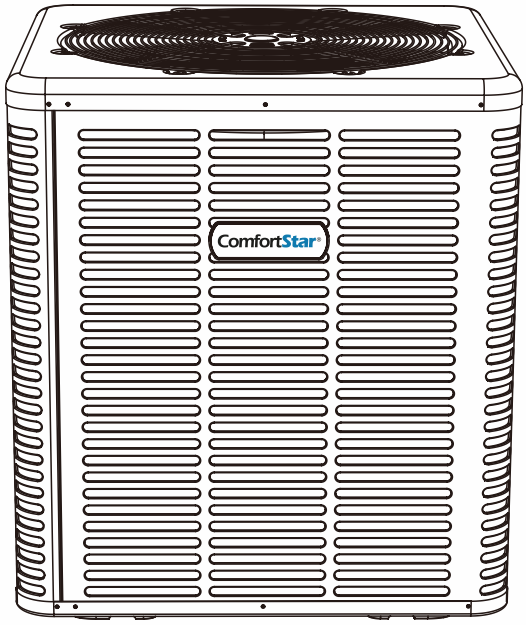
ComfortStar®
Air Conditioning & Heating Products

Service Manual

BAR17-18-15(40G)
BAR17-24-15(40H)
BAR17-30-15(40J)
BAR17-36-15(40K)



⚠ RECOGNIZE THIS SYMBOL AS A SAFETY PRECAUTION

ATTENTION INSTALLING PERSONNEL

Prior to installation, thoroughly familiarize yourself with this Installation Manual. Observe all safety warnings. During installation or repair, caution is to be observed
It is your responsibility to install the product safely and to educate the customer on its safe use

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www.comfortstarusa.com

Part 1

General Information

1 Product lineup

Model	Cooling Capacity (Btu/h)	Appearance
BAR17-18-15	18000	
BAR17-24-15	24000	
BAR17-30-15	30000	
BAR17-36-15	35000	
BAR10-42-15	42000	
BAR10-48-15	46000	
BAR10-60-15	54000	

2 Specifications

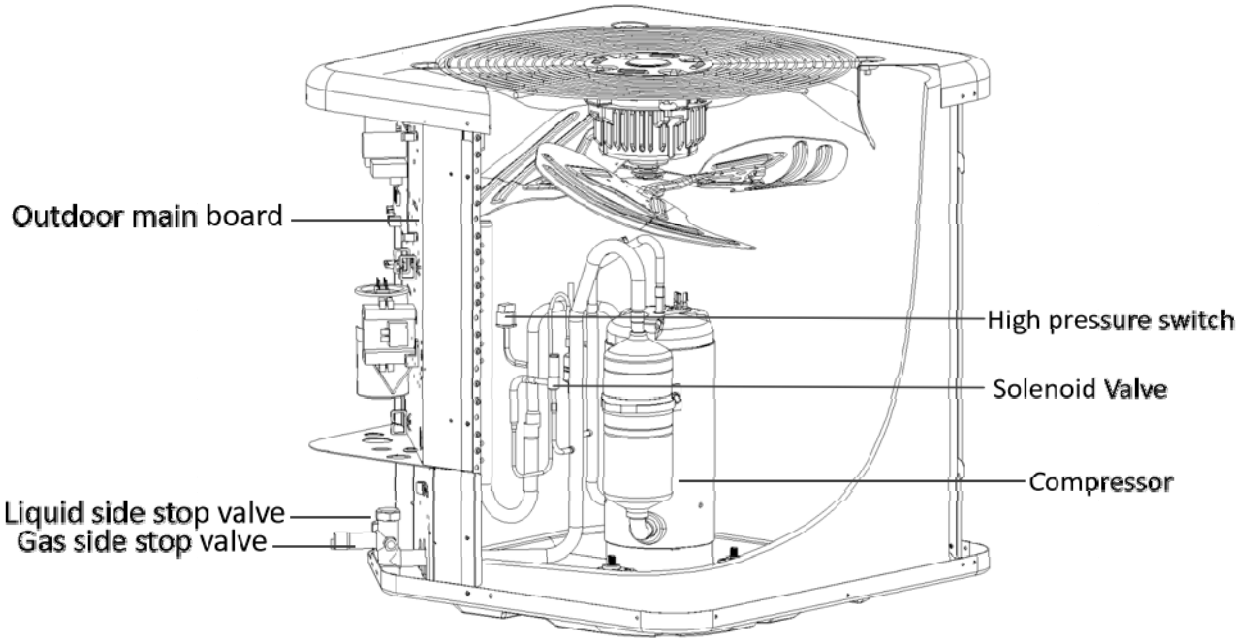
OUTDOOR UNIT			BAR17-18-15	BAR17-24-15	BAR17-30-15	BAR17-36-15	BAR10-42-15	BAR10-48-15	BAR10-60-15
Power supply	Rated Voltage	V, Ph, Hz	208/230V, 1Ph, 60Hz						
Cooling	capacity	Btu/h	18000	24000	30000	35000	42000	46000	54000
	Input	W	1358	1871	2144	2503	3070	3543	3927
Heating	capacity	Btu/h	/	/	/	/	/	/	/
	Input	W	/	/	/	E	/	/	/
Outdoor Minimum Circuit Ampacity		A	11.0	13.0	17.0	24.0	25.0	27.0	33.0
Outdoor Max.Fuse		A	15.0	15.0	25.0	30.0	35.0	40.0	50.0
Outdoor Air Flow		CFM	2000	2000	2650	2650	2950	2950	2950
Outdoor Noise Level		dB(A)	58.0	58.0	59.0	59.0	60.0	60.0	60.0
Connecting Wiring		AWG	24V: AWG 14*3 Shielded	24V: AWG 12*3 Shielded		24V: AWG 10*3 Shielded		24V: AWG 8*3 Shielded	
Comunication Type			24V	24V	24V	24V	24V	24V	24V
Throttle type			Capiliary	Capiliary	Capiliary	Capiliary	Capiliary	Capiliary	Capiliary
Outdoor Unit	Unpacking(W*D*H)	inch	23-5/8×23-5/8×25		29-9/64×29-9/64×25		29-9/64×29-9/64×32-7/8		
	Packing (W*D*H)	inch	25-63/64×25-63/64×26-3/16		30-5/16×30-5/16×26-3/16		30-5/16×30-5/16×34-1/16		
	Net/Gross weight	lbs	117/123	119/126	139/148	145/154	157/168	176/187	182/193
Refrigeration	Type/Charge	oz	R32/46	R32/53	R32/76	R32/79	R32/92	R32/92	R32/92
	Outdoor Additional Charge	oz/ft	0.52	0.52	0.52	0.52	0.52	0.52	0.52
	N.A.Design Pressure	PSI	174/609	174/609	174/609	174/609	0.29	174/609	174/609
Refrigerant pipe	Liquid /Vapor Valve Size	inch	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)
	Max. refrigerant pipe length	ft	98	131	131	131	164	213	213
	Max.Height Difference	ft	66	82	82	82	82	98	98
Outdoor unit	Cooling	℉	23~125	23~125	23~125	23~125	23~125	23~125	23~125
	Heating	℉	/	/	/	/	/	/	/

Part 2

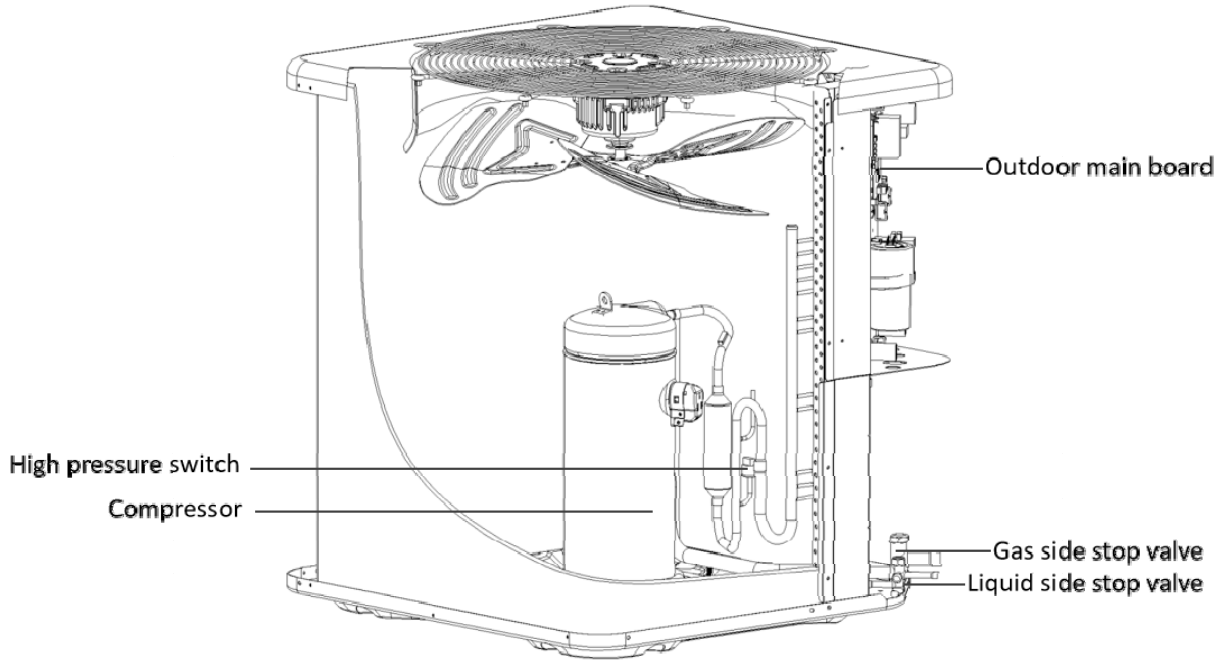
Component Layout and Refrigerant Circuit

1 Layout Functional Components

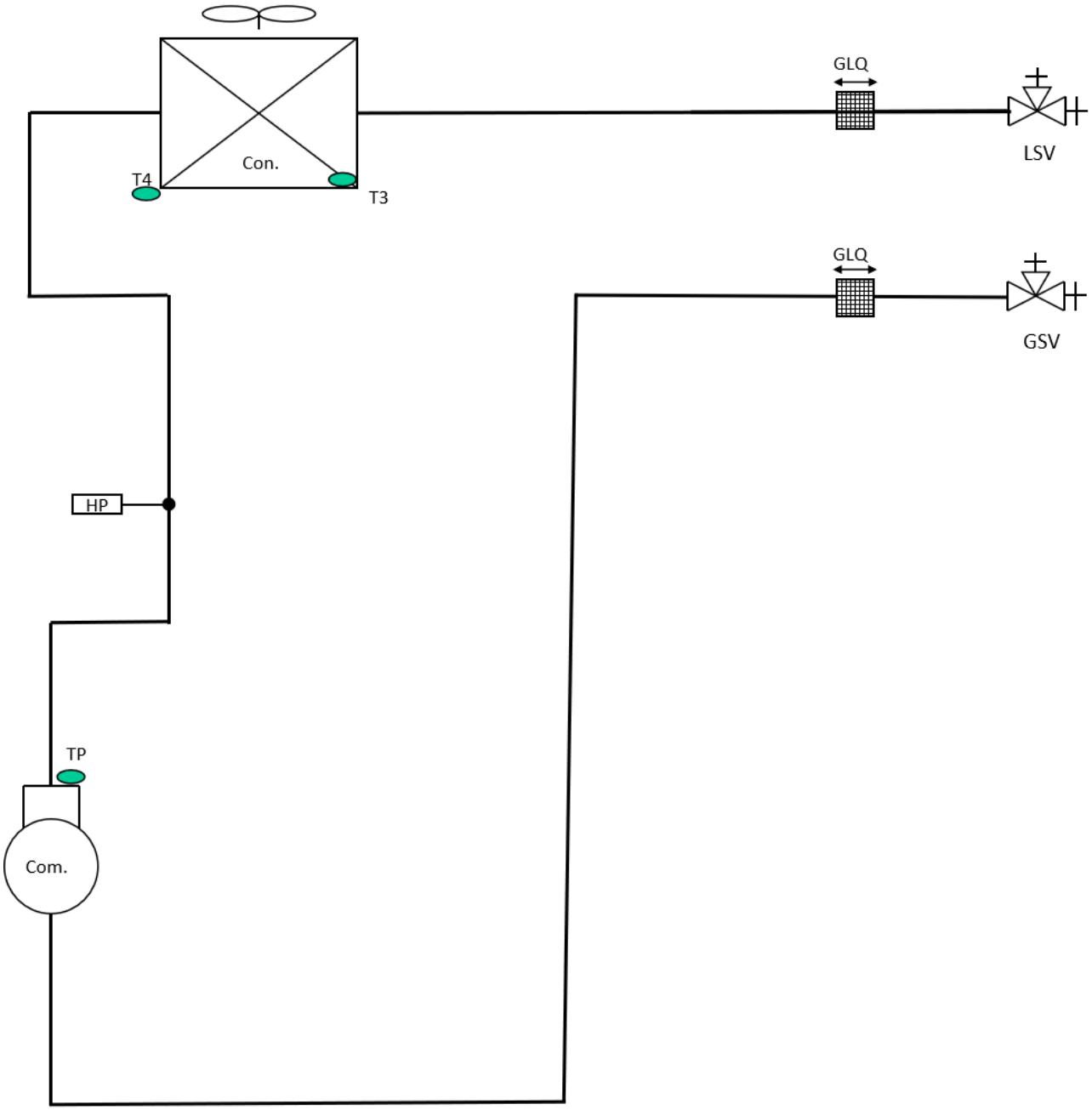
BAR17-18-15, BAR17-24-15,BAR17-30-15,BAR17-36-15,



BAR10-42-15, BAR10-48-15,BAR10-60-15,



2 Piping diagrams

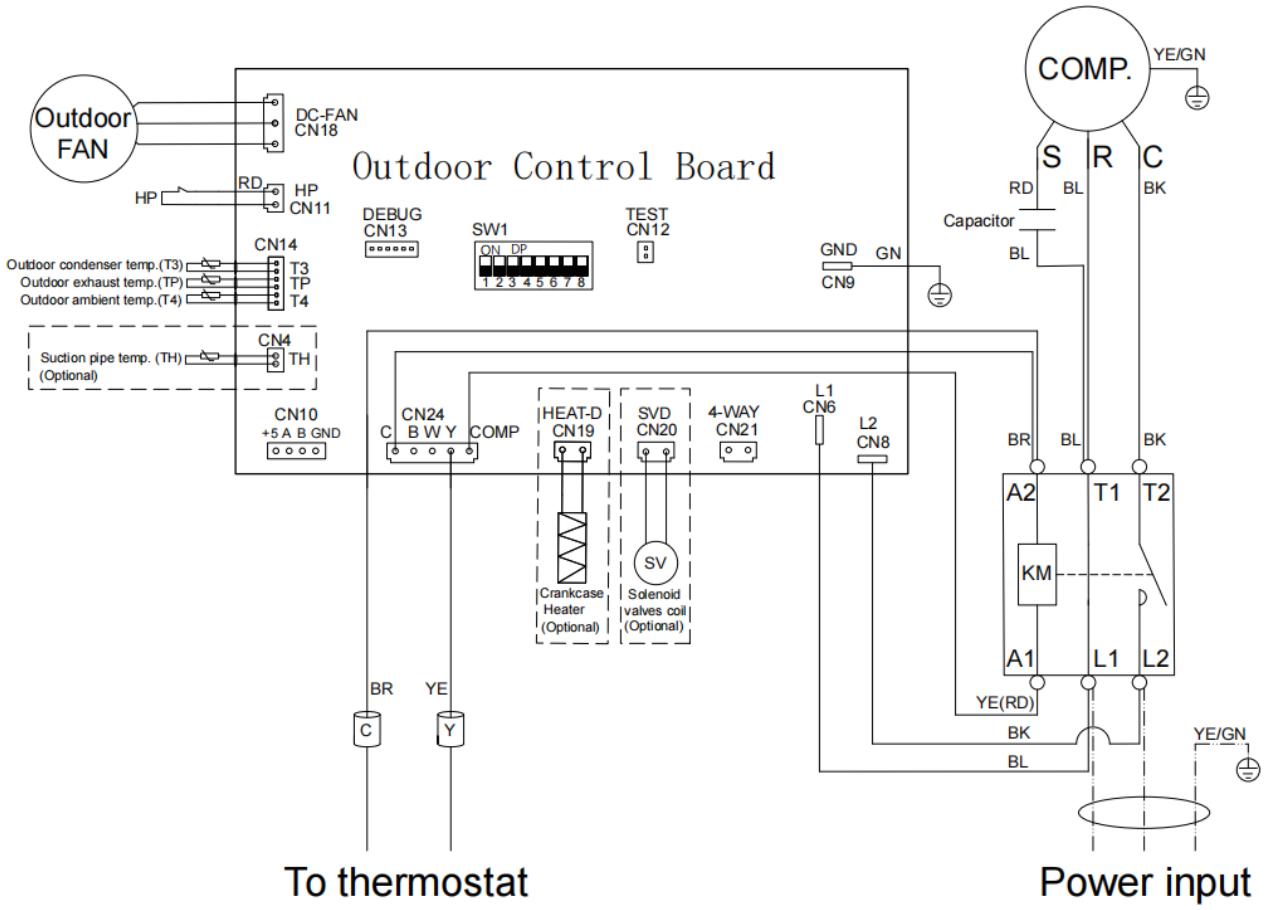


NO.	Component(Outdoor unit)	NO.	Component(Outdoor unit)
Com.	Compressor	LSV	Liquid Stop Valve
TP	Exhaust temperature sensor	GSV	Gas Stop Valve
HP	High pressure switch		
T4	Ambient temperature sensor		
T3	Condenser coil temperature sensor		
Con.	Condenser		
RCP	Refrigerant cooling pipe		
GLQ	Filter		

Part 3

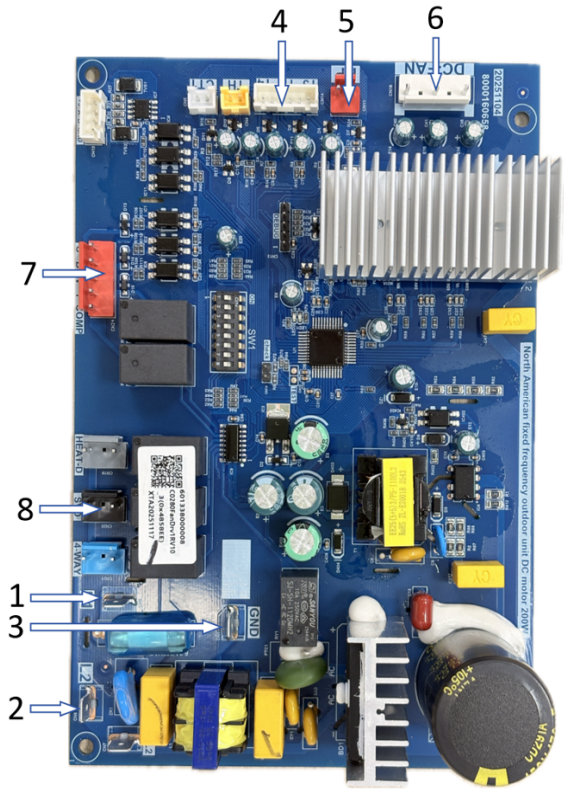
Wiring Diagram

1 Electric wiring diagram



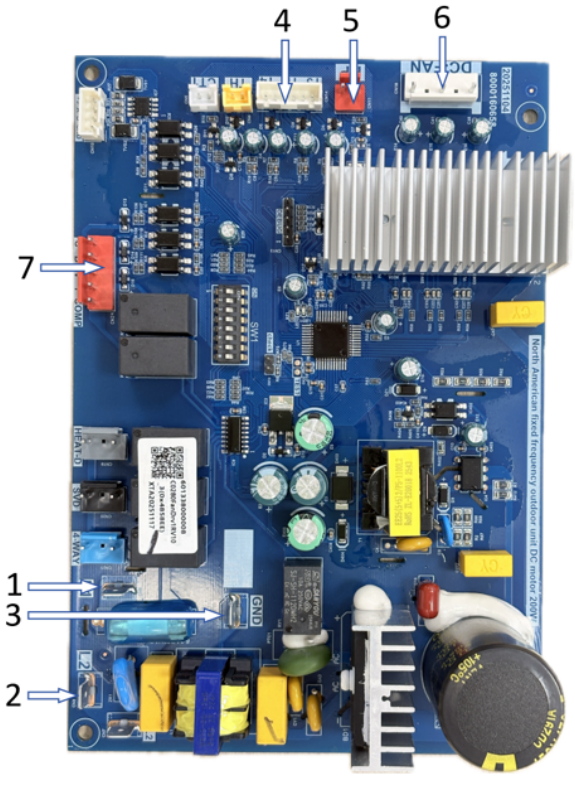
Note:18k 24k 30k 36k models should connect Solenoid valves coil

2 PCB



No.	Functional description
1	Power supply input L(L1)
2	Power supply input N(L2)
3	Ground wire
4	T3 T4 TP sensor port
5	High pressure protection switch port
6	DC motor port
7	C B W Y COMP port(24V)
8	Solenoid valve port

18/24/30/36K Outdoor Main Control Board



No.	Functional description
1	Power supply input L(L1)
2	Power supply input N(L2)
3	Ground wire
4	T3 T4 TP sensor port
5	High pressure protection switch port
6	DC motor port
7	C B W Y COMP port(24V)

42/48/60K Outdoor Main Control Board

Definition of SW1

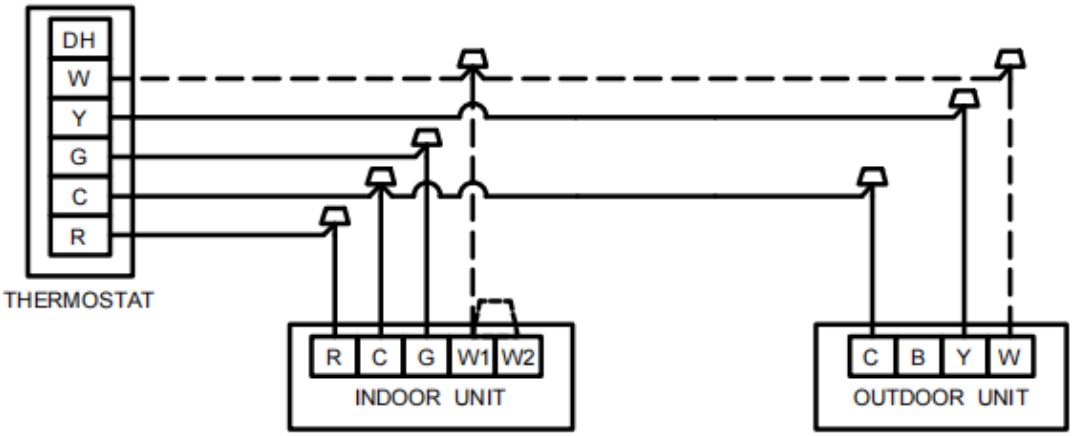
<table>
<tr><th colspan="2">Wire Color Code</th><th colspan="2">DIP switch status Indicate</th><th colspan="6">Outdoor Display Board
SW1 DIP switch selection</th><th colspan="3">Outdoor Display Board
SW1 DIP switch selection</th></tr>
<tr><td colspan="2" rowspan="5">RD RED OR ORANGE
BL BLUE GN GREEN
BR BROWN GY GRAY
BK BLACK YE YELLOW
WH WHITE PR PURPLE</td><td rowspan="2">ON
OFF
1</td><td rowspan="2">This Indicate OFF
(The DIP switch is dialed to the digital side)</td><td>SW1.1</td><td>OFF</td><td colspan="4">24V Control (Default)</td><td>SW1.5</td><td>OFF</td><td>Reserved (Default)</td></tr>
<tr><td></td><td>ON</td><td colspan="4">RS485 Comm. Mode</td><td></td><td>ON</td><td>Manual Defrosting</td></tr>
<tr><td rowspan="2">SW1.2</td><td>OFF</td><td colspan="4">Heating and cooling</td><td rowspan="2">SW1.6</td><td>OFF</td><td>Auto Defrosting (Default)</td></tr>
<tr><td>ON</td><td colspan="4">Single-cooled (Default)</td><td>ON</td><td>Periodically Defrosting</td></tr>
<tr><td rowspan="2">ON
OFF
1</td><td rowspan="2">This Indicate ON
(The DIP switch is dialed to the non-digital side)</td><td rowspan="4">SW1.3</td><td>OFF</td><td rowspan="4">SW1.4</td><td>OFF</td><td rowspan="4">Model</td><td>18K</td><td rowspan="2">SW1.7</td><td>OFF</td><td>Defrost interval 60 minutes (Default)</td></tr>
<tr><td>OFF</td><td>ON</td><td>24K 30K 36K 42K</td><td>ON</td><td>Defrost interval 30 minutes</td></tr>
<tr><td>ON</td><td>OFF</td><td>Reserved</td><td rowspan="2">SW1.8</td><td>OFF</td><td>Gerenal mode (Default)</td></tr>
<tr><td>ON</td><td>ON</td><td>48K 60K</td><td>ON</td><td>High vertical mode</td></tr>
</table>

3 Low voltage wiring diagram

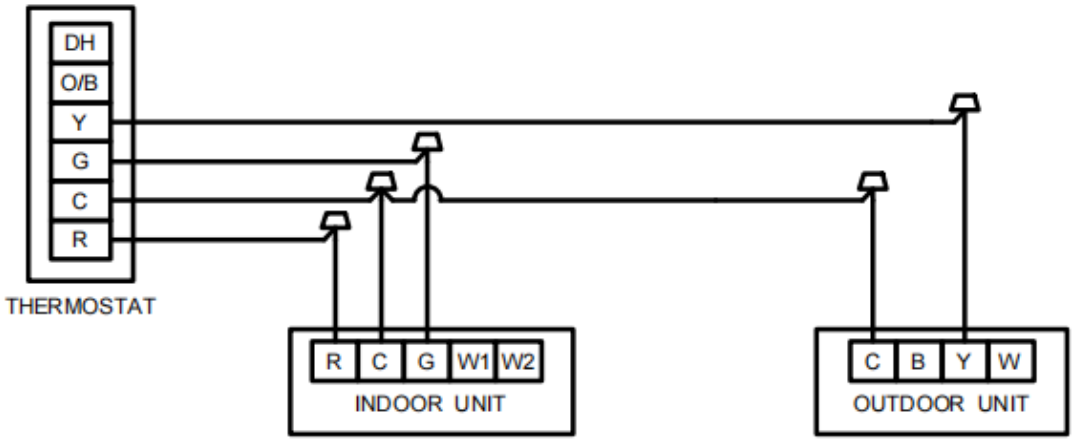
The following wiring diagram are suitable for the Indoor Unit and Outdoor Unit with 24V thermostat.

Cooling-Only Model

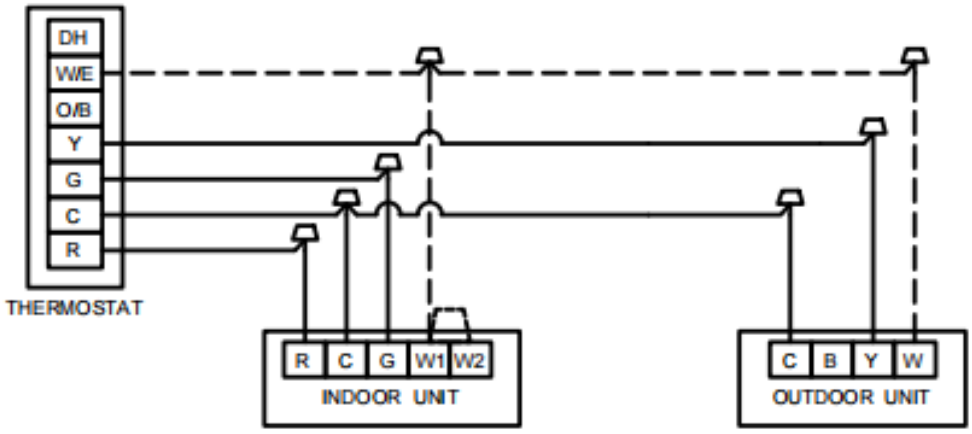
Wiring for 1H and 1C thermostat (no heat pump system model)



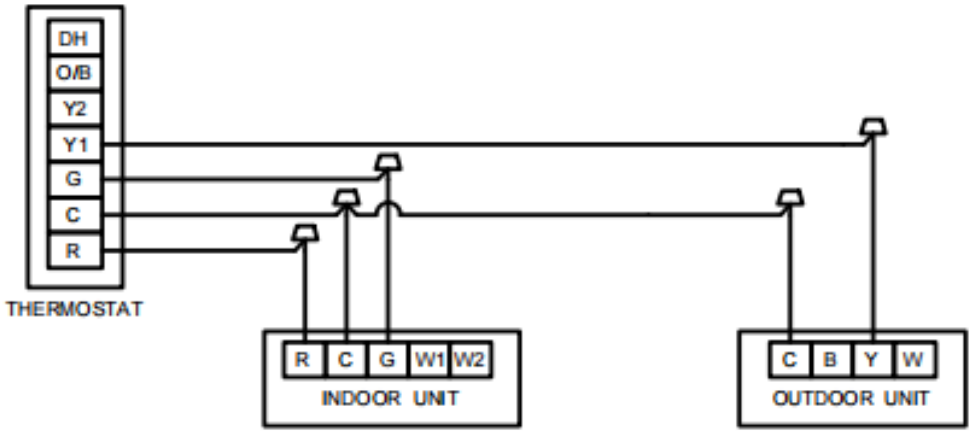
Wiring for 1H and 1C thermostat (no heat pump system model)



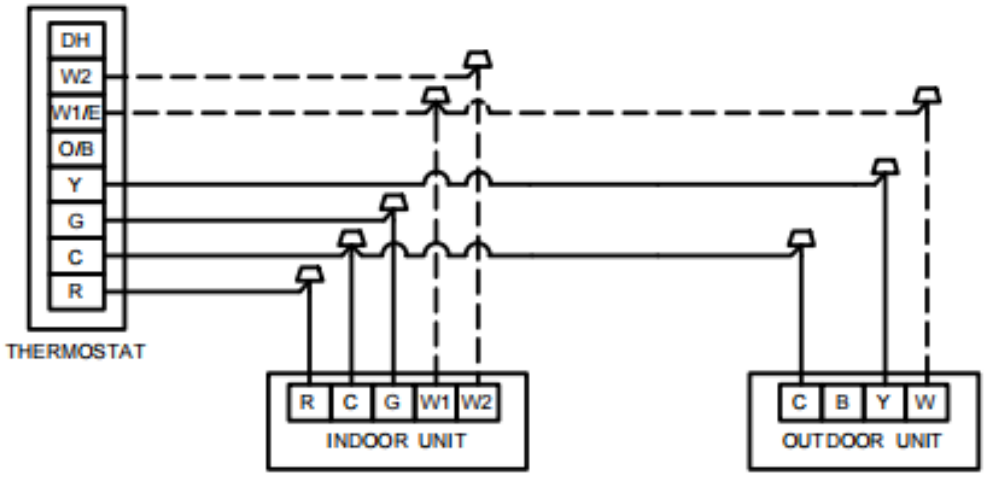
Wiring for 2H and 1C thermostat (no heat pump system model)



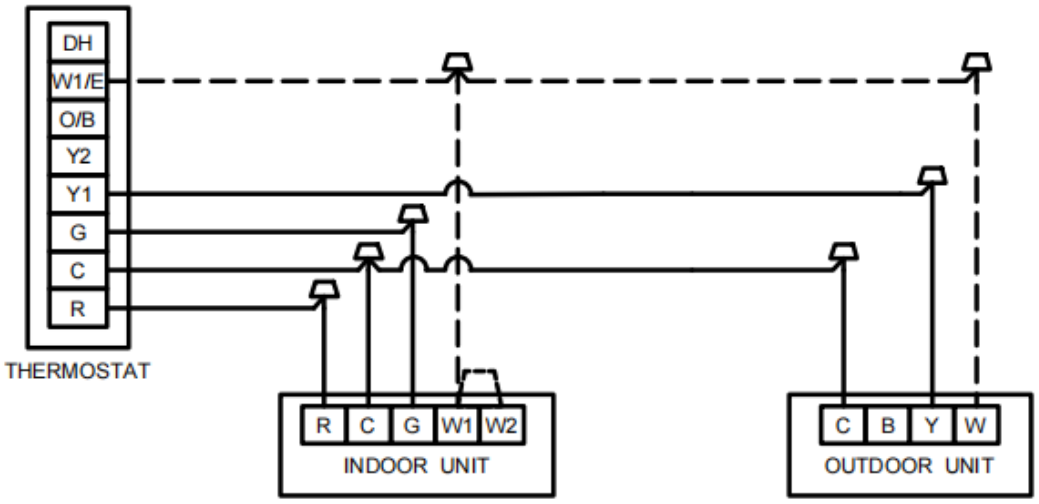
Wiring for 2H and 2C thermostat (no heat pump system model)



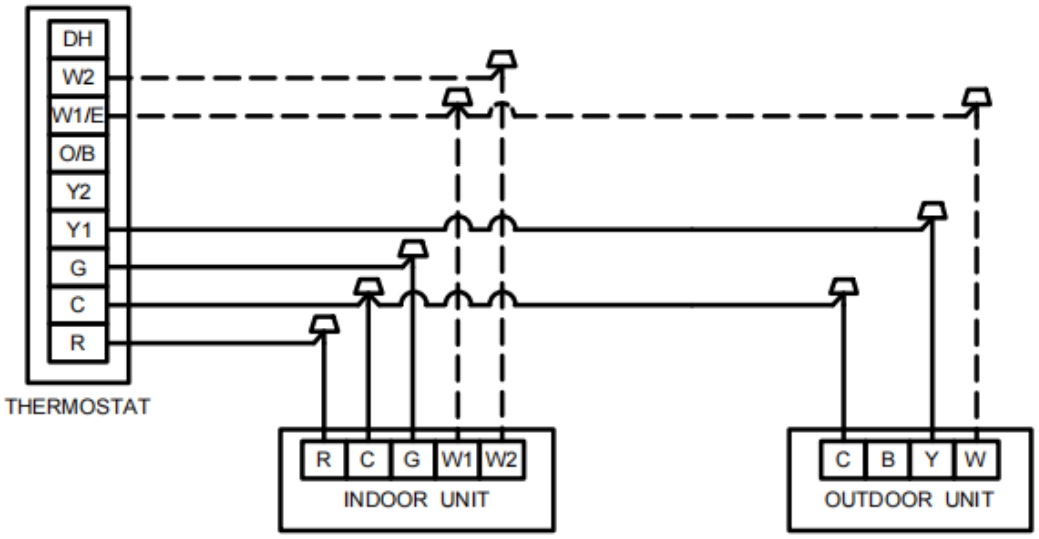
Wiring for 3H and 1C thermostat (no heat pump system model)



Wiring for 3H and 2C thermostat (no heat pump system model)



Wiring for 4H and 2C thermostat (no heat pump system model)



Control Logic：

Indoor unit connector

Connector	Purpose
R	24V Power Connection
C	Common
G	Fan Control
W1	Stage 1 Electric Heating
W2	Stage 2 Electric Heating

Outdoor unit connector

Connector	Purpose
C	Common
Y	Cooling

Note：

1) DH wiring is optional and requires a thermostat with a humidistat. DH functions as Passive Dehumidification and will downstage the indoor fan to first stage. System will operate according to normal sequence of operations if DH wiring is absent.

2) Dashed lines in the above thermostat wiring diagrams refer to optional wiring (wiring for Passive Dehumidification Function and/OR Electric Heat). For thermostat wiring please refer to the Owner's Manual of the thermostat.

Part 4

Diagnosis and Troubleshooting

1 Error code table

	LED Display	System Status
Operating Mode	Green Light: Steadily On Red Light: Off	Standby
		Cooling
		Heating
System Alert	Green Light: Flashes 1 Time Red Light: Off	Low Pressure Alert(Reserved)
	Green Light: Flashes 2 Times Red Light: Off	High Pressure Alert
	Green Light: Flashes 3 Times Red Light: Off	Tp Exhaust Over-temperature Protection
	Green Light: Flashes 4 Times Red Light: Off	TH Anti-freeze Protection Fault(Reserved)
	Green Light: Flashes 5 Times Red Light: Off	T4 Ambient Temperature Protection
	Green Light: Flashes 6 Times Red Light: Off	T3 Over-temperature Protection
	Green Light: Off Red Light: Flashes 1 Time	T3 Sensor Error
	Green Light: Off Red Light: Flashes 2 Times	T4 Sensor Error
	Green Light: Off Red Light: Flashes 3 Times	Tp Sensor Error
System Lockout	Green Light: Off Red Light: Flashes 5 Times	6 Low Pressure Faults within 60 Mins(Reserved)
	Green Light: Off Red Light: Flashes 6 Times	3 Exhaust Over-temperature Faults within 60 Mins
	Green Light: Off Red Light: Flashes 7 Times	8 TH Anti-freeze Faults within 200 Mins(Reserved)

2 Troubleshooting

2.1 Safety Precautions

The following precautions here are quite important, so be sure to follow them carefully. Read these instructions carefully before installation. Keep this manual in a handy for future preference.

Failure to adhere to all precautionary measures listed in this section may result in personal injury, damage to the unit or to property, or in extreme cases, death.

WARNING

- Indicates a potentially hazardous situation which if not avoided, could result in death or serious injury.

CAUTION

- Indicates a potentially hazardous situation which if not avoided, may result in minor or moderate injury.
- It is also used to alert against unsafe practices.

2.1.1 In case of Accidents or Emergency

WARNING

- If a gas leak is suspected, immediately turn off the gas and ventilate the area if a gas leak is suspected before turning the unit on.
- If strange sounds or smoke is detected from the unit, turn the breaker off and disconnect the power supply cable.
- If the unit comes into contact with liquid, contact an authorized service center.
- If liquid from the batteries makes contact with skin or clothing, immediately rinse or wash the area well with clean water.
- Do not insert hands or other objects into the air inlet or outlet while the unit is plugged in.
- Do not operate the unit with wet hands.

CAUTION

- Clean and ventilate the unit at regular intervals when operating it near a stove or near similar devices.
- Do not use the unit during severe weather conditions. If possible, remove the product from the window before such occurrences.

2.1.2 Information servicing(For flammable materials)

WARNING

- Use this unit only on a dedicated circuit.
- Damage to the installation area could cause the unit
- to fall, potentially resulting in personal injury, property damage, or product failure.
- Only qualified personnel should disassemble, install, remove, or repair the unit.
- Only a qualified electrician should perform electrical work. For more information, contact your dealer, seller, or an authorized service center.

CAUTION

- While unpacking be careful of sharp edges around the unit as well as the edges of the fins on the condenser and evaporator.

2.1.3 Operation and Maintenance

WARNING

- Do not use defective or under-rated circuit breakers.
- Ensure the unit is properly grounded and that a dedicated circuit and breaker are installed.
- Do not modify or extend the power cable. Ensure the power cable is secure and not damaged during operation.
- Do not unplug the power supply plug during operation.
- Do not store or use flammable materials near the unit.
- Do not open the inlet grill of the unit during operation.
- Do not touch the electrostatic filter if the unit is equipped with one.
- Do not block the inlet or outlet of air flow to the unit.
- Do not use harsh detergents, solvents, or similar items to clean the unit. Use a soft cloth for cleaning.
- Do not touch the metal parts of the unit when removing the air filter as they are very sharp.
- Do not step on or place anything on the unit or outdoor units.
- Do not drink water drained from the unit.
- Avoid direct skin contact with water drained from the unit.

- Use a firm stool or step ladder according to manufacturer procedures when cleaning or maintaining the unit.

CAUTION

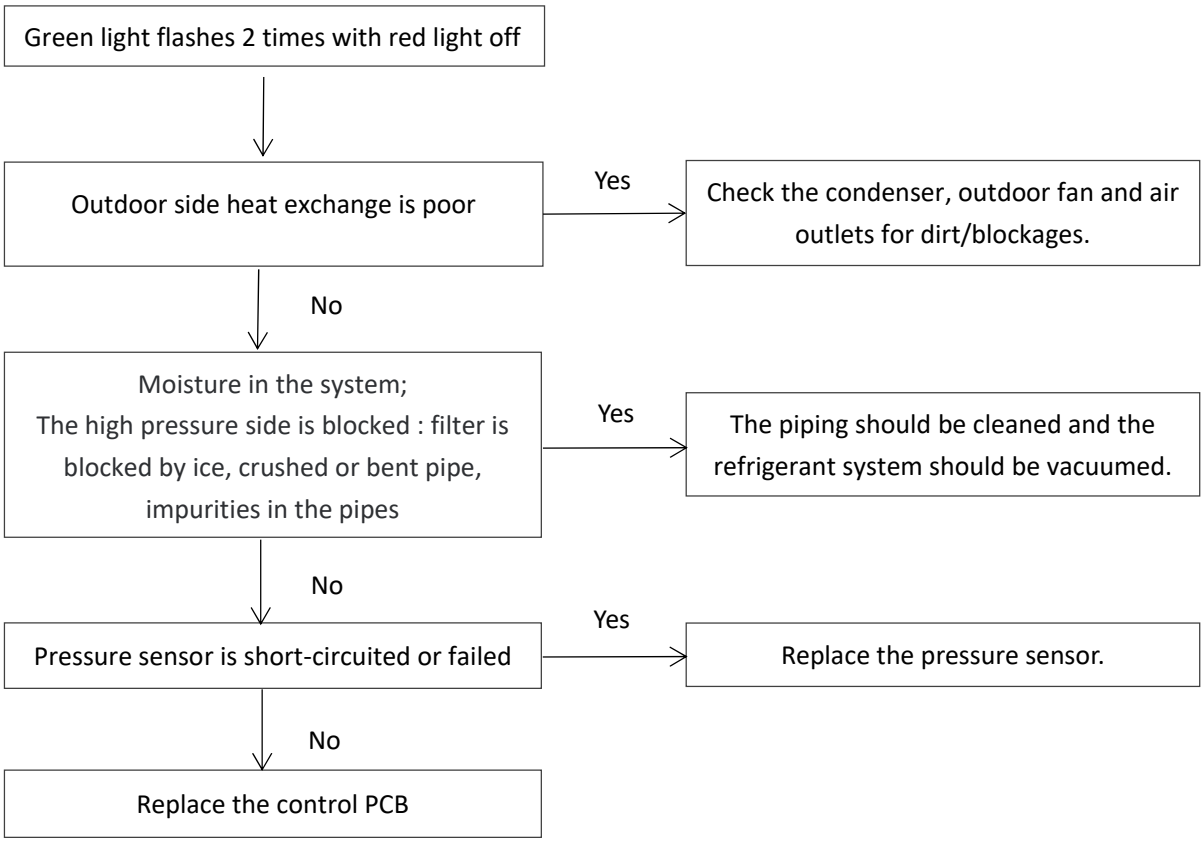
- Do not install or operate the unit for an extended period of time in areas of high humidity or in an environment directly exposing it to sea wind or salt spray.
- Do not install the unit on a defective or damaged installation stand, or in an unsecured location.
- Ensure the unit is installed at a level position
- Do not install the unit where noise or air discharge
- Created by the outdoor unit will negatively impact the environment or nearby residences.
- Do not expose skin directly to the air discharged by the unit for prolonged periods of time.
- Ensure the unit operates in areas water0r other liquids.
- Ensure the drain hose is installed correctly to ensure proper water drainage.
- When lifting or transporting the unit, it is recommended that two or more people are used for this task.
- When the unit is not to be used for an extended time, disconnect the power supply or turn off the breaker.

2.2 ATL Troubleshooting

- ATL indicates ambient temperature out of bounds protection.
- The unit stops running and will not start operating until the ambient temperature returns to the allowable temperature range, error code is displayed on the communication board.
- The allowable ambient temperature range is 5~125℉(-15~52℃).

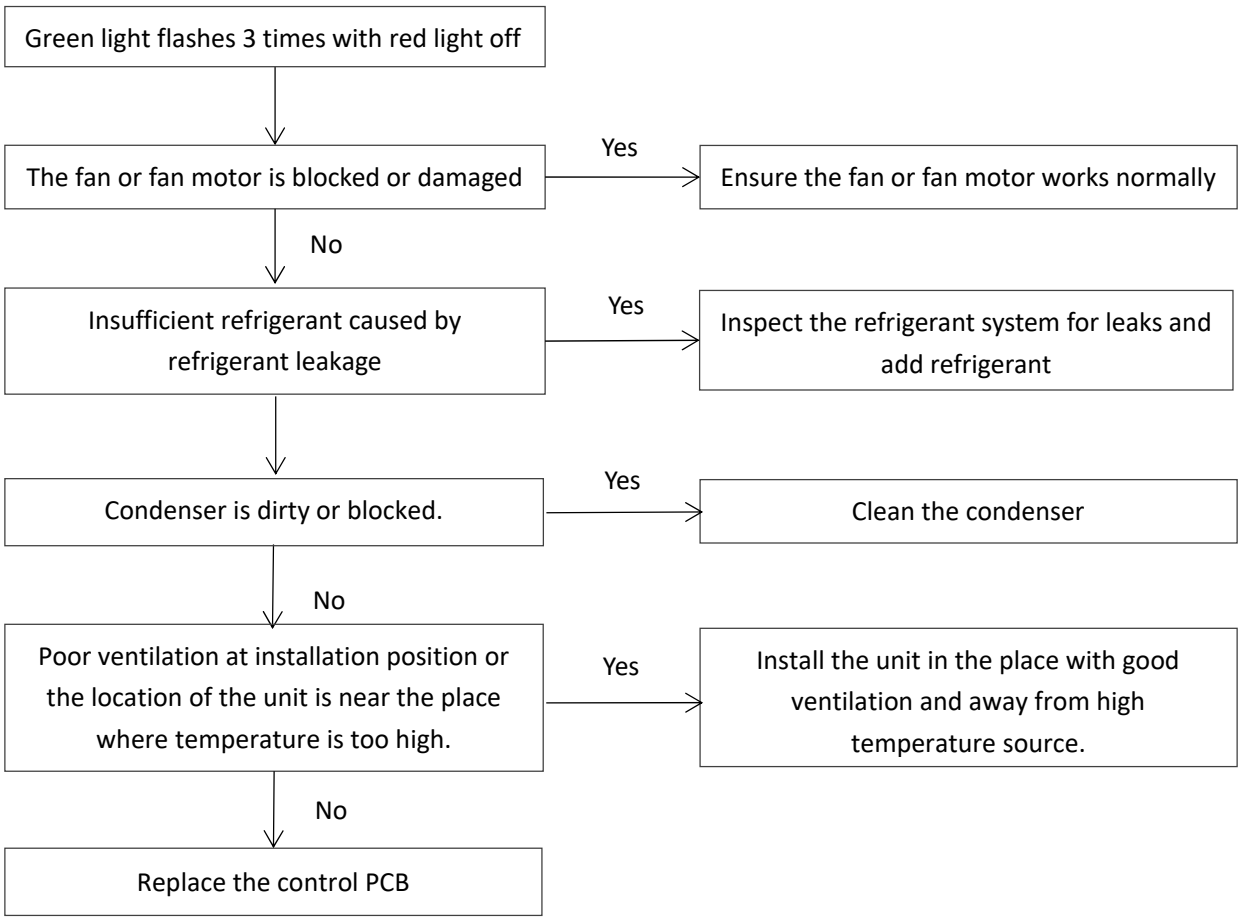
2.3 High Pressure Alert

■ Green light flashes 2 times with red light off indicates High Pressure Alert.



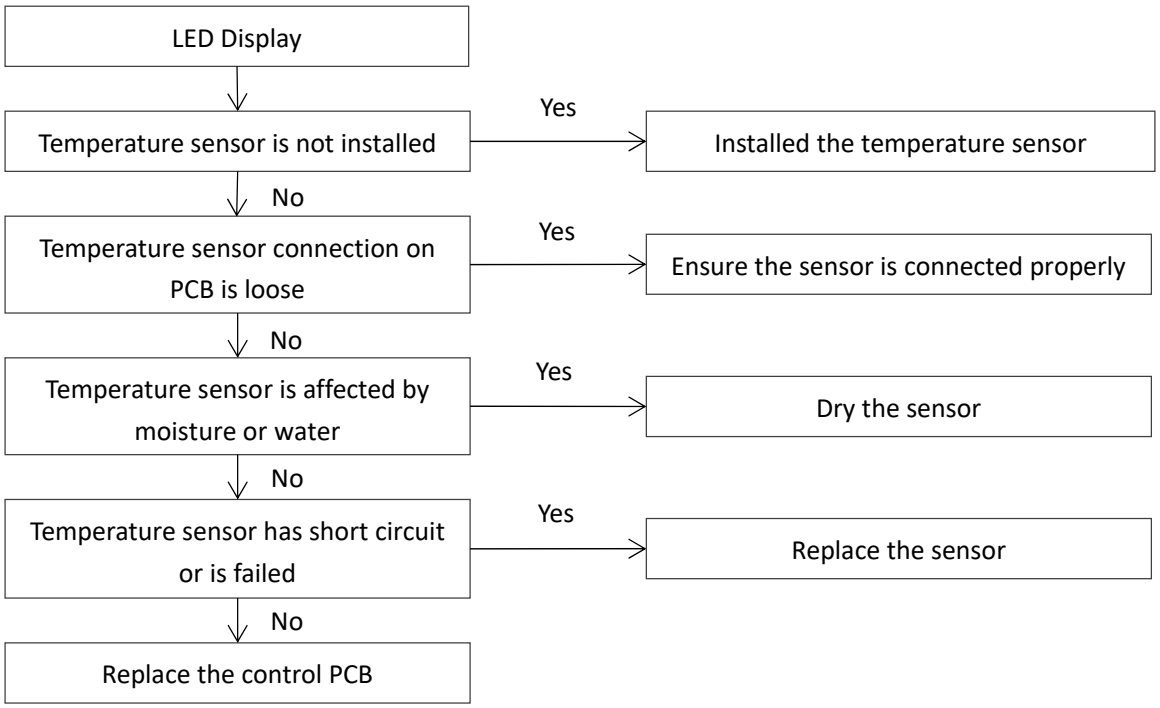
2.4 TP Exhaust Over-temperature Protection Troubleshooting

- Green light flashes 3 times with red light off indicates discharge temperature protection.
- The unit stops running and error code is displayed on the communication board.



2.5 T3/T4/TP Troubleshooting

- Green light flashes 5 times with red light off indicates Ambient Temperature Protection.
- Green light flashes 5 times with red light off indicates T3 Over-temperature Protection.
- Green light off with red light flashes 1 times indicates T3 Sensor Error.
- Green light off with red light flashes 2 times indicates T4 Sensor Error.
- Green light off with red light flashes 3 times indicates TP Sensor Error.
- Green light off with red light flashes 6 times indicates Exhaust Over-temperature Faults within 60 mins.



Note:

1) Measure sensor resistance. If the resistance is too low, the sensor has short-circuited. If the resistance is not consistent with the sensor's resistance characteristics table, the sensor has failed.

3. Temperature Sensor Resistance Characteristics

Outdoor ambient temperature sensor(T4) and condenser coil temperature sensor(T3) resistance characteristics.

Temperature (℃)	Resistance (kΩ)	Temperature (℃)	Resistance (kΩ)	Temperature (℃)	Resistance (kΩ)	Temperature (℃)	Resistance (kΩ)
-25	144.266	**15**	16.079	**55**	2.841	**95**	0.708
-24	135.601	**16**	15.313	**56**	2.734	**96**	0.686
-23	127.507	**17**	14.588	**57**	2.632	**97**	0.666
-22	119.941	**18**	13.902	**58**	2.534	**98**	0.646
-21	112.867	**19**	13.251	**59**	2.44	**99**	0.627
-20	106.732	**20**	12.635	**60**	2.35	**100**	0.609
-19	100.552	**21**	12.05	**61**	2.264	**101**	0.591
-18	94.769	**22**	11.496	**62**	2.181	**102**	0.574
-17	89.353	**23**	10.971	**63**	2.102	**103**	0.558
-16	84.278	**24**	10.473	**64**	2.026	**104**	0.542
-15	79.521	**25**	10	**65**	1.953	**105**	0.527
-14	75.059	**26**	9.551	**66**	1.883		
-13	70.873	**27**	9.125	**67**	1.816		
-12	66.943	**28**	8.721	**68**	1.752		
-11	63.252	**29**	8.337	**69**	1.69		
-10	59.784	**30**	7.972	**70**	1.631		
-9	56.524	**31**	7.625	**71**	1.574		
-8	53.458	**32**	7.296	**72**	1.519		
-7	50.575	**33**	6.982	**73**	1.466		
-6	47.862	**34**	6.684	**74**	1.416		
-5	45.308	**35**	6.401	**75**	1.367		
-4	42.903	**36**	6.131	**76**	1.321		
-3	40.638	**37**	5.874	**77**	1.276		
-2	38.504	**38**	5.63	**78**	1.233		
-1	36.492	**39**	5.397	**79**	1.191		
0	34.596	**40**	5.175	**80**	1.151		
1	32.807	**41**	4.964	**81**	1.113		
2	31.12	**42**	4.763	**82**	1.076		
3	29.528	**43**	4.571	**83**	1.041		
4	28.026	**44**	4.387	**84**	1.007		
5	26.608	**45**	4.213	**85**	0.974		
6	25.268	**46**	4.046	**86**	0.942		
7	24.003	**47**	3.887	**87**	0.912		
8	22.808	**48**	3.735	**88**	0.883		
9	21.678	**49**	3.59	**89**	0.855		
10	20.61	**50**	3.451	**90**	0.828		
11	19.601	**51**	3.318	**91**	0.802		
12	18.646	**52**	3.191	**92**	0.777		
13	17.743	**53**	3.069	**93**	0.753		
14	16.888	**54**	2.952	**94**	0.73		

Compressor exhaust temperature sensor (TP) resistance characteristics.

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-20	542.7	**20**	68.66	**60**	13.59	**100**	3.702
-19	511.9	**21**	65.62	**61**	13.11	**101**	3.595
-18	483	**22**	62.73	**62**	12.65	**102**	3.492
-17	455.9	**23**	59.98	**63**	12.21	**103**	3.392
-16	430.5	**24**	57.37	**64**	11.79	**104**	3.296
-15	406.7	**25**	54.89	**65**	11.38	**105**	3.203
-14	384.3	**26**	52.53	**66**	10.99	**106**	3.113
-13	363.3	**27**	50.28	**67**	10.61	**107**	3.025
-12	343.6	**28**	48.14	**68**	10.25	**108**	2.941
-11	325.1	**29**	46.11	**69**	9.902	**109**	2.86
-10	307.7	**30**	44.17	**70**	9.569	**110**	2.781
-9	291.3	**31**	42.33	**71**	9.248	**111**	2.704
-8	275.9	**32**	40.57	**72**	8.94	**112**	2.63
-7	261.4	**33**	38.89	**73**	8.643	**113**	2.559
-6	247.8	**34**	37.3	**74**	8.358	**114**	2.489
-5	234.9	**35**	35.78	**75**	8.084	**115**	2.422
-4	222.8	**36**	34.32	**76**	7.82	**116**	2.357
-3	211.4	**37**	32.94	**77**	7.566	**117**	2.294
-2	200.7	**38**	31.62	**78**	7.321	**118**	2.233
-1	190.5	**39**	30.36	**79**	7.086	**119**	2.174
0	180.9	**40**	29.15	**80**	6.859	**120**	2.117
1	171.9	**41**	28	**81**	6.641	**121**	2.061
2	163.3	**42**	26.9	**82**	6.43	**122**	2.007
3	155.2	**43**	25.86	**83**	6.228	**123**	1.955
4	147.6	**44**	24.85	**84**	6.033	**124**	1.905
5	140.4	**45**	23.89	**85**	5.844	**125**	1.856
6	133.5	**46**	22.89	**86**	5.663	**126**	1.808
7	127.1	**47**	22.1	**87**	5.488	**127**	1.762
8	121	**48**	21.26	**88**	5.32	**128**	1.717
9	115.2	**49**	20.46	**89**	5.157	**129**	1.674
10	109.8	**50**	19.69	**90**	5	**130**	1.632
11	104.6	**51**	18.96	**91**	4.849		
12	99.69	**52**	18.26	**92**	4.703		
13	95.05	**53**	17.58	**93**	4.562		
14	90.66	**54**	16.94	**94**	4.426		
15	86.49	**55**	16.32	**95**	4.294		
16	82.54	**56**	15.73	**96**	4.167		
17	78.79	**57**	15.16	**97**	4.045		
18	75.24	**58**	14.62	**98**	3.927		
19	71.86	**59**	14.09	**99**	3.812		