

ACIQ

24K-60K R32 DC-INVERTER ROOFTOP PACKAGE UNIT HEAT PUMP

SERVICE MANUAL

Models Covered:

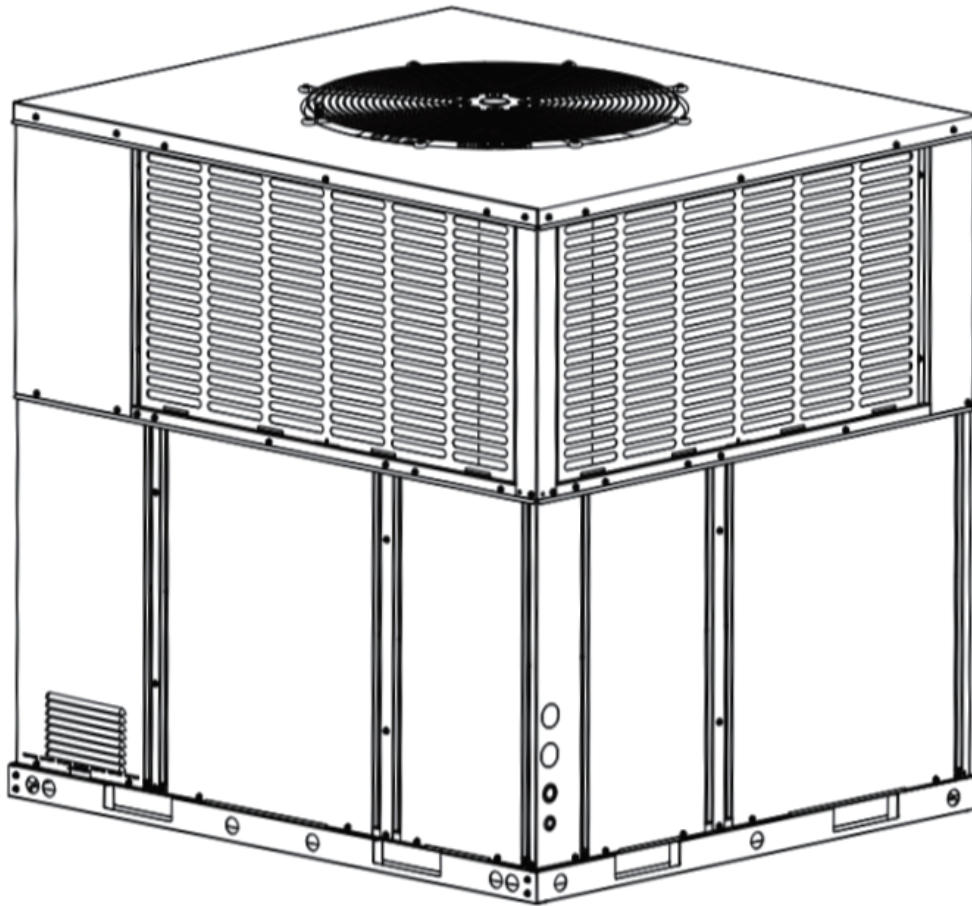
AC-I-24-INV-HP-PKG

AC-I-36-INV-HP-PKG

AC-I-48-INV-HP-PKG

AC-I-60-INV-HP-PKG

AC-I-60-INV-HP-3PH-PKG





VERSION DATE: 05-26-26

Part 1

General Information

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1 Product lineup

Model	Capacity(Btu/h)		Appearance
	Cooling	Heating	
AC-I-24-INV-HP-PKG	24000	25000	
AC-I-36-INV-HP-PKG	34200	34200	
AC-I-48-INV-HP-PKG	48000	48000	
AC-I-60-INV-HP-PKG	55000	57000	
AC-I-60-INV-HP-3PH-PKG	55000	57000	

2 Specifications

Model			AC-I-24-INV-HP-PKG	AC-I-36-INV-HP-PKG	AC-I-48-INV-HP-PKG	AC-I-60-INV-HP-PKG	AC-I-60-INV-HP-3PH-PKG	
Power supply		V-Ph-Hz	208~230V/1PH/60HZ	208~230V/1PH/60HZ	208~230V/1PH/60HZ	208~230V/1PH/60HZ	208~230V/3PH/60HZ	
Cooling	Capacity	Btu/h	24000	34200	48000	55000	55000	
	Input	kW	1.97	3.17	4.29	5.19	5.19	
	SEER2	Btu/W	19.0	18.5	19.0	18.5	18.5	
	EER2	Btu/W	12.20	10.80	11.20	10.60	10.60	
Heating	Capacity	Btu/h	25000	34200	48000	57000	57000	
	Input	kW	2.10	2.85	3.84	4.96	4.96	
	HSPF2	Btu/h.W	9.5	8.2	9.0	8.8	8.8	
Min. Brch. Cir. Ampacity		A	25.90	29.65	38.95	41.45	26.45	
Max. Overcurrent Protection		A	41.44	47.44	58.00	65.90	65.90	
Compressor		Brand	GMCC	GMCC	GMCC	GMCC	GMCC	
		Type	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary	
Refrigerant type		Type	R32	R32	R32	R32	R32	
		oz(kg)	102.3(2.9)	102.3(2.9)	169.3(4.80)	169.3(4.80)	169.3(4.80)	
Outdoor Fan		Type	BLDC Motor	BLDC Motor	BLDC Motor	BLDC Motor	BLDC Motor	
		CFM	3200@0.0 in. w.g.	3200@0.0 in. w.g.	4300@0.0 in. w.g.	4300@0.0 in. w.g.	4300@0.0 in. w.g.	
Indoor Fan		Type	ECM Motor	ECM Motor	ECM Motor	ECM Motor	ECM Motor	
		CFM	860@0.50 in. w.g.	1120@0.50 in. w.g.	1680@0.50 in. w.g.	1710@0.50 in. w.g.	1710@0.50 in. w.g.	
Dimension		Unit (W*D*H)	m	1288×890×1190			1310×1138×1306	
			in	50-45/64×35-3/64×46-27/32			51-9/16×44-13/16×51-7/16	
		Packing (W*D*H)	m	1306×906×1228			1328×1154×1312	
			in	51-27/64×35-43/64×48-11/32			52-9/32×45-7/16×51-21/32	
Net / Gross weight		kg	188/194	188/194	250/258	250/258		
		lbs	415/428	415/428	551/569	551/569		
Operation temp. range		Cooling	°C/°F			-5-52/23-125		
		Heating	°C/°F			-20-30/-4-86		

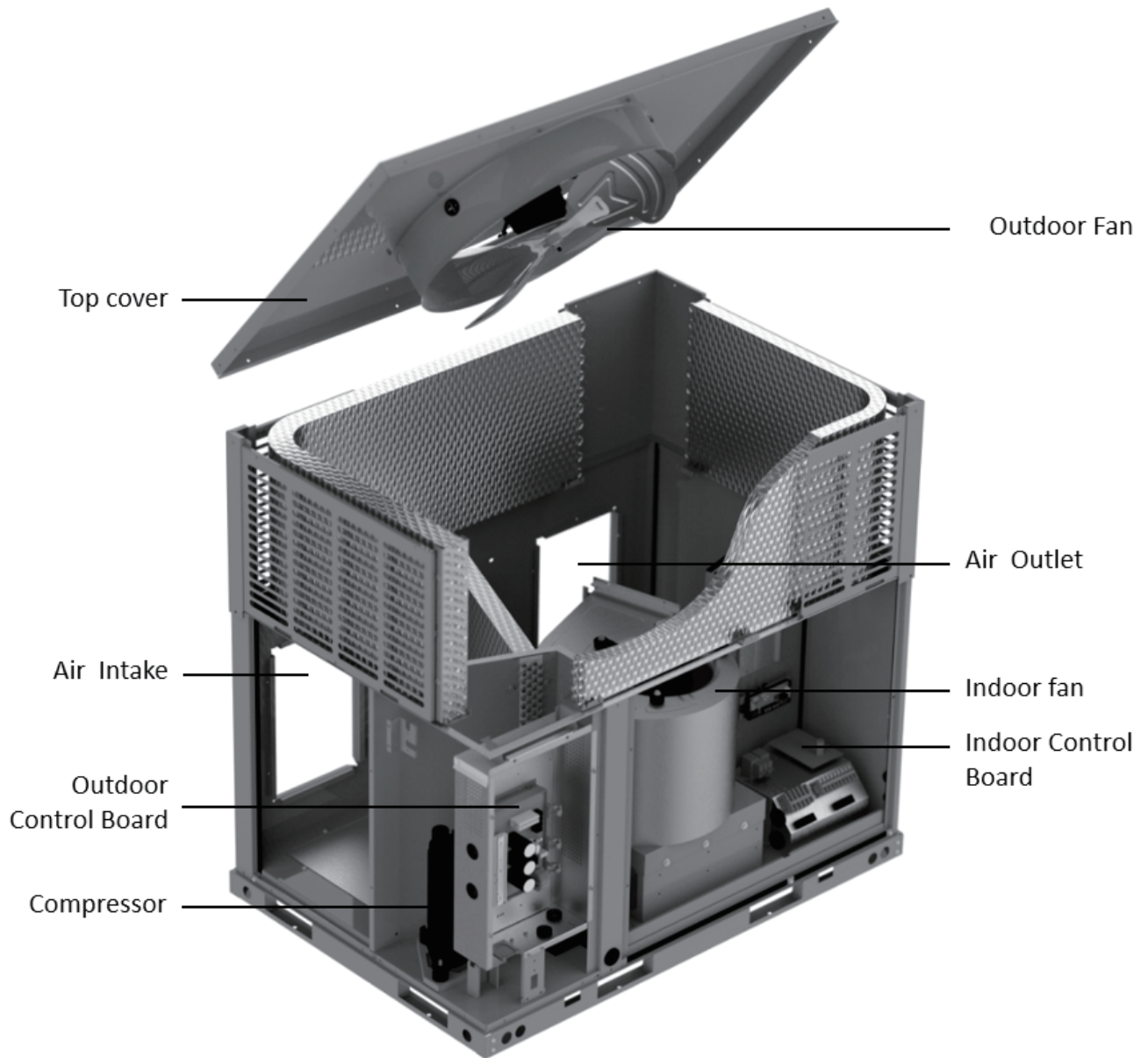
Part 2

Component Layout and Refrigerant Circuit

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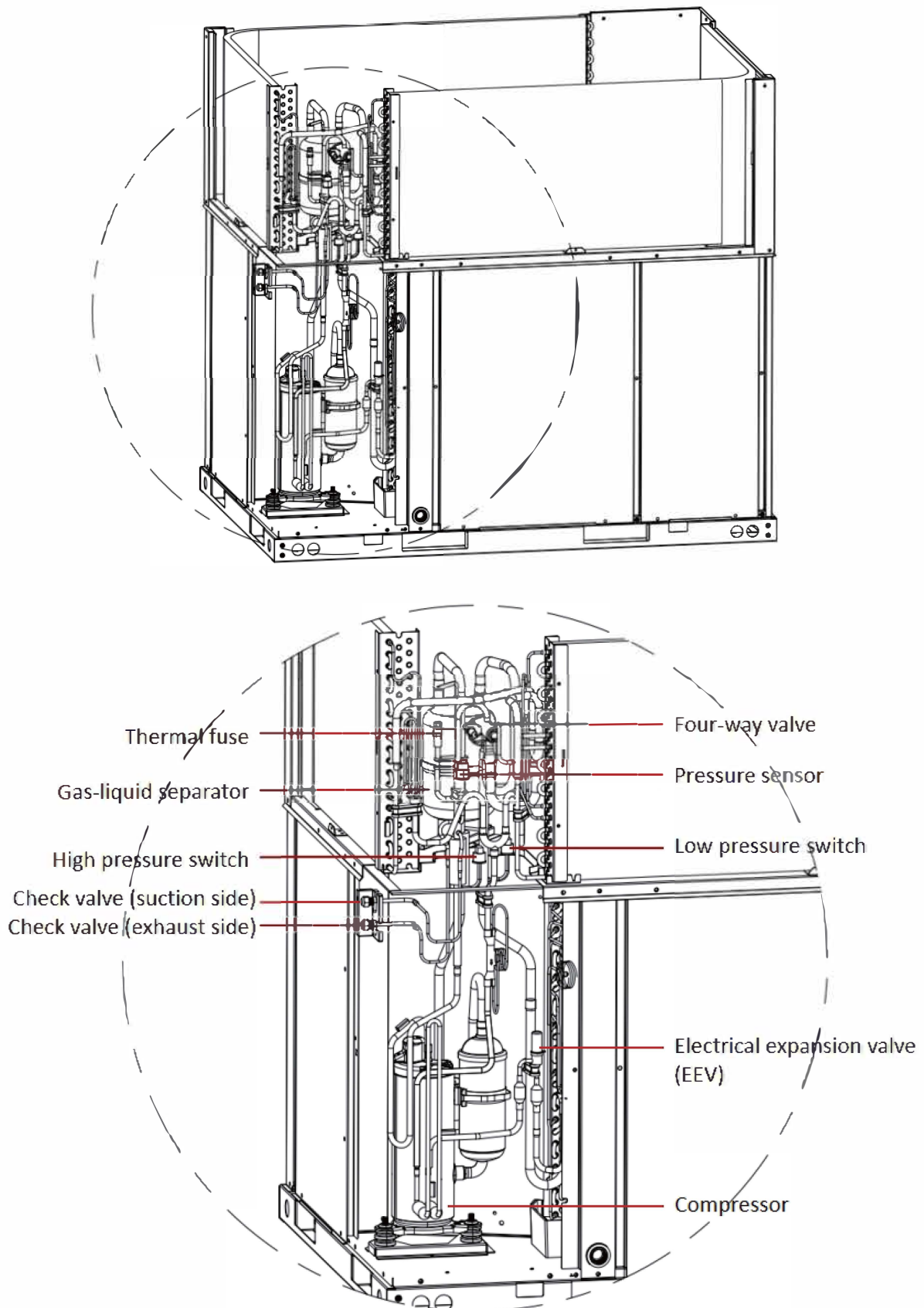
1 Layout Functional Components

1.1 Structure of the unit and main components

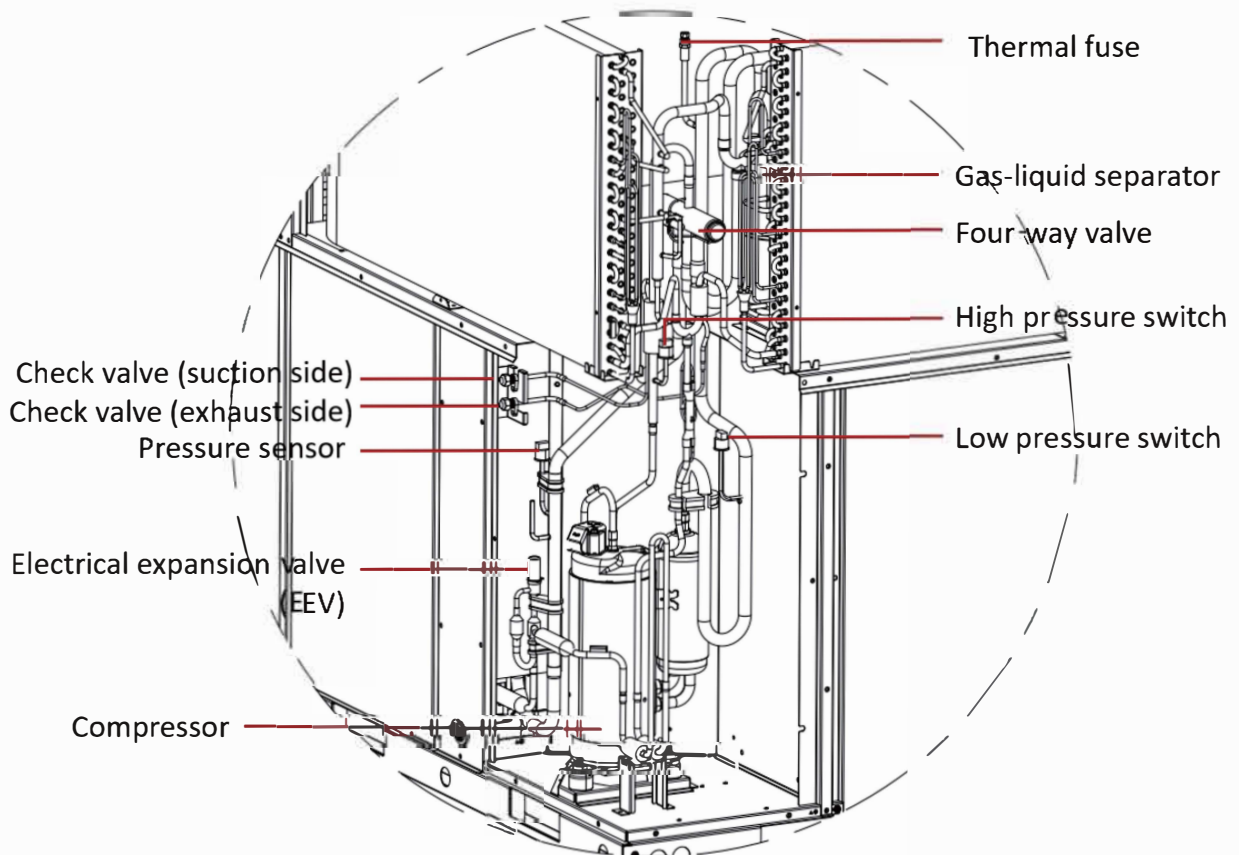
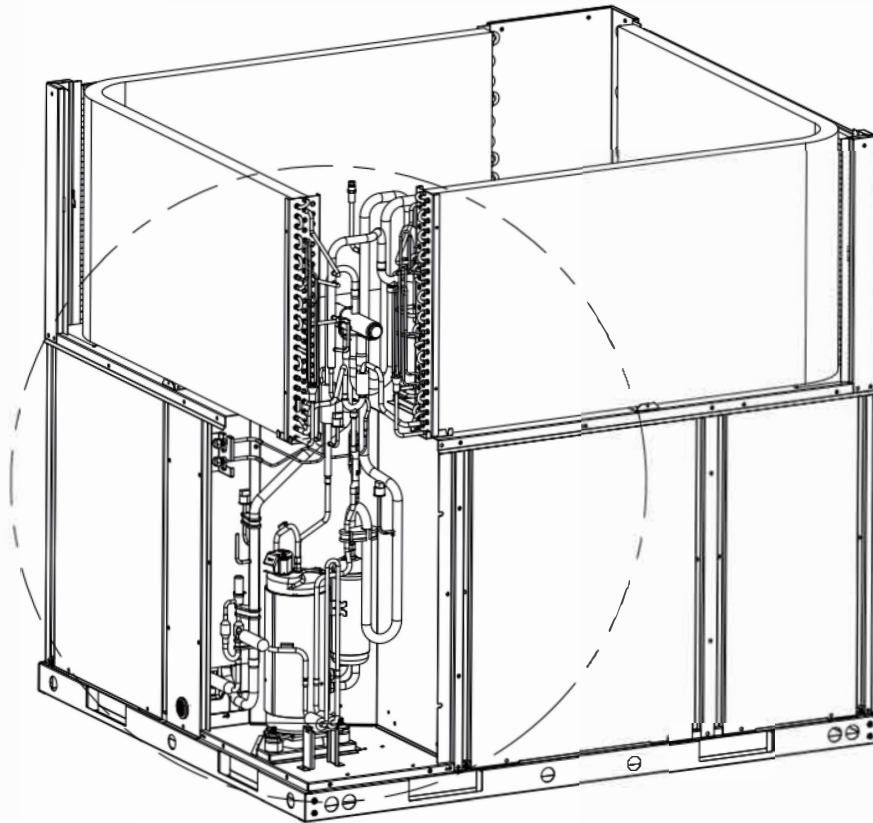


1.2 Refrigerant system and main components

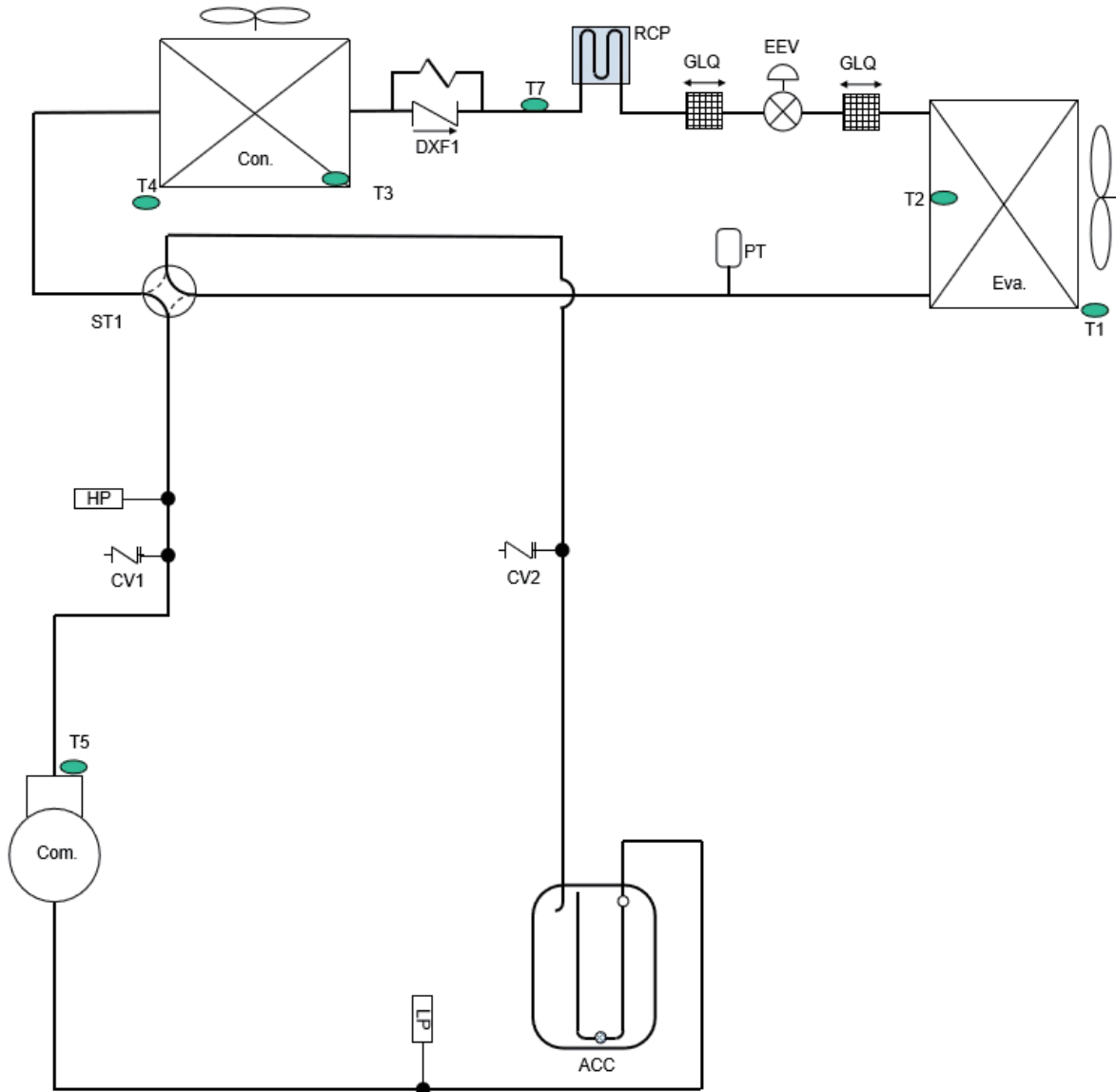
AC-I-24-INV-HP-PKG & AC-I-36-INV-HP-PKG



AC-I-48-INV-HP-PKG, AC-I-60-INV-HP-PKG, & AC-I-60-INV-HP-3PH-PKG



2 Piping diagrams



NO.	Component(Outdoor unit)	NO.	Component(Outdoor unit)
Com.	Compressor	T7	Refrigerant cooling pipe inlet temperature sensor
T5	Exhaust temperature sensor	RCP	Refrigerant cooling pipe
CV1	Check valve1	GLQ	Filter
HP	High pressure switch	EEV	Electrical expansion valve
PT	Pressure transducer	Eva.	Evaporator
ST1	Four-way valve	T1	Room temperature sensor
Con.	Condenser	T2	Indoor pipe temperature sensor
T3	Condenser coil temperature sensor	CV2	Check valve2
T4	Ambient temperature sensor	ACC	Gas-liquid separator
DXF1	One-way valve	LP	Low pressure switch

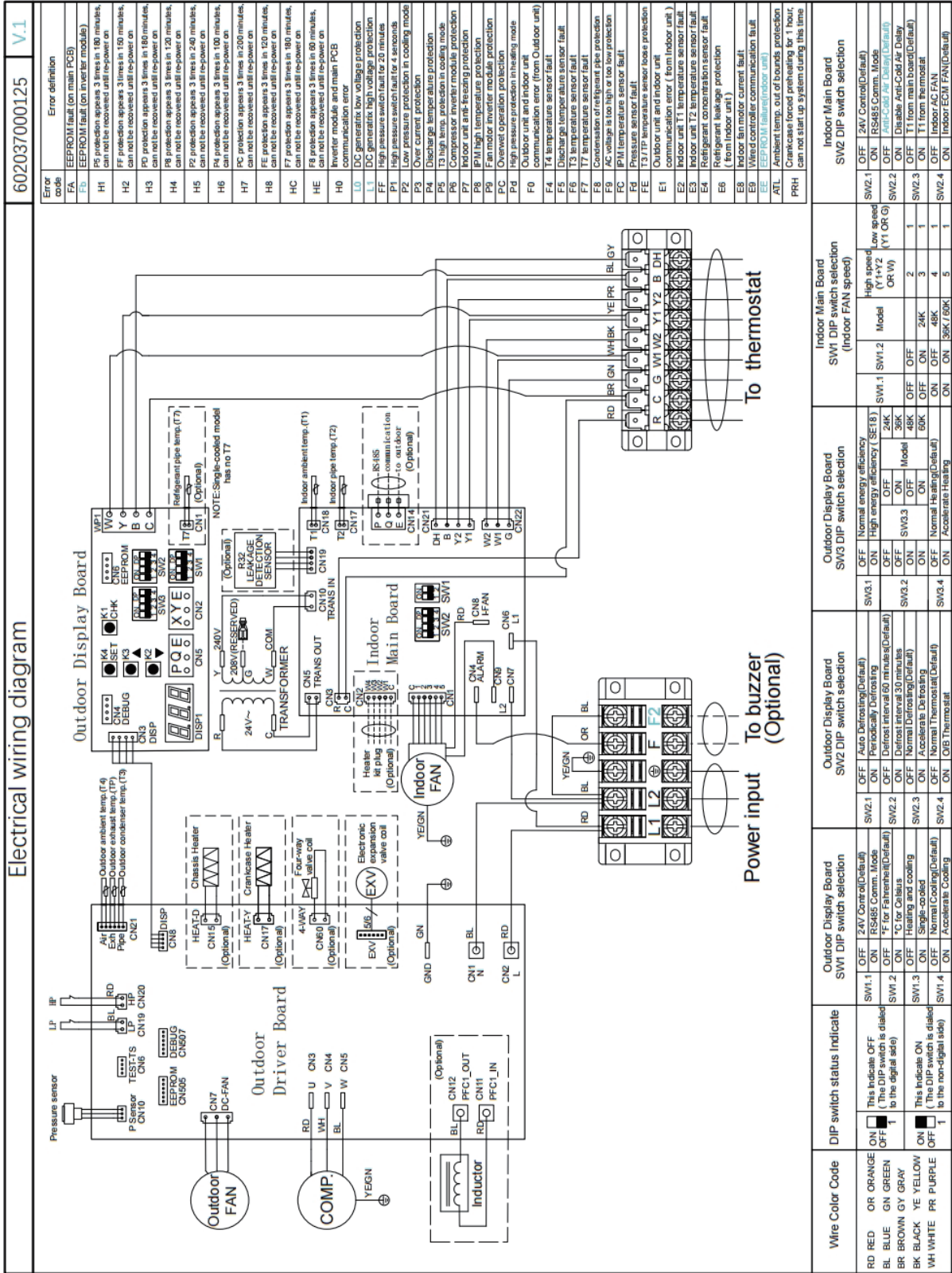
Part 3

Wiring Diagram

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1 Electric wiring diagram

Single-phase rooftop



Wire Color Code & Definition of DIP Switch

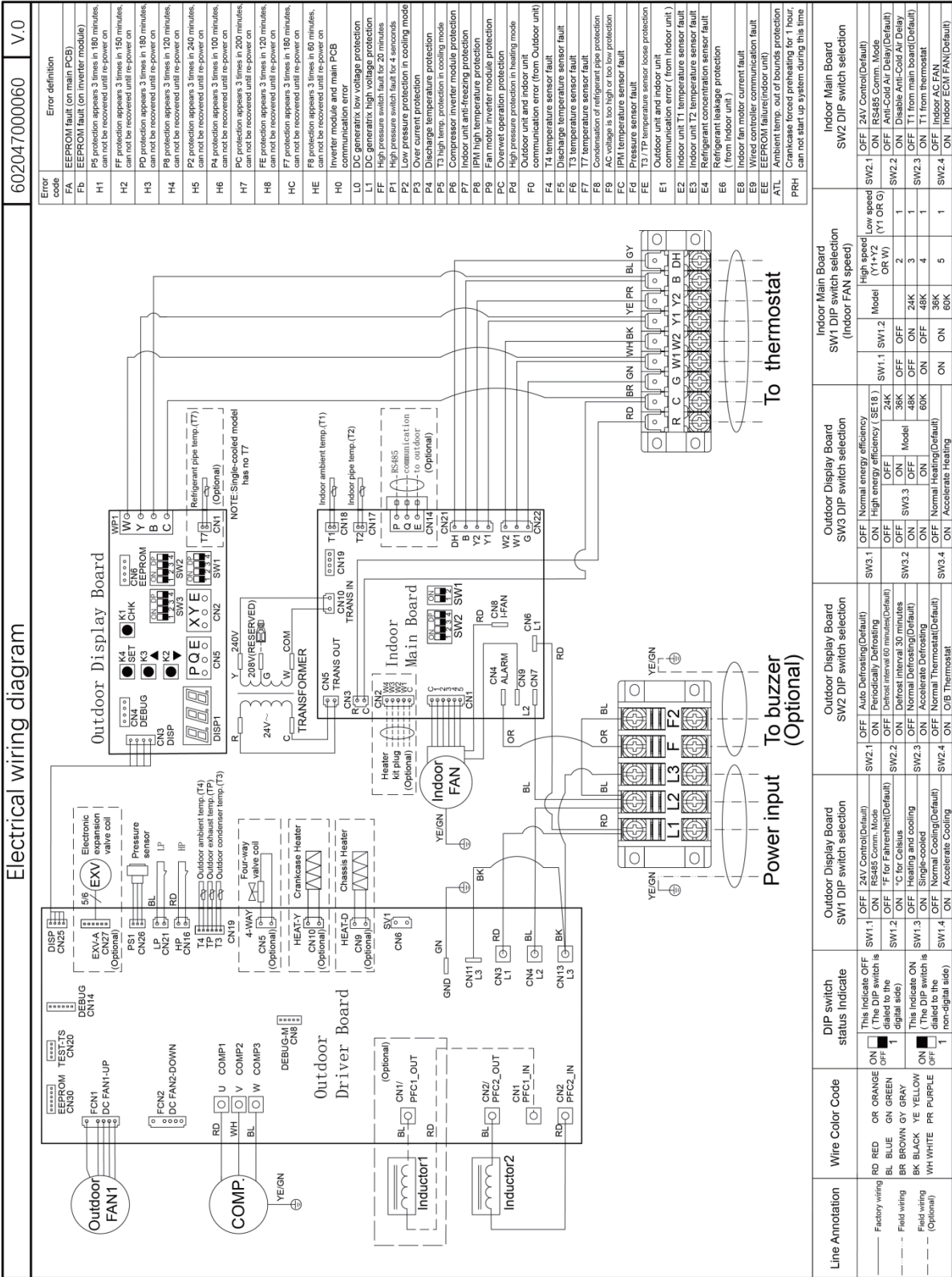
Wire Color Code	DIP switch status Indicate	
RD RED OR ORANGE BL BLUE GN GREEN BR BROWN GY GRAY	ON <input type="checkbox"/> OFF <input checked="" type="checkbox"/>	This Indicate OFF (The DIP switch is dialed to the digital side)
BK BLACK YE YELLOW WH WHITE PR PURPLE	ON <input checked="" type="checkbox"/> OFF <input type="checkbox"/>	This Indicate ON (The DIP switch is dialed to the non-digital side)

Outdoor Display Board SW1 DIP switch selection			Outdoor Display Board SW2 DIP switch selection			Outdoor Display Board SW3 DIP switch selection				
SW1.1	OFF	24V Control(Default)	SW2.1	OFF	Auto Defrosting(Default)	SW3.1	OFF	Normal energy efficiency		
	ON	RS485 Comm. Mode		ON	Periodically Defrosting		ON	High energy efficiency (SE18)		
SW1.2	OFF	°F for Fahrenheit(Default)	SW2.2	OFF	Defrost interval 60 minutes(Default)	SW3.2	OFF	SW3.3	OFF	24K
	ON	°C for Celsius		ON	Defrost interval 30 minutes		ON		36K	
SW1.3	OFF	Heating and cooling	SW2.3	OFF	Normal Defrosting(Default)		OFF		48K	
	ON	Single-cooled		ON	Accelerate Defrosting		ON		60K	
SW1.4	OFF	Normal Cooling(Default)	SW2.4	OFF	Normal Thermostat(Default)	SW3.4	OFF	Normal Heating(Default)		
	ON	Accelerate Cooling		ON	O/B Thermostat		ON	Accelerate Heating		

Indoor Main Board SW1 DIP switch selection (Indoor FAN speed)					Indoor Main Board SW2 DIP switch selection			
SW1.1	SW1.2	Model	High speed (Y1+Y2 OR W)	Low speed (Y1 OR G)	SW2.1	OFF	24V Control(Default)	
						ON	RS485 Comm. Mode	
OFF	OFF		2	1	SW2.2	OFF	Anti-Cold Air Delay(Default)	
						ON	Disable Anti-Cold Air Delay	
OFF	ON	24K	3	1	SW2.3	OFF	T1 from main board(Default)	
ON	OFF	48K	4	1		ON	T1 from thermostat	
ON	ON	36K / 60K	5	1	SW2.4	OFF	Indoor AC FAN	
						ON	Indoor ECM FAN(Default)	

Three-phase rooftop

Electrical wiring diagram



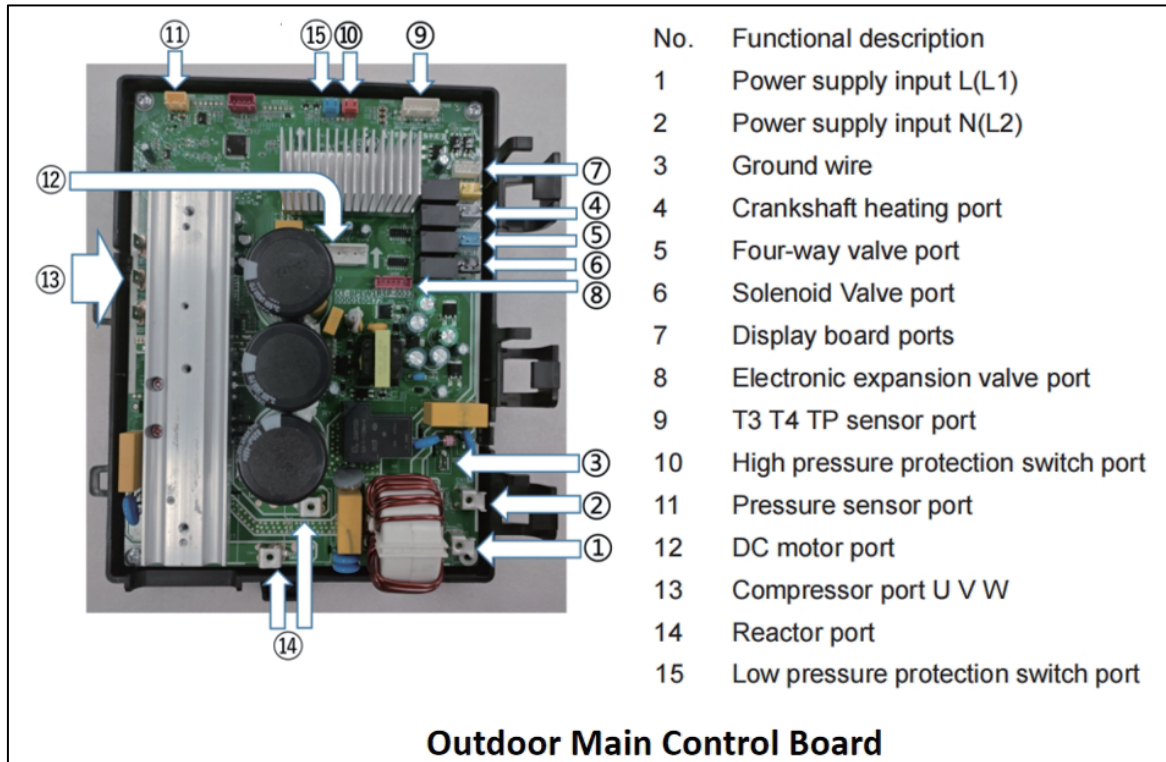
Wire Color Code	DIP switch status Indicate	
RD RED OR ORANGE BL BLUE GN GREEN BR BROWN GY GRAY BK BLACK YE YELLOW WH WHITE PR PURPLE	ON <input type="checkbox"/> OFF <input checked="" type="checkbox"/>	This Indicate OFF (The DIP switch is dialed to the digital side)
	ON <input checked="" type="checkbox"/> OFF <input type="checkbox"/>	This Indicate ON (The DIP switch is dialed to the non-digital side)

Outdoor Display Board SW1 DIP switch selection			Outdoor Display Board SW2 DIP switch selection		
SW1.1	OFF	24V Control(Default)	SW2.1	OFF	Auto Defrosting(Default)
	ON	RS485 Comm. Mode		ON	Periodically Defrosting
SW1.2	OFF	°F for Fahrenheit(Default)	SW2.2	OFF	Defrost interval 60 minutes(Default)
	ON	°C for Celsius		ON	Defrost interval 30 minutes
SW1.3	OFF	Heating and cooling	SW2.3	OFF	Normal Defrosting(Default)
	ON	Single-cooled		ON	Accelerate Defrosting
SW1.4	OFF	Normal Cooling(Default)	SW2.4	OFF	Normal Thermostat(Default)
	ON	Accelerate Cooling		ON	O/B Thermostat

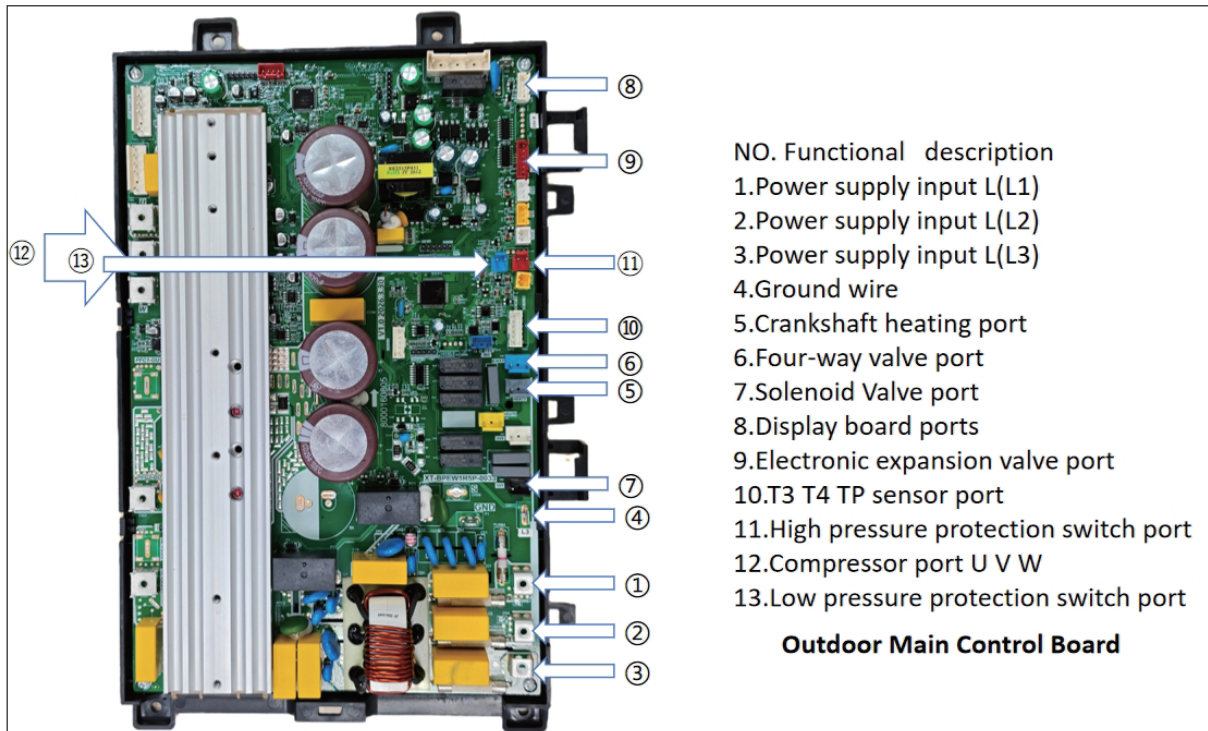
Outdoor Display Board SW3 DIP switch selection				Indoor Main Board SW1 DIP switch selection (Indoor FAN speed)					Indoor Main Board SW2 DIP switch selection										
SW3.1	OFF	Normal energy efficiency		SW1.1	SW1.2	Model	High speed (Y1+Y2 OR W)	Low speed (Y1 OR G)	SW2.1	OFF	24V Control(Default)								
	ON	High energy efficiency (SE18)								ON	RS485 Comm. Mode								
SW3.2	OFF	SW3.3	OFF	Model	SW1.1	SW1.2	Model	High speed (Y1+Y2 OR W)	Low speed (Y1 OR G)	SW2.2	OFF	Anti-Cold Air Delay(Default)							
	ON		ON								24K	2	1	ON	Disable Anti-Cold Air Delay				
	ON		OFF							48K	OFF	ON	24K	3	1	SW2.3	OFF	T1 from main board(Default)	
	ON		ON							60K	ON	OFF	48K	4	1		ON	T1 from thermostat	
SW3.4	OFF	Normal Heating(Default)		SW1.1	SW1.2	Model	High speed (Y1+Y2 OR W)	Low speed (Y1 OR G)	SW2.4	OFF	Indoor AC FAN								
	ON	Accelerate Heating								ON	ON	36K 60K	5	1	ON	Indoor ECM FAN(Default)			

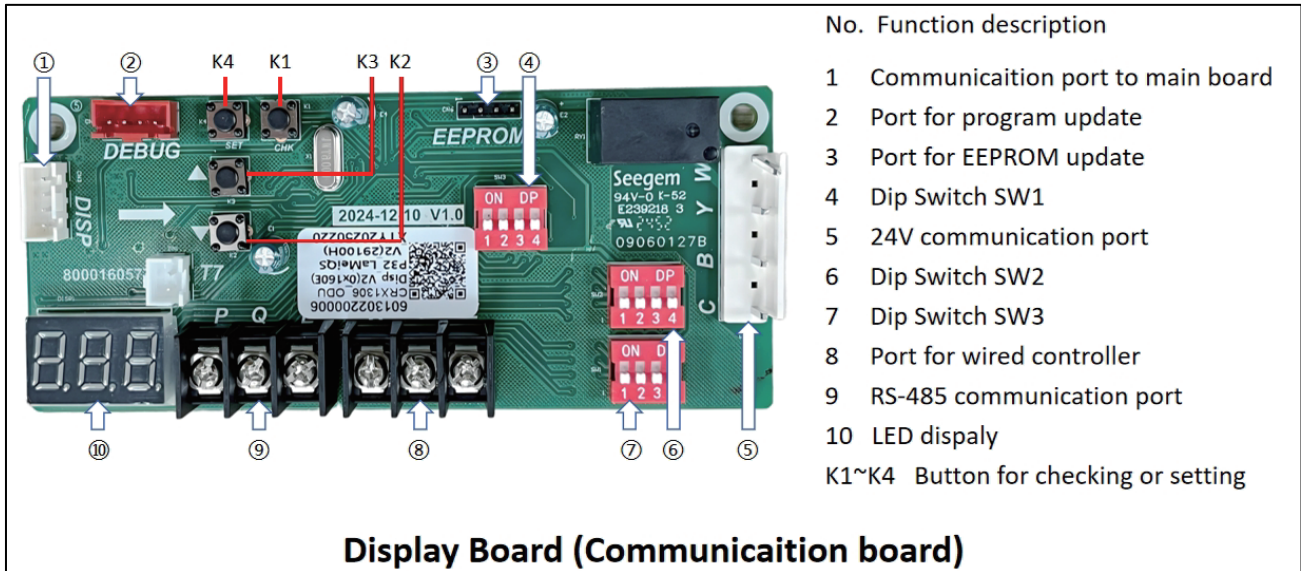
2 PCB

Single-phase rooftop



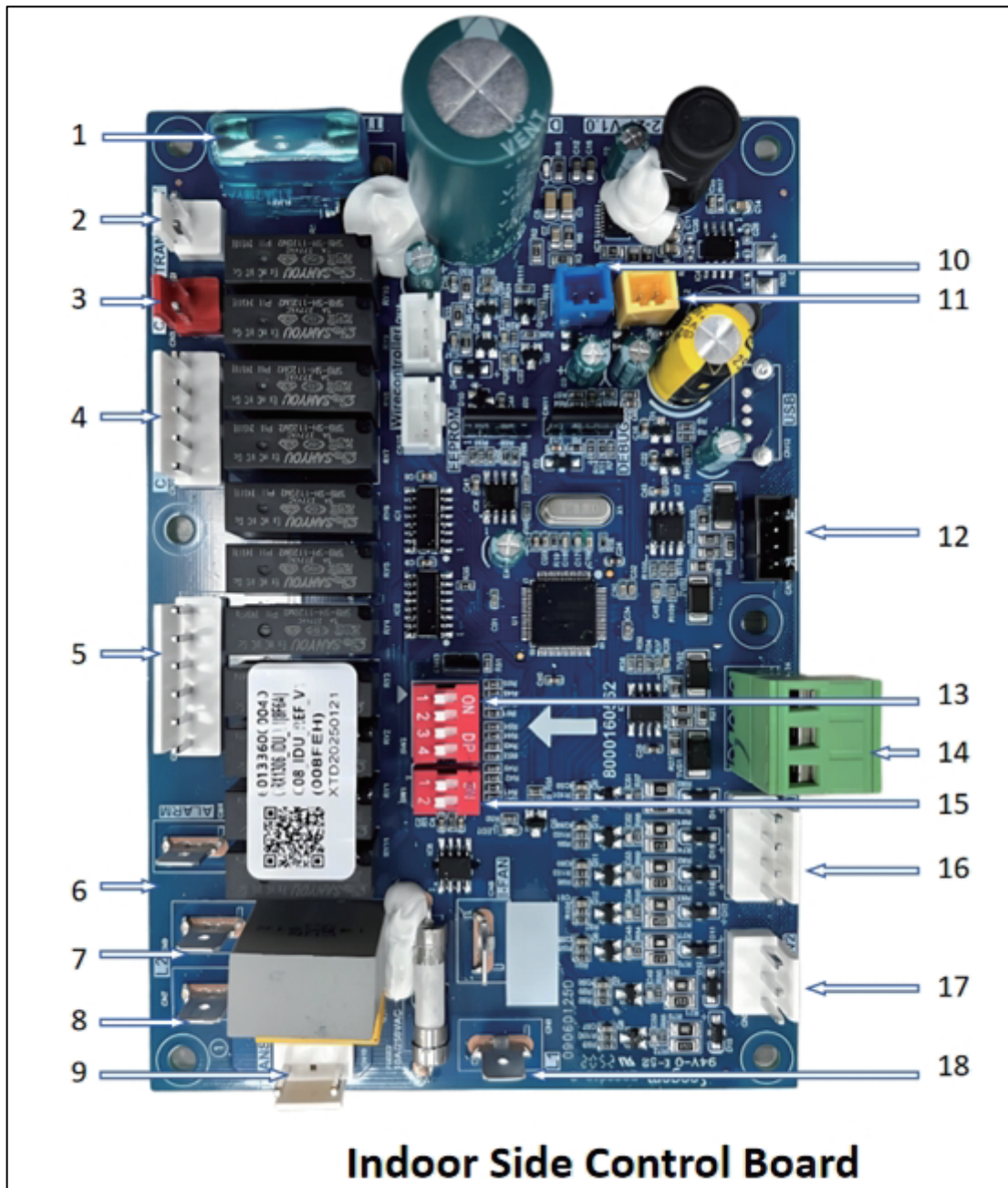
Three-phase rooftop





Definition and uses of the button

- K1: Press "K1" once to enter the outdoor unit parameter inspection.
- K2: Press "K2" to view the parameters in sequence.
- K3: Press "K3" to view the parameters in reverse order.
- K4: "SET" button used to enter forced cooling mode to recover the refrigerant.



Indoor Side Control Board

No.	Port Names and Definitions	No.	Port Names and Definitions
1	Fuse	10	Port for room temperature sensor T1
2	24V trans in from transformer	11	Port for indoor coil temperature sensor T2
3	Port to 24V thermostat(R/C)	12	Port for refrigerant concentration monitor
4	Port for electrical heater(reserved)	13	DIP Switch-SW2
5	Port for indoor fan motor	14	RS-485 communication port
6	Connect to "F" terminal of the terminal block	15	DIP Switch-SW1
7	Connect to indoor fan motor(optional)	16	Port to 24V thermostat(DH/B/Y2/Y1)
8	Connect to power supply-L2	17	Port to 24V thermostat(W2/W1/G)
9	220V trans out to transformer	18	Connect to power supply-L1

3 Auxiliary electrical heater



3.1 electrical data

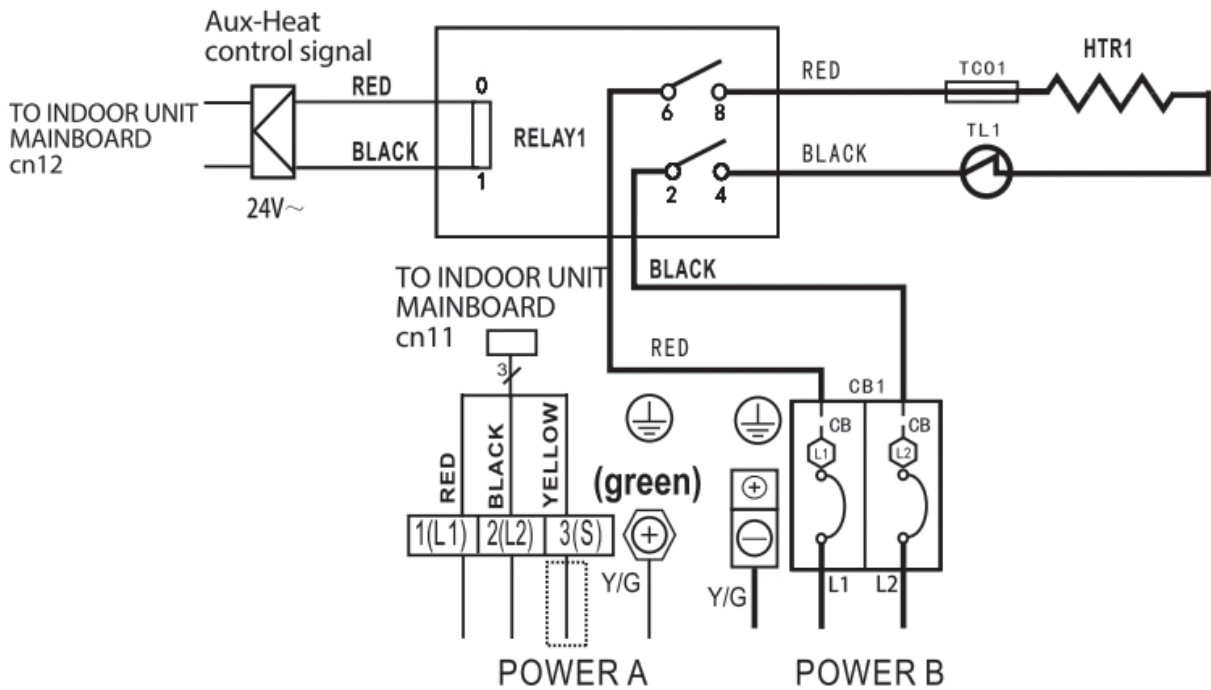
Model	kW 208/240	Heater Kit FLA (A)	Minimum CKT AMPS (A)	Rating of overcurrent protective device or HACR breaker (A)
AC-I-05-EAH-PKG	3.8/5	18.2/20.8	23/26	2
AC-I-07-EAH-PKG	5.6/7.5	27.9/31.9	35/40	2
AC-I-10-EAH-PKG	7.5/10	36.3/41.7	46/53	2
AC-I-15-EAH-PKG	11.3/15	55.1/62.6	69/79	3
AC-I-20-EAH-PKG	15/20	72.8/83.3	91/105	3

3.2 Wiring diagram

Specification	Number of circuit breakers	Number of relays	Number of power cord groups	Number of power cord grounding screws
5kW	1	1	2	2
8kW	1	2	2	2
10kW	1	2	2	2
15kW	2	4	3	3
20kW	2	4	3	3

5kW Heat Kit

-  : THERMAL CUT-OUT(Cut-off temperature 98°C, holding temperature 83°C, limiting temperature 410°C.)
-  : THERMAL LINK, SELF-RESETTING(Break-off temperature 60 ± 3°C, reset temperature 43 ± 6°C.)









NOTE1: 

This symbol indicates the element is optional, The wiring type of the actual unit shall prevail.

NOTE2:

Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

Round hole number	Relay number	Round hole number	Circuit breaker number
	RELAY 1		CB1
			
			
			
			



NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.

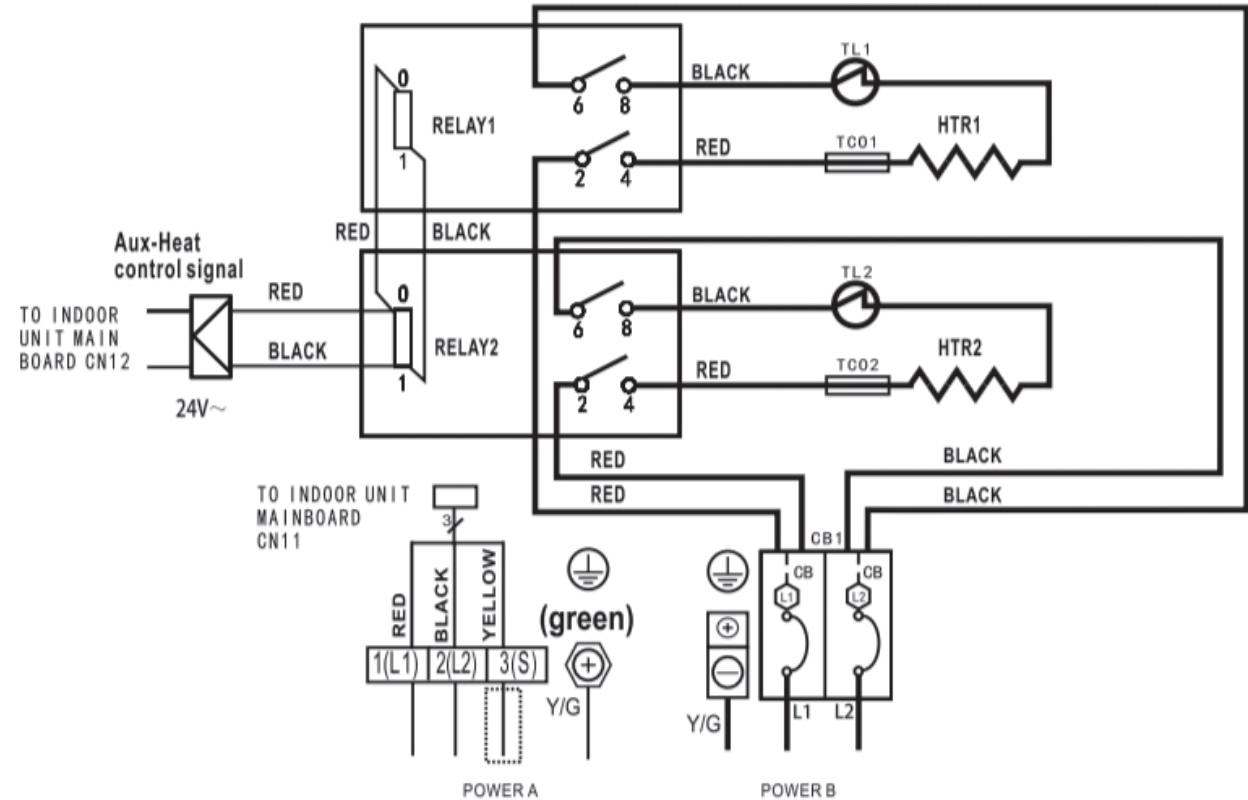
NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.

The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.



8/10kW Heat Kit

-  : THERMAL CUT-OUT(Cut-off temperature 98°C, holding temperature 83°C, limiting temperature 410°C.)
-  : THERMAL LINK, SELF-RESETTING(Break-off temperature 60 ± 3°C, reset temperature 43 ± 6°C.)



NOTE1: 

This symbol indicates the element is optional, The wiring type of the actual unit shall prevail.

NOTE2:

Please attach the nameplate to the cover of the electric control box. All the round holes located on the plate represent numbers. Please refer to the Installation Manual for details.

Round hole number	Relay number	Round hole number	Circuit breaker number
⊙	RELAY 1	⊙	CB1
⊙⊙	RELAY 2		
⊙⊙⊙			
⊙⊙⊙⊙			
⊙⊙⊙⊙⊙			

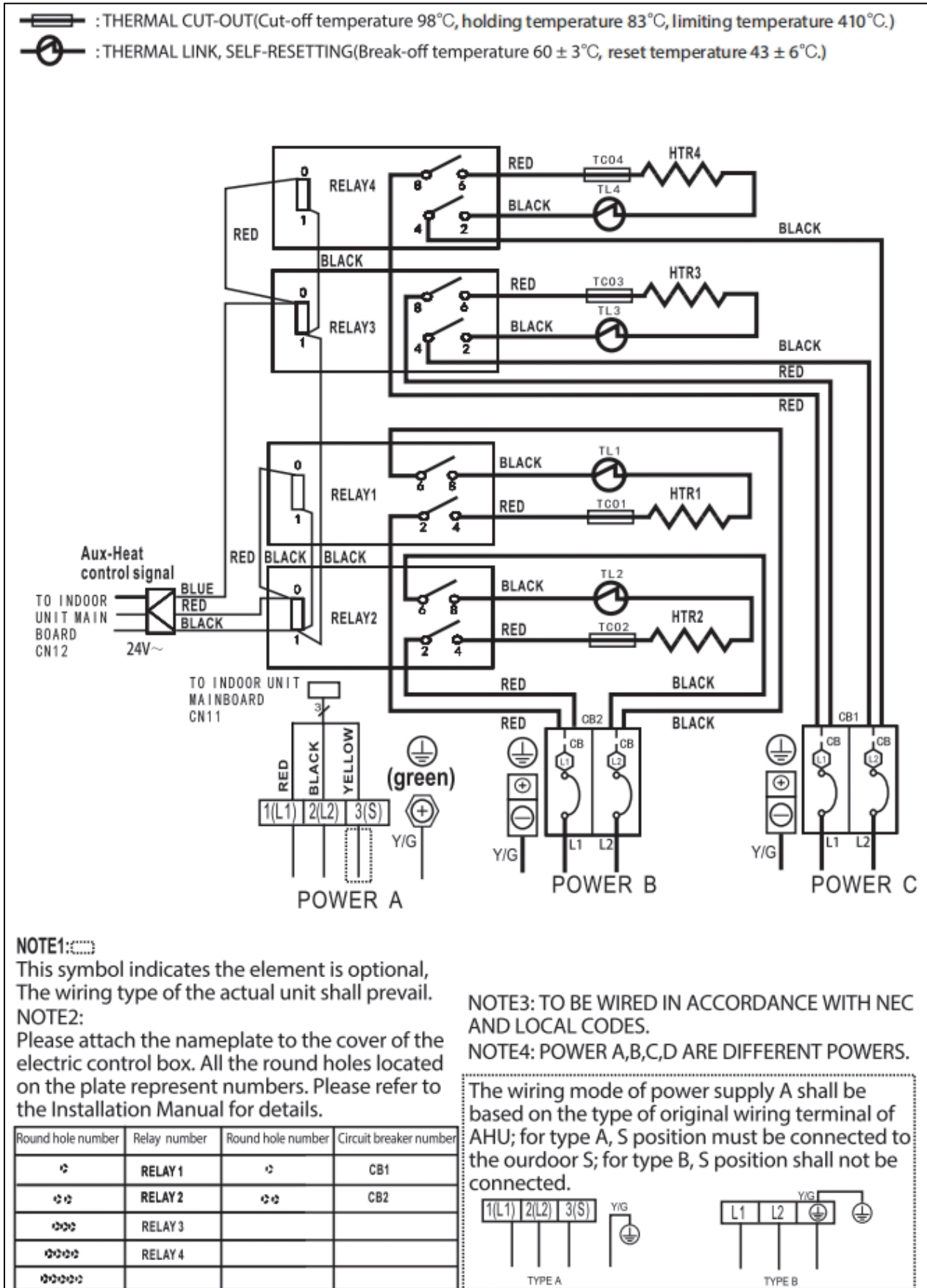
NOTE3: TO BE WIRED IN ACCORDANCE WITH NEC AND LOCAL CODES.

NOTE4: POWER A,B,C,D ARE DIFFERENT POWERS.

The wiring mode of power supply A shall be based on the type of original wiring terminal of AHU; for type A, S position must be connected to the outdoor S; for type B, S position shall not be connected.



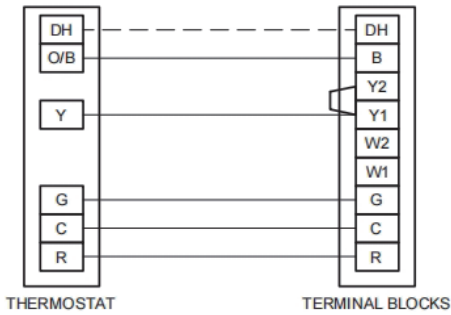
15/20kW Heat Kit



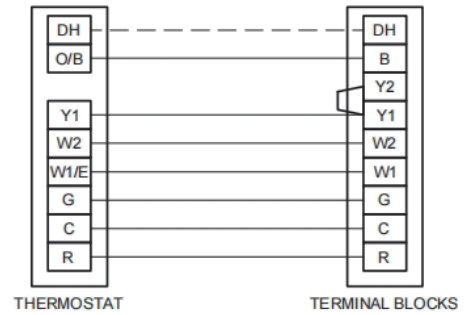
4 Low voltage wiring diagram

The following wiring diagram are suitable for the unit with 24V thermostat.

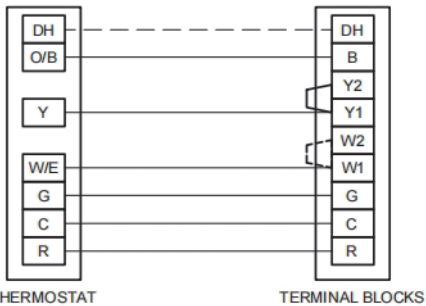
Wiring for 1H and 1C thermostat
(Y1/Y2 jumped for fan control, not related to compressor operation.)



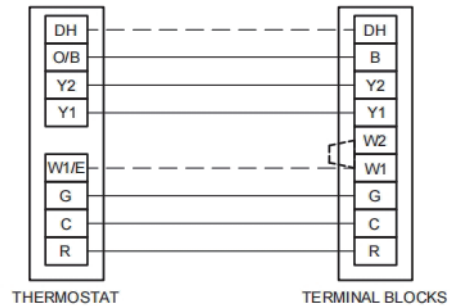
Wiring for 3H and 1C thermostat
(Y1/Y2 jumped for fan control, not related to compressor operation.)



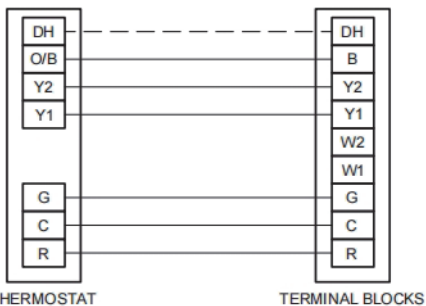
Wiring for 2H and 1C thermostat
(Y1/Y2 jumped for fan control, not related to compressor operation.)



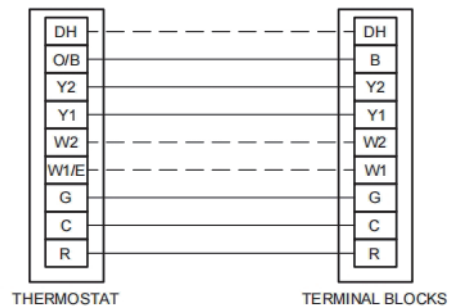
Wiring for 3H and 2C thermostat
(2-COOL here represents 2 stages of fan cooling only, the compressor modulates separately from the fan.)



Wiring for 2H and 2C thermostat
(2-COOL here represents 2 stages of fan cooling only, the compressor modulates separately from the fan.)



Wiring for 4H and 2C thermostat
(2-COOL here represents 2 stages of fan cooling only, the compressor modulates separately from the fan.)



Control Logic:**Indoor unit connector**

Connector	Purpose
R	24V Power Connection
C	Common
G	Fan Control
Y1	Low Cooling
Y2	High Cooling
B	Heating Reversing Valve
W1	Stage 1 Electric Heating
W2	Stage 2 Electric Heating
DH	Dehumidification

Outdoor unit connector

Connector	Purpose
C	Common
Y	Cooling
B	Heating Reversing Valve
W	Defrost control

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.
- 3) B wire must be used with heat pump system only, the reversing valve energizes in heating.

Part 4

Diagnosis and Troubleshooting

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3. Temperature Sensor Resistance Characteristics 51

1 Error code table

Error code	Error definition
E1	Communication error (Indoor side)
E2	T1- Room temperature sensor fault
E3	T2 -Indoor coil temperature sensor fault
E4	Refrigerant concentration sensor fault
E6	Refrigerant leakage protection
E8	Indoor fan motor current fault
E9	Wired controller communication fault
EE	EEPROM failure (indoor unit)
F0	Communication error(Outdoor side)
F4	T4 - Ambient temperature sensor fault
F5	T5 - Discharge temperature sensor fault
F6	T3 - Coil temperature sensor fault
F7	T7 - refrigerant cooling pipe inlet temperature sensor fault
F8	T7 temp sensor error in detecting condensate risks
F9	AC voltage is too high or too low protection
FA	EEPROM fault (on main PCB)
FB	EEPROM fault (on inverter module)
FC	IPM temperature sensor fault
FD	Pressure sensor fault
FE	T3/T5 temperature sensor loose protection
FF	High pressure switch fault for 20 minutes
H0	Inverter module and main PCB communication error
H1	P5 protection appears 3 times in 180 minutes can't be recovered until re-power on
H2	FF protection appears 3 times in 150 minutes can't be recovered until re-power on
H3	PD protection appears 3 times in 180 minutes can't be recovered until re-power on

H4	P8 protection appears 3 times in 120 minutes can't be recovered until re-power on
H5	P2 protection appears 3 times in 240 minutes can't be recovered until re-power on
H6	P4 protection appears 3 times in 100 minutes can't be recovered until re-power on
H7	PC protection appears 3 times in 200 minutes can't be recovered until re-power on
H8	FE protection appears 3 times in 120 minutes can't be recovered until re-power on
H9	Communication Error Between Chip 139 and Chip 24T (certain models)
HC	F7 protection appears 3 times in 180 minutes can't be recovered until re-power on
HE	F8 protection appears 3 times in 60 minutes can't be recovered until re-power on
L0	DC bus low voltage protection
L1	DC bus high voltage protection
P1	High pressure switch fault for 4 seconds
P2	Low pressure protection
P3	Over current protection
P4	Discharge temperature protection
P5	T3 high temperature protection in cooling mode
P6	Compressor inverter module protection
P7	Indoor unit anti-freezing protection
P8	IPM high temperature protection
P9	Outdoor fan motor fault
PC	Overwet operation protection
PD	High pressure protection in heating mode
ATL	Ambient temperature out of bounds protection

Other codes

Code	Code Definition
D0	Oil return
Df	Defrost
DC	Force cooling
LA	Frequency limitation by voltage
LB	Frequency limitation or decline by high pressure
LC	Frequency limitation by condenser temp
LD	Frequency limitation by discharge temp
LE	Frequency limitation by IPM modular high temp
LF	Frequency limitation by current
PRH	Crankcase heater preheating, can not start

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

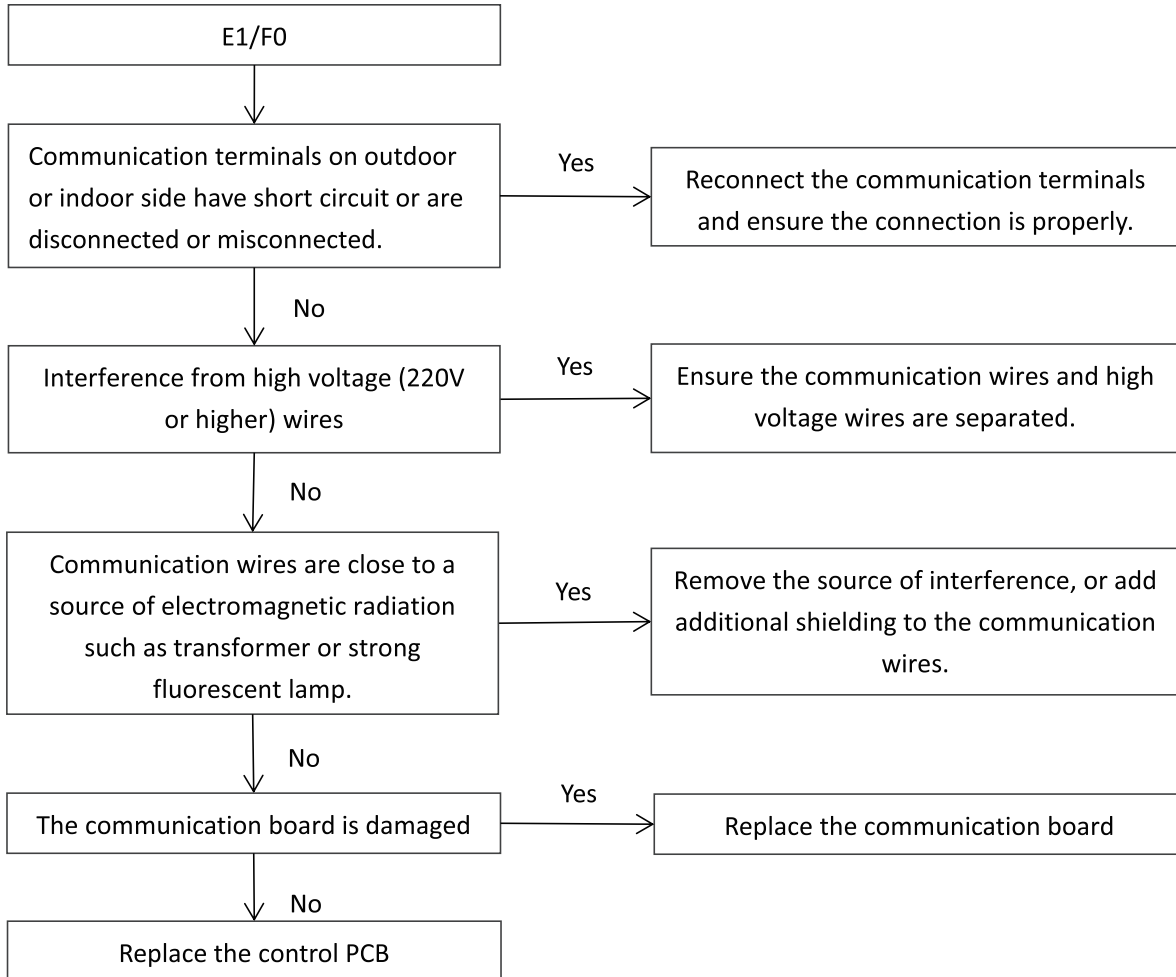
- Do not install or operate the unit for an extended period of time in areas of high humidity or in an environment directly exposing it to sea wind or salt spray.
- Do not install the unit on a defective or damaged installation stand, or in an unsecured location.
- Ensure the unit is installed at a level 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 waterOr 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°F (-15~52°C).

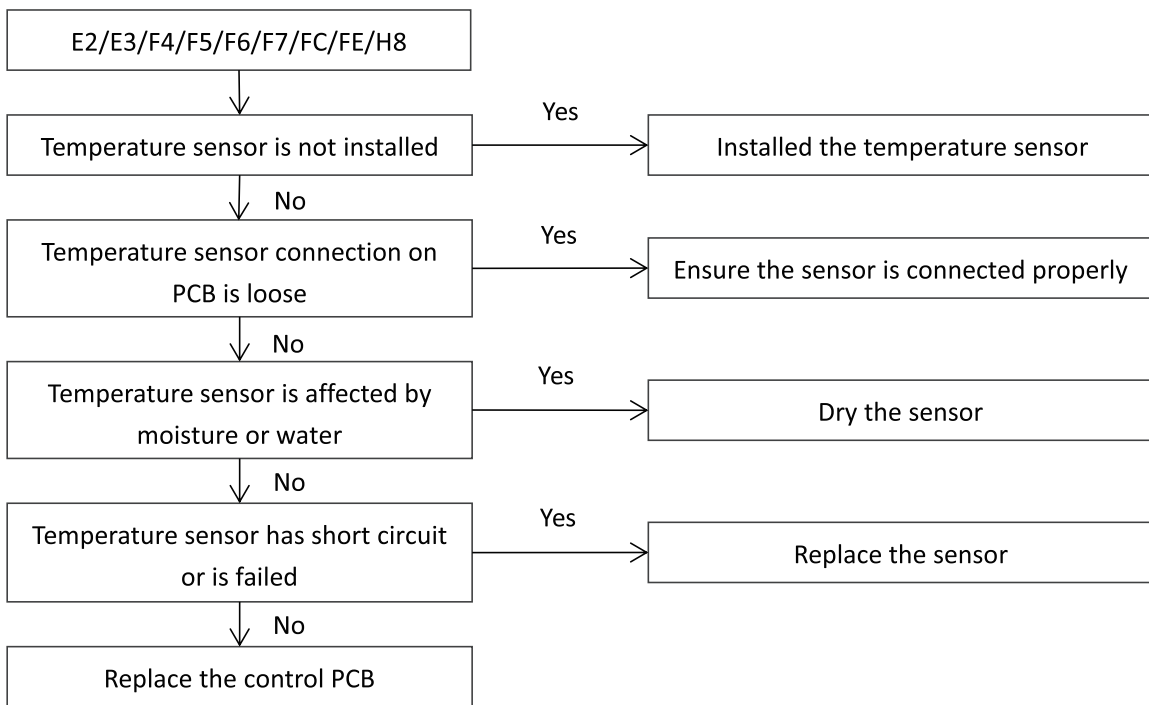
2.3 E1/F0 Troubleshooting

- E1 indicates RS485 communication error(indoor side).
- F0 indicates RS485 communication error(outdoor side).
- The unit stops running and error code is displayed on the communication board



2.4 E2/E3/F4/F5/F6/F7/FC/FE/H8 Troubleshooting

- E2 indicates indoor unit T1-roomtemperature sensor fault
- E3 indicates indoor unit T2-indoor coil temperature sensor fault
- F4 indicates T4-ambient temperature sensor fault
- F5 indicates T5-discharge temperature sensor fault
- F6 indicates T3-outdoor coil temperature sensor fault
- F7 indicates T7-refrigerant cooling pipe inlet temperature sensor fault
- FC indicates IPM temperature sensor fault
- FE indicates T3/TP temperature sensor loose protection
- H8 indicates FE protection appears 3 times in 120 minutes can't be recovered until re-power on.
- The unit stops running and error code is displayed on the communication board

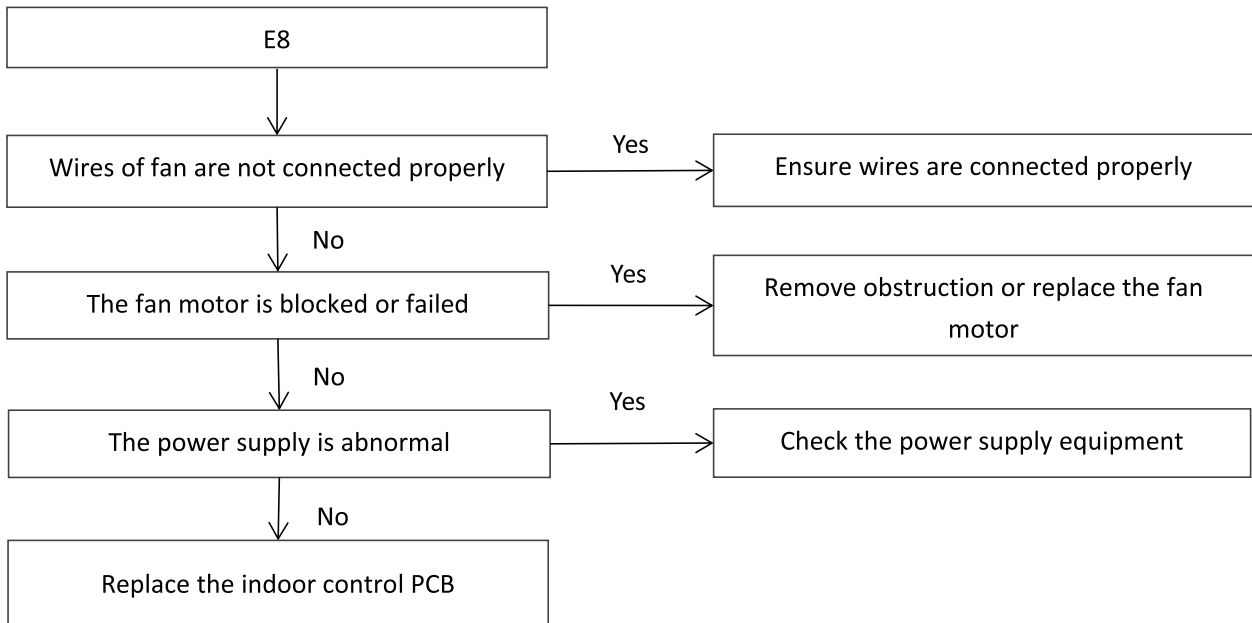


Note:

- 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.
- 2) E2/E3 is applicable only when communication is established between the ComfortStar outdoor unit and the ComfortStar indoor unit via RS-485.

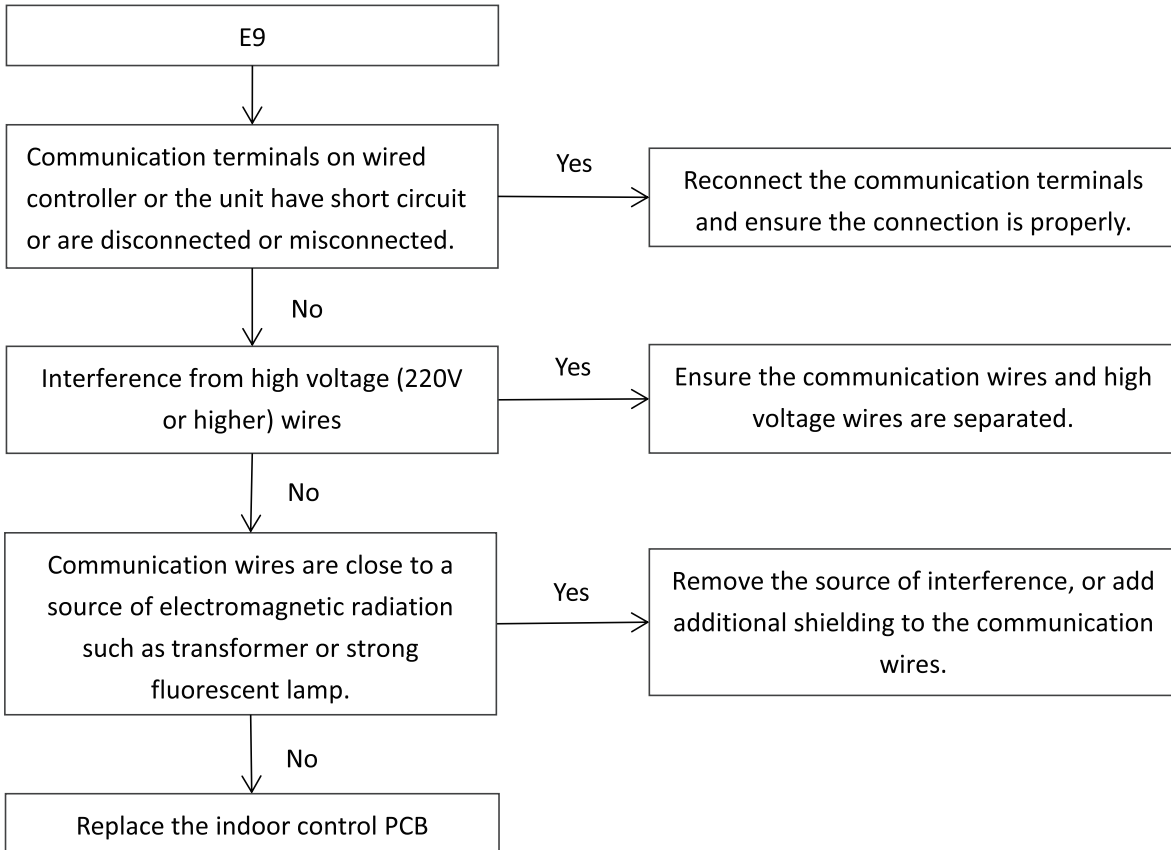
2.5 E8 Troubleshooting

- E8 indicates indoor fan motor current fault.
- The unit stops running and error code is displayed on the communication board



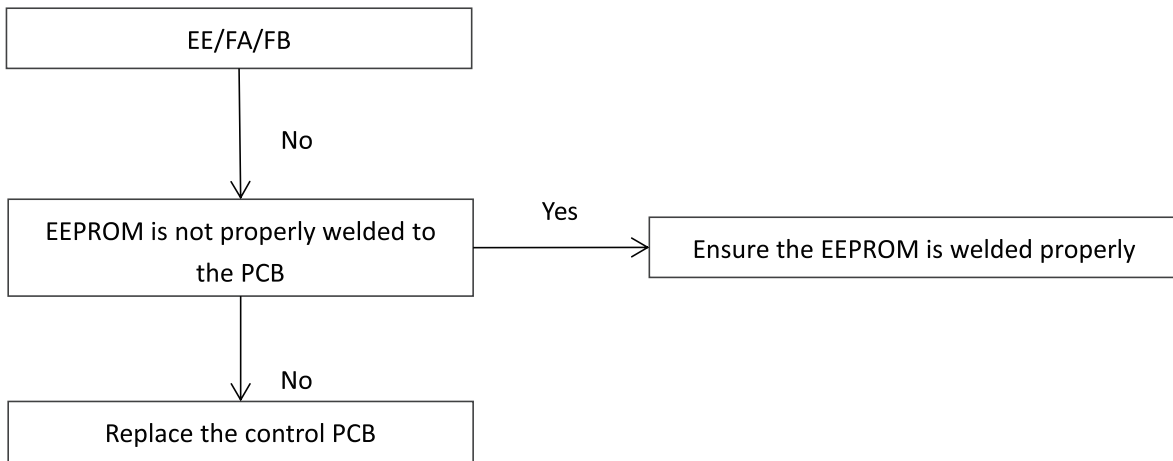
2.6 E9 Troubleshooting

- E9 indicates wired controller communication fault.
- The unit stops running and error code is displayed on the communication board



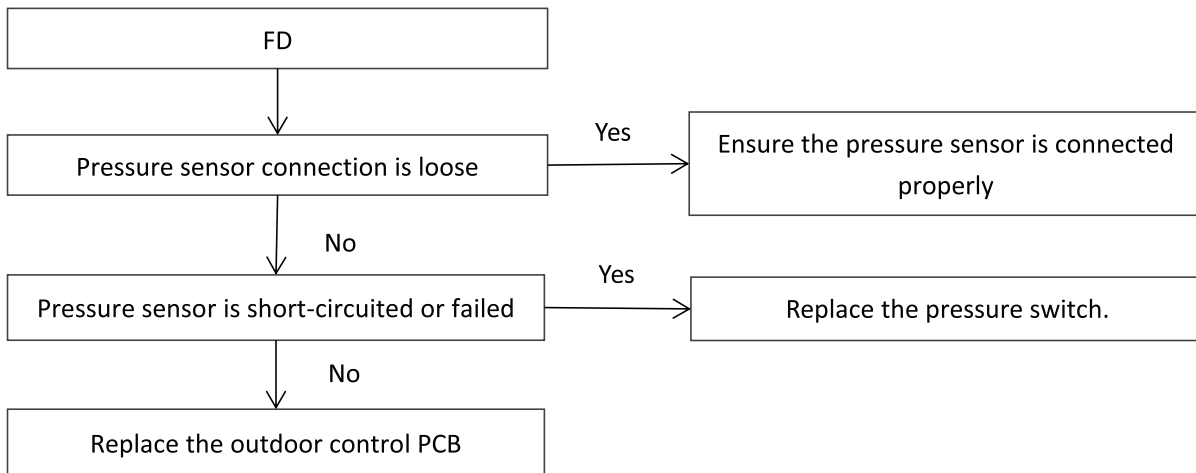
2.7 EE/FA/FB Troubleshooting

- EE indicates EEPROM fault (indoor unit)
- FA indicates EEPROM fault on the main PCB
- FB indicates EEPROM fault on the inverter module
- The unit stops running and error code is displayed on the communication board



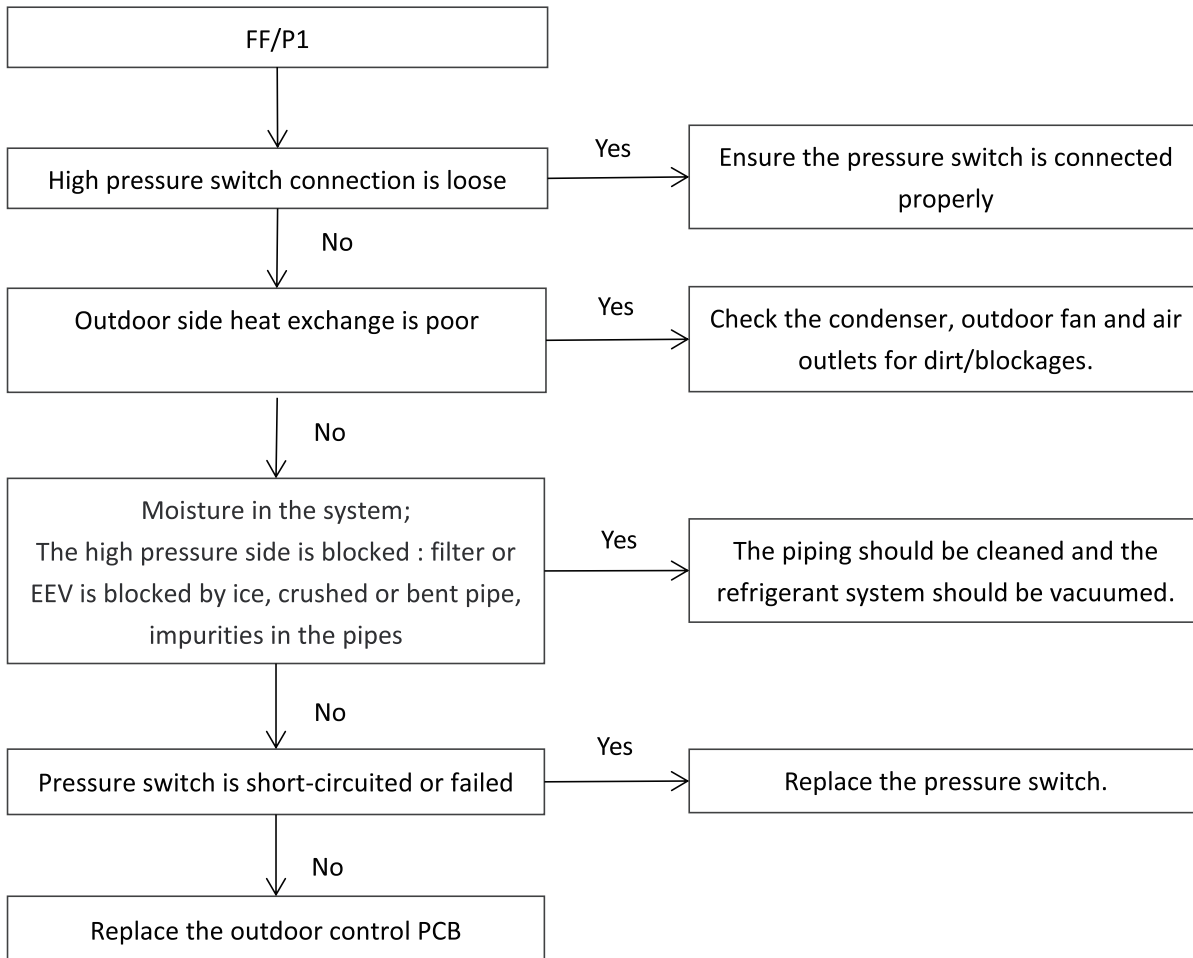
2.8 FD Troubleshooting

- FD indicates pressure sensor fault
- The unit stops running and error code is displayed on the communication board



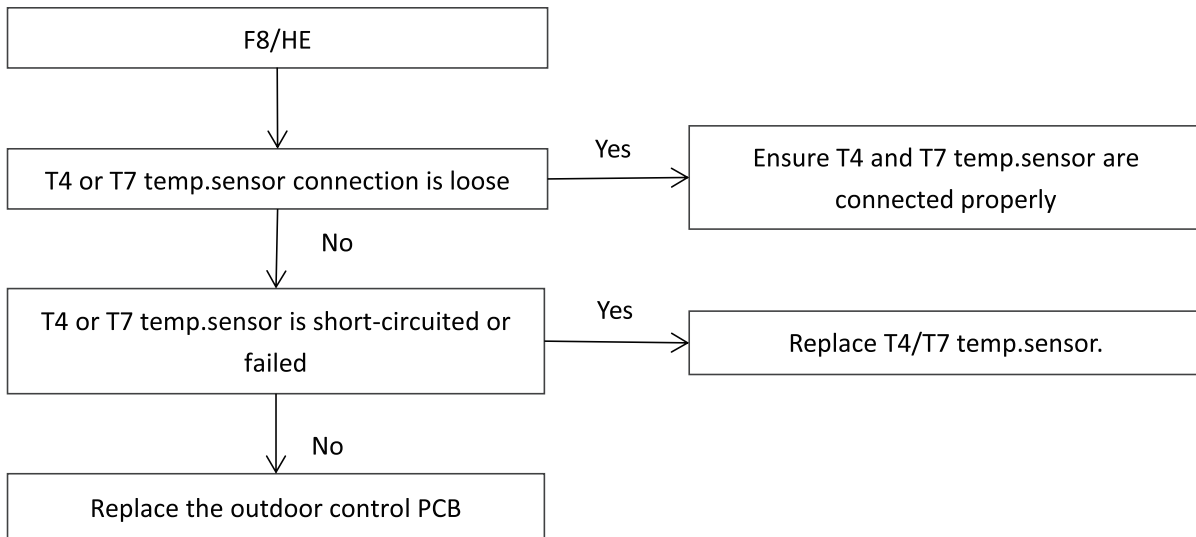
2.9 FF/P1/H2 Troubleshooting

- FF indicates high pressure switch fault for 20 minutes.
- P1 indicates high pressure switch fault for 4 seconds.
- H2 indicates FF protection appears 3 times in 150 minutes can't be recovered until re-power on.
- The unit stops running and error code is displayed on the communication board



2.10 F8/HE Troubleshooting

- FF indicates T7 temp sensor error in detecting condensate risks.
- HE indicates F8F protection appears 3 times in 60 minutes can't be recovered until re-power on.
- The unit stops running and error code is displayed on the communication board

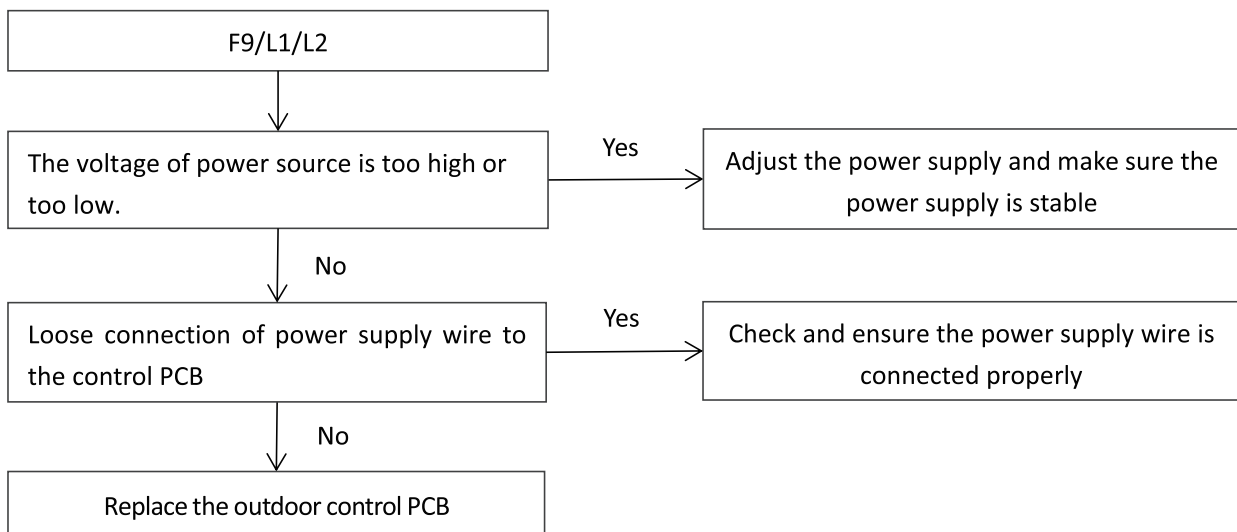


2.11 F9/L0/L1 Troubleshooting

- F9 indicates AC voltage is too high or too low protection
- L0 indicates DC bus low voltage protection
- L1 indicates DC bus high voltage protection

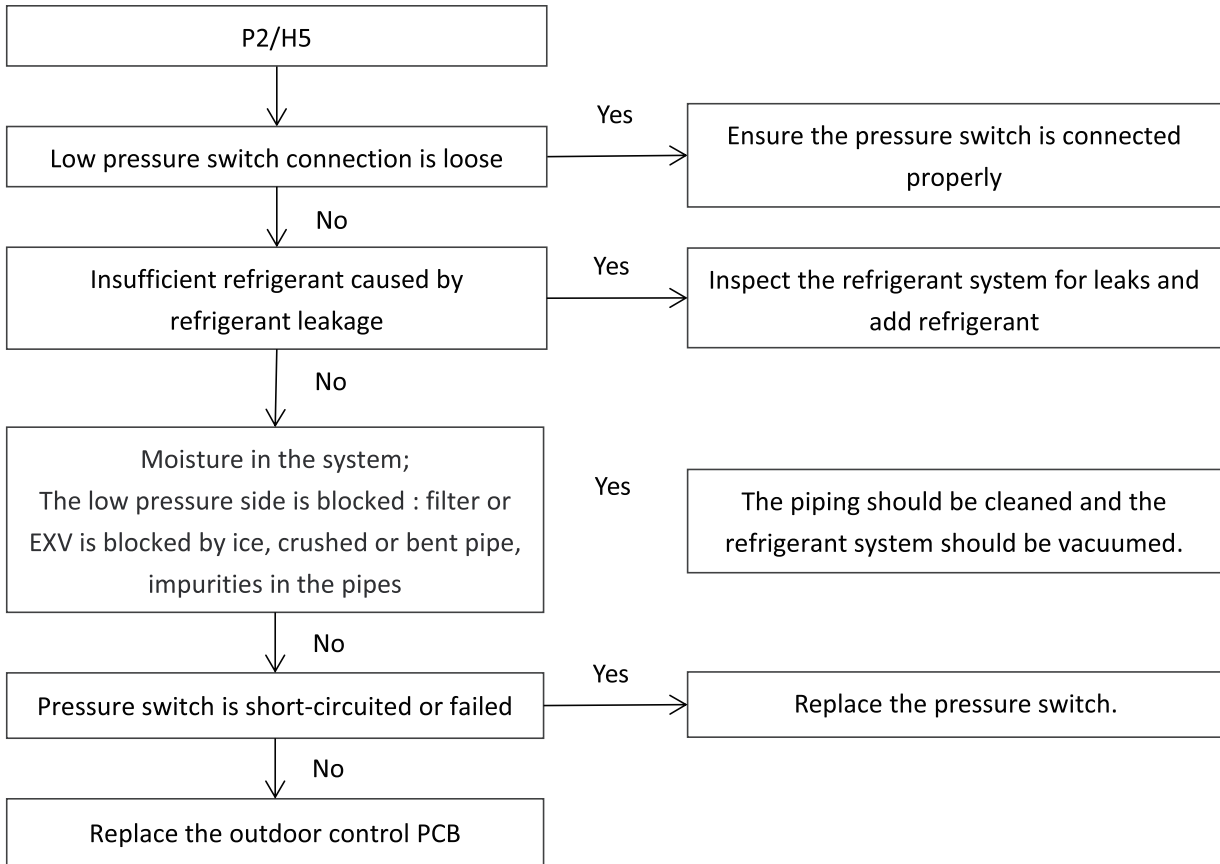
Allowable voltage range of power source	178~265V
Upper limit of DC generatrix voltage	430V
Lower limit of DC generatrix voltage	150V

- The unit stops running and error code is displayed on the communication board



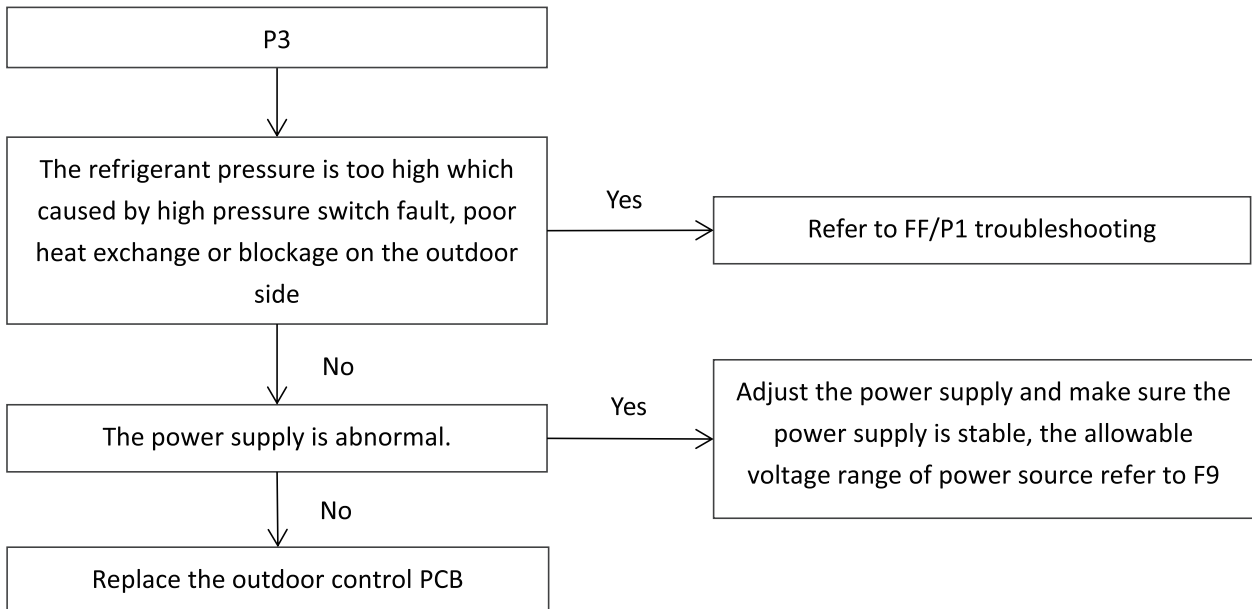
2.12 P2/H5 Troubleshooting

- P2 indicates low pressure protection .
- H5 indicates P2 protection appears 3 times in 240 minutes can't be recovered until re-power on.
- The unit stops running and error code is displayed on the communication board



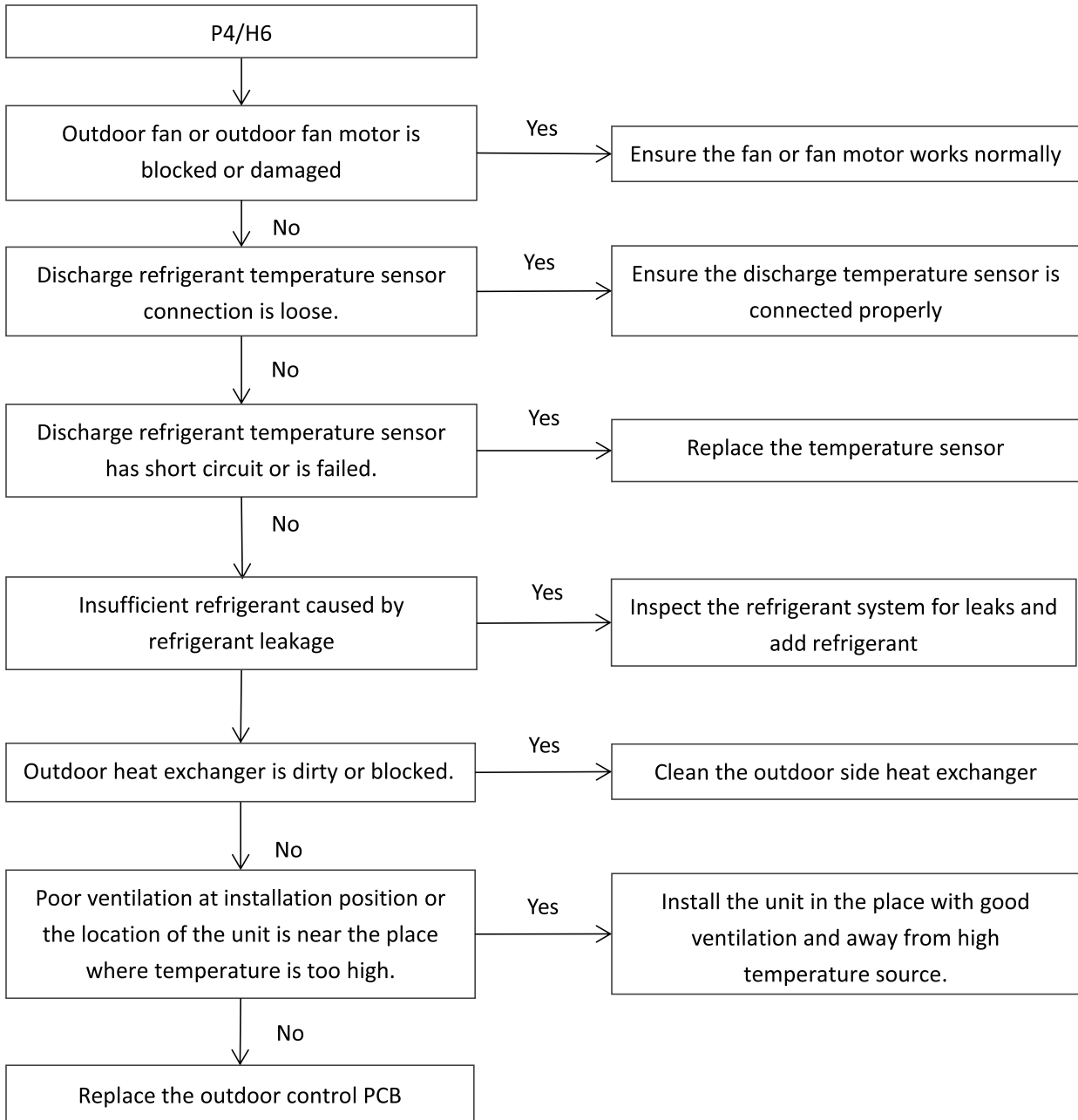
2.13 P3 Troubleshooting

- P3 indicates over current protection
- The unit stops running and error code is displayed on the communication board



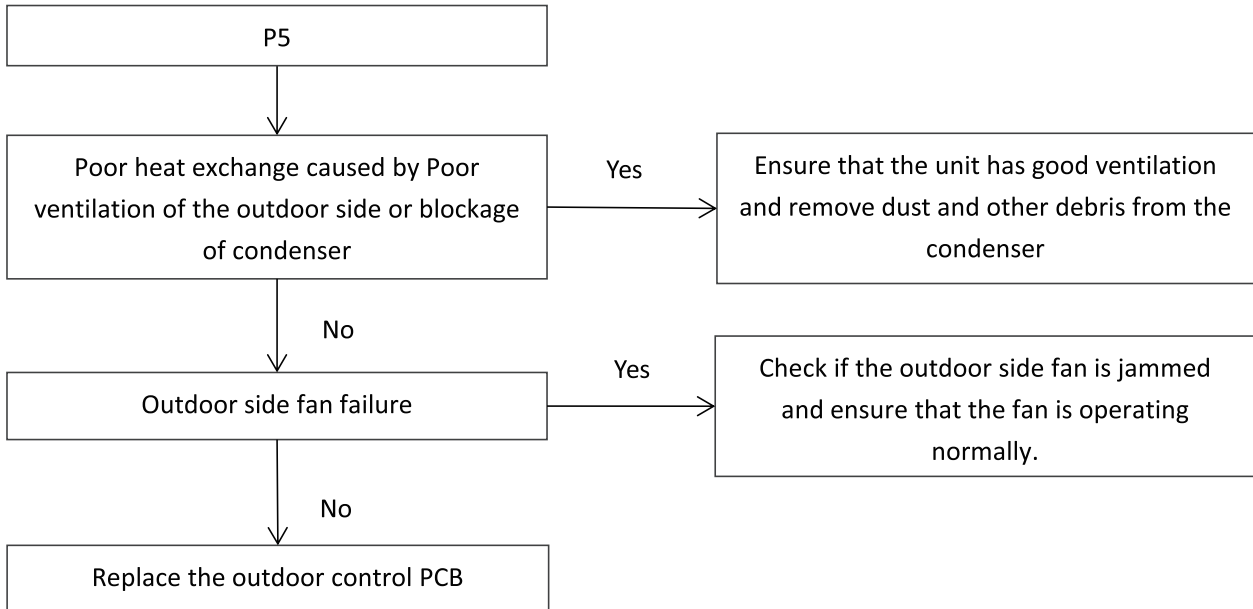
2.14 P4/H6 Troubleshooting

- P4 indicates discharge temperature protection
- H6 indicates P4 protection appears 3 times in 100 minutes can't be recovered until re-power on.
- The unit stops running and error code is displayed on the communication board.



2.15 P5 Troubleshooting

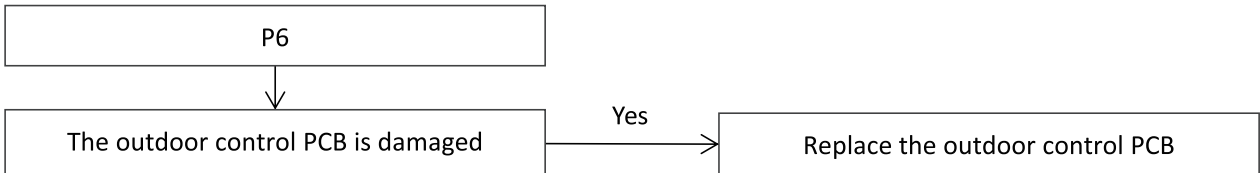
- P5 indicates T3 high temperature protection in cooling mode
- The unit stops running and error code is displayed on the communication board.



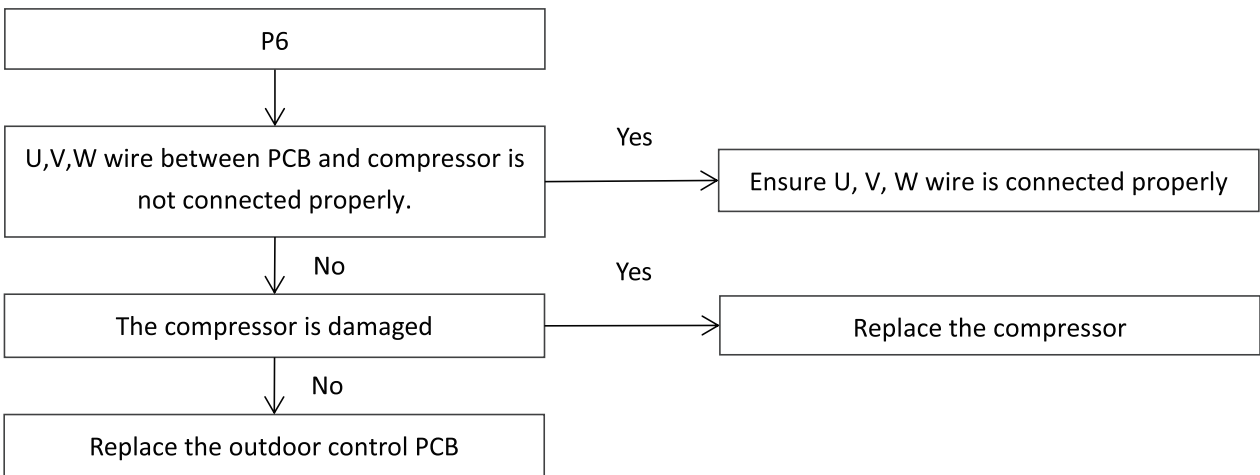
2.16 P6 Troubleshooting

- P6 indicates compressor inverter module protection.
- The unit stops running and error code is displayed on the communication board.

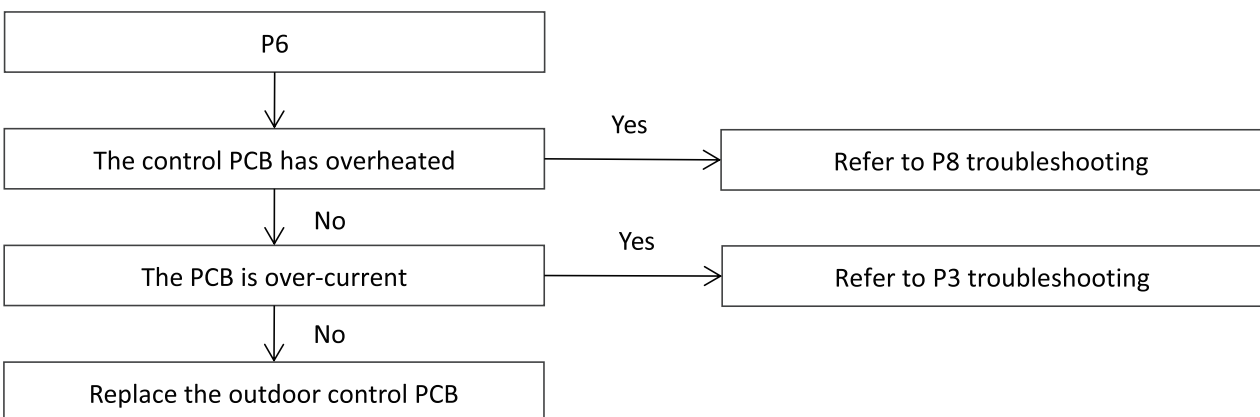
Situation1: P6 appears immediately when the outdoor unit is powered-on



Situation2: P6 appears immediately after the compressor starts up

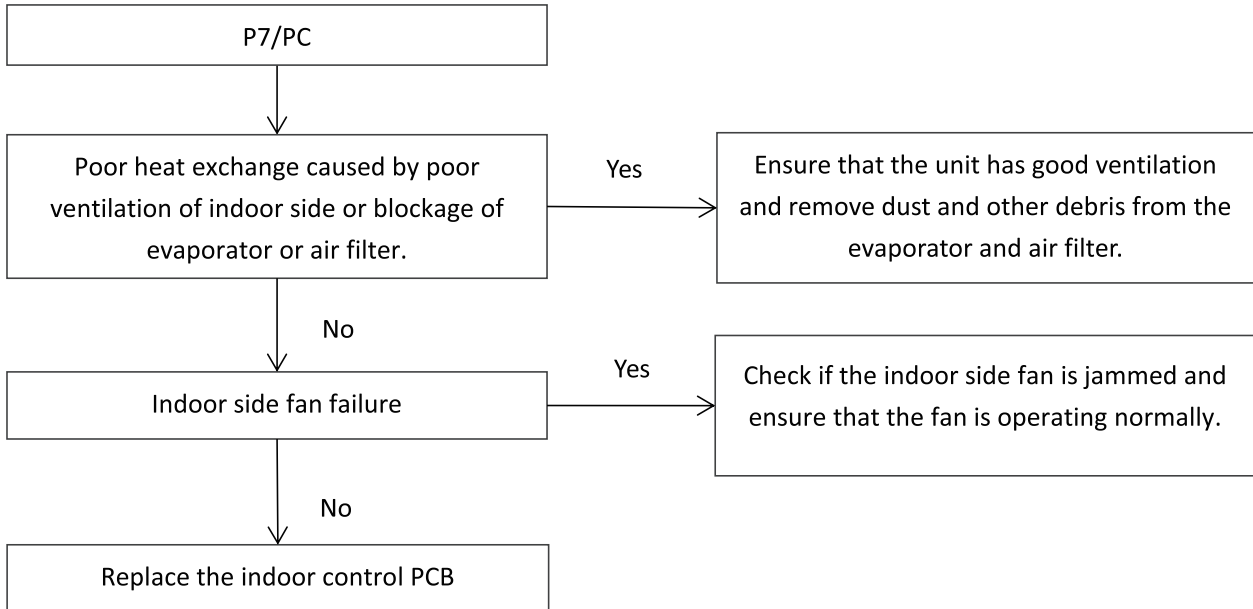


Situation3: P6 appears after the compressor has been running for a period of time.



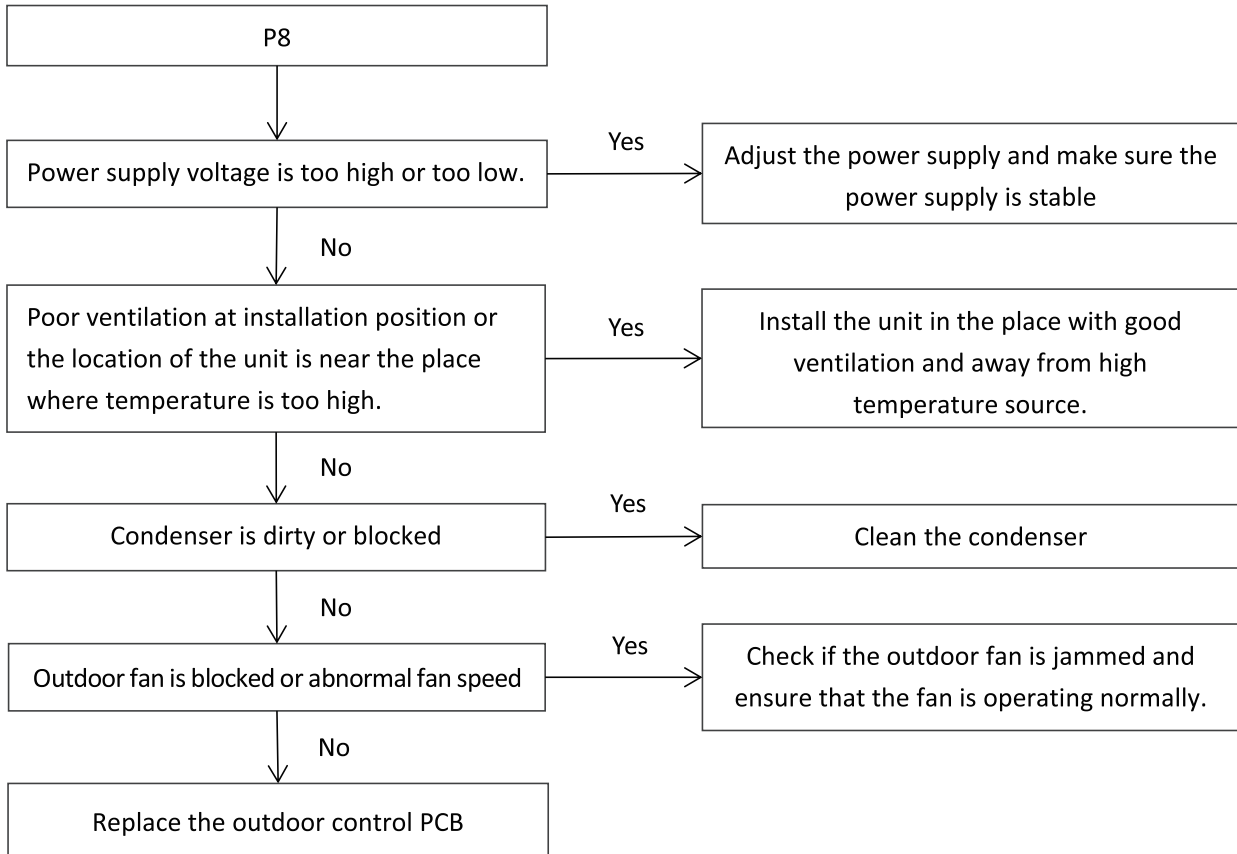
2.17 P7/PC Troubleshooting

- P7 indicates Indoor unit anti-freezing protection.
- PC indicates overwet operation protection.
- The unit stops running and error code is displayed on the communication board.



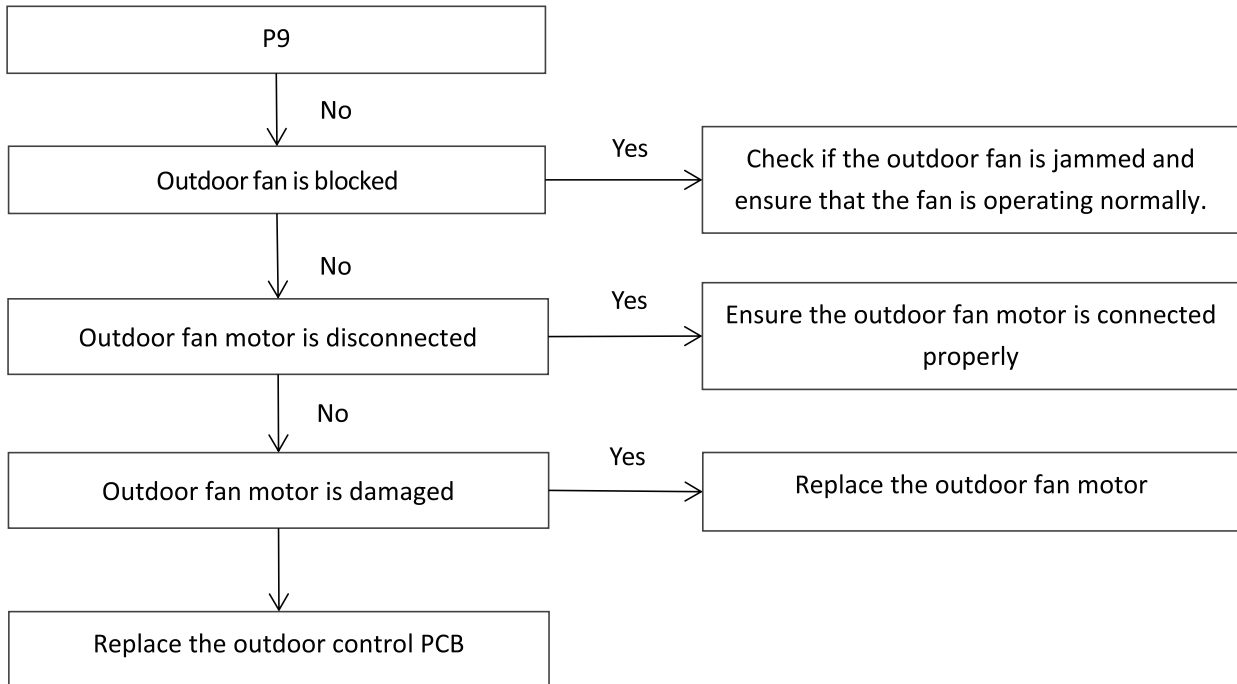
2.18 P8 Troubleshooting

- P8 indicates IPM high temperature protection.
- The unit stops running and error code is displayed on the communication board.



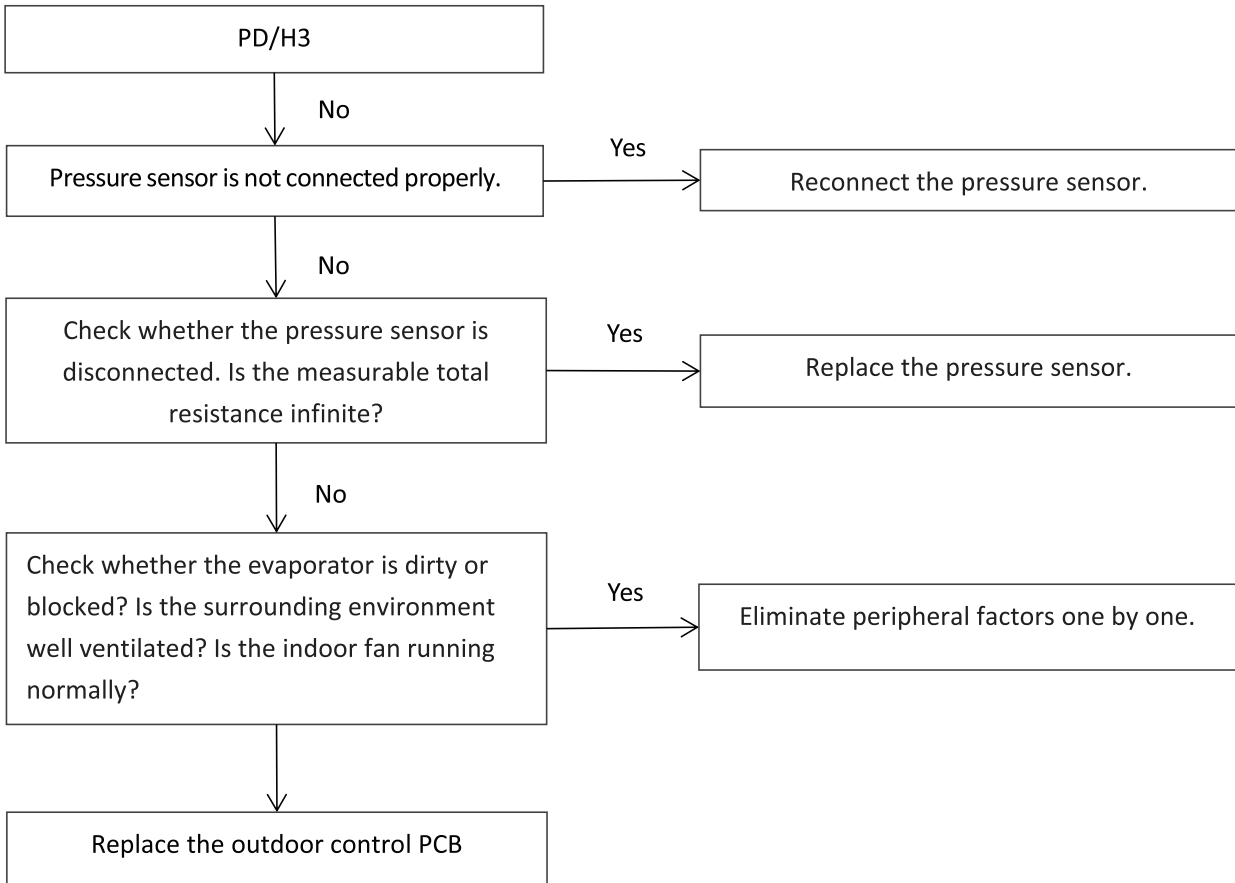
2.19 P9 Troubleshooting

- P9 indicates outdoor fan motor fault
- The unit stops running and error code is displayed on the communication board.



2.20 PD/H3 Troubleshooting

- PD indicates high pressure protection in heating mode
- H3 indicates PD protection appears 3 times in 180 minutes can't be recovered until re-power on
- The unit stops running and error code is displayed on the communication board.



2.21 H0 Troubleshooting

- H0 indicates Communication fault of master board and driver chip
- The unit stops running and error code is displayed on the communication board.

There is only one control PCB in the electric control box which integrates the functions of main control board and inverter module, maintenance personnel has to replace the PCB when H0 fault occurs.

3. Temperature Sensor Resistance Characteristics

Room temperature sensor(T1), condenser coil temperature sensor(T2), condenser coil temperature sensor(T3) and outdoor ambient temperature sensor(T4) resistance characteristics.

Temperature	R _{max}	R _{nor}	R _{min}	Temperature	R _{max}	R _{nor}	R _{min}
°C	kΩ	kΩ	kΩ	°C	kΩ	kΩ	kΩ
-25	49.51	47.92	46.38	16	7.24	7.14	7.05
-24	46.94	45.46	44.02	17	6.95	6.86	6.77
-23	44.51	43.13	41.79	18	6.67	6.59	6.50
-22	42.23	40.94	39.69	19	6.41	6.33	6.25
-21	40.08	38.88	37.71	20	6.15	6.08	6.01
-20	38.05	36.93	35.84	21	5.91	5.85	5.78
-19	36.14	35.09	34.07	22	5.68	5.62	5.56
-18	34.34	33.36	32.40	23	5.46	5.40	5.35
-17	32.63	31.72	30.83	24	5.25	5.20	5.14
-16	31.03	30.17	29.34	25	5.05	5.00	4.95
-15	29.51	28.71	27.93	26	4.86	4.81	4.76
-14	28.07	27.33	26.60	27	4.68	4.63	4.58
-13	26.72	26.02	25.34	28	4.51	4.46	4.41
-12	25.44	24.78	24.15	29	4.34	4.29	4.24
-11	24.22	23.61	23.02	30	4.18	4.13	4.08
-10	23.08	22.51	21.95	31	4.03	3.98	3.93
-9	21.99	21.46	20.93	32	3.89	3.84	3.79
-8	20.96	20.46	19.97	33	3.75	3.70	3.65
-7	19.99	19.52	19.06	34	3.61	3.56	3.52
-6	19.06	18.63	18.20	35	3.48	3.44	3.39
-5	18.19	17.78	17.38	36	3.36	3.31	3.27
-4	17.36	16.98	16.61	37	3.24	3.20	3.15
-3	16.57	16.22	15.87	38	3.13	3.08	3.04
-2	15.83	15.49	15.17	39	3.02	2.97	2.93
-1	15.12	14.81	14.50	40	2.91	2.87	2.83
0	14.45	14.16	13.87	42	2.72	2.67	2.63
1	13.81	13.54	13.27	43	2.63	2.58	2.54
2	13.20	12.95	12.70	44	2.54	2.49	2.45
3	12.63	12.39	12.15	45	2.45	2.41	2.37
4	12.08	11.85	11.64	46	2.37	2.33	2.29
5	11.56	11.35	11.14	47	2.29	2.25	2.21
6	11.06	10.87	10.67	48	2.21	2.17	2.13
7	10.59	10.41	10.23	49	2.14	2.10	2.06
8	10.14	9.97	9.80	50	2.07	2.03	1.99
9	9.71	9.56	9.40	51	2.00	1.97	1.93
10	9.31	9.16	9.01	52	1.94	1.90	1.86
11	8.92	8.78	8.65	53	1.88	1.84	1.80
12	8.55	8.42	8.30	54	1.82	1.78	1.74
13	8.20	8.08	7.96	55	1.76	1.72	1.69
14	7.86	7.75	7.64	56	1.70	1.67	1.63
15	7.55	7.44	7.34	57	1.65	1.61	1.58

Temperature	R _{max}	R _{nor}	R _{min}		Temperature	R _{max}	R _{nor}	R _{min}
°F	kΩ	kΩ	kΩ		°F	kΩ	kΩ	kΩ
-13	49.51	47.92	46.38		60.80	7.24	7.14	7.05
-11	46.94	45.46	44.02		62.60	6.95	6.86	6.77
-9	44.51	43.13	41.79		64.40	6.67	6.59	6.50
-8	42.23	40.94	39.69		66.20	6.41	6.33	6.25
-6	40.08	38.88	37.71		68.00	6.15	6.08	6.01
-4	38.05	36.93	35.84		69.80	5.91	5.85	5.78
-2	36.14	35.09	34.07		71.60	5.68	5.62	5.56
0	34.34	33.36	32.40		73.40	5.46	5.40	5.35
1	32.63	31.72	30.83		75.20	5.25	5.20	5.14
3	31.03	30.17	29.34		77.00	5.05	5.00	4.95
5	29.51	28.71	27.93		78.80	4.86	4.81	4.76
7	28.07	27.33	26.60		80.60	4.68	4.63	4.58
9	26.72	26.02	25.34		82.40	4.51	4.46	4.41
10	25.44	24.78	24.15		84.20	4.34	4.29	4.24
12	24.22	23.61	23.02		86.00	4.18	4.13	4.08
14	23.08	22.51	21.95		87.80	4.03	3.98	3.93
16	21.99	21.46	20.93		89.60	3.89	3.84	3.79
18	20.96	20.46	19.97		91.40	3.75	3.70	3.65
19	19.99	19.52	19.06		93.20	3.61	3.56	3.52
21	19.06	18.63	18.20		95.00	3.48	3.44	3.39
23	18.19	17.78	17.38		96.80	3.36	3.31	3.27
25	17.36	16.98	16.61		98.60	3.24	3.20	3.15
27	16.57	16.22	15.87		100.40	3.13	3.08	3.04
28	15.83	15.49	15.17		102.20	3.02	2.97	2.93
30	15.12	14.81	14.50		104.00	2.91	2.87	2.83
32	14.45	14.16	13.87		107.60	2.72	2.67	2.63
34	13.81	13.54	13.27		109.40	2.63	2.58	2.54
36	13.20	12.95	12.70		111.20	2.54	2.49	2.45
37	12.63	12.39	12.15		113.00	2.45	2.41	2.37
39	12.08	11.85	11.64		114.80	2.37	2.33	2.29
41	11.56	11.35	11.14		116.60	2.29	2.25	2.21
43	11.06	10.87	10.67		118.40	2.21	2.17	2.13
45	10.59	10.41	10.23		120.20	2.14	2.10	2.06
46	10.14	9.97	9.80		122.00	2.07	2.03	1.99
48	9.71	9.56	9.40		123.80	2.00	1.97	1.93
50	9.31	9.16	9.01		125.60	1.94	1.90	1.86
52	8.92	8.78	8.65		127.40	1.88	1.84	1.80
54	8.55	8.42	8.30		129.20	1.82	1.78	1.74
55	8.20	8.08	7.96		131.00	1.76	1.72	1.69
57.20	7.86	7.75	7.64		132.80	1.70	1.67	1.63
59.00	7.55	7.44	7.34		134.60	1.65	1.61	1.58

Temperature	R _{max}	R _{nor}	R _{min}
°C	(kΩ)	(kΩ)	(kΩ)
58	1.60	1.56	1.53
59	1.55	1.51	1.48
60	1.50	1.46	1.43
61	1.45	1.42	1.39
62	1.41	1.37	1.34
63	1.36	1.33	1.30
64	1.32	1.29	1.26
65	1.28	1.25	1.22
66	1.24	1.21	1.18
67	1.21	1.18	1.15
68	1.17	1.14	1.11
69	1.13	1.11	1.08
70	1.10	1.07	1.05
71	1.07	1.04	1.02
72	1.04	1.01	0.98
73	1.01	0.98	0.96
74	0.98	0.95	0.93
75	0.95	0.92	0.90
76	0.92	0.90	0.87
77	0.90	0.87	0.85
78	0.87	0.85	0.82
79	0.85	0.82	0.80
80	0.82	0.80	0.78
81	0.80	0.78	0.75
82	0.78	0.75	0.73
83	0.75	0.73	0.71
84	0.73	0.71	0.69
85	0.71	0.69	0.67
86	0.69	0.67	0.65
87	0.68	0.66	0.64
88	0.66	0.64	0.62
89	0.64	0.62	0.60
90	0.62	0.60	0.58
91	0.61	0.59	0.57
92	0.59	0.57	0.55
93	0.57	0.56	0.54
94	0.56	0.54	0.52
95	0.54	0.53	0.51
96	0.53	0.51	0.50
97	0.52	0.50	0.48
98	0.50	0.49	0.47
99	0.49	0.47	0.46
100	0.48	0.46	0.45

Temperature	R _{max}	R _{mon}	R _{min}
°F	kΩ	kΩ	kΩ
136	1.60	1.56	1.53
138	1.55	1.51	1.48
140	1.50	1.46	1.43
142	1.45	1.42	1.39
144	1.41	1.37	1.34
145	1.36	1.33	1.30
147	1.32	1.29	1.26
149	1.28	1.25	1.22
151	1.24	1.21	1.18
153	1.21	1.18	1.15
154	1.17	1.14	1.11
156	1.13	1.11	1.08
158	1.10	1.07	1.05
160	1.07	1.04	1.02
162	1.04	1.01	0.98
163	1.01	0.98	0.96
165	0.98	0.95	0.93
167	0.95	0.92	0.90
169	0.92	0.90	0.87
171	0.90	0.87	0.85
172	0.87	0.85	0.82
174	0.85	0.82	0.80
176	0.82	0.80	0.78
178	0.80	0.78	0.75
180	0.78	0.75	0.73
181	0.75	0.73	0.71
183	0.73	0.71	0.69
185	0.71	0.69	0.67
187	0.69	0.67	0.65
189	0.68	0.66	0.64
190	0.66	0.64	0.62
192	0.64	0.62	0.60
194	0.62	0.60	0.58
196	0.61	0.59	0.57
198	0.59	0.57	0.55
199	0.57	0.56	0.54
201	0.56	0.54	0.52
203	0.54	0.53	0.51
205	0.53	0.51	0.50
207	0.52	0.50	0.48
208	0.50	0.49	0.47
210	0.49	0.47	0.46
212	0.48	0.46	0.45

Compressor exhaust temperature sensor (T5) 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		

Temperature (°F)	Resistance (kΩ)	Temperature (°F)	Resistance (kΩ)	Temperature (°F)	Resistance (kΩ)	Temperature (°F)	Resistance (kΩ)
-4.0	542.7000	68.0000	68.6600	140.0	13.5900	212.0000	3.7020
-2.2	511.9000	69.8000	65.6200	141.8	13.1100	213.8000	3.5950
-0.4	483.0000	71.6000	62.7300	143.6	12.6500	215.6000	3.4920
1.4	455.9000	73.4000	59.9800	145.4	12.2100	217.4000	3.3920
3.2	430.5000	75.2000	57.3700	147.2	11.7900	219.2000	3.2960
5.0	406.7000	77.0000	54.8900	149.0	11.3800	221.0000	3.2030
6.8	384.3000	78.8000	52.5300	150.8	10.9900	222.8000	3.1130
8.6	363.3000	80.6000	50.2800	152.6	10.6100	224.6000	3.0250
10.4	343.6000	82.4000	48.1400	154.4	10.2500	226.4000	2.9410
12.2	325.1000	84.2000	46.1100	156.2	9.9020	228.2000	2.8600
14.0	307.7000	86.0000	44.1700	158.0	9.5690	230.0000	2.7810
15.8	291.3000	87.8000	42.3300	159.8	9.2480	231.8000	2.7040
17.6	275.9000	89.6000	40.5700	161.6	8.9400	233.6000	2.6300
19.4	261.4000	91.4000	38.8900	163.4	8.6430	235.4000	2.5590
21.2	247.8000	93.2000	37.3000	165.2	8.3580	237.2000	2.4890
23.0	234.9000	95.0000	35.7800	167.0	8.0840	239.0000	2.4220
24.8	222.8000	96.8000	34.3200	168.8	7.8200	240.8000	2.3570
26.6	211.4000	98.6000	32.9400	170.6	7.5660	242.6000	2.2940
28.4	200.7000	100.4000	31.6200	172.4	7.3210	244.4000	2.2330
30.2	190.5000	102.2000	30.3600	174.2	7.0860	246.2000	2.1740
32.0	180.9000	104.0000	29.1500	176.0	6.8590	248.0000	2.1170
33.8	171.9000	105.8000	28.0000	177.8	6.6410	249.8000	2.0610
35.6	163.3000	107.6000	26.9000	179.6	6.4300	251.6000	2.0070
37.4	155.2000	109.4000	25.8600	181.4	6.2280	253.4000	1.9550
39.2	147.6000	111.2000	24.8500	183.2	6.0330	255.2000	1.9050
41.0	140.4000	113.0000	23.8900	185.0	5.8440	257.0000	1.8560
42.8	133.5000	114.8000	22.8900	186.8	5.6630	258.8000	1.8080
44.6	127.1000	116.6000	22.1000	188.6	5.4880	260.6000	1.7620
46.4	121.0000	118.4000	21.2600	190.4	5.3200	262.4000	1.7170
48.2	115.2000	120.2000	20.4600	192.2	5.1570	264.2000	1.6740
50.0	109.8000	122.0000	19.6900	194.0	5.0000	266.0000	1.6320
51.8	104.6000	123.8000	18.9600	195.8	4.8490		
53.6	99.6900	125.6000	18.2600	197.6	4.7030		
55.4	95.0500	127.4000	17.5800	199.4	4.5620		
57.2	90.6600	129.2000	16.9400	201.2	4.4260		
59.0	86.4900	131.0000	16.3200	203.0	4.2940		
60.8	82.5400	132.8000	15.7300	204.8	4.1670		
62.6	78.7900	134.6000	15.1600	206.6	4.0450		
64.4	75.2400	136.4000	14.6200	208.4	3.9270		
66.2	71.8600	138.2000	14.0900	210.2	3.8120		

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The design and specifications are subject to change without prior notice for product improvement. Consult with the sales agency or manufacturer for details. Any updates to the manual will be uploaded to the service website, please check for the latest version.