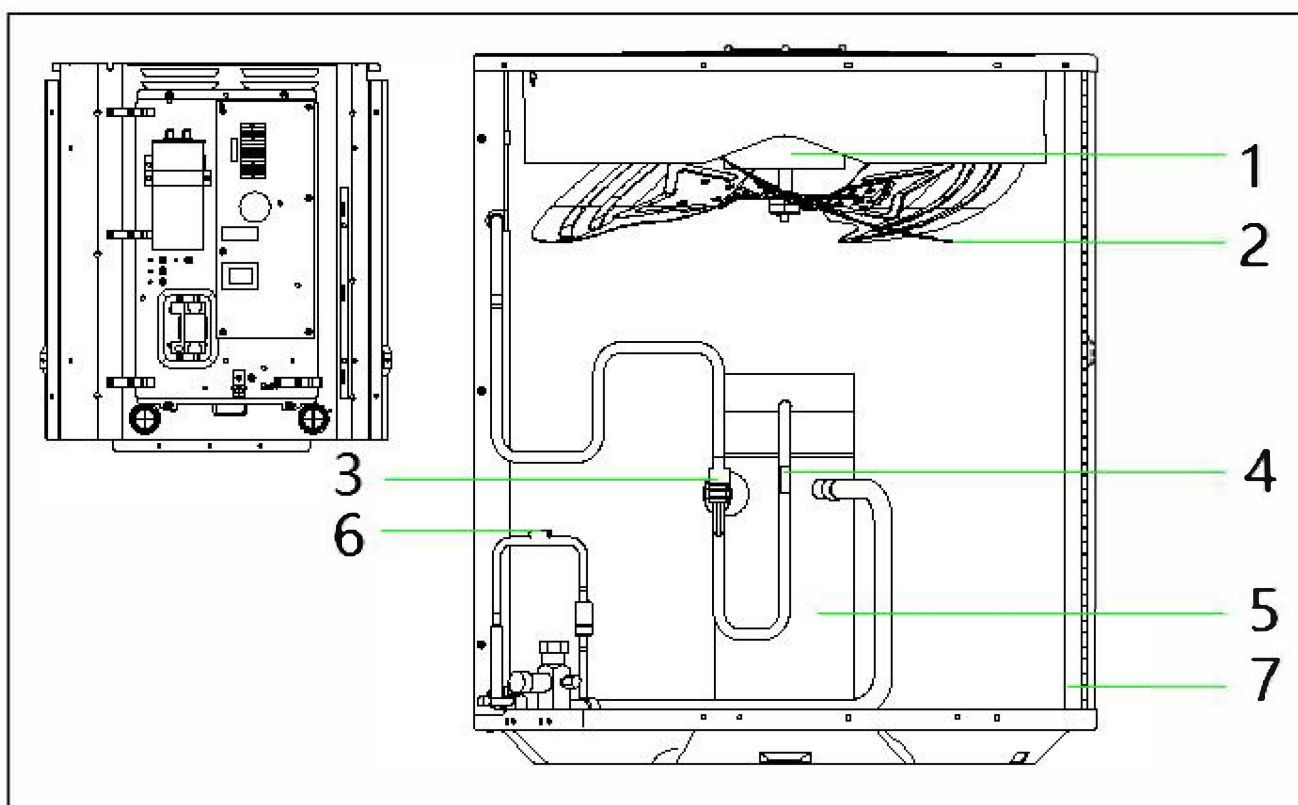


2.2 Functional Part

13.4 AC 120/140

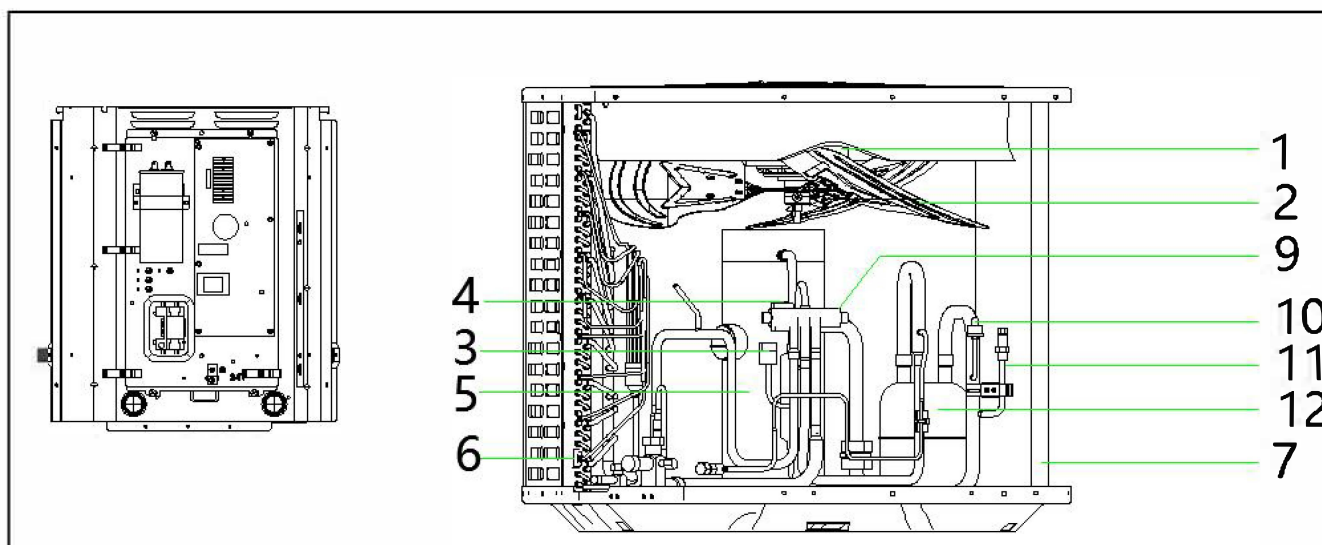


14.3 AC 160

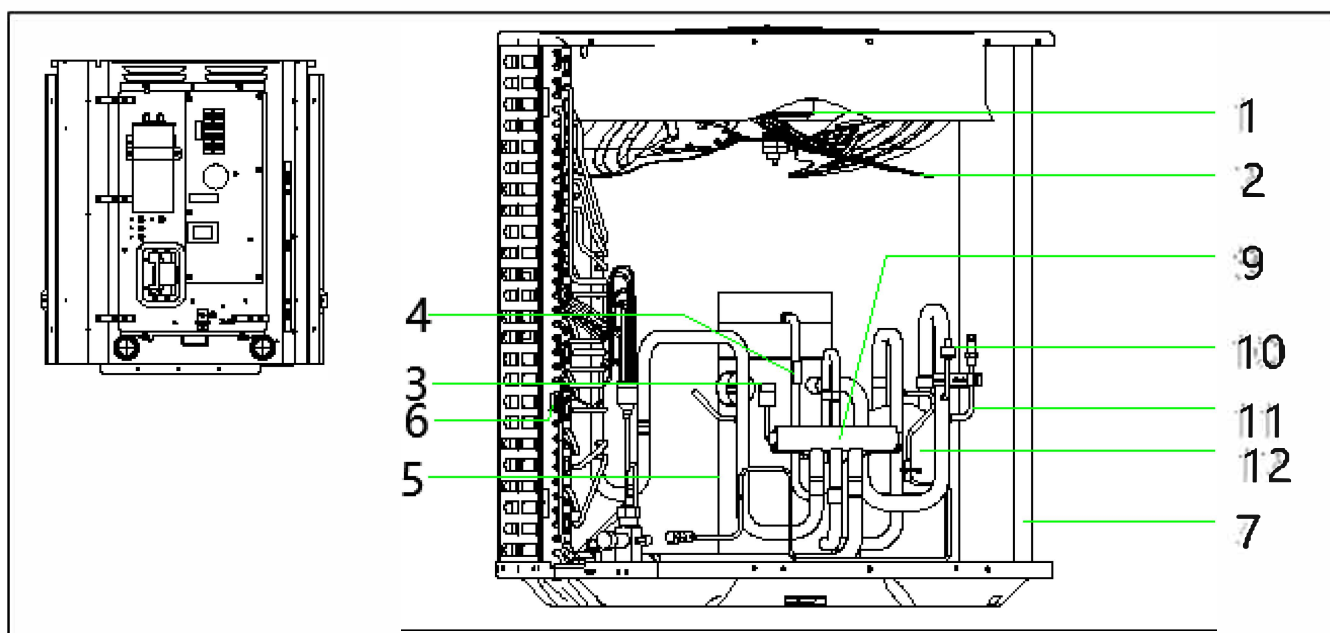


2.2 Functional Part

14.3 HP 53/71/90



14.3 HP 105/120/140/160



2.2 Functional Part

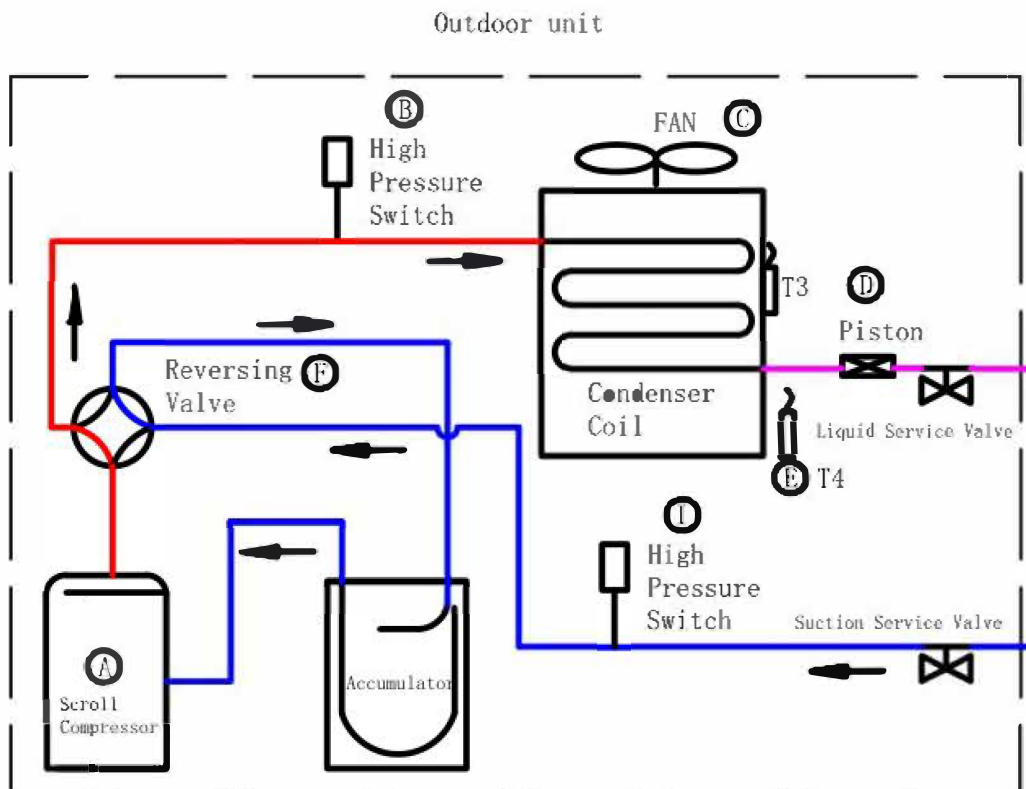
No. in diagram	Symbol	Part Name
1	Motor	Fan motor
2	Fan	Fan of outdoor
3	HPS	High pressure switch
4	DTS	Discharge Temperature switch
5	Comp.	Compressor
6	T3	Condenser coil temperature sensor
7	COIL	Condenser coil
8	PEV	Pressure Equalizer Valve
9	RV	The Reversing Valve
10	PS	Pressure switch
11	FPA	Fusible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

2. Refrigerant Circuit

2.3 Refrigerant Flow Chart

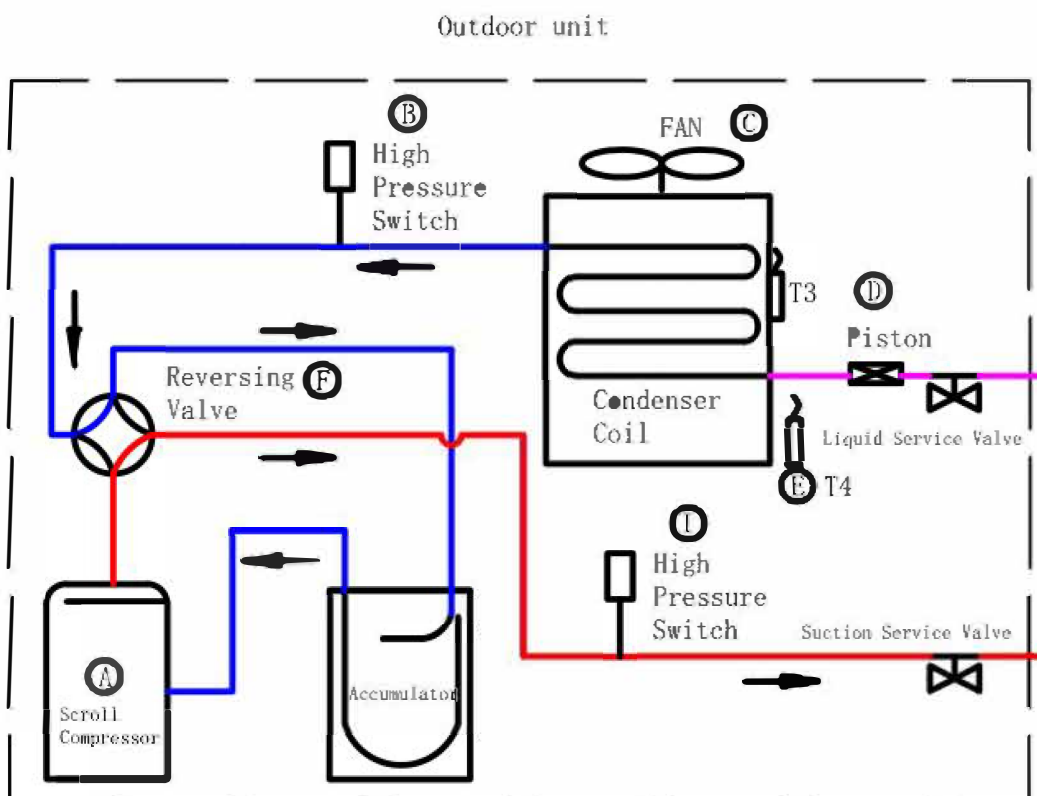
Cooling Operation/Cooling Oil Return Operation/Defrost Operation

- High pressure gas
- High pressure liquid
- Low pressure



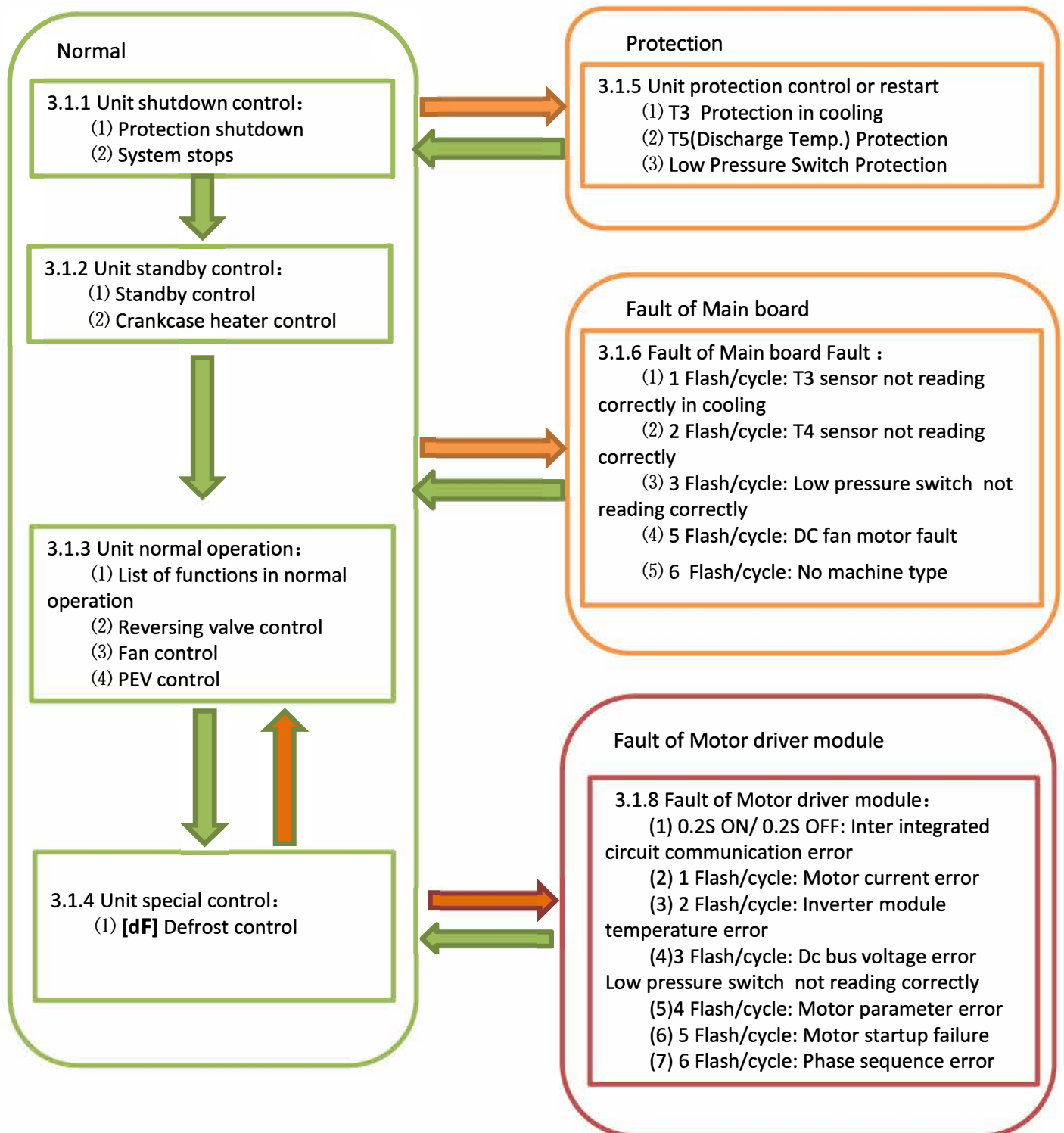
Heating Operation/Heating Oil Return Operation

- High pressure gas
- High pressure liquid
- Low pressure



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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) or LED 2(Green) 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 and 2s off).

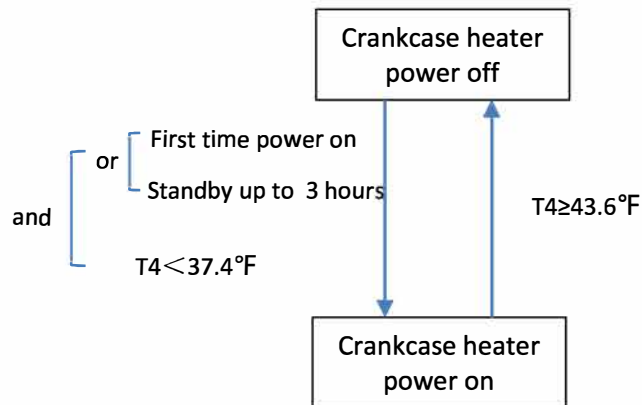
3.1.2 Unit standby control

(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.



T_4 is the Ambient temperature .

3.1.3 Unit normal operation

Anytime the compressor is operating, the digital tube will show the frequency of compressor.

(1) List of functions in normal

[Cooling]

Symbol	Part Name	Major function
RV	The Reversing Valve	OFF
Fan	Outdoor fan motor	10 speeds ECM motor. Controlled by T3.

[Heating]

Symbol	Part Name	Major function
RV	The Reversing Valve	ON
Fan	Outdoor fan motor	10 speeds ECM motor. Controlled by T4 and compressor speed

(2) Reversing valve control control

The heat pump need "B" signal of 24V wires.

●Cooling:

The reversing valve is off during cooling.

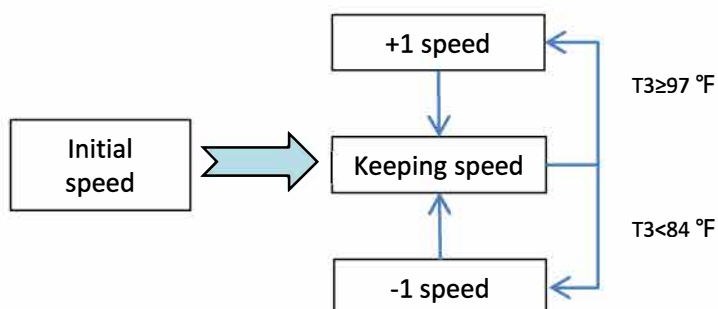
●Heating:

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.

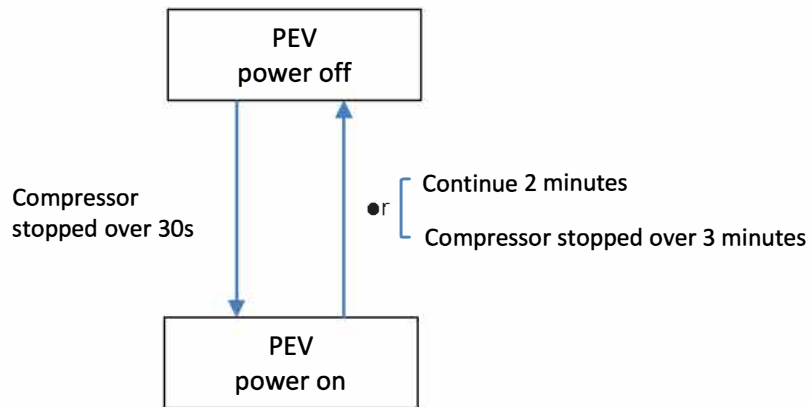
[Heating]

Fan when heating maintains 10 speed

3.1.3 Unit Normal operation

(4) 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

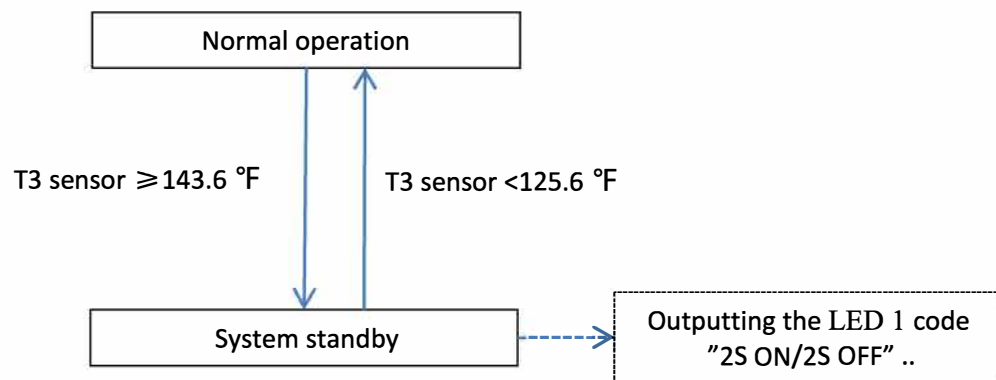
● The Demand Defrost Control (DDC) monitors the ODU coil temperature using thermistor (T3). A second thermistor (T4) monitors outdoor ambient temperature. Based on these parameters, as well as accumulative running time and Standby time, the DDC calculates proper initiation of defrost.

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

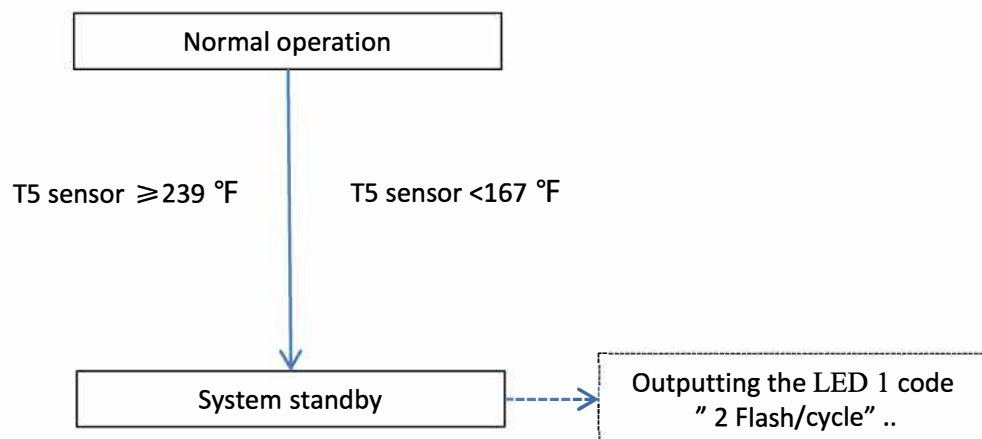
1. After T3 is achieved.
 - T4 $\geq$ 19°F T3<32 °F and lasted for 60 minutes
2. After T4 is achieved.
 - T3<28°F and lasted for 65 minutes
 - _ "Standby time" is 2 hours, T3<28°F when starting and lasted for 15 minutes

3.1.7 Unit protection control or restart:

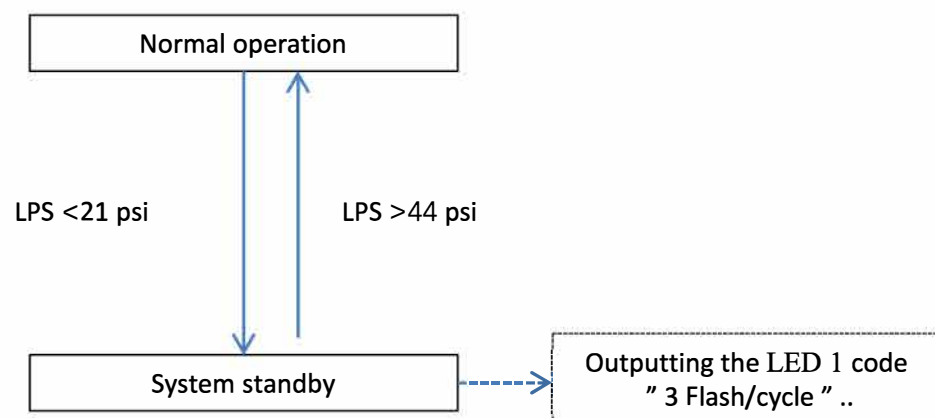
(1) T3 Protection in cooling



(2) T5(Discharge Temp.) Protection



(3) Low Pressure Switch Protection



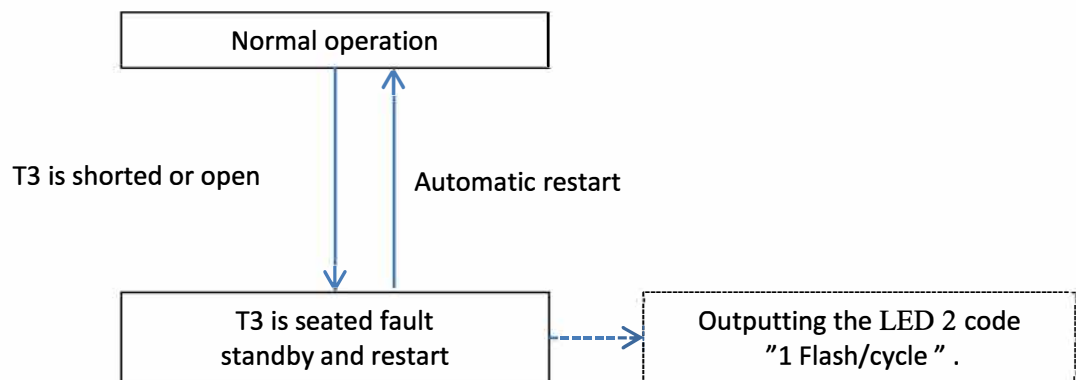
3. Function and Control

3.1.6 Fault of Main board:

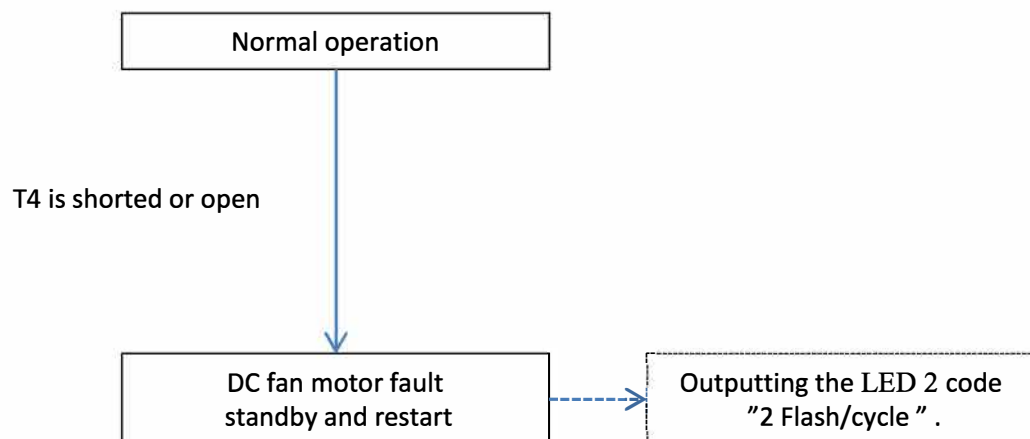
No.	Operation LED	Protection code	Protection control description	Supposed cause
1	LED2	1 Flash/cycle	T3 sensor not reading correctly in cooling	T3 sensor is not properly placed/High pressure switch fault
2	LED2	2 Flash/cycle	T4 sensor not reading correctly	T4 sensor is not properly placed/High pressure switch fault/ Discharge temp. switch open
3	LED2	3 Flash/cycle	Low pressure switch not reading correctly	Low pressure switch is not properly connected.
4	LED2	5 Flash/cycle	DC fan motor fault	Motor fault/severe weather (fan rpm too low due to wind)
5	LED2	6 Flash/cycle	Phase sequence error	Speed message isn't wrote in main board

3.1.7 Unit protection control or restart:

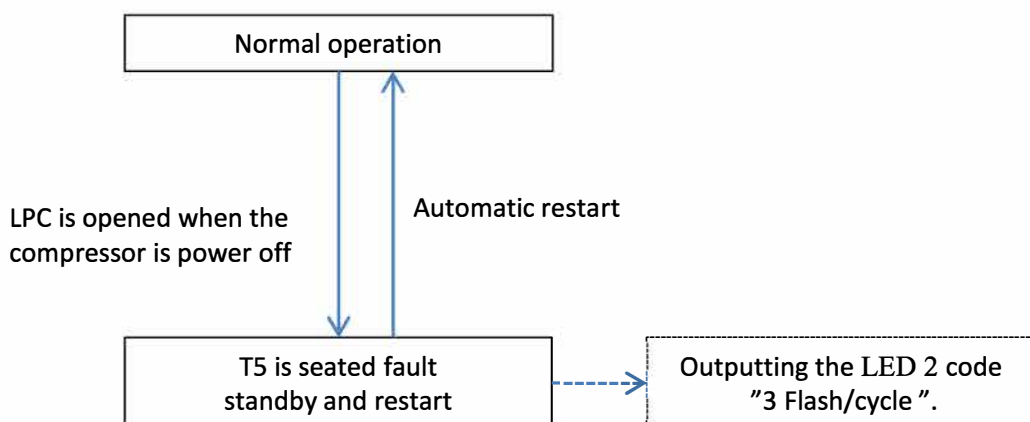
(1) T3 sensor not reading correctly in cooling



(2) T4 sensor not reading correctly

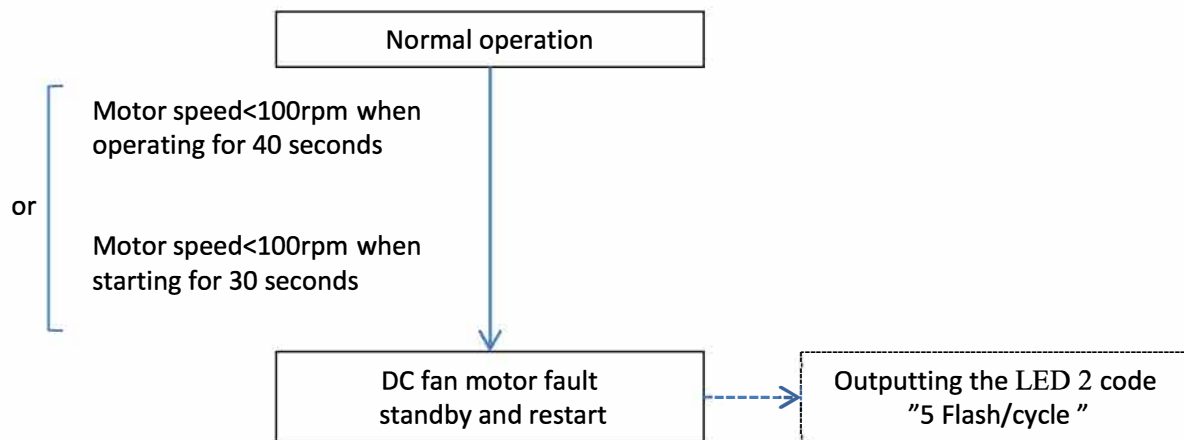


(3) LPC open



3.1.7 Unit protection control or restart :

(4) OFM Failure



3. Function and Control

3.1.8 Fault of Motor driver module :

No.	Operation LED	Protection code	Protection control description	Supposed cause
1	LED1	0.2S ON/0.2S OFF	Inter integrated circuit communication error	Main board is broken
2	LED1	1 Flash/cycle	Motor current error	Motor shaft is stuck or Motor is broken
3	LED1	2 Flash/cycle	Inverter module temperature error	Motor is broken
4	LED1	3 Flash/cycle	Dc bus voltage error	Check out the power supply
5	LED1	4 Flash/cycle	Motor parameter error	Main board is broken or motor type is wrong
6	LED1	5 Flash/cycle	Motor startup failure	Check out the Motor
7	LED1	6 Flash/cycle	Phase sequence error	Check out the Motor supply wiring

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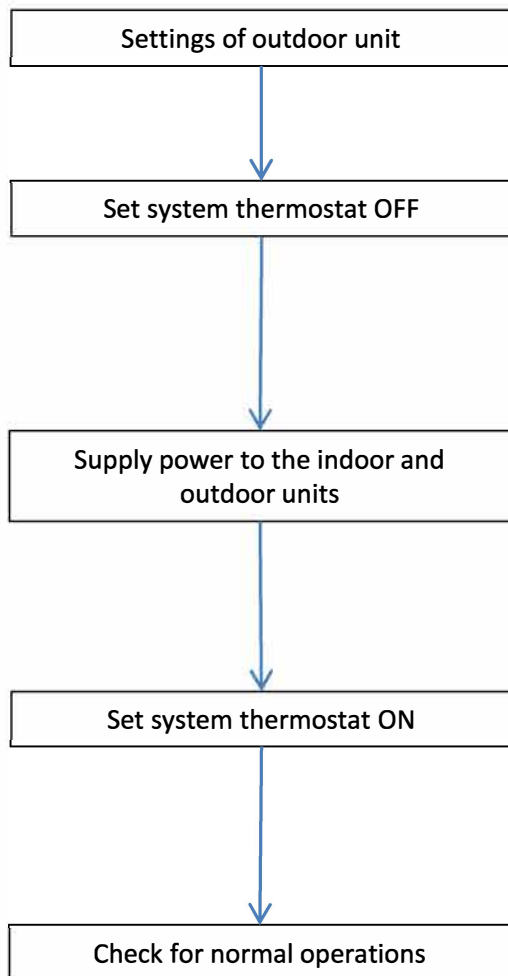
4.1 Test operation

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 Test 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 flash 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°F**

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 Test operation

4.1.3 Charging Refrigerant

(1) Charging method selection

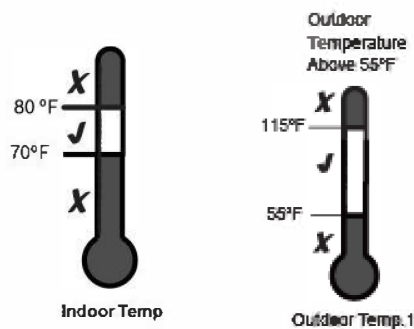
Weigh-in charging method

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°F.

Superheating charging method

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



Note: . When the temperature is $\geq 115^\circ\text{F}$, it must be charged by weighing

(2) Based charging (Condenser charging)

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

(3) 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.

4. Field settings

4.1 Test operation

(4) Method for charging mode

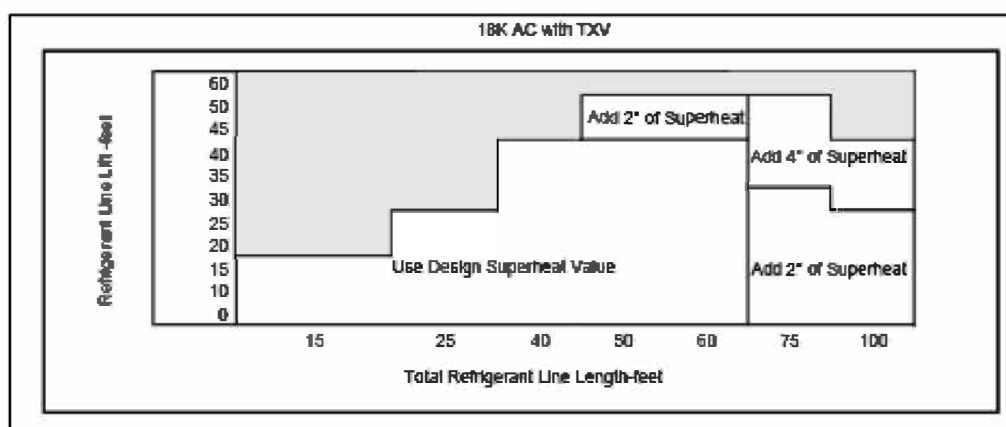
Design superheat with TXV (throttle)

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

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	16	11	6	5	5	5
110	18	13	8	5	5	5
105	20	15	10	5	5	5
100	23	17	13	7	5	5
95	25	20	15	9	5	5
90	27	22	17	12	5	5
85	29	24	19	14	8	5
80	25	20	16	11	7	5
75	22	18	14	9	5	5
70	22	18	13	8	5	5
65	21	17	13	8	5	5
60	20	16	12	7	5	5
55	19	15	11	5	5	5

Determine the final superheat value using total Line Length and Lift measured in 5.3 and the charts below



For more information, please go to read installation manual

4. Field settings

4.1 Test operation

(4) Method for charging mode

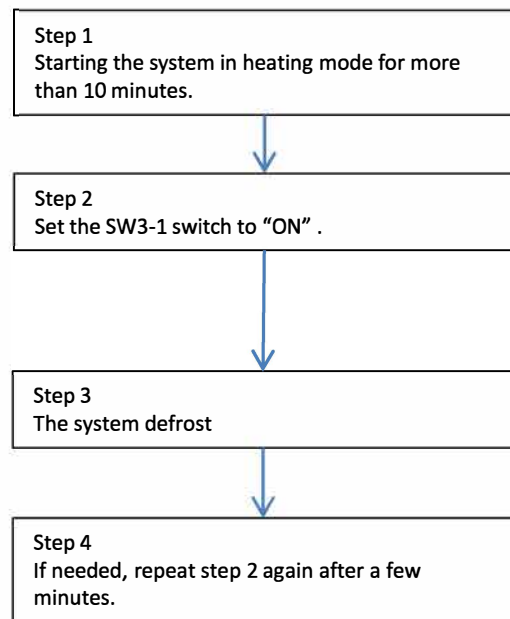
R410A Refrigerant Superheat Chart							
Suction Temp (°F)	Final Superheat (°F)						
	6	8	10	12	14	16	18
Suction Gauge Pressure (PSI)							
40	105	101	97	93	89	86	82
42	109	105	101	97	93	89	86
44	114	109	105	101	97	93	89
46	118	114	109	105	101	97	93
48	123	118	114	109	105	101	97
50	128	123	118	114	109	105	101
52	133	128	123	118	114	109	105
54	138	133	128	123	118	114	109
56	143	138	133	128	123	118	114
58	148	143	138	133	128	123	118
60	153	148	143	138	133	128	123
62	159	153	148	143	138	133	128
64	164	159	153	148	143	138	133
66	170	164	159	153	148	143	138
68	176	170	164	159	153	148	143
70	182	176	170	164	159	153	148
72	188	182	176	170	164	159	153

Notes:

1. If superheating is low, remove refrigerant. If superheating is high, add refrigerant.
2. If superheat >30°F, please check if there are abnormal condition for insulation, high humidity, high room temperature. Also check if discharge superheat>60 °F or there is fault code. Replace TXV if everything is normal.
3. If superheat <5°F, please check if there are abnormal on blower motor speed or low room temperature. Also check if discharge superheat<40 °F 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 Test operation

4.1.4 Manual defrost

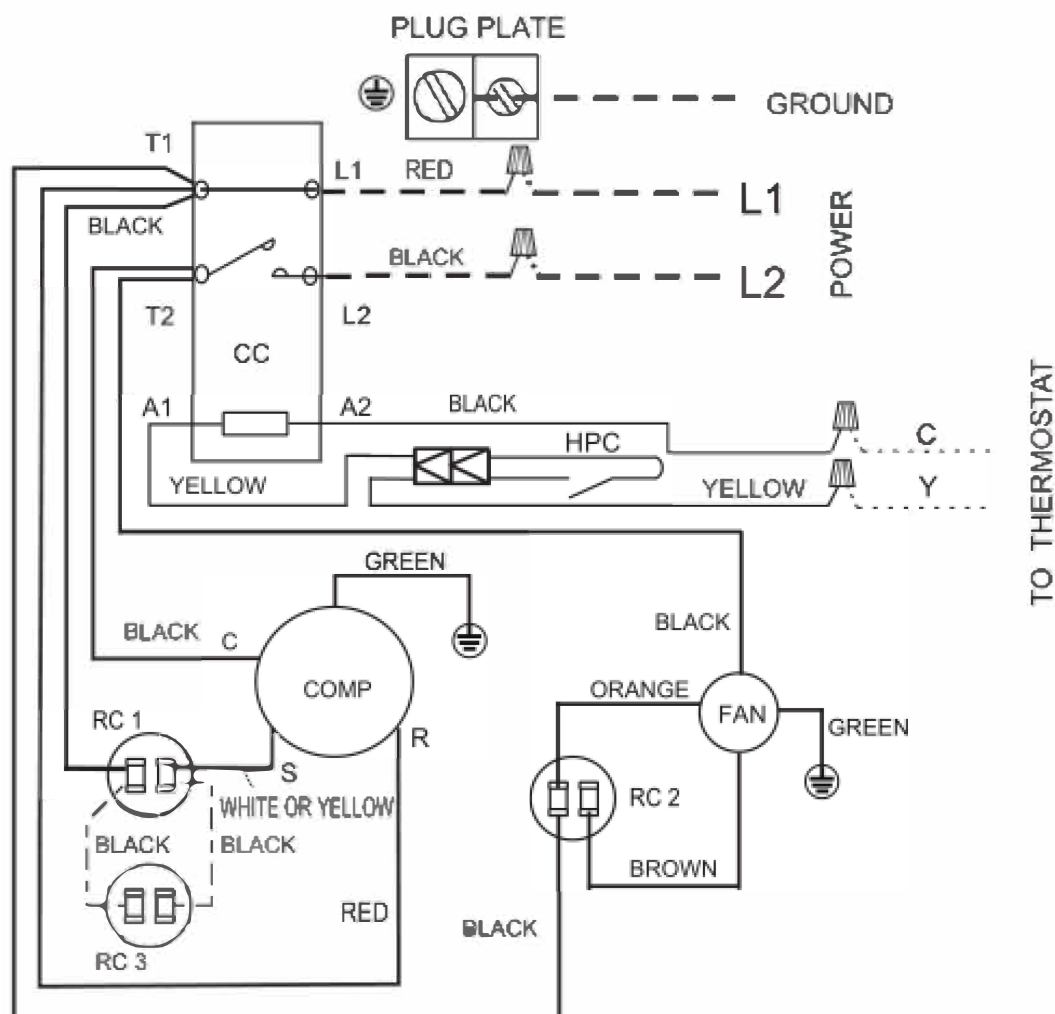


Note:
Defrost will exit automatically.

4. Field settings

4.2 Field setting

4.2.1 Setting by DIP switches---13.4AC 42/48/60K



LINE VOLTAGE

FACTORY STANDARD ————
 FIELD INSTALLED
 FACTORY OPTIONAL - - - -

LOW VOLTAGE

FACTORY STANDARD ————
 FIELD INSTALLED
 FACTORY OPTIONAL - - - -

USE COPPER CONDUCTORS ONLY

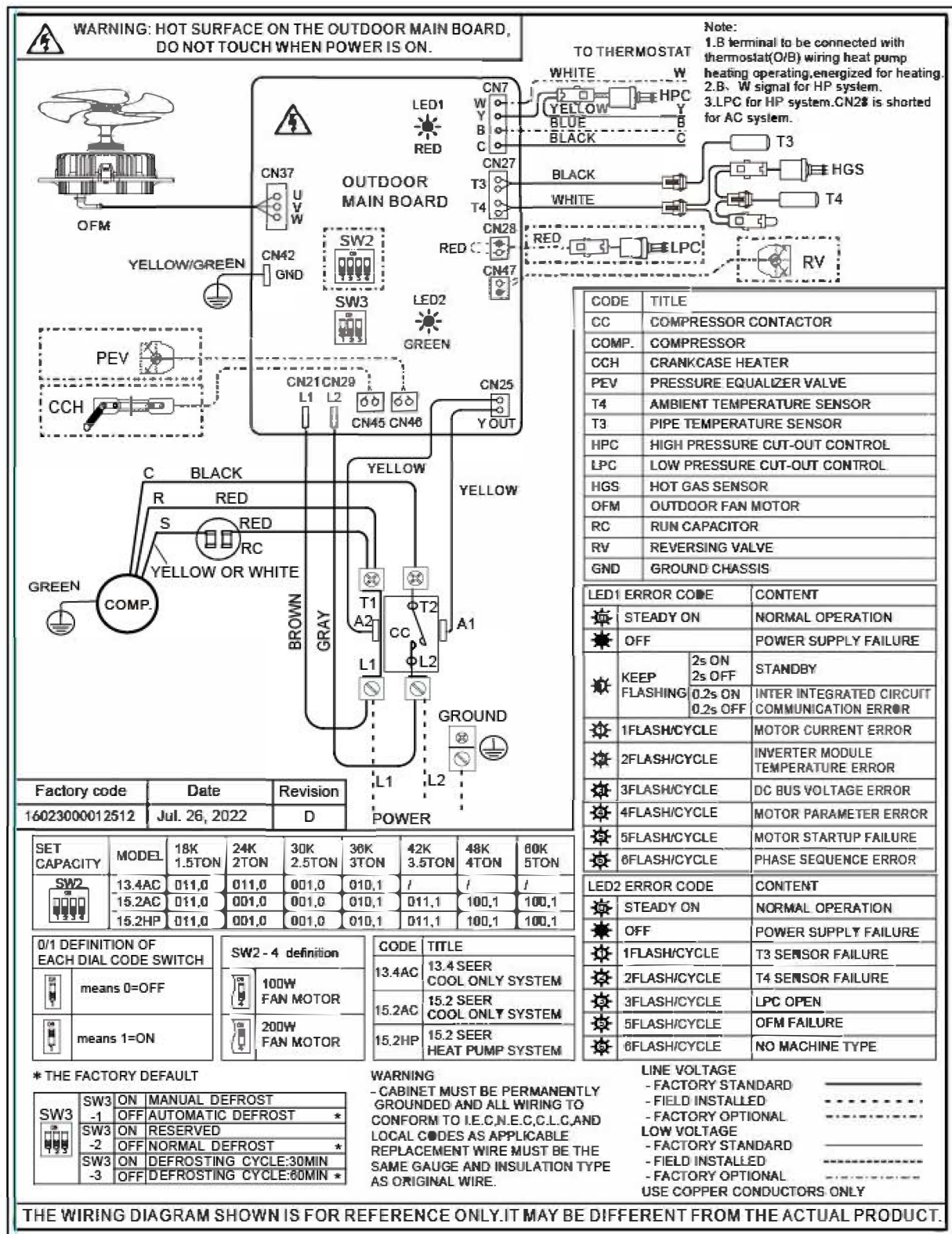
HPC HIGH PRESSURE CUT-OUT CONTROL
 CC COMPRESSOR CONTACTOR
 COMP COMPRESSOR
 RC 1 RUN CAPACITOR 1
 RC 2 RUN CAPACITOR 2
 RC 3 RUN CAPACITOR 3

WARNING: CABINET MUST BE PERMANENTLY GOUNDED AND ALL WIRING TO CONFORM TO I.E.C.,N.E.C.,C.E.C.,C.L.C.,AND LOCAL CODES AS APPLICABLE REPLACEMENT WIRE MUST BE THE SAME GAUGE AND INSULATION TYPE AS ORIGINAL WIRE

4. Field settings

4.2 Field setting

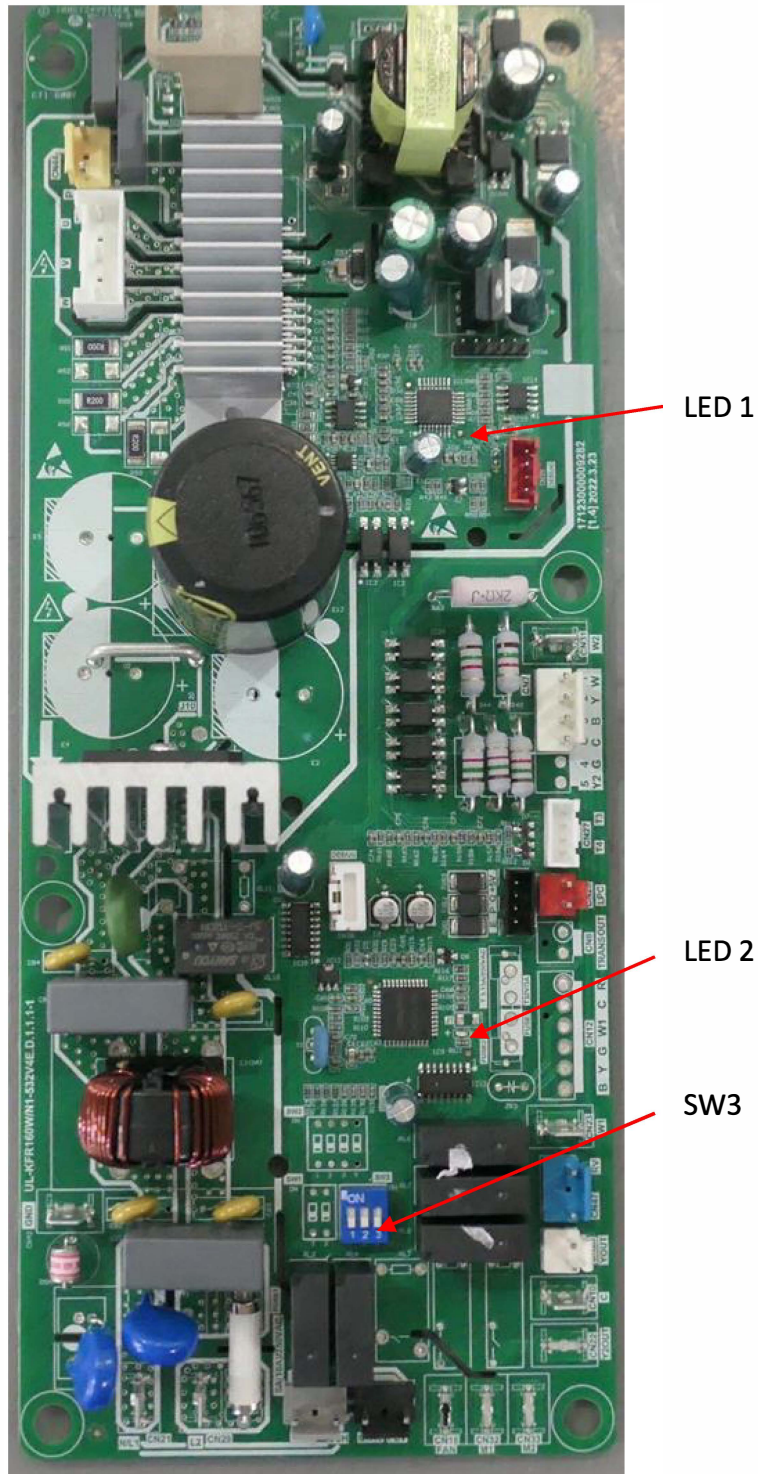
4.2.1 Setting by DIP switches---4/5TON



4. Field settings

4.2 Field setting

4.2.2 DIP switch position indication ---2/3TON

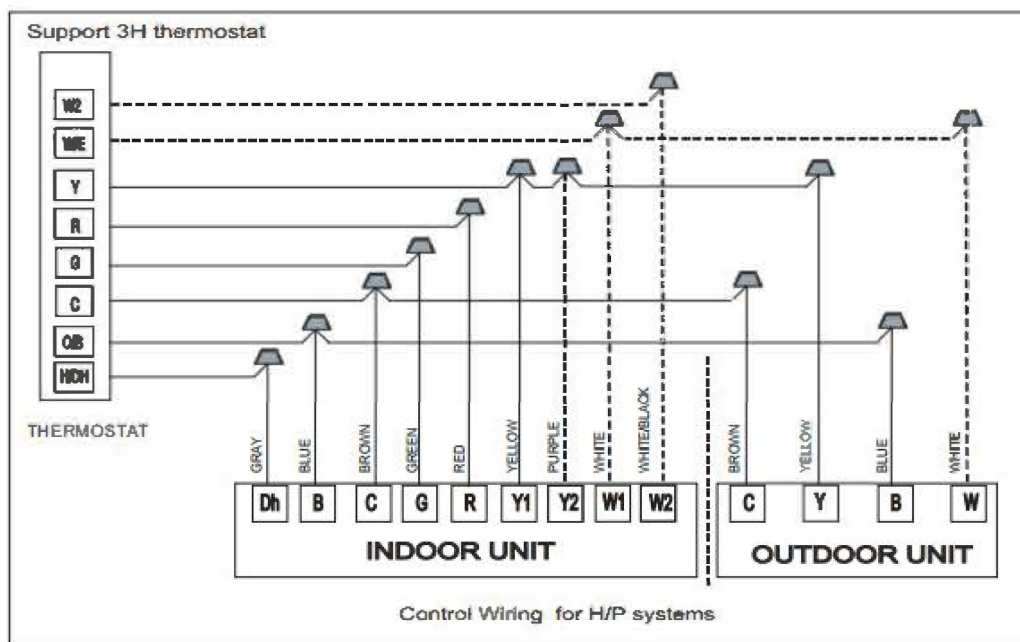
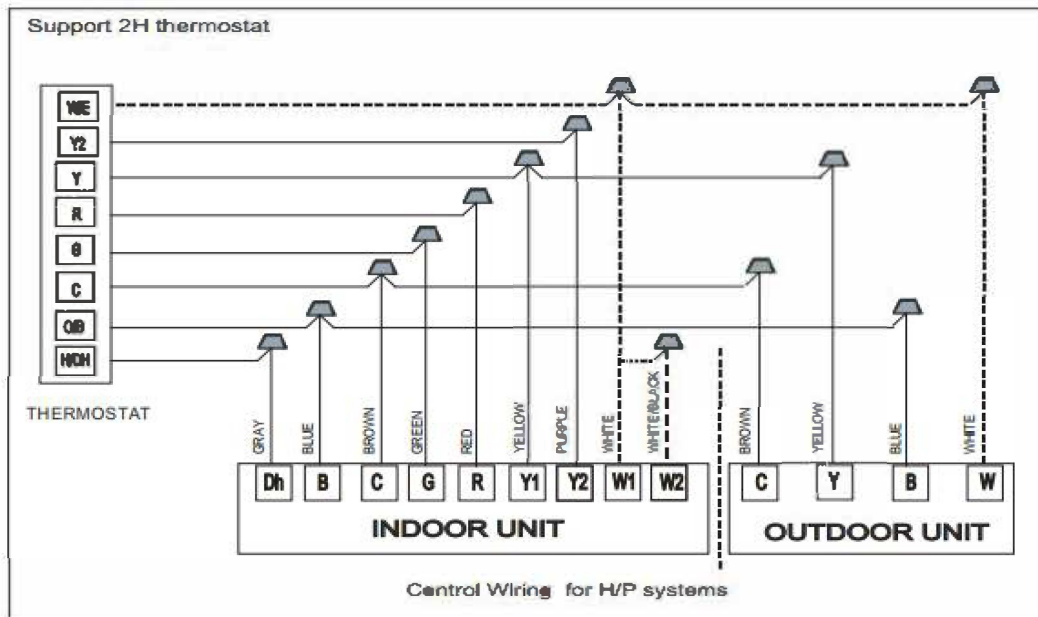


4. Field settings

4.3 Thermostat

4.3.1 Control wiring

Note: B signal need thermostat programming settings.



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.

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5. Intelligent Troubleshooting

5.1 diagnosis system introduction

There are two types of auxiliary diagnosis code in system: Main board code and Motor driver module code

5.1.1 Fault of Main board

No.	Operation LED	Protection code	Protection control description	Supposed cause
1	LED2	1 Flash/cycle	T3 sensor not reading correctly in cooling	T3 sensor is not properly placed/High pressure switch fault
2	LED2	2 Flash/cycle	T4 sensor not reading correctly	T4 sensor is not properly placed/High pressure switch fault/ Discharge temp. switch open
3	LED2	3 Flash/cycle	Low pressure switch not reading correctly	Low pressure switch is not properly connected.
4	LED2	5 Flash/cycle	DC fan motor fault	Motor fault/severe weather (fan rpm too low due to wind)
5	LED2	6 Flash/cycle	No machine type	Speed message isn't wrote in main board

5.1.2 Fault of Motor driver module :

No.	Operation LED	Protection code	Protection control description	Supposed cause
1	LED1	0.2S ON/0.2S OFF	Inter integrated circuit communication error	Main board is broken
2	LED1	1 Flash/cycle	Motor current error	Motor shaft is stuck or Motor is broken
3	LED1	2 Flash/cycle	Inverter module temperature error	Motor is broken
4	LED1	3 Flash/cycle	Dc bus voltage error	Check out the power supply
5	LED1	4 Flash/cycle	Motor parameter error	Main board is broken or motor type is wrong
6	LED1	5 Flash/cycle	Motor startup failure	Check out the Motor
7	LED1	6 Flash/cycle	Phase sequence error	Check out the Motor supply wring

Note:

1. These fault codes will be displayed on the digital tube until the issue is resolved.

5.2 Symptom-based Troubleshooting

5.2.1 LED1/LED2 OFF

Issue	LED1/LED2 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



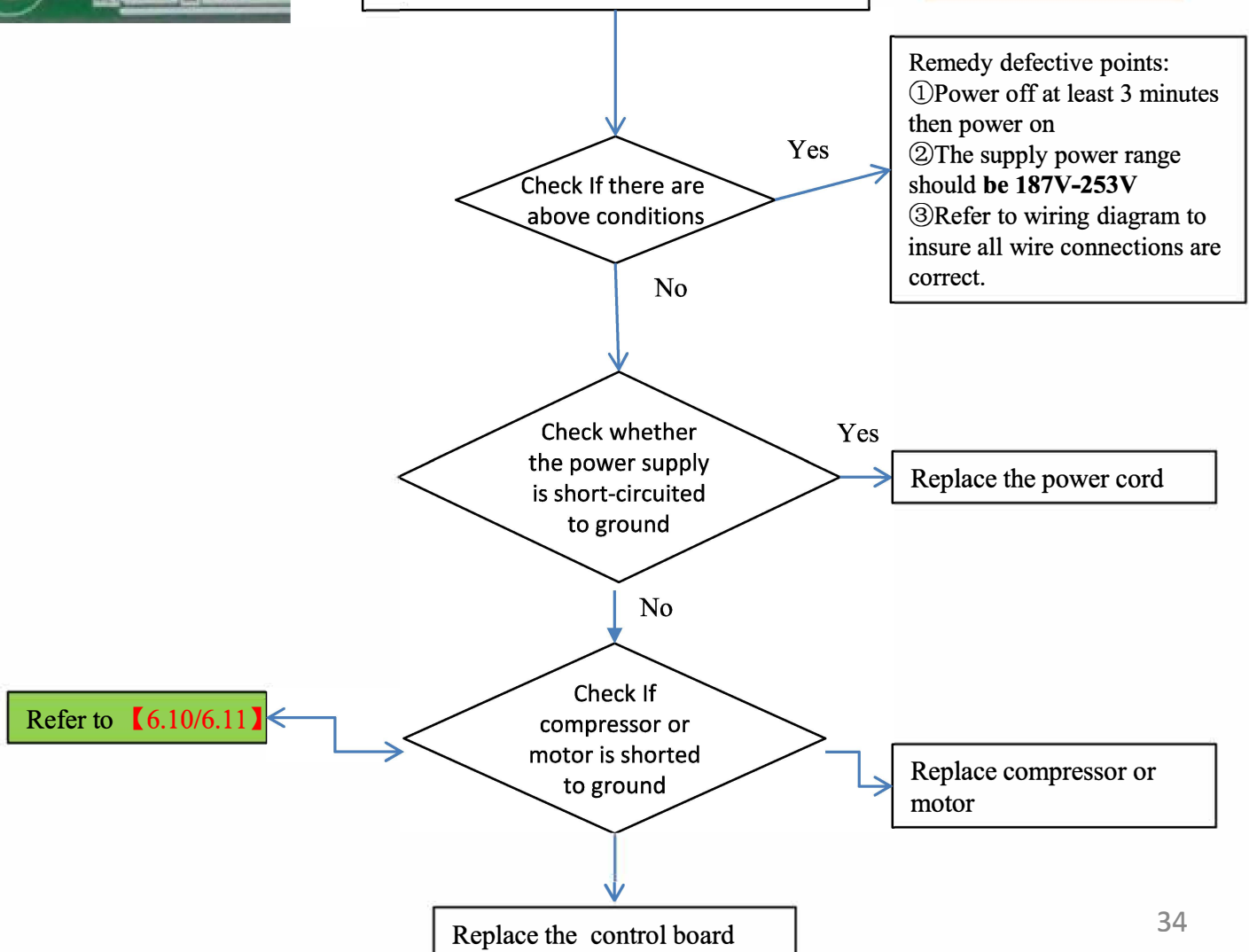
Check for the following 4 points:
 ① If frequently power off and power on (within 3 minutes)
 ② If the supply power is normal
 ③ If wiring diagram to insure all wire

Note:

- ① to ①
- ② to ②

The same below

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



5.2 Symptom-based Troubleshooting

5.2.2 System does not start operation

Issue	System does not start operation
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

- ①--
- ②Refer to wiring diagram
- ③Measure the voltage between YC and BC
- ④ Refer to wiring diagram



Check for the following 4 points:

- ①The thermostat doesn't start
- ②Wrong wire connections
- ③No 24Vac output (Check if there is 18-28Vac and 0Vdc between Y&C、 B&C)
- ④Compressor wire disconnected

Check if there are above 4 conditions

Yes

No

Remedy defective points:

- ①Start the thermostat
- ②correct the connections
- ③Replace the thermostat
- ④Connect the compressor wire

Power off and wait at least 3 minutes then power on

Cooling:40~120°F
Heating:5~86°F

If there are above conditions

Yes

No need to have service

No

If T4 sensor failed

Replace the T4 sensor

No

If T4 sensor failed

Replace the T4 sensor

No

Run Normally

Refer to 【 6.6 】

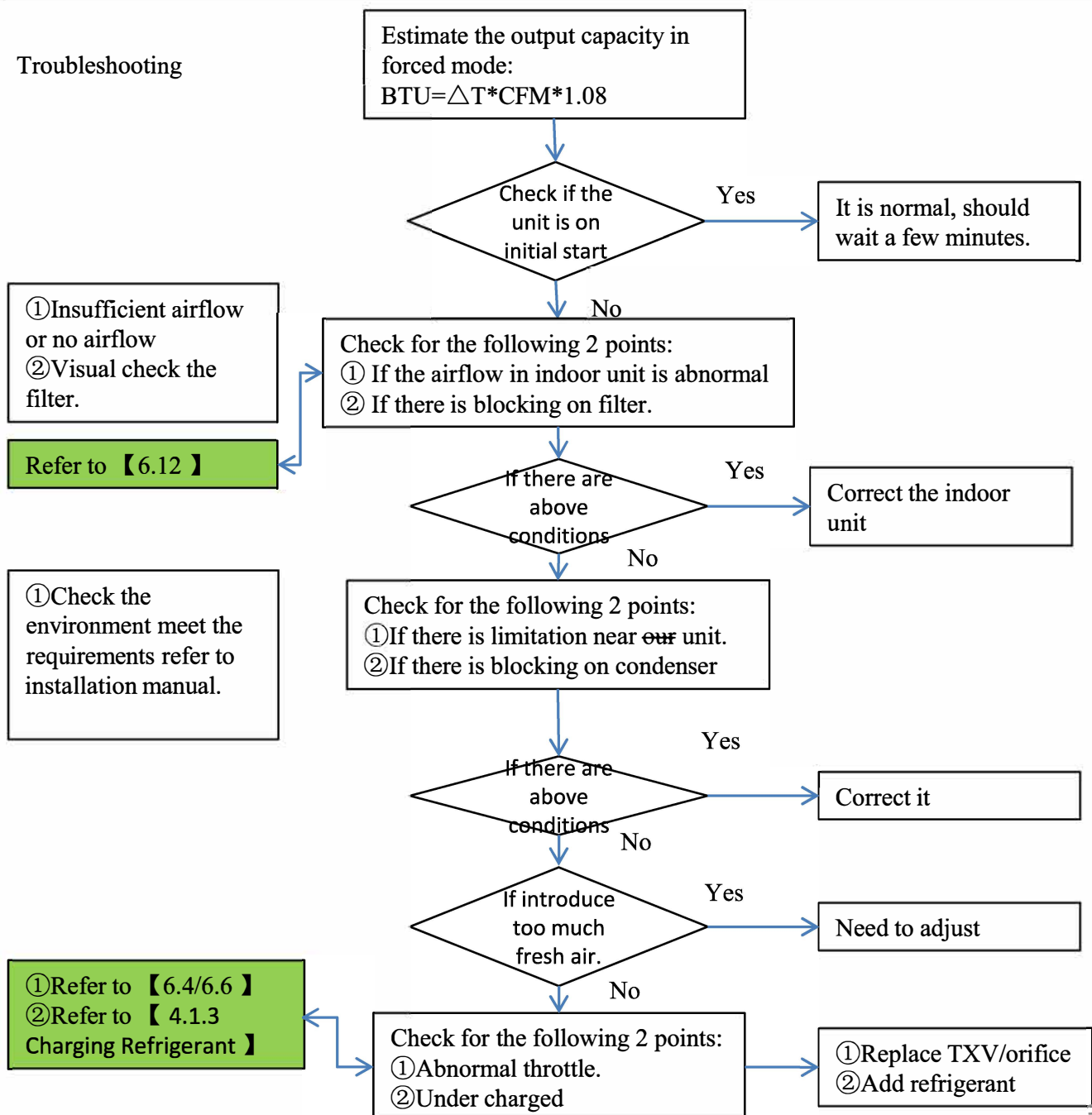
Refer to 【 6.7 】

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

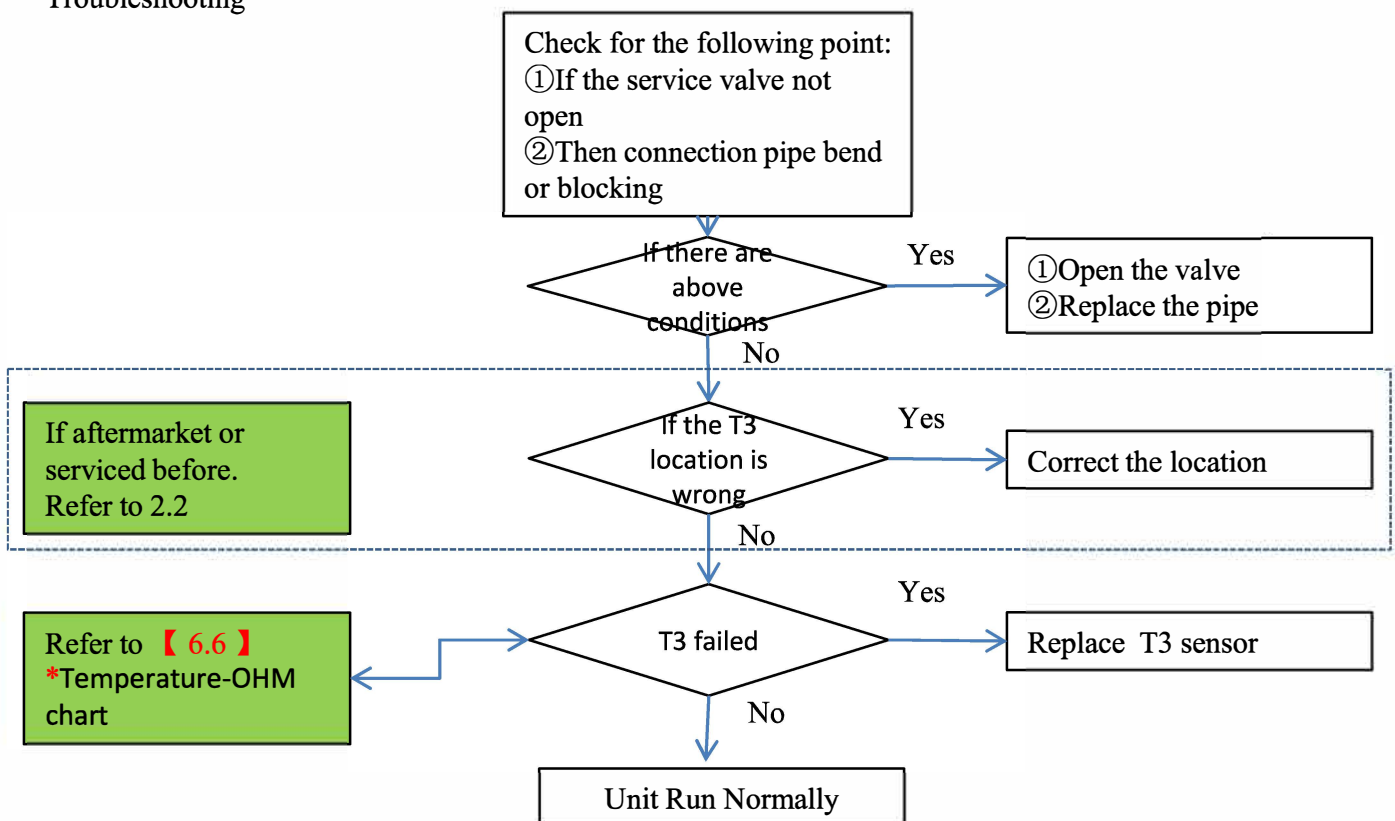


5.3 Troubleshooting by Main board Fault code

5.3.1 LED2-1 Flash/cycle

Faulty code	LED2-1 Flash/cycle
Model	All
Name	T3 sensor not reading correctly in cooling
Classify	System fault
Possible cause	• Wrong location of T3 sensor • Faulty T3 sensor • Service valves not open

Troubleshooting

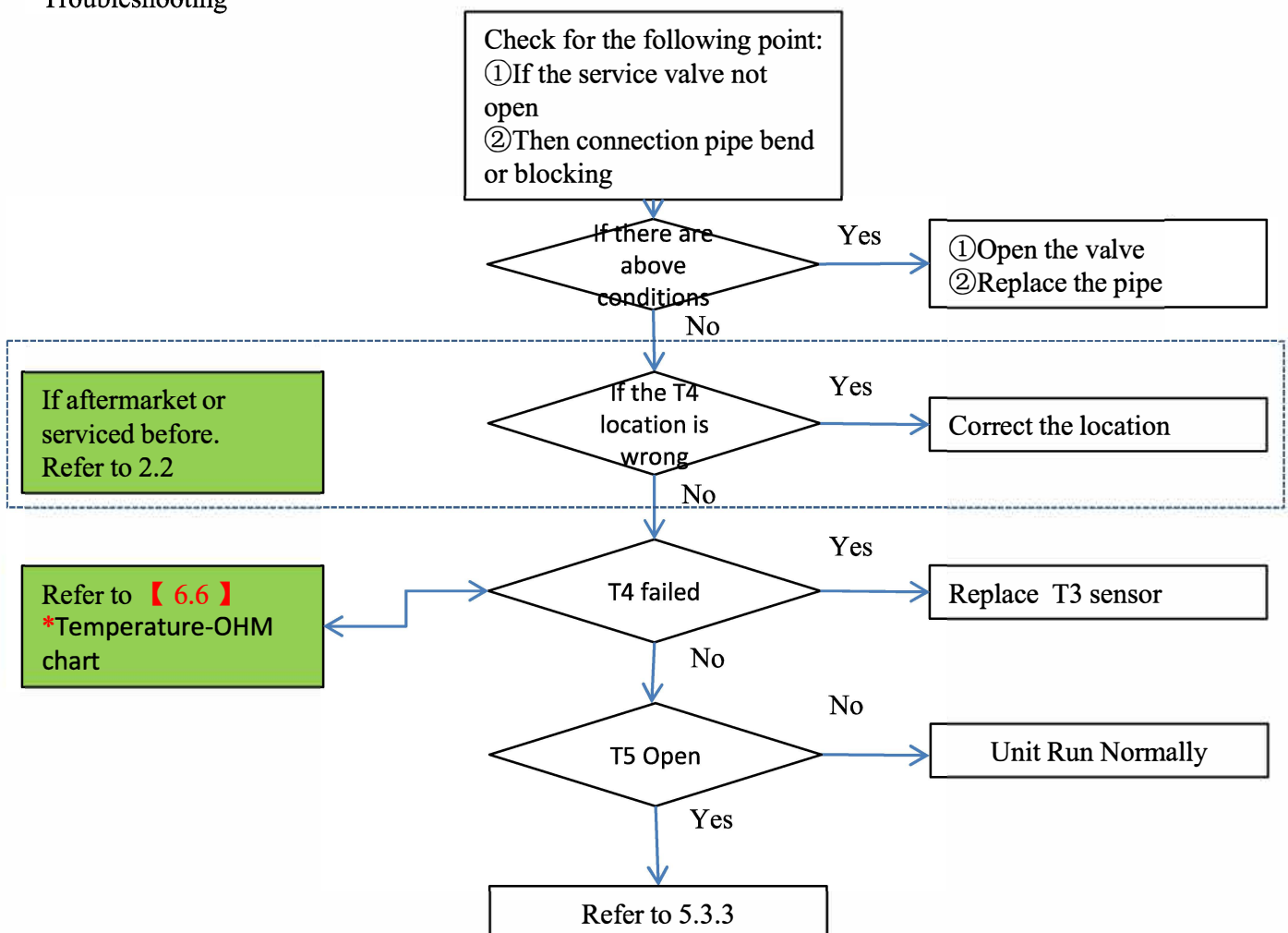


5.3 Troubleshooting by Main board Fault code

5.3.2 LED2-2 Flash/cycle

Faulty code	LED2-2 Flash/cycle
Model	All
Name	T4 sensor not reading correctly/Discharge Temperature switch (T5)open
Classify	System fault
Possible cause	• Wrong location of T4 sensor • Faulty T4 sensor • Discharge Temperature switch open

Troubleshooting

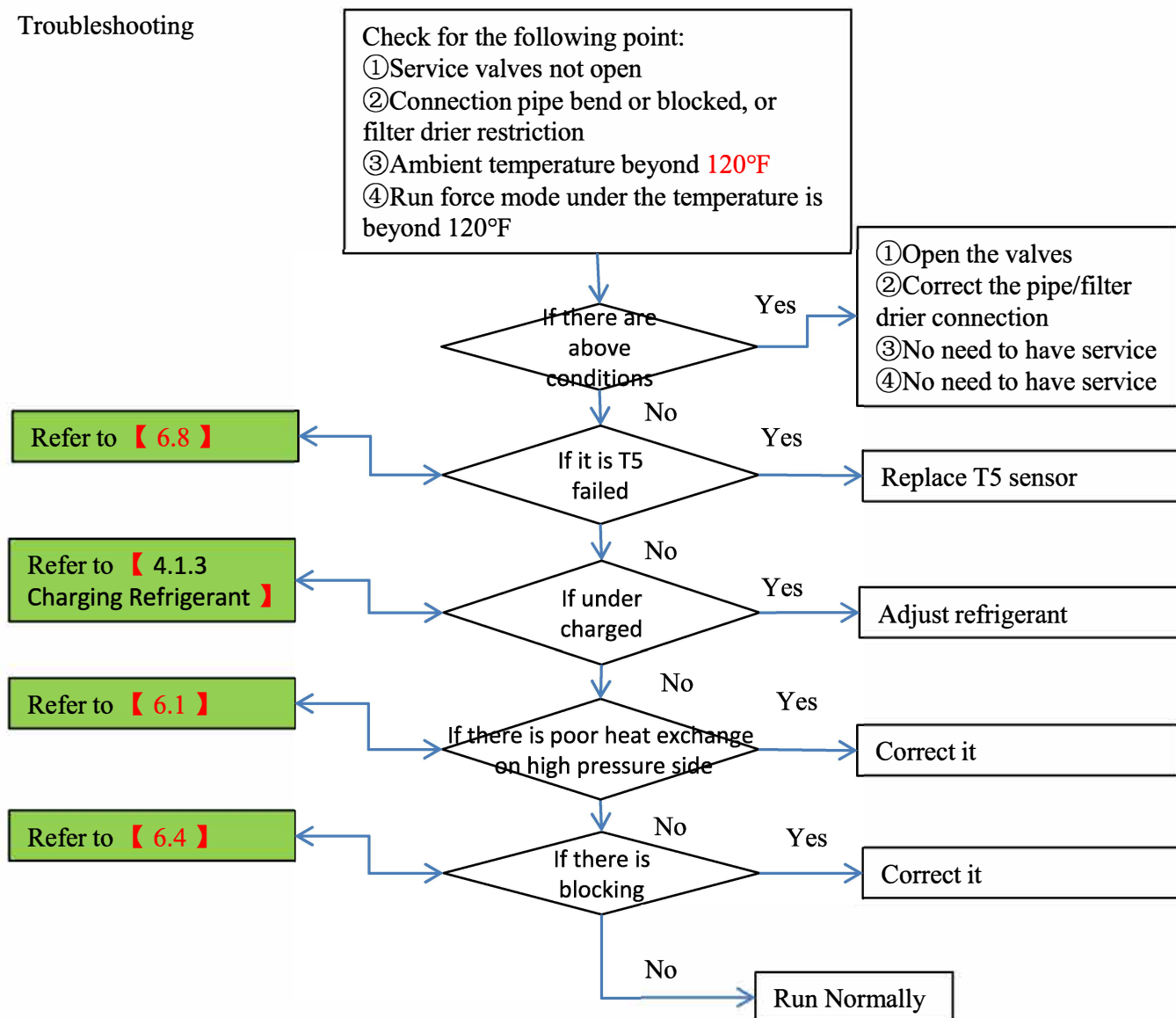


5.3 Troubleshooting by Main board Fault code

5.3.3 LED2-2 Flash/cycle

Faulty code	LED2-2 Flash/cycle
Model	All
Name	Compressor discharge temperature (T5) protection
Classify	System fault
Possible cause	• TXV/EEV/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

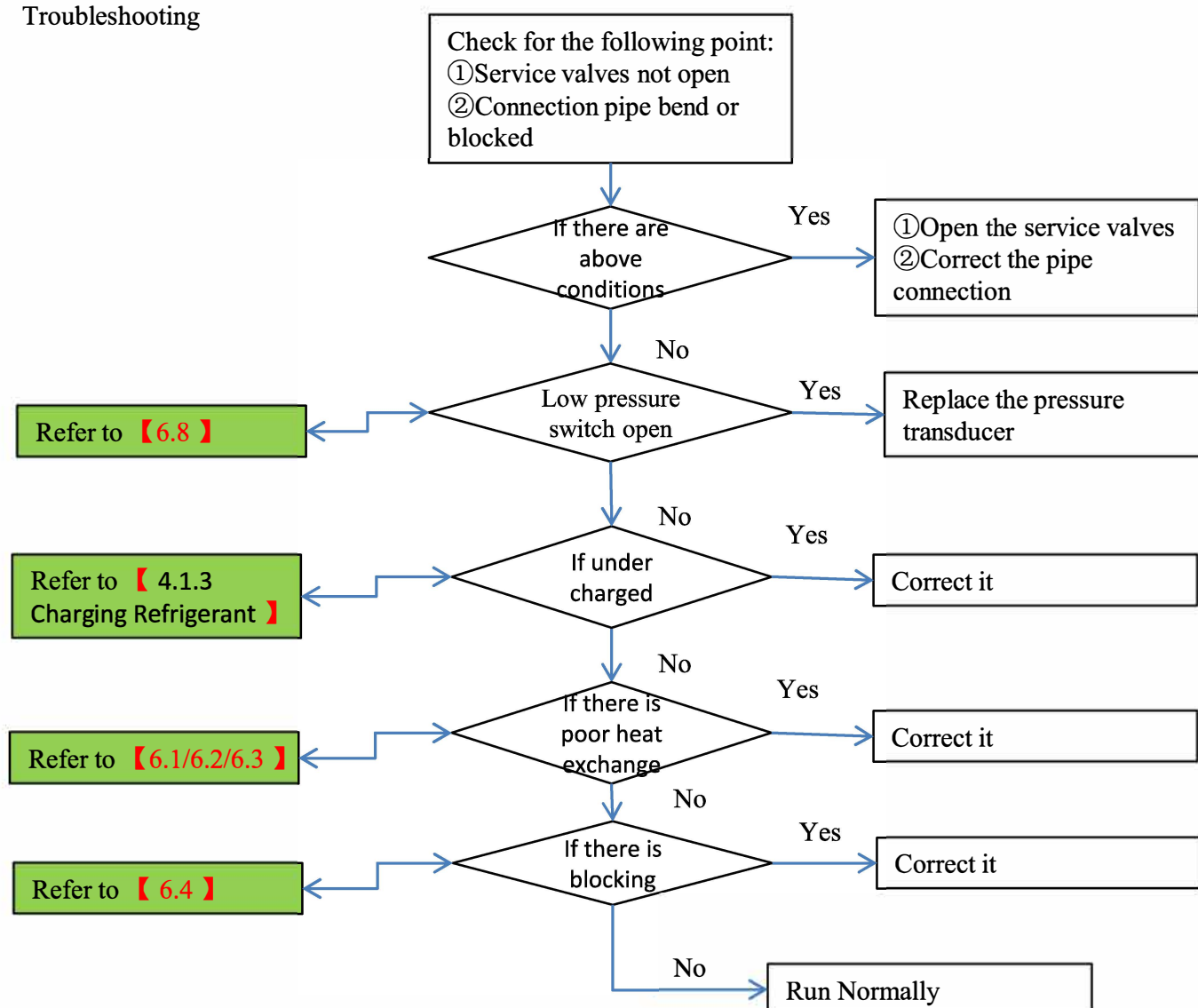


5.3 Troubleshooting by Main board Fault code

5.3.4 LED2-3 Flash/cycle

Faulty code	LED2-3 Flash/cycle
Mode	All
Name	Low pressure protection
Classify	System fault
Possible cause	- Indoor unit motor stopped abnormally / poor heat exchange TXV/EEV/filter drier/indoor coil blocked - Service valves not open - Under charged

Troubleshooting

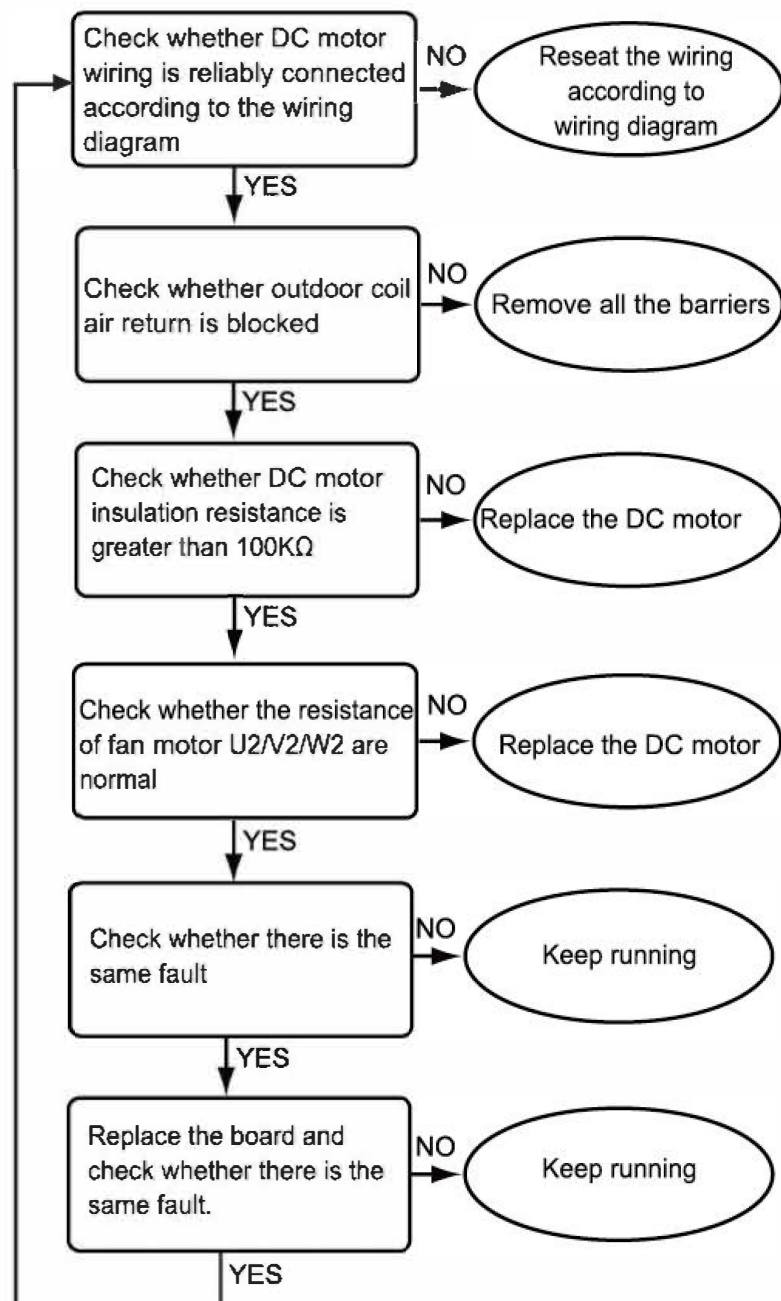
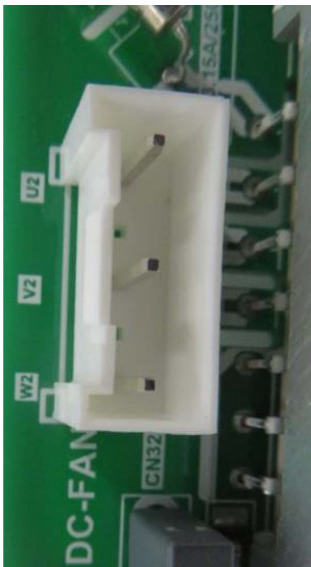


5.3 Troubleshooting by Main board Fault code

5.3.5 LED2-5 Flash/cycle

Faulty code	LED2-5 Flash/cycle
Model	All
Name	DC fan motor fault
Classify	Electric issue
Possible cause	- Start electromagnetic interference - Motor failed - Electric issue

Troubleshooting



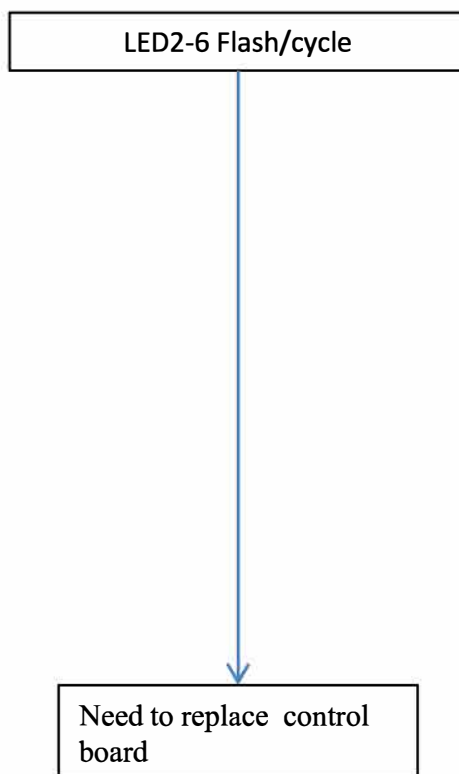
Refer to **【6. 10】**

5.3 Troubleshooting by Main board Fault code

5.3.5 LED2-6 Flash/cycle

Faulty code	LED2-6 Flash/cycle
Model	All
Name	No machine type
Classify	Electric issue
Possible cause	• Speed message isn't wrote in main board • Control board broken

Troubleshooting

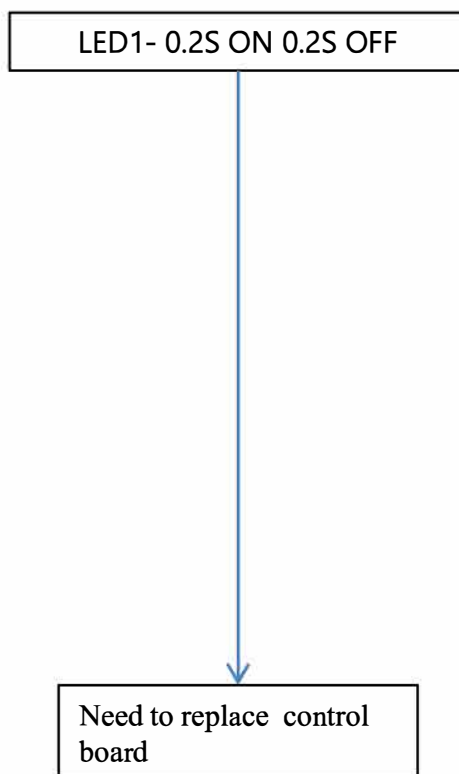


5.4 Troubleshooting by Motor driver module code

5.4.1 LED1- 0.2S ON 0.2S OFF

Faulty code	LED1- 0.2S ON 0.2S OFF
Model	all
Name	Inter integrated circuit communication error fault
Classify	Electric issue
Possible cause	• Motor driver module poor contact • Control board broken

Troubleshooting

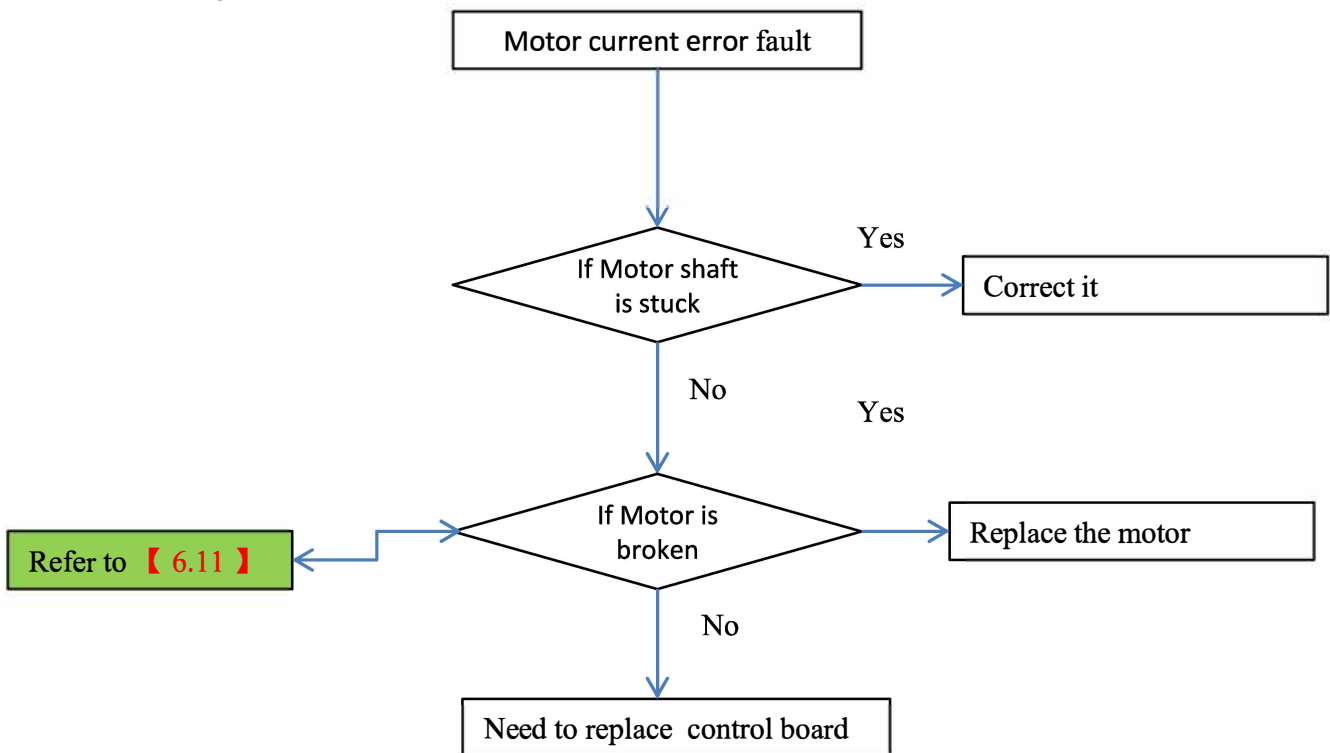


5.4 Troubleshooting by Motor driver module code

5.4.2 LED1--1 Flash/cycle

Faulty code	LED1--1 Flash/cycle
Model	all
Name	Motor current error fault
Classify	Electric issue
Possible cause	• Motor shaft stuck • Motor broken • Control board broken

Troubleshooting

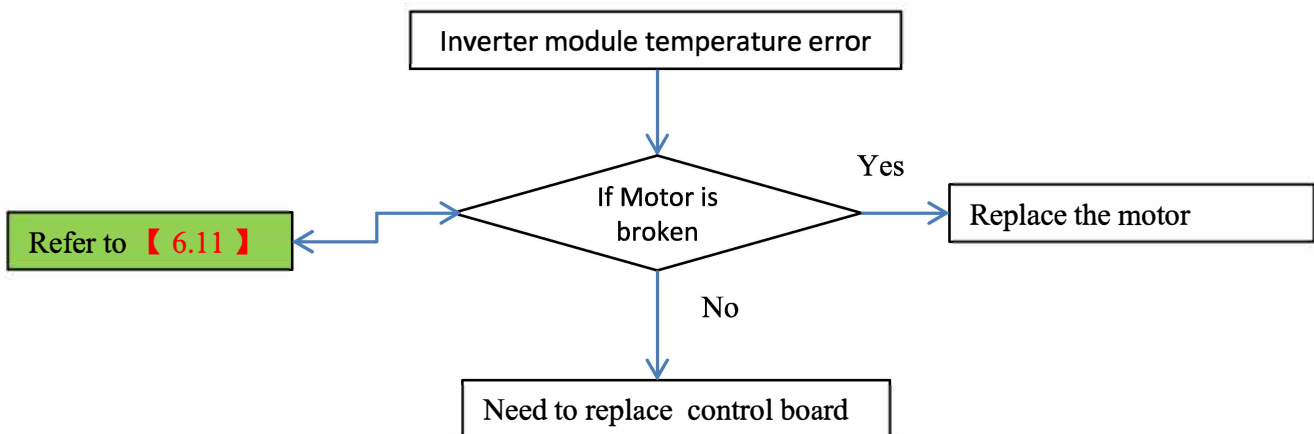


5.4 Troubleshooting by Motor driver module code

5.4.3 LED1--2 Flash/cycle

Faulty code	LED1—2 Flash/cycle
Model	all
Name	Inverter module temperature error
Classify	Electric issue
Possible cause	• Motor is broken • Control board broken

Troubleshooting

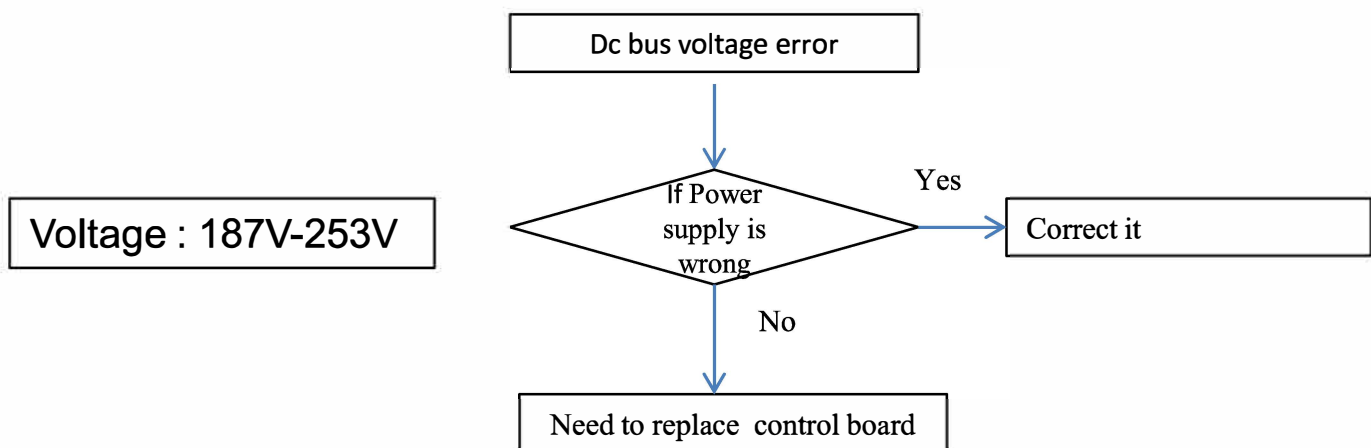


5.4 Troubleshooting by Motor driver module code

5.4.4 LED1--3 Flash/cycle

Faulty code	LED1—3 Flash/cycle
Model	all
Name	Dc bus voltage error
Classify	Electric issue
Possible cause	• Power supply wrong • Control board broken

Troubleshooting

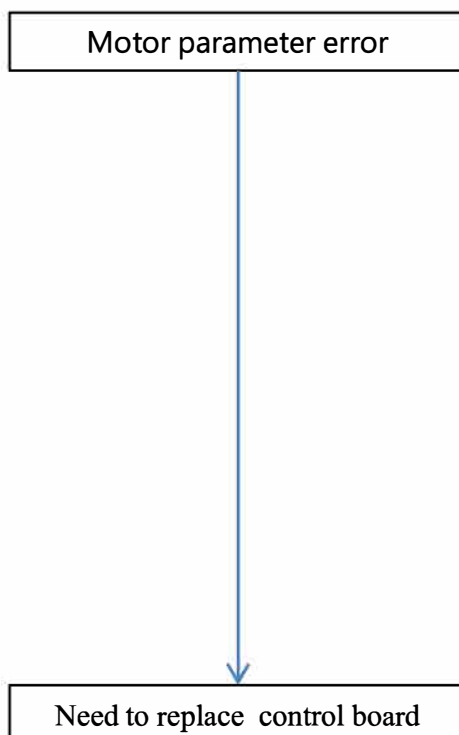


5.4 Troubleshooting by Motor driver module code

5.4.5 LED1--4 Flash/cycle

Faulty code	LED1—4 Flash/cycle
Model	all
Name	Motor parameter error
Classify	Electric issue
Possible cause	• Control board broken

Troubleshooting

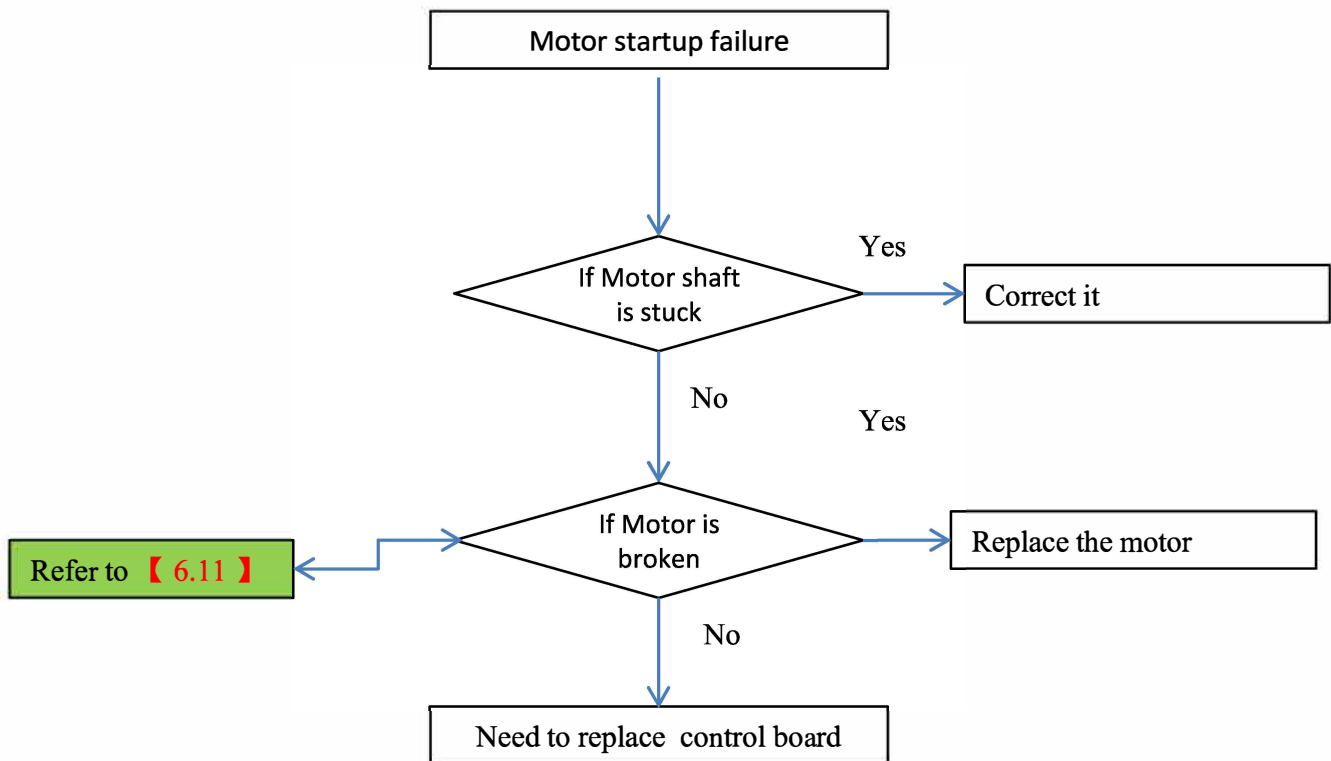


5.4 Troubleshooting by Motor driver module code

5.4.6 LED1--5 Flash/cycle

Faulty code	LED1—5 Flash/cycle
Model	all
Name	Motor startup failure
Classify	Electric issue
Possible cause	• Motor broken • Motor shaft stuck • Control board broken

Troubleshooting

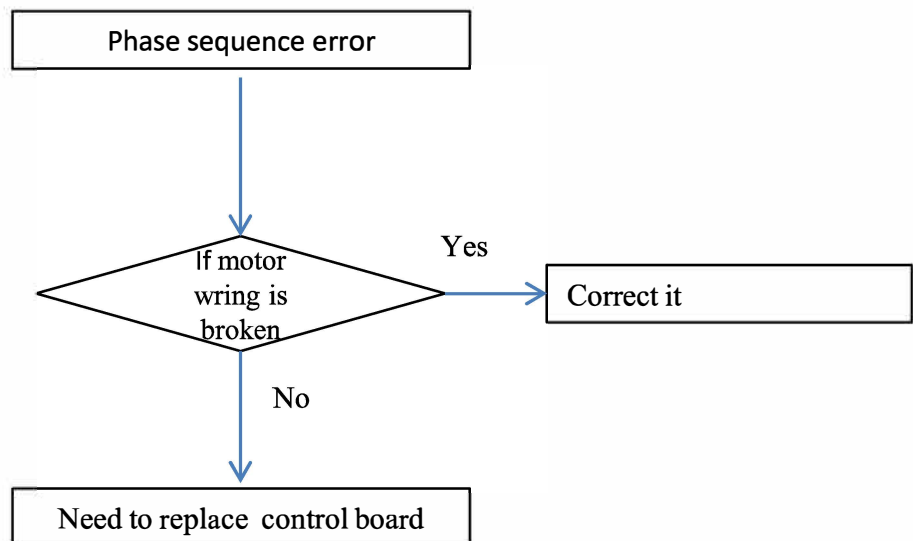


5.4 Troubleshooting by Motor driver module code

5.4.7 LED1--6 Flash/cycle

Faulty code	LED1—6 Flash/cycle
Model	all
Name	Phase sequence error
Classify	Electric issue
Possible cause	• Motor wiring broken • Control board broken

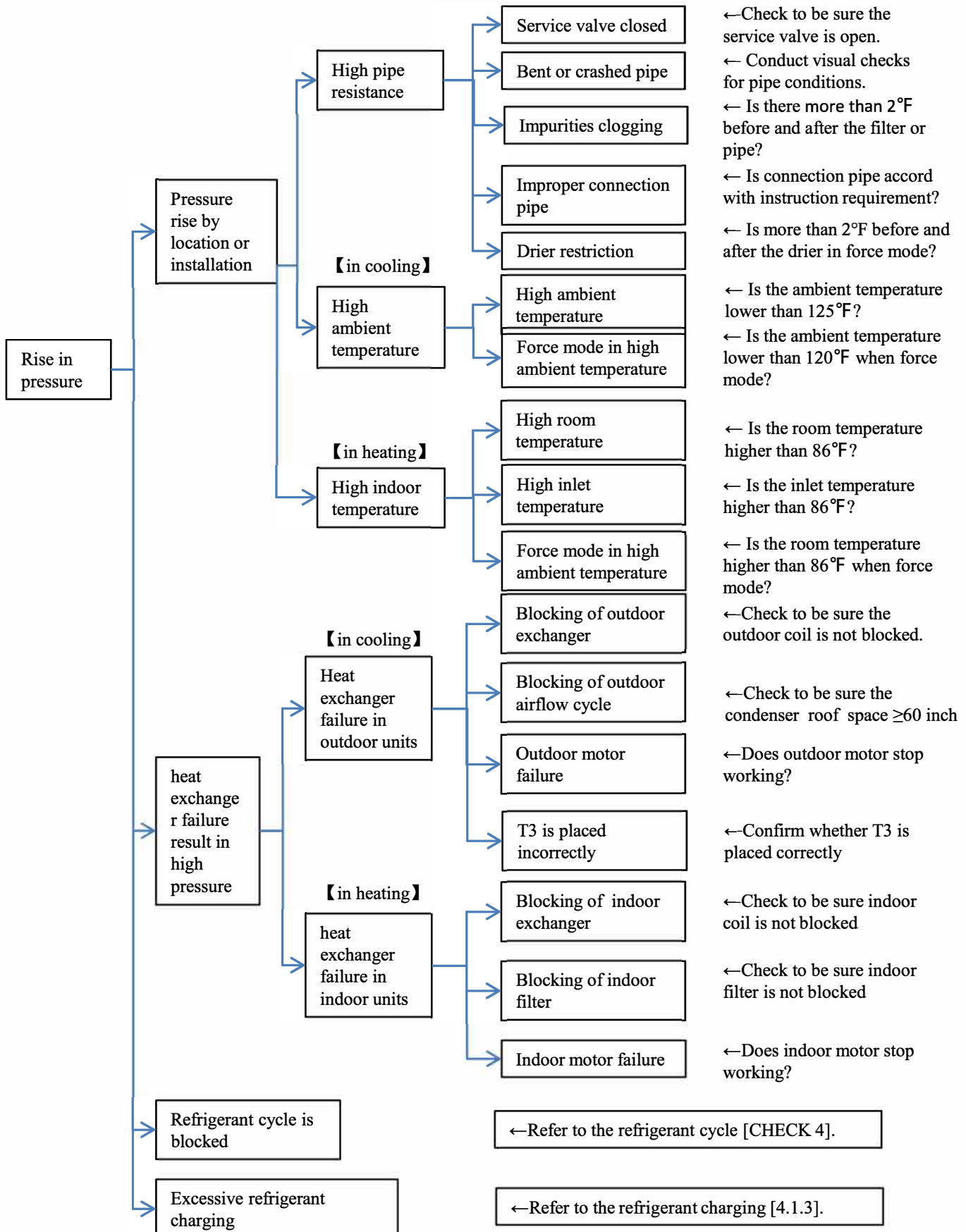
Troubleshooting



PART 6	Check	50
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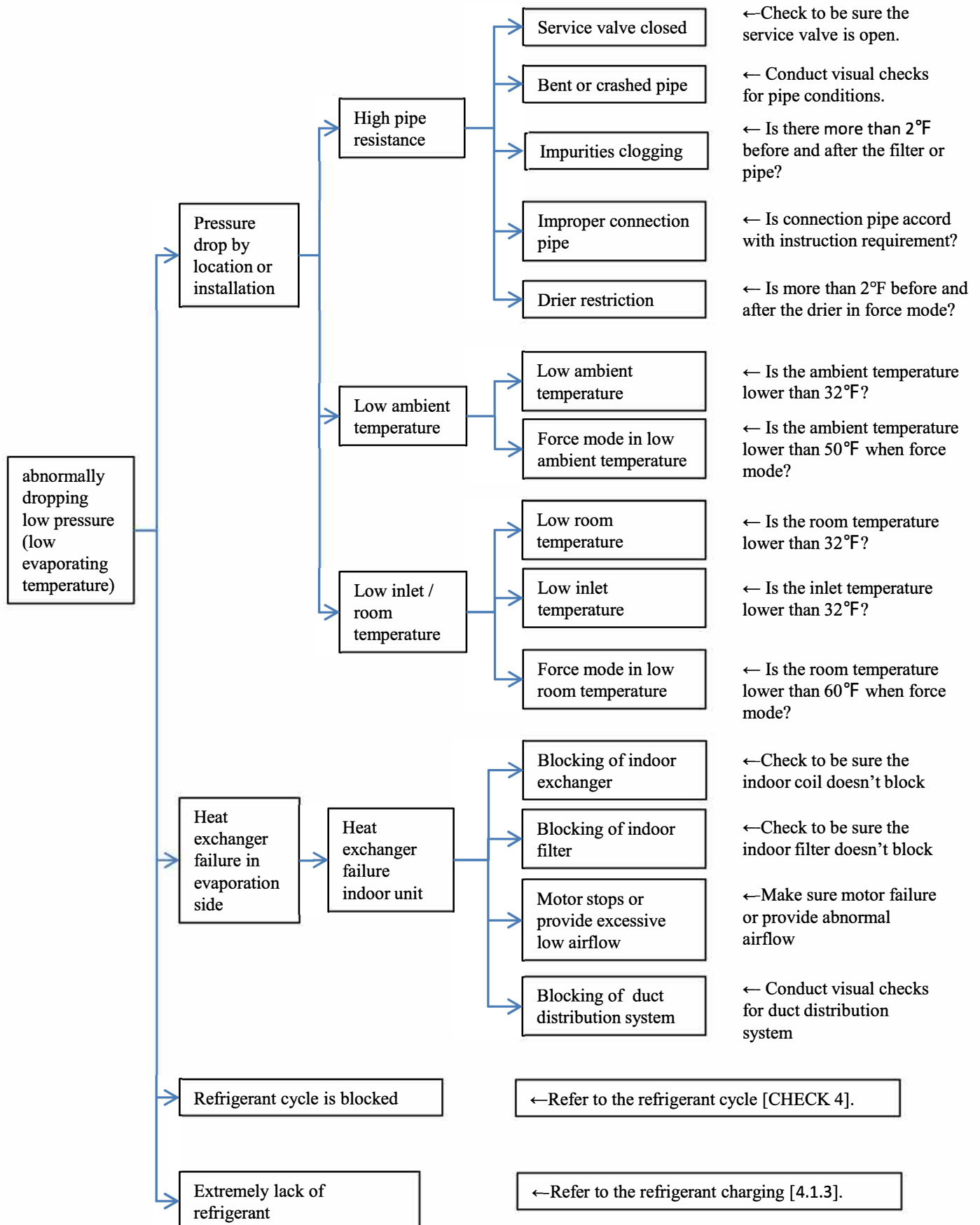
CHECK 1**6.1 Check for Causes of Rise in High Pressure**

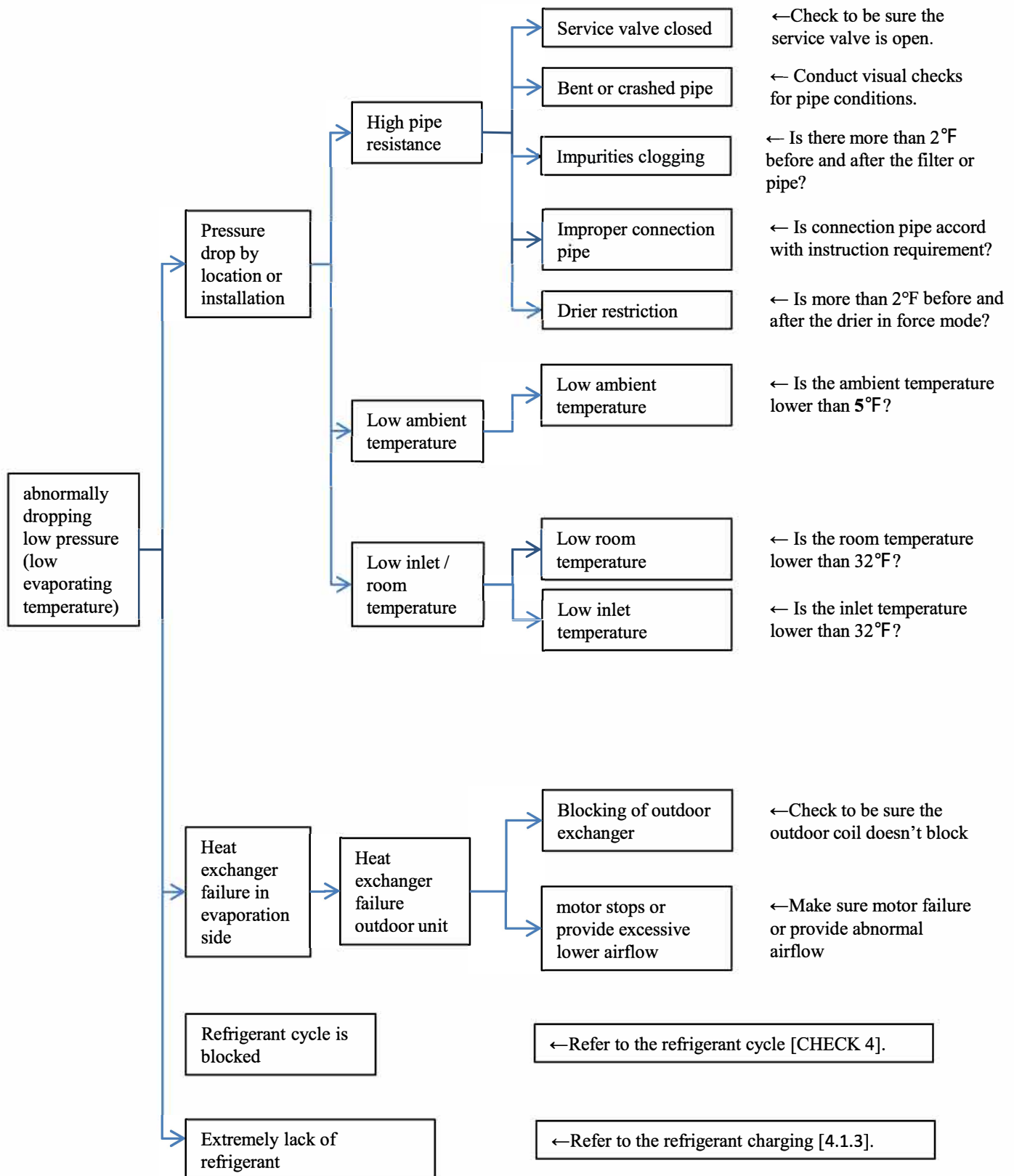
Note: 310-380PSIG head pressure is normal for heating in normal conditions operation. The pressure may be as high as 440PSIG at 40°F outdoor temperature or higher. Start-up or return oil stages during heating.



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

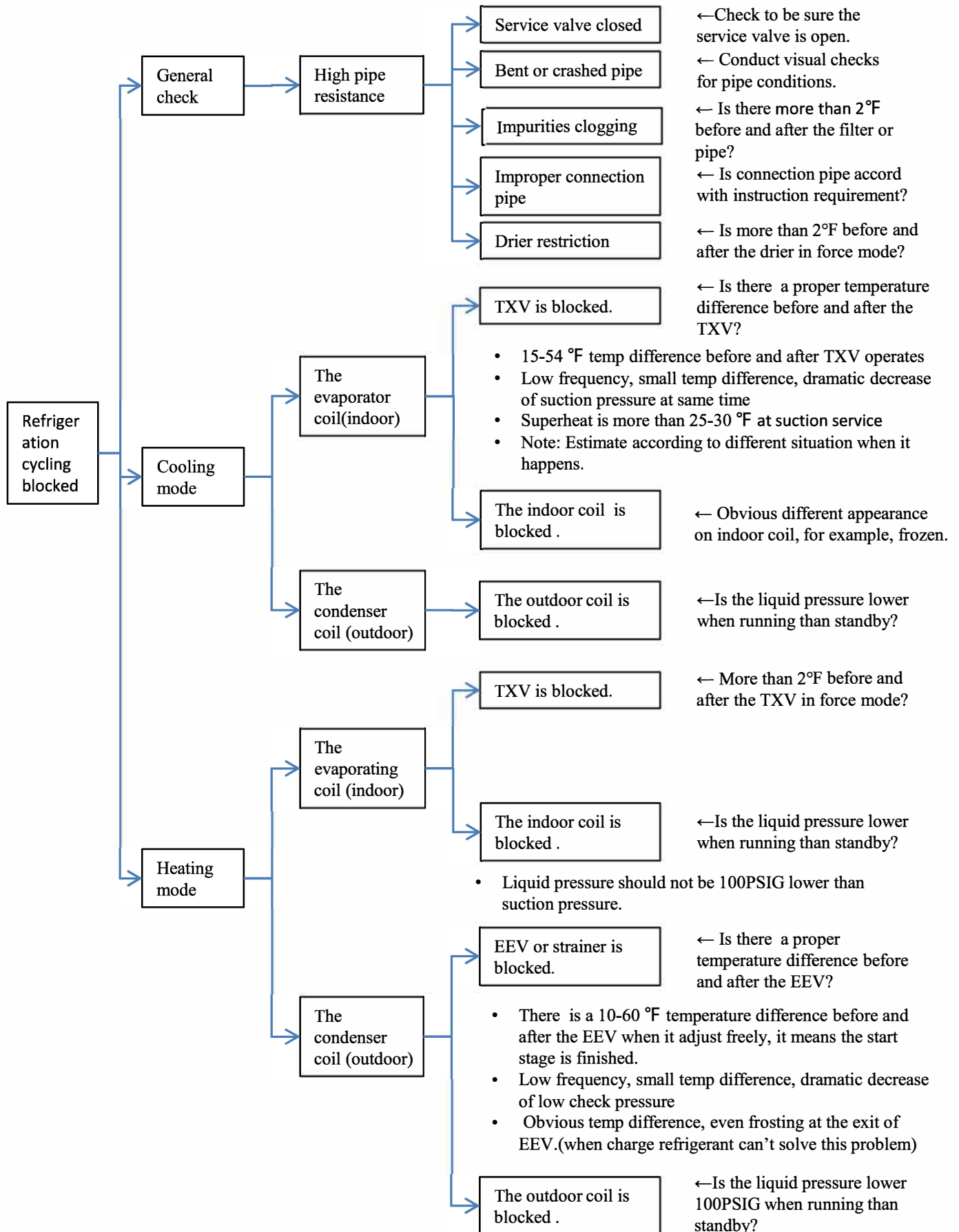
Note: 110-140PSIG head pressure is normal in cooling conditions. The value may be lower/higher at maximum/minimum/limited frequency of compressor operation . Start-up or return oil stages.

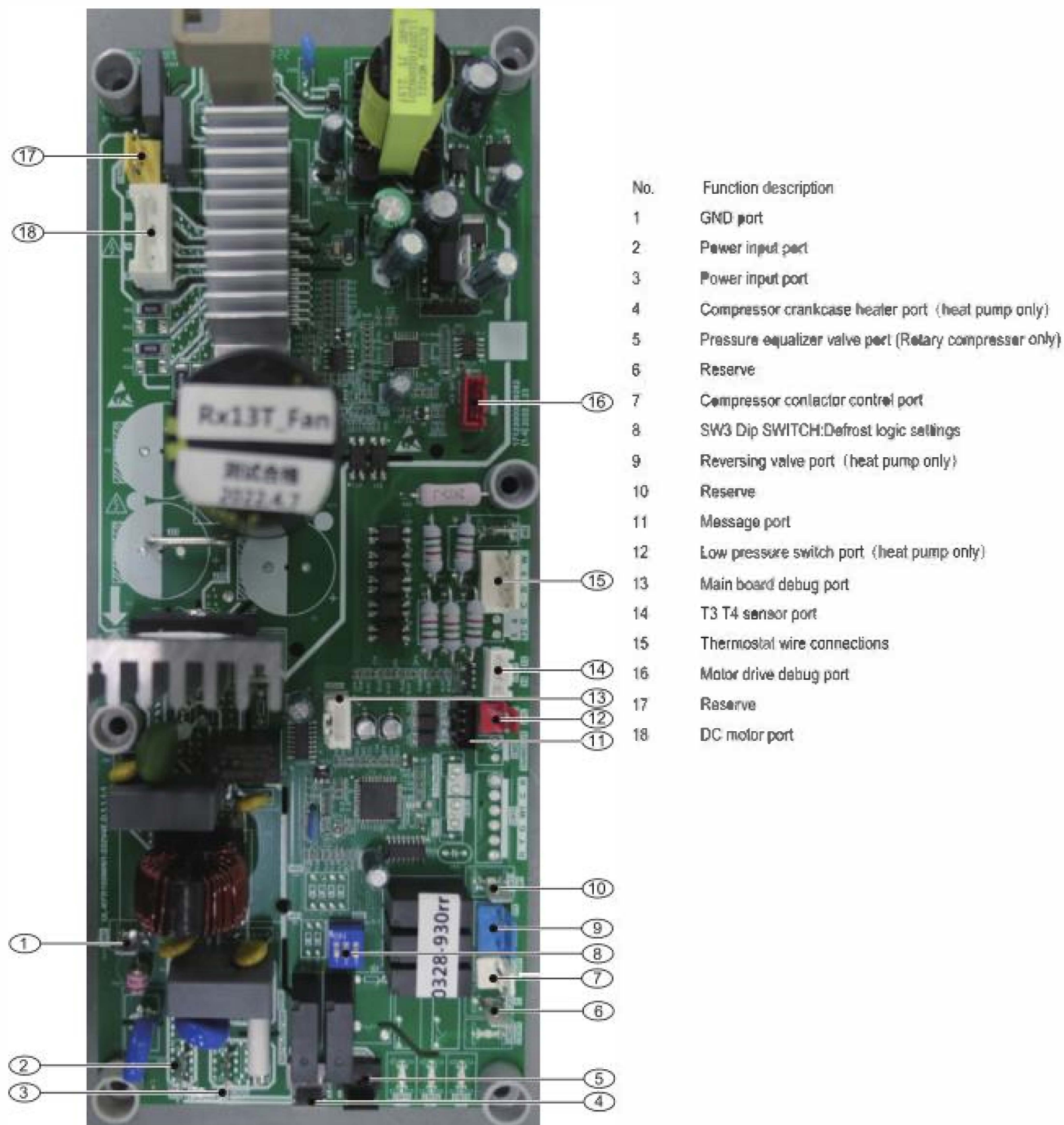


CHECK 3**6.3 Check for Causes of Dropping Low Pressure in heating**

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.



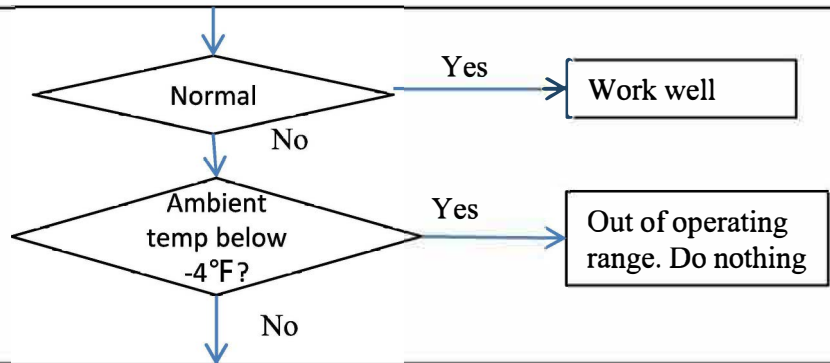
CHECK 5**6.5 Check for control board**

*The photo is provided for reference purposes only, Layout and components will vary according to the unit specification.

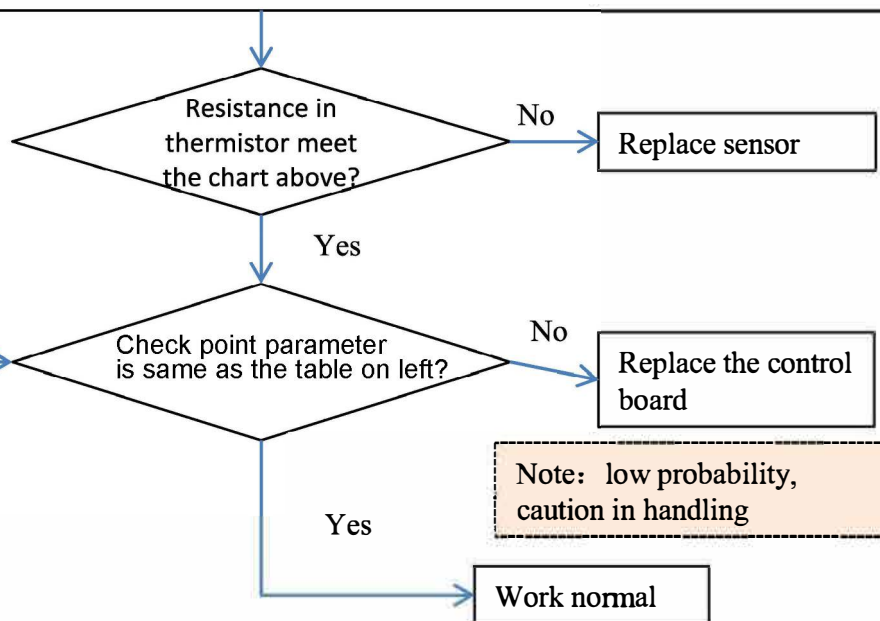
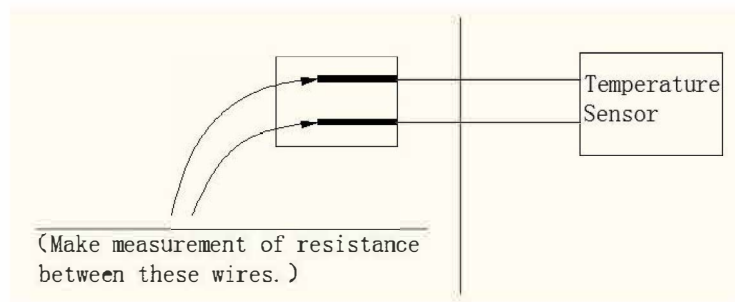
CHECK 6**6.6 Check for Temperature Sensor (T3/T4)****Check temp transducer (T3/T4) :**

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°F when standby.(need to avoid the waste heat affect T5/Tf when standby mode)

T3/T4: 77 °F --10KΩ



When power off and sensor unplugged

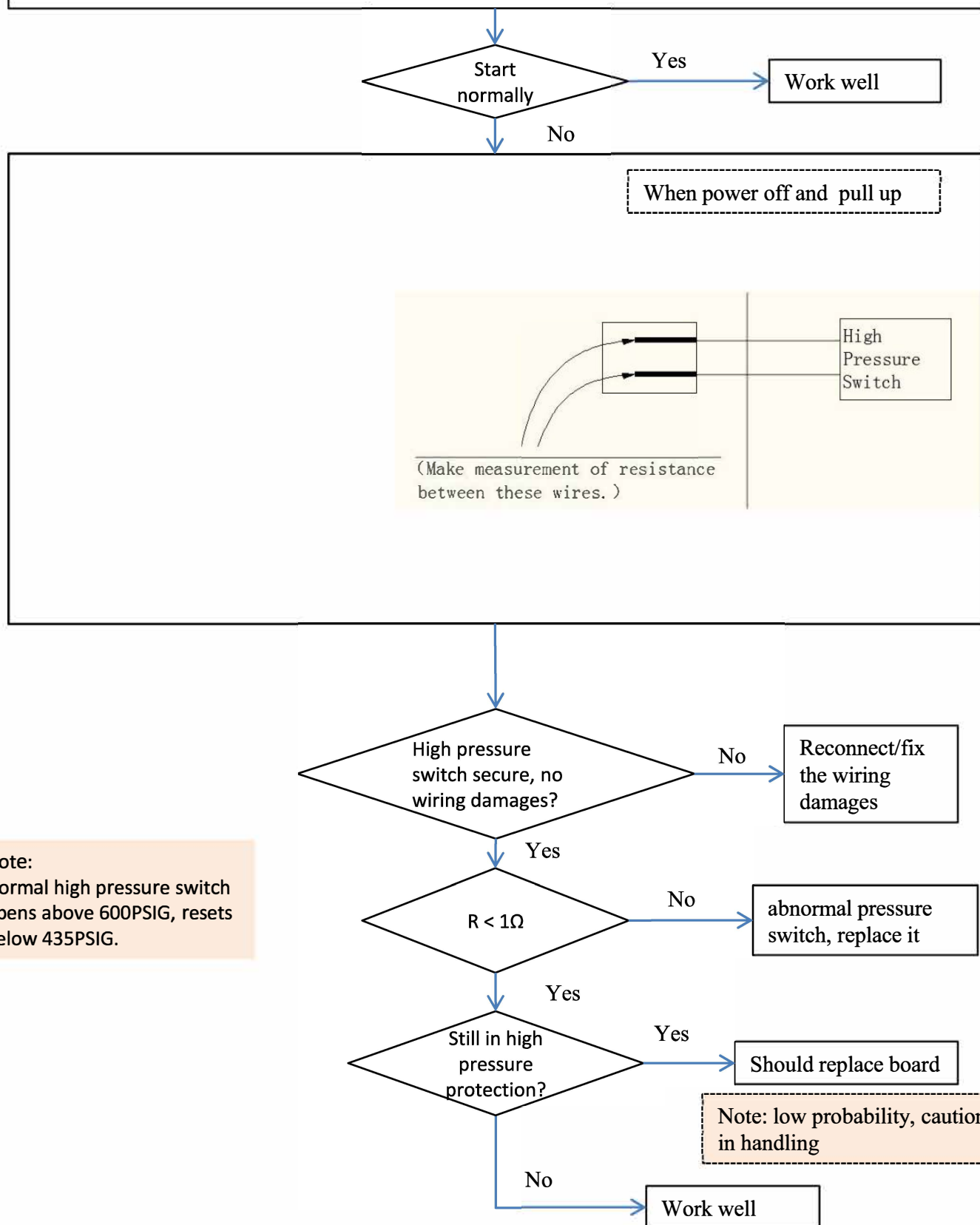


Refer to **Appendix 7**

CHECK 7

6.7 Check for High Pressure Switch (HPS)

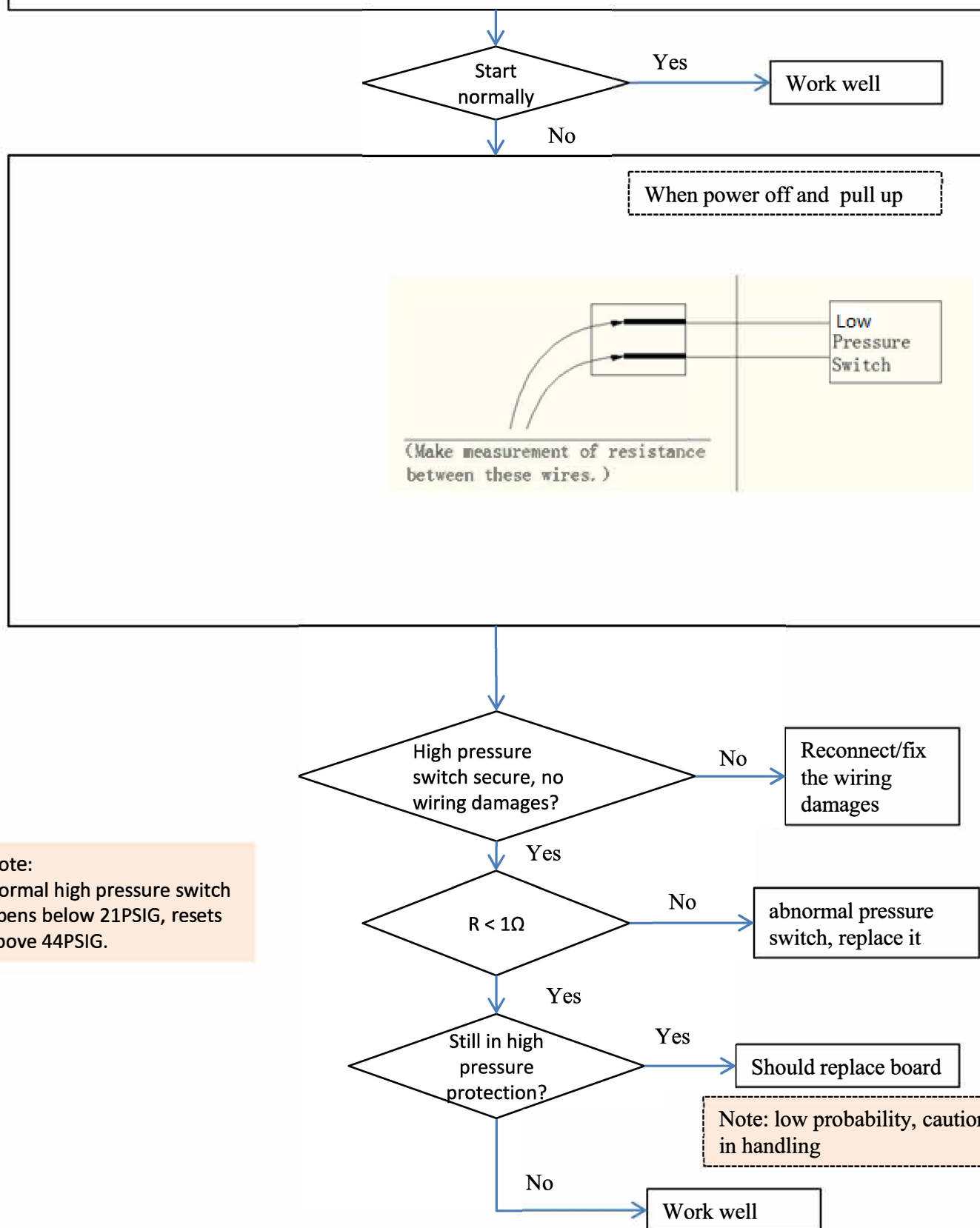
High Pressure Switch :
Whether the switch can start normally when start the machine



CHECK 8

6.8 Check for Low Pressure Switch (LPS)

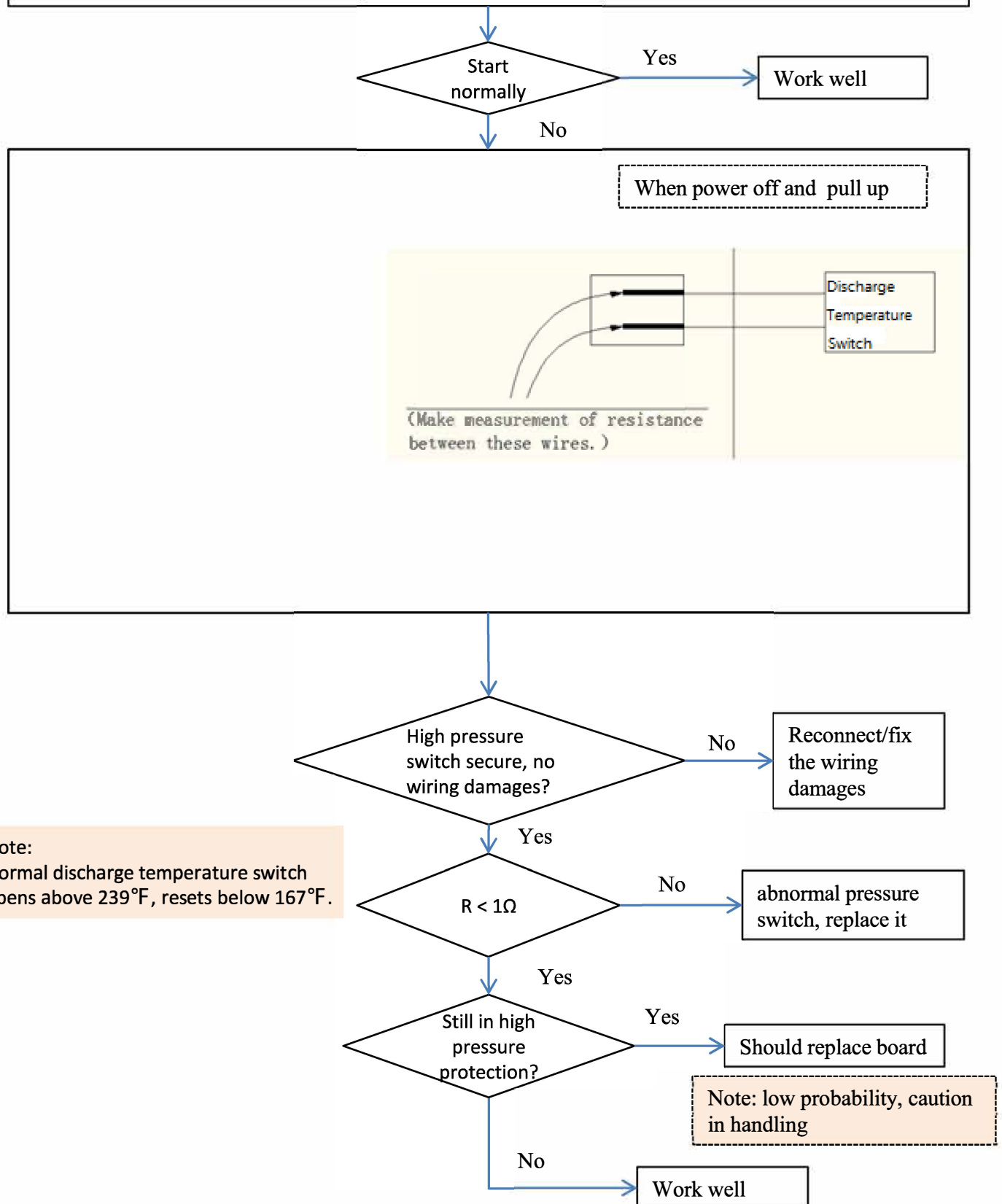
High Pressure Switch :
Whether the switch can start normally when start the machine



CHECK 9

6.8 Check for Discharge Temperature Switch (T5)

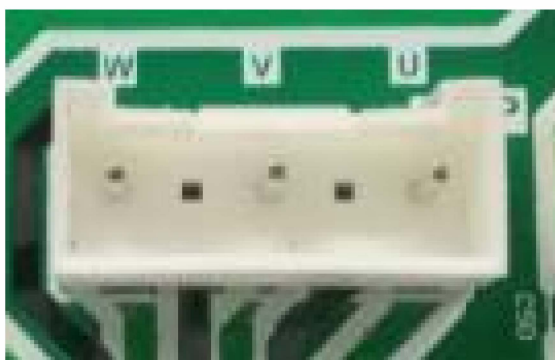
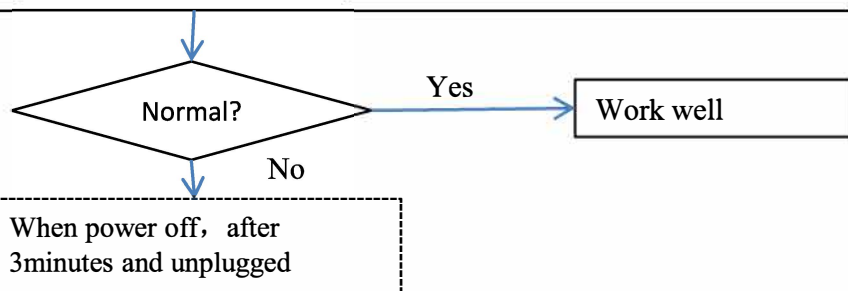
Discharge Temperature Switch :
Whether the switch can start normally when start the machine



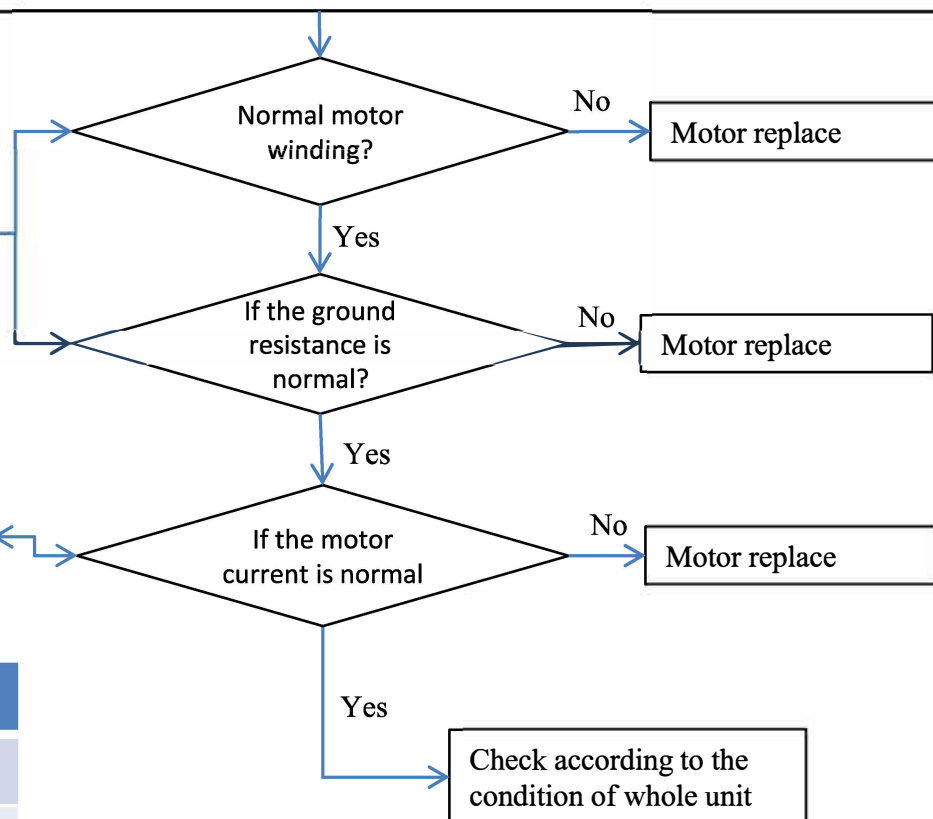
CHECK 10

6.10 Check for Condenser fan motor

Condenser fan motor:
Whether fan can start normally



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



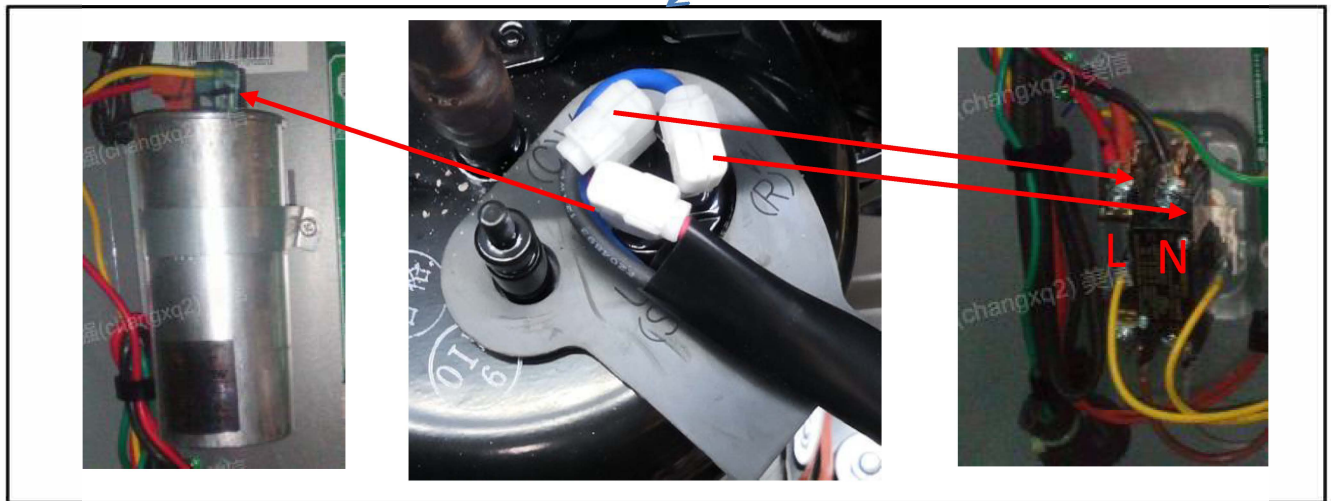
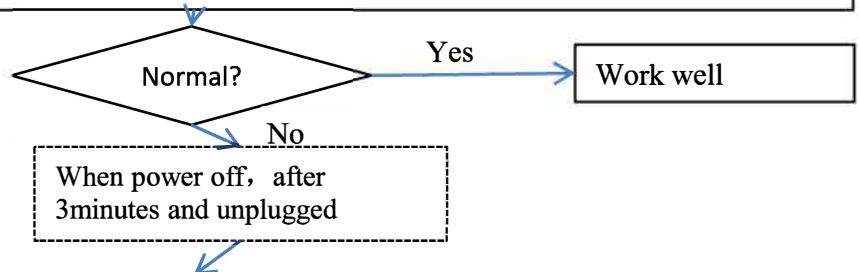
If the current is pulsating violently or abnormally beyond the "B" value

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

CHECK 11

6.11 Check for Compressor

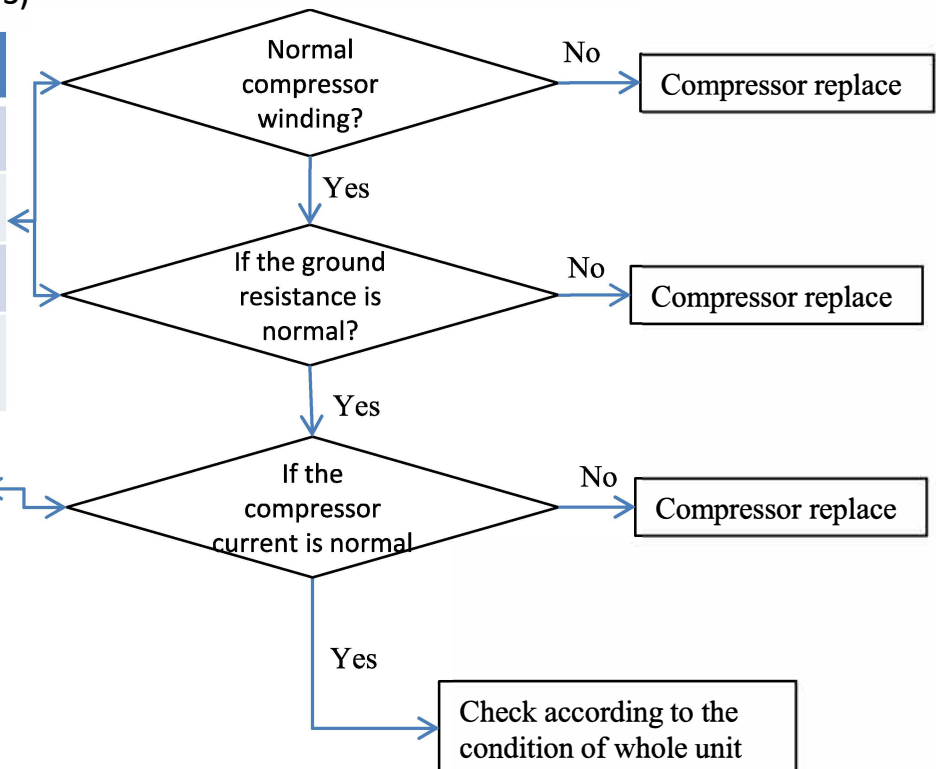
Compressor:
Whether compressor can start normally



For Scroll compressor, supply wiring 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

If the current is pulsating violently or abnormally beyond the "B" value



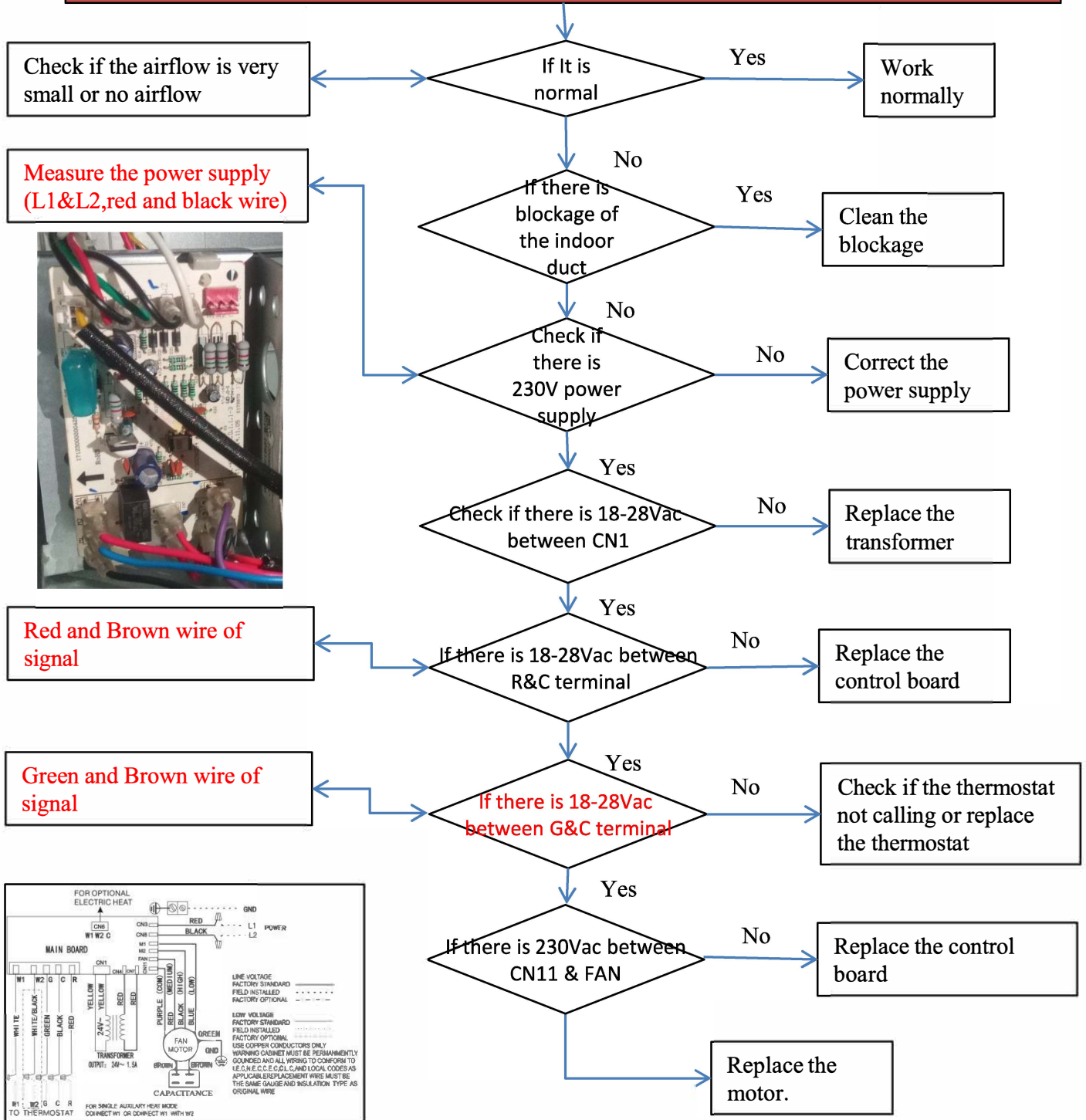
Model	1.5Ton	2Ton	2.5Ton	3Ton	3.5Ton	4Ton	5Ton
B(A)	10	12	13	17	20	23	30

CHECK 12

6.12 Check for indoor air flow

Indoor air flow:
Indoor air flow is normal/Check the capacity by $\text{BTU} = \Delta T \cdot \text{CFM} \cdot 1.5$ in force mode.

Indoor air flow:
Indoor air flow is normal/Check the capacity by $\text{BTU} = \Delta T \cdot \text{CFM} \cdot 1.5$ in force mode.

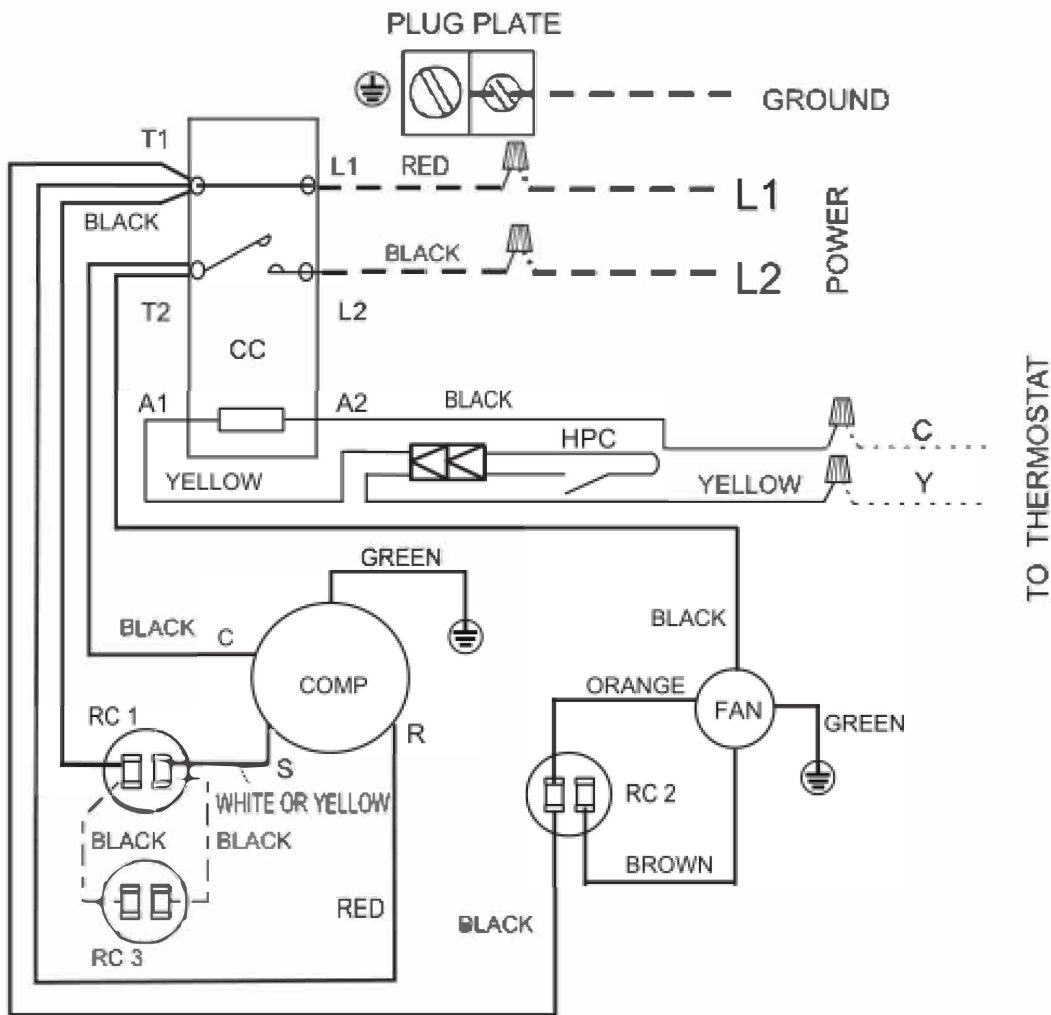


PART 7 Appendix

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Appendix 1

7.1 Wiring diagrams-42/48/60K



LINE VOLTAGE

FACTORY STANDARD

FIELD INSTALLED

FACTORY OPTIONAL

LOW VOLTAGE

FACTORY STANDARD

FIELD INSTALLED

FACTORY OPTIONAL

USE COPPER CONDUCTORS ONLY

HPC HIGH PRESSURE CUT-OUT CONTROL

CC COMPRESSOR CONTACTOR

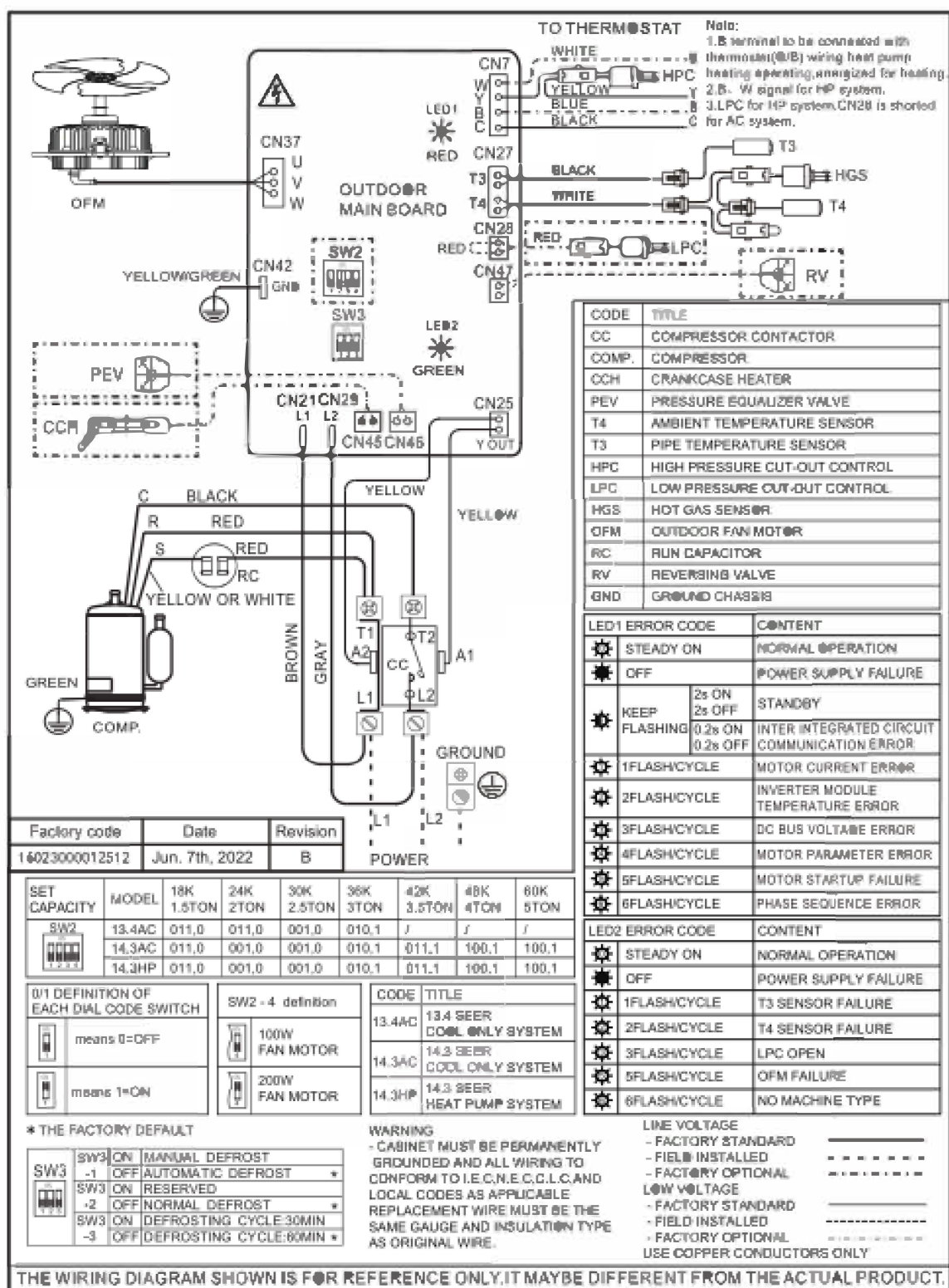
COMP COMPRESSOR

RC 1 RUN CAPACITOR 1

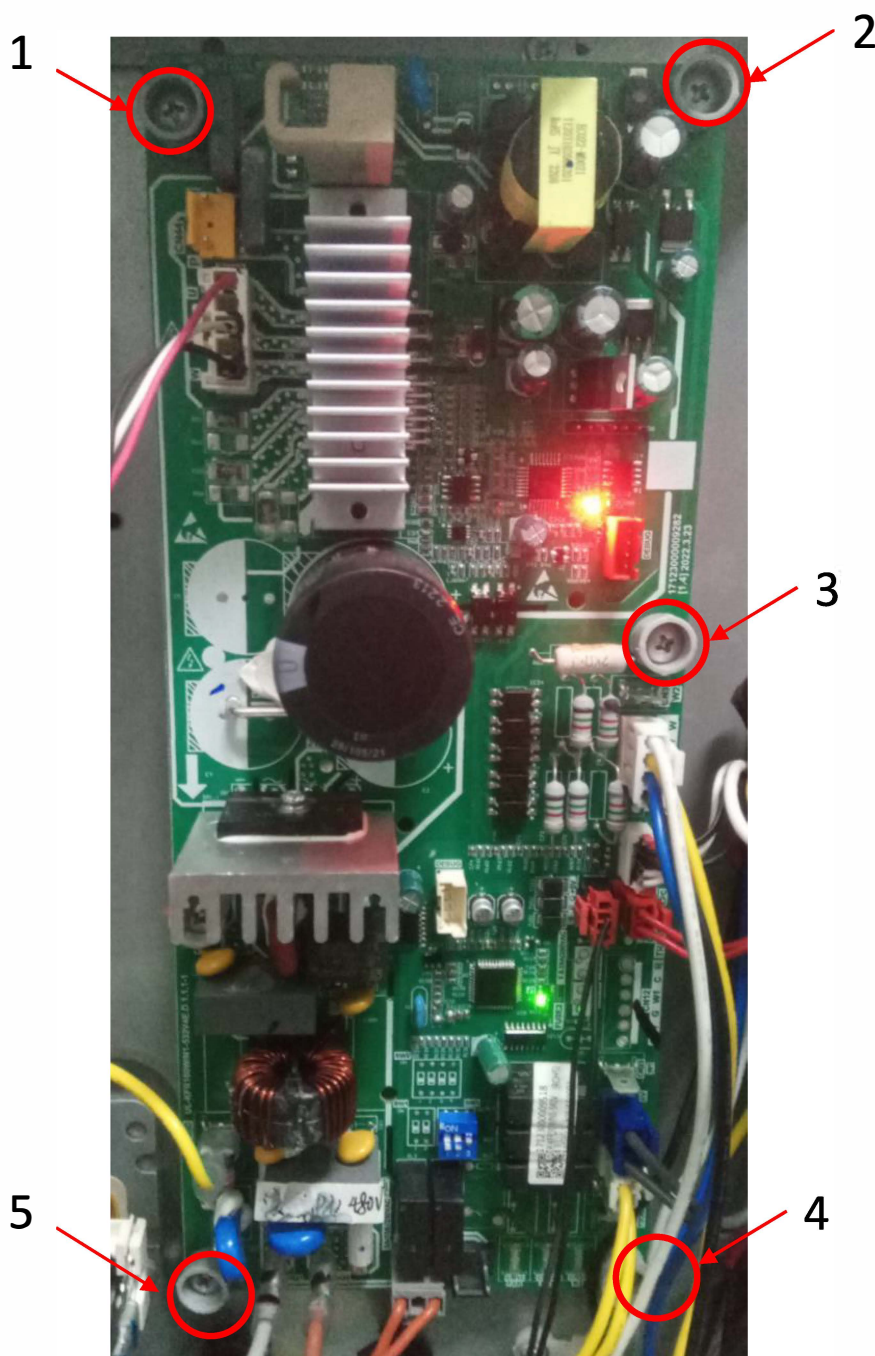
RC 2 RUN CAPACITOR 2

RC 3 RUN CAPACITOR 3

WARNING: CABINET MUST BE PERMANENTLY GOUNDED AND ALL WIRING TO CONFORM TO I.E.C,N.E.C,C.E.C,C.L.C,AND LOCAL CODES AS APPLICABLE REPLACEMENT WIRE MUST BE THE SAME GAUGE AND INSULATION TYPE AS ORIGINAL WIRE



1. Power off and wait at least 3 minutes before opening the electric control box.
2. Remove the wirings carefully.
3. Remove the **5** screws on the board (as shown by the red circle and the serial number)
4. Install the new board on the unit.
5. Fasten the **8** screws (Refer to Figure 1).
11. Reconnect the wires according to the wire diagram.
6. Set up the SW2 switches refer to the below chart.
7. Double check the wire connection, screws, thermal paste etc.



SW2 Setting details

SET CAPACITY	MODEL	18K 1.5TON	24K 2TON	30K 2.5TON	36K 3TON	42K 3.5TON	48K 4TON	60K 5TON
SW2 	13.4AC	011,0	011,0	001,0	010,1	/	/	/
	15.2AC	011,0	001,0	001,0	010,1	011,1	100,1	100,1
	15.2HP	011,0	001,0	001,0	010,1	011,1	100,1	100,1

Fault code of moter driver module fault code

LED1 ERROR CODE			CONTENT
	STEADY ON		NORMAL OPERATION
	OFF		POWER SUPPLY FAILURE
	KEEP FLASHING	2s ON 2s OFF	IDLE
		0.2s ON 0.2s OFF	INTER INTEGRATED CIRCUIT COMMUNICATION ERROR
	1FLASH/CYCLE		MOTOR CURRENT ERROR
	2FLASH/CYCLE		INVERTER MODULE TEMPERATURE ERROR
	3FLASH/CYCLE		DC BUS VOLTAGE ERROR
	4FLASH/CYCLE		MOTOR PARAMETER ERROR
	5FLASH/CYCLE		MOTOR STARTUP FAILURE
	6FLASH/CYCLE		PHASE SEQUENCE ERROR

Fault code of System main control board

LED2 ERROR CODE		CONTENT
	STEADY ON	NORMAL OPERATION
	OFF	POWER SUPPLY FAILURE
	1FLASH/CYCLE	T3 SENSOR FAILURE
	2FLASH/CYCLE	T4 SENSOR FAILURE
	3FLASH/CYCLE	LPC OPEN
	5FLASH/CYCLE	OFM FAILURE

[illegible]

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 failure of fan motor or fan capacitor or filter
RES O.D. AIRFLOW -Perhaps failure of fan motor or fan capacitor or recirculation or blocking coil
RES O.D. RADIATOR-Perhaps failure of blocking radiator

Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ
-4	106.73	37	23.87	78	10	119	3.69
-3	103.25	38	23.22	79	9.5	120	3.61
-2	99.88	39	22.19	80	8.26	121	3.53
-1	96.65	40	21.39	81	7.03	122	3.45
0	93.53	41	20.61	82	5.81	123	3.36
1	90.53	42	19.85	83	4.69	124	3.27
2	87.62	43	19.12	84	3.58	125	3.18
3	84.83	44	18.42	85	2.47	126	3.1
4	82.13	45	17.73	86	1.37	127	3.01
5	79.52	46	17.07	87	0.26	128	2.92
6	77.01	47	16.42	88	0.15	129	2.83
7	74.58	48	15.78	89	0.04	130	2.74
8	72.24	49	15.12	90	0.03	131	2.65
9	69.98	50	14.48	91	0.02	132	2.56
10	67.8	51	13.84	92	0.01	133	2.47
11	65.69	52	13.21	93	0.00	134	2.38
12	63.65	53	12.59	94	0.00	135	2.29
13	61.68	54	11.97	95	0.00	136	2.2
14	59.78	55	11.34	96	0.00	137	2.11
15	57.95	56	10.72	97	0.00	138	2.02
16	56.17	57	10.1	98	0.00	139	1.93
17	54.46	58	9.48	99	0.00	140	1.84
18	52.8	59	8.86	100	0.00	141	1.75
19	51.2	60	8.24	101	0.00	142	1.66
20	49.65	61	7.62	102	0.00	143	1.57
21	48.16	62	7.01	103	0.00	144	1.48
22	46.71	63	6.4	104	0.00	145	1.39
23	45.31	64	5.79	105	0.00	146	1.3
24	43.95	65	5.18	106	0.00	147	1.21
25	42.64	66	4.57	107	0.00	148	1.12
26	41.38	67	3.96	108	0.00	149	1.03
27	40.15	68	3.35	109	0.00	150	0.94
28	38.97	69	2.74	110	0.00	151	0.85
29	37.82	70	2.13	111	0.00	152	0.76
30	36.71	71	1.52	112	0.00	153	0.67
31	35.64	72	0.91	113	0.00	154	0.58
32	34.6	73	0.3	114	0.00	155	0.49
33	33.59	74	0.00	115	0.00	156	0.4
34	32.61	75	0.00	116	0.00	157	0.31
35	31.67	76	0.00	117	0.00	158	0.22
36	30.76	77	0.00	118	0.00	159	0.13