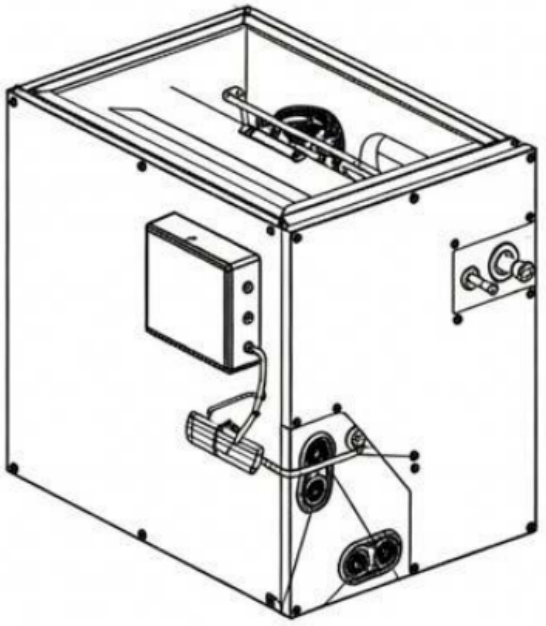
ComfortStar®

Air Conditioning & Heating Products

Service Manual

Indoor Unit:

AC32-1824B-15(42Q)
AC32-3036B-15(42R)
AC32-3036C-15(42S)
AC32-4860C-15(42T)
AC32-4860D-15(42U)



⚠ 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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Part 1

General Information

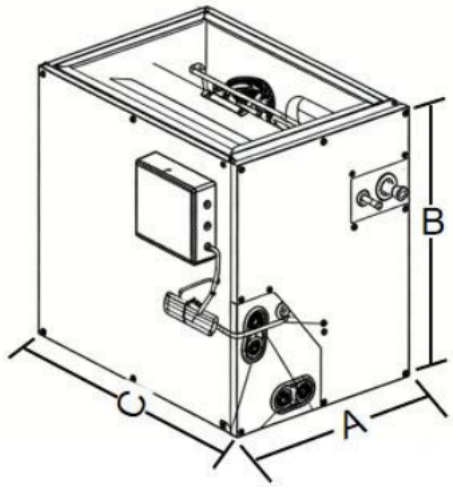
1 Product lineup

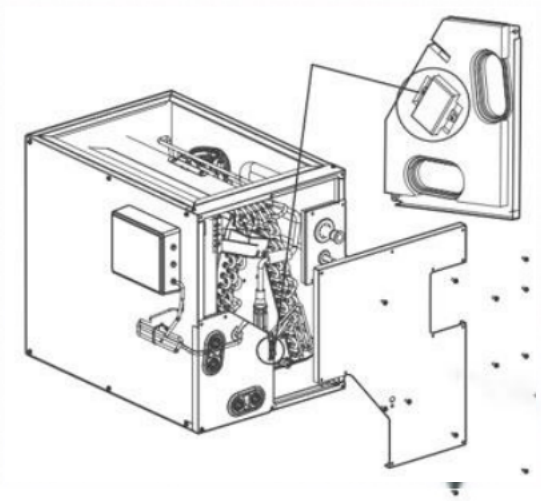
Model	Cooling Capacity (Btu/h)	Appearance
AC32-1824B-15	18000/24000	
AC32-3036B-15	30000/35000	
AC32-3036C-15	30000/35000	
AC32-4860C-15	46000/54000	
AC32-4860D-15	46000/54000	

2 Specification

Model	Indoor unit		AC32-1824B-15	AC32-3036B-15	AC32-3036C-15	AC32-4860C-15	AC32-4860D-15
Power supply		V, Ph, Hz	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60	208/230, 1, 60
Cooling	Rated Capacity	Btu/hr	18000/24000	30000/35000	30000/35000	46000/54000	46000/54000
Indoor coil	Number of rows		3	4	4	5	5
	Tube OD	inch	9/32	9/32	9/32	9/32	9/32
Indoor Unit	Unit Demension(W*D*H)	inch	17-33/64*21-1/32*17-63/64	17-33/64*21-1/32*23-37/64	21-1/32*21-1/32*23-37/64	21-1/32*21-1/32*27-51/64	24-31/64-1/32*27-51/64
	Packing Demension(W*D*H)	inch	20-15/32*26-49/64*20-5/64	20-15/32*26-49/64*25-63/64	24-1/64*26-49/64*26-63/64	24-1/64*26-49/64*29-59/64	27-9/16-49/64*29-59/64
	Net/Gross Weight	lbs	42/50	59.5/68	64/74	81/92	97/115
Refrigerant pipe	Liquid side/Gas side	inch	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)	(3/8) / (3/4)
	Max. refrigerant pipe length	feet	131	131	131	246	246
	Max. difference in level	feet	65.6	98	98	98	98
Indoor(Setting Tem.)	Cooling	°F	60~90	60~90	60~90	60~90	60~90
	Heating	°F	/	/	/	/	/

3 Dimensional drawings

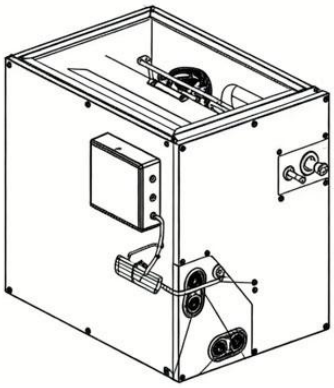


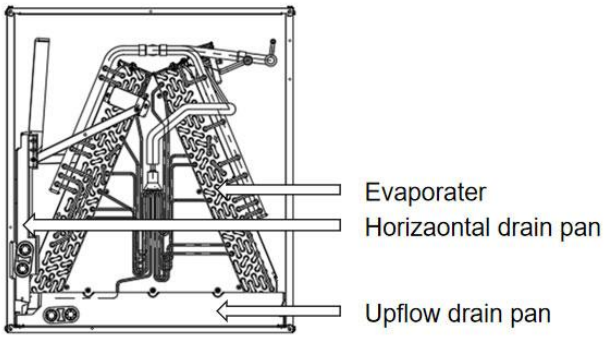


Dimensions / Model		AC32-1824B-15		AC32-3036B-15		AC32-3036C-15	
		inch	mm	inch	mm	inch	mm
A	Model Width	17-63/64	457	23-37/64	599	23-37/64	599
B	Model Height	17-33/64	445	17-33/64	445	21-1/32	534
C	Model Deep	21-1/32	534	21-1/32	534	21-1/32	534

Dimensions / Model		AC32-4860C-15		AC32-4860D-15	
		inch	mm	inch	mm
A	Model Width	27-51/64	706	24-31/64	706
B	Model Height	21-1/32	534	27-51/64	622
C	Model Deep	21-1/32	534	21-1/32	534

4 Layout Functional Components

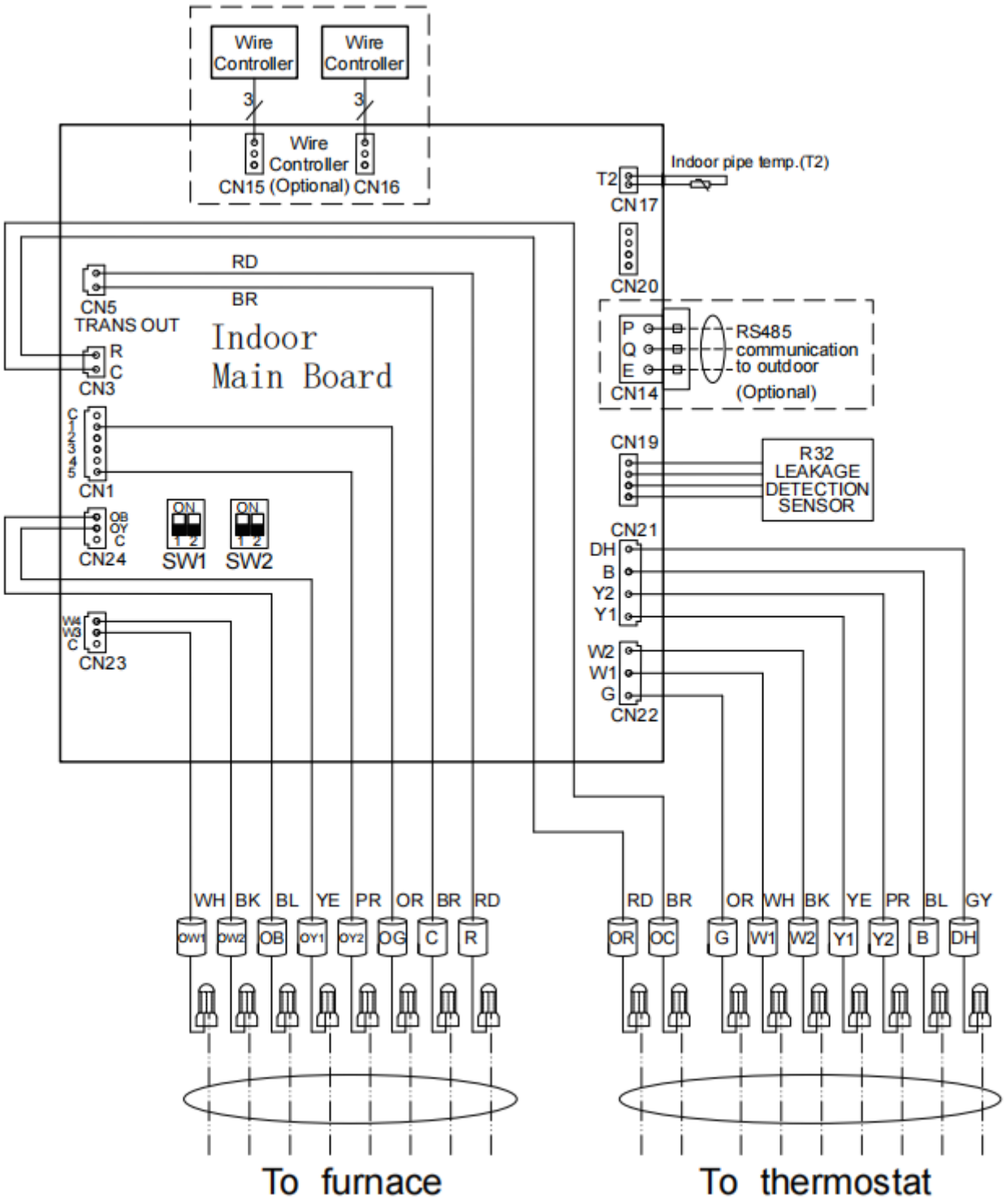




Part 2

Wiring Diagram

1 Electric wiring diagram



DIP switch status Indicate	
	This Indicate OFF (The DIP switch is dialed to the digital side)
	This Indicate ON (The DIP switch is dialed to the non-digital side)

SW1 DIP switch selection		
SW1.1	SW1.2	Reserve
OFF	OFF	Reserve (Default)
OFF	ON	Reserve
ON	OFF	Reserve
ON	ON	Reserve

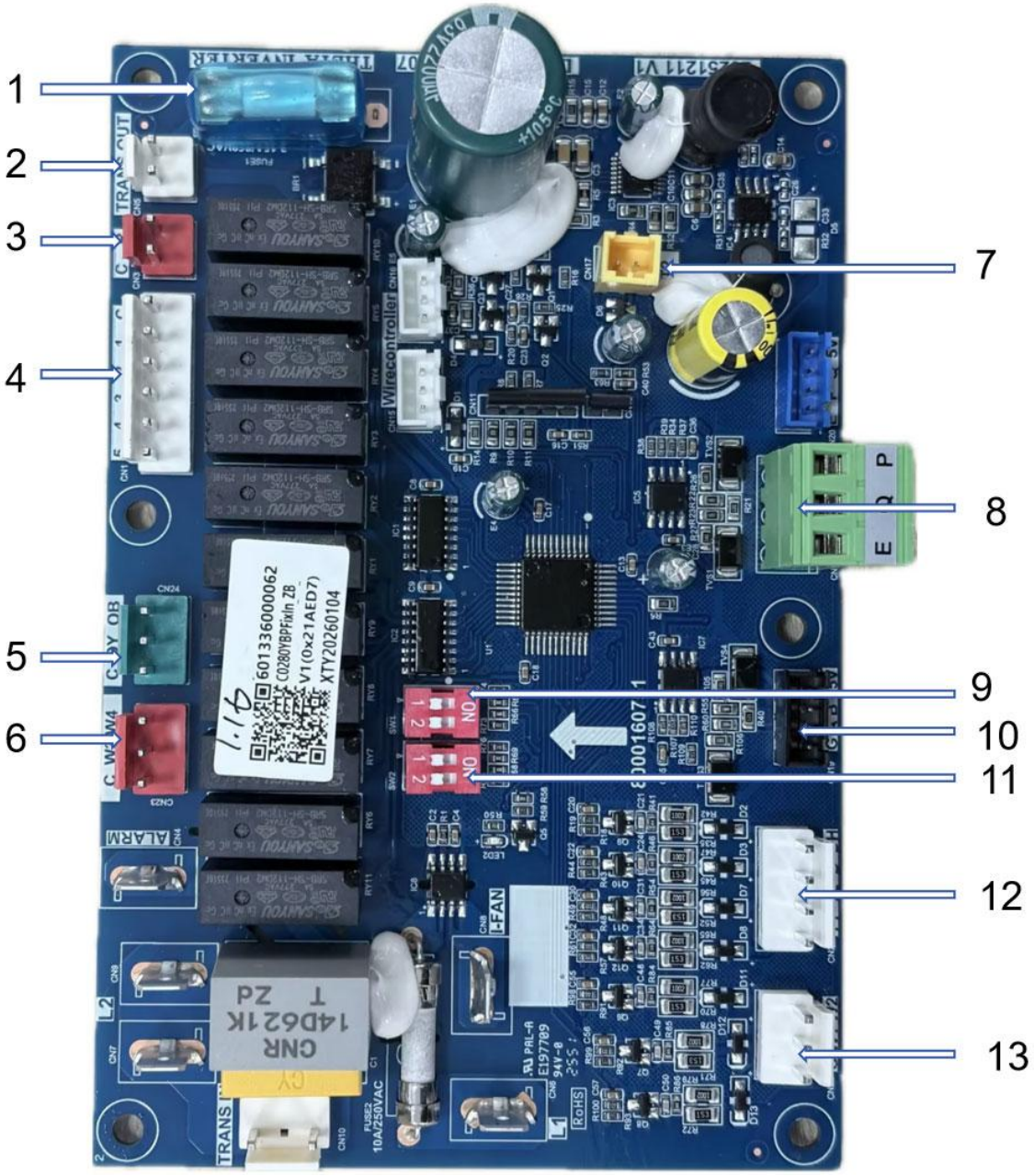
SW2 DIP switch selection		
SW2.1	OFF	24V Control(Default)
	ON	RS485 Comm. Mode
SW2.2	OFF	Anti-Cold Air Delay(Default)
	ON	Disable Anti-Cold Air Delay

Wire Color Code	
RD RED	OR ORANGE
BL BLUE	PK PINK
BR BROWN	GY GRAY
BK BLACK	YE YELLOW
WH WHITE	PR PURPLE
WH/BK WHITE BLACK STRIPE	

LINE ANNOTATION	
———	Factory wiring
—·—·—·—	Field install
- — - — -	Dashed box

INTERFACE VOLTAGE		
CN5	R / C	Input : 24VAC
CN21	Y1 / Y2 / B / DH	Input : 24VAC
CN22	G / W1 / W2	Input : 24VAC
CN1	OG / OY2	Output : 24VAC
CN3	OR / OC	Output : 24VAC
CN23	OW1 / OW2	Output : 24VAC
CN24	OY / OB	Output : 24VAC
CN14	P / Q / E	Output : 5VDC

2 PCB

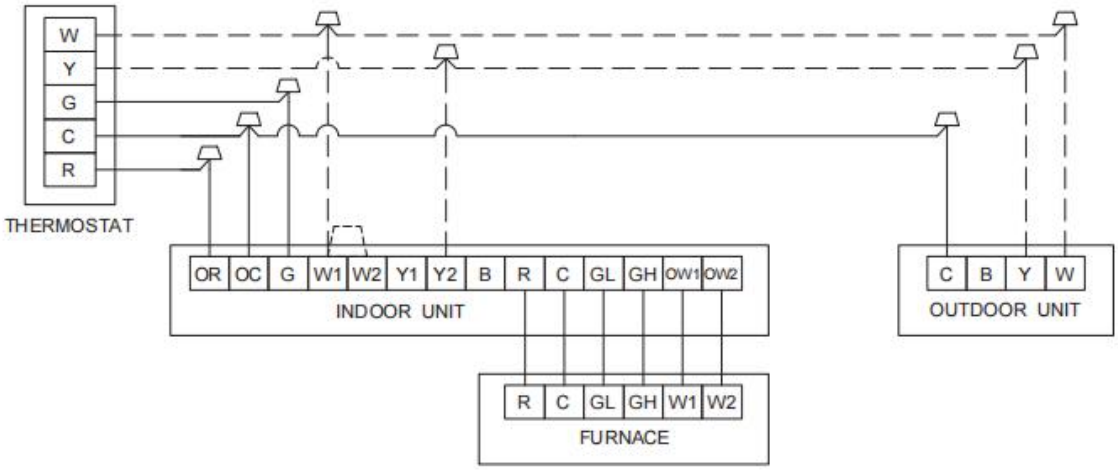


No.	Port Names and Definitions	No.	Port Names and Definitions
1	Fuse	10	Port for refrigerant concentration monitor
2	24V trans in from transformer	11	DIP Switch-SW2
3	Port to 24V thermostat(R/C)	12	Port to 24V thermostat(DH/B/Y2/Y1)
4	Control Device for Furnace	13	Port to 24V thermostat(W2/W1/G)
5	Rapid heating mode		
6	Port to furnace thermostat(W2/W1/G)		
7	Port for indoor coil temperature sensor T2		
8	RS-485 communication port to outdoor		
9	DIP Switch-SW1		

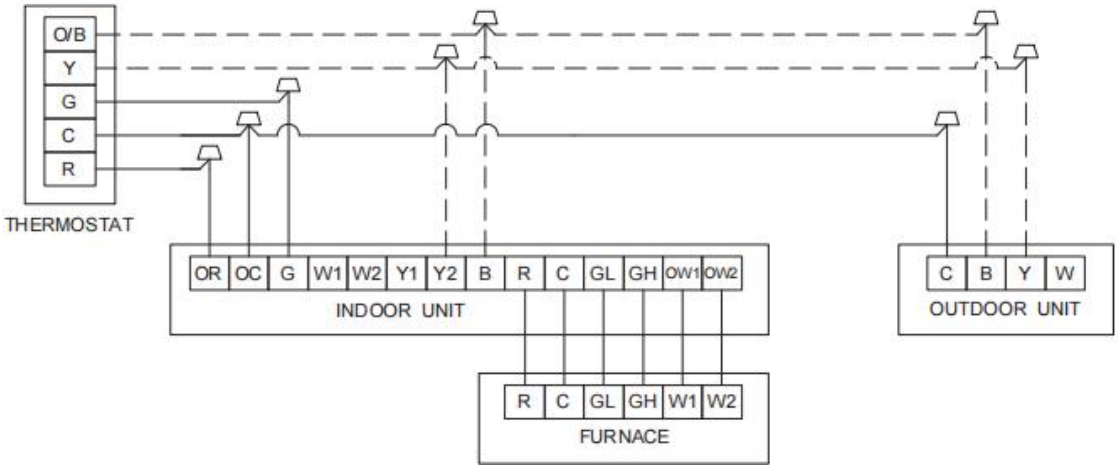
3 Low voltage wiring diagram

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

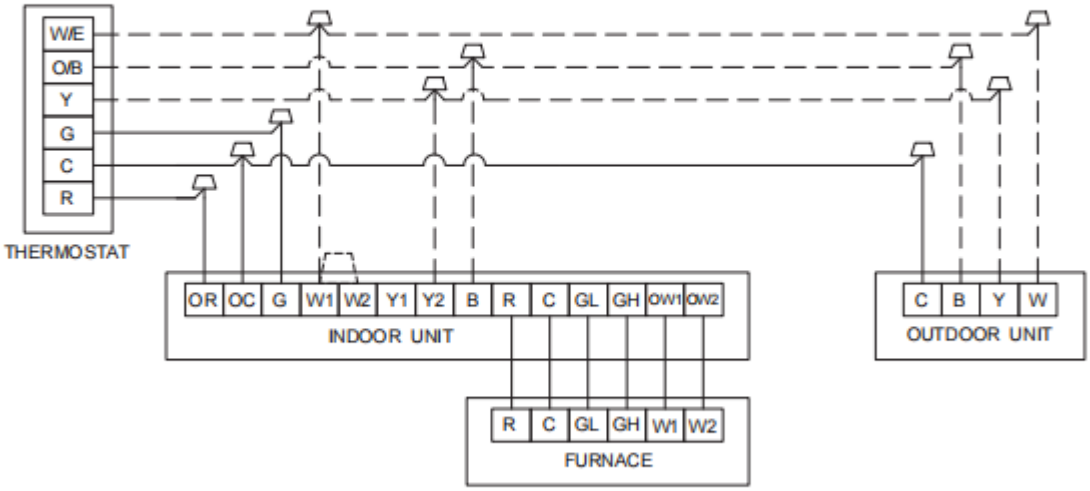
Note1: Any time the electric heat elements are active. the indoor fan will run in high stage.



Wiring for 1H and 1C thermostat

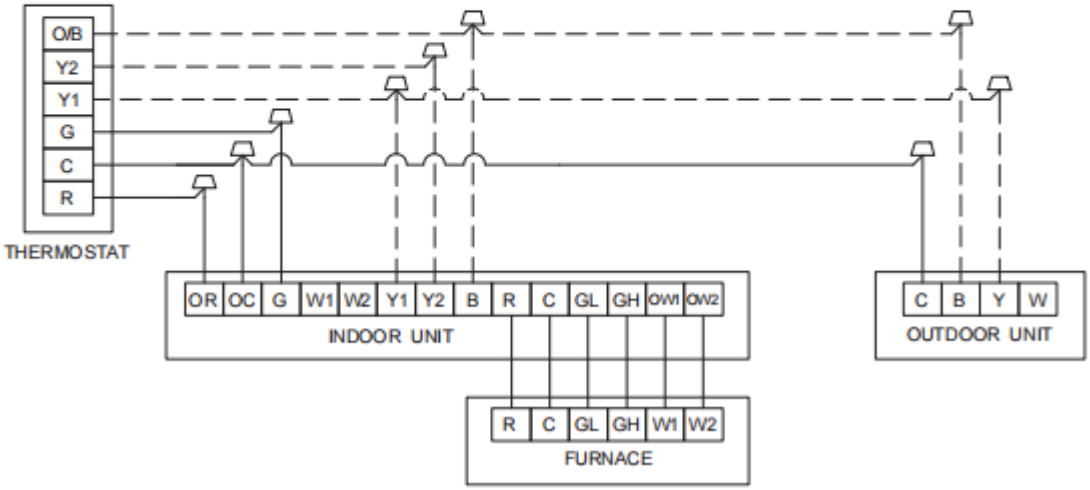


Note1: Any time the electric heat elements are active. the ndoor fan will run in high stage.

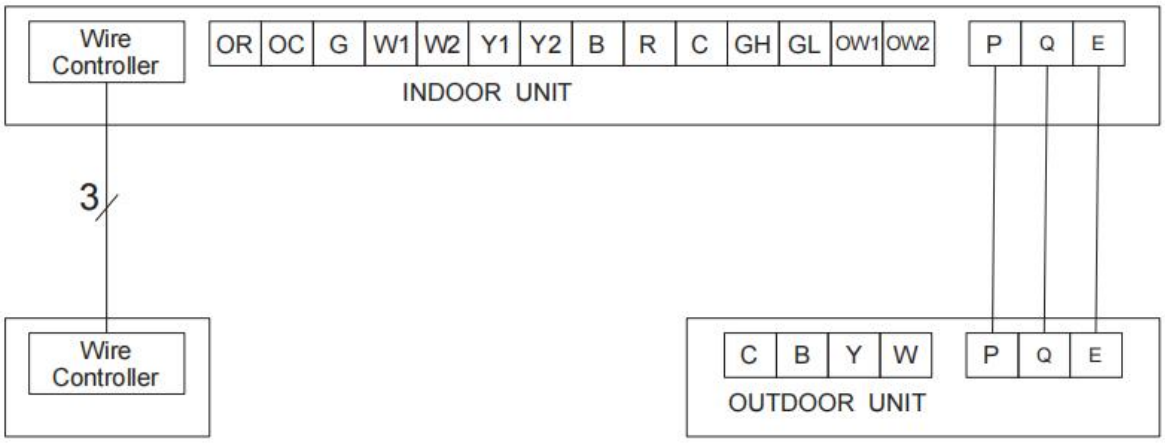


Wiring for 2H and 2C thermostat

Note1: Y1 and Y2 here represents 2 stages of fan cooling only, the compressor modulates separately from the fan.



The following wiring diagram are suitable for the Indoor Unit and Outdoor Unit with RS485 communication.



Control Logic:

Connector	Usage
R	Provides 24VAC power from the furnace to the board.
C	The 24VAC common wire between the furnace and the board.
OW1	First stage of furnace command line from the board to the furnace (OW1-W1).If the furnace that only have a W and do not have a W2, connect OW1 to the W of the furnace and make no connection with the OW2 signal wire (OW1-W).
OW2	Second stage of furnace command line from the board to the furnace (OW2-W2). OW2 cannot be ON unless OW1 is already ON.
GL	Connect the GL signal to G of the furnace (GL-G).If the furnace that do not have a G, connect GL to the Y or Y1 of the furnace (GL-Y or GL-Y1).
GH	For 2-speed configuration, connect the GH signal to Y2 of the furnace (GH-Y2). In this configuration, the GL signal turns on as follows: - In Cool mode or Heat mode with HP when high speed fan is requested. - In Auto Fan and Cool mode, the signal goes to high speed when the difference between room temperature and set point temperature is more than or equal to 1.5°C. The signal goes back to low speed when the temperature difference is less than 1°C. - In Auto Fan and Heat mode with the HP, the signal goes to high speed when the difference between room temperature and set point temperature is less than or equal to -1.5°C. The signal goes back to low speed when the temperature difference is more than 0°C.

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.

4 Electrical parameters

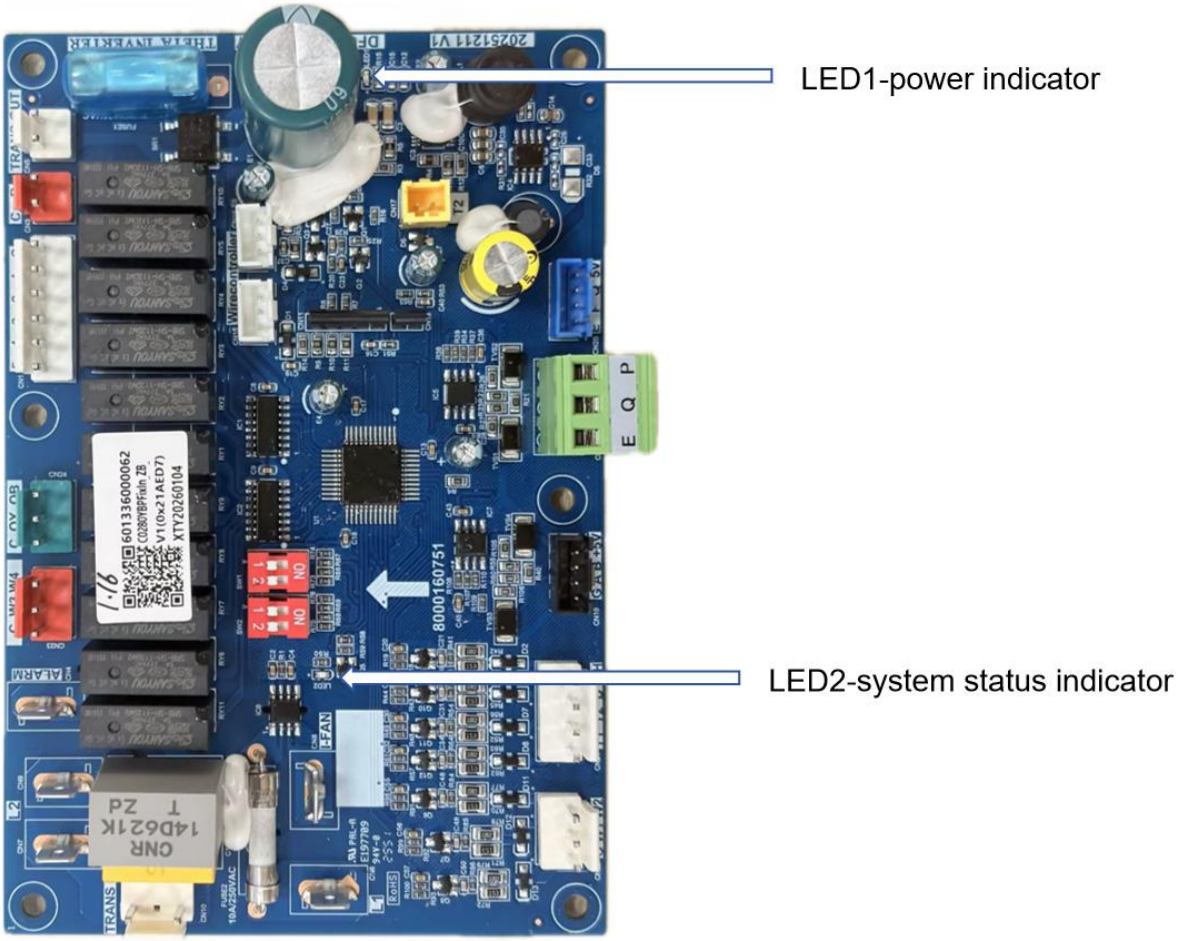
Capacity(Btu/h)		18K	24K	30K	36K	48K	60K
Power	Phase	1	1	1	1	1	1
(Indoor)	Frequency and Volt	208/230,60Hz					
Power	Phase	1	1	1	1	1	1
(Outdoor)	Frequency and Volt	208/230,60Hz					
Max.Fuse	Indoor unit(A)	0.3	0.3	0.3	0.3	0.3	0.3
	Outdoor unit(A)	15	20	25	30	40	50
Indoor unit	Line quantity	3	3	3	3	3	3
Powerline	Line diameter(AWG)	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2
Outdoor unit	Line quantity	3	3	3	3	3	3
Powerline	Line diameter(AWG)						
Outdoor unit	Line quantity	3	3	3	3	3	3
Signal line	Line diameter(AWG)	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2	20/0.5mm^2
Thermostat	Line quantity	/	/	/	/	/	/
Signal line	Line diameter(AWG)	18/0.8mm^2	18/0.8mm^2	18/0.8mm^2	18/0.8mm^2	18/0.8mm^2	18/0.8mm^2

Part 3

Diagnosis and Troubleshooting

1 Error code table

Error code	Error definition
Flash for 3 times every 8 seconds	T2 temperature sensor fault
Flash for 4 times every 8 seconds	R32 refrigerant concentration sensor fault
Flash for 5 times every 8 seconds	R32 refrigerant leakage protection
Flash for 6 times every 8 seconds	Anti-freeze protection
Flash for 10 times every 8 seconds	Wired controller communication error



Note: In normal operation, LED1 and LED2 are steady on; when the system is standby, LED1 will be steady on, LED2 will flash slowly.

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.

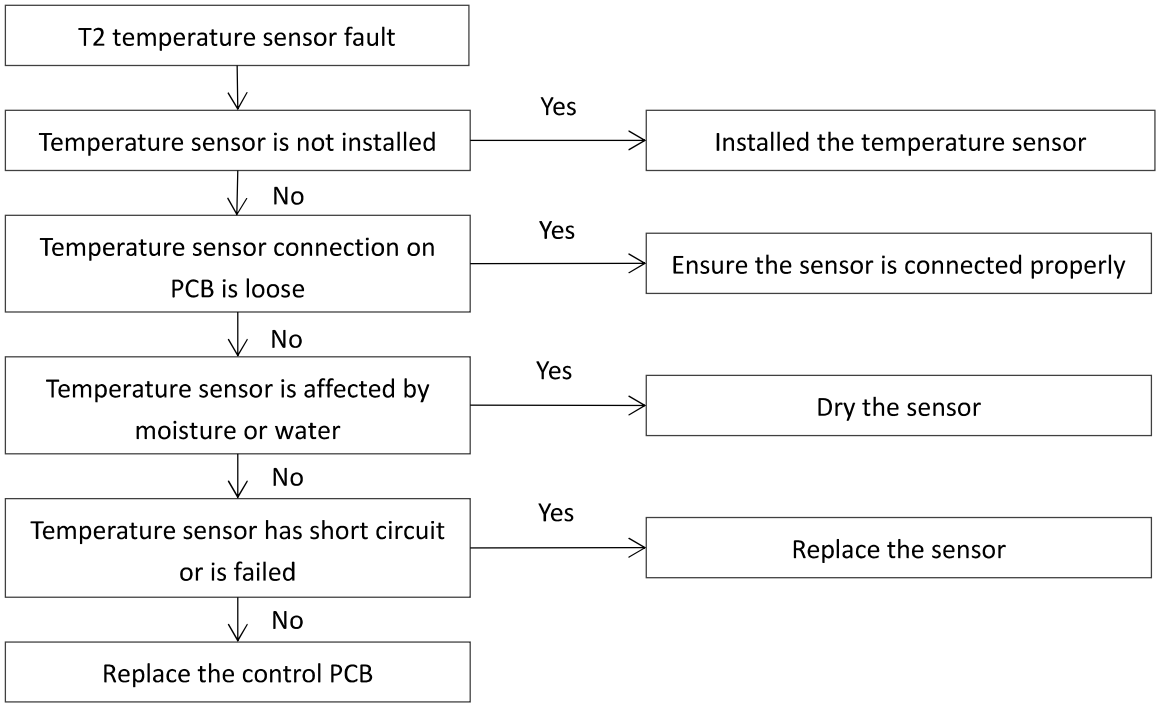
- Use a firm stool or step ladder according to manufacturer procedures when cleaning or maintaining the unit.

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 T2 temperature sensor fault troubleshooting

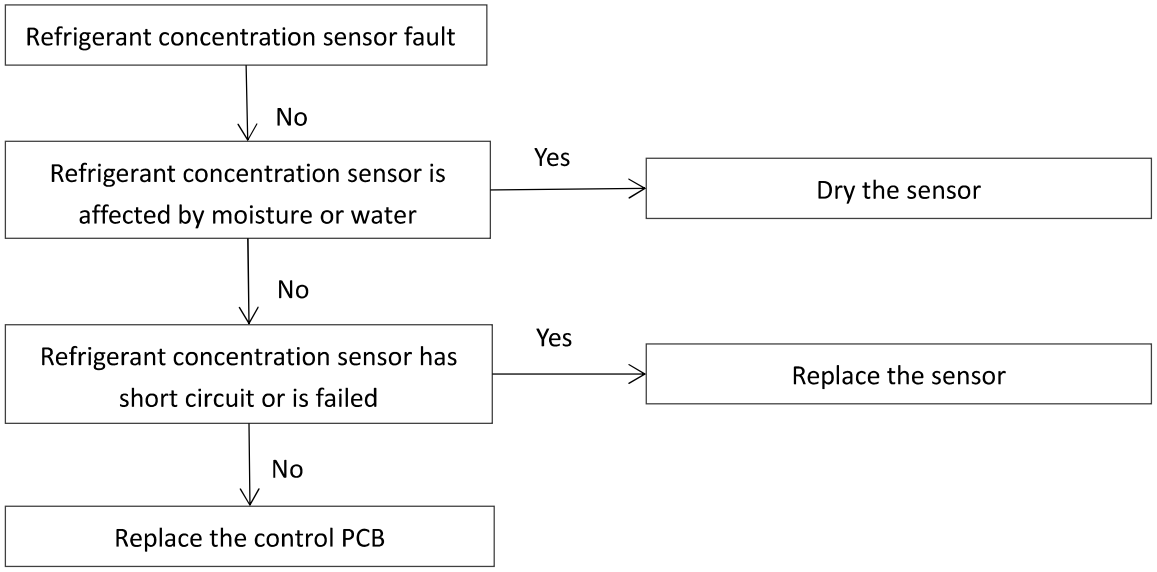
- LED2 flashes for 3 times every 8 seconds indicates indoor unit T2 temperature sensor fault
- The unit stops running and LED2 flashes 2 or 3 times in each round.



Note: 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.

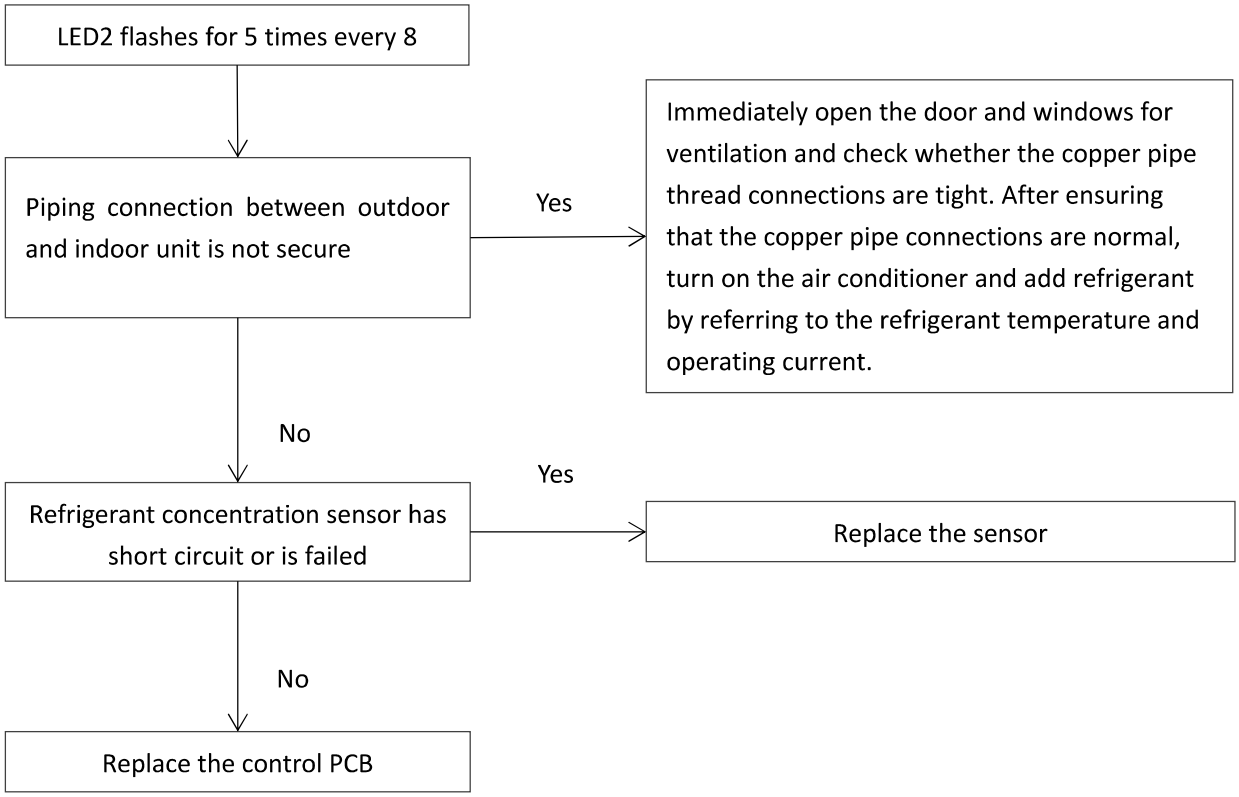
2.3 Refrigerant concentration sensor fault troubleshooting

- LED2 flash for 4 times every 8 seconds indicates refrigerant concentration sensor fault (Only valid when connected to a refrigerant concentration sensor.)
- The unit stops running and LED2 flashes 4 times in each round.



2.4 Refrigerant leakage protection troubleshooting

- LED2 flashes for 5 times every 8 seconds indicates refrigerant leakage protection (Only valid when connected to a refrigerant concentration sensor.)
- The unit stops running and error code is displayed on LED2 flashes 5 times in each round.

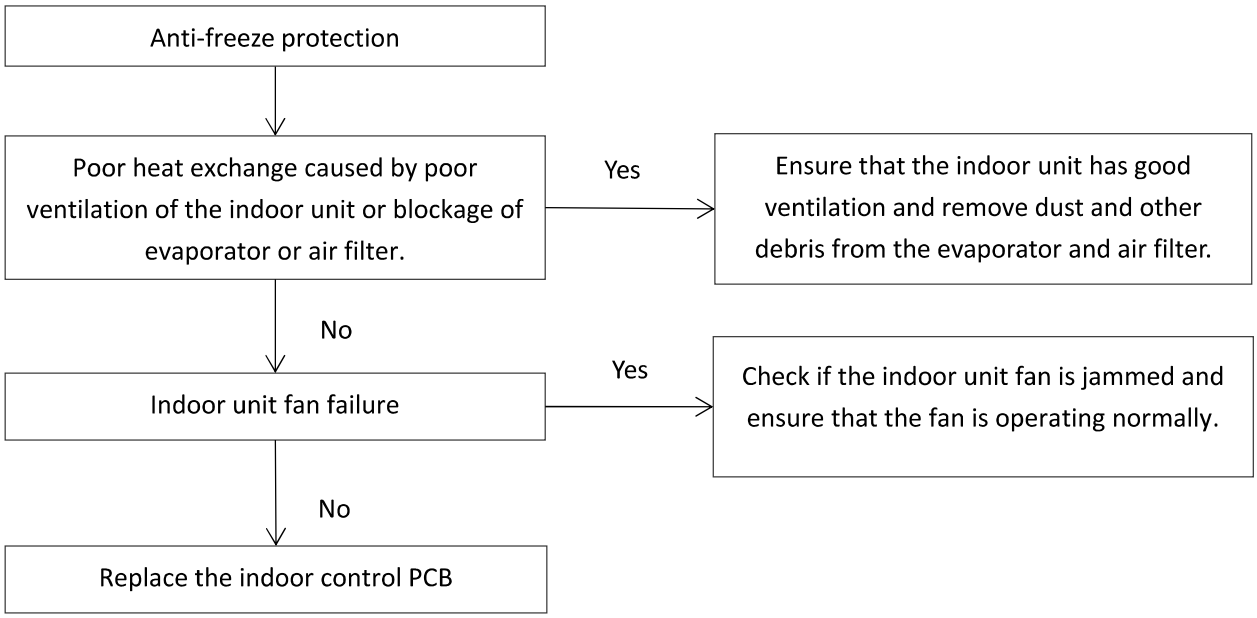


Note:

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.

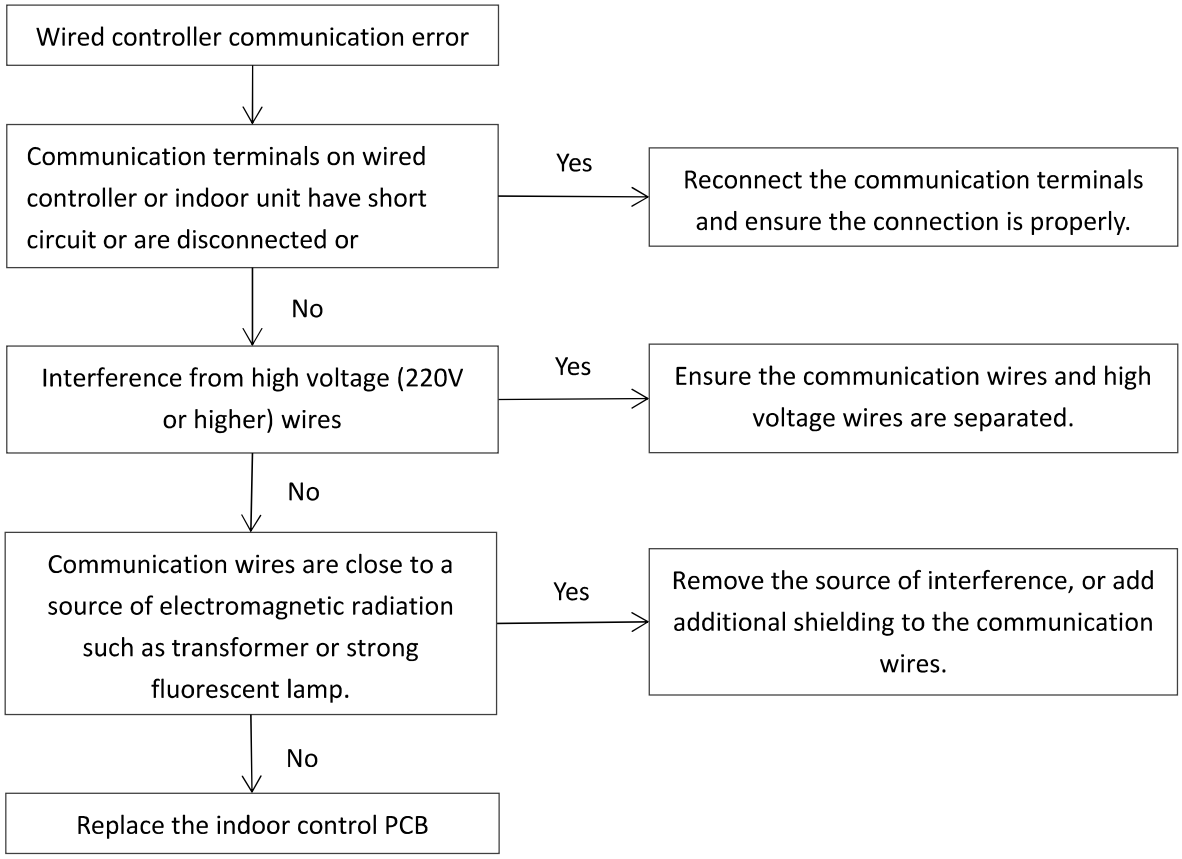
2.5 Anti-freeze protection troubleshooting

- LED2 flashes 6 times every 8 seconds indicates anti-freeze protection.
- The unit stops running and LED2 flashes 6 times in each round.



2.6 Wired controller communication error troubleshooting

- LED2 flashes 10 times every 8 seconds indicates wired controller communication error.
- The unit stops running and LED2 flashes 10 times in each round.



3. Temperature Sensor Resistance Characteristics

Condenser coil temperature sensor(T2) resistance characteristics.

Temperature (℃)	Temperature (℉)	Resistance (kΩ)	Temperature (℃)	Temperature (℉)	Resistance (kΩ)
-25	-13	144.266	15	59	16.079
-24	-11	135.601	16	61	15.313
-23	-9	127.507	17	63	14.588
-22	-8	119.941	18	64	13.902
-21	-6	112.867	19	66	13.251
-20	-4	106.732	20	68	12.635
-19	-2	100.552	21	70	12.05
-18	0	94.769	22	72	11.496
-17	1	89.353	23	73	10.971
-16	3	84.278	24	75	10.473
-15	5	79.521	25	77	10
-14	7	75.059	26	79	9.551
-13	9	70.873	27	81	9.125
-12	10	66.943	28	82	8.721
-11	12	63.252	29	84	8.337
-10	14	59.784	30	86	7.972
-9	16	56.524	31	88	7.625
-8	18	53.458	32	90	7.296
-7	19	50.575	33	91	6.982
-6	21	47.862	34	93	6.684
-5	23	45.308	35	95	6.401
-4	25	42.903	36	97	6.131
-3	27	40.638	37	99	5.874
-2	28	38.504	38	100	5.63
-1	30	36.492	39	102	5.397
0	32	34.596	40	104	5.175
1	34	32.807	41	106	4.964
2	36	31.12	42	108	4.763
3	37	29.528	43	109	4.571
4	39	28.026	44	111	4.387
5	41	26.608	45	113	4.213
6	43	25.268	46	115	4.046
7	45	24.003	47	117	3.887
8	46	22.808	48	118	3.735
9	48	21.678	49	120	3.59
10	50	20.61	50	122	3.451
11	52	19.601	51	124	3.318
12	54	18.646	52	126	3.191
13	55	17.743	53	127	3.069
14	57	16.888	54	129	2.952

Temperature(℃)	Temperature(℉)	Resistance(kQ)	Temperature(℃)	Temperature(℉)	Resistance(kQ)
55	131	2.841	95	171	0.708
56	133	2.734	96	173	0.686
57	135	2.632	97	175	0.666
58	136	2.534	98	176	0.646
59	138	2.44	99	178	0.627
60	140	2.35	100	180	0.609
61	142	2.264	101	182	0.591
62	144	2.181	102	184	0.574
63	145	2.102	103	185	0.558
64	147	2.026	104	187	0.542
65	149	1.953	105	189	0.527
66	151	1.883			
67	153	1.816			
68	154	1.752			
69	156	1.69			
70	158	1.631			
71	160	1.574			
72	162	1.519			
73	163	1.466			
74	165	1.416			
75	167	1.367			
76	169	1.321			
77	171	1.276			
78	172	1.233			
79	174	1.191			
80	176	1.151			
81	178	1.113			
82	180	1.076			
83	181	1.041			
84	183	1.007			
85	185	0.974			
86	187	0.942			
87	189	0.912			
88	190	0.883			
89	192	0.855			
90	194	0.828			
91	196	0.802			
92	198	0.777			
93	199	0.753			
94	201	0.73			