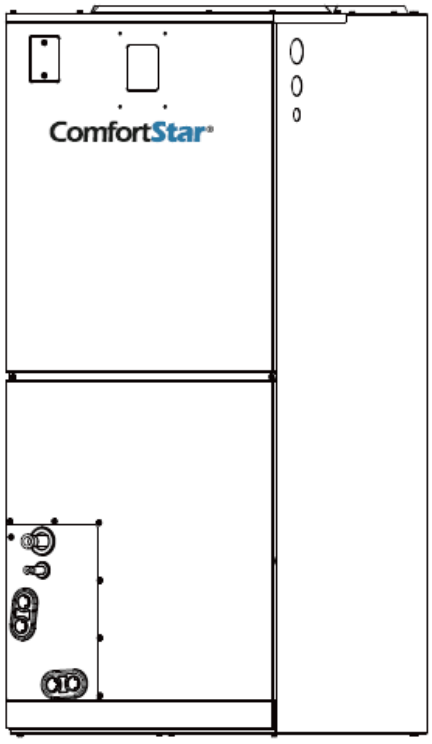
ComfortStar®
Air Conditioning & Heating Products

# Service Manual

**Indoor unit:** **LUC17-42-15** (40N)
**LUC17-48-15** (40E)
LUC17-60-15 (40F)




⚠ 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

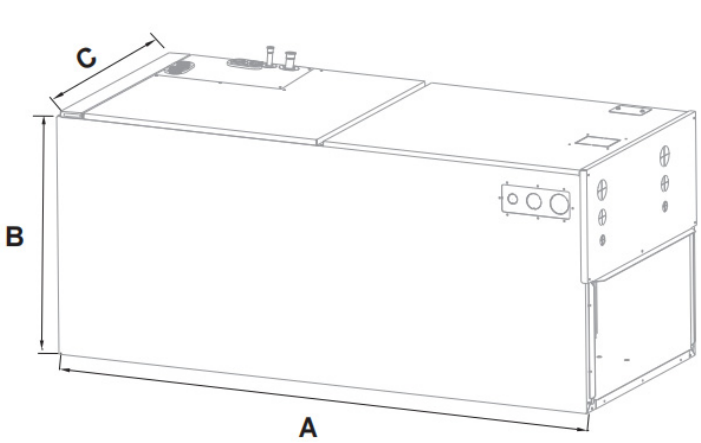
# 1 Product lineup

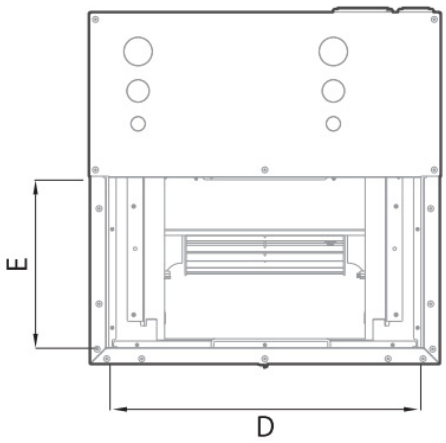
| Model | Cooling Capacity (Btu/h) | Heating Capacity (Btu/h) | Appearance |
|---|---|---|---|
| LUC17-18-15 | 18000 | / |  |
| LUC17-24-15 | 24000 | / | |
| LUC17-30-15 | 30000 | / |  |
| LUC17-36-15 | 35000 | / | |
| LUC17-42-15 | 42000 | / |  |
| LUC17-48-15 | 46000 | / | |
| LUC17-60-15 | 54000 | / | |

# 2 Specifications

| Indoor | | | LUC17-18-15 | LUC17-24-15 | LUC17-30-15 | LUC17-36-15 | LUC17-42-15 | LUC17-48-15 | LUC17-60-15 |
|---|---|---|---|---|---|---|---|---|---|
| Power supply | Rated Voltage | V, Ph, Hz | 208/230V, 1Ph, 60Hz | 208/230V, 1Ph, 60Hz | 208/230V, 1Ph, 60Hz | 208/230V, 1Ph, 60Hz | 208/230V, 1Ph, 60Hz | 208/230V, 1Ph, 60Hz | 208/230V, 1Ph, 60Hz |
| Cooling | Capacity | Btu/h | 18000 | 24000 | 30000 | 35000 | 42000 | 46000 | 54000 |
| Heating | Capacity | Btu/h | / | / | / | / | / | / | / |
| Indoor MINIMUM CIRCUIT AMPACITY | | A | 3.5 | 3.5 | 5.0 | 5.0 | 7.0 | 7.0 | 7.0 |
| Indoor MAX.FUSE | | A | 6.0 | 6.0 | 6.0 | 6.0 | 10.0 | 10.0 | 10.0 |
| Indoor air flow (H/L) | | CFM | 650/420 | 650/420 | 950/520 | 950/520 | 1450/750 | 1690/750 | 1690/750 |
| Indoor Noise level (H/L) | | dB(A) | 38.5/34 | 38.5/34 | 40/36 | 40/36 | 53/46 | 53/46 | 53/46 |
| N.A. Design pressure | | PSI | 174/609 | 174/609 | 174/609 | 174/609 | 174/609 | 174/609 | 174/609 |
| Indoor unit | Dimension (W×D×H) | inch | 17-33/64×21-1/32×45 | | 21-1/32×21-1/32×49-7/32 | | 24-31/64×21-1/32×52-63/64 | | |
| | Packing Demension | inch | 20-55/64×26-37/64×46-17/64 | | 24-13/32×26-37/64×50-13/64 | | 27-7/8×26-37/64×54-9/64 | | |
| | Net/Gross Weight | lbs | 114/127 | 114/127 | 137/151 | 137/151 | 165/184 | 165/184 | 165/184 |
| Refrigerant piping | Liquid/Gas side | 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) |
| Connecting Wiring | | AWG | 24V: AWG 14*3 Shielded | 24V: AWG 14*3 Shielded | 24V: AWG 14*3 Shielded | 24V: AWG 14*3 Shielded | 24V: AWG 14*3 Shielded | 24V: AWG 14*3 Shielded | 24V: AWG 14*3 Shielded |
| Comunication Type | | | 24V | 24V | 24V | 24V | 24V | 24V | 24V |
| Throttle type | | | Piston | Piston | Piston | Piston | Piston | Piston | Piston |
| Setting Temp. Range | | ℉ | 60~90 | 60~90 | 60~90 | 60~90 | 60~90 | 60~90 | 60~90 |

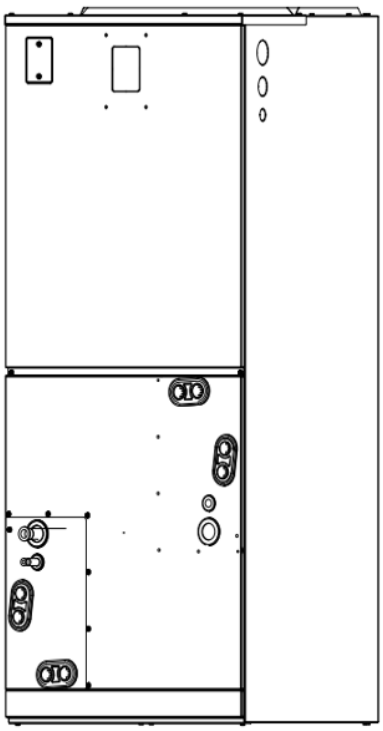
## 3 Dimensional drawings

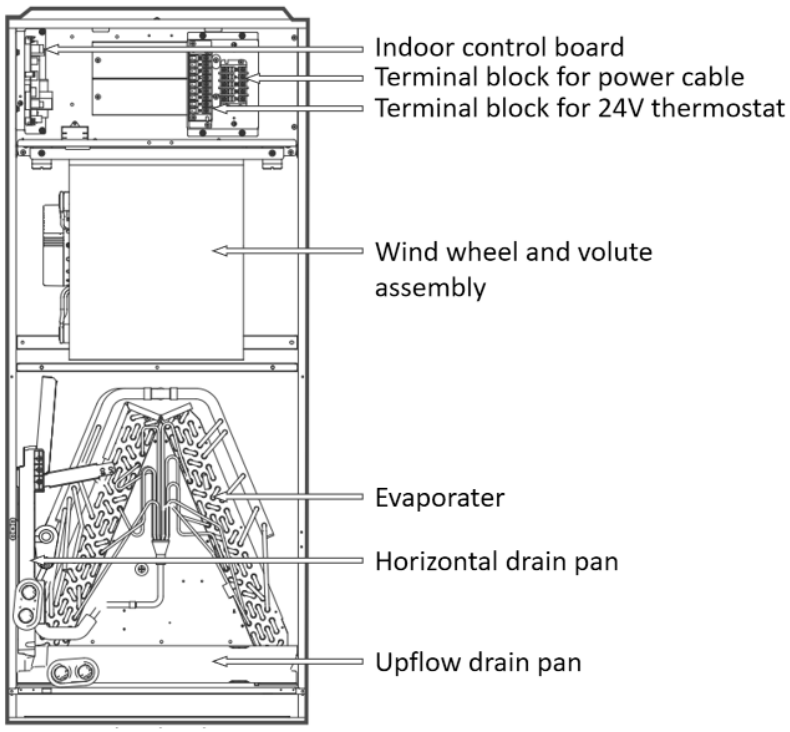



| Dimensions \ Model (Btu/h) | | 18/24K | 30/36K | 42/48/60K |
|---|---|---|---|---|
| A | mm | 1145 | 1245 | 1346 |
| | inch | 45 | 49-7/32 | 52-63/64 |
| B | mm | 534 | 534 | 534 |
| | inch | 21-1/32 | 21-1/32 | 21-1/32 |
| C | mm | 445 | 534 | 622 |
| | inch | 17-33/64 | 21-1/32 | 24-31/64 |
| D | mm | 400 | 490 | 580 |
| | inch | 15-3/4 | 19-19/64 | 22-53/64 |
| E | mm | 260 | 260 | 260 |
| | Inch | 10-15/64 | 10-15/64 | 10-15/64 |

## 4 Layout Functional Components

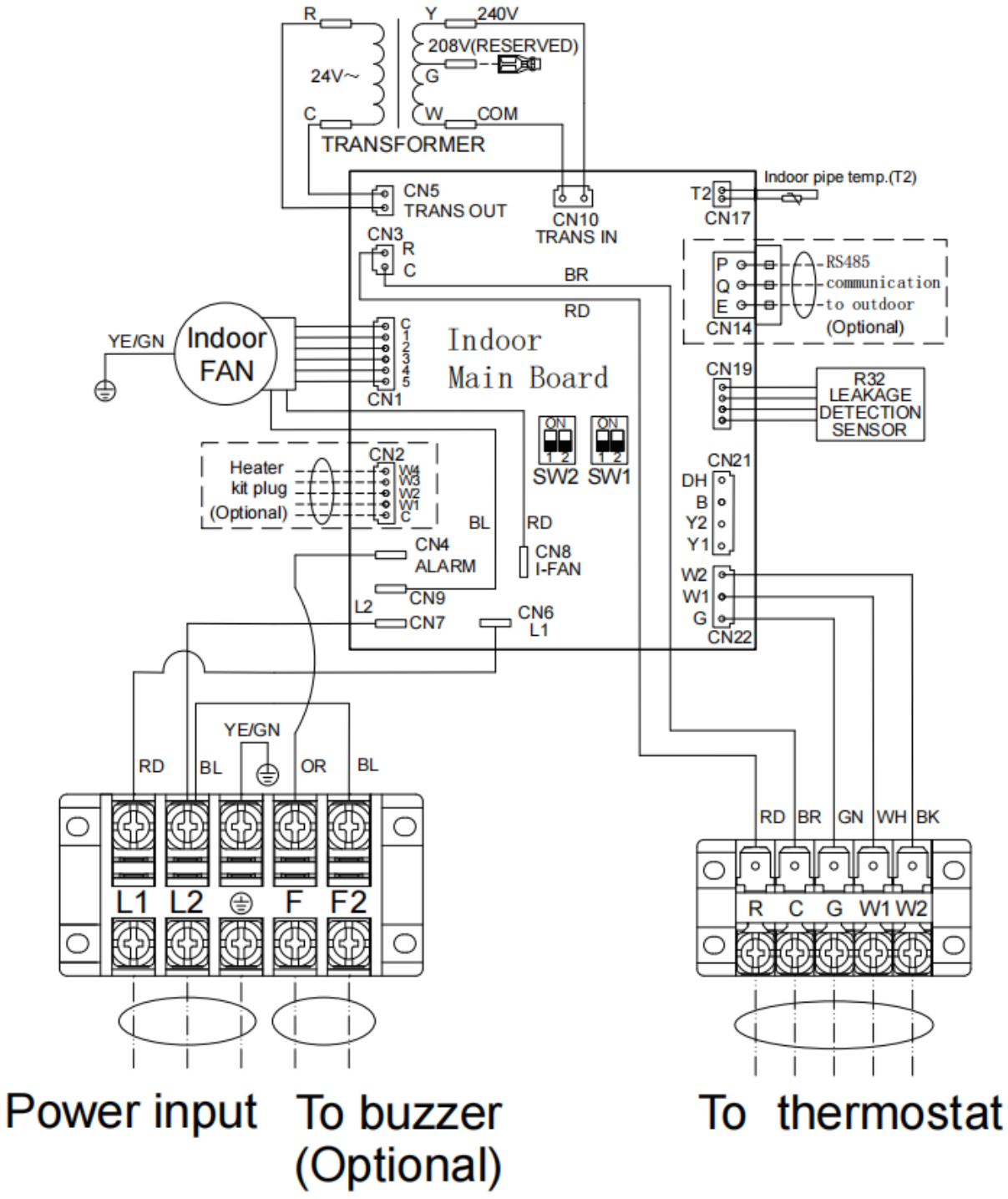


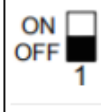
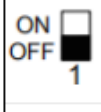


# Part 2

# Wiring Diagram

## 1 Electric wiring diagram



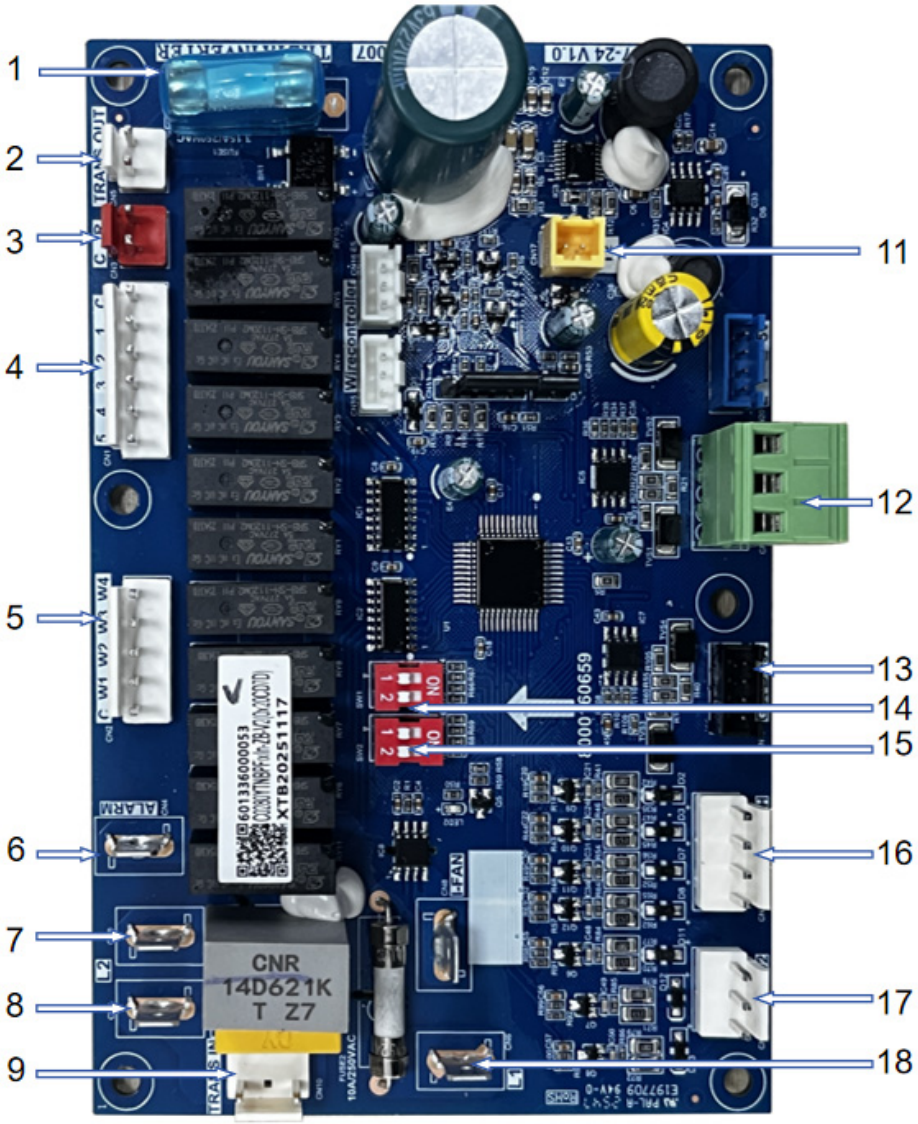
| DIP Switch status Indicate | |
|---|---|
|   | This Indicate OFF (The DIP switch is dialed to the digital side) |
|   | This Indicate ON (The DIP switch is dialed to the digital side) |

| SW1 DIP Switch selection (Indoor FAN speed) | | | |
|---|---|---|---|
| SW1.1 | SW1.2 | FAN speed | Models |
| OFF | OFF | 1 | |
| OFF | ON | 3 | 42K |
| ON | OFF | 4 | 18K 24K 30K 48K |
| ON | ON | 5 | 36K 60K |

| SW2 DIP Switch Selection | | |
|---|---|---|
| SW2.1 | OFF | 24V Control (Default) |
| | ON | RS485 Comm.Mode |
| SW2.2 | OFF | Heating and cooling |
| | ON | Single-Cooled (Default) |

| Wire Color Code | | | |
|---|---|---|---|
| RD | RED | OR | ORANGE |
| BL | BLUE | GN | GREEN |
| BR | BROWN | GY | GRAY |
| BK | BLACK | YE | YELLOW |
| WH | WHITE | PR | PURPLE |

## 2 PCB

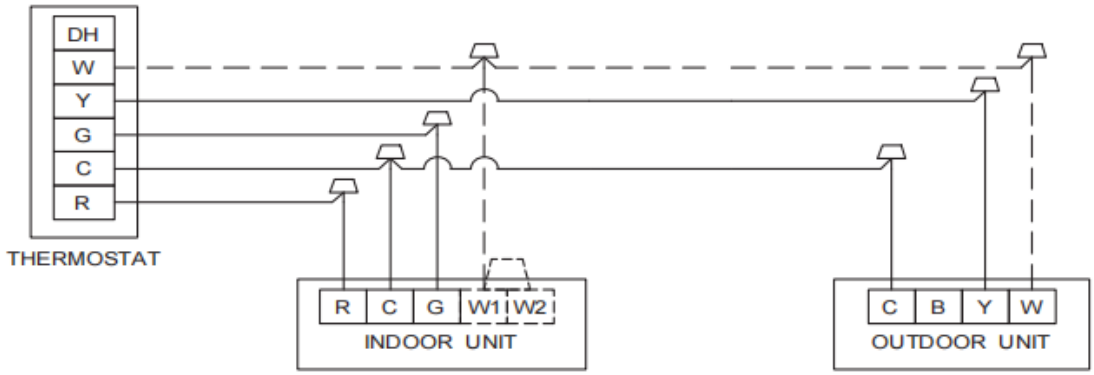



| No. | Port Names and Definitions | No. | Port Names and Definitions |
|---|---|---|---|
| 1 | Fuse | 11 | Port for indoor coil temperature sensor T2 |
| 2 | 24V trans in from transformer | 12 | RS-485 communication port |
| 3 | Port to 24V thermostat(R/C) | 13 | Port for refrigerant concentration monitor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

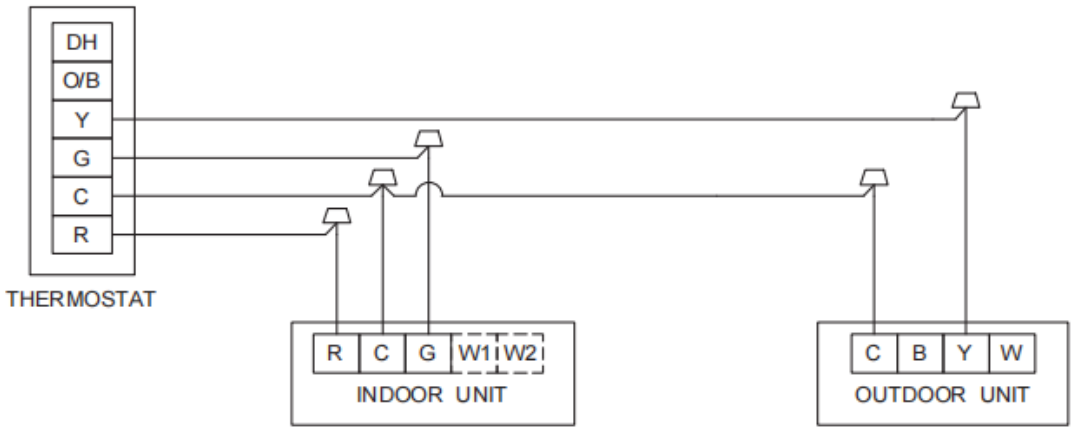
## 3 Low voltage wiring diagram

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

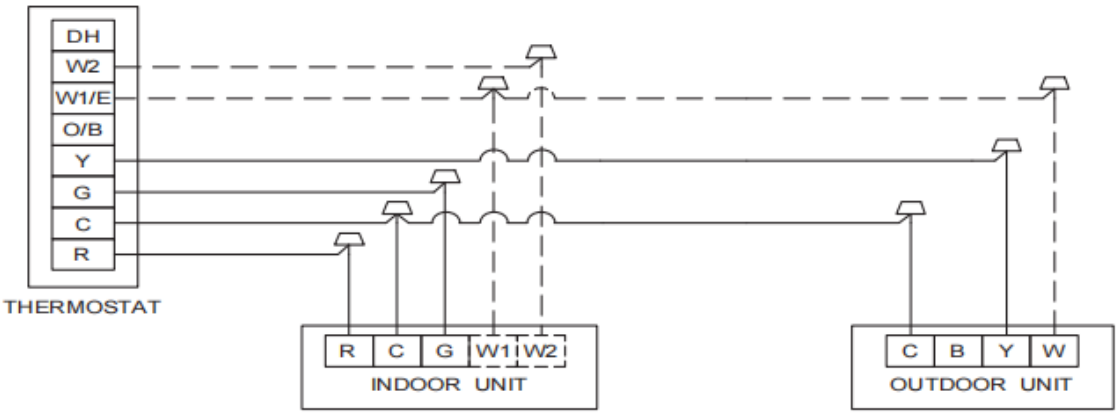
Wiring for 1H and 1C thermostat (no heat pump system model)



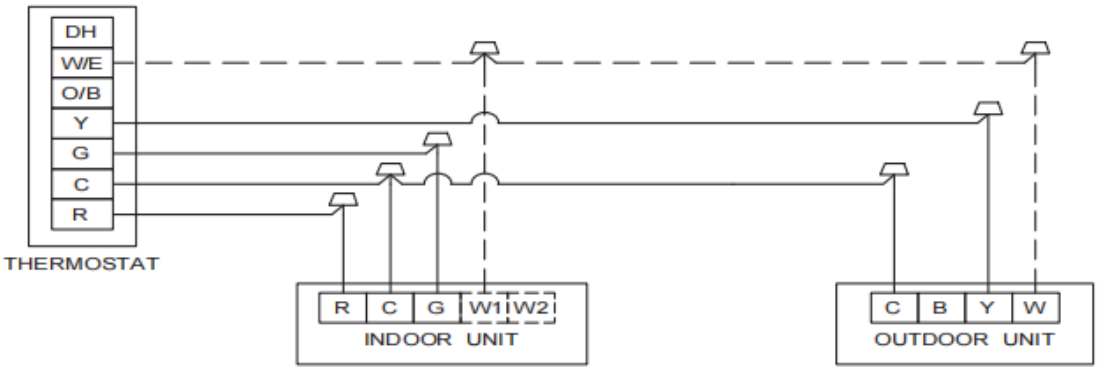

Wiring for 1H and 1C thermostat (no heat pump system model)



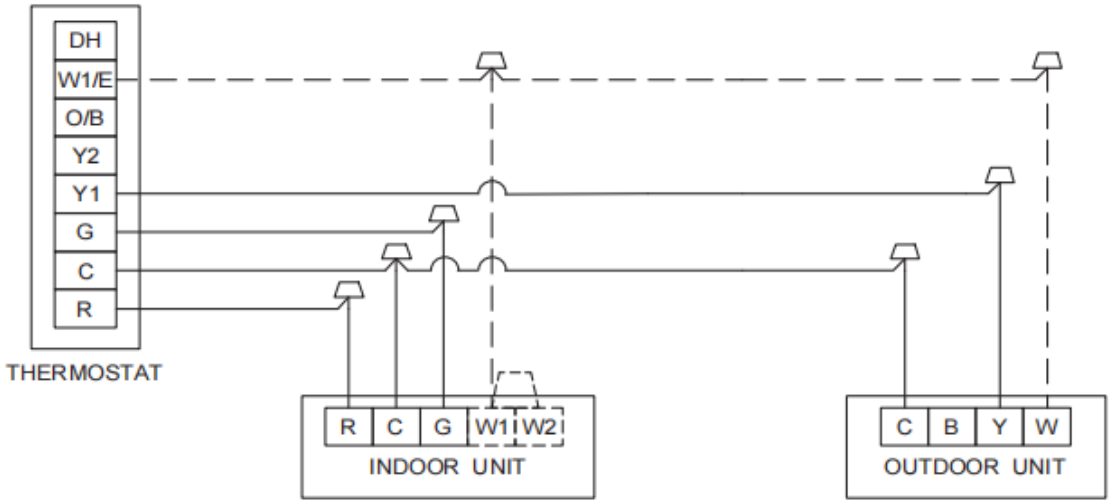
## Wiring for 3H and 1C thermostat (no heat pump system model)



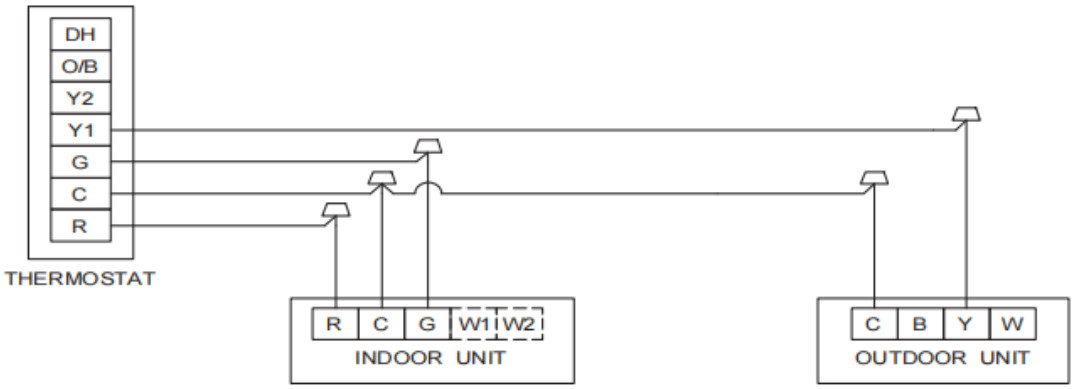

## Wiring for 2H and 1C thermostat (no heat pump system model)



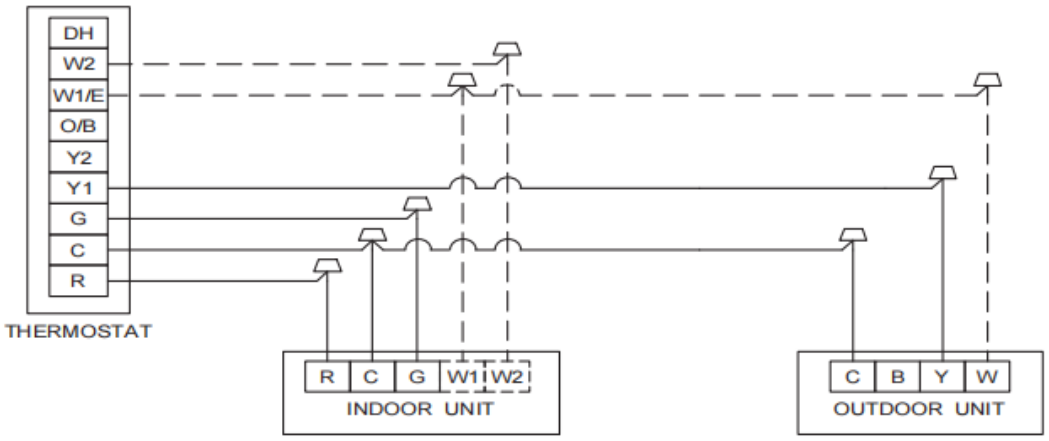

## Wiring for 3H and 2C thermostat (no heat pump system model)



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



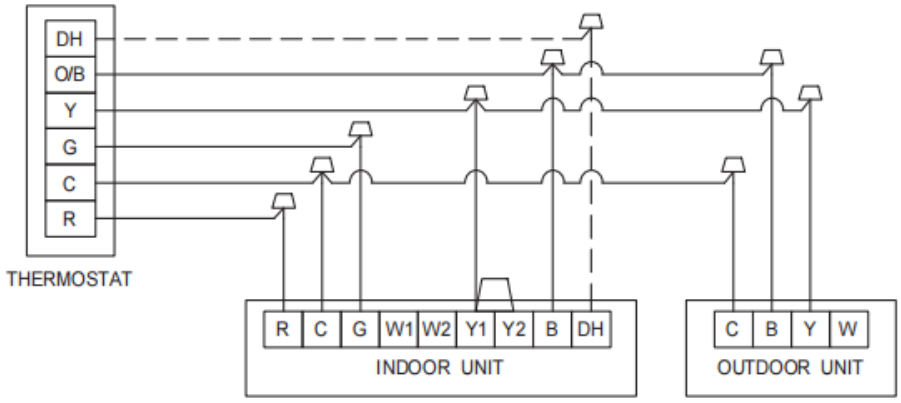

## Wiring for 4H and 2C thermostat (no heat pump system model)




**Heat Pump System Model**

## Wiring for 1H and 1C thermostat (heat pump system model)

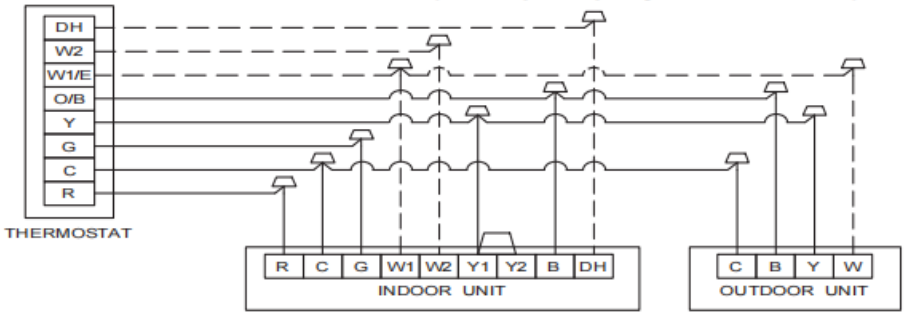
Note:Because Y1 and Y2 are jumped, the indoor fan will only run in high stage.



## Wiring for 3H and 1C thermostat (heat pump system model)

Note:Because Y1 and Y2 are jumped, the indoor fan will only run in high stage.

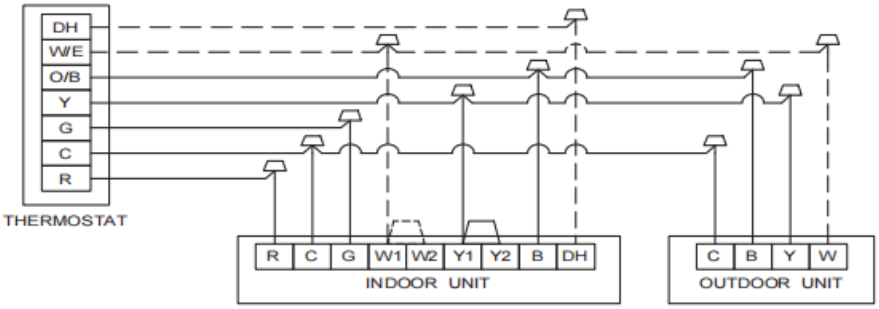
Note: Any time the electric heat elements are active. the indoor fan will run in high stage.




## Wiring for 2H and 1C thermostat (heat pump system model)

Note:Because Y1 and Y2 are jumped, the indoor fan will only run in high stage.

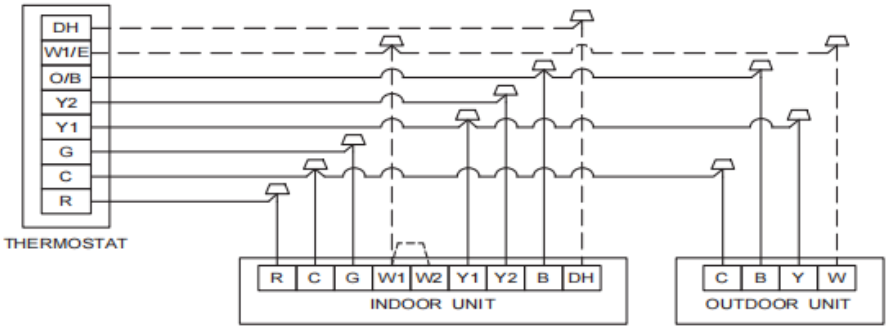
Note: Any time the electric heat elements are active. the indoor fan will run in high stage.




## Wiring for 3H and 2C thermostat (heat pump system model)

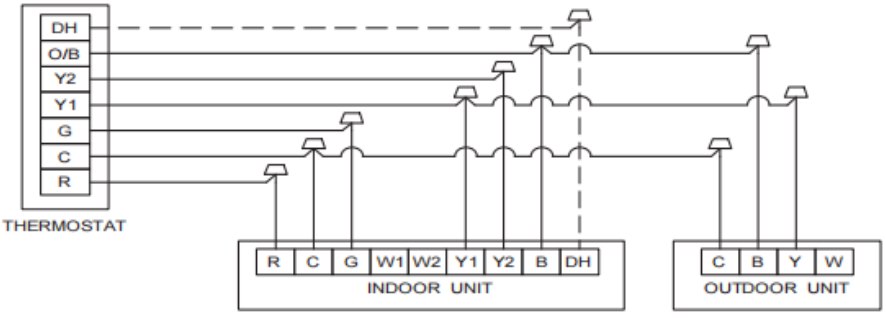
Note:Y1 and Y2 here represents 2 stages of fan cooling only, the compressor modulates separately from the fan.

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

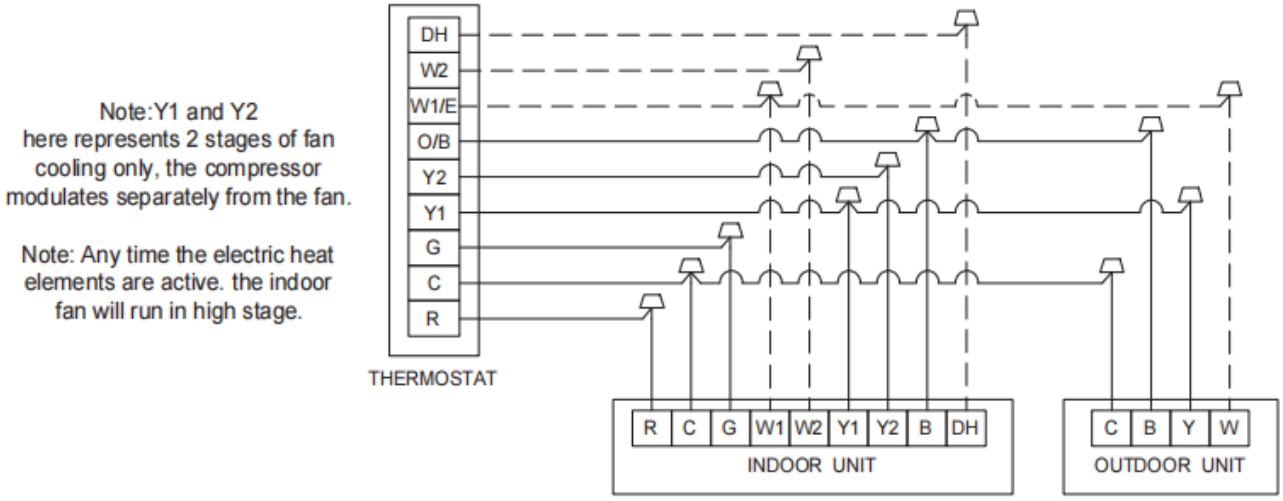



## Wiring for 2H and 2C thermostat (heat pump system model)

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



## Wiring for 4H and 2C thermostat (heat pump system model)




**Control Logic:**

Indoot unit connector

| Connector | Purpose |
|---|---|
| R | 24V Power Connection |
| C | Common |
| G | Fan Control |
| Y1 | Low Cooling |
| Y2 | High Cooling |
| B | Heating Reversing Valve |
| W1 | Stage1 Electrical Heating |
| W2 | Stage2 Electrical Heating |
| DH | Dehumidification |

Outdoot 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.

# 4 Electrical parameters

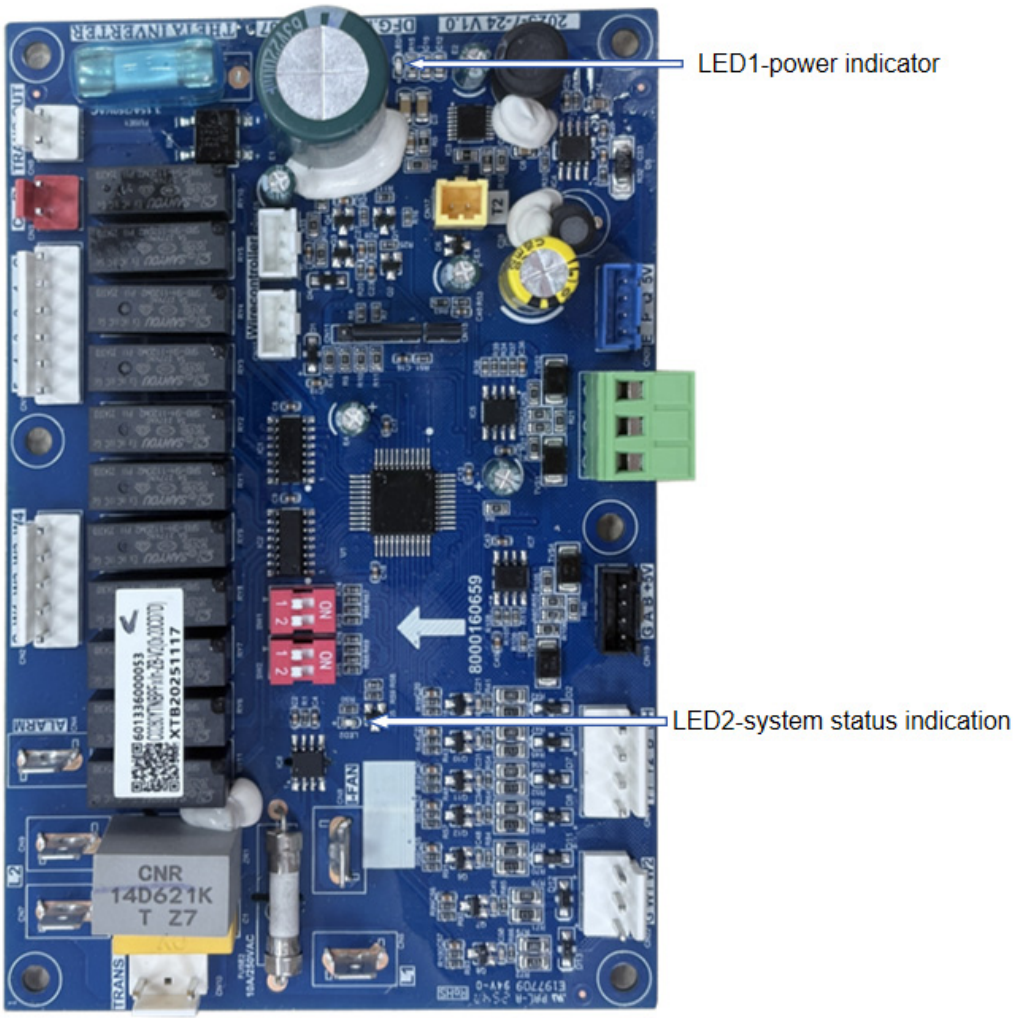
| Capacity(Btu/h) | | 18K | 24K | 30K | 36K | 42k | 48k | 60k |
|---|---|---|---|---|---|---|---|---|
| Power | Phase | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| (Indoor) | Frequency and Volt | 208/230,60Hz | | | | | | |
| Power | Phase | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| (Outdoor) | Frequency and Volt | 208/230,60Hz | | | | | | |
| Max.Fuse | Indoor unit(A) | 6 | 6 | 6 | 6 | 10 | 10 | 10 |
| | Outdoor unit(A) | 15 | 15 | 25 | 30 | 35 | 40 | 50 |
| Indoor unit | Line quantity | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Powerline | Line diameter(AWG) | 14/2.1mm$^2$ | 14/2.1mm2 | 14/2.1mm$^2$ | 14/2.1mm$^2$ | 14/2.1mm$^2$ | 14/2.1mm2 | 14/2.1mm$^2$ |
| Outdoor unit | Line quantity | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Powerline | Line diameter(AWG) | 14/2.1mm2 | 12/3.3mm$^2$ | 12/3.3mm$^2$ | 10/5.3mm$^2$ | 8/8.4mm$^2$ | 8/8.4mm$^2$ | 8/8.4mm$^2$ |
| Outdoor unit | Line quantity | 3 | 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$^2$ | 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$^2$ | 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 8 times every 8 seconds | Indoor fan motor fault |
| Flash for 9 times every 8 seconds | Communication error between outdoor and indoor unit |
| 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.

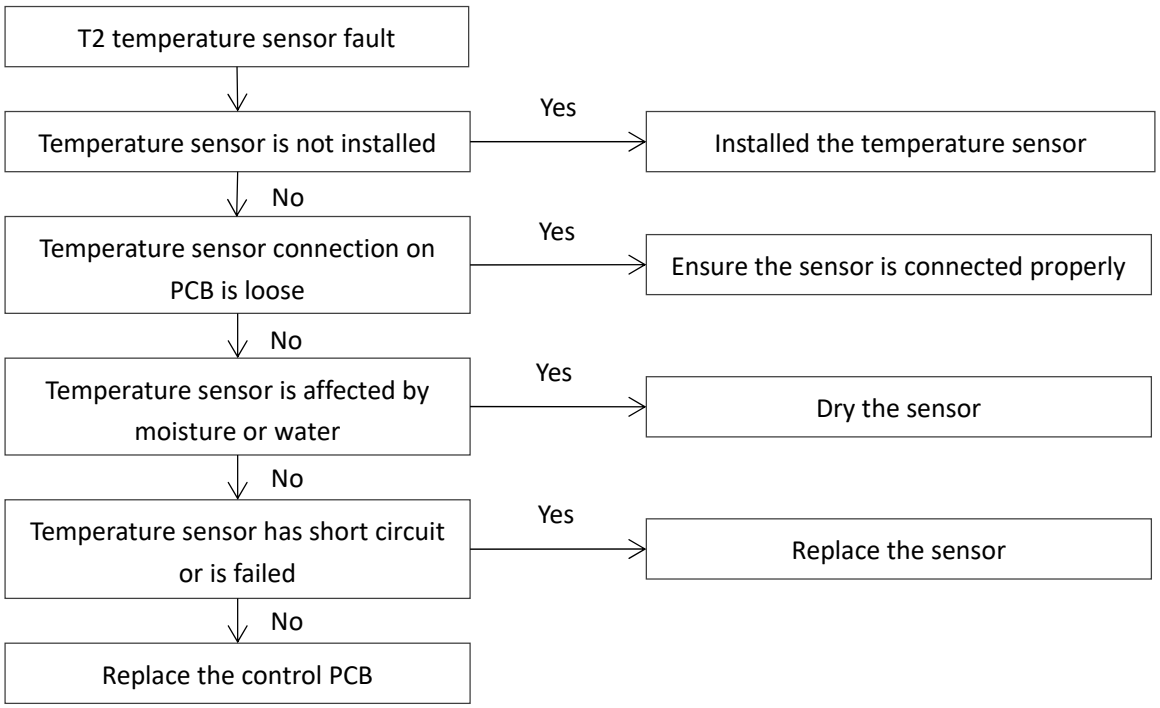
- Use a firm stool or step ladder according to manufacturer procedures when cleaning or maintaining the unit.

**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

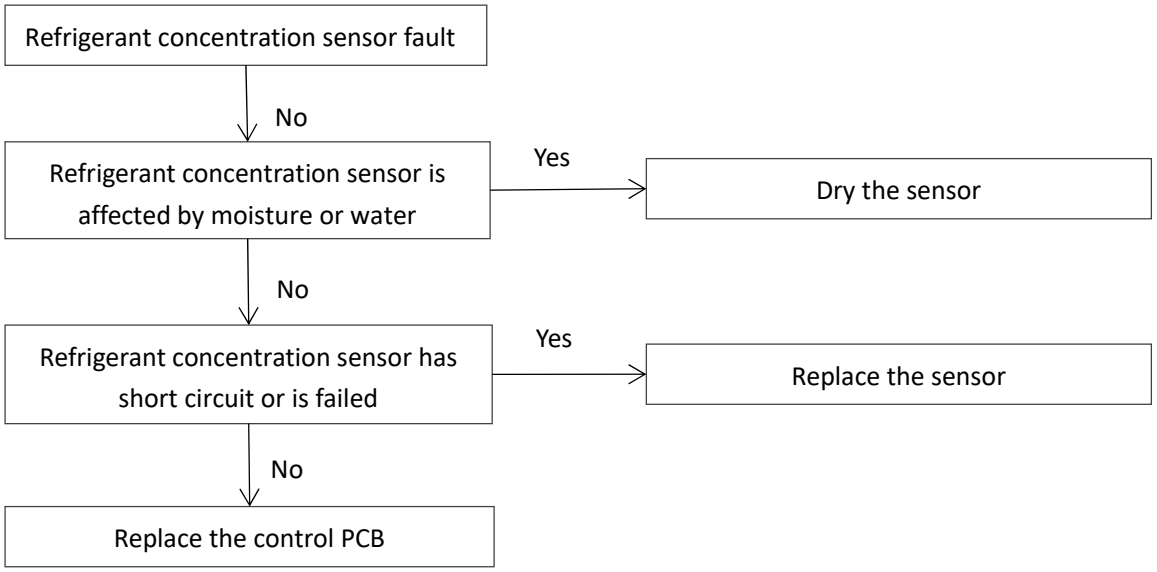
- LED2 flashes for 3 times every 8 seconds indicates indoor unit T2 temperature sensor fault
- The unit stops running and LED2 flashes 2 or 3 times in each round.




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.

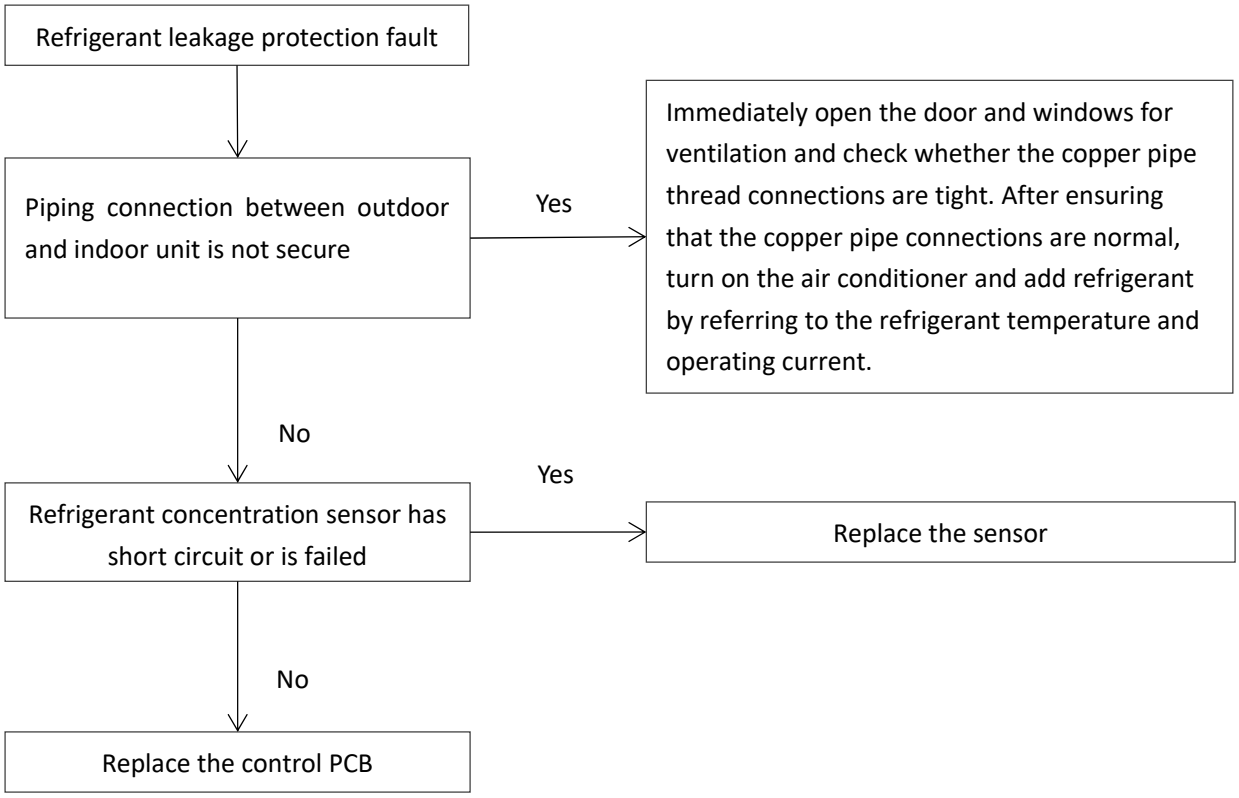
### 2.3 Refrigerant concentration sensor fault troubleshooting

- 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.

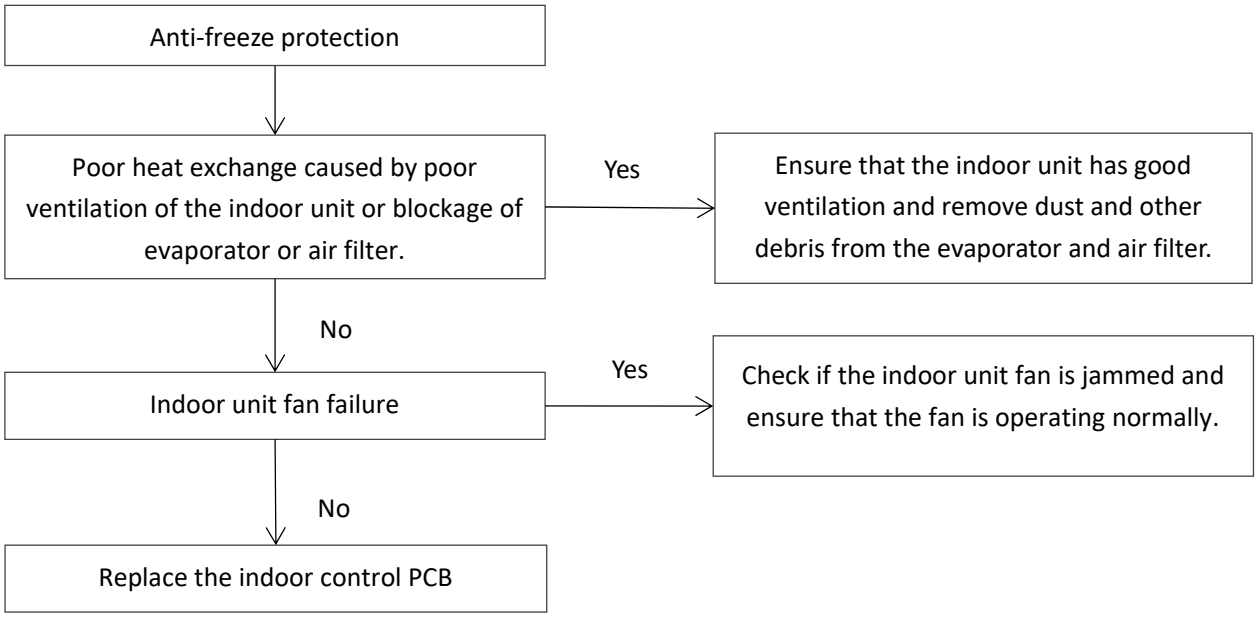



Note:

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.

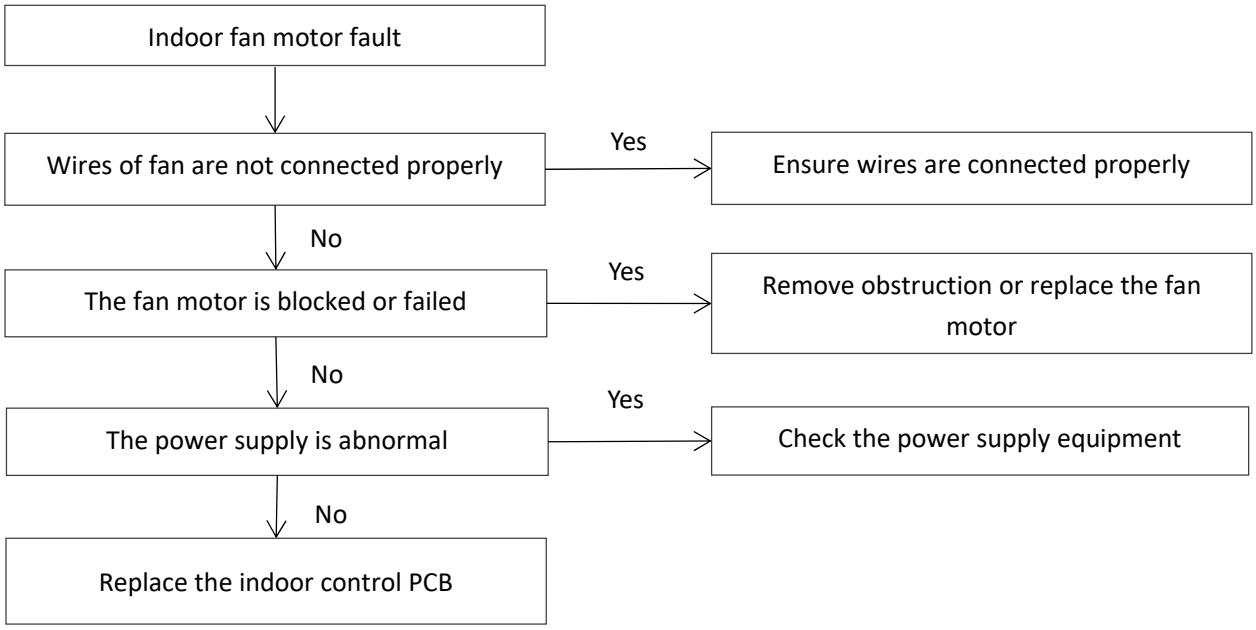
## 2.5 Anti-freeze protection troubleshooting

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



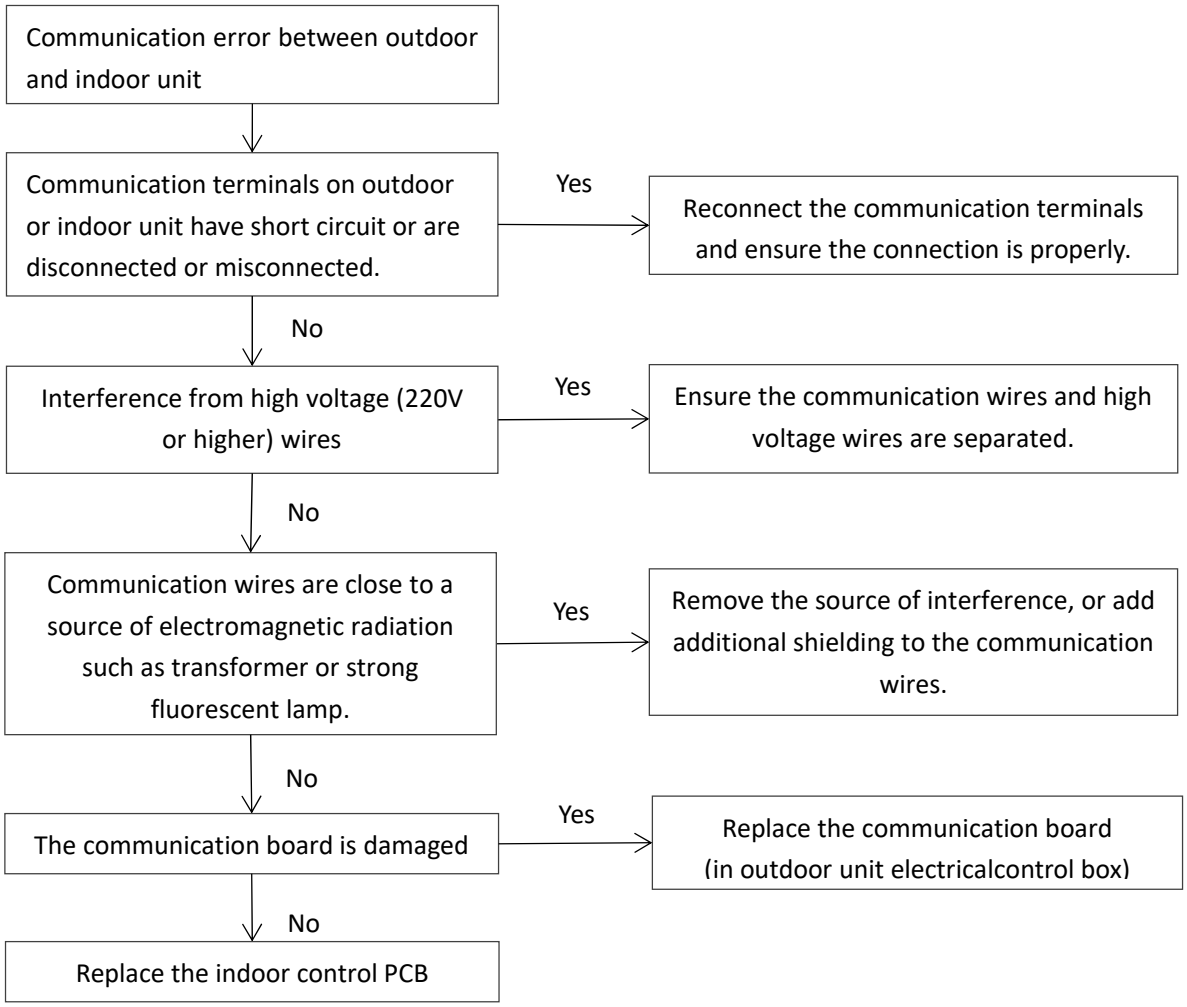
## 2.6 Indoor fan motor fault troubleshooting

- LED2 flashes 8 times every 8 seconds indicates indoor fan motor fault.
- The unit stops running and LED2 flashes 8 times in each round.



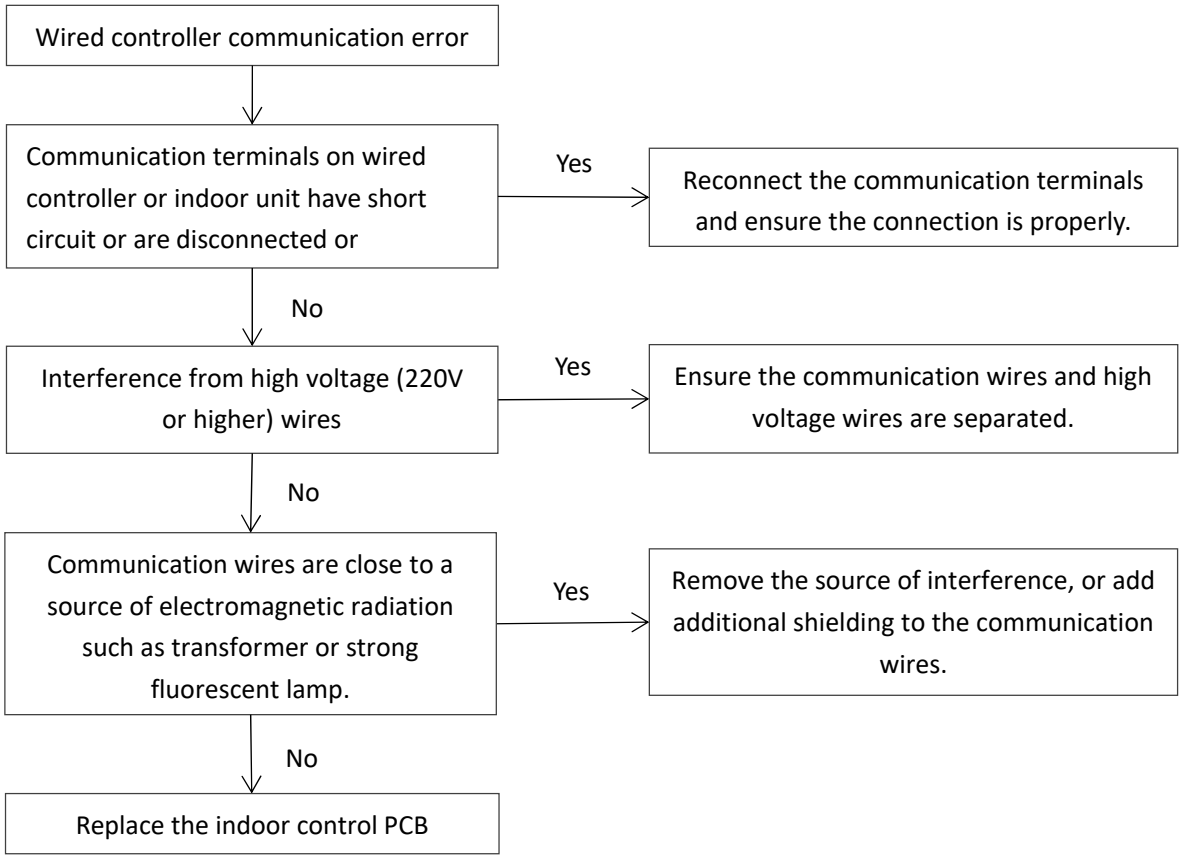
## 2.7 Communication error between outdoor and indoor unit troubleshooting

- LED2 flashes 9 times every 8 seconds indicates communication error between outdoor and indoor unit.
- The unit stops running and LED2 flashes 9 times in each round.



## 2.8 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

Room temperature sensor(T1) and condenser coil temperature sensor(T2) resistance characteristics.

| Temperature (°C) | Temperature (°F) | Resistance (kQ) | Temperature (°C) | Temperature (°F) | Resistance (kQ) |
|---|---|---|---|---|---|
| -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 (°C) | Temperature (°F) | Resistance (kΩ) | Temperature (°C) | Temperature (°F) | Resistance (kQ) |
|---|---|---|---|---|---|
| 55 | 131 | 2.841 | 95 | 203 | 0.708 |
| 56 | 133 | 2.734 | 96 | 205 | 0.686 |
| 57 | 135 | 2.632 | 97 | 207 | 0.666 |
| 58 | 136 | 2.534 | 98 | 208 | 0.646 |
| 59 | 138 | 2.44 | 99 | 210 | 0.627 |
| 60 | 140 | 2.35 | 100 | 212 | 0.609 |
| 61 | 142 | 2.264 | 101 | 214 | 0.591 |
| 62 | 144 | 2.181 | 102 | 216 | 0.574 |
| 63 | 145 | 2.102 | 103 | 217 | 0.558 |
| 64 | 147 | 2.026 | 104 | 219 | 0.542 |
| 65 | 149 | 1.953 | 105 | 221 | 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 | | | |