# Service Manual

2025.8

# Part 1
# General Information

# 1.Indoor and Outdoor Units

| Series | Capacity | Outdoor units | Indoor units |
|---|---|---|---|
| 18 SEER2 Inverter Air Handlers | 24K | OTV18HN024A | OTA18C002A |
| | | OTV18CN024A | |
| | 36K | OTV18HN036A | OTA18C004A |
| | | OTV18CN036A | |
| | 48K | OTV18HN048A | OTA18C006A |
| | | OTV18CN048A | |
| | 60K | OTV18HN060A | OTA18C007A |
| | | OTV18CN060A | |

# 2.External Appearance

| Indoor Unit | Outdoor Unit |
|---|---|
|  |  |

# Part 2
# Engineering Data

# 1.Specifications

## 1.1 Outdoor Units

### Heat pump

| Model | | | OTV18HN024A | OTV18HN036A | OTV18HN048A | OTV18HN060A |
|---|---|---|---|---|---|---|
| Electrical Data | V/Ph/Hz | V/Ph/Hz | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 |
| | Minimum Circuit Ampacity | A | 32 | 32 | 41 | 41 |
| | Max. Overcurrent Protection | A | 40 | 40 | 50 | 50 |
| | Min / Max Volts | V | 180/264 | 180/264 | 180/264 | 180/264 |
| Cooling | Capacity | Btu/h | 24000 | 33000 | 47000 | 55000 |
| | EER2 | Btu/h.W | 12.5 | 11.2 | 11.5 | 10.0 |
| | SEER2 | Btu/h.W | 18.5 | 18.0 | 18/18.5 | 17.0 |
| Heating | Capacity | Btu/h | 24000 | 34000 | 47500 | 54000 |
| | HSPF2 | Btu/h.W | 8.8 | 8.8 | 8.8/9.2 | 8.8 |
| | COP2 (5℉) | Btu/h.W | 2.15 | 2.00 | 2.10/2.30 | 2.30 |
| Compressor | Brand | | GMCC | GMCC | GMCC | GMCC |
| | Type | | Rotary | Rotary | Rotary | Rotary |
| | Capacity | W/h | 7350 | 7350 | 13330 | 13330 |
| | Input | W | 2090 | 2090 | 3660 | 3660 |
| | Refrigerant oil | ml | 900 | 900 | 1000 | 1000 |
| | Rated current(RLA) | A | 9.55 | 9.55 | 6.5 | 6.5 |
| | Demagnetizing Current | A | 52 | 52 | 61 | 61 |
| Outdoor motor | Brand | | Broad-ocean | Broad-ocean | Broad-ocean | Broad-ocean |
| | Type | | DC | DC | DC | DC |
| | Rated HP | W | 2/7 | 2/7 | 2/7 | 2/7 |
| | Speed | rpm | 950 | 950 | 1050 | 1100 |
| | FLA | A | 2.0 | 2.0 | 2.0 | 2.0 |
| Outdoor Fan | material | | Metal | Metal | Metal | Metal |
| | Type | | Axial flow | Axial flow | Axial flow | Axial flow |
| | Diameter | In. | 23-3/5 | 23-3/5 | 23-3/5 | 23-3/5 |
| | Height | In. | 4-1/2 | 4-1/2 | 4-1/2 | 4-1/2 |
| | Air flow | CFM | 2800 | 2800 | 3800 | 3800 |
| Outdoor coil | Number of row | | 2 | 2 | 2 | 2 |
| | Tube outside dia. / Type | mm | 7 / Rifled tube | 7 / Rifled tube | 7 / Rifled tube | 7 / Rifled tube |
| | Fin spacing / Thickness / Type | mm / mm | 1.4 / 0.095 / Hydrophilic aluminium fin | | | |
| | Length (outer/inner row)*Width*Height | mm | （2128/2065）*26.74*588 | （2128/2065）*26.74*588 | （2128/2065）*26.74*798 | （2128/2065）*26.74*798 |
| | Tube pitch(a) × row pitch(b) | mm | 13.37*21 | 13.37*21 | 13.37*21 | 13.37*21 |
| Outdoor noise level | | dB(A) | 41-62 | 41-64 | 50-62 | 50-65 |
| Outdoor unit | Dimension (W×D×H) | mm | 740×740×635 | 740×740×635 | 740×740×835 | 740×740×835 |
| | | inch | 29-1/7×29-1/7×25 | 29-1/7×29-1/7×25 | 29-1/7×29-1/7×32-7/8 | 29-1/7×29-1/7×32-7/8 |
| | Packing (W×D×H) | mm | 775×775×665 | 775×775×665 | 775×775×865 | 775×775×865 |
| | | in. | 30-1/2×30-1/2×26-1/5 | 30-1/2×30-1/2×26-1/5 | 30-1/2×30-1/2×34-1/10 | 30-1/2×30-1/2×34-1/10 |
| | Net / Gross weight | kg | 71/75 | 71/75 | 89/93.5 | 89/93.5 |
| | | lbs | 157/165 | 157/165 | 196/206 | 196/206 |
| Refrigerant system | Liquid side / Gas side | in. | 3/8 / 3/4 | 3/8 / 3/4 | 3/8 / 7/8 | 3/8 / 7/8 |
| | Refrigerant type | | R32 | R32 | R32 | R32 |
| | Factory charge | kg/oz | 3.2/112.9 | 3.2/112.9 | 4.2/148.1 | 4.2/148.1 |
| Operating temperatures | Cooling | ℉ | 5~125 | 5~125 | 5~125 | 5~125 |
| | Heating | ℉ | -13~86 | -13~86 | -13~86 | -13~86 |
| Shipping per STD40HQ | | | 180 | 180 | 135 | 135 |

## Cooling only

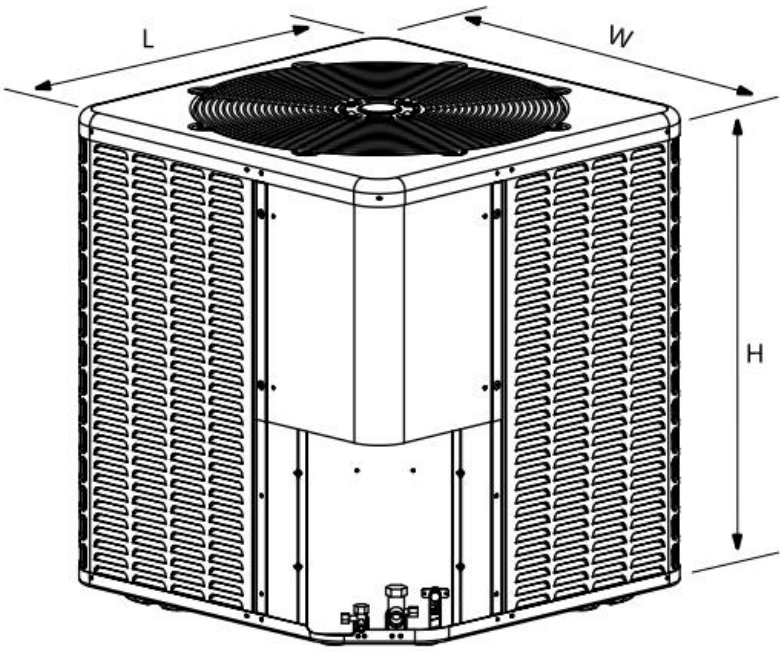
| Model | | | OTV18CN024A | OTV18CN036A | OTV18CN048A | OTV18CN060A |
|---|---|---|---|---|---|---|
| Electrical Data | V/Ph/Hz | V/Ph/Hz | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 |
| | Minimum Circuit Ampacity | A | 32 | 32 | 41 | 41 |
| | Max. Overcurrent Protection | A | 40 | 40 | 50 | 50 |
| | Min / Max Volts | V | 180/264 | 180/264 | 180/264 | 180/264 |
| Cooling | Capacity | Btu/h | 24000 | 33000 | 47000 | 55000 |
| | EER2 | Btu/h.W | 12.5 | 11.2 | 11.5 | 10.0 |
| | SEER2 | Btu/h.W | 18.5 | 18.0 | 18/18.5 | 17.0 |
| Compressor | Brand | | GMCC | GMCC | GMCC | GMCC |
| | Type | | Rotary | Rotary | Rotary | Rotary |
| | Capacity | W/h | 7350 | 7350 | 13330 | 13330 |
| | Input | W | 2090 | 2090 | 3660 | 3660 |
| | Refrigerant oil | ml | 900 | 900 | 1000 | 1000 |
| | Rated current(RLA) | A | 9.55 | 9.55 | 6.5 | 6.5 |
| | Demagnetizing Current | A | 52 | 52 | 61 | 61 |
| Outdoor motor | Brand | | Broad-ocean | Broad-ocean | Broad-ocean | Broad-ocean |
| | Type | | DC | DC | DC | DC |
| | Rated HP | W | 2/7 | 2/7 | 2/7 | 2/7 |
| | Speed | rpm | 950 | 950 | 1050 | 1100 |
| | FLA | A | 2.0 | 2.0 | 2.0 | 2.0 |
| Outdoor Fan | material | | Metal | Metal | Metal | Metal |
| | Type | | Axial flow | Axial flow | Axial flow | Axial flow |
| | Diameter | In. | 23-3/5 | 23-3/5 | 23-3/5 | 23-3/5 |
| | Height | In. | 4-1/2 | 4-1/2 | 4-1/2 | 4-1/2 |
| | Air flow | CFM | 2800 | 2800 | 3800 | 3800 |
| Outdoor coil | Number of row | | 2 | 2 | 2 | 2 |
| | Tube outside dia. / Type | mm | 7 / Rifled tube | 7 / Rifled tube | 7 / Rifled tube | 7 / Rifled tube |
| | Fin spacing / Thickness / Type | mm / mm | 1.4 / 0.095 / Hydrophilic aluminium fin | | | |
| | Length (outer/inner row)*Width*Height | mm | （2128/2065）*26.74*588 | （2128/2065）*26.74*588 | （2128/2065）*26.74*798 | （2128/2065）*26.74*798 |
| | Tube pitch(a) × row pitch(b) | mm | 13.37*21 | 13.37*21 | 13.37*21 | 13.37*21 |
| Outdoor noise level | | dB(A) | 41-62 | 41-64 | 50-62 | 50-65 |
| Outdoor unit | Dimension (W×D×H) | mm | 740×740×635 | 740×740×635 | 740×740×835 | 740×740×835 |
| | | inch | 29-1/7×29-1/7×25 | 29-1/7×29-1/7×25 | 29-1/7×29-1/7×32-7/8 | 29-1/7×29-1/7×32-7/8 |
| | Packing (W×D×H) | mm | 775×775×665 | 775×775×665 | 775×775×865 | 775×775×865 |
| | | in. | 30-1/2×30-1/2×26-1/5 | 30-1/2×30-1/2×26-1/5 | 30-1/2×30-1/2×34-1/10 | 30-1/2×30-1/2×34-1/10 |
| | Net / Gross weight | kg | 67/71 | 67/71 | 83/87.5 | 83/87.5 |
| | | lbs | 148/157 | 148/157 | 183/193 | 183/193 |
| Refrigerant system | Liquid side / Gas side | in. | 3/8 / 3/4 | 3/8 / 3/4 | 3/8 / 7/8 | 3/8 / 7/8 |
| | Refrigerant type | | R32 | R32 | R32 | R32 |
| | Factory charge | kg/oz | 2.4/84.7 | 2.4/84.7 | 3.2/112.9 | 3.2/112.9 |
| Operating temperatures | Cooling | ℉ | 5~125 | 5~125 | 5~125 | 5~125 |
| Shipping per STD40HQ | | | 180 | 180 | 135 | 135 |

## 1.2 Indoor Units

| Power supply | | V/Ph/Hz | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 |
|---|---|---|---|---|---|---|
| Cooling | Capacity | Btu/h | 24000 | 33000 | 47000 | 55000 |
| | EER2 | Btu/h.W | 12.5 | 11.2 | 11.5 | 10 |
| | SEER2 | Btu/h.W | 18.5 | 18 | 18.5 | 17 |
| Heating | Capacity | Btu/h | 24000 | 34000 | 47500 | 54000 |
| | HSPF2 | Btu/h.W | 8.8 | 8.8 | 9.2 | 8.8 |
| | COP2(5℉) | Btu/h.W | 2.15 | 2 | 2.3 | 2.3 |
| Electrical Data | Minimum Circuit Ampacity | | 4.8 | 4.8 | 7.2 | 7.2 |
| | Max. Overcurrent Protection | | 6 | 6 | 10 | 10 |
| | Min / Max Volts | V | 180/264 | 180/264 | 180/264 | 180/264 |
| Indoor coil | Number of rows | | 4*2 | 4*2 | 5*2 | 5*2 |
| | Tube outside dia. / Type | | 7mm / Rifled tube | 7mm / Rifled tube | 7mm / Rifled tube | 7mm / Rifled tube |
| | Fin spacing / Thickness / Type | mm / mm | 1.5 / 0.095 / Hydrophilic aluminium fin | | | |
| | Length*Width*Height | mm | 443*53.48*420 | 443*53.48*420 | 507*66.85*545 | 507*66.85*545 |
| | Tube pitch(a) × row pitch(b) | mm | 13.37*21 | 13.37*21 | 13.37*21 | 13.37*21 |
| Indoor motor | type | | ECM | ECM | ECM | ECM |
| | Rated output | HP | 1/2 | 1/2 | 3/4 | 3/4 |
| | Rated RPM | r/min | 1000 | 1000 | 1050 | 1050 |
| | FLA | A | 3.2 | 3.2 | 5.5 | 5.5 |
| Indoor fan | material | | Galvanized plate | Galvanized plate | Galvanized plate | Galvanized plate |
| | Type | | Centrifugal | Centrifugal | Centrifugal | Centrifugal |
| | Diameter | inch | 11 | 11 | 11 | 11 |
| | Height | inch | 11 | 11 | 11 | 11 |
| Indoor air flow | | CFM | 670/820 | 670/1130 | 1280/1650 | 1280/1650 |
| ESP | | Pa | 145 | 145 | 145 | 145 |
| Indoor noise level | | dB(A) | 45-55 | 45-55 | 48-59 | 48-59 |
| Metering device | Throttle type | | TXV | TXV | TXV | TXV |
| Indoor unit | Dimension (W×D×H) | mm | 500×560×1162 | 500×560×1162 | 560×623×1350 | 560×623×1350 |
| | | in. | 19-5/8×22×45-3/4 | 19-5/8×22×45-3/4 | 22×24-1/2×53-1/8 | 22×24-1/2×53-1/8 |
| | Packing (W×D×H) | mm | 580×650×1210 | 580×650×1210 | 640×705×1395 | 640×705×1395 |
| | | in. | 22-5/6×25-3/5×47-5/8 | 22-5/6×25-3/5×47-5/8 | 25-1/5×27-3/4×54-3/4 | 25-1/5×27-3/4×54-3/4 |
| | Net / Gross weight | kg | 59 / 64 | 59 / 64 | 78 / 84 | 78 / 84 |
| | | lbs | 130/ 141 | 130/ 141 | 172 / 185 | 172 / 185 |
| Refrigerant piping Liquid side / Gas side | | in. | 3/8 / 3/4 | 3/8 / 3/4 | 3/8 / 7/8 | 3/8 / 7/8 |
| Shipping per STD40HQ | | | 144 | 144 | 54 | 54 |
| Power supply | | V/Ph/Hz | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 | 208/230/1/60 |

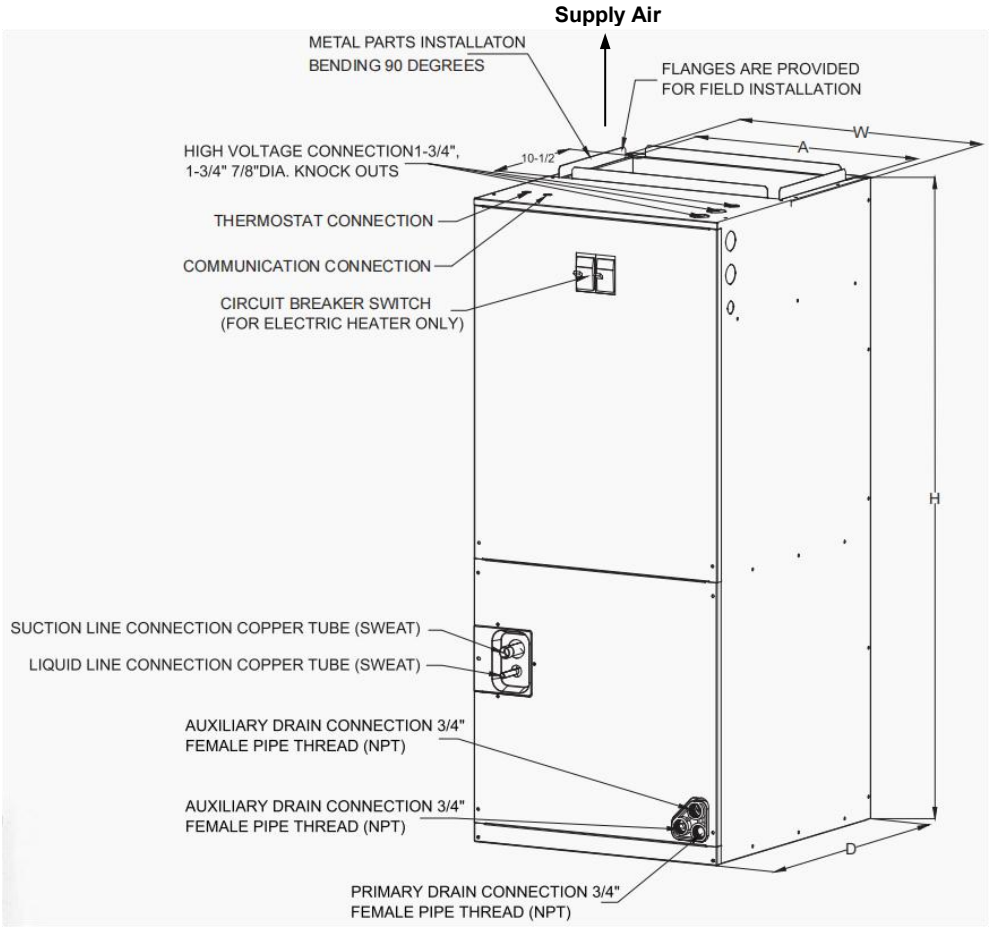
# 2. Dimensions

## 2.1 Outdoor Units




| Model name | Dimensions | | |
|---|---|---|---|
| | "L" mm (in.) | "W" mm (in.) | "H" mm (in.) |
| **OTV18HN024A**<br>**OTV18CN024A** | 740 (29-1/7) | 740 (29-1/7) | 635 (25) |
| **OTV18HN036A**<br>**OTV18CN036A** | | | |
| **OTV18HN048A**<br>**OTV18CN048A** | 740 (29-1/7) | 740 (29-1/7) | 835 (32-7/8) |
| **OTV18HN060A**<br>**OTV18CN060A** | | | |

## 2.2Indoor Units

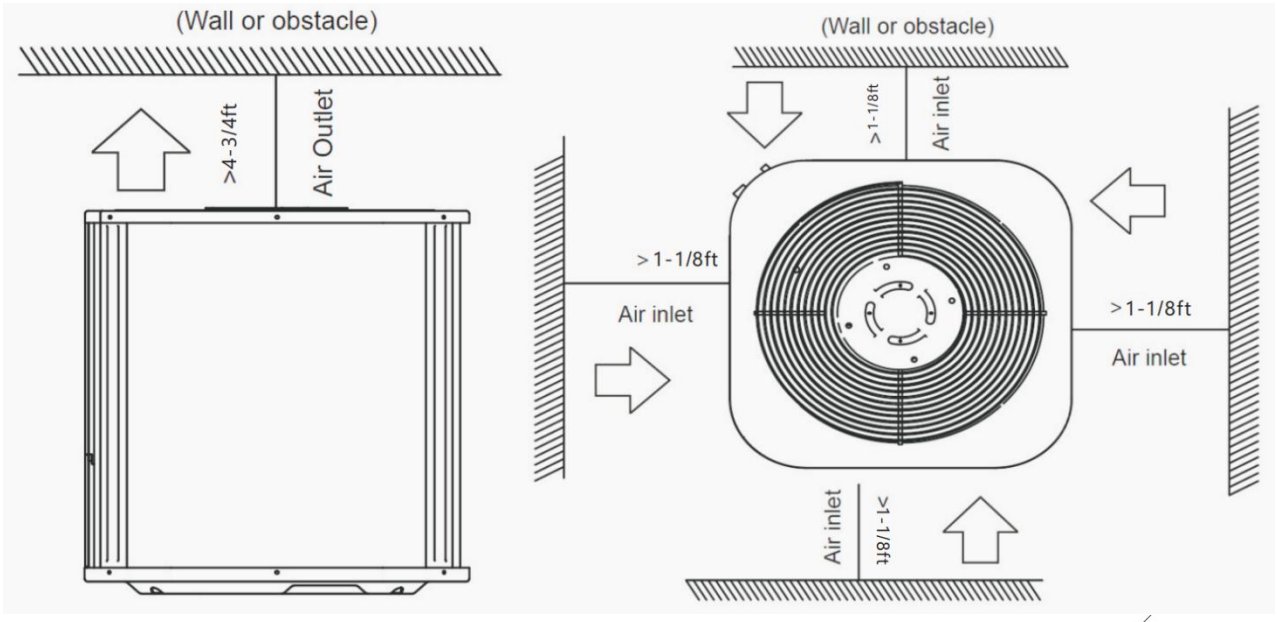


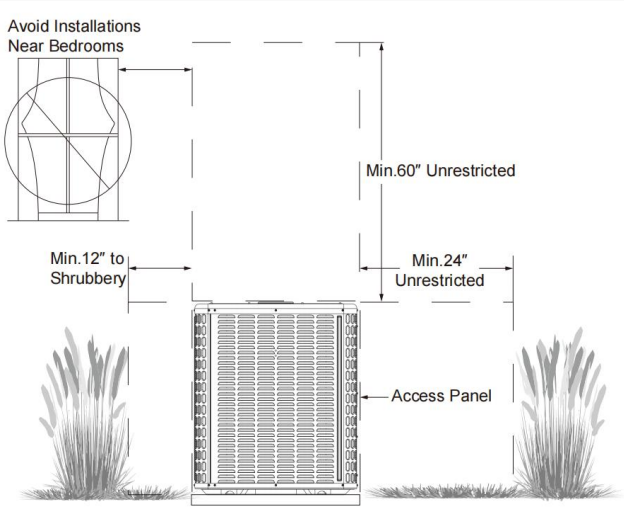

**Upflow unit shown;**
**Unit may be installed upflow, downflow,horizontal right, or left air supply.**

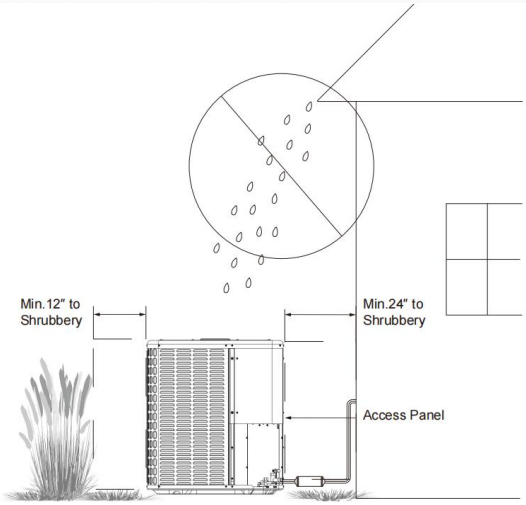
| Model name | Dimensions | | | |
|---|---|---|---|---|
| | "W" mm (in.) | "D" mm (in.) | "H" mm (in.) | Supply duct "A" mm (in.) |
| **OTA18C002A** | 500 (19-5/8) | 560 (22) | 1162 (45-3/4) | 454 (17-7/8) |
| **OTA18C004A** | | | | |
| **OTA18C006A** | 560 (22) | 623 (24-1/2) | 1350 (53-1/8) | 496 (19-1/2) |
| **OTA18C007A** | | | | |

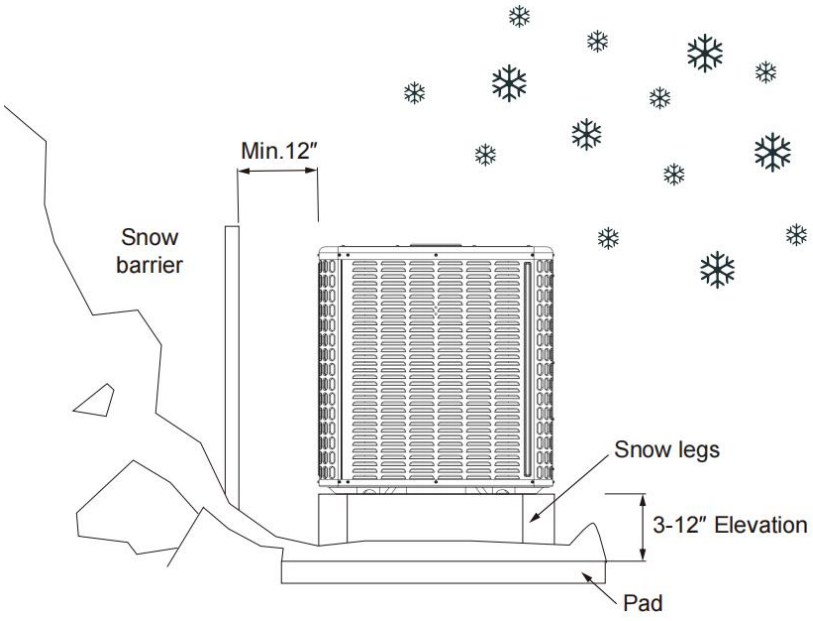
# 3.Installation Space Requirements

## 3.1Outdoor Units



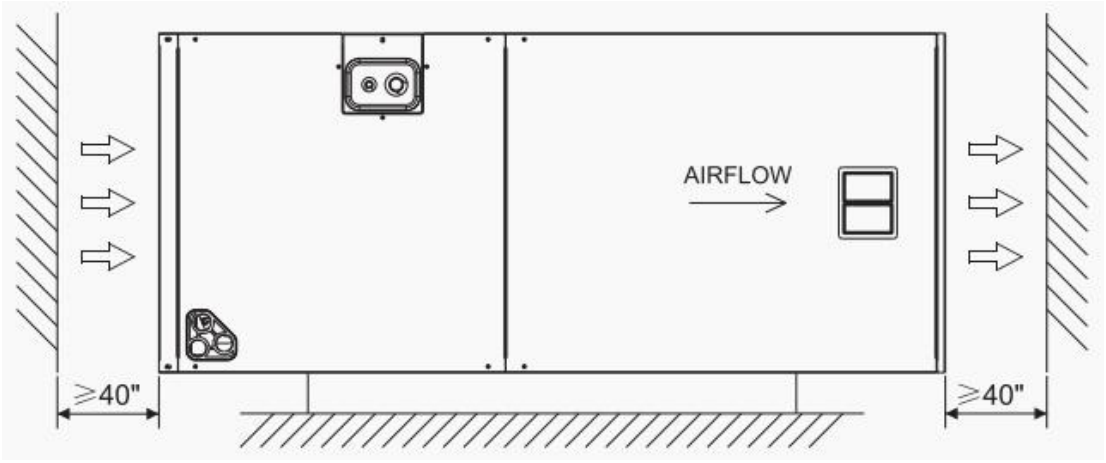



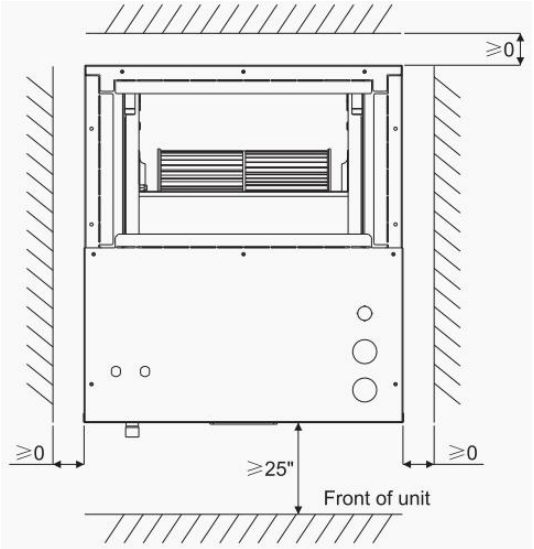
## 3.2Indoor Units

### Regular Air Handler:

**Horizontal position:**

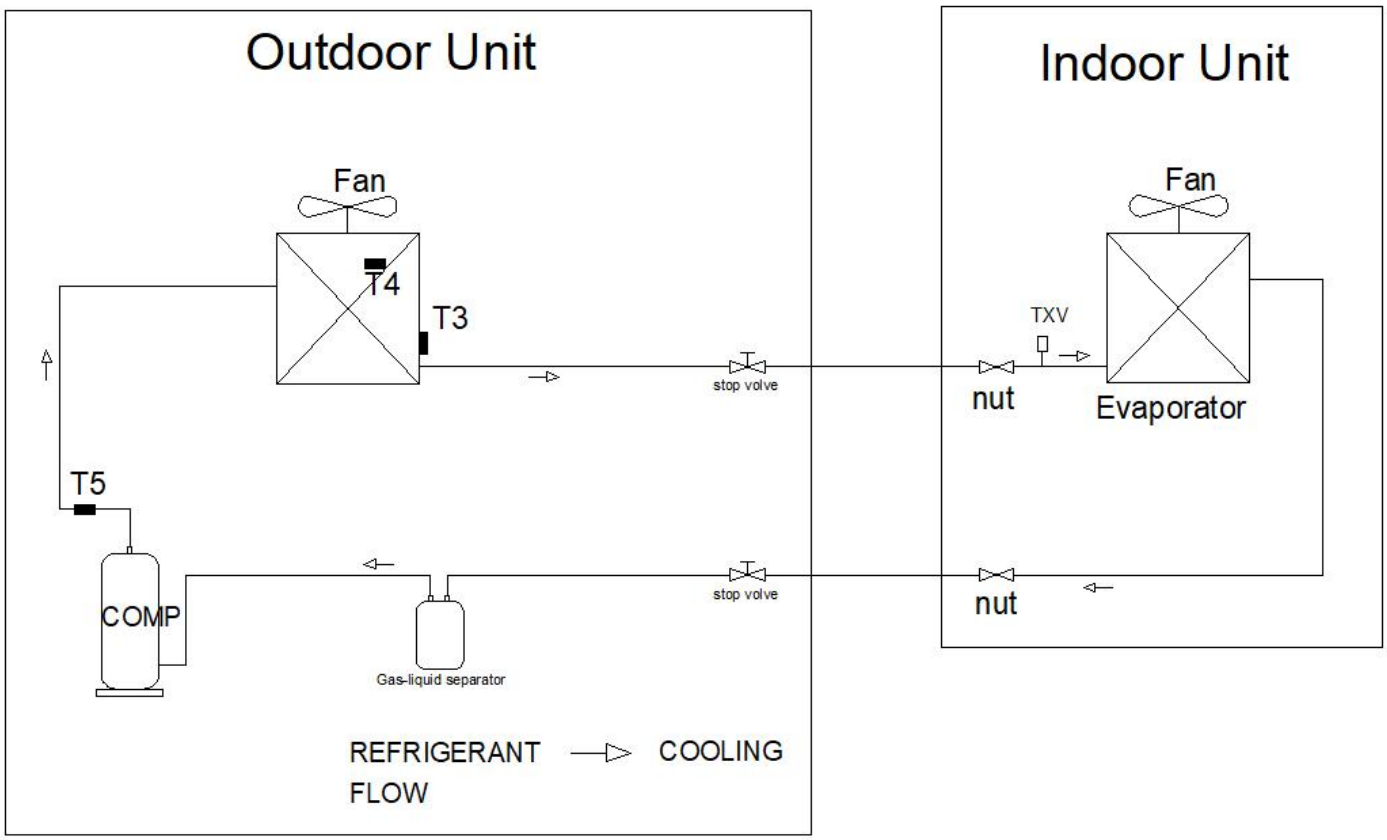



**Vertical position:**

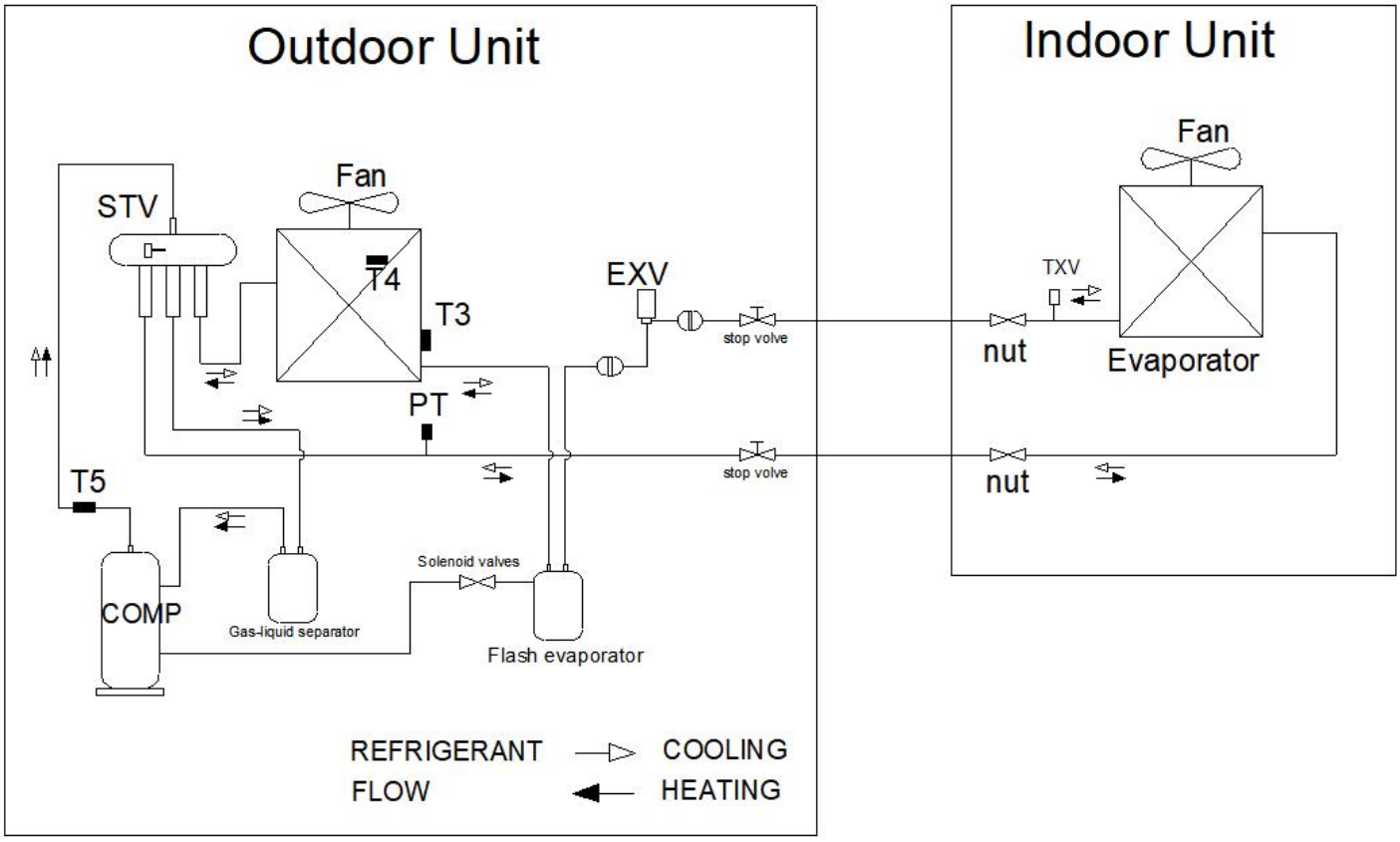


## 4. Piping Diagrams

**Cooling only models:**



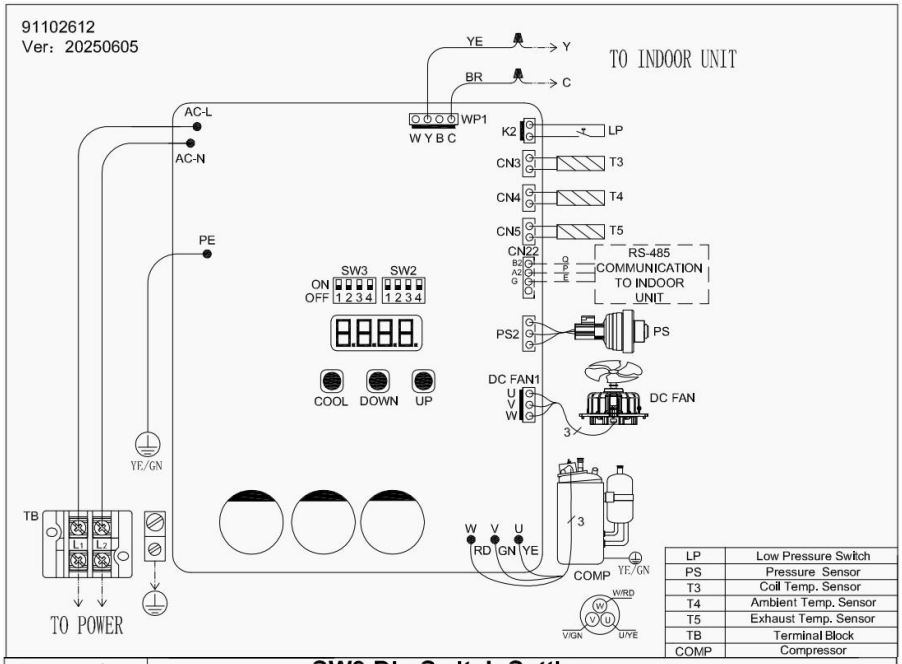
**Heat pump models:**



# 5.Wiring Diagrams

## 5.1 Outdoor Units

### Cooling only models：24K、36K、48K、60K:




| Factory default | SW3 Dip Switch Setting | | | | | |
|---|---|---|---|---|---|---|
| SW3 | SW2 | 1# | 2# | Model | 3# | Model |
| ON 1 2 3 4 | ON 1 2 3 4 | OFF | OFF | Tes0=A,between A+X and A-X; Tcs0=B,between B+X and B-X | OFF | 24V thermostat control |
| | | ON | OFF | Tes0=A,between A+X and A-X ; Tcs0=B+1°X,between 51 and B (B<51) | ON | RS-485 communication mode |
| SW2-1 and SW2-2 are selected based on the model. Other DIP switches are OFF by default | | OFF | ON | Tes0=A-1°X,between A and 2 (A>2); Tcs0=B,between B+2°X and B | SW3-4 Reserved | |
| | | ON | ON | Tes0=A-1°X,between A and 2 (A>2); Tcs0=B+1°X,between 51 and B (B<51) | | |

**SW2 DIP switch setting**

| 1# | 2# | Model | 1# | 2# | Model | 3# | Function | 4# | Function |
|---|---|---|---|---|---|---|---|---|---|
| OFF | OFF | 24K | OFF | ON | 48K | OFF | Fahrenheit (°F) | OFF | Automatic defrost |
| ON | OFF | 36K | ON | ON | 60K | ON | Celsius (℃) | ON | Manual defrost |

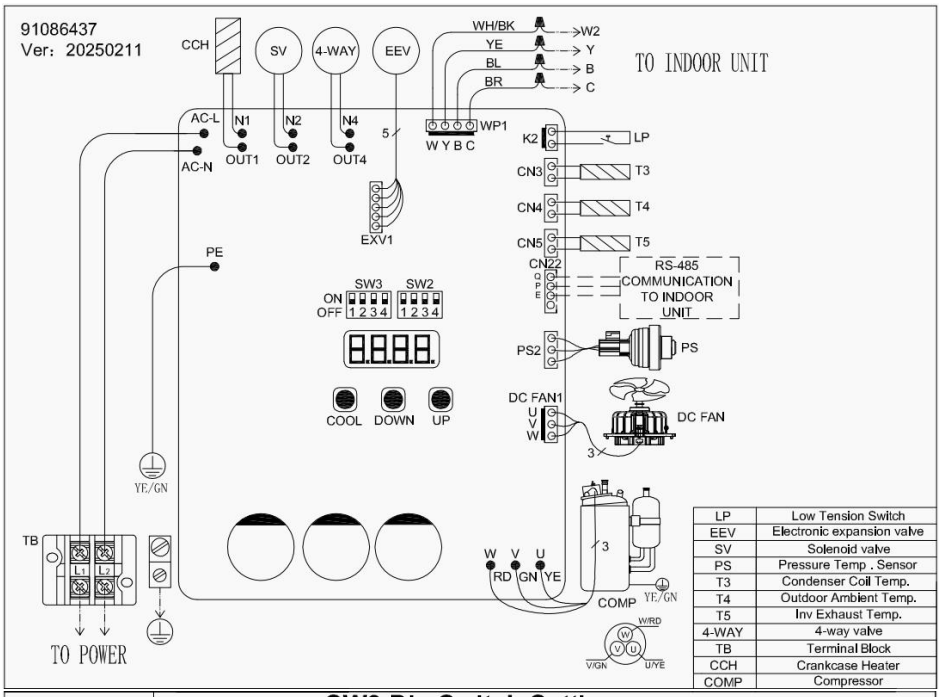
**Check Table**

| Num | Display content | Num | Display content |
|---|---|---|---|
| 01 | Outdoor power(Model) | 16 | Target superheat (°F ; Actual value) |
| 02 | Run mode (1: Standby mode; 2: In cooling mode; 3: In heating mode; 4: Force cooling) | 17 | Discharge temp. superheat (°F ; Actual value ) |
| | | 18 | PFC temp.(°F ; Actual value ) |
| 03 | Internal engine start signal ( 0 or 1 ) | 19 | AC current (A ; Actual value ) |
| 04 | Compressor running signal ( 0 or 1 ) | 20 | Compressor current (A ; Actual value ) |
| 05 | Target frequency (Hz ; Actual value) | 21 | AC voltage (VAC ; Actual value ) |
| 06 | Fan speed (R/min ; Actual value) | 22 | DC voltage (VDC ; Actual value ) |
| 07 | T3 Condenser coil temp. (°F ; Actual value ) | 23 | Enter PI contrlo sign ( 0 or 1) |
| 08 | T4 outdoor ambient temp. (°F ; Actual value ) | 24 | Frequency increase (Actual value gear) |
| 09 | T5 exhaust temp. (°F ; Actual value ) | 25 | △EV(step ; Actual value ) |
| 10 | Temp transform by low pressure sensor( °F ; Actual value) | 26 | EXV opening degree (step ; Actual value) |
| 11 | Low pressure value (Bar ; Actual value) | 27 | Oil output volume (CC ; Actual value ) |
| 12 | Temp transform by high pressure sensor ( °F ; Actual value) | 28 | Ability test mode (1-40 ; Mode gear ) |
| 13 | High pressure value (Bar ; Actual value ) | 29 | Software version number |
| 14 | IPM modular temp. Tfin (°F ; Actual value ) | 30 | Frequency limit item |
| 15 | Target temp. Tes/Tcs (°F ; Actual value) | 31 | Last failure or protection code |

**Failure and Protection**

| | | | |
|---|---|---|---|
| C1 | T4 Outdoor air temperature sensor failure | LF | Overcurrent protection of primary side ----------Lock protection when it occurs 3 times in 60min, unrecoverable until re-energizee |
| C2 | T3 Condenser coil temperature sensor failure/T3 sensor is not plugged tightly ----------Lock protection when T3 sensor is not plugged tightly occurs 20 times in 120min , unrecoverable until re-energize | H5 | Low pressure switch failure ----------Lock protection when it occurs 10 times in 60min, unrecoverable until re-energizee |
| C3 | T5 Exhaust temperature sensor failure /T5 exhaust sensor is not plugged tightly ----------Lock protection when T5 sensor is not plugged tightly occurs 20 times in 180min , unrecoverable until re-energize | HE | AC voltage protection |
| | | L0 | IPM A protection |
| E8 | T3 Condensate high temperature protection ----------Lock protection when it occurs 20 times in 180min，unrecoverable until re-energize | PE | Fan A protection |
| | | L9 | IPM module high temperature protection ----------Lock protection when it occurs 20 times in 120min, unrecoverable until re-energizee |
| E3 | T5 Exhaust high temperature protection ----------Lock protection when it occurs 20 times in 100min, unrecoverable until re-energizee | E0 | Fluorine deficiency protection ----------Lock protection when it occurs 5 times in 100min, unrecoverable until re-energizee |
| F1 | High pressure sensor failure | | |
| F3 | Over pressure protection ----------Lock protection when it occurs 20 times in 180min, unrecoverable until re-energizee | H0 | Wet operation protection ----------Lock protection when it occurs 20 times in 200min, unrecoverable until re-energizee |
| F4 | Low pressure sensor failure | F6 | Low pressure the pressure is too low ----------Lock protection when it occurs 10 times in 100min, unrecoverable until re-energizee |
| F8 | High compression ratio protection | | |
| H2 | High pressure switch failure ----------Lock protection when it occurs 20 times in 150min，unrecoverable until re-energize | J2 | 485 Communication failure |
| | | d0 | Oil return |
| | | dF | Defrost |
| F9 | Low compression ratio protection | dH | Force cooling |

**Heat pump models：24K、36K、48K、60K:**




| | |
|---|---|
| LP | Low Tension Switch |
| EEV | Electronic expansion valve |
| SV | Solenoid valve |
| PS | Pressure Temp . Sensor |
| T3 | Condenser Coil Temp. |
| T4 | Outdoor Ambient Temp. |
| T5 | Inv Exhaust Temp. |
| 4-WAY | 4-way valve |
| TB | Terminal Block |
| CCH | Crankcase Heater |
| COMP | Compressor |

Factory default

## SW3 Dip Switch Setting

| SW3 | SW2 | 1# | 2# | Model | 3# | Model |
|---|---|---|---|---|---|---|
| ON 1 2 3 4 | ON 1 2 3 4 | OFF | OFF | Tes0=A,between A+X and A-X; Tcs0=B,between B+X and B-X | OFF | 24V thermostat control |
| | | ON | OFF | Tes0=A,between A+X and A-X ; Tcs0=B+1*X,between 51 and B (B<51) | ON | RS-485 communication mode |
| SW2-1 and SW2-2 are selected based on the model. Other DIP switches are OFF by default | | OFF | ON | Tes0=A-1*X,between A and 2 (A>2); Tcs0=B,between B+2*X and B | SW3-4 Reserved | |
| | | ON | ON | Tes0=A-1*X,between A and 2 (A>2); Tcs0=B+1*X,between 51 and B (B<51) | | |

## SW2 DIP switch setting

| 1# | 2# | Model | 1# | 2# | Model | 3# | Function | 4# | Function |
|---|---|---|---|---|---|---|---|---|---|
| OFF | OFF | 24K | OFF | ON | 48K | OFF | Fahrenheit (℉) | OFF | Automatic defrost |
| ON | OFF | 36K | ON | ON | 60K | ON | Celsius (℃) | ON | Manual defrost |

## Check Table

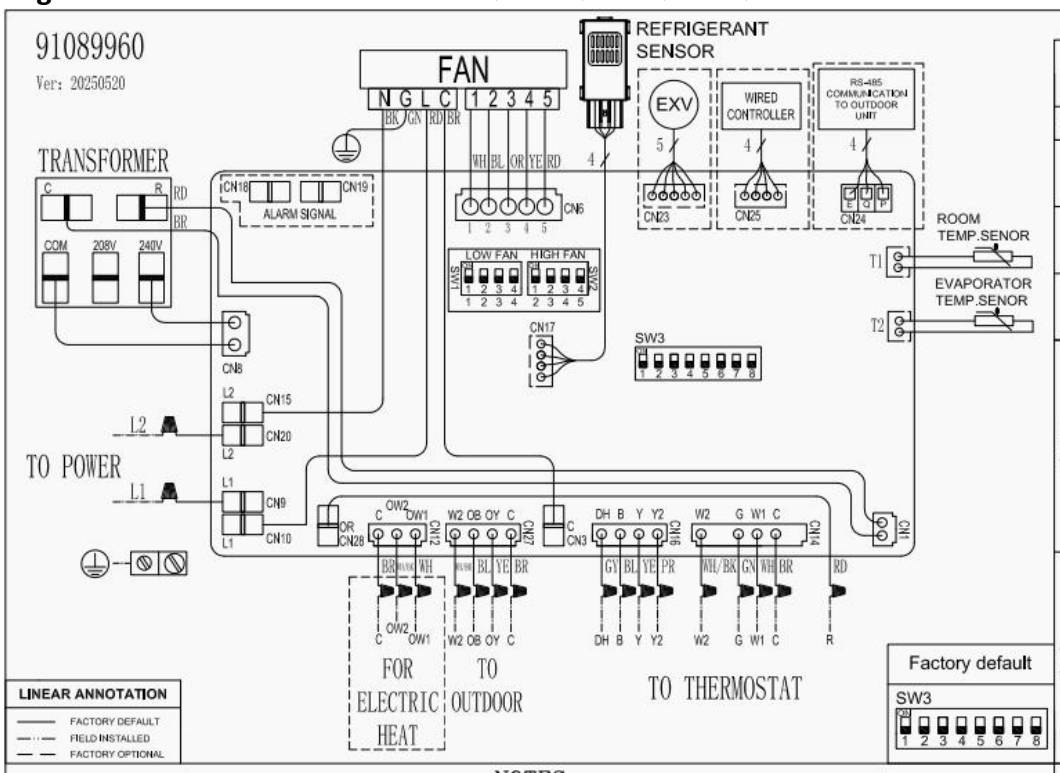
| Num | Display content | Num | Display content |
|---|---|---|---|
| 01 | Outdoor power(Model) | 16 | Target superheat (℉ ; Actual value) |
| 02 | Run mode (1: Standby mode; 2: In cooling mode; 3: In heating mode; 4: Force cooling) | 17 | Discharge temp. superheat (℉ ; Actual value ) |
| | | 18 | PFC temp.(℉ ; Actual value ) |
| 03 | Internal engine start signal ( 0 or 1 ) | 19 | AC current (A ; Actual value ) |
| 04 | Compressor running signal ( 0 or 1 ) | 20 | Compressor current (A ; Actual value ) |
| 05 | Target frequency (Hz ; Actual value) | 21 | AC voltage (VAC ; Actual value ) |
| 06 | Fan speed (R/min ; Actual value) | 22 | DC voltage (VDC ; Actual value ) |
| 07 | T3 Condenser coil temp. (℉ ; Actual value ) | 23 | Enter PI contrlo sign ( 0 or 1) |
| 08 | T4 outdoor ambient temp. (℉ ; Actual value ) | 24 | Frequency increase (Actual value gear) |
| 09 | T5 exhaust temp. (℉ ; Actual value ) | 25 | △EV(step ; Actual value ) |
| 10 | Temp transform by low pressure sensor( ℉ ; Actual value) | 26 | EXV opening degree (step ; Actual value) |
| 11 | Low pressure value (Bar ; Actual value) | 27 | TOil output (CC ; Actual value ) |
| 12 | Temp transform by high pressure sensor ( ℉ ; Actual value) | 28 | Ability test mode (1-40 ; Mode gear ) |
| 13 | High pressure value (Bar ; Actual value ) | 29 | Software version number |
| 14 | IPM modular temp. Tfin (℉ ; Actual value ) | 30 | Frequency limit item |
| 15 | Target temp. Tes/Tcs (℉ ; Actual value) | 31 | Last failure or protection code |

## Failure and Protection

| | | | |
|---|---|---|---|
| C1 | T4 Outdoor air temperature sensor failure | LF | Overcurrent protection of primary side ----------Lock protection when it occurs 3 times in 60min, unrecoverable until re-energizee |
| C2 | T3 Condenser coil temperature sensor failure/T3 sensor is not plugged tightly ----------Lock protection when T3 sensor is not plugged tightly occurs 20 times in 120min , unrecoverable until re-energize | H5 | Low pressure switch failure ----------Lock protection when it occurs 10 times in 60min, unrecoverable until re-energizee |
| C3 | T5 Exhaust temperature sensor failure /T5 exhaust sensor is not plugged tightly ----------Lock protection when T5 sensor is not plugged tightly occurs 20 times in 180min , unrecoverable until re-energize | HE | AC voltage protection |
| | | L0 | IPM A protection |
| E8 | T3 Condensate high temperature protection ----------Lock protection when it occurs 20 times in 180min，unrecoverable until re-energize | PE | Fan A protection |
| | | L9 | IPM module high temperature protection ----------Lock protection when it occurs 20 times in 120min, unrecoverable until re-energizee |
| E3 | T5 Exhaust high temperature protection ----------Lock protection when it occurs 20 times in 100min, unrecoverable until re-energizee | E0 | Fluorine deficiency protection ----------Lock protection when it occurs 5 times in 100min, unrecoverable until re-energizee |
| F1 | High pressure sensor failure | | |
| F3 | Over pressure protection ----------Lock protection when it occurs 20 times in 180min, unrecoverable until re-energizee | H0 | Wet operation protection ----------Lock protection when it occurs 20 times in 200min, unrecoverable until re-energizee |
| F4 | Low pressure sensor failure | F6 | Low pressure the pressure is too low ----------Lock protection when it occurs 10 times in 100min, unrecoverable until re-energizee |
| F8 | High compression ratio protection | | |
| H2 | High pressure switch failure ----------Lock protection when it occurs 20 times in 150min，unrecoverable until re-energize | J2 | 485 Communication failure |
| | | d0 | Oil return |
| | | dF | Defrost |
| F9 | Low compression ratio protection | dH | Force cooling |

## 5.2Indoor Units

### Regular Air Handler connect HP ODU：24K、36K、48K、60K



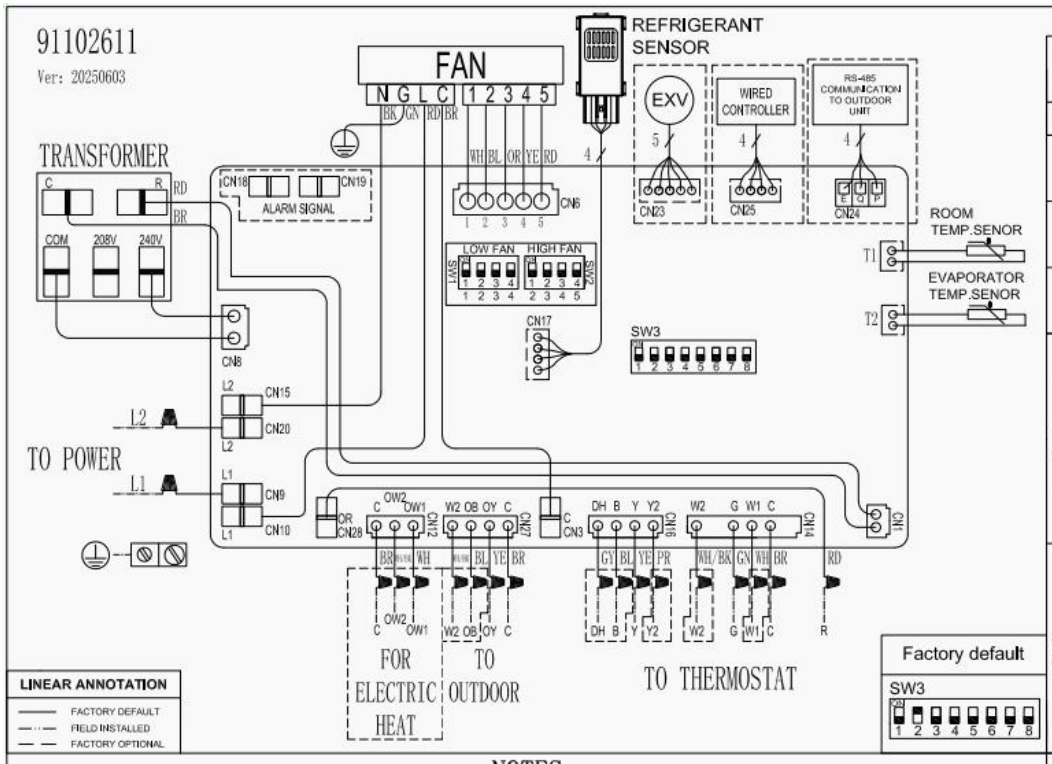

| DIP SWITCH DEFINITION | | | | |
|---|---|---|---|---|
| MODEL | SW1 | LOW FAN | SW2 | HIGH FAN |
| 24K | | Speed 1 | | Speed 2 |
| 36K | | Speed 1 | | Speed 4 |
| 48K 60K | | Speed 2 | | Speed 4 |

| | | |
|---|---|---|
| SW3-1 SW3-2 | | Heat Pump Only |
| | | HP+AuxIllary Heat |
| | | AC+Electric Heat |
| | | Cooling Only |
| SW3-3 SW3-4 | | Dual Speed ECM Motor |
| | | SIngle Speed ECM Motor |
| | | Dual Speed AC Motor |
| | | SIngle Speed AC Motor |
| SW3-5 | ON | No Refrigerant Sensor |
| | OFF | Refrigerant Sensor |
| SW3-6 | ON | No Anti-cold Air |
| | OFF | Anti-cold Air |
| SW3-7 | ON | IDU/ODU 485 Comm. |
| | OFF | IDU/ODU 24V Comm. |
| SW3-8 | OFF | Reserve |

**NOTES**

1. Rewlred In accordance wlth NEC and local codes.
2. If any of the orlglnal wlre, as supplled, must be replaced use the same or equlvalent type wlre.
3. The unlts should connect the stated-cross-sectlon earth wlre and keep It groundlng unfalllngly.
4. If some signal lines of CN14 and CN16 are not used, wrap them up separately with CAP.
5. When need to change the transformer stage, remove the lead from "240V"terminal and then connect thelead to "208V"terminal.
6. In case of refrlgerant leakage, CN18 and CN19 are used to control the alarm slgnal or exhaust fan.
7. Electrlc Heater Is optlonal.

## Regular Air Handler connect AC ODU：24K、36K、48K、60K




### NOTES

1. Rewlred In accordance wlth NEC and local codes.
2. If any of the orlglnal wlre, as supplled, must be replaced use the same or equlvalent type wlre.
3. The unlts should connect the stated-cross-sectlon earth wlre and keep It groundlng unfalllngly.
4. If some signal lines of CN14 and CN16 are not used, wrap them up separately with CAP.
5. When need to change the transformer stage, remove the lead from "240V"terminal and then connect thelead to "208V"terminal.
6. In case of refrlgerant leakage, CN18 and CN19 are used to control the alarm slgnal or exhaust fan.
7. Electrlc Heater Is optlonal.

### DIP SWITCH DEFINITION

| MODEL | SW1 | LOW FAN | SW2 | HIGH FAN |
|---|---|---|---|---|
| 24K | | Speed 1 | | Speed 2 |
| 36K | | Speed 1 | | Speed 4 |
| 48K 60K | | Speed 2 | | Speed 4 |

| | | |
|---|---|---|
| SW3-1 SW3-2 | | Heat Pump Only |
| | | HP+Auxlllary Heat |
| | | AC+Electrlc Heat |
| | | Cooling Only |
| SW3-3 SW3-4 | | Dual Speed ECM Motor |
| | | SIngle Speed ECM Motor |
| | | Dual Speed AC Motor |
| | | SIngle Speed AC Motor |
| SW3-5 | ON | No Refrigerant Sensor |
| | OFF | Refrigerant Sensor |
| SW3-6 | ON | No Anti-cold Air |
| | OFF | Anti-cold Air |
| SW3-7 | ON | IDU/ODU 485 Comm. |
| | OFF | IDU/ODU 24V Comm. |
| SW3-8 | OFF | Reserve |

# 6.Capacity Tables

## 6.1Cooling Capacity Tables

**TC: Total capacity (kBTU/hr)  S/T: Ratio of sensible heat and total capacity  kW:Total input power**

| OTV18CN024A<br>OTV18HN024A<br>+OTA18C002A（Cooling） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoor Airflow(CFM) | Outdoor DB(℉) | IWB(℉) | 59 | | | | 63 | | | | 67 | | | | 71 | | | |
| | | IDB(℉) | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 |
| 670 | 65 | TC | 18.1 | 18.1 | 19.2 | 21.2 | 21.3 | 21.6 | 22.1 | 21.8 | 25.5 | 24.8 | 25.2 | 25.7 | / | 29.0 | 28.9 | 29.2 |
| | | S/T | 76.9 | 93.4 | 100.0 | 100.0 | 57.6 | 71.3 | 84.4 | 97.0 | 42.2 | 54.9 | 66.7 | 77.5 | / | 40.6 | 51.5 | 61.4 |
| | | kW | 0.9 | 0.9 | 0.9 | 1.0 | 0.9 | 1.0 | 1.0 | 1.0 | 1.2 | 1.2 | 1.2 | 1.2 | / | 1.4 | 1.4 | 1.5 |
| | 75 | TC | 15.7 | 16.0 | 17.6 | 19.7 | 19.0 | 19.5 | 19.5 | 19.6 | 23.3 | 23.3 | 23.4 | 23.4 | / | 27.1 | 27.2 | 27.7 |
| | | S/T | 80.8 | 98.0 | 100.0 | 100.0 | 59.1 | 75.2 | 89.7 | 100.0 | 42.3 | 55.7 | 68.5 | 80.7 | / | 40.7 | 52.2 | 62.4 |
| | | kW | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.3 | 1.3 | 1.3 | 1.3 | / | 1.5 | 1.5 | 1.5 |
| | 85 | TC | 14.5 | 14.9 | 17.0 | 18.8 | 17.9 | 18.3 | 18.4 | 18.8 | 22.1 | 22.2 | 22.2 | 22.1 | / | 26.3 | 26.4 | 26.5 |
| | | S/T | 83.9 | 100.0 | 100.0 | 100.0 | 60.1 | 76.1 | 92.4 | 100.0 | 42.4 | 56.5 | 70.0 | 83.2 | / | 40.8 | 52.6 | 63.5 |
| | | kW | 1.0 | 1.0 | 1.1 | 1.2 | 1.1 | 1.1 | 1.2 | 1.2 | 1.4 | 1.4 | 1.4 | 1.4 | / | 1.7 | 1.7 | 1.7 |
| | 95 | TC | 14.7 | 14.9 | 17.0 | 18.6 | 18.1 | 18.2 | 18.3 | 18.6 | 20.6 | 21.1 | 21.2 | 21.3 | / | 26.0 | 25.7 | 26.1 |
| | | S/T | 83.8 | 100.0 | 100.0 | 100.0 | 59.9 | 76.5 | 92.5 | 100.0 | 42.6 | 57.3 | 71.3 | 85.0 | / | 40.8 | 52.9 | 63.8 |
| | | kW | 1.2 | 1.2 | 1.3 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.6 | 1.6 | 1.6 | 1.6 | / | 2.0 | 2.0 | 2.0 |
| | 105 | TC | 14.2 | 14.5 | 16.2 | 18.1 | 16.5 | 16.7 | 16.8 | 18.1 | 20.2 | 20.4 | 20.6 | 20.5 | / | 25.1 | 25.1 | 25.3 |
| | | S/T | 85.0 | 100.0 | 100.0 | 100.0 | 61.5 | 79.3 | 96.1 | 100.0 | 42.6 | 57.8 | 72.3 | 86.6 | / | 40.9 | 53.3 | 64.7 |
| | | kW | 1.5 | 1.5 | 1.6 | 1.9 | 1.6 | 1.6 | 1.6 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | / | 2.0 | 2.1 | 2.1 |
| | 115 | TC | 13.3 | 13.7 | 15.8 | 17.8 | 15.6 | 15.7 | 16.0 | 17.7 | 18.5 | 18.7 | 18.8 | 19.0 | / | 20.7 | 20.9 | 21.1 |
| | | S/T | 88.0 | 100.0 | 100.0 | 100.0 | 62.6 | 81.7 | 98.2 | 100.0 | 43.0 | 59.5 | 75.4 | 90.0 | / | 41.8 | 56.4 | 70.0 |
| | | kW | 1.5 | 1.5 | 1.7 | 2.0 | 1.7 | 1.7 | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | / | 2.1 | 2.2 | 2.2 |
| 820 | 65 | TC | 19.6 | 19.6 | 20.9 | 23.1 | 23.2 | 23.5 | 24.0 | 23.7 | 27.4 | 27.0 | 27.4 | 27.9 | / | 31.5 | 31.4 | 31.7 |
| | | S/T | 84.1 | 100.0 | 100.0 | 100.0 | 63.1 | 78.1 | 92.4 | 100.0 | 46.2 | 60.1 | 73.0 | 84.8 | / | 44.4 | 46.3 | 67.2 |
| | | kW | 1.0 | 1.0 | 1.1 | 1.2 | 1.1 | 1.2 | 1.2 | 1.2 | 1.4 | 1.4 | 1.4 | 1.4 | / | 1.6 | 1.6 | 1.7 |
| | 75 | TC | 17.1 | 17.4 | 19.2 | 21.5 | 20.7 | 21.2 | 21.3 | 21.4 | 25.4 | 25.4 | 25.5 | 25.5 | / | 29.5 | 29.6 | 30.2 |
| | | S/T | 88.5 | 100.0 | 100.0 | 100.0 | 64.7 | 81.3 | 98.2 | 100.0 | 46.3 | 61.0 | 75.0 | 88.3 | / | 44.6 | 57.1 | 68.3 |
| | | kW | 1.0 | 1.0 | 1.1 | 1.2 | 1.1 | 1.2 | 1.2 | 1.2 | 1.5 | 1.5 | 1.5 | 1.5 | / | 1.7 | 1.7 | 1.7 |
| | 85 | TC | 15.7 | 16.1 | 18.4 | 20.3 | 19.3 | 19.8 | 19.9 | 20.3 | 23.9 | 24.0 | 24.0 | 23.9 | / | 28.4 | 28.5 | 28.7 |
| | | S/T | 91.9 | 100.0 | 100.0 | 100.0 | 65.9 | 83.4 | 100.0 | 100.0 | 46.5 | 61.9 | 76.7 | 91.2 | / | 44.7 | 57.6 | 69.5 |
| | | kW | 1.1 | 1.1 | 1.3 | 1.4 | 1.3 | 1.3 | 1.4 | 1.4 | 1.6 | 1.6 | 1.6 | 1.6 | / | 1.9 | 1.9 | 1.9 |
| | 95 | TC | 16.2 | 16.5 | 18.9 | 20.8 | 19.8 | 20.2 | 20.3 | 20.8 | 22.9 | 23.1 | 23.2 | 23.3 | / | 28.4 | 28.5 | 28.6 |
| | | S/T | 91.0 | 100.0 | 100.0 | 100.0 | 65.7 | 83.1 | 100.0 | 100.0 | 46.6 | 62.7 | 78.1 | 92.7 | / | 44.9 | 57.9 | 70.0 |
| | | kW | 1.4 | 1.4 | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 1.8 | 1.8 | 1.8 | / | 2.2 | 2.2 | 2.2 |
| | 105 | TC | 15.5 | 15.8 | 17.6 | 19.7 | 17.9 | 18.2 | 18.3 | 19.7 | 22.0 | 22.2 | 22.4 | 22.3 | / | 27.3 | 27.3 | 27.5 |
| | | S/T | 93.1 | 100.0 | 100.0 | 100.0 | 67.4 | 86.9 | 100.0 | 100.0 | 46.7 | 63.3 | 79.2 | 94.9 | / | 44.8 | 58.4 | 70.9 |
| | | kW | 1.6 | 1.6 | 1.7 | 1.9 | 1.7 | 1.8 | 1.8 | 1.9 | 2.1 | 2.0 | 2.1 | 2.1 | / | 2.6 | 2.6 | 2.7 |
| | 115 | TC | 14.6 | 15.1 | 17.4 | 19.6 | 17.2 | 17.3 | 17.6 | 19.5 | 20.4 | 20.6 | 20.7 | 20.9 | / | 22.8 | 23.0 | 23.2 |
| | | S/T | 96.4 | 100.0 | 100.0 | 110.0 | 68.6 | 89.5 | 100.0 | 100.0 | 47.1 | 65.2 | 82.6 | 98.6 | / | 45.8 | 61.8 | 76.6 |
| | | kW | 1.7 | 1.7 | 1.9 | 2.2 | 1.9 | 1.9 | 1.9 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | / | 2.3 | 2.4 | 2.4 |

| OTV18CN036A<br>OTV18HN036A<br>+OTA18C004A（Cooling） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoor Airflow(CFM) | Outdoor DB(℉) | IWB(℉) | 59 | | | | 63 | | | | 67 | | | | 71 | | | |
| | | IDB(℉) | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 |
| 670 | 65 | TC | 16.2 | 16.1 | 16.2 | 18.3 | 20.8 | 20.9 | 20.8 | 20.7 | 24.2 | 23.8 | 23.8 | 23.8 | / | 27.7 | 27.6 | 27.3 |
| | | S/T | 78.1 | 94.6 | 100.0 | 100.0 | 58.1 | 70.9 | 83.4 | 95.5 | 44.1 | 55.6 | 66.7 | 77.1 | / | 42.2 | 52.2 | 61.6 |
| | | kW | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 1.1 | 1.1 | 1.1 | 1.1 | / | 1.3 | 1.3 | 1.3 |
| | 75 | TC | 15.8 | 15.8 | 16.2 | 17.9 | 18.7 | 19.0 | 18.9 | 18.5 | 22.6 | 22.3 | 22.4 | 22.3 | / | 26.6 | 26.6 | 26.6 |
| | | S/T | 78.9 | 95.6 | 100.0 | 100.0 | 59.3 | 73.0 | 86.8 | 100.0 | 43.9 | 56.2 | 68.0 | 79.2 | / | 42.3 | 52.4 | 62.1 |
| | | kW | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 1.1 | 1.1 | 1.1 | 1.1 | / | 1.3 | 1.3 | 1.3 |
| | 85 | TC | 13.3 | 13.3 | 14.4 | 16.2 | 16.4 | 16.5 | 16.2 | 16.2 | 21.1 | 21.1 | 21.0 | 21.0 | / | 24.8 | 24.7 | 24.7 |
| | | S/T | 84.5 | 100.0 | 100.0 | 100.0 | 61.1 | 77.0 | 93.5 | 100.0 | 44.0 | 56.9 | 69.5 | 81.4 | / | 42.3 | 53.2 | 63.5 |
| | | kW | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.2 | 1.2 | 1.2 | 1.2 | / | 1.5 | 1.5 | 1.5 |
| | 95 | TC | 12.6 | 12.6 | 14.4 | 16.2 | 16.1 | 16.1 | 16.2 | 16.2 | 19.1 | 19.0 | 19.0 | 18.9 | / | 24.1 | 24.0 | 23.9 |
| | | S/T | 86.5 | 100.0 | 100.0 | 100.0 | 61.4 | 77.7 | 93.4 | 100.0 | 44.0 | 58.3 | 72.1 | 85.3 | / | 42.3 | 53.5 | 64.2 |
| | | kW | 1.0 | 1.0 | 1.0 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.3 | 1.3 | / | 1.6 | 1.6 | 1.6 |
| | 105 | TC | 12.4 | 12.4 | 14.1 | 15.6 | 15.0 | 15.0 | 14.9 | 15.8 | 18.7 | 18.6 | 18.6 | 18.4 | / | 23.3 | 23.0 | 22.9 |
| | | S/T | 87.3 | 100.0 | 100.0 | 100.0 | 62.5 | 80.1 | 97.2 | 100.0 | 44.0 | 58.6 | 72.7 | 86.4 | / | 42.2 | 54.1 | 65.2 |
| | | kW | 1.2 | 1.2 | 1.3 | 1.4 | 1.3 | 1.3 | 1.3 | 1.4 | 1.6 | 1.6 | 1.6 | 1.6 | / | 2.0 | 2.0 | 2.0 |
| | 115 | TC | 11.5 | 11.8 | 13.8 | 16.0 | 14.6 | 14.6 | 14.6 | 15.9 | 18.5 | 18.5 | 18.4 | 18.4 | / | 23.0 | 22.9 | 22.8 |
| | | S/T | 90.4 | 100.0 | 100.0 | 100.0 | 63.1 | 81.1 | 98.5 | 100.0 | 44.1 | 58.8 | 73.2 | 86.8 | / | 42.3 | 54.2 | 65.4 |
| | | kW | 1.2 | 1.3 | 1.5 | 1.6 | 1.5 | 1.5 | 1.5 | 1.6 | 1.8 | 1.8 | 1.8 | 1.8 | / | 2.2 | 2.2 | 2.2 |
| 1130 | 65 | TC | 26.8 | 27.0 | 29.5 | 32.0 | 30.5 | 31.0 | 31.2 | 32.0 | 34.9 | 35.3 | 36.0 | 36.2 | / | 39.5 | 39.8 | 41.0 |
| | | S/T | 84.9 | 100.0 | 100.0 | 100.0 | 62.3 | 79.8 | 97.0 | 100.0 | 11.0 | 59.8 | 74.6 | 89.1 | / | 42.7 | 56.6 | 68.9 |
| | | kW | 1.4 | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.8 | 1.9 | 1.9 | 1.9 | / | 2.1 | 2.1 | 2.2 |
| | 75 | TC | 24.0 | 25.1 | 28.4 | 31.5 | 29.2 | 29.6 | 29.8 | 31.5 | 33.2 | 33.9 | 34.1 | 34.1 | / | 38.7 | 39.2 | 39.6 |
| | | S/T | 89.7 | 100.0 | 100.0 | 100.0 | 63.1 | 81.6 | 99.1 | 100.0 | 44.1 | 60.6 | 76.5 | 91.8 | / | 42.8 | 56.9 | 70.0 |
| | | kW | 1.4 | 1.5 | 1.7 | 1.9 | 1.7 | 1.7 | 1.8 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | / | 2.3 | 2.3 | 2.3 |
| | 85 | TC | 23.9 | 25.0 | 28.2 | 31.3 | 28.8 | 29.4 | 29.6 | 31.3 | 33.2 | 33.9 | 34.1 | 34.0 | / | 37.6 | 38.1 | 38.5 |
| | | S/T | 90.0 | 100.0 | 100.0 | 100.0 | 63.8 | 82.2 | 99.7 | 100.0 | 44.1 | 60.7 | 76.8 | 92.4 | / | 42.9 | 57.5 | 71.1 |
| | | kW | 1.7 | 1.8 | 2.0 | 2.2 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.4 | 2.4 | 2.4 | / | 2.6 | 2.6 | 2.7 |
| | 95 | TC | 23.9 | 24.9 | 28.0 | 31.0 | 29.0 | 29.2 | 29.2 | 31.1 | 33.2 | 33.8 | 33.9 | 33.8 | / | 37.0 | 37.2 | 37.3 |
| | | S/T | 90.4 | 100.0 | 100.0 | 100.0 | 63.7 | 82.7 | 100.0 | 100.0 | 44.1 | 60.9 | 77.3 | 92.8 | / | 43.0 | 58.2 | 72.4 |
| | | kW | 2.0 | 2.0 | 2.3 | 2.5 | 2.4 | 2.5 | 2.5 | 2.5 | 2.7 | 2.8 | 2.8 | 2.8 | / | 3.0 | 3.0 | 3.0 |
| | 105 | TC | 22.9 | 24.1 | 27.0 | 30.1 | 27.4 | 27.8 | 27.8 | 30.1 | 30.9 | 31.1 | 31.2 | 31.2 | / | 33.3 | 33.5 | 33.6 |
| | | S/T | 92.3 | 100.0 | 100.0 | 100.0 | 65.0 | 84.9 | 100.0 | 100.0 | 44.5 | 62.7 | 80.5 | 96.9 | / | 43.8 | 60.4 | 76.3 |
| | | kW | 2.2 | 2.4 | 2.7 | 2.9 | 2.7 | 2.7 | 2.7 | 2.9 | 3.0 | 3.0 | 3.0 | 3.0 | / | 3.0 | 3.0 | 3.0 |
| | 115 | TC | 20.0 | 21.4 | 23.4 | 25.2 | 22.5 | 22.6 | 23.4 | 25.2 | 24.6 | 24.7 | 24.9 | 25.2 | / | 26.5 | 26.7 | 26.8 |
| | | S/T | 98.6 | 100.0 | 100.0 | 100.0 | 69.6 | 94.2 | 100.0 | 100.0 | 45.9 | 68.3 | 90.6 | 100.0 | / | 45.7 | 66.3 | 86.2 |
| | | kW | 2.2 | 2.3 | 2.4 | 2.5 | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | / | 2.5 | 2.5 | 2.5 |

| OTV18CN048A<br>OTV18HN048A<br>+OTA18C006A（Cooling） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoor Airflow(CFM) | Outdoor DB(℉) | IWB(℉) | 59 | | | | 63 | | | | 67 | | | | 71 | | | |
| | | IDB(℉) | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 |
| 1280 | 65 | TC | 30.7 | 31.3 | 32.7 | 37.2 | 37.3 | 37.7 | 38.1 | 38.2 | 43.2 | 43.6 | 43.9 | 44.0 | / | 51.2 | 50.7 | 50.8 |
| | | S/T | 79.9 | 96.7 | 100.0 | 100.0 | 58.6 | 73.4 | 87.9 | 99.4 | 42.8 | 56.0 | 68.7 | 80.8 | / | 41.3 | 52.6 | 63.2 |
| | | kW | 1.6 | 1.7 | 1.7 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.2 | 2.3 | 2.3 | 2.3 | / | 2.7 | 2.7 | 2.7 |
| | 75 | TC | 28.3 | 28.7 | 30.9 | 34.8 | 33.4 | 33.8 | 34.1 | 34.4 | 41.0 | 41.7 | 42.0 | 42.0 | / | 47.6 | 47.6 | 47.8 |
| | | S/T | 82.8 | 99.7 | 100.0 | 100.0 | 60.4 | 76.9 | 93.3 | 100.0 | 42.9 | 56.9 | 70.2 | 83.1 | / | 41.4 | 53.6 | 64.8 |
| | | kW | 1.7 | 1.7 | 1.8 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.4 | 2.5 | 2.5 | 2.5 | / | 2.7 | 2.7 | 2.7 |
| | 85 | TC | 25.2 | 25.9 | 30.3 | 33.8 | 32.0 | 32.4 | 32.6 | 33.8 | 38.2 | 38.4 | 38.6 | 38.6 | / | 46.0 | 46.0 | 46.3 |
| | | S/T | 87.5 | 100.0 | 100.0 | 100.0 | 61.5 | 79.0 | 95.6 | 100.0 | 43.2 | 58.3 | 72.8 | 86.9 | / | 41.7 | 54.4 | 66.0 |
| | | kW | 1.8 | 1.8 | 2.1 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.5 | 2.5 | 2.5 | / | 3.0 | 3.0 | 3.1 |
| | 95 | TC | 25.6 | 26.2 | 30.6 | 34.0 | 32.2 | 32.6 | 32.8 | 34.0 | 37.1 | 37.8 | 38.1 | 38.4 | / | 45.6 | 45.6 | 46.0 |
| | | S/T | 87.4 | 100.0 | 100.0 | 100.0 | 61.5 | 79.0 | 95.9 | 100.0 | 43.4 | 58.9 | 73.6 | 87.6 | / | 42.8 | 54.7 | 66.5 |
| | | kW | 2.2 | 2.2 | 2.5 | 2.7 | 2.6 | 2.7 | 2.7 | 2.7 | 2.9 | 3.0 | 3.0 | 3.0 | / | 3.6 | 3.6 | 3.6 |
| | 105 | TC | 24.6 | 26.0 | 30.3 | 33.4 | 30.8 | 31.1 | 31.1 | 33.4 | 35.7 | 36.0 | 36.8 | 37.0 | / | 42.0 | 41.8 | 42.2 |
| | | S/T | 89.5 | 100.0 | 100.0 | 100.0 | 62.5 | 80.8 | 98.4 | 100.0 | 43.6 | 59.9 | 75.0 | 89.6 | / | 42.3 | 56.1 | 69.0 |
| | | kW | 2.5 | 2.6 | 2.9 | 3.2 | 3.0 | 3.0 | 3.0 | 3.2 | 3.3 | 3.3 | 3.4 | 3.4 | / | 3.8 | 3.8 | 3.8 |
| | 115 | TC | 24.3 | 25.5 | 29.0 | 32.3 | 28.5 | 28.9 | 29.4 | 32.4 | 32.9 | 33.3 | 33.6 | 34.0 | / | 36.8 | 37.1 | 37.3 |
| | | S/T | 90.3 | 100.0 | 100.0 | 100.0 | 64.2 | 83.9 | 100.0 | 100.0 | 44.0 | 61.5 | 78.4 | 94.0 | / | 43.1 | 58.6 | 73.2 |
| | | kW | 2.9 | 3.0 | 3.3 | 3.6 | 3.2 | 3.2 | 3.3 | 3.6 | 3.6 | 3.6 | 3.6 | 3.7 | / | 3.8 | 3.8 | 3.8 |
| 1650 | 65 | TC | 38.1 | 38.5 | 42.5 | 46.6 | 44.2 | 45.6 | 45.4 | 46.6 | 51.5 | 51.7 | 52.4 | 52.8 | / | 58.3 | 58.9 | 59.6 |
| | | S/T | 84.2 | 100.0 | 100.0 | 100.0 | 60.8 | 77.9 | 95.2 | 100.0 | 42.8 | 58.3 | 73.1 | 87.4 | / | 41.6 | 55.1 | 67.6 |
| | | kW | 2.2 | 2.2 | 2.4 | 2.6 | 2.5 | 2.6 | 2.6 | 2.6 | 2.9 | 2.9 | 2.9 | 3.0 | / | 3.3 | 3.4 | 3.4 |
| | 75 | TC | 34.0 | 35.1 | 39.9 | 45.3 | 40.9 | 41.7 | 42.1 | 45.3 | 48.1 | 48.8 | 49.8 | 50.0 | / | 57.2 | 58.4 | 59.0 |
| | | S/T | 89.0 | 100.0 | 100.0 | 100.0 | 62.5 | 81.5 | 98.5 | 100.0 | 43.1 | 59.5 | 75.3 | 90.5 | / | 41.8 | 55.6 | 68.3 |
| | | kW | 2.2 | 2.2 | 2.5 | 2.9 | 2.6 | 2.6 | 2.6 | 2.9 | 3.0 | 3.0 | 3.1 | 3.1 | / | 3.6 | 3.8 | 3.8 |
| | 85 | TC | 33.5 | 35.3 | 40.4 | 45.5 | 41.0 | 41.8 | 42.1 | 45.5 | 47.9 | 49.2 | 49.6 | 49.8 | / | 54.7 | 55.4 | 56.1 |
| | | S/T | 90.0 | 100.0 | 100.0 | 100.0 | 62.9 | 82.0 | 99.1 | 100.0 | 43.3 | 59.8 | 75.9 | 91.3 | / | 42.2 | 56.8 | 70.3 |
| | | kW | 2.6 | 2.7 | 3.0 | 3.4 | 3.1 | 3.1 | 3.1 | 3.4 | 3.5 | 3.7 | 3.7 | 3.7 | / | 4.0 | 4.0 | 4.1 |
| | 95 | TC | 33.7 | 35.7 | 40.6 | 45.2 | 40.7 | 41.4 | 41.7 | 45.2 | 46.3 | 46.7 | 47.1 | 47.3 | / | 49.7 | 50.3 | 50.6 |
| | | S/T | 90.5 | 100.0 | 100.0 | 100.0 | 63.4 | 82.9 | 99.9 | 100.0 | 43.5 | 61.0 | 78.2 | 94.1 | / | 42.8 | 58.8 | 74.0 |
| | | kW | 3.0 | 33.2 | 3.6 | 4.0 | 3.6 | 3.6 | 3.7 | 3.9 | 4.0 | 4.0 | 4.0 | 4.0 | / | 4.1 | 4.1 | 4.1 |
| | 105 | TC | 32.9 | 34.8 | 39.4 | 41.0 | 38.2 | 39.4 | 39.6 | 41.2 | 40.6 | 41.1 | 41.4 | 41.4 | / | 43.3 | 44.5 | 44.2 |
| | | S/T | 91.9 | 100.0 | 100.0 | 100.0 | 64.9 | 85.3 | 100.0 | 100.0 | 44.2 | 63.9 | 83.6 | 99.9 | / | 43.8 | 61.6 | 79.4 |
| | | kW | 3.5 | 3.6 | 4.1 | 4.0 | 4.0 | 4.1 | 4.1 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | / | 4.0 | 4.1 | 4.0 |
| | 115 | TC | 28.4 | 31.4 | 34.8 | 36.7 | 32.2 | 32.6 | 34.8 | 36.7 | 35.3 | 35.8 | 36.0 | 36.7 | / | 37.9 | 38.5 | 38.7 |
| | | S/T | 98.2 | 100.0 | 100.0 | 100.0 | 68.9 | 93.6 | 100.0 | 100.0 | 45.1 | 67.5 | 90.1 | 100.0 | / | 44.9 | 65.6 | 85.6 |
| | | kW | 3.5 | 3.7 | 4.0 | 4.0 | 3.8 | 3.8 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | / | 4.0 | 4.0 | 4.0 |

| OTV18CN060A<br>OTV18HN060A<br>+OTA18C007A（Cooling） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indoor Airflow(CFM) | Outdoor DB(℉) | IWB(℉) | 59 | | | | 63 | | | | 67 | | | | 71 | | | |
| | | IDB(℉) | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 | 70 | 75 | 80 | 85 |
| 1280 | 65 | TC | 37.2 | 37.7 | 42.9 | 46.7 | 44.9 | 45.1 | 45.3 | 46.7 | 53.0 | 52.9 | 52.9 | 54.1 | / | 61.0 | 60.8 | 60.9 |
| | | S/T | 81.3 | 98.3 | 100.0 | 100.0 | 60.0 | 75.4 | 90.7 | 100.0 | 43.2 | 57.3 | 70.7 | 82.6 | / | 41.8 | 54.1 | 65.3 |
| | | kW | 1.9 | 1.9 | 2.3 | 2.5 | 2.4 | 2.4 | 2.4 | 2.5 | 2.8 | 2.8 | 2.8 | 2.9 | / | 3.3 | 3.3 | 3.3 |
| | 75 | TC | 35.6 | 37.0 | 41.7 | 47.1 | 43.6 | 43.9 | 44.2 | 47.0 | 51.6 | 51.6 | 51.6 | 51.7 | / | 60.2 | 59.5 | 59.6 |
| | | S/T | 82.9 | 99.0 | 100.0 | 100.0 | 60.6 | 76.5 | 92.1 | 100.0 | 43.3 | 57.8 | 71.5 | 84.4 | / | 41.8 | 54.5 | 65.9 |
| | | kW | 2.1 | 2.2 | 2.6 | 2.9 | 2.7 | 2.7 | 2.7 | 2.9 | 3.2 | 3.2 | 3.2 | 3.2 | / | 3.7 | 3.6 | 3.6 |
| | 85 | TC | 35.7 | 36.6 | 41.8 | 47.1 | 43.6 | 43.8 | 44.2 | 46.6 | 51.4 | 51.4 | 51.4 | 51.6 | / | 59.4 | 58.9 | 58.7 |
| | | S/T | 83.1 | 99.3 | 100.0 | 100.0 | 60.5 | 76.7 | 92.2 | 100.0 | 43.2 | 57.7 | 71.8 | 74.9 | / | 41.9 | 54.7 | 66.5 |
| | | kW | 2.6 | 2.7 | 3.0 | 3.5 | 3.3 | 3.3 | 3.3 | 3.5 | 3.8 | 3.8 | 3.8 | 3.8 | / | 4.5 | 4.3 | 4.3 |
| | 95 | TC | 36.2 | 36.9 | 42.2 | 46.9 | 43.8 | 44.2 | 44.3 | 47.0 | 51.3 | 51.3 | 51.3 | 51.5 | / | 58.9 | 58.8 | 58.6 |
| | | S/T | 83.1 | 99.5 | 100.0 | 100.0 | 60.8 | 76.9 | 92.7 | 100.0 | 43.3 | 58.1 | 72.2 | 85.3 | / | 41.9 | 54.8 | 66.7 |
| | | kW | 3.2 | 3.2 | 3.8 | 4.2 | 3.9 | 3.9 | 3.9 | 4.2 | 4.5 | 4.5 | 4.5 | 4.5 | / | 5.3 | 5.3 | 5.3 |
| | 105 | TC | 34.8 | 36.6 | 41.1 | 45.0 | 42.3 | 42.4 | 42.7 | 45.0 | 47.5 | 47.5 | 47.6 | 47.7 | / | 54.0 | 53.5 | 54.0 |
| | | S/T | 84.7 | 99.9 | 100.0 | 100.0 | 61.4 | 78.3 | 94.3 | 100.0 | 43.6 | 59.4 | 74.5 | 88.6 | / | 42.3 | 56.4 | 69.1 |
| | | kW | 3.6 | 3.8 | 4.3 | 4.6 | 4.4 | 4.4 | 4.5 | 4.6 | 4.8 | 4.8 | 4.8 | 4.8 | / | 5.3 | 5.3 | 5.3 |
| | 115 | TC | 28.5 | 31.1 | 34.4 | 36.9 | 32.6 | 32.9 | 34.5 | 36.9 | 36.6 | 36.8 | 36.9 | 37.0 | / | 41.5 | 41.6 | 41.8 |
| | | S/T | 92.1 | 100.0 | 100.0 | 100.0 | 66.2 | 87.1 | 100.0 | 100.0 | 44.8 | 64.4 | 83.1 | 98.9 | / | 43.9 | 61.1 | 77.1 |
| | | kW | 3.4 | 3.6 | 3.9 | 3.9 | 3.7 | 3.8 | 3.9 | 3.9 | 4.0 | 4.0 | 4.0 | 3.9 | / | 4.3 | 4.3 | 4.3 |
| 1650 | 65 | TC | 40.8 | 42.5 | 47.0 | 52.4 | 58.5 | 58.8 | 49.2 | 52.5 | 56.9 | 56.8 | 57.0 | 58.2 | / | 66.9 | 66.2 | 66.8 |
| | | S/T | 82.9 | 99.0 | 100.0 | 100.0 | 66.2 | 77.4 | 93.2 | 100.0 | 43.3 | 58.3 | 72.5 | 85.3 | / | 41.8 | 54.9 | 66.6 |
| | | kW | 2.2 | 2.3 | 2.6 | 2.9 | 2.7 | 2.7 | 2.8 | 2.9 | 3.2 | 3.2 | 3.2 | 3.3 | / | 3.9 | 3.9 | 4.1 |
| | 75 | TC | 40.4 | 41.4 | 47.4 | 52.3 | 48.9 | 49.2 | 49.4 | 52.2 | 57.3 | 57.2 | 57.4 | 57.6 | / | 64.4 | 64.3 | 64.4 |
| | | S/T | 83.6 | 99.8 | 100.0 | 100.0 | 61.0 | 77.5 | 93.3 | 100.0 | 43.2 | 58.3 | 72.6 | 85.9 | / | 42.0 | 55.3 | 67.6 |
| | | kW | 2.7 | 2.7 | 3.1 | 3.5 | 3.3 | 3.3 | 3.3 | 3.5 | 3.9 | 3.8 | 3.9 | 0.9 | / | 4.3 | 4.2 | 4.3 |
| | 85 | TC | 40.6 | 41.7 | 47.5 | 52.8 | 48.8 | 49.1 | 49.5 | 52.4 | 46.8 | 56.8 | 56.9 | 57.1 | / | 64.3 | 64.1 | 64.3 |
| | | S/T | 83.9 | 99.9 | 100.0 | 100.0 | 61.2 | 77.9 | 93.8 | 100.0 | 43.3 | 58.6 | 73.1 | 86.8 | / | 42.0 | 55.5 | 68.0 |
| | | kW | 3.2 | 3.2 | 3.6 | 4.2 | 3.9 | 3.9 | 3.9 | 4.1 | 4.5 | 4.5 | 4.5 | 4.5 | / | 5.0 | 5.0 | 5.0 |
| | 95 | TC | 40.3 | 42.0 | 47.3 | 52.4 | 48.5 | 48.7 | 49.6 | 52.5 | 56.9 | 56.8 | 56.9 | 57.0 | / | 63.4 | 63.7 | 63.7 |
| | | S/T | 84.5 | 99.9 | 100.0 | 100.0 | 61.4 | 78.5 | 94.1 | 100.0 | 43.3 | 58.8 | 73.5 | 87.4 | / | 42.1 | 55.8 | 68.5 |
| | | kW | 3.8 | 3.9 | 4.4 | 5.0 | 4.5 | 4.6 | 4.8 | 5.0 | 5.4 | 5.4 | 5.4 | 5.4 | / | 5.9 | 6.0 | 6.0 |
| | 105 | TC | 37.9 | 40.5 | 45.6 | 49.0 | 45.6 | 45.8 | 46.3 | 49.0 | 49.8 | 49.7 | 50.3 | 50.2 | / | 55.2 | 55.2 | 55.2 |
| | | S/T | 86.9 | 100.0 | 100.0 | 100.0 | 62.6 | 80.7 | 97.1 | 100.0 | 43.8 | 61.2 | 77.4 | 92.6 | / | 42.9 | 58.4 | 72.8 |
| | | kW | 4.1 | 4.4 | 5.0 | 5.2 | 5.0 | 5.1 | 5.1 | 5.2 | 5.2 | 5.2 | 5.3 | 5.3 | / | 5.6 | 5.6 | 5.6 |
| | 115 | TC | 29.4 | 32.8 | 36.5 | 40.2 | 33.6 | 33.9 | 36.5 | 40.2 | 38.2 | 38.5 | 38.7 | 40.1 | / | 42.5 | 42.7 | 42.9 |
| | | S/T | 96.5 | 100.0 | 100.0 | 100.0 | 68.7 | 92.0 | 100.0 | 100.0 | 45.2 | 66.6 | 87.3 | 100.0 | / | 44.8 | 63.9 | 81.9 |
| | | kW | 3.5 | 3.9 | 4.1 | 4.4 | 3.9 | 3.9 | 4.1 | 4.4 | 4.2 | 4.3 | 4.3 | 4.4 | / | 4.5 | 4.5 | 4.5 |

## 6.2Heating Capacity Tables

**TC: Total capacity (kBTU/hr)  kW:Total input power**

| OTV18HN024A + OTA18C002A（Heating） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Airflow(CFM)** | **ID(℉)** | **OD(℉)** | **86** | **72** | **67** | **62** | **57** | **52** | **47** | **42** | **37** | **32** | **27** | **22** | **17** | **12** | **7** | **3** |
| 670 | 60 | TC | 32.6 | 28.7 | 28.5 | 26.0 | 30.5 | 28.6 | 27.4 | 26.6 | 24.6 | 29.1 | 27.5 | 28.2 | 21.4 | 21.4 | 20.4 | 19.5 |
| | | kW | 1.6 | 1.8 | 1.8 | 1.8 | 2.2 | 2.2 | 2.3 | 2.4 | 2.4 | 3.1 | 3.1 | 3.3 | 3.2 | 3.1 | 3.2 | 3.2 |
| | 70 | TC | 30.8 | 26.7 | 26.1 | 24.4 | 24.8 | 23.7 | 22.8 | 20.9 | 20.6 | 23.8 | 22.6 | 23.2 | 17.6 | 18.0 | 17.1 | 16.7 |
| | | kW | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.1 | 2.0 | 2.2 | 2.7 | 2.7 | 2.9 | 2.8 | 2.8 | 2.8 | 2.9 |
| | 75 | TC | 30.1 | 26.3 | 25.5 | 23.9 | 22.9 | 21.3 | 20.5 | 19.0 | 17.7 | 21.3 | 20.3 | 20.9 | 16.4 | 16.4 | 15.6 | 14.9 |
| | | kW | 2.0 | 2.1 | 2.1 | 2.1 | 1.9 | 1.9 | 2.0 | 2.0 | 1.9 | 2.5 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| | 80 | TC | 29.2 | 25.5 | 24.8 | 23.3 | 22.3 | 20.8 | 19.6 | 18.2 | 16.9 | 18.8 | 17.3 | 18.6 | 14.2 | 14.4 | 13.7 | 13.4 |
| | | kW | 2.1 | 2.2 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.4 | 2.2 | 2.6 | 2.4 | 2.5 | 2.5 | 2.6 |
| 820 | 60 | TC | 36.6 | 33.0 | 32.1 | 30.2 | 33.7 | 30.8 | 29.5 | 28.1 | 26.4 | 31.7 | 29.5 | 30.3 | 23.2 | 23.6 | 22.1 | 20.0 |
| | | kW | 1.6 | 1.7 | 1.7 | 1.7 | 2.1 | 2.0 | 2.1 | 2.1 | 2.2 | 2.8 | 2.8 | 3.1 | 2.9 | 3.0 | 2.9 | 2.8 |
| | 70 | TC | 31.5 | 27.2 | 26.5 | 24.9 | 28.0 | 26.2 | 24.9 | 23.7 | 21.8 | 26.0 | 24.6 | 24.9 | 19.3 | 19.3 | 18.5 | 17.4 |
| | | kW | 1.5 | 1.6 | 1.6 | 1.6 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 2.4 | 2.4 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 |
| | 75 | TC | 30.7 | 26.7 | 26.0 | 24.2 | 23.6 | 22.3 | 21.2 | 20.0 | 19.6 | 23.1 | 21.9 | 22.5 | 17.6 | 17.6 | 16.6 | 16.1 |
| | | kW | 1.6 | 1.7 | 1.7 | 1.7 | 1.5 | 1.6 | 1.6 | 1.6 | 1.8 | 2.2 | 2.2 | 2.4 | 2.3 | 2.3 | 2.3 | 2.4 |
| | 80 | TC | 30.0 | 26.0 | 25.4 | 23.8 | 22.8 | 21.3 | 19.4 | 18.4 | 17.0 | 20.4 | 19.2 | 20.3 | 15.4 | 15.7 | 14.9 | 14.3 |
| | | kW | 1.7 | 1.8 | 1.8 | 1.8 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 2.0 | 2.0 | 2.3 | 2.1 | 2.1 | 2.2 | 2.2 |

| OTV18HN036A + OTA18C004A（Heating） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Airflow(CFM)** | **ID(℉)** | **OD(℉)** | **86** | **72** | **67** | **62** | **57** | **52** | **47** | **42** | **37** | **32** | **27** | **22** | **17** | **12** | **7** | **3** |
| 670 | 60 | TC | 26.9 | 26.2 | 26.4 | 26.7 | 26.6 | 26.2 | 25.9 | 25.5 | 25.0 | 25.7 | 25.2 | 24.7 | 23.2 | 22.8 | 21.2 | 19.5 |
| | | kW | 1.2 | 1.4 | 1.5 | 1.6 | 1.7 | 1.7 | 1.9 | 1.9 | 2.1 | 2.3 | 2.5 | 2.6 | 2.5 | 2.8 | 2.8 | 2.7 |
| | 70 | TC | 21.5 | 21.1 | 21.3 | 20.4 | 21.2 | 20.6 | 20.7 | 20.3 | 19.9 | 20.1 | 20.0 | 20.2 | 19.9 | 18.3 | 18.1 | 17.1 |
| | | kW | 1.0 | 1.2 | 1.3 | 1.3 | 1.4 | 1.4 | 1.6 | 1.6 | 1.7 | 1.9 | 1.9 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 |
| | 75 | TC | 18.1 | 18.0 | 18.1 | 17.6 | 18.0 | 17.9 | 17.7 | 17.3 | 17.2 | 17.4 | 17.2 | 17.4 | 17.1 | 15.9 | 15.6 | 14.8 |
| | | kW | 0.8 | 1.0 | 1.1 | 1.1 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 2.0 | 2.0 | 2.0 | 2.3 | 2.2 |
| | 80 | TC | 16.1 | 15.0 | 14.6 | 14.9 | 15.6 | 15.0 | 15.1 | 14.7 | 14.4 | 14.7 | 14.5 | 14.6 | 14.5 | 13.4 | 13.5 | 12.2 |
| | | kW | 0.8 | 0.9 | 0.9 | 0.9 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.5 | 1.5 | 1.8 | 1.9 | 2.0 | 2.1 | 2.0 |
| 1130 | 60 | TC | 50.8 | 46.5 | 44.6 | 42.0 | 39.2 | 37.1 | 35.7 | 33.6 | 31.7 | 29.1 | 30.0 | 26.4 | 24.7 | 24.7 | 22.9 | 21.0 |
| | | kW | 2.5 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.6 | 2.5 | 2.4 | 2.7 | 2.7 | 2.7 |
| | 70 | TC | 40.7 | 39.1 | 38.6 | 37.9 | 38.5 | 36.5 | 34.9 | 32.8 | 30.7 | 28.4 | 28.1 | 26.3 | 24.8 | 24.2 | 22.4 | 20.9 |
| | | kW | 2.0 | 2.3 | 2.3 | 2.4 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.7 | 2.7 | 2.6 | 2.9 | 2.9 | 2.9 |
| | 75 | TC | 35.4 | 33.8 | 33.4 | 32.9 | 33.8 | 33.1 | 32.7 | 32.2 | 30.5 | 28.4 | 28.2 | 26.3 | 24.4 | 23.9 | 22.2 | 20.3 |
| | | kW | 1.7 | 1.9 | 2.0 | 2.1 | 2.3 | 2.4 | 2.5 | 2.7 | 2.7 | 2.6 | 2.8 | 2.8 | 2.7 | 3.0 | 3.0 | 2.9 |
| | 80 | TC | 29.6 | 28.7 | 28.7 | 28.4 | 28.8 | 28.2 | 27.9 | 27.5 | 26.9 | 27.2 | 27.4 | 25.6 | 23.9 | 23.6 | 21.7 | 20.5 |
| | | kW | 1.5 | 1.7 | 1.8 | 1.8 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 | 2.6 | 2.9 | 2.8 | 2.8 | 3.2 | 3.2 | 3.1 |

| OTV18HN048A + OTA18C006A（Heating） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Airflow(CFM) | ID(℉) | OD(℉) | 86 | 72 | 67 | 62 | 57 | 52 | 47 | 42 | 37 | 32 | 27 | 22 | 17 | 12 | 7 | 3 |
| 1280 | 60 | TC | 47.4 | 46.7 | 45.1 | 45.9 | 48.0 | 47.3 | 46.0 | 45.3 | 43.8 | 45.9 | 43.5 | 46.8 | 37.0 | 35.9 | 34.6 | 33.2 |
| | | kW | 2.1 | 2.5 | 2.5 | 2.6 | 3.0 | 3.2 | 3.3 | 3.5 | 3.6 | 4.1 | 4.1 | 4.9 | 4.1 | 4.1 | 4.3 | 4.5 |
| | 70 | TC | 39.7 | 36.9 | 36.4 | 36.5 | 36.9 | 36.2 | 36.1 | 36.2 | 35.1 | 36.2 | 35.5 | 36.2 | 29.8 | 28.5 | 27.4 | 26.2 |
| | | kW | 1.7 | 2.0 | 2.0 | 2.1 | 2.3 | 2.4 | 2.6 | 2.8 | 2.9 | 3.2 | 3.3 | 3.7 | 3.3 | 3.3 | 3.3 | 3.5 |
| | 75 | TC | 33.8 | 30.5 | 30.4 | 31.1 | 31.7 | 31.0 | 31.4 | 31.2 | 30.4 | 32.2 | 31.0 | 31.2 | 26.1 | 25.3 | 24.0 | 22.8 |
| | | kW | 1.5 | 1.7 | 1.7 | 1.8 | 2.0 | 2.0 | 2.3 | 2.4 | 2.5 | 2.9 | 2.9 | 3.2 | 2.9 | 2.9 | 2.9 | 3.0 |
| | 80 | TC | 28.7 | 25.3 | 23.9 | 24.6 | 26.6 | 26.0 | 26.1 | 26.2 | 26.3 | 27.2 | 26.4 | 26.9 | 22.5 | 21.8 | 21.1 | 19.8 |
| | | kW | 1.5 | 1.5 | 1.5 | 1.6 | 1.8 | 1.8 | 2.0 | 2.1 | 2.3 | 2.6 | 2.7 | 2.9 | 2.6 | 2.7 | 2.7 | 2.8 |
| 1650 | 60 | TC | 63.7 | 61.4 | 59.9 | 58.2 | 60.4 | 58.8 | 57.0 | 56.0 | 52.5 | 48.6 | 52.5 | 49.4 | 40.4 | 43.1 | 39.4 | 35.8 |
| | | kW | 3.0 | 3.4 | 3.5 | 3.7 | 4.2 | 4.3 | 4.4 | 4.6 | 4.4 | 4.3 | 5.2 | 5.2 | 4.4 | 5.4 | 5.1 | 4.9 |
| | 70 | TC | 48.5 | 46.6 | 45.9 | 46.5 | 48.8 | 47.2 | 46.0 | 44.5 | 42.9 | 45.7 | 43.6 | 46.4 | 36.0 | 34.7 | 33.6 | 31.8 |
| | | kW | 2.4 | 2.6 | 2.6 | 2.8 | 3.3 | 3.3 | 3.5 | 3.6 | 3.7 | 4.3 | 4.4 | 5.0 | 4.1 | 4.2 | 4.4 | 4.5 |
| | 75 | TC | 44.0 | 40.4 | 39.6 | 38.6 | 39.7 | 41.6 | 40.3 | 39.0 | 37.5 | 39.6 | 38.6 | 38.1 | 32.2 | 30.3 | 29.2 | 27.7 |
| | | kW | 2.1 | 2.3 | 2.4 | 2.4 | 2.6 | 3.0 | 3.1 | 3.2 | 3.0 | 3.7 | 3.9 | 4.0 | 3.7 | 3.7 | 3.8 | 3.9 |
| | 80 | TC | 36.5 | 31.0 | 33.9 | 33.0 | 35.3 | 33.2 | 34.1 | 32.9 | 32.2 | 34.5 | 32.9 | 33.3 | 28.2 | 26.7 | 25.1 | 24.0 |
| | | kW | 1.8 | 1.9 | 2.0 | 2.0 | 2.4 | 2.3 | 2.6 | 2.7 | 2.8 | 3.3 | 3.3 | 3.5 | 3.3 | 3.3 | 3.3 | 3.3 |

| OTV18HN060A + OTA18C007A（Heating） | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Airflow(CFM) | ID(℉) | OD(℉) | 86 | 72 | 67 | 62 | 57 | 52 | 47 | 42 | 37 | 32 | 27 | 22 | 17 | 12 | 7 | 3 |
| 1280 | 60 | TC | 67.0 | 66.7 | 65.5 | 64.7 | 65.2 | 63.6 | 60.3 | 56.4 | 52.5 | 48.5 | 52.7 | 50.0 | 46.2 | 49.2 | 45.3 | 41.5 |
| | | kW | 2.8 | 3.5 | 3.7 | 3.8 | 4.2 | 4.4 | 4.3 | 4.1 | 3.9 | 3.8 | 4.8 | 4.7 | 4.6 | 5.4 | 5.1 | 4.9 |
| | 70 | TC | 52.4 | 51.7 | 51.0 | 50.4 | 51.3 | 50.9 | 50.1 | 49.8 | 49.3 | 47.7 | 48.8 | 48.2 | 45.6 | 48.6 | 44.7 | 40.7 |
| | | kW | 2.3 | 2.7 | 2.8 | 3.0 | 3.2 | 3.4 | 3.6 | 3.8 | 4.1 | 4.2 | 4.7 | 5.0 | 4.9 | 5.9 | 5.5 | 5.3 |
| | 75 | TC | 44.9 | 44.1 | 43.6 | 45.1 | 44.8 | 44.1 | 43.3 | 42.9 | 42.8 | 43.2 | 42.2 | 42.1 | 41.6 | 41.8 | 41.6 | 40.5 |
| | | kW | 2.0 | 2.3 | 2.4 | 2.6 | 2.7 | 2.9 | 3.1 | 3.3 | 3.5 | 3.8 | 4.0 | 4.3 | 4.5 | 4.8 | 5.3 | 5.5 |
| | 80 | TC | 38.6 | 38.5 | 36.9 | 36.7 | 37.7 | 37.2 | 37.1 | 36.7 | 36.2 | 36.6 | 36.2 | 35.9 | 35.5 | 34.7 | 34.6 | 34.3 |
| | | kW | 1.9 | 2.0 | 2.0 | 2.1 | 2.4 | 2.5 | 2.7 | 2.9 | 3.1 | 3.4 | 3.5 | 3.8 | 3.9 | 4.1 | 4.4 | 4.7 |
| 1650 | 60 | TC | 70.3 | 69.7 | 66.8 | 65.1 | 66.3 | 64.1 | 60.6 | 56.6 | 52.9 | 48.8 | 54.2 | 50.2 | 46.7 | 49.4 | 45.5 | 41.6 |
| | | kW | 3.4 | 4.2 | 4.3 | 4.5 | 4.5 | 4.4 | 4.3 | 4.1 | 4.0 | 3.9 | 5.0 | 4.8 | 4.6 | 5.4 | 5.2 | 5.0 |
| | 70 | TC | 59.6 | 57.1 | 57.2 | 56.8 | 57.0 | 56.5 | 55.6 | 55.4 | 51.8 | 47.8 | 51.6 | 48.6 | 45.7 | 48.7 | 45.0 | 41.1 |
| | | kW | 2.6 | 3.0 | 3.3 | 3.5 | 3.7 | 4.0 | 4.2 | 4.5 | 4.3 | 4.2 | 5.1 | 5.0 | 4.9 | 5.9 | 5.6 | 5.3 |
| | 75 | TC | 51.6 | 51.1 | 49.6 | 48.9 | 49.5 | 48.5 | 48.5 | 48.1 | 47.5 | 47.1 | 46.5 | 47.1 | 45.6 | 46.2 | 44.6 | 41.0 |
| | | kW | 2.4 | 2.8 | 2.8 | 3.0 | 3.1 | 3.3 | 3.6 | 3.8 | 4.1 | 4.2 | 4.5 | 4.9 | 5.1 | 5.6 | 5.8 | 5.4 |
| | 80 | TC | 44.0 | 41.3 | 41.0 | 40.6 | 42.9 | 42.0 | 41.1 | 40.9 | 39.9 | 40.5 | 40.0 | 40.0 | 39.2 | 38.8 | 38.7 | 38.3 |
| | | kW | 2.2 | 2.3 | 2.3 | 2.5 | 2.8 | 2.9 | 3.1 | 3.3 | 3.5 | 3.8 | 3.9 | 4.3 | 4.4 | 4.7 | 5.1 | 5.4 |

## 7.Accessories

### 7.1Standard Accessories

**Outdoor unit:**

**24K、36K、48K、60K**

| Items | Quantity |
|---|---|
| Installation manual | 1 |
| line of communication | 1 |

**Indoor unit：**

**24K、36K、48K、60K**

| Items | Quantity |
|---|---|
| Installation manual | 1 |
| Plug | 2 |
| Water outlet nozzle | 1 |
| Rubber gasket | 3 |
| Button-type wire protection cover | 2 |
| Spring screw joint | 13 |
| Wiring harness assembly | 1 |
| Circuit breaker partition | 1 |

### 7.2Optional Accessories

| Items | Accessories |
|---|---|
| a | Electric heater |
| b | Dry filter |

# Part 3
# Outdoor Unit Installation

# 1.Safety

## 1.1 Symbol Keywords

| | | |
|---|---|---|
| ⚠ | WARNING | The warnings in this document are identified by warning triangles printed on a black background. The key words at the beginning of the warning indicate the type and severity of the next risk if no measures are taken to prevent it. |

**The following keywords are defined and used in this document:**

| | | |
|---|---|---|
| ▶ | Danger | Indicates a hazardous situation, which, if not avoided, will lead to death or serious injury. |
| ▶ | Warning | Indicates a hazardous situation, which, if not avoided, may lead to death or serious injury. |
| ▶ | Caution | Indicates a hazardous situation, which, if not avoided, may cause mild to moderate injury. |
| ▶ | Note | Used to deal with behaviors unrelated to personal injury. |

**Important information**

| | |
|---|---|
| ℹ | This symbol represents important information that is not dangerous to people or property. |

## 1.2 Safety Precautions

**Please read before proceeding**

| | | |
|---|---|---|
| ⚠ | WARNING | ▶ Failure to observe this warning may result in property damage, serious personal injury or death. |
| | | ▶ Before touching the electrical components, wait for 3 minutes after disconnecting the power supply. |

| | | |
|---|---|---|
| ⚠ | NOTICE | ▶ This document is the property of the customer and is kept by this unit. When you are finished, please return to the service information package. |
| | | ▶ These instructions do not cover all changes in the system, nor do they provide all unexpected situations that may be encountered during installation. |
| | | ▶ If you need more information, or there are special problems that are not sufficient for the buyer, you should consult your installation dealer or local dealer. |

Some benefits of installing an approved indoor and outdoor split system are maximum efficiency, best performance and best overall system reliability.

This document contains wiring diagram and maintenance information. This is the customer's property and belongs to this unit. When you are finished, please return to the service information package.

## Warning:

- The unit must be installed by qualified personnel with a capability certificated for handling refrigerant fluids. Refer to regulation and laws in use on installation location.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Servicing shall be performed only as recommended by the manufacturer.
- Product uninstallation and recycling must be performed by a certified technician.
- The appliances is designed to be operated in outdoor area. If have to be installed indoor, the appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- The appliance shall be installed in accordance with national wiring regulations.
- Children should be supervised to ensure that they do not play with the appliance.
- Before accessing the connection terminals, all power circuits must be disconnected.
- This information is intended for use by individuals with sufficient electrical and mechanical experience background. Attempting to repair central air conditioning products may result in personal injury and/or property damage.

## Warning: Dangerous voltage

- Failure to observe this warning may result in property damage, serious personal injury or death.
- Can cause injury or death. disconnect all remote electric power supplies before servicing. Follow proper locking/tagging procedures to ensure that the power supply will not be energized accidentally.

## Warning: Refrigerant oil

- Attempting to repair central air-conditioning products may result in property damage, serious personal injury or death. These units use R32 refrigerant, and its working pressure is 50-70% higher than R-22. Use only the service equipment approved by R32 . The refrigerant cylinder may contain a "dip" tube to allow liquid refrigerant to be filled into the system. This systems use POE oil (VG75、VG75R or equivalent), which can easily absorb moisture from the atmosphere. In order to limit this "moisture absorption" effect, the system should be sealed as much as possible. If the system is exposed to the atmosphere for more than 4 hours, the compressor oil must be changed.
  Do not destroy the vacuum with air, and always replace the filter dryer when you open the system for component replacement.

## Warning: Hot surface

- May cause mild to severe burns. Failure to observe this caution may result in property damage or personal injury. Do not touch the top of the compressor.

## Caution: Contains refrigerant

- Failure to follow the correct procedures will lead to personal illness or injury or serious equipment damage. The system contains high-pressure oil and refrigerant. Before opening the system, recover the refrigerant to release the pressure.

## Note: Indoor unit required

- The indoor unit must be matched with the expansion valve.

## Note:

- The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI rated with expansion valve indoor systems. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

## Note: Grounding required

- Failure to check or use the correct maintenance tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that can conduct current are grounded. If the grounding wire, screw, strap, clip, nut or washer used to complete the grounding path is removed during maintenance, it must be put back in place and properly fixed.

## Warning: service valve

- Failure to observe this warning will result in release of system pressure, which may result in personal injury and/or property damage. When opening the liquid pipeline service valve, be extra careful. Turn the valve stem counterclockwise until the valve stem touches the bead.

Warning: Brazing required

- Failure to check the wiring or use the correct maintenance tools may result in equipment damage or personal injury. If using existing refrigerant lines, make sure that all joints are brazed, not soldered.

Warning: High current leakage

- Failure to observe this warning may result in property damage, serious personal injury or death. Before connecting the power supply, grounding is essential.

Warning:

- This product may expose you to chemicals including lead and lead components, which are known to cause cancer, birth defects or other reproductive harm in California. For more information, please visit www.P65Warnings.ca.gov.

Warning:

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliances is designed to be operated in outdoor area. If have to be installed indoor, the appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

| | | |
|---|---|---|
| A2L | **WARNING** | This symbol that this appliance used a flammable refrigerant . If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire. |
|  | **CAUTION** | This symbol that the operation manual should be read carefully. |
|  | **CAUTION** | This symbol that a service personnel should be handling this equipment with reference to the installation manual. |
|  | **CAUTION** | This symbol that information is available such as the operating manual or installation manual. |

## 1.3 Instructions for repairing appliances containing R32

**Checks to the area**

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimised.

**Work procedure**

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapor being present while the work is being performed.

**General work area**

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

**Checking for presence of refrigerant**

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.

**Presence of fire extinguisher**

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

**No ignition sources**

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

**Ventilated area**

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

**Checks to the refrigerating equipment**

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

– *the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;*

– *the ventilation machinery and outlets are operating adequately and are not obstructed;*

– *if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant*

– *marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;*

– *refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.*

**Checks to electrical devices**

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised. Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

**Repairs to sealed components**

Sealed electrical components shall be replaced.

**Repair to intrinsically safe components**

Intrinsically safe components must be replaced.

**Cabling**

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

**Detection of flammable refrigerants**

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to **Removal and evacuation.**

**Removal and evacuation**

When breaking into the refrigerant circuit to make repairs – or for any other purpose –conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

– safely remove refrigerant following local and national regulations;
– evacuate;
– purge the circuit with inert gas (optional for A2L);
– evacuate (optional for A2L);
– continuously flush or purge with inert gas when using flame to open circuit;
and
– open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

**Charging procedures**

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

**Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure, ensure that:

- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with instructions.

h) Do not overfill cylinders (no more than 80 % volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

**Labelling**

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

**Recovery**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

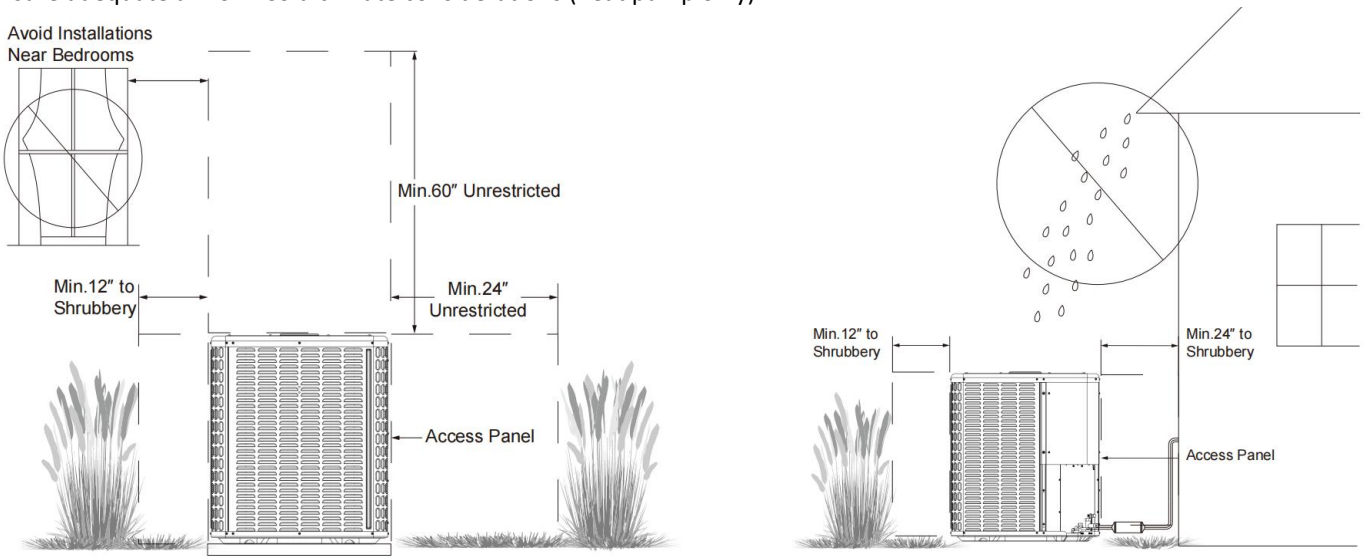
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

## 2.Unit Location Considerations

### 2.1Unit Dimensions and Location Restrictions

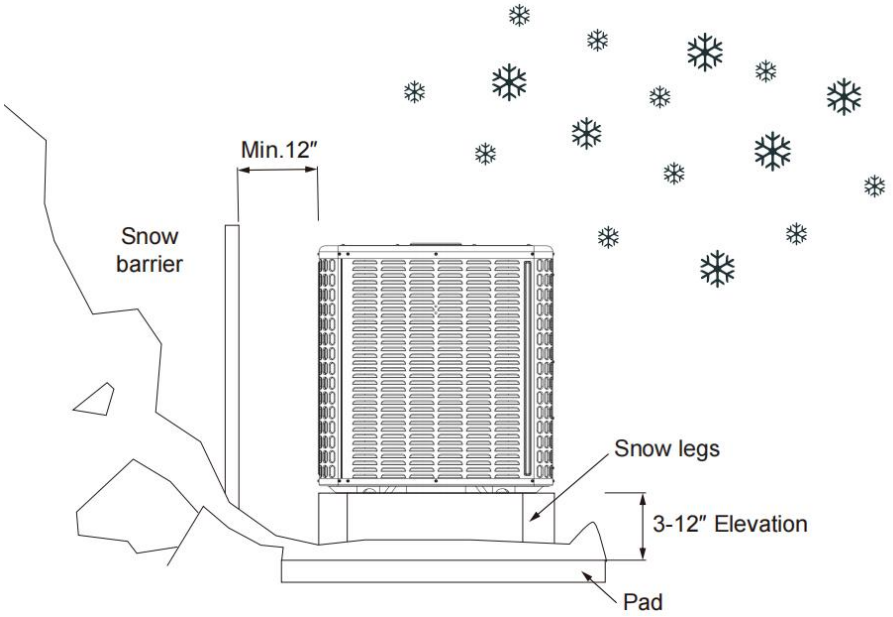
**Note：** The outdoor unit shall be located in a well-ventilated location other than the occupied space, such as in the open air. For installation of the indoor unit, refer to the corresponding installation and operation manual. If an indoor unit is installed in an unventilated area, the area shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.

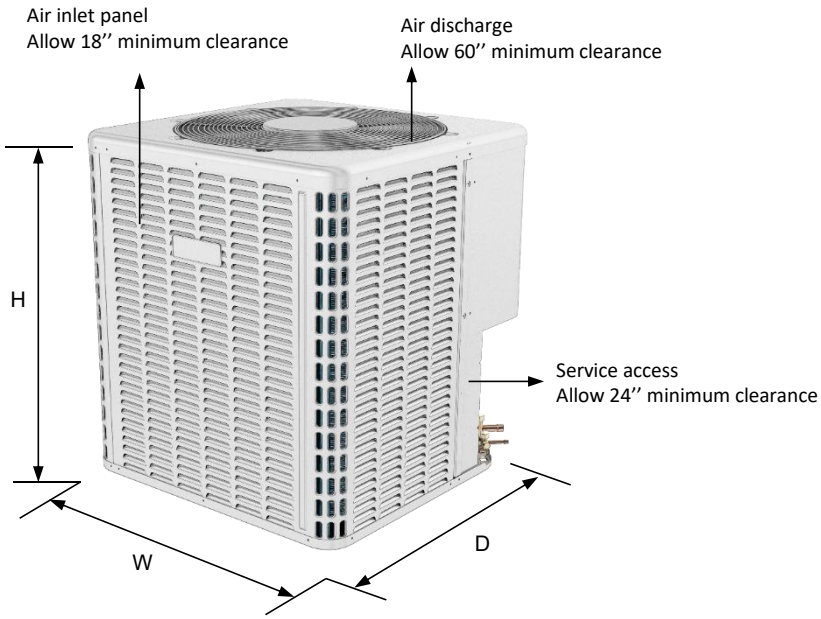
Ensure the top discharge area is unrestricted for at least 60 inches above the unit. Do not locate outdoor unit near bedrooms since normal operational sounds may be objectionable. Position unit to allow adequate space for unobstructed airflow, wiring, refrigerant lines, and serviceability. Maintain a distance of 24 inches between units. 24 inches clearance must be provided in front of the control box (access panels) and any other side requiring service. Position unit where water, snow or ice from roof or overhang cannot fall directly on unit. Position the outdoor unit a minimum of 12" from any wall or surrounding shrubbery to ensure adequate airflow. Cold climate considerations (heat pump only)




Units should be elevated 3-12 inches above the pad or rooftop, depending on local weather. This additional height will allow drainage of snow and ice melted during defrost cycle prior to its refreezing. Ensure that drain holes in unit base pan are not obstructed, preventing drainage of defrost water .

If possible, avoid locations that are likely to accumulate snow drifts. If not possible, a snow drift barrier should be installed around the unit to prevent a build-up of snow on the sides of the unit.





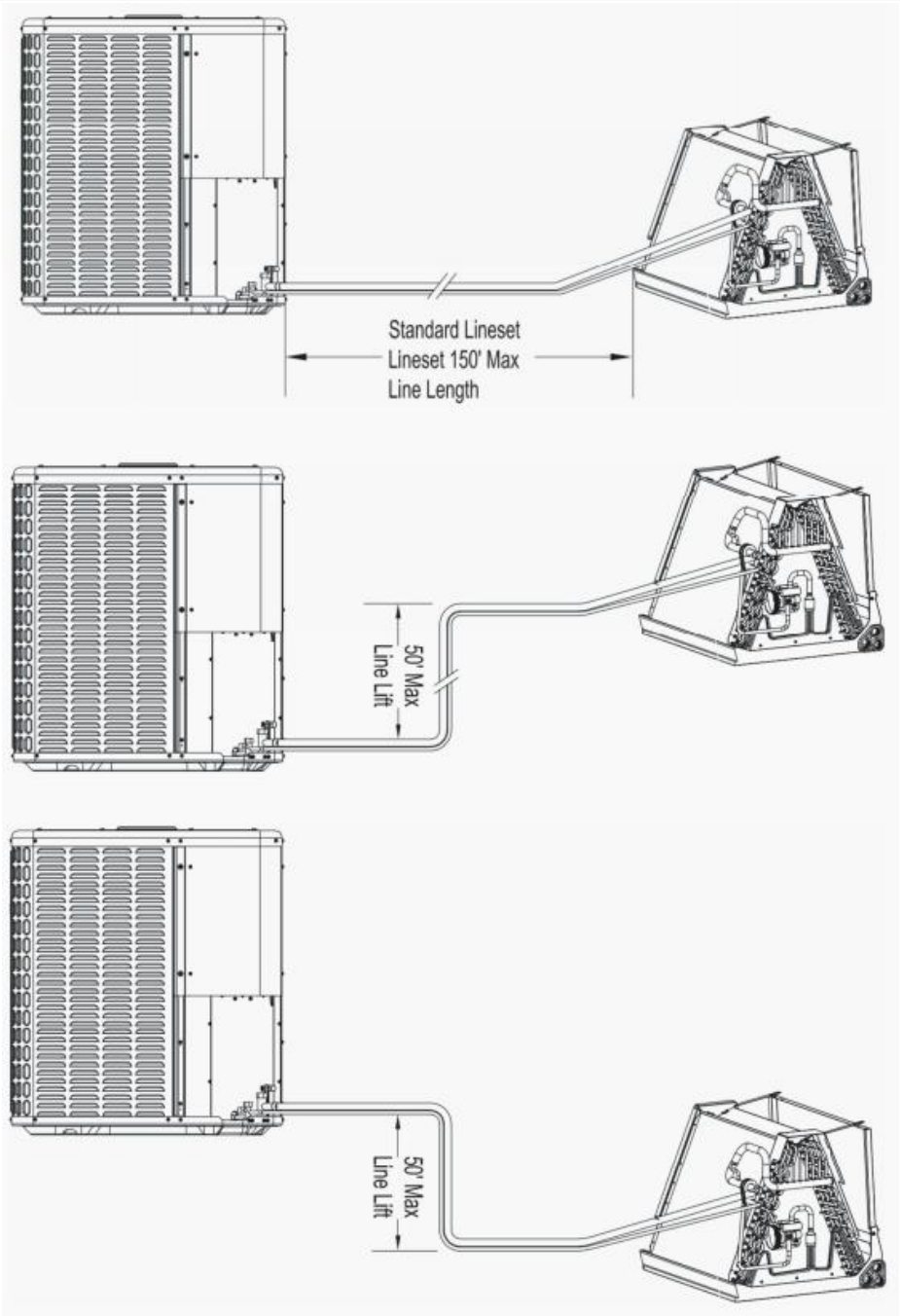

| Model | Dimensions | | | Refrigerant Connection Service Valve Size | |
|---|---|---|---|---|---|
| | "W" mm (in.) | "D" mm (in.) | "H" mm (in.) | Liquid (in.) | Gas (in.) |
| **24K** | 740 (29-1/7) | 633 (25) | 740 (29-1/7) | 3/8 | 3/4 |
| **36K** | | | | | |
| **48K** | 740 (29-1/7) | 835 (32-7/8) | 740 (29-1/7) | 3/8 | 7/8 |
| **60K** | | | | | |

## 2.2Refrigerant Piping Limits

Considering the allowable pipe length and height drop to determine the installation position. Make sure the distance and height drop between indoor and outdoor unit not exceed the data in the following table.

| System Capacity Model | Liquid Line | Suction Line | Total Equivalent Length - Feet | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 25 | 50 | 75 | 100 | 125 | 150 |
| | Inch O.D | | Maximum Vertical Separation -Feet | | | | | |
| 24K | 3/8 | 3/4 Std. | 25 | 50 | 45 | 40 | 30 | 25 |
| 36K | 3/8 | 3/4 Std. | 25 | 50 | 50 | 50 | 35 | 25 |
| 48K | 3/8 | 7/8 Std. | 25 | 50 | 50 | 40 | 30 | 25 |
| 60K | 3/8 | 7/8 Std. | 25 | 50 | 50 | 40 | 30 | 25 |

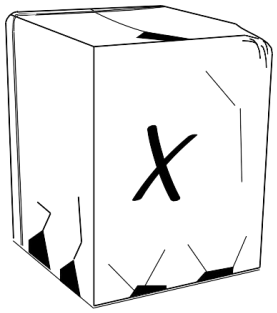
- Maximum equivalent length of pipeline = 150 feet.
- Maximum vertical equivalent length = 50 feet.
- Use only the pipe diameters shown in Table 2.3.
- If the suction line exceeds 65 feet, do not use a larger suction line than recommended.



## 3.Unit Preparation

Check for damage and report promptly to the carrier any damage found to the unit.

The charge port can be used to check to be sure the refrigerant charge has been retained during shipment.

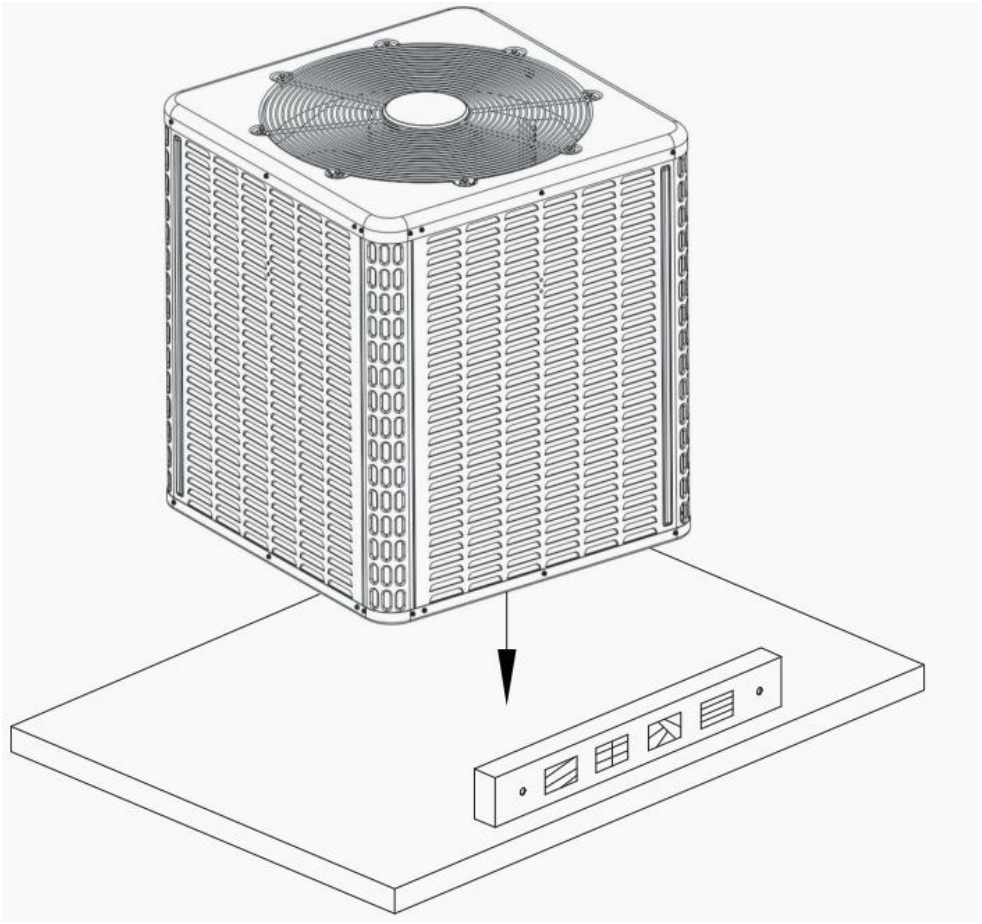


## 4.Setting the Unit

When installing the unit on a support pad, such as a concrete slab, consider the following:

- The pad should be at least 1-2” larger than the unit on all sides.
- The pad must be separate from any structure.
- The pad must be level.
- The pad should be high enough above grade to allow for drainage.
- The pad location must comply with National, State, and Local codes.

**IMPORTANT NOTE:** These instructions are intended to provide a method to tie-down system to cement slab as a securing procedure for high wind areas. It is recommended to check Local Codes for tie-down methods and protocols.



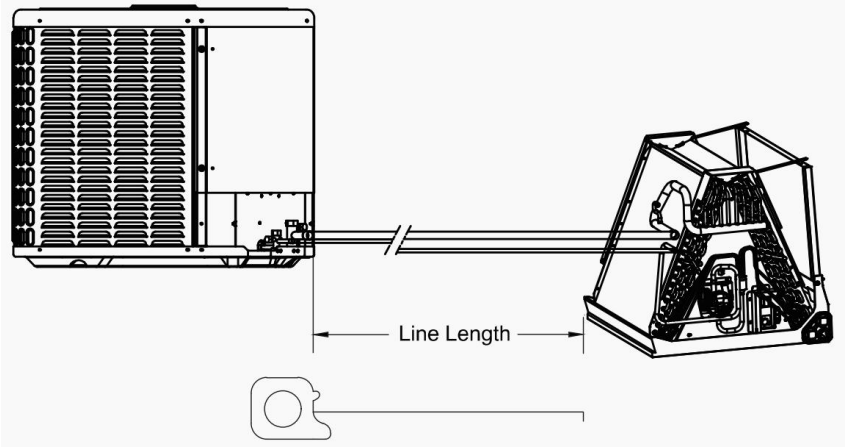
## 5.Refrigerant Line Considerations

### 5.1Refrigerant Line and Service Valve Connection Sizes

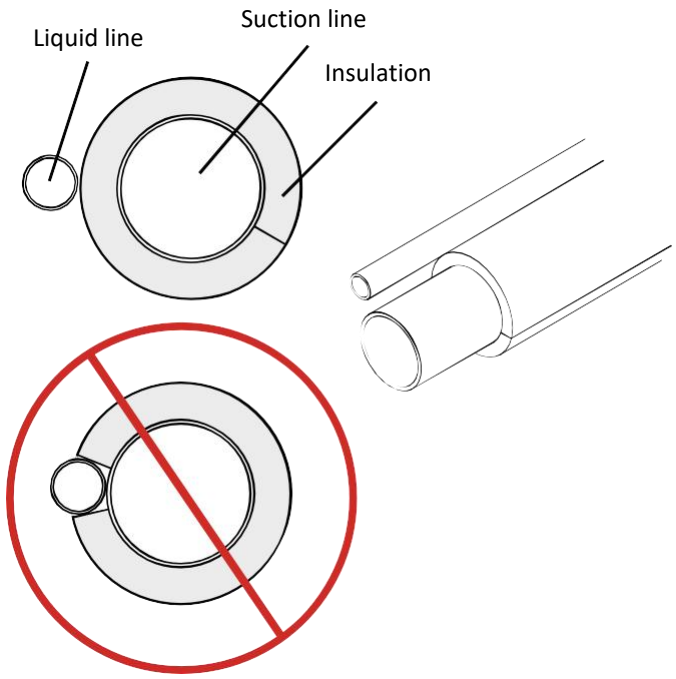
| | Line Sizes | | Service Valve Connection Sizes | |
|---|---|---|---|---|
| Model | Suction Line (O.D.) | Liquid Line (O.D.) | Suction Line Connection(I.D.) | Liquid Line Connection(I.D.) |
| 24K/36K | 3/4 | 3/8 | 3/4 | 3/8 |
| 48K/60K | 7/8 | 3/8 | 7/8 | 3/8 |

### 5.2Refrigerant Line Length and Insulation

Determine required line length, see suction 2.2.



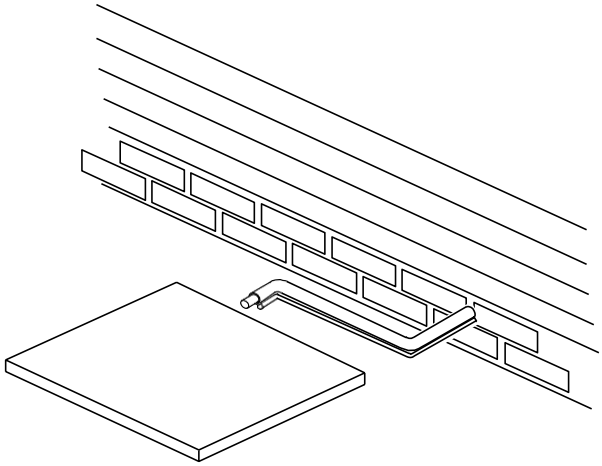

**IMPORTANT:** The Suction Line must always be insulated. DO NOT allow the Liquid Line and Suction Line to come in direct (metal to metal) contact.



### 5.3Reuse Existing Refrigerant Lines

**CAUTION**

If using existing refrigerant lines make certain that all joints are brazed, not soldered.



For retrofit applications, where the existing refrigerant lines will be used, the following precautions should be taken:

- Ensure that the refrigerant lines are the correct size.
- Ensure that the refrigerant lines are free of leaks, acid, and oil.

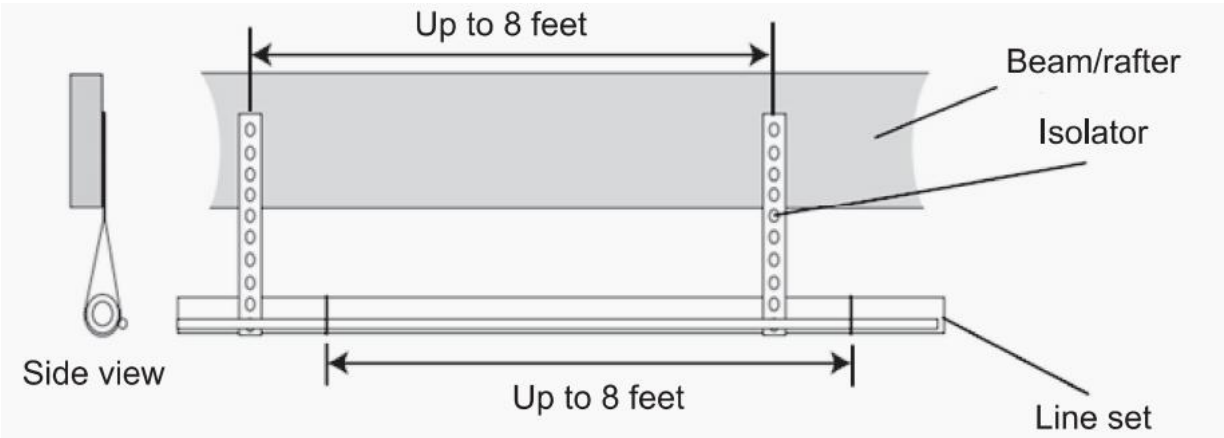
**Note:** The manufacturer recommends installing only approved matched indoor and outdoor systems. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

## 6.Refrigerant Line Routing

**Important:** Take precautions to prevent noise within the building structure due to vibration transmission from the refrigerant lines.

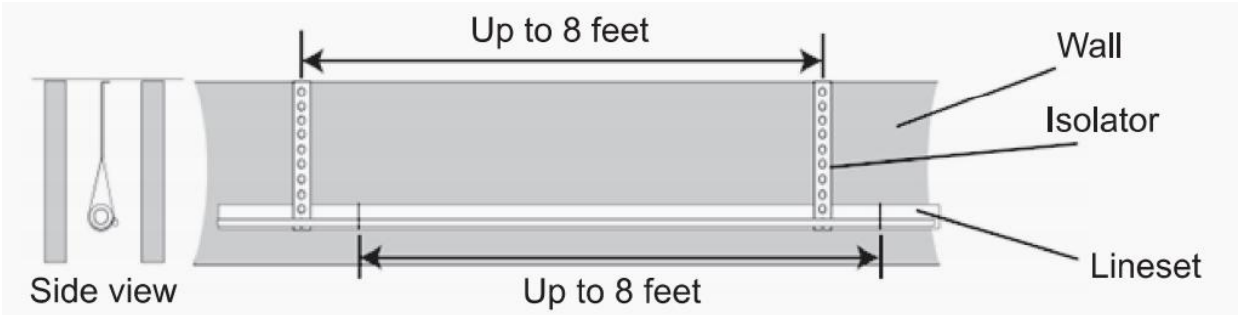
Comply with National, State, and Local Codes when isolating line sets from joists, rafters, walls, or other structural elements. For example:

- When the refrigerant lines have to be fastened to floor joists or other framing in a structure, use isolation type hangers.
- Isolation hangers should also be used when refrigerant lines are run in stud spaces or enclosed ceilings.
- When the refrigerant lines run through a wall or sill, they should be insulated and isolated.
- Isolate the lines from all ductwork.
- Minimize the number of 90º turns.



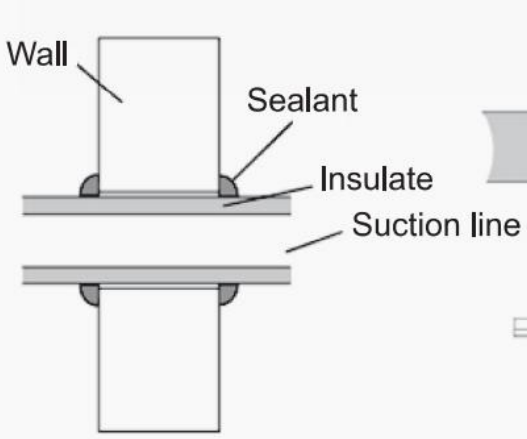

Secure Suction Line from joists using isolators every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

**Isolated from beam/rafter**

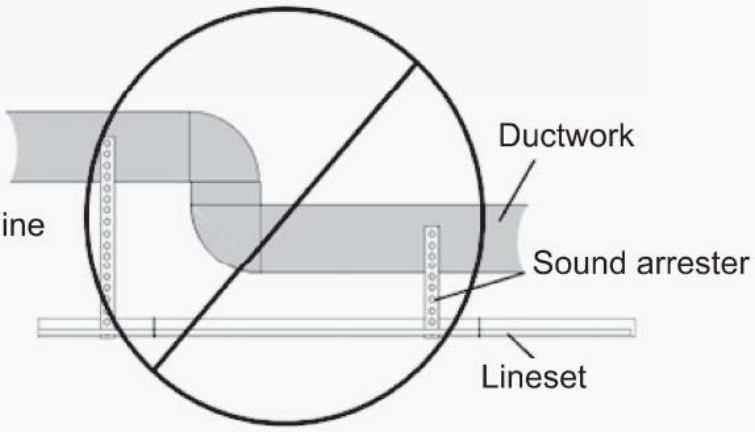



Secure Suction Line from joists using isolators every 8 ft. Secure Liquid Line directly to Suction Line using tape, wire, or other appropriate method every 8 ft.

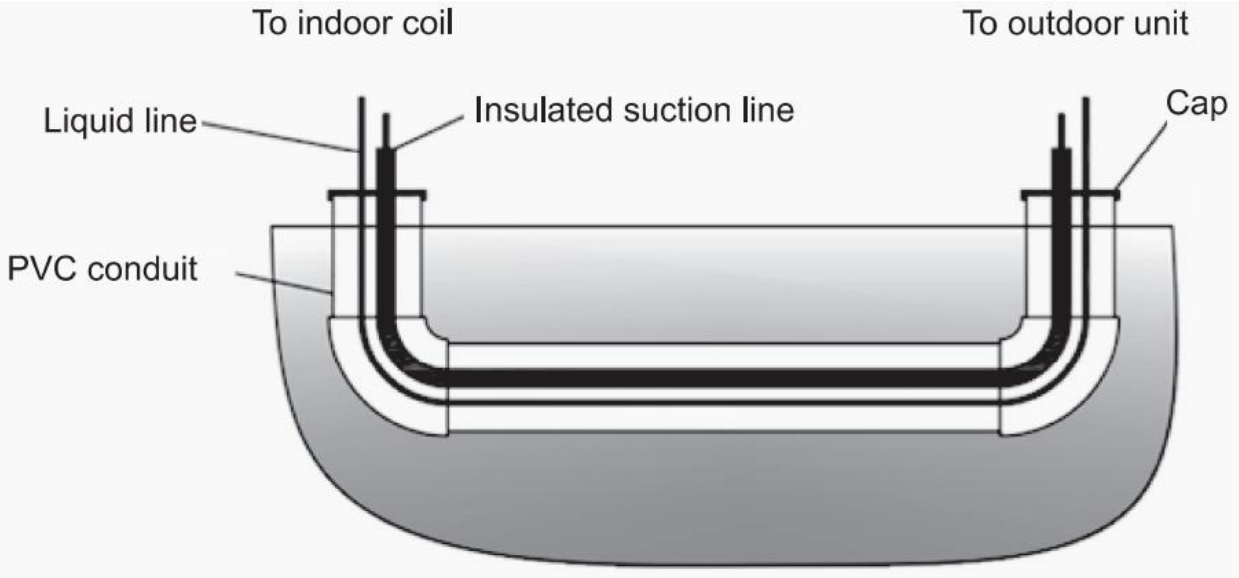
**Isolation on the wall**




**Wall isolation**

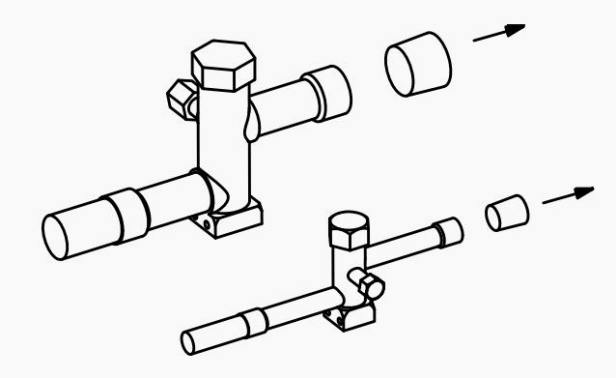



Do not hang the lineset on the duct work.

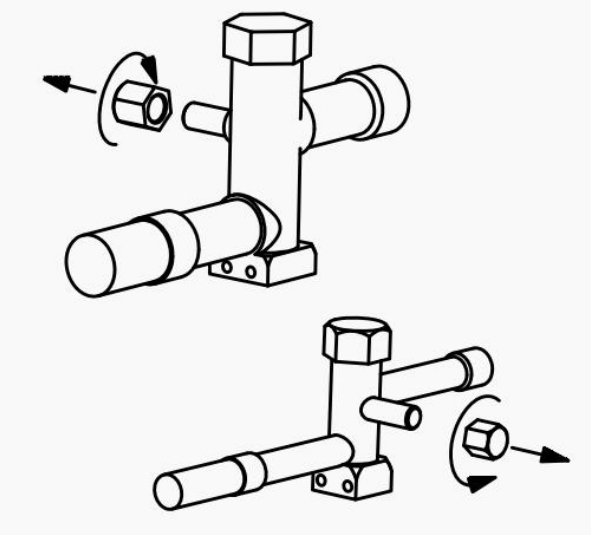


## 7.Refrigerant Line Brazing

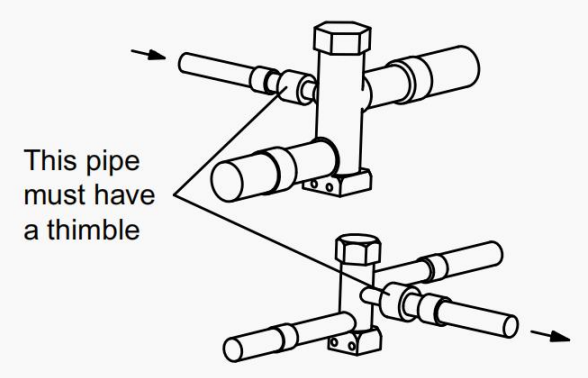
1.Remove caps or plugs. Use a deburring tool to deburr the pipe ends. Clean both internal and external surfaces of the tubing using an emery cloth.



2.Remove the pressure tap cap from both service valves.



3.Purge the refrigerant lines and indoor coil with dry nitrogen.




4.Wrap a wet rag around the valve body to avoid heat damage and continue the dry nitrogen purge.

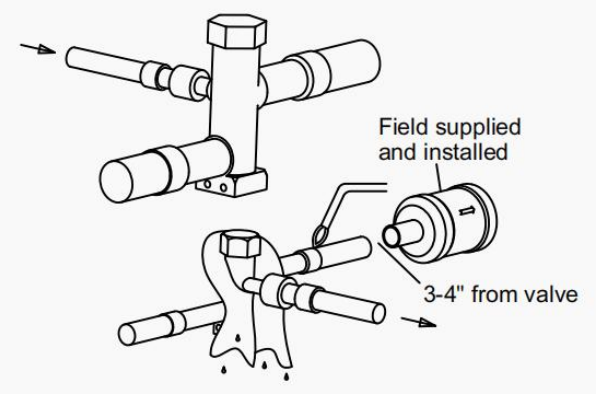
Braze the refrigerant lines to the service valves.

Check liquid line filter drier's directional flow arrow to confirm correct direction of refrigeration flow (away from outdoor unit and toward evaporator coil) as illustrated. Braze the filter drier to the Liquid Line.

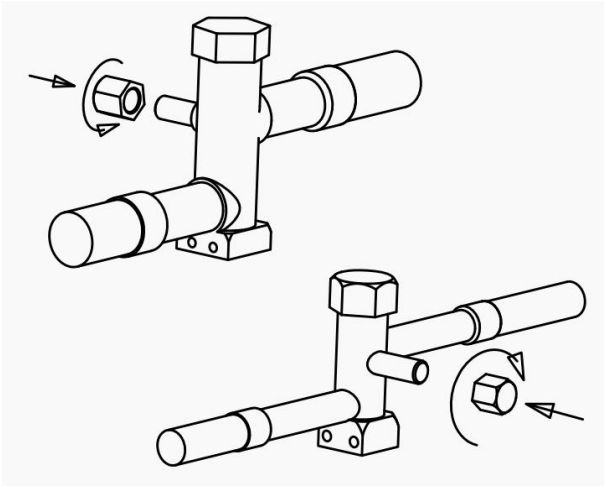
Continue the dry nitrogen purge. Do not remove the wet rag until all brazing is completed.

**Important:** Remove the wet rag before stopping the dry nitrogen purge.

**Note:** Install drier in Liquid Line.



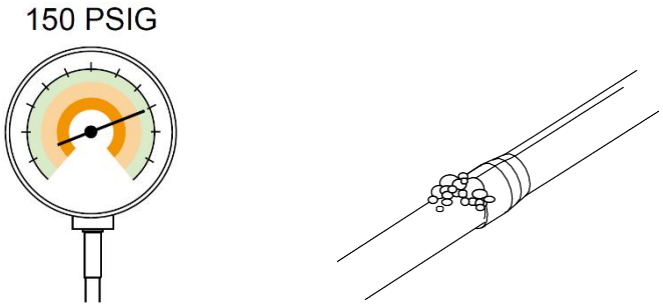

5.Replace the pressure tap caps after the service valves have cooled.



## 8.Refrigerant Line Leakage Check

Pressurize the refrigerant lines and evaporator coil to 150 PSIG using dry nitrogen.

Check for leaks by using a soapy solution or bubbles at each brazed location.




## 9.Vacuum Drying

Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation. Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.

Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

The ultimate vacuum degree of vacuum pump shall be -756mmHg or above. Precision of vacuum pump shall reach 0.02mmHg or above.

## 10.Service Valves

**Warning: Moderate to severe burns**

When opening the liquid line service valve, be extra careful. Turn counterclockwise until the valve stem just touches the hem. No torque is required. Failure to observe this warning will result in sudden release of system pressure, and may result in personal injury and/or property damage.

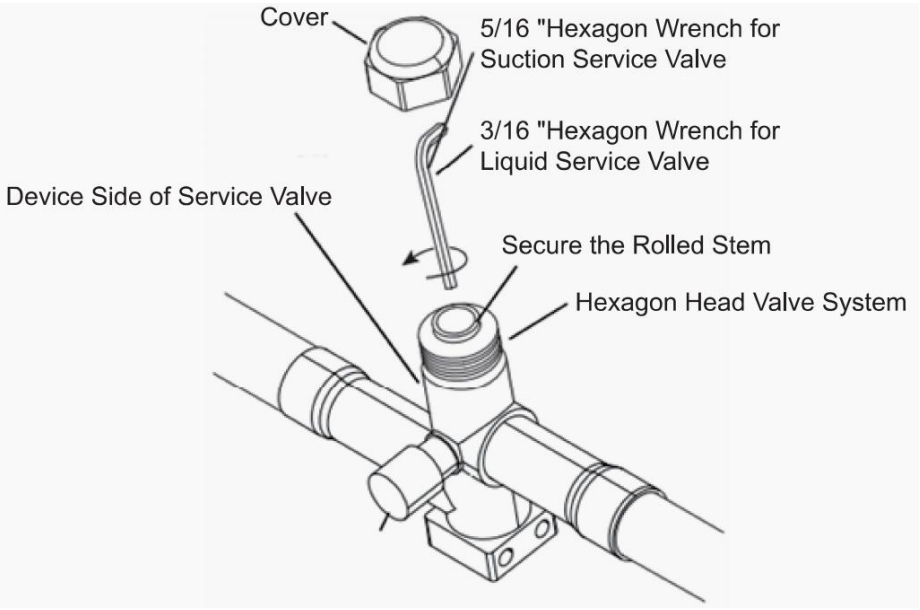
**Important:** Before opening the service valve, the leakage inspection and evacuation must be completed. The valve of copper welded pipe installation should be used for leakage inspection and vacuum pumping. The use of a separate suction port in this process will lead to refrigerant loss.

1.Remove service valve cap.

2.Fully insert hex wrench into the stem and back out counterclockwise until valve stem just touches the rolled edge.

3.Replace the valve stem cap to prevent leaks. Tighten finger tight plus an additional 1/6 turn.

4.Repeat STEPS 1 - 3 for Liquid Service Valve.



# 11.System Refrigerant Charging Regulation

## 11.1 Refrigerant Charging: Weighing Method

Use weigh-in method the initial installation, or anytime a system charge is being replaced. Weigh-in method can also be used when power is not available to the equipment site or operating conditions(indoor/outdoor temperatures) are not in range to verify with the subcooling charging method.

The factory charge in the outdoor unit is sufficient for 25 feet of standard size interconnecting liquid line. Additional 0.32 oz/ft refrigerant is needed when length of line set is more than 25 feet.

After completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging. The minimum test pressure for the system shall be the low side design pressure (See nameplate for detail).

**New installation-Calculate the charging amount of connecting pipes larger than 25 ft.**

1. Total length of pipeline (ft) = _____(a)
2. Standard piping setup (ft) =25 (b)
3. (a) minus (b) = _____ (c)
4. Refrigerant multiplier =0.32 oz/ft (d)
5. Additional refrigerant quantity (c*d) = _____(e)*

* If the line set is less than 25 feet, e=0

**Sealed-System Repairs-Calculating total system charge.**

1. Total length of pipeline (ft) = _____(a)
2. Standard piping setup (ft) =25 (b)
3. (a) minus (b) = _____ (c)
4. Refrigerant multiplier = 0.32 oz/ft (d)
5. Additional refrigerant quantity (c*d)= _____(e) *
6. Factory filling quantity (nameplate)= _____(f)
7. Total system charge (e +f) = _____

* If the line set is less than 25 feet, e =0

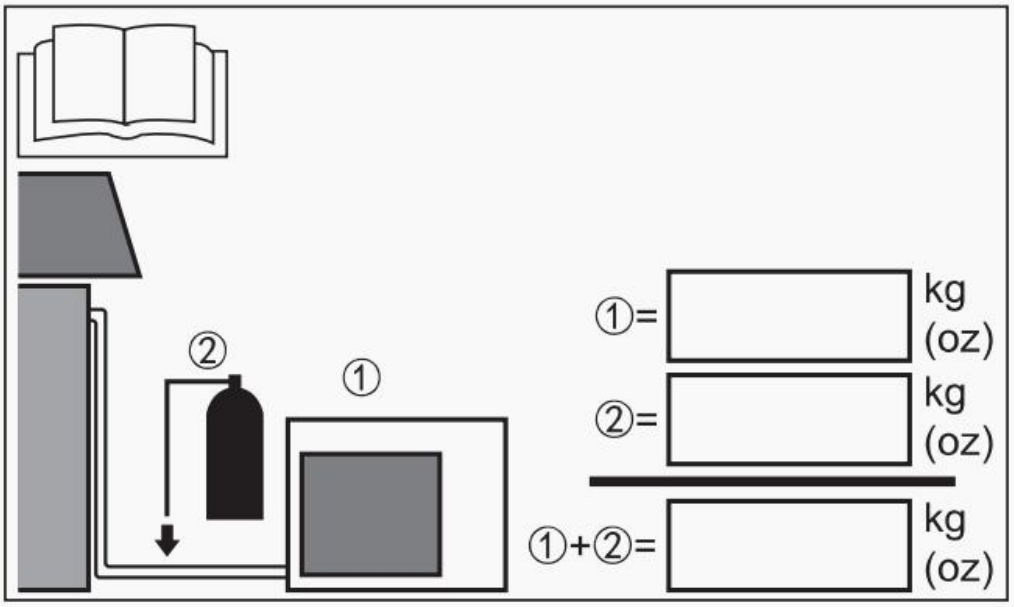
**WARNING**

The only mode approved for verifying system charging is in "forced cooling mode". The outdoor temperature must be between 68°F and 113°F, and the indoor temperature should be between 68°F and 89°F.

You can refer to the above formula for calculation, or you can choose the appropriate refrigerant addition according to the piping length.

**Additional Refrigerant Guidelines**

| Piping length (ft) | Additional charge (oz) |
|---|---|
| 25.0 | 0.00 |
| 50.0 | 8.00 |
| 75.0 | 16.00 |
| 100.0 | 24.00 |
| 125.0 | 32.00 |
| 150.0 | 40.00 |




**Example 1 REFRIGERANT CHARGE of the precharged part of the appliance**
**Example 2 REFRIGERANT CHARGE added during installation**

### 11.2 Subcooling Charging and Refrigerant Adjustment in Cooling Mode

1. Check the outdoor ambient temperature.

Subcooling (cooling mode) is the only recommended charging method when the outdoor ambient temperature is higher than 68°F.

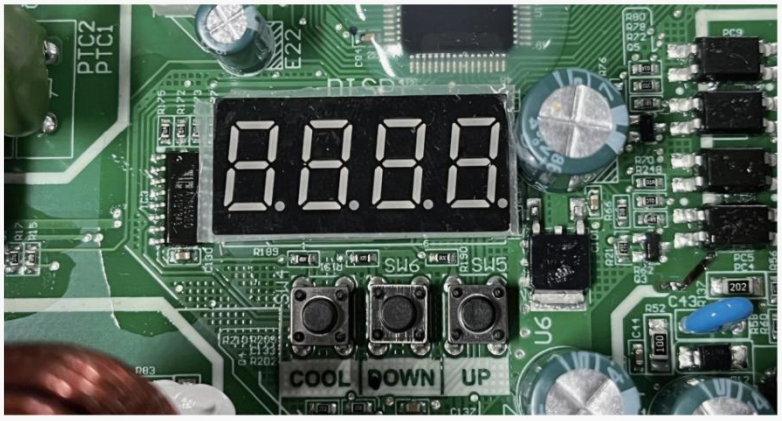
For outdoor ambient temperature below 68°F, use the weighing charging method.

**WARNING**

When the outdoor ambient temperature is higher than 68℉, be sure to return in spring or summer, so as to accurately charge the system in cooling mode.

Subcooling Method

1. Check the ambient temperature. Subcooling method (cooling mode) is only for outdoor temperature between 68℉ and 113 ℉, and indoor temperature between 68℉ and 113℉. For temperature out of the range, use the weigh-in method mentioned above.
2. Start "forced cooling" mode. Start the system in cooling mode, briefly press "COOL" button until the symbol "dC" displayed. Once enter "forced cooling mode", symbol "dC" and the current frequency will be displayed in digital display. "Forced cooling" mode will automatically exit after 60 minutes or briefly press the "COOL" quit "forced cooling" mode manually.




briefly press “COOL” till “dC” displayed to start/quit “forced cooling” mode

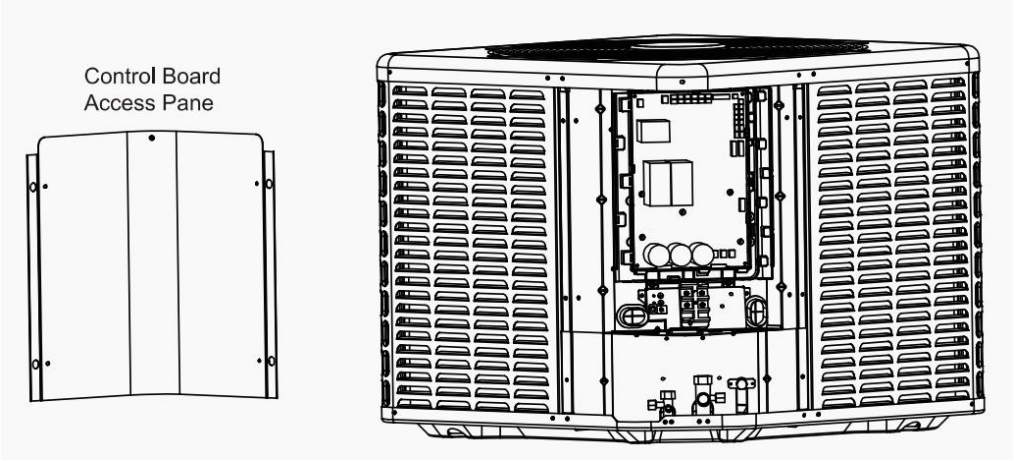
3. Wait until the system is stable. Wait for twenty (20) minutes after "forced cooling" mode started. Compressor will maintain a specific frequency in "forced cooling" mode.
4. Calculate subcooling value. Calculate subcooling value with measured liquid line temperature and pressure. lf calculated subcooling value is lower than the design subcooling value, refrigerant should be added. lf calculated subcooling value is higher than the value, refrigerant should be recovered.
5. Adjust refrigerant. Connect service tools to unit and adjust refrigerant according to analysis in step 4.
6. Wait for stabilization of system. Wait for 5 minutes and repeat steps 4 through 5 until the subcooling value matches the design subcooling value.
7. Recover normal state. Remove service tools, briefly press "COOL" button to quit "forced cooling" mode. Symbol "dC" should disappear when "forced cooling" mode quitted.

| Liquid Line Temp (°F) | Subcooling Value(°F) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | Liquid Gauge Pressure (PSI) | | | | | | | | |
| 55 | 174 | 177 | 180 | 183 | 186 | 189 | 192 | 195 | 198 |
| 60 | 189 | 192 | 195 | 198 | 201 | 204 | 207 | 211 | 214 |
| 65 | 204 | 207 | 211 | 214 | 217 | 221 | 224 | 227 | 231 |
| 70 | 221 | 224 | 227 | 231 | 234 | 238 | 241 | 245 | 249 |
| 75 | 238 | 241 | 245 | 249 | 252 | 256 | 260 | 264 | 268 |
| 80 | 256 | 260 | 264 | 268 | 272 | 276 | 280 | 284 | 288 |
| 85 | 276 | 280 | 284 | 288 | 292 | 296 | 300 | 305 | 309 |
| 90 | 296 | 300 | 305 | 309 | 313 | 318 | 322 | 327 | 331 |
| 95 | 318 | 322 | 327 | 331 | 336 | 340 | 345 | 350 | 355 |
| 100 | 340 | 345 | 350 | 355 | 359 | 364 | 369 | 374 | 379 |
| 105 | 364 | 369 | 374 | 379 | 384 | 390 | 395 | 400 | 405 |
| 110 | 390 | 395 | 400 | 405 | 411 | 416 | 422 | 427 | 433 |
| 115 | 416 | 422 | 427 | 433 | 438 | 444 | 450 | 456 | 461 |
| 120 | 444 | 450 | 456 | 461 | 467 | 473 | 479 | 486 | 492 |
| 125 | 473 | 479 | 486 | 492 | 498 | 504 | 511 | 517 | 523 |

| Subcooling (°F) | | Ambient Remperature(°F) | | | |
|---|---|---|---|---|---|
| | | 68~77 | 77~86 | 86~95 | ＞95 |
| Model | 24K | 4±2 | 4±2 | 3±2 | 2±2 |
| | 36K | 4±2 | 4±2 | 3±2 | 2±2 |
| | 48K | 4±2 | 3±2 | 3±2 | 2±2 |
| | 60K | 4±2 | 3±2 | 3±2 | 2±2 |

## 12.Electrical Wiring

### 12.1Low Voltage Connection Diagram

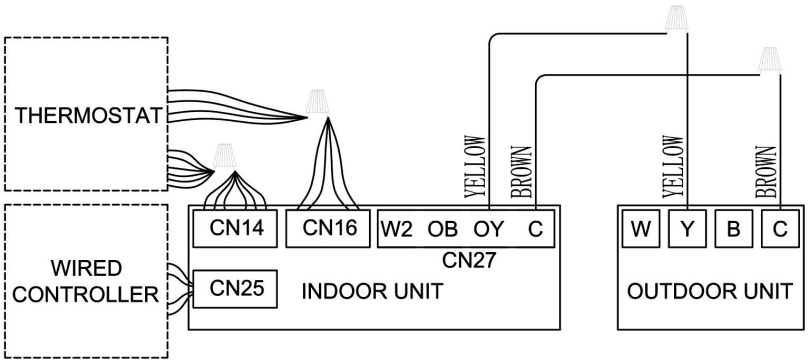



**Connection of Low Voltage Device**

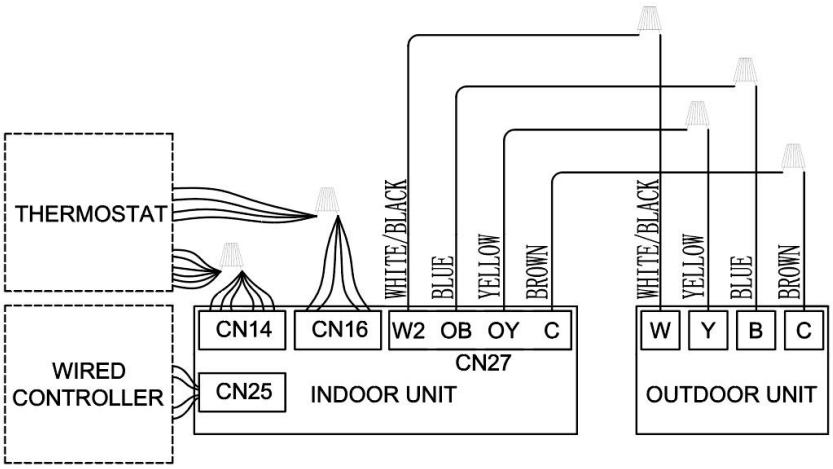
### 12.2Wiring Diagram of Thermostat

- Ensure that the power supply is consistent with the nameplate of the unit.
- The power connection and grounding of the unit must comply with local regulations.
- Scenes less than 100 feet in length should use 18 AWG colored low-voltage wires. 16 AWG wire shouldbe used for scenes with a length of more than 100 feet.
- "----"On-site installation of electrical auxiliary heat connection.
- W1: The first stage of motor heating installed in the indoor unit.
- W2: The second stage of electric heating or electric auxiliary heating installed in the indoor unit.
- The W signal of the outdoor unit is connected to the electric auxiliary heating.

**Note:**The dotted line in the following thermostat wiring diagram indicates optional wiring (wiring for passive dehumidification and/or electric heating). For the wiring of the thermostat, please refer to the user manual of the thermostat.
**Note:**The reversing valve is energized in heating mode and de-energized in cooling mode.

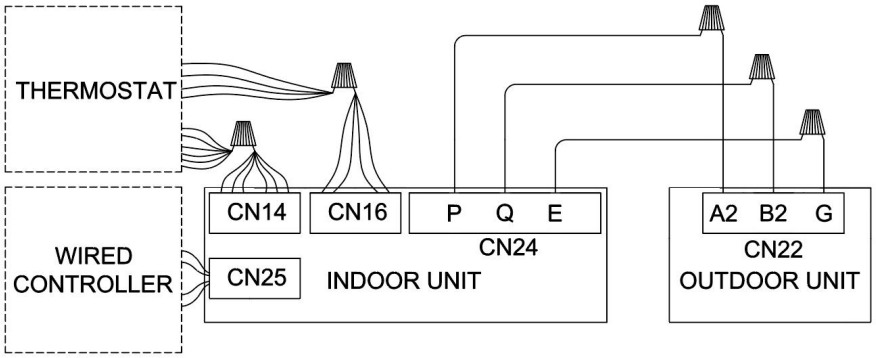



Control Wiring For AC Systems




Control Wiring For HP Systems

24V Communication Wiring




RS485 Communication Wiring(AC / HP)

## 12.3High Voltage Power Supply

**WARNING**

**Warning: Live electrical parts!**

● During the installation, testing, maintenance and troubleshooting of this product, it may be necessary to use live electrical parts. Failure to observe all electrical safety precautions when exposed to live electrical parts may result in death or serious injury.

The high-voltage power supply must match the nameplate of the unit (208/230V, 1PH, 60Hz).

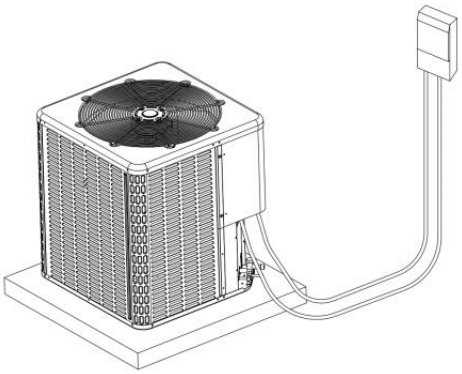
**WARNING**

Power supply wiring must comply with national, state and local regulations.

Follow the instructions of the unit wiring diagram located inside the access panel of the control box, and refer to the wiring diagram in this IOM.

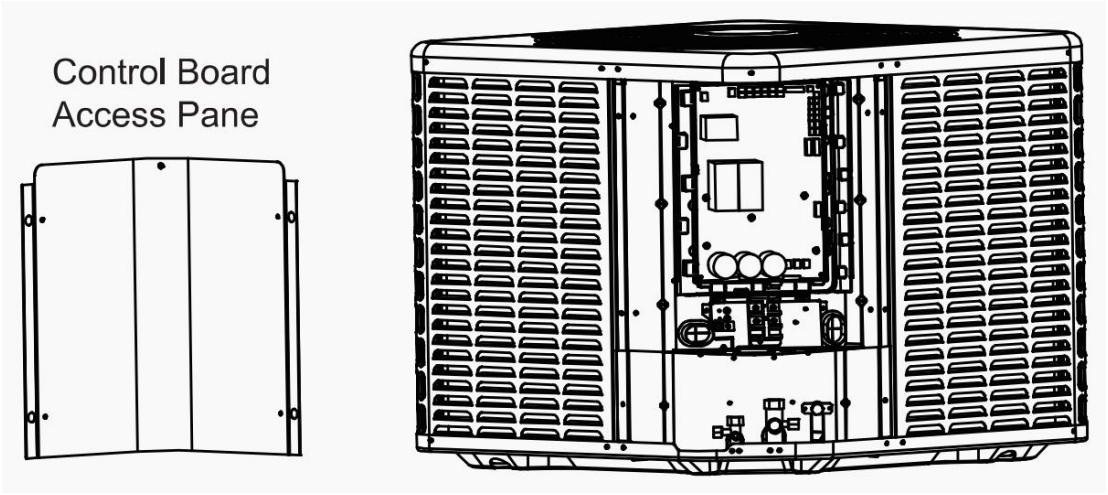
## 12.4High Voltage Disconnect Switch

Install a separate disconnect switch on the outdoor unit.
High-voltage wiring must use flexible electrical conduit supplied on site.



## 12.5High Voltage Grounding

Ground the outdoor unit according to the requirements of national, state and local regulations.




**Electric wiring gauge**

| Model | | | 24K | 36K | 48K | 60K |
|---|---|---|---|---|---|---|
| Line Gauge | Indoor Unit Power Line | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 16 | 16 | 16 | 16 |
| | Outdoor Unit Power Line | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 14 | 14 | 10 | 10 |

# Part 4
# Indoor Unit Installation

# 1. Safety

## 1.1 Symbol Keywords

| | | |
|---|---|---|
|  | WARNING | The warnings in this document are identified by warning triangles printed on a black background. The keyword at the beginning of the warning indicates the type and severity of the risk if no measures are taken to prevent it. |

**The following keywords are defined and used in this document:**

| | | |
|---|---|---|
| ▶ | Dangerous | Means a hazardous situation, which, if not avoided, will lead to death or serious injury. |
| ▶ | Warning | Indicates a hazardous situation, which may lead to death or serious injury if not avoided. |
| ▶ | Caution | Indicates a hazardous situation, which may cause mild to moderate injury if not avoided. |
| ▶ | Note | Used to deal with behaviors unrelated to personal injury. |

**Important Information**

| | |
|---|---|
|  | This symbol represents important information that is not harmful to people or property. |

## 1.2 Safety Precautions

**Please read before proceeding**

Warning:

- The unit must be installed by qualified personnel with a capability certificated for handling R32 refrigerant. Refer to regulation and laws in use on installation location.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- The appliance shall be installed in accordance with national wiring regulations.
- Children should be supervised to ensure that they do not play with the appliance.
- The minimum clearance to combustible surfaces (curtains,blinds,etc.) from the appliance should be 300 mm.
- Leak detection system installed. Unit must be powered except for service
- Before accessing the connection terminals, all power circuits must be disconnected.
- Please read these instructions carefully before attempting to install or operate. Failure to follow these instructions may result in incorrect installation, adjustment, repair or maintenance, which may result in fire, electric shock, property damage, personal injury or death.
- Installation, service, maintenance and repair of this unit must be performed by a certified technician.
- Servicing shall be performed only as recommended by the manufacturer.
- Product uninstallation and recycling must be performed by a certified technician.
- Keep any required ventilation openings clear of obstruction.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).

**QUALIFICATION OF WORKERS**

The installation and servicing of this equipment must be performed by qualified, experienced technicians only. Professional installation personnel should have the following experience:

- Installing the electric heater;
- Opening of sealed components;
- Opening of ventilated enclosures;
- Commissioning and troubleshooting;
- Checking the electric control part and wiring;
- Breaking into the refrigerant circuit and charging.

This document is property of customer and should be kept together with this equipment.

These instructions do not cover all the different variations of the system, nor do they provide all the unexpected situations that may be encountered during the installation process.

The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are AHRI rated only with TXV indoor systems. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

## Warning: Fire, electric shock, property damage, personal injury or death

- The whole installation process must comply with NATIONAL, STATE AND LOCAL CODES. If you need more information, please contact your local dealer.
- Dispose of properly in accordance with federal or local regulations . Flammable refrigerant used.
- Risk of fire due to flammable refrigerant used . Follow handling instructions carefully in compliance with national regulations

## Warning: Risk of electric shock

- Can cause injury or death. disconnect all remote electric power supplies before servicing. More than one disconnect switch may be required to cut off the power of the equipment. Dangerous voltage can cause serious personal injury or death.

## Warning: Electric shock

- If the fan assembly needs to be dismantled, all disconnect switches supplying power to the equipment must be powered off and locked (if the device cannot be seen), so that the field power cord can be safely dismantled from the fan assembly. Otherwise, it may cause electric shock, personal injury or death.

## Warning: Fire, electric shock, property damage, personal injury or death

- Flammable refrigerant used . Consult repair manual/owner's guide before attempting to service this product . All safety precautions must be followed.
- Due to possible equipment damage or personal injury, installation, repair and maintenance should be carried out by trained qualified maintenance personnel. Consumers are advised to only clean/replace the filter screen. Do not operate the equipment with the access panel removed.

## Warning:

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

| | | |
|---|---|---|
| A2L | **WARNING** | This symbol that this appliance used a flammable refrigerant . If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire. |
| | **CAUTION** | This symbol that the operation manual should be read carefully. |
| | **CAUTION** | This symbol that a service personnel should be handling this equipment with reference to the installation manual. |
| | **CAUTION** | This symbol that information is available such as the operating manual or installation manual. |

## Warning:

- This product may expose you to chemicals including lead and lead components, which are known to cause cancer, birth defects or other reproductive harm in California. For more information, please visit www.P65Warnings.ca.gov.

## Warning: Electric shock

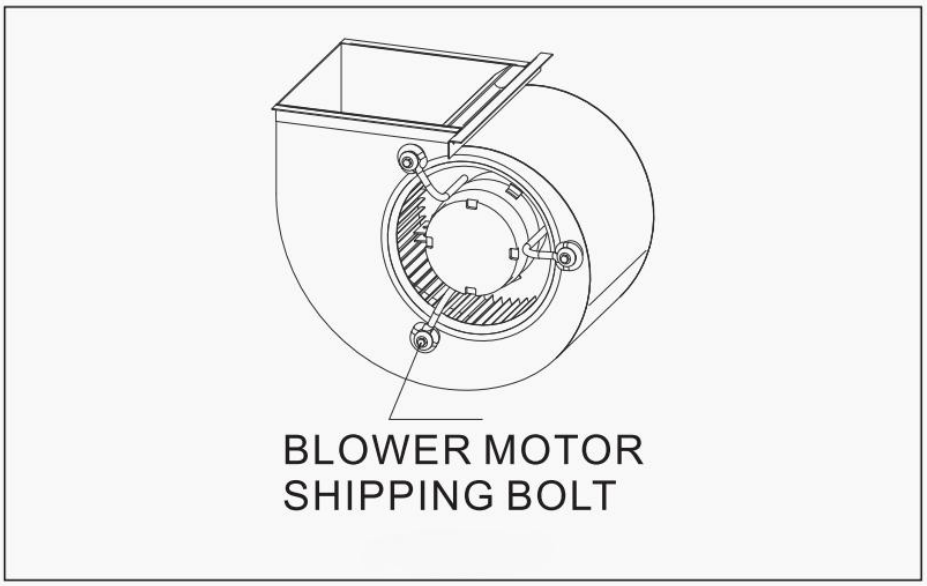
- The device must be permanently grounded. Otherwise, it will cause electric shock, personal injury or death.

## Note: Fire risk

- The product is only used for one or two residences.
- The materials of pressure ventilation system and piping system must meet the latest NFPA 90B standard.

## Note:

- Make sure the fan bracket is fastened (3 motor mounting bolts - Figure 1.1). Then, before operating the device, check whether the wheels are firmly fixed on the motor shaft.



## 1.3 Safety precautions for R32 refrigerant

1.1 Checks to the area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimised.

1.2 Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

1.3 General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

1.4 Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.

1.5 Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or $CO_2$ fire extinguisher adjacent to the charging area.

1.6 No ignition sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

1.7 Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

1.8 Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- *the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;*
- *the ventilation machinery and outlets are operating adequately and are not obstructed;*
- *if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;*
- *marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;*

– *refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.*

1.9 Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised. Initial safety checks shall include:

- that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

**2. Repairs to sealed components**

Sealed electrical components shall be replaced.

**3. Repair to intrinsically safe components**

Intrinsically safe components must be replaced.

**4. Cabling**

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

**5. Detection of flammable refrigerants**

Under no circumstances shall potential sources of ignition be used in the searching for or detection ofrefrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containingchlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
If a leak is suspected, all naked flames shall be removed/extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
Removal of refrigerant shall be according to **Removal and evacuation.**

**6. Removal and evacuation**

When breaking into the refrigerant circuit to make repairs – or for any other purpose –conventional

procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

**7. Charging procedures**

In addition to conventional charging procedures, the following requirements shall be followed.
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The systemshall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall becarried out prior to leaving the site.

**8. Decommissioning**

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure, ensure that:
- mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- all personal protective equipment is available and being used correctly;
- the recovery process is supervised at all times by a competent person;
- recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.
e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts ofthe system.
f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in accordance with instructions.
h) Do not overfill cylinders (no more than 80 % volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has beencleaned and checked.

**9. Labelling**

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

**10. Recovery**

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

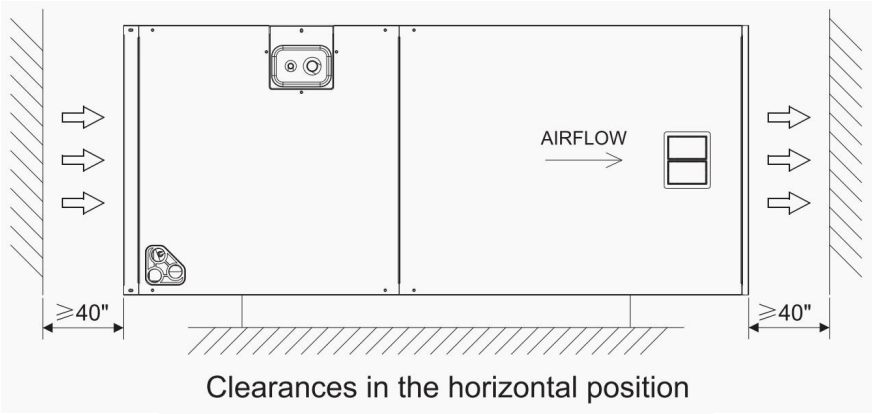
The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

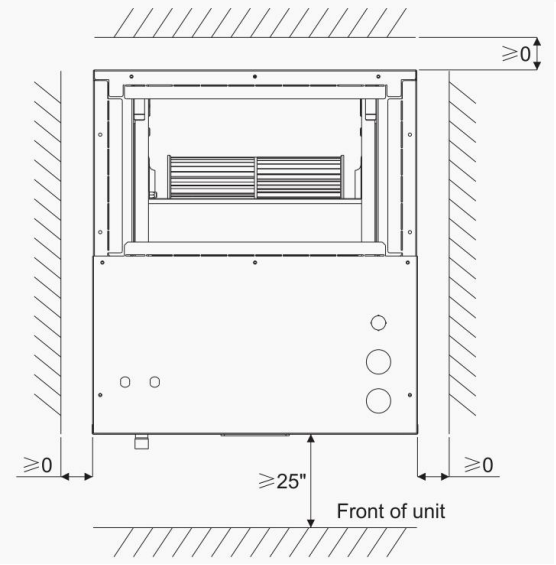
If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

## 1.4 General

The device can return air at the bottom at the upward airflow position, return air from left to right at the horizontal position and return air at the top at the downward airflow position.
This air handler provides the flexibility to be installed in any upward, downward or horizontal airflow application. According to the airflow performance table, adjust the fan speed through the DIP switch (located on the control panel of the air handler) to select the correct air volume. Please refer to the wiring diagram of Dip switch settings.
To ensure proper installation, please choose a firm and flat site. Make sure enough clearance is reserved for installation and maintenance.



Clearances in the horizontal position




**Note：** the installed device must have the required clearance. Failure to follow these instructions may result in equipment damage and/or premature equipment failure.

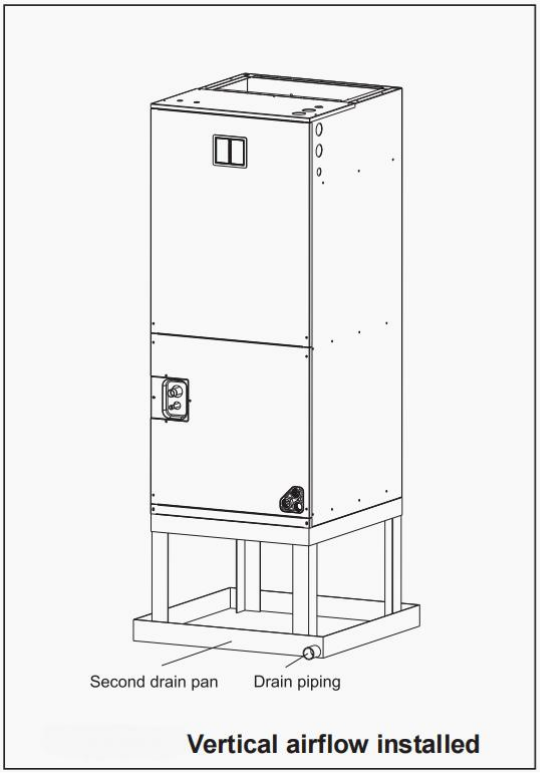
**Warning：Fire risk**

Keep flammable materials and vapors (such as gasoline) away from air handlers. Failure to follow these instructions may result in death, explosion or fire.

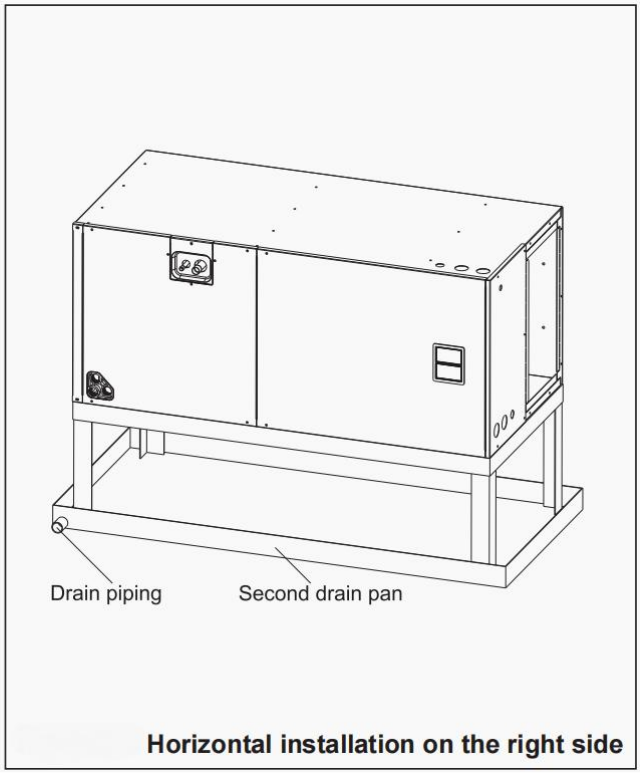
**Installation in High Humidity Environment**

When the unit is installed in a hot and humid place, if the temperature in the installation space exceeds 86 ℉ and the RH (relative humidity) exceeds 80%, it is recommended to insulate the outside of the cabinet. Use glass wool or polyethylene foam as insulation material; The thickness should be greater than 2 inches, and it must be suitable for the installation space opening. Condensate may also be produced on the insulation surface. Ensure that insulation materials designed for HVAC systems are used. In the process of refrigeration, condensate may be produced on the surface. It is also recommended to use an auxiliary drain pan and fix the equipment firmly to prevent it from falling.

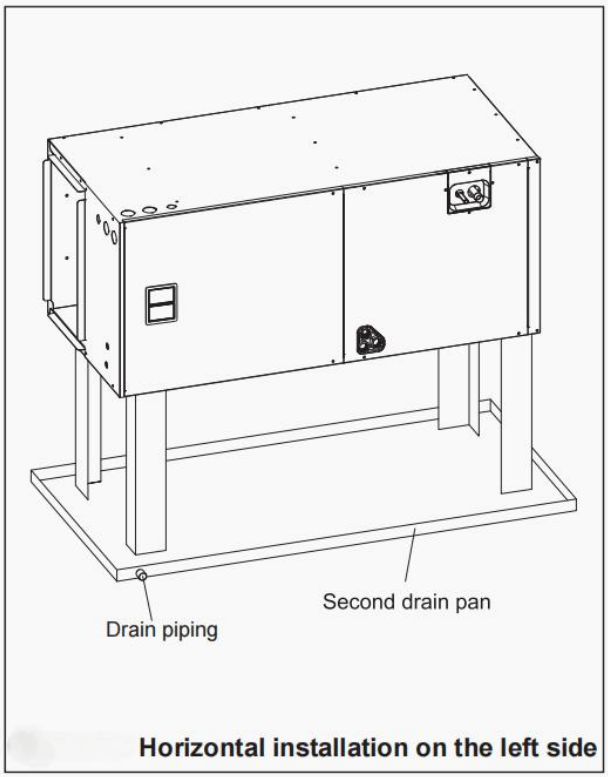
**Note：** For the use of auxiliary drainage tray, please refer to local regulations.



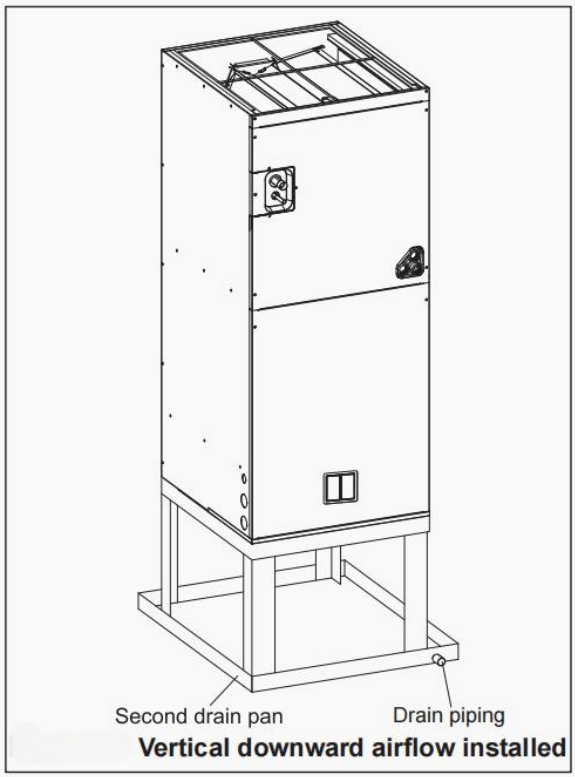

**Vertical airflow installed**



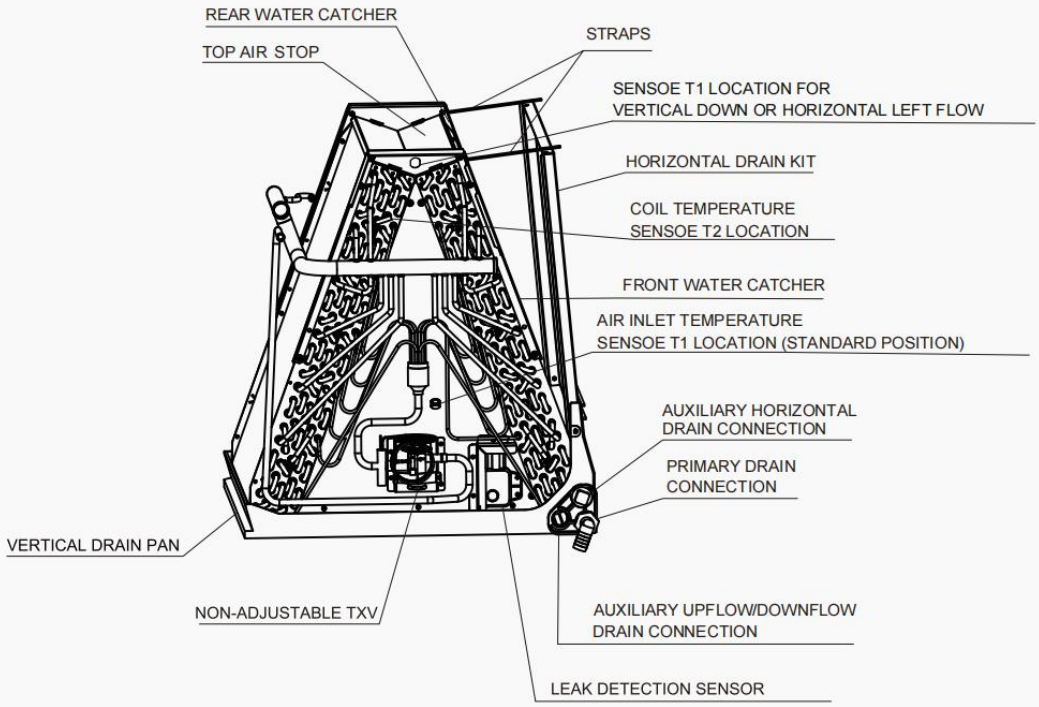

**Horizontal installation on the right side**




**Horizontal installation on the left side**




**Vertical downward airflow installed**


REAR WATER CATCHER
TOP AIR STOP
STRAPS
SENSOE T1 LOCATION FOR
VERTICAL DOWN OR HORIZONTAL LEFT FLOW
HORIZONTAL DRAIN KIT
COIL TEMPERATURE
SENSOE T2 LOCATION
FRONT WATER CATCHER
AIR INLET TEMPERATURE
SENSOE T1 LOCATION (STANDARD POSITION)
AUXILIARY HORIZONTAL
DRAIN CONNECTION
PRIMARY DRAIN
CONNECTION
VERTICAL DRAIN PAN
NON-ADJUSTABLE TXV
AUXILIARY UPFLOW/DOWNFLOW
DRAIN CONNECTION
LEAK DETECTION SENSOR

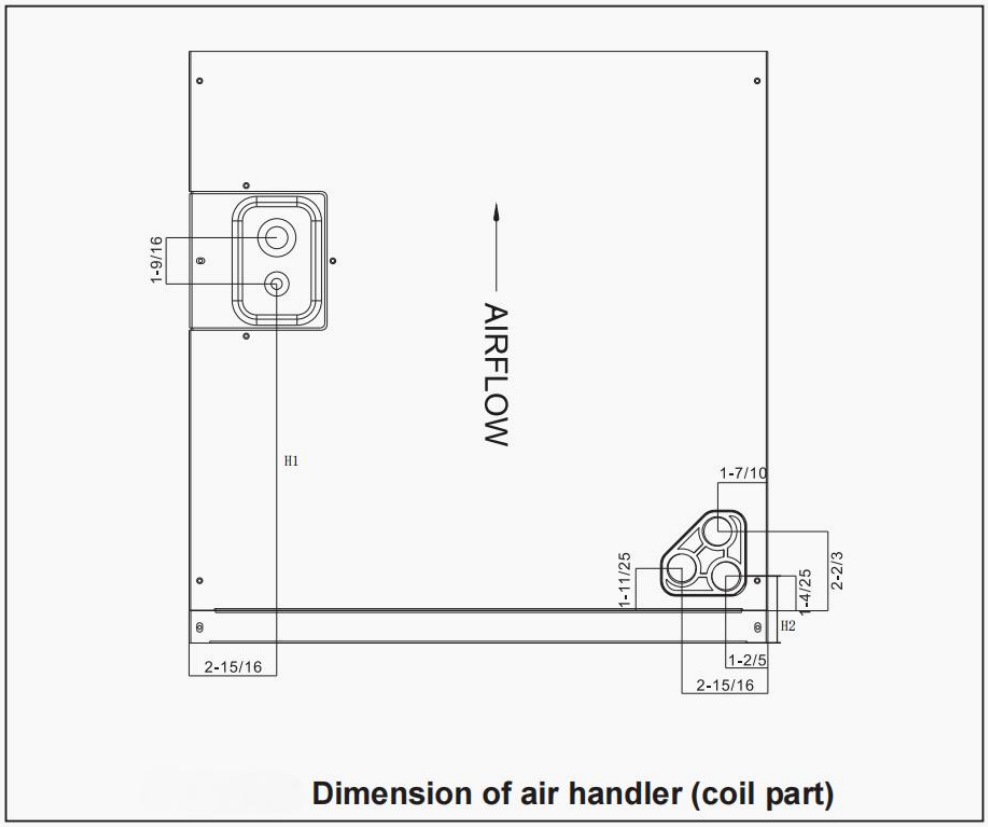
## 2.Applications

### 2.1Vertical Upflow

•The vertical upward airflow configuration is the factory default configuration of all models.

If the return air is to be ducted, the duct should be installed flush with the ground. Use 1/8 to 1/4 inch thick fireproof elastic gasket between ducts, unit and floor.

**Note：** Torque applied to the drainage connection should not exceed 15 foot-pounds. For vertical upward air flow and horizontal right installation, dimensions of pipe and drain pipe can be found in blow.



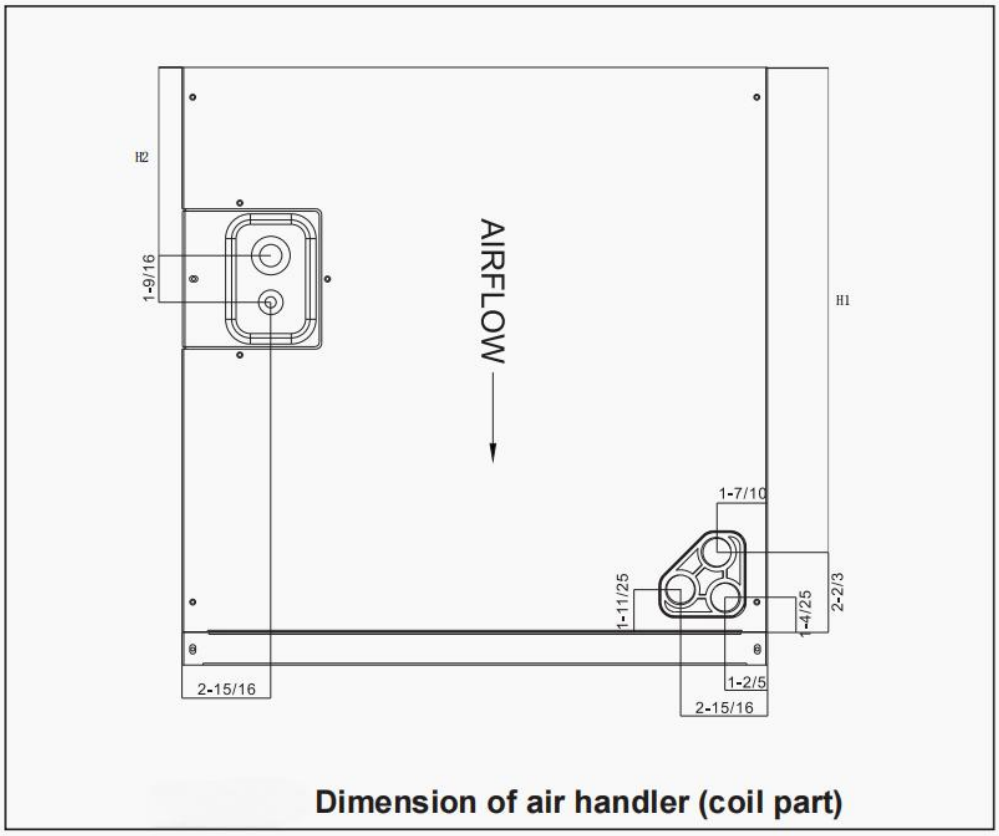

Dimension of air handler (coil part)

| Model | "H1" inch [mm] | "H2" inch [mm] |
|---|---|---|
| 24K/36K | 12-1/4 [311] | 2-1/4[57] |
| 48K/60K | 19[483] | 1-25/32[45] |

## 2.2Vertical Downflow

**Convert to Vertical Downward airflow Position:**

The vertical upward airflow position can be converted into the vertical downward airflow position.Remove the coil (evaporator) access panel and coil, and reinstall it by rotating 180 ° from the original position.




Dimension of air handler (coil part)

| Model | "H1" inch [mm] | "H2" inch [mm] |
|---|---|---|
| 24K/36K | 17-11/16 [449] | 7-9/16 [192] |
| 48K/60K | 21-11/16 [551] | 4-13/32 [112] |

## 2.3Horizontal

Horizontal right installation is the default factory configuration for all models.

**Switch to Horizontal Left Installation:**

•By removing the indoor coil assembly and reinstalling the coil, the vertical upflow position can be converted into a horizontal left position.

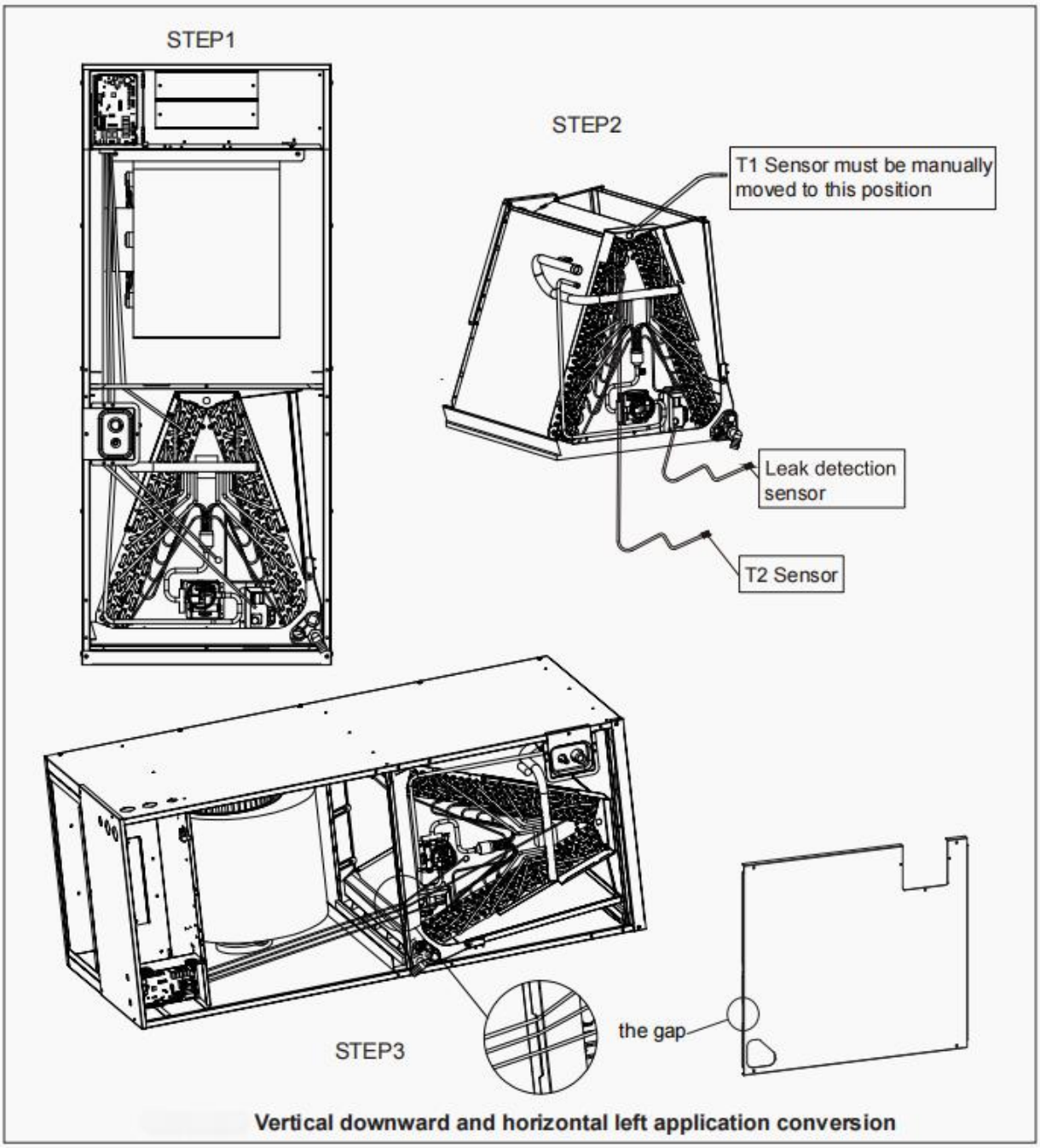
•Rotate the device by 90° to the horizontal left position, with the coil segment on the right and the blower segment on the left.

•Re-install the indoor coil by rotating 180° from the original position. Ensure that the fixing groove is fully engaged with the coil guide rail.

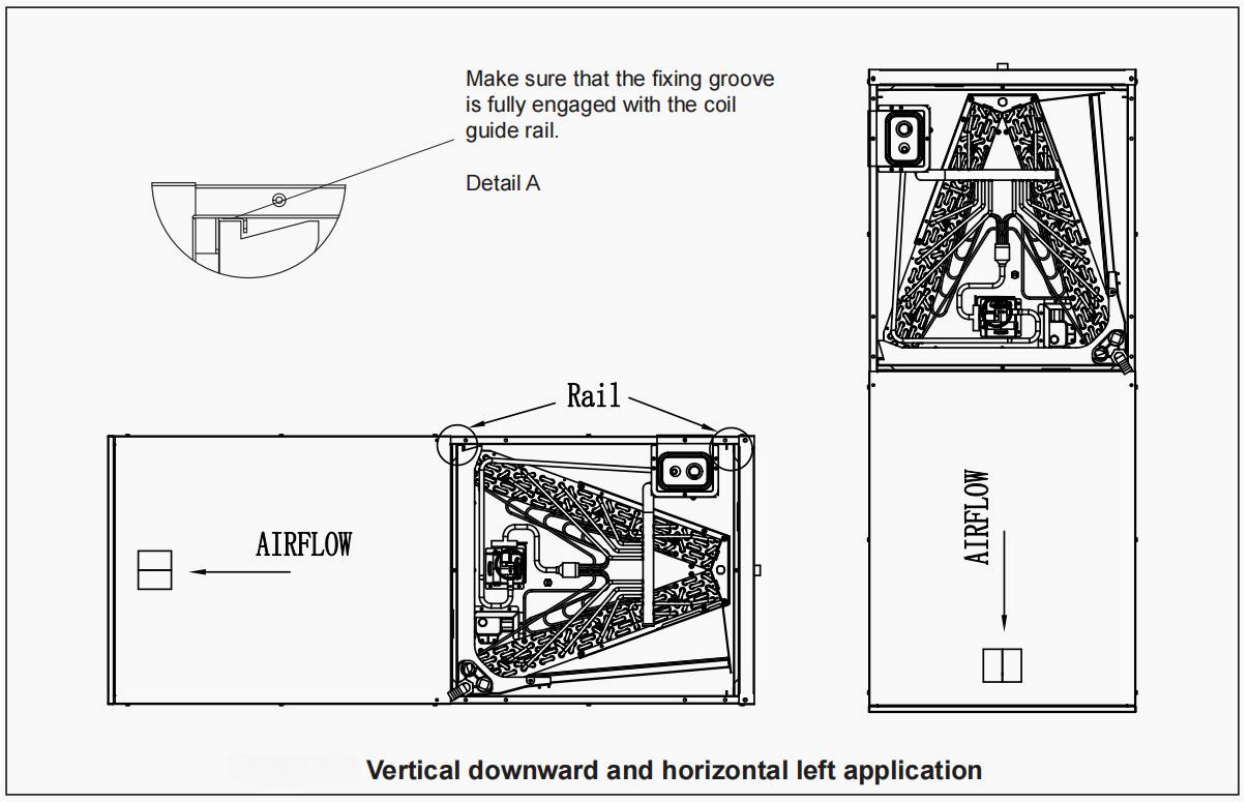
•When configured to be placed horizontally above the ceiling and/or living space, it is recommended to use an additional field supplied drain pan.

**Steps to Change Cabinet Direction to Vertical Downward or Horizontal Left Direction**

1. Remove the screws and the front panel, and disconnect the plug of T2 sensor and leak detection sensor wire from the circuit board.
2. Pull out the coil with sensor wire (do not disconnect T2 sensor and leak detection sensor from the coil).
3. Install the coil in the correct direction and fix it in place. Reinsert those sensor wire in PCBA through the gap on the cabinet cover.




Vertical downward and horizontal left application conversion




**Vertical downward and horizontal left application**

Note:

- Horizontal units must be configured for right hand air supply or left hand air supply. Horizontal drain pan must be located under indoor coil.
- Failure to use the drain pan will result in property damage.

**Horizontal Conversion:**

Remove the indoor coil and reinstall it by 180 ° from the original position. The horizontal right air outlet can be changed to the horizontal left air outlet.

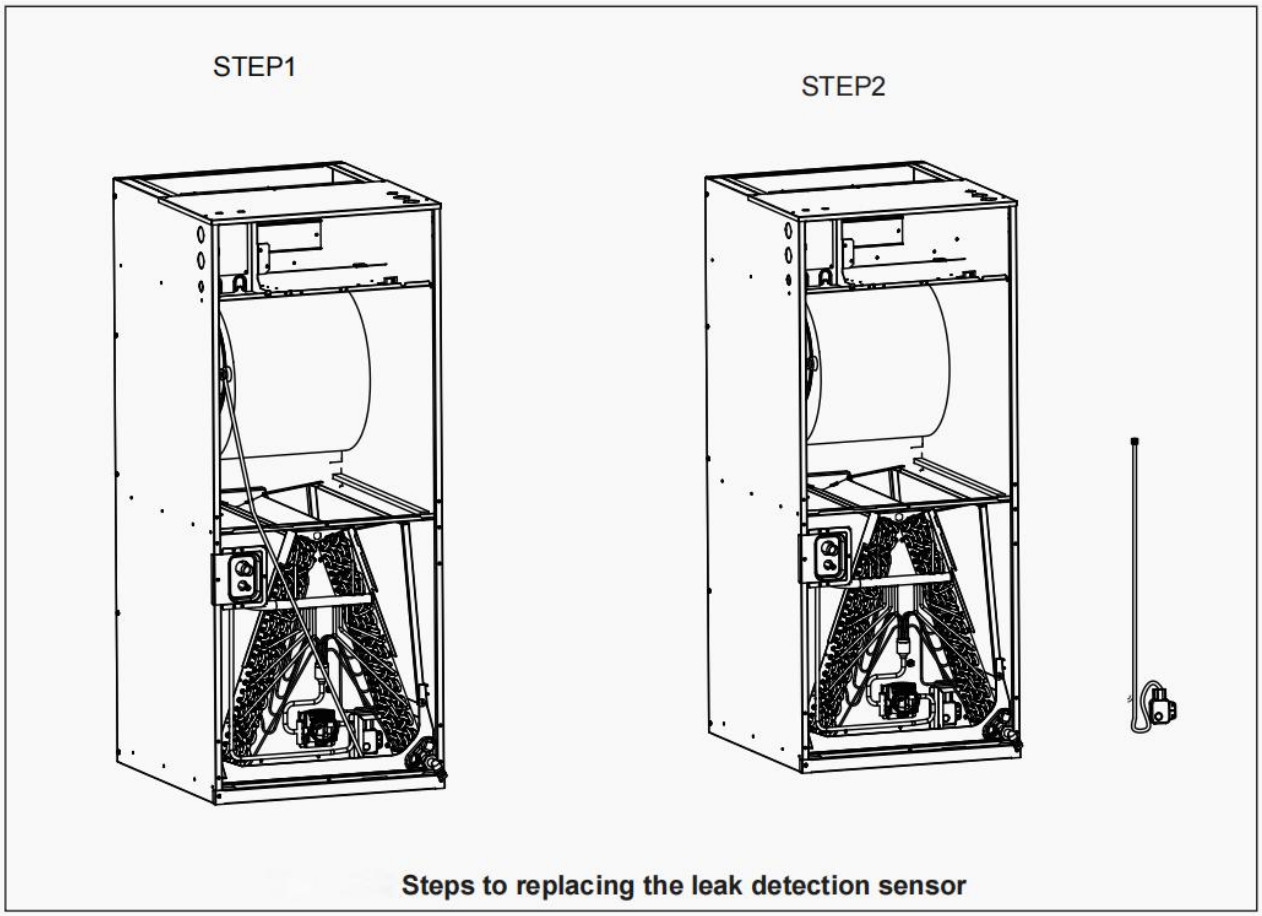
## 2.4Install in unconditioned space.

**Note:** There are two pairs of coil guide rails in the air handler, which are used for upward and downward air supply applications. lf the air handler is installed in an unconditioned space. two unused coil guide rails should be removed to minimize condensate on the surface of the air handler. Unscrew 6 mounting screws from both sides of the cabinet to easily remove the coil guide rail.

## 2.5Steps to replacing the leak detection sensor

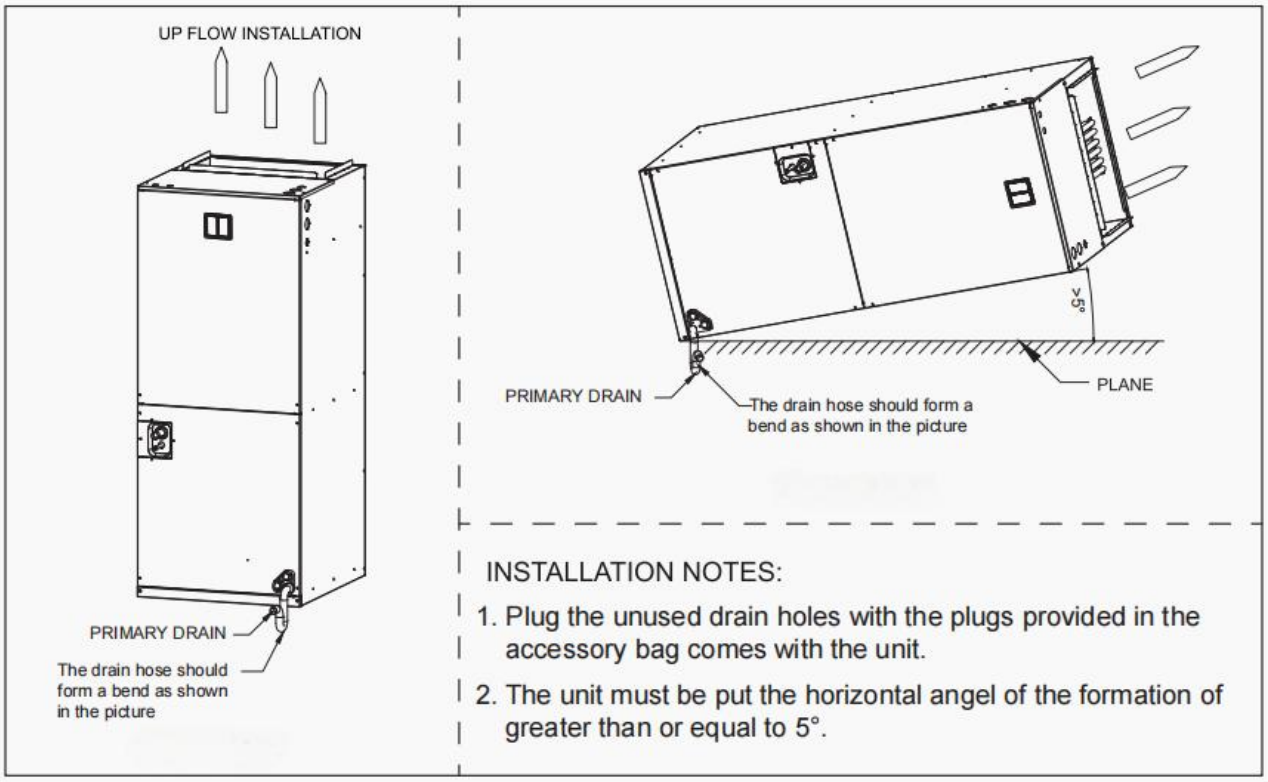
GENERAL SPECIFICATIONS Of LEAK DETECTION SENSOR:
MODEL: SGD-41S-D1-MI or ZRT510-R32
MINIMUM LIFETIME: 15 YEARS
It needs to be replaced with the same model. lf in doubt, please consult the manufacturer for assistance.

1. Remove the screws and the front panel, and disconnect the plug of leak detection sensor wire from the circuit board.
2. Remove the screws and pull out the leak detection sensor with the wire.
3. Replace the new leak detection sensor and screw it to the triangular plate, plug and tie the wires to the electronic control board in the same way as before. Install the access panels, make sure there is no outstanding gap to allow refrigerant escape in case of leakage.



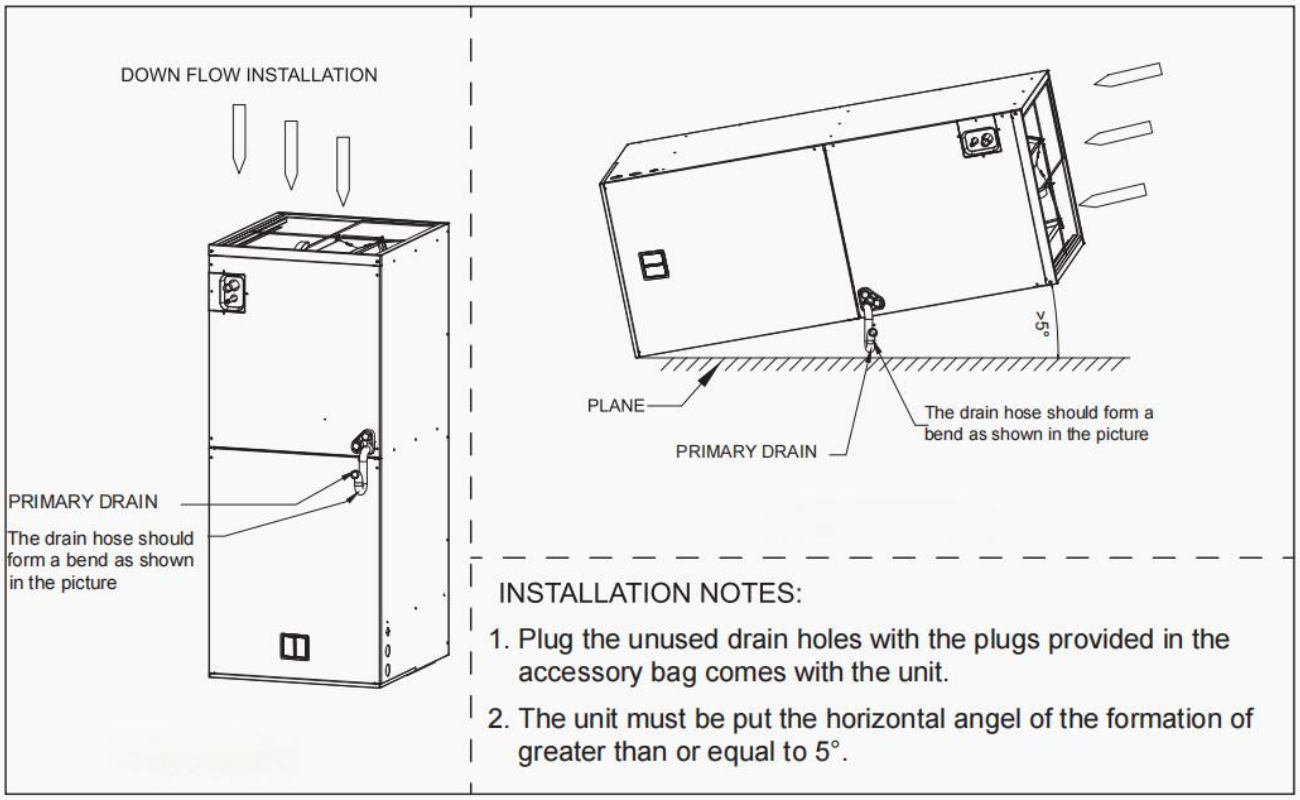

**Steps to replacing the leak detection sensor**

## 2.6Precautions for four-way installation




INSTALLATION NOTES:

1. Plug the unused drain holes with the plugs provided in the accessory bag comes with the unit.
2. The unit must be put the horizontal angel of the formation of greater than or equal to 5°.


DOWN FLOW INSTALLATION
PRIMARY DRAIN
The drain hose should form a bend as shown in the picture
PLANE
PRIMARY DRAIN
The drain hose should form a bend as shown in the picture
>5°
INSTALLATION NOTES:
1. Plug the unused drain holes with the plugs provided in the accessory bag comes with the unit.
2. The unit must be put the horizontal angel of the formation of greater than or equal to 5°.

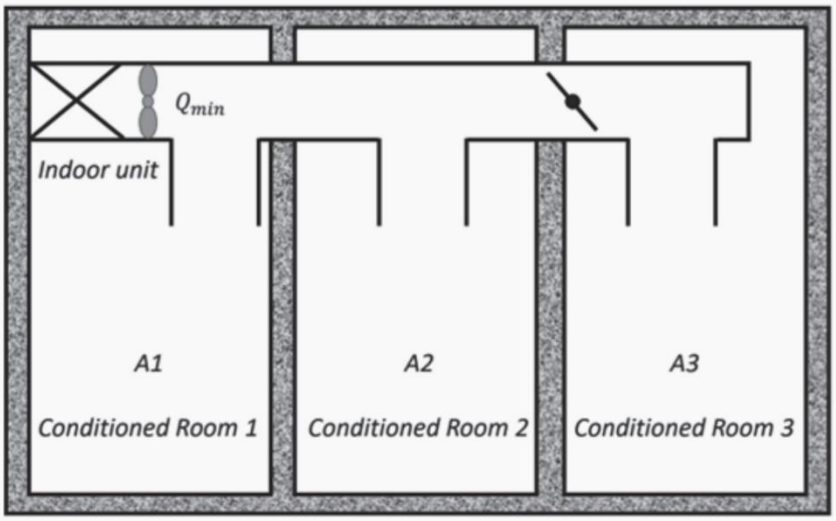
## 2.7Installation room size rules

Minimum room height, 2.2 m and 7.22 ft.

Minimum room area (operating or storage), 15.84 $m^2$ and 170.53 $ft^2$.

Note: For minimum room areas at higher installation heights, see instructions

Installation method:




Make sure that the applied room space area TA is larger than the TA min.

| 24K/36K | | | | | |
|---|---|---|---|---|---|
| Piping length (ft) | Refrigerant perfusion (oz / kg) | TAmin (m2) | TAmin (ft2) | Qmin^ ($m^3/h$) | Qmin ($m^3/h$) |
| 25 | 112.88 / 3.20 | 9.51 | 102.33 | 313.73 | 742.9 |
| 50 | 120.88 / 3.43 | 10.18 | 109.59 | 335.97 | 742.9 |
| 75 | 128.88 / 3.65 | 10.85 | 116.84 | 358.20 | 742.9 |
| 100 | 136.88 / 3.88 | 11.53 | 124.09 | 380.44 | 742.9 |
| 125 | 144.88 / 4.11 | 12.20 | 131.34 | 402.67 | 742.9 |
| 150 | 152.88 / 4.33 | 12.88 | 138.60 | 424.91 | 742.9 |
| 48K/60K | | | | | |
| Piping length (ft) | Refrigerant perfusion (oz / kg) | TAmin (m2) | TAmin (ft2) | Qmin^ ($m^3/h$) | Qmin ($m^3/h$) |
| 25 | 148.10 / 4.20 | 12.47 | 134.26 | 411.62 | 1319.2 |
| 50 | 156.10 / 4.43 | 13.15 | 141.52 | 433.86 | 1319.2 |
| 75 | 164.10 / 4.65 | 13.82 | 148.77 | 456.09 | 1319.2 |
| 100 | 172.10 / 4.88 | 14.49 | 156.02 | 478.33 | 1319.2 |
| 125 | 180.10 / 5.11 | 15.17 | 163.27 | 500.56 | 1319.2 |
| 150 | 188.10 / 5.33 | 15.84 | 170.53 | 522.80 | 1319.2 |
| Note:： TA=A1+A2+A3+…+An (If there is a damper in the duct. When damper is open, the room area TA is the sum of all room area connected by ductwork. If it is closed, TA is the sum of the room areas before the damper.) | | | | | |

Table:Minimum room area/ zone de chambre minimale

(e.g.: 36K Installation connection piping length of 25 feet and refrigerant charge of 112.88 oz results in an installation room area of not less than 102.36 sq. ft.)

## 3.Electrical Wiring

The wiring on site must comply with the National Electric Code (C.E.C. in Canada)and any applicable local regulations.

**Warning: Electric shock**

Before installation or maintenance, please disconnect all power supply of the device. More than one disconnect switch may be required to cut off the power of the equipment. Dangerous voltage can cause serious personal injury or death.

### 3.1Power Supply Wiring

It is important that proper electrical power is available for connection to the unit model being installed. See the unit nameplate, wiring diagram and electrical data in the installation instructions.

•If necessary, install a branch circuit breaker of sufficient size, which is located within sight and easy to install.

•**IMPORTANT:** When installing an electric heater, the device may be equipped with one or two 30-60 amp circuit breakers. These circuit breakers protect internal lines and act as disconnecting devices when short circuit occurs. The circuit breaker installed in the device does not provide overcurrent protection for the power connection, so its size may be larger than that of the branch circuit protection.

•The power supply line of the circuit must be a minimum 221°F copper conductor. For current carrying capacity, wire size and circuit protector requirements, please refer to electrical data in this section. The power supply protection device can be a fuse or a "HACR" type circuit breaker.

•High-voltage wires can pass through the tapping holes on the right, left or top of the device.

•"Three 7/8 ". 1-3/8" and 1-3/4"diameter tapped holes can be used to connect high-voltage wires to the device.

•The high-voltage wires must be connected to the red and black wires in the control part of the air handler.

### 3.2Control Wiring

**IMPORTANT:** The low-voltage control line should not run in the conduit together with the high-voltage line. Keep the distance between the two catheters according to local codes.

•Scenes less than 100 feet in length should use 18 AWG colored low-voltage wires. 16 AWG wire should be used for scenes with a length of more than 100 feet.

•See the connection position of low-voltage wires.

•For the correct wiring instructions, please refer to the wiring diagram located back side of the air handler blower access panel.

•After installation, make sure that the low-voltage and high-voltage wiring are kept separate.

### 3.3Grounding

**Danger: Electric shock**

The device must be permanently grounded. Otherwise, it will cause electric shock, personal injury or death.

•When installed according to existing electrical codes, grounding can be through wires or metal conductors.

•Grounding can also be achieved by connecting the grounding wire to the ground lug (ground lug) on the machine.

•When the power supply circuits are used, each circuit needs to be grounded plate separately.

•The grounding plate is located at the upper right of the cabinet.

### 3.4Electrical Data

| Model | Voltage | Hertz | HP | Fan speed | Circuit AMPS | RPM | MOP(A) |
|---|---|---|---|---|---|---|---|
| 24K | 208/230 | 60 | 1/2 | 5 | 4.5 | 960 | 6 |
| 36K | 208/230 | 60 | 1/2 | 5 | 4.5 | 1000 | 6 |
| 48K | 208/230 | 60 | 3/4 | 5 | 7.2 | 1010 | 10 |
| 60K | 208/230 | 60 | 3/4 | 5 | 7.2 | 1010 | 10 |

## 3.5MCA/MOP data of electric heat kit

**Applicable heat kits for AHU multi position installation**

| Heater Kit Model | Air Handler Model | Electric Heater (kW) | MCA (Min. Circuit Ampacity) | | MOP (Max. Fuse or Breaker (HACR) Ampacity) | | Fan Speed (AC/HP) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 208V | 230V | 208V | 230V | 1 | 2 | 3 | 4 | 5 |
| ZP-HR50-01 | 24k | 5 | 22.80 | 24.90 | 25 | 25 | ● | ● | ● | ● | ● |
| ZP-HR75-01 | | 7.5 | 34.80 | 37.90 | 35 | 40 | ● | ● | ● | ● | ● |
| ZP-HR100-01 | | 10 | 45.40 | 49.80 | 50 | 50 | ● | ● | ● | ● | ● |
| ZP-HR50-01 | 36k | 5 | 22.80 | 24.90 | 25 | 25 | ● | ● | ● | ● | ● |
| ZP-HR75-01 | | 7.5 | 34.80 | 37.90 | 35 | 40 | ● | ● | ● | ● | ● |
| ZP-HR100-01 | | 10 | 45.40 | 49.80 | 50 | 50 | ● | ● | ● | ● | ● |
| ZP-HR150-01 | | 15 | 34.8/34.8 | 37.9/37.9 | 35/35 | 40/40 | × | ● | ● | ● | ● |
| ZP-HR50-01 | 48k | 5 | 22.80 | 24.90 | 25 | 25 | × | ● | ● | ● | ● |
| ZP-HR75-01 | | 7.5 | 34.80 | 37.90 | 35 | 40 | × | ● | ● | ● | ● |
| ZP-HR100-01 | | 10 | 45.40 | 49.80 | 50 | 50 | × | ● | ● | ● | ● |
| ZP-HR150-01 | | 15 | 34.8/34.8 | 37.9/37.9 | 35/35 | 40/40 | × | ● | ● | ● | ● |
| ZP-HR200-01 | | 20 | 45.4/45.4 | 49.8/49.8 | 50/50 | 50/50 | × | ● | ● | ● | ● |
| ZP-HR50-01 | 60k | 5 | 22.8 | 24.9 | 25 | 25 | × | × | × | ● | ● |
| ZP-HR75-01 | | 7.5 | 34.8 | 37.9 | 35 | 40 | × | × | × | ● | ● |
| ZP-HR100-01 | | 10 | 45.4 | 49.8 | 50 | 50 | × | × | × | ● | ● |
| ZP-HR150-01 | | 15 | 34.8/34.8 | 37.9/37.9 | 35/35 | 40/40 | × | × | × | ● | ● |
| ZP-HR200-01 | | 20 | 45.4/45.4 | 49.8/49.8 | 50/50 | 50/50 | × | × | × | ● | ● |

•Heat kit applicable for AHU 4-way position installation.

•Ampacities for MCA and Fuse/breaker including the blower motor.

•The heat pump system needs specific airflow. Each ton of cooling requires 350 to 450 cubic feet (CFM) of air per minute, or nominally 400 CFM.

**Heater Kit Accessories**

| Model | Description | 24 | 36 | 48 | 60 |
|---|---|---|---|---|---|
| ZP-HR50-01 | 5 kW heating kit, double-pole circuit breaker | ● | ● | ● | ● |
| ZP-HR75-01 | 7.5 kW heating kit, double-pole circuit breaker | ● | ● | ● | ● |
| ZP-HR100-01 | 10 kW heating kit, double-pole circuit breaker | ● | ● | ● | ● |
| ZP-HR150-01 | 15kW heating kit, double pole circuit breaker | × | ● | ● | ● |
| ZP-HR200-01 | 20 kW heating kit, double pole circuit breaker | × | × | ● | ● |

•Indicates availability,and x indicates unavailability.

**Warning:**

•The electric heating must be installed by qualified personnel. Refer to current regulations and laws for installation location.

•This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

•The appliance shall be installed in accordance with national wiring regulations.

## 4.Airflow Performance

The air flow data is based on the cooling performance of coil and without filter. Performance table, select the appropriate product.

External static pressure ESP should be kept within the minimum and maximum limits shown in the following table to ensure the normal operation of cooling, heating and electric heating.

| Air Handler Model | Blower Speeds | | External Static Pressure (in.w.c.) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 |
| 2 Tons 24K | 1 | CFM | 912 | 865 | 815 | 753 | 691 | 614 | 551 | 492 | 437 |
| | | Watts | 90 | 96 | 102 | 106 | 115 | 117 | 126 | 128 | 133 |
| | 2 | CFM | 1033 | 991 | 947 | 903 | 848 | 793 | 720 | 664 | 603 |
| | | Watts | 121 | 129 | 136 | 139 | 150 | 157 | 160 | 164 | 177 |
| | 3 | CFM | 1133 | 1093 | 1048 | 1007 | 967 | 914 | 867 | 800 | 744 |
| | | Watts | 156 | 163 | 166 | 177 | 184 | 188 | 199 | 203 | 214 |
| | 4 | CFM | 1252 | 1216 | 1180 | 1139 | 1101 | 1068 | 1025 | 974 | 922 |
| | | Watts | 206 | 211 | 217 | 228 | 236 | 244 | 253 | 264 | 271 |
| | 5 | CFM | 1339 | 1305 | 1270 | 1237 | 1200 | 1166 | 1131 | 1080 | 1036 |
| | | Watts | 246 | 249 | 262 | 264 | 277 | 280 | 295 | 299 | 315 |
| 3 Tons 36K | 1 | CFM | 912 | 865 | 815 | 753 | 691 | 614 | 551 | 492 | 437 |
| | | Watts | 90 | 96 | 102 | 106 | 115 | 117 | 126 | 128 | 133 |
| | 2 | CFM | 1033 | 991 | 947 | 903 | 848 | 793 | 720 | 664 | 603 |
| | | Watts | 121 | 129 | 136 | 139 | 150 | 157 | 160 | 164 | 177 |
| | 3 | CFM | 1133 | 1093 | 1048 | 1007 | 967 | 914 | 867 | 800 | 744 |
| | | Watts | 156 | 163 | 166 | 177 | 184 | 188 | 199 | 203 | 214 |
| | 4 | CFM | 1252 | 1216 | 1180 | 1139 | 1101 | 1068 | 1025 | 974 | 922 |
| | | Watts | 206 | 211 | 217 | 228 | 236 | 244 | 253 | 264 | 271 |
| | 5 | CFM | 1339 | 1305 | 1270 | 1237 | 1200 | 1166 | 1131 | 1080 | 1036 |
| | | Watts | 246 | 249 | 262 | 264 | 277 | 280 | 295 | 299 | 315 |
| 4 Tons 48K | 1 | CFM | 1345 | 1284 | 1220 | 1153 | 1091 | 969 | 910 | 841 | 776 |
| | | Watts | 142 | 152 | 167 | 173 | 185 | 201 | 209 | 209 | 216 |
| | 2 | CFM | 1521 | 1461 | 1405 | 1348 | 1293 | 1239 | 1114 | 1056 | 999 |
| | | Watts | 192 | 210 | 221 | 222 | 244 | 254 | 268 | 283 | 291 |
| | 3 | CFM | 1698 | 1643 | 1591 | 1540 | 1490 | 1439 | 1393 | 1337 | 1213 |
| | | Watts | 263 | 279 | 280 | 306 | 319 | 318 | 338 | 356 | 363 |
| | 4 | CFM | 1853 | 1805 | 1758 | 1712 | 1665 | 1611 | 1568 | 1523 | 1476 |
| | | Watts | 330 | 355 | 372 | 386 | 390 | 415 | 428 | 421 | 446 |
| | 5 | CFM | 2245 | 2202 | 2160 | 2109 | 2068 | 2029 | 1989 | 1950 | 1911 |
| | | Watts | 582 | 584 | 609 | 631 | 647 | 670 | 677 | 707 | 727 |
| 5 Tons 60K | 1 | CFM | 1345 | 1284 | 1220 | 1153 | 1091 | 969 | 910 | 841 | 776 |
| | | Watts | 142 | 152 | 167 | 173 | 185 | 201 | 209 | 209 | 216 |
| | 2 | CFM | 1521 | 1461 | 1405 | 1348 | 1293 | 1239 | 1114 | 1056 | 999 |
| | | Watts | 192 | 210 | 221 | 222 | 244 | 254 | 268 | 283 | 291 |
| | 3 | CFM | 1698 | 1643 | 1591 | 1540 | 1490 | 1439 | 1393 | 1337 | 1213 |
| | | Watts | 263 | 279 | 280 | 306 | 319 | 318 | 338 | 356 | 363 |
| | 4 | CFM | 1853 | 1805 | 1758 | 1712 | 1665 | 1611 | 1568 | 1523 | 1476 |
| | | Watts | 330 | 355 | 372 | 386 | 390 | 415 | 428 | 421 | 446 |
| | 5 | CFM | 2245 | 2202 | 2160 | 2109 | 2068 | 2029 | 1989 | 1950 | 1911 |
| | | Watts | 582 | 584 | 609 | 631 | 647 | 670 | 677 | 707 | 727 |

--- The highlighted area indicates the airflow within the required range of 300-450cfm/ton.

**NOTES:**

1. The advanced airflow must be used as the rated airflow for the full-load operation of the machine.
2. The rated airflow of a system without an electric heater kit requires 300 to 450 cubic feet of air per minute(CFM).

3. The rated airflow of a system with an electric heater kit requires 350 to 450 cubic feet of air per minute(CFM).
4. The air distribution system has the greatest influence on air flow. Therefore, the contractor should only use the procedures recognized by the industry.
5. The design and construction of air duct should be done carefully. Poor design or process will lead to a significant decline in system performance.
6. The air supply duct should be set along the periphery of the air-conditioned space with appropriate size. Improper location or insufficient airflow may lead to insufficient ventilation or noise in the ductwork.
7. The installer should balance the air distribution system to ensure that all rooms in the room have proper quiet airflow, The speedometer or airflow hood can be used to balance and verify the branch duct and system airflow (CFM).

## 4.1.Indoor Fan Function

Passive Dehumidification (Optional).
This unit has a Passive Dehumidification function which lowers the fan speed with a DH call from the thermostat, This function requires proper DH wiring from the indoor unit to the thermostat(with a humidistat).

## 5.Ductwork

On-site ductwork must comply with National Fire Protection Association NFPA 90A, NFPA 90B and any applicable local ordinance(s).

**Warning: Fire and carbon monoxide**

Under no circumstances should the return ductwork be connected to any other heat-producing equipment, such as mantelpiece, stove, etc. Unauthorized use of such equipment may cause fire, carbon monoxide poisoning, explosion, personal injury or property damage.

The metal ductwork operating in the air-conditioned space must be insulated and covered with a moisture-proof layer. lf the construction and installation are carried out according to SMACNA glass fiber duct construction standard, the fiber duct system can be used. The ductwork must meet the U/L standard 181 test of Class l air duct by National Fire Protection Association of America. Check the local regulations of ductwork and insulation requirements.

•The duct system must be designed within the external static pressure range of the designed operation of the device. Adequate airflow in the system is very important. Ensure that the supply and return ductwork, grid, special filter screen, accessories, etc. are included in the total resistance. Please refer to the airflow performance table in Section 5 of this manual.

•Design the ductwork according to "ACCA" manual "D" residential air conditioning design and equipment selection in winter and summer. The latest version can be obtained from "ACCA" American Air Conditioning Contractors Association, 1513 16th Street NW, Washington, Dc, 20036. If the ductwork contains flexible air pipes, make sure that the system takes into account the pressure drop information(straight line length plus all turns) shown in "ACCA" manual "D".

•The air duct connector should be connected to the 3/4 "flange on the equipment. install a flange around the air outlet.

**IMPORTANT:** If the duct connector has an elbow, its size should not be smaller than that of the flange on the outlet of the device.

**IMPORTANT:** The front flange on the return duct (if connected to the fan casing) must not be screwed into the area where the power cord is located. Drill bits or sharp screw tips can damage the insulation of the internal wires of the equipment.

•Use appropriate fasteners suitable for the type of duct used, fix the outlet and return ducts to the flanges of the device, and connect the ducts to the device with adhesive tape as needed to prevent air leakage.

## 6.Refrigerant Pipe Connection

Before the refrigerant pipe connection is completed, keep the coil sealed. Please refer to the installation.operation and maintenance manual of the external machine for detailed information on refrigerant line size, duct installation and filling amount.

Pull out the rubber plugs and check whether there is nitrogen flowing out.

**Warning: Personal injury hazard**

•Failure to follow this warning could result in personal injury.

•Wear eye protection.

**Note:**

•Factory nitrogen charge may escape past rubber plugs during storage. This does not indicate a leaking coil nor warrant return of the coil.

**Note:**

•Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure. No leak shall be detected.

Care should be taken to connect the refrigerant pipe so that it will not obstruct the maintenance channel in front of the equipment.

Before brazing, the metal 1and 2 need to be uninstalled.

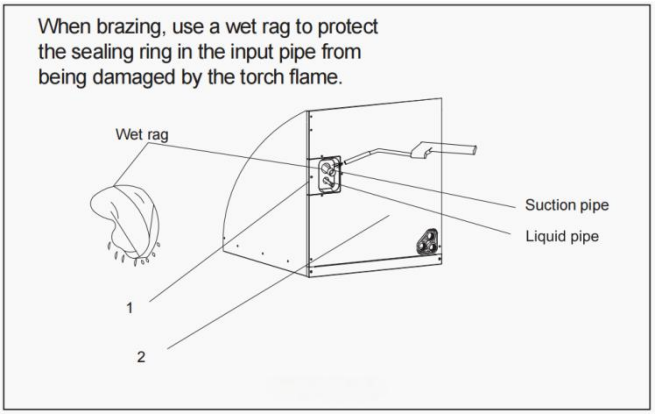
Pull out the evaporator (6 inches) so that longer refrigerant line could be exposed for wet rag and brazing.

During brazing, nitrogen should flow through the refrigerant pipe.

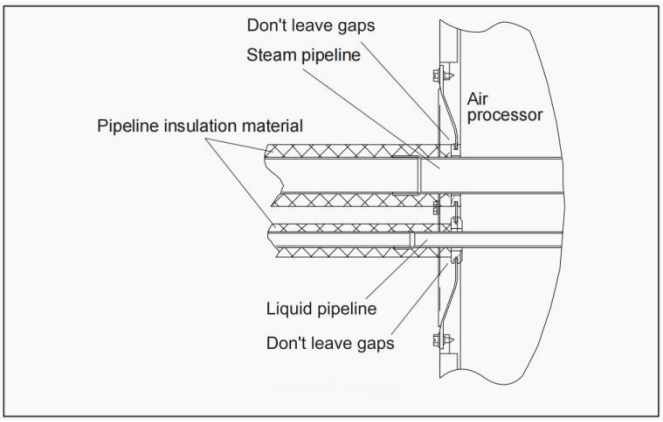
Use a brazing shield to protect the paint of the cabinet, and use a wet rag to protect the rubber gasket of the pipeline from being damaged by the torch flame. During the brazing process, protect the temperature sensing bulb of TXV with wet cloth or approved heating paste.

After brazing, pull in the evaporator and put the metal 1 and 2 back to the cabinet.

After the refrigerant pipeline connection is completed, seal and fill the surrounding gaps with pressure-sensitive gaskets.



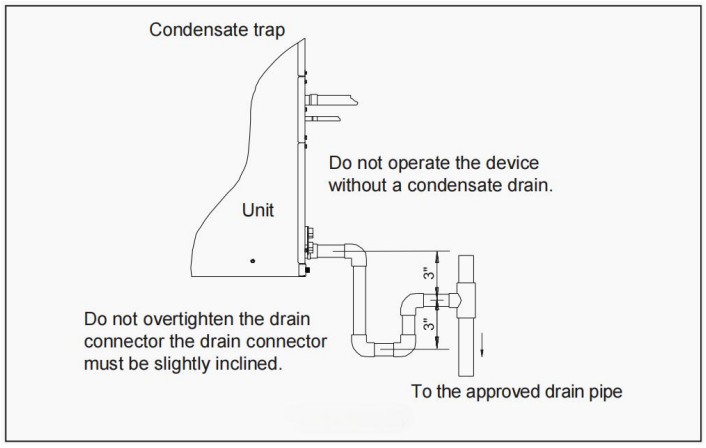

After brazing, make sure that there is no refrigerant leakage. After checking the vapor leakage, make sure that the pipeline is insulated.



## 6.1Condensate Drain Tubing

For specific requirements, please consult local codes.

For the required condensate trap installation.




1. When connecting the drain connector to the drain pan, use a thin layer of PTFE paste. silicone or PTEF, and tighten it by hand.
2. When connecting the drain connector to the drain pan, don't over tighten it. Tight fittings will crack the pipe connection on the drain pan.

**IMPORTANT:**

•Make sure that the drainage pipe will not block the inlet in front of the device. The minimum clearance required for removal and maintenance of filter screen, coil or fan is 24 inches.

•Make sure that the machine is placed horizontally or slightly inclined to the main drain outlet, so that water can be completely drained from the machine.

•Do not reduce the drain pipe size to less than the connection size provided on the condensate drain pan.

•All horizontal drainage pipes must be inclined downward at a slope of at least 1/8 inch per foot to ensure proper drainage.

•Do not connect condensate drain line to a closed or open sewer pipe. Run condensate to an open drain or run line to a safe outdoor area.

•Where necessary, the drainage pipeline should be insulated to prevent damage caused by condensation water formed on the outer surface of the pipeline.

•If necessary, be prepared to disconnect and clean the main drainage pipe. Install a 3-inch elbow on the main drainage pipe as close as possible to the unit. Make sure that the top of the elbow is lower than the joint of the drain pan to allow the drain pan to drain completely.

•Auxiliary drainage pipes should be extended to places where condensate can be easily seen. If the condensed water starts to flow out from the auxiliary drain pipe, the homeowner should pay attention to the possible problems.

•Plug the unused drain connector with the plug in the parts package provided with the equipment. Use a thin layer of Teflon paste, silicone or Teflon tape to form a waterproof seal.

•After installation, test the condensate drain pan and drain pipe. Pour water into the drain pan, enough to fill the drain traps and pipes. Check to ensure that the drain pan completely drains water, no leakage is found in the drain pipe fittings, and water is discharged from the main drain pipe terminal.

## 7.Air Filter (Not factory-installed)

The filter is not included in the device and must be provided on site.

The size of external filters or other filtering devices must meet the maximum flow rate of 300ft/min, or meet the recommended value of filter type.

The application and placement of filter is very important for airflow, which may affect the performance of heating and cooling system. Reduced airflow will shorten the life of the main components of the system,such as motors, components, thermal relays, evaporator coils or compressors. Therefore, we recommend that the return air duct system has only one filter position. For systems without return air filter grids, multiple filter grids can be installed at each return air opening.

If a high-efficiency filter screen or electronic air filtration system is used, it is very important that the airflow rate is not reduced. If the air flow decreases, the overall performance and efficiency of the device will decrease. It is strongly recommended to contact professional installation technicians to ensure the correct installation of such filtration systems.

**IMPORTANT:** DO NOT DOUBLE FILTER THE RETURN AIR DUCT SYSTEM. DO NOT FILTER THE SUPPLY AIR DUCT SYSTEM.THIS WILL CHANGE THE PERFORMANCE OF THE UNIT AND REDUCE AIRFLOW.

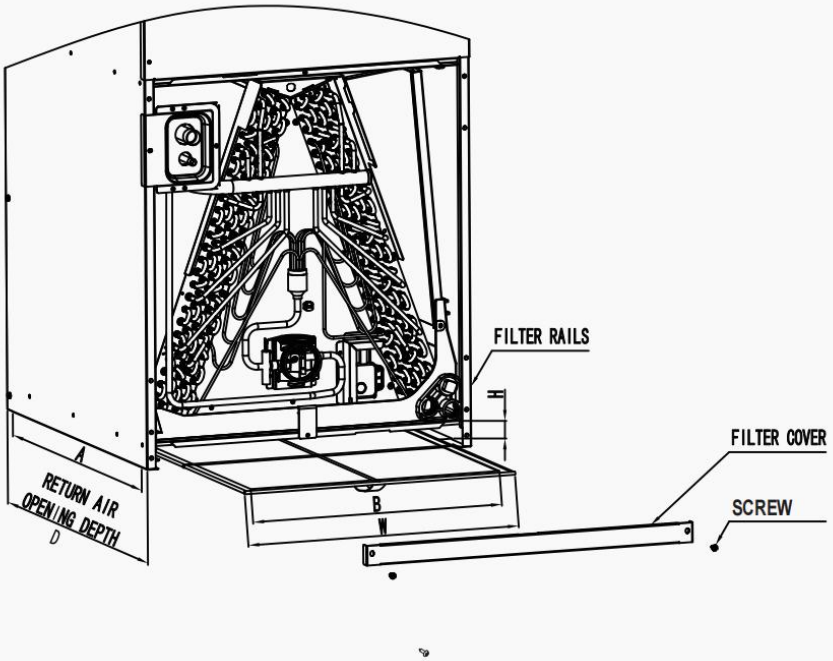
**Waring: Fire risk**

Do not operate the system without a filter, Part of the dust suspended in the air may temporarily stay on the duct and the air outlet of the room. Any circulating dust particles may be heated and burnt due to contact with AHU elements. This residue will stain the ceiling, walls, curtains, carpets and other items in the house. When some types of candles, oil lamps or igniters burn, soot may be generated in the filter.

## 8. Filter Installation Dimensions

•The filter is included in the device and must be provided on site.

•When installing the indoor unit, regardless of the installation method, make sure that the filter is installed as shown in blow.




Installation of filter

### Size number

| Model | Filter size inches [mm] | "W" Inch [mm] | "D" Inch [mm] | "H" Inch [mm] | Return Width "A" inch [mm] | Return Length "B" inch [mm] |
|---|---|---|---|---|---|---|
| 24K/36K | 18.1×21.4[460×544] | 18.3 [466] | 21.6 [548] | 1 [25.4] | 20.8 [528] | 16.3 [414] |
| 48K/60K | 20.5×23.8[521×605] | 20.7 [526] | 23.9 [608] | 1 [25.4] | 23 [584] | 18.8 [478] |

**Removal/Installation of Air Filter**

•Manually remove the screw and remove the filter cover.

•Hold the edge of the strainer and pull it out.

•Install a new filter so that the arrow on the filter screen is consistent with the airflow direction.

•If a reusable filter is used, please clean it according to the manufacturer's specifications before reinstalling it.

•The filter needs to meet UL 900 standard.

## 9.Wiring Diagram

**Warning: Electric shock**

Before repairing or installing this device, please disconnect all power supplies. There may be multiple power sources. Otherwise, property damage, personal injury or death may result.

**Danger: Electric shock**

The device must be properly grounded and protected by a circuit breaker or fuse.

**Warning: Electric shock**

These devices must be wired and installed according to all national and local safety codes.

**Buzzer wiring**

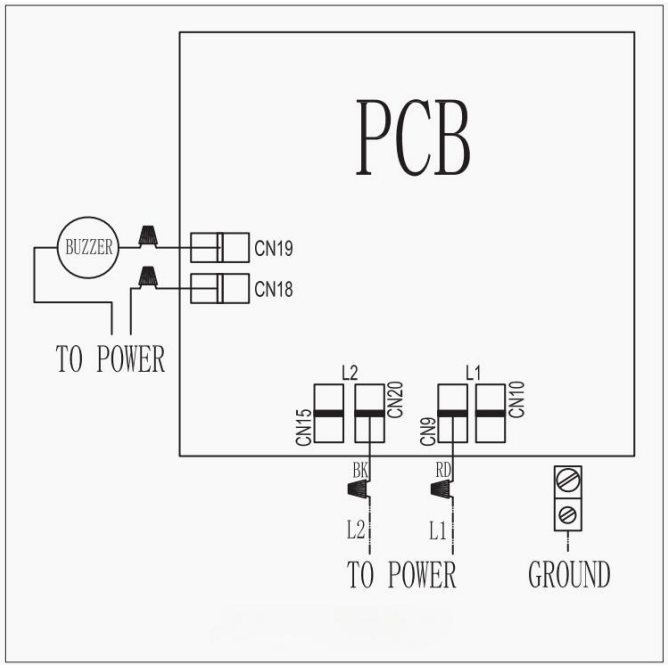
1) If you need to install the buzzer, please connect its power supply wire in series with terminals CN18 and CN19 on the control board.

2) When the refrigerant concentration reaches the threshold,terminals CN18 and CN19 will establish a connection.triggering the buzzer to sound.

**To avoid electric shock, make sure:**

1)Equipment is properly grounded.

2) The main power plug of the device has been connected to the ground wire (do not change it).




**Note:** The dotted line in the following thermostat wiring diagram indicates optional wiring(wiring for passive dehumidification function and/or electric heating). For the wiring of the thermostat, please refer to the user manual of the thermostat.

**R32 Leakage Detection Function:**

The function utilizes a R32 refrigerant sensor to detect the R32 concentration. Terminal CN18/CN19 is reserved for connecting buzzer if needed. When R32 leakage occurs in the indoor coil and the concentration is above 10%, the unit will perform as the following:

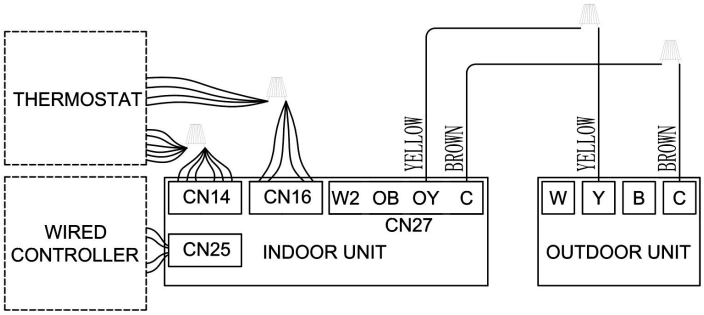
A. Cut off power to thermostat to stop compressor from continuing operation;

B. Electric Heat kit will be turned off;

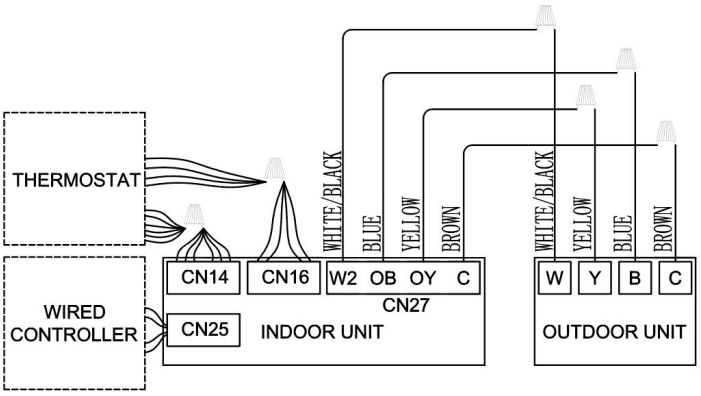
C. Dry contact signal will be output between terminal CN18 and CN19 and the buzzer will be turned on.

**Note:** Dh wiring is optional and requires a thermostat with a humidifier. Dh plays the role of passive dehumidification, and puts the indoor blower in the Low fan speed. If Dh wiring is missing, the system will run in the normal operation sequence.

Communication Wiring Diagram for Indoor and Outdoor Units
**Note:** Choose either the thermostat or the wired controller.

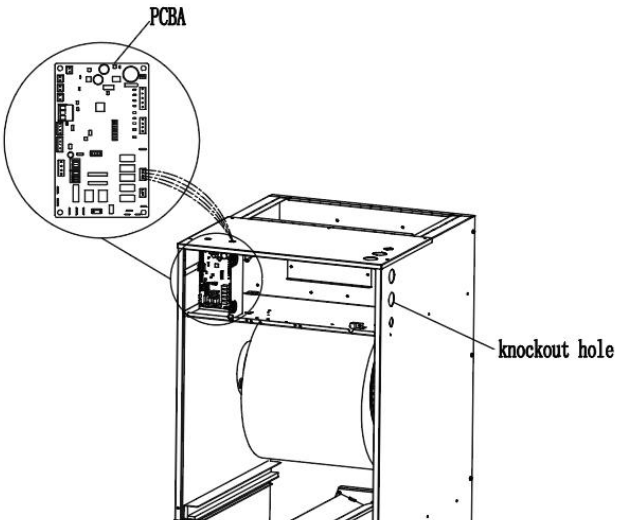


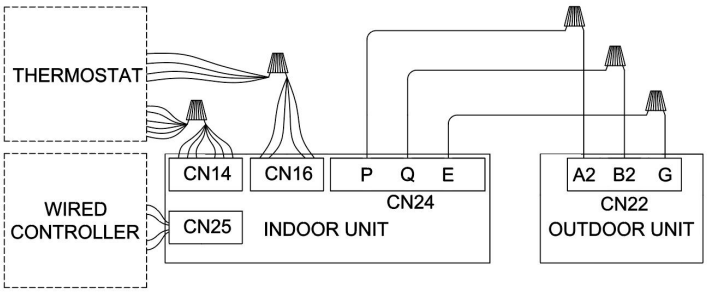

Control Wiring For AC Systems



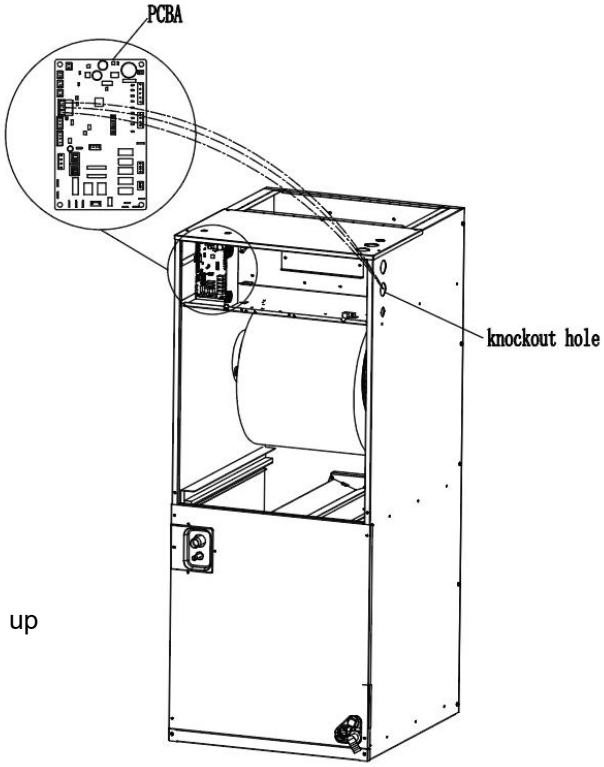

Control Wiring For HP Systems

24V Communication Wiring



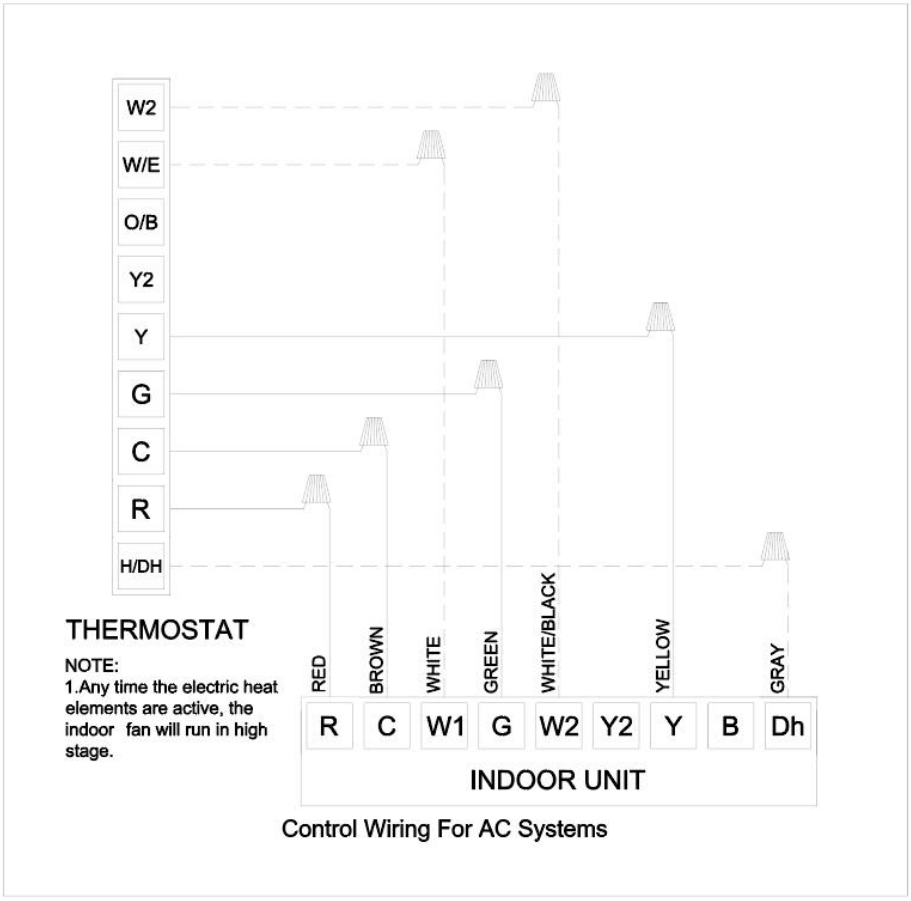

RS485 Communication Wiring(AC / HP)



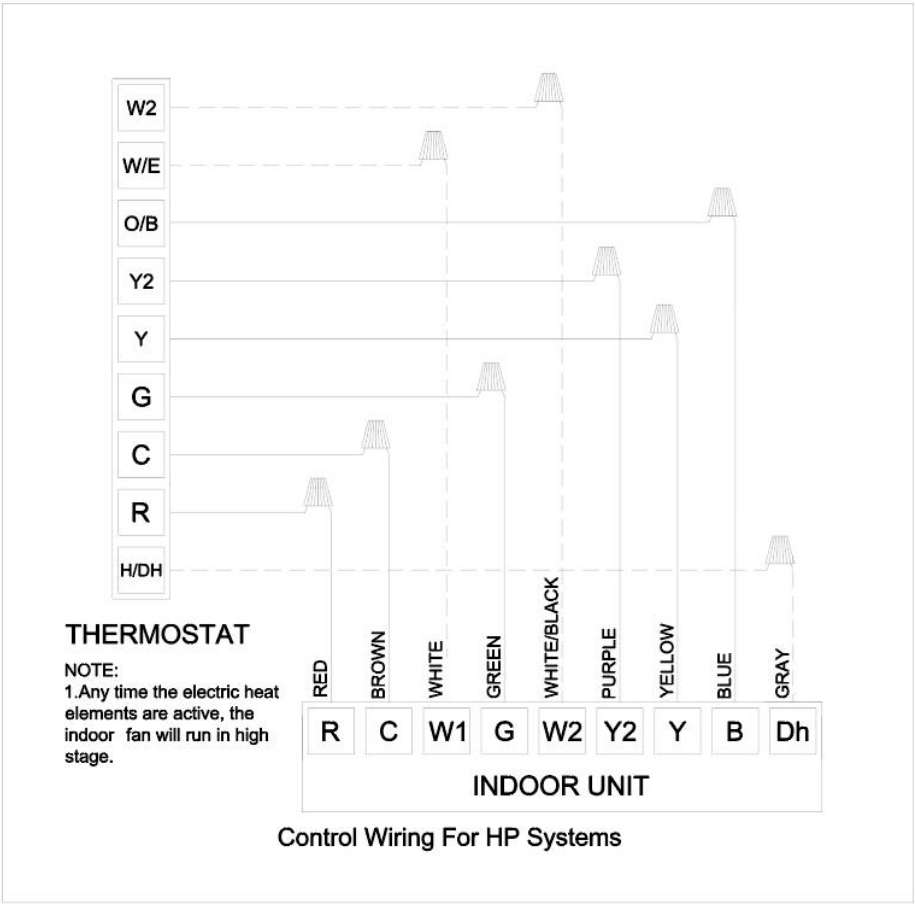

**Note:**If some signal lines of CN14 and CN16 are not used, wrap them up separately with CAP.

**24V Thermostat Wiring Guide**

**Note:** Please refer to the corresponding wiring diagram based on the actual wiring situation.




Control Wiring For AC Systems




Control Wiring For HP Systems

## 10.Electrical Wiring Gauge

**NOTE:** If RS485 communication is used between the indoor and outdoor units, the connecting cable must be a three-core shielded signal cable.

### Electric wiring gauge AC

| Model | | | 24K | 36K | 48K | 60K |
|---|---|---|---|---|---|---|
| Line Gauge | Indoor Unit Power Line | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 16 | 16 | 16 | 16 |
| | Outdoor Unit Power Line | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 14 | 14 | 10 | 10 |
| | Indoor-Thermostat Singal Line | Line Quantity | Select the number of wiring harnesses according to the actual wiring situation | | | |
| | | Line Diameter(AWG) | 18 | 18 | 18 | 18 |
| | Indoor-Outdoor Communication Signal Line (24V) | Line Quantity | 2 | 2 | 2 | 2 |
| | | Line Diameter(AWG) | 18 | 18 | 18 | 18 |
| | Indoor-Outdoor Communication Signal Line (RS485) | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 22 | 22 | 22 | 22 |

### Electric wiring gauge HP

| Model | | | 24K | 36K | 48K | 60K |
|---|---|---|---|---|---|---|
| Line Gauge | Indoor Unit Power Line | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 16 | 16 | 16 | 16 |
| | Outdoor Unit Power Line | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 14 | 14 | 10 | 10 |
| | Indoor-Thermostat Singal Line | Line Quantity | Select the number of wiring harnesses according to the actual wiring situation | | | |
| | | Line Diameter(AWG) | 18 | 18 | 18 | 18 |
| | Indoor-Outdoor Communication Signal Line (24V) | Line Quantity | 4 | 4 | 4 | 4 |
| | | Line Diameter(AWG) | 18 | 18 | 18 | 18 |
| | Indoor-Outdoor Communication Signal Line (RS485) | Line Quantity | 3 | 3 | 3 | 3 |
| | | Line Diameter(AWG) | 22 | 22 | 22 | 22 |

# Part 5

# System Operation and Troubleshooting

## 1.Control logic description

●The Inverter system adopts the same 24VAC control as any conventional heat pump.

●The compressor's speed is controlled based on coil pressures monitored by the unit's pressure transducer. To ensure stable and adequate capacity, the compressor speed will modulate relative to evaporator pressure during cooling operation and relative to condensing pressure during heating operation.

## 2.Sensor and valves

●T3 (Outdoor coil temperature)

--High temperature protection

--Outdoor fan control (Cooling mode)

--Defrost control (Heating mode)

●T4 (ODU ambient temperature)

--Maximum current limitation

--Defrosting condition (Heating mode)

--Outdoor fan control (Heating mode)

●T5 (Compressor discharge temperature)

--High discharge temperature / Low superheat protection

--Electronic Expansion Valve (EEV) control

●Tfin (lPM radiator temperature)

--High lPM temperature protection

●PS2 (Pressure transducer)

--Detect evaporating pressure in cooling mode and condensing pressure in heating mode

--Compressor frequency control

--Electronic Expansion Valve (EEV) control

--High pressure protection (heating mode)

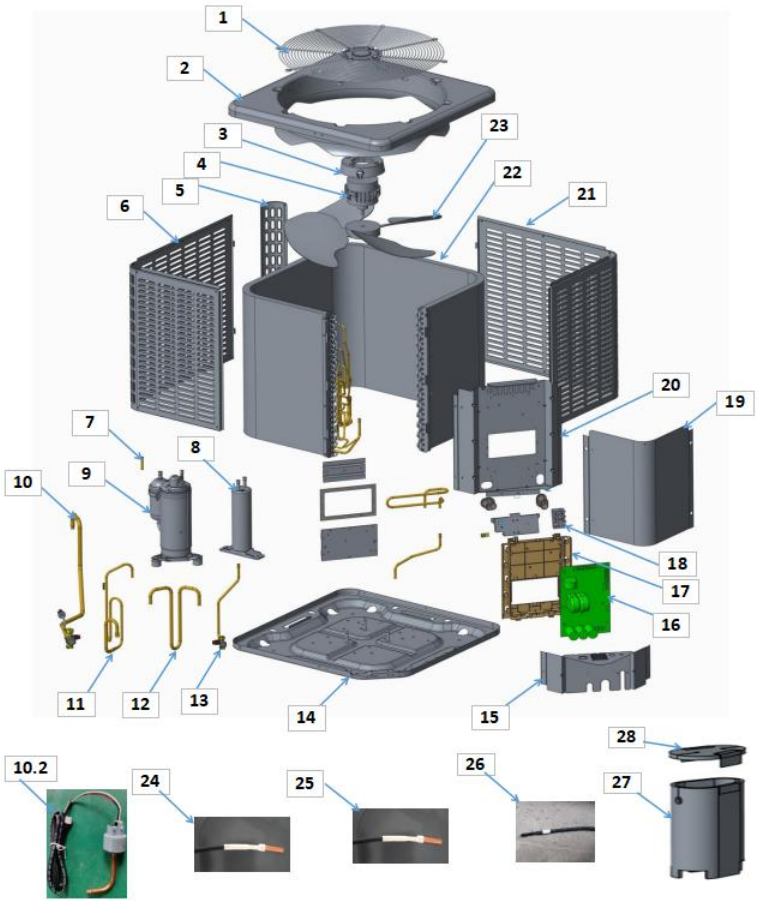
--Low pressure protection (cooling mode)

●Reversing valve

--Used to switch the refrigerant flow direction between cooling and heating mode

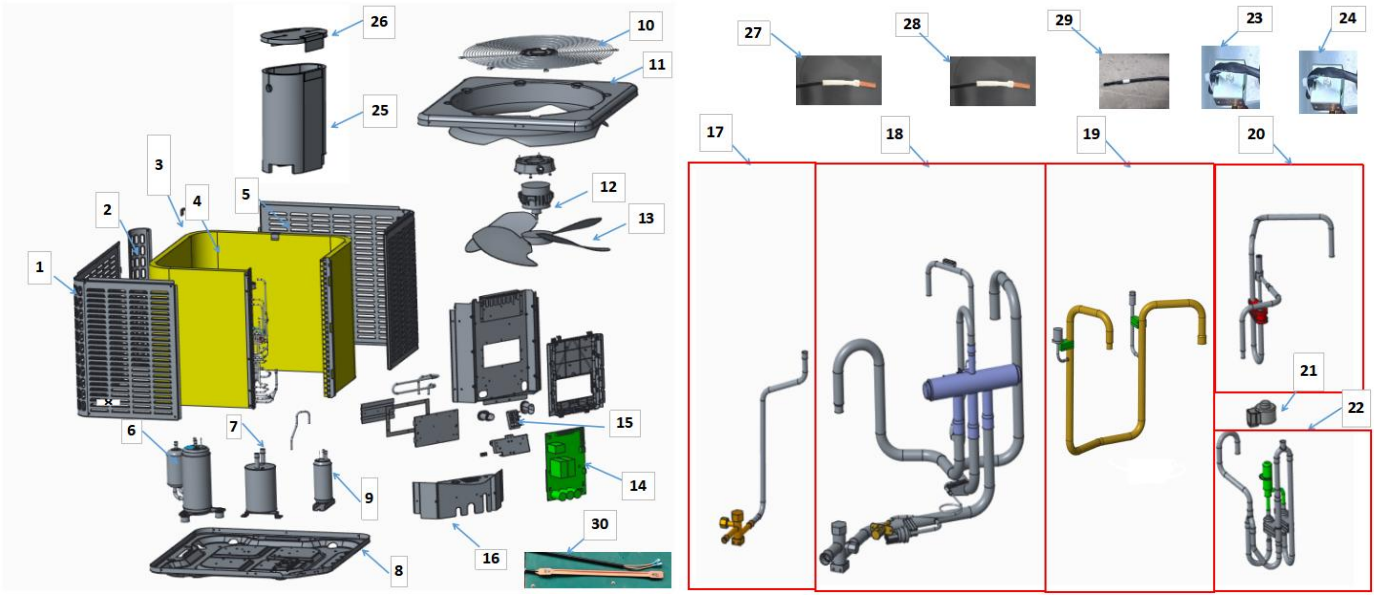
## 3.Exploded views

**Cooling only outdoor unit:**



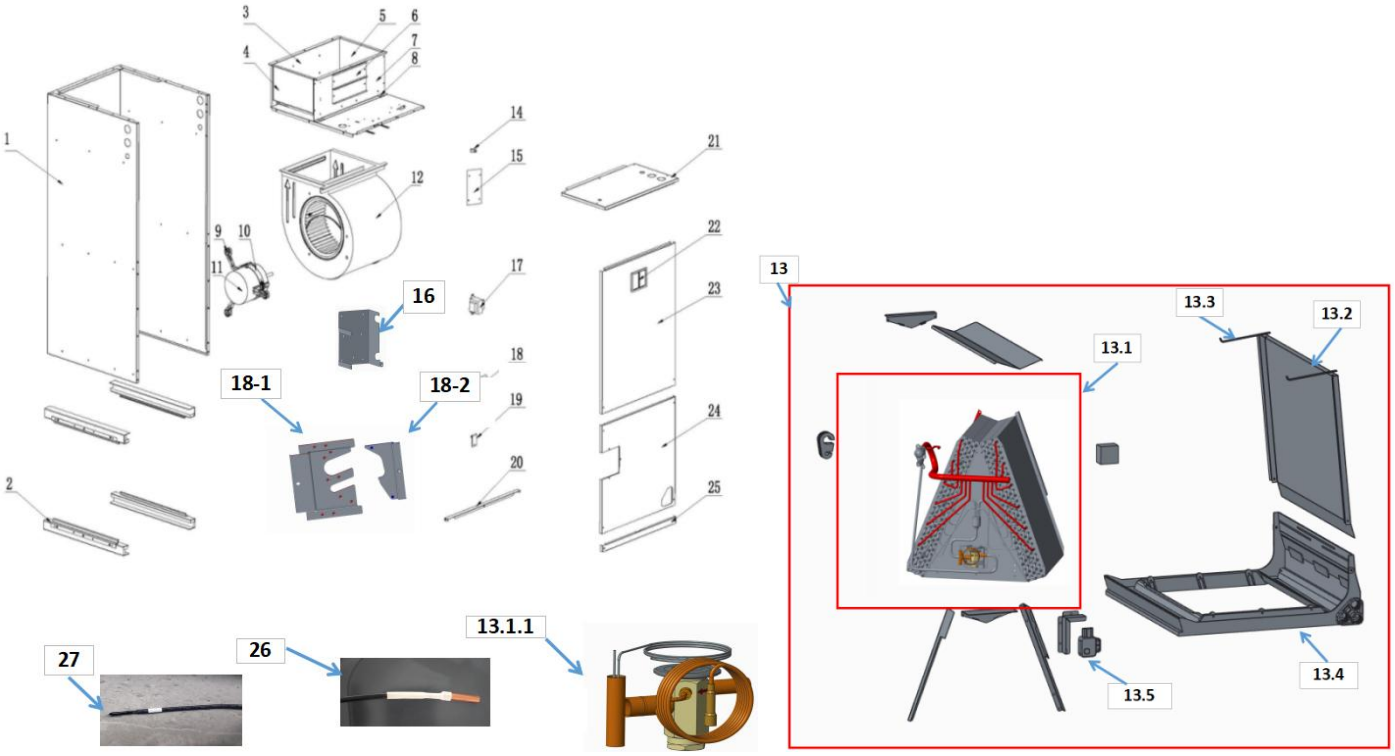

| No. | Part Name | Quantity | No. | Part Name | Quantity |
|---|---|---|---|---|---|
| 1 | Top air outlet grille | 1 | 14 | Chassis assembly | 1 |
| 2 | Top cover assembly | 1 | 15 | Lower side plate | 1 |
| 3 | Motor installation base | 1 | 16 | PCB | 1 |
| 4 | Fan motor | 1 | 17 | Base of the electric control board | 1 |
| 5 | Support plate | 1 | 18 | termianl | 1 |
| 6 | Left side plate | 1 | 19 | Upside plate | 1 |
| 7 | The air supply port is blocked | 1 | 20 | Frequency electrical control installation board assembly | 1 |
| 8 | Gas-liquid separator | 1 | 21 | Right side plate | 1 |
| 9 | Compressor | 1 | 22 | Condenser assembly | 1 |
| 10 | Low-pressure valve assembly (threaded connection) | 1 | 22.1 | Shunt pipe assembly | 1 |
| 10.1 | Stop valve 3/8(threaded connection) | 1 | 22.2 | Gas collection pipe assembly | 1 |
| 10.2 | Pressure sensor | | 23 | Axial-flow fan | 1 |
| 10.3 | Rubber fixing block | 1 | 24 | T5 Exhaust temperature sensor | 1 |
| 11 | Exhaust pipe assembly | 1 | 25 | T3 Condenser tube temperature sensor | 1 |
| 12 | Gas return pipe | 1 | 26 | T4 Ambient temperature sensor | 1 |
| 13 | High-pressure valve assembly (threaded connection) | 1 | 27 | Sound insulation cotton around the compressor | 1 |
| 13.1 | Stop valve 3/4(threaded connection) | 1 | 28 | Sound insulation cotton for the compressor top cover | 1 |

**Heat pump outdoor unit:**



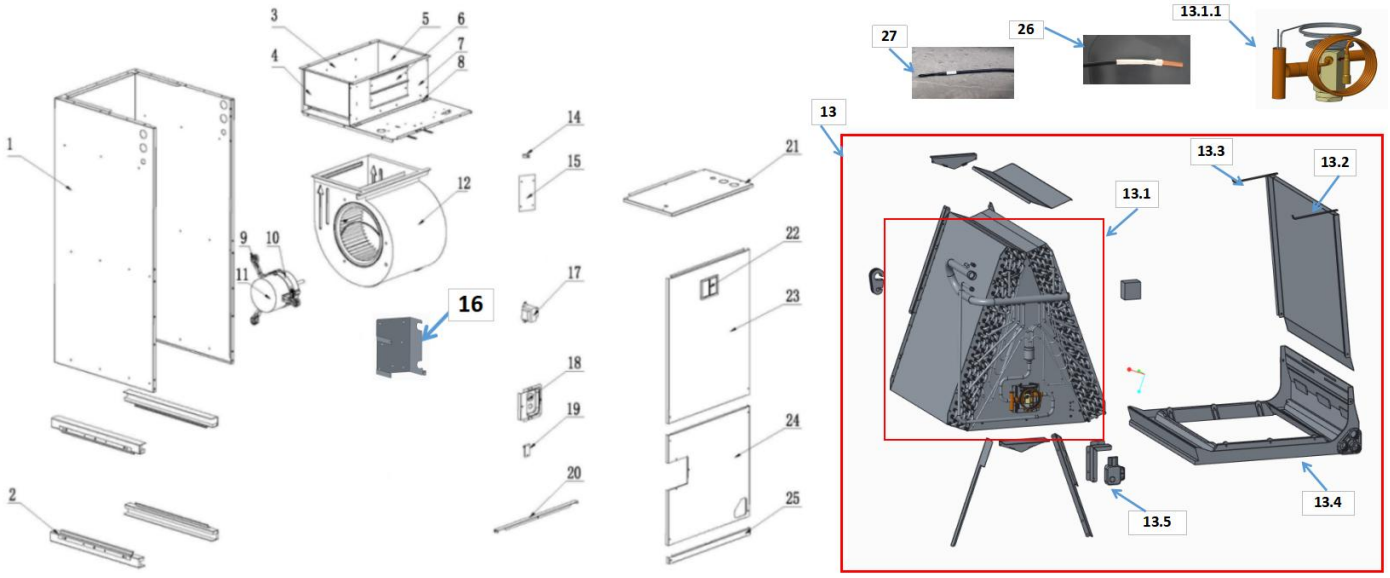

| No. | Part Name | Quantity | No. | Part Name | Quantity |
|---|---|---|---|---|---|
| 1 | Left side plate | 1 | 18.2 | Pressure sensor | 1 |
| 2 | Support plate | 1 | 18.3 | Rubber fixing block 1 | 2 |
| 3 | Condenser fixing plate | 2 | 19 | Air return pipe assembly | 1 |
| 4 | Condenser assembly | 1 | 19.1 | Low pressure switch | 1 |
| 4.1 | Shunt pipe assembly | 1 | 19.2 | Rubber fixing block 1 | 2 |
| 4.2 | Gas collection pipe assembly | 1 | 20 | Air-blow pipe assembly | 1 |
| 5 | Right side plate | 1 | 20.1 | Solenoid valve | 1 |
| 6 | Compressor | 1 | 21 | EXV coil | 1 |
| 7 | Gas-liquid separator | 1 | 22 | Flash tank connection pipe assembly | 1 |
| 8 | Chassis assembly | 1 | 22.1 | EXV | 1 |
| 9 | Flash tank | 1 | 22.2 | Check valve | 1 |
| 10 | Top air outlet grille | 1 | 22.3 | Cut-off valve 3/4 | 1 |
| 11 | Top cover assembly | 1 | 22.4 | Rubber fixing block 1 | 2 |
| 12 | Fan motor | 1 | 22.5 | Rubber fixing block 2 | 1 |
| 13 | Axial-flow fan | 1 | 23 | Solenoid valve coil | 1 |
| 14 | PCB | 1 | 24 | Four-way valve coil | 1 |
| 15 | Terminal block | 1 | 25 | Compressor external sound insulation cotton | 1 |
| 16 | Lower side plate | 1 | 26 | Compressor top cover sound insulation cotton | 1 |
| 17 | High pressure valve assembly | 1 | 27 | Condenser temperature sensor | 1 |
| 17.1 | Cut-off valve 3/8 | 1 | 28 | Compressor exhaust temperature sensor | 1 |
| 18 | Four-way valve assembly | 1 | 29 | Ambient temperature sensor | 1 |
| 18.1 | Four-way valve | 1 | 30 | Crankshaft heating belt | 1 |

**Air handler:**
**Cooling only**




| No. | Part Name | Quantity | No. | Part Name | Quantity |
|---|---|---|---|---|---|
| 1 | Chassis cotton sticking assembly | 1 | 13.4 | Plastic drain pan cotton sticking assembly | 1 |
| 2 | Drain pan support plate cotton sticking assembly | 4 | 13.5 | Refrigerant leak detection sensor | 1 |
| 3 | Wind wheel fixing plate | 1 | 14 | Brass binding post | 1 |
| 4 | Left side plate of air duct | 1 | 15 | PCB | 1 |
| 5 | Right side plate of air duct | 1 | 16 | Electric control mounting plate | 1 |
| 6 | Electric heater sealing plate | 2 | 17 | Transformer | 1 |
| 7 | Front side panel of air duct | 1 | 18-1 | Pipe cover plate (threaded connection) | 1 |
| 8 | Wind wheel mounting block | 2 | 18-2 | Pipe cover plate fixing plate (threaded connection) | 1 |
| 9 | Motor fixing beam assembly | 3 | 19 | Drain pan fixing block | 1 |
| 10 | Motor clamp | 1 | 20 | Support bar | 2 |
| 11 | Fan motor | 1 | 21 | Electric control box cover plate cotton sticking assembly | 1 |
| 12 | Wind wheel volute | 1 | 22 | Circuit breaker sealing plate | 1 |
| 13 | Evaporator preinstalled assembly | 1 | 23 | Upper side plate cotton sticking assembly | 1 |
| 13.1 | Evaporator welding assembly | 1 | 24 | Lower side plate cotton sticking assembly | 1 |
| 13.1.1 | TXV | 1 | 25 | Filter cover | 1 |
| 13.2 | Drain pan cotton sticking assembly | 1 | 26 | Evaporator temperature sensor | 1 |
| 13.3 | Connecting plate | 2 | 27 | Ambient temperature sensor | 1 |

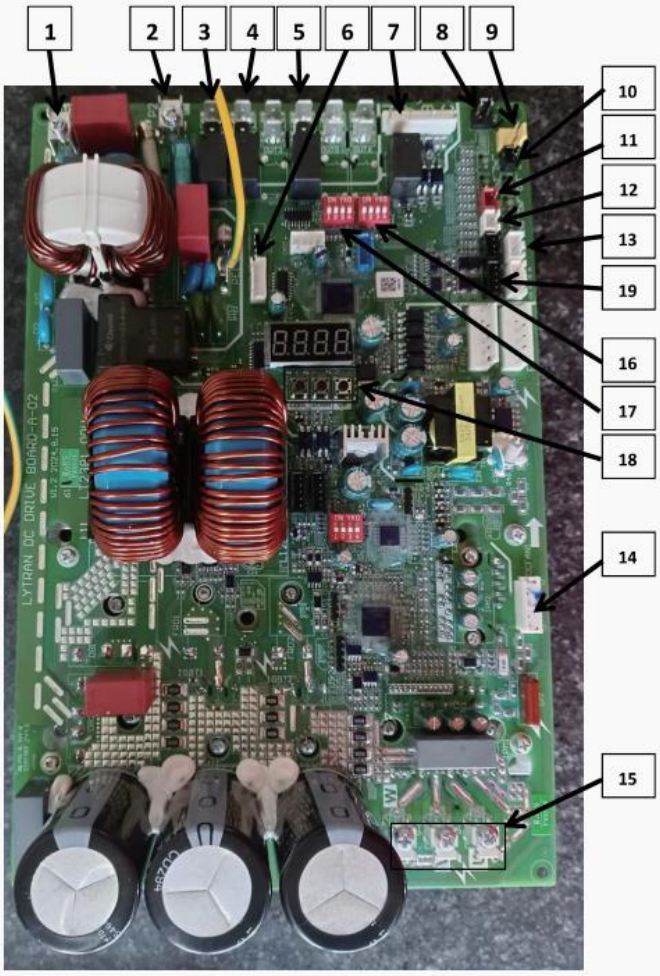
**Air handler:**
**Heat pump**




| No. | Part Name | Quantity | No. | Part Name | Quantity |
|---|---|---|---|---|---|
| 1 | Chassis cotton sticking assembly | 1 | 13.4 | Plastic drain pan cotton sticking assembly | 1 |
| 2 | Drain pan support plate cotton sticking assembly | 4 | 13.5 | Refrigerant leak detection sensor | 1 |
| 3 | Wind wheel fixing plate | 1 | 14 | Brass binding post | 1 |
| 4 | Left side plate of air duct | 1 | 15 | PCB | 1 |
| 5 | Right side plate of air duct | 1 | 16 | Electric control mounting plate | 1 |
| 6 | Electric heater sealing plate | 2 | 17 | Transformer | 1 |
| 7 | Front side panel of air duct | 1 | 18 | Piping cover cotton sticking assembly | 1 |
| 8 | Wind wheel mounting block | 2 | 19 | Drain pan fixing block | 1 |
| 9 | Motor fixing beam assembly | 3 | 20 | Support bar | 2 |
| 10 | Motor clamp | 1 | 21 | Electric control box cover plate cotton sticking assembly | 1 |
| 11 | Fan motor | 1 | 22 | Circuit breaker sealing plate | 1 |
| 12 | Wind wheel volute | 1 | 23 | Upper side plate cotton sticking assembly | 1 |
| 13 | Evaporator preinstalled assembly | 1 | 24 | Lower side plate cotton sticking assembly | 1 |
| 13.1 | Evaporator welding assembly | 1 | 25 | Filter cover | 1 |
| 13.1.1 | TXV | 1 | 26 | Evaporator temperature sensor | 1 |
| 13.2 | Drain pan cotton sticking assembly | 1 | 27 | Ambient temperature sensor | 1 |
| 13.3 | Connecting plate | 2 | | | |

## 4.Main PCB Ports

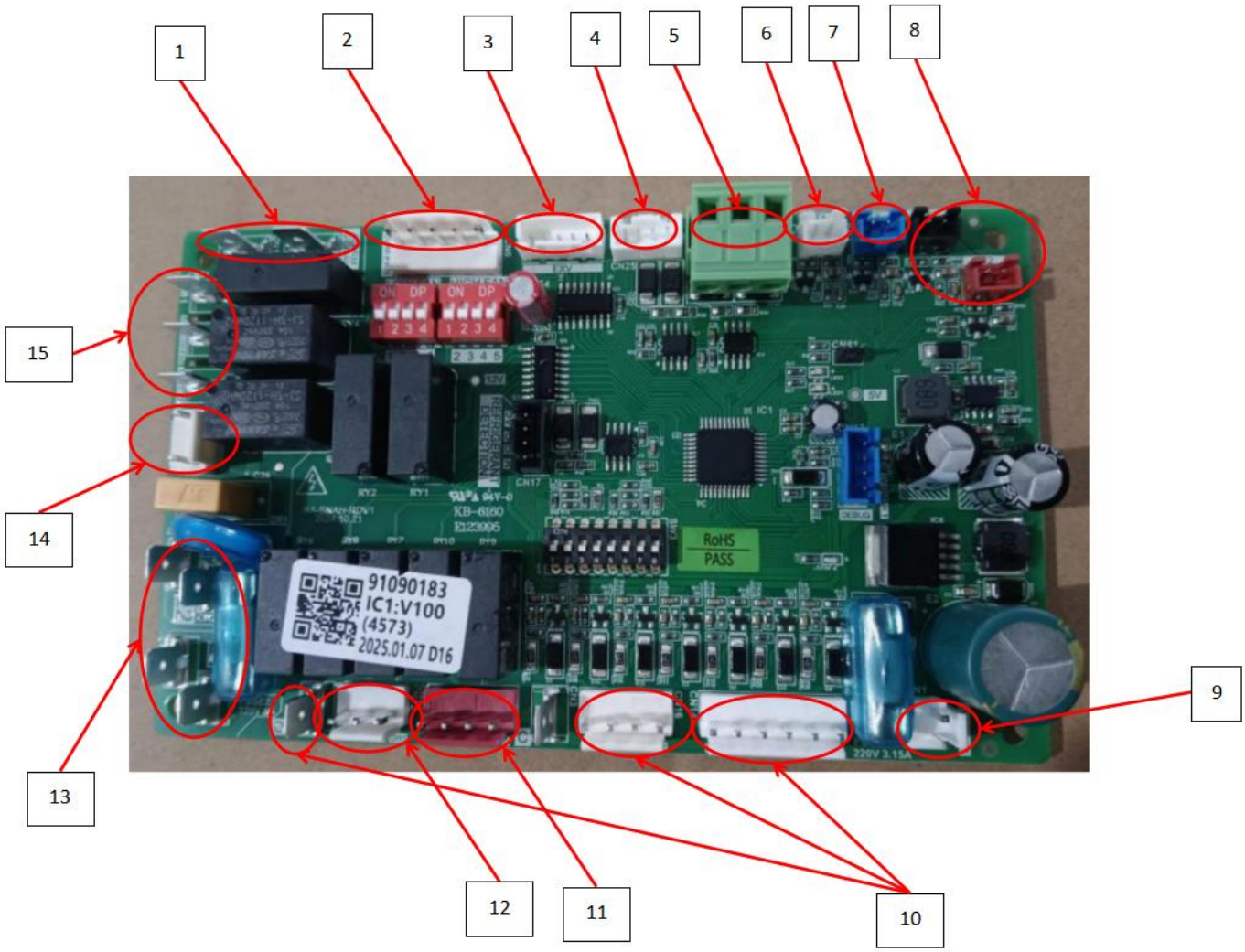
**For 24K-60K outdoor unit(cooling only/heat pump):**




No. Functional description

1、Power supply input L2(AC-N)
2、Power supply input L1(AC-L)
3、Crankshaft heating port(N1-OUT1)
4、Solenoid Valve port(N2-OUT2)
5、4-Valve port(N4-OUT4)
6、Electronic expansion valve port(EXV1)
7、24V communication port(WP1)
8、low pressure protection switch port(K2)
9、High pressure protection switch port(K3)
10、Inv Exhaust Temp.senor port(CN5)
11、Condenser Coil Temp.senor port(CN3)
12、Outdoor Ambient Temp.senor port(CN4)
13、Pressure Temp . Sensor port(PS2)
14、DC motor port(DC FAN1)
15、Compressor port W U V
16、Dip switch SW2
17、Dip switch SW3
18、Switch (SW4、SW6、SW5)
19、RS485 communication port

**For 24K-60K indoor units(cooling only/heat pump):**




| No. | Content | No. | Content |
|---|---|---|---|
| 1 | Refrigerant leakage | 9 | 24V power |
| 2 | ECM fan motor | 10 | Thermostat |
| 3 | EXV | 11 | 24V communication |
| 4 | Wired | 12 | E-heater |
| 5 | RS 485 communication | 13 | 220V power |
| 6 | Ambient temperature sensor | 14 | Transformer |
| 7 | Evaporator temperature sensor | 15 | AC fan motor |
| 8 | Reserved interface of the sensor | | |

## 5.Fault code table

### 5.1 Parameter Point Check Table

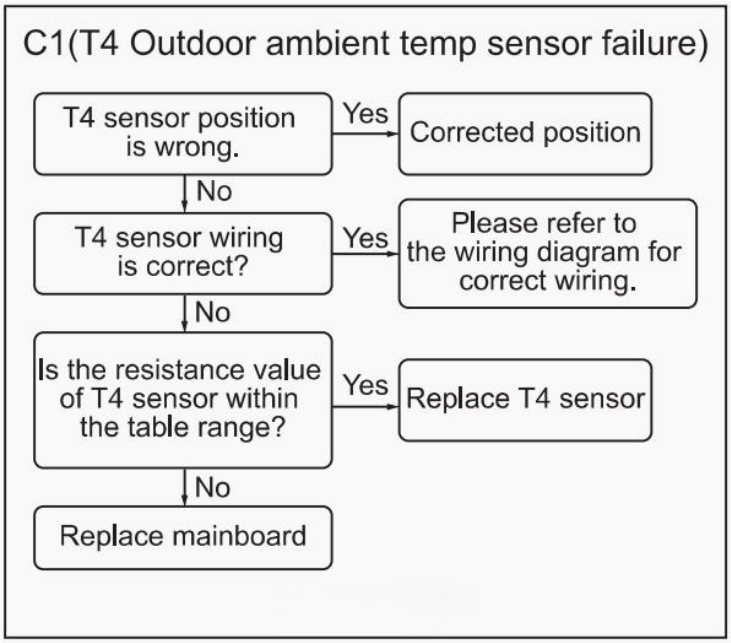
To display system parameters, press the "DOWN" (SW6) or "UP" (SW5) button to run through the series of parameters available. The first time you press the "UP" button, it will display the NUM of the parameter, and after 1 second, it will display the value of the parameter. If you press the "UP" button again, it will go to the next NUM of the parameter, pressing the "DOWN" button will go to the previous NUM of the parameter.

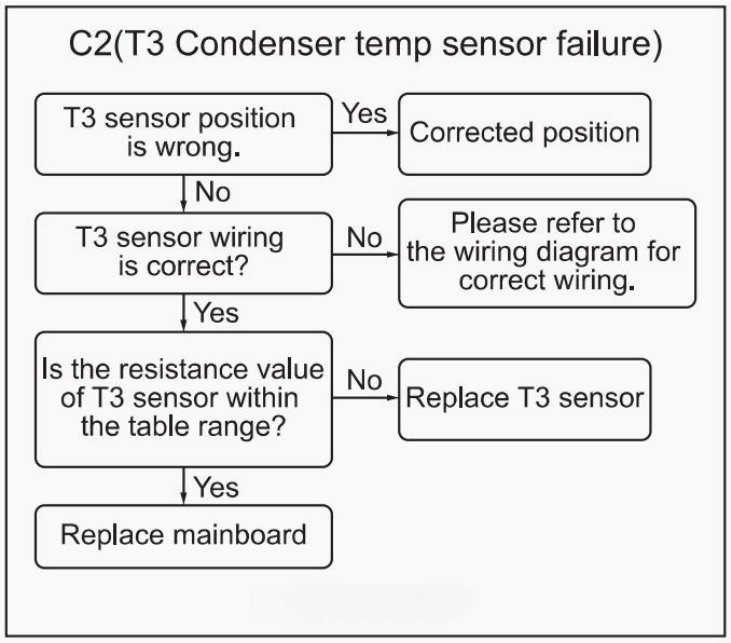
| Check Table | |
|---|---|
| Num | Display content |
| 01 | Outdoor power(Model) |
| 02 | Run mode (1: Standby mode; 2: In cooling mode; 3: In heating mode; 4: Force cooling) |
| 03 | Internal engine start signal ( 0 or 1 ) |
| 04 | Compressor running signal ( 0 or 1 ) |
| 05 | Target frequency (Hz ; Actual value) |
| 06 | Fan speed (R/min;Actual value) |
| 07 | T3 Condenser coil temp. (℉ ; Actual value ) |
| 08 | T4 outdoor ambient temp. (℉ ; Actual value ) |
| 09 | T5 exhaust temp. (℉ ; Actual value ) |
| 10 | Temp transform by low pressure sensor(℉ ; Actual value) |
| 11 | Low pressure value (Bar ; Actual value) |
| 12 | Temp transform by high pressure sensor (℉ ; Actual value) |
| 13 | High pressure value (Bar ; Actual value ) |
| 14 | IPM modular temp. Tfin (℉ ; Actual value ) |
| 15 | Target temp. Tes/Tcs (℉ ; Actual value) |
| 16 | Target superheat (℉ ; Actual value) |
| 17 | Discharge temp. superheat (℉ ; Actual value ) |
| 18 | PFC temp.(℉ ; Actual value ) |
| 19 | AC current (A ; Actual value ) |
| 20 | Compressor current (A ; Actual value ) |
| 21 | AC voltage (VAC ; Actual value ) |
| 22 | DC voltage (VDC ; Actual value ) |
| 23 | Enter PI contrlo sign ( 0 or 1) |
| 24 | Frequency increase (Actual value gear) |
| 25 | △EV(step ; Actual value ) |
| 26 | EXV opening degree (step ; Actual value) |
| 27 | TOil output (CC ; Actual value ) |
| 28 | Ability test mode (1-40 ; Mode gear ) |
| 29 | Software version number |
| 30 | Frequency limit item |
| 31 | Last failure or protection code |

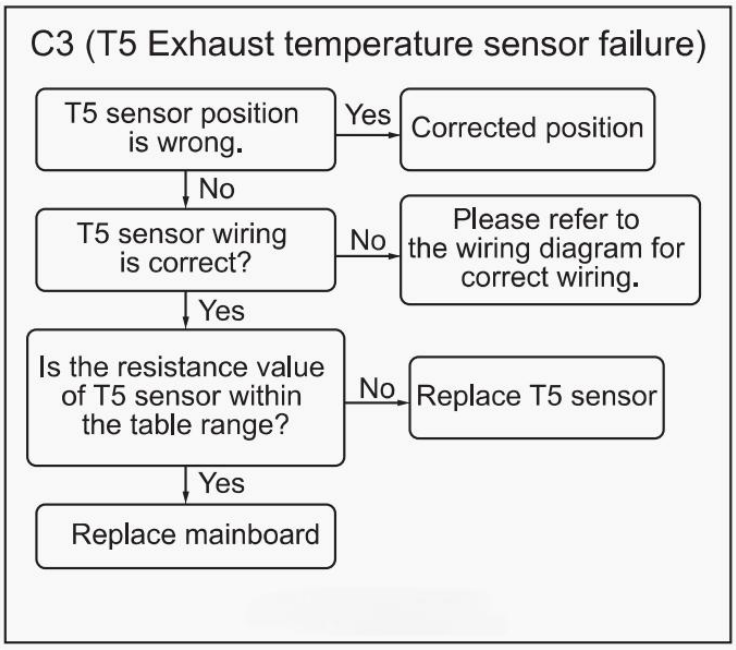
**5.2 Parameter Point Check Table**

| Code | Fault or Protection Definition | Notes |
|---|---|---|
| C1 | Outdoor air temperature sensor failure | |
| C2 | Condensate temperature sensor failure / T3 sensor not securely connected | Lock protection if T3 sensor is loose 20 times in 120 minutes; cannot recover until re-energized. |
| C3 | Exhaust temperature sensor failure / T5 sensor not securely connected | Lock protection if T5 sensor is loose 20 times in 180 minutes; cannot recover until re-energized. |
| E8 | Condensate high temperature protection | Lock protection if triggered 20 times in 180 minutes; cannot recover until re-energized. |
| E3 | Exhaust high temperature protection | Lock protection if triggered 20 times in 100 minutes; cannot recover until re-energized. |
| F1 | High pressure sensor failure | |
| F3 | Overpressure protection | Lock protection if triggered 20 times in 180 minutes; cannot recover until re-energized. |
| F4 | Low pressure sensor failure | |
| F6 | Low pressure too low | Lock protection if triggered 10 times in 100 minutes; cannot recover until re-energized. |
| F8 | High compression ratio protection | |
| F9 | Low compression ratio protection | |
| H2 | High pressure switch failure | Lock protection if triggered 20 times in 150 minutes; cannot recover until re-energized. |
| H5 | Low pressure switch failure | Lock protection if triggered 10 times in 60 minutes; cannot recover until re-energized. |
| HE | AC voltage protection | |
| LF | Primary side overcurrent protection | Lock protection if triggered 3 times in 60 minutes; cannot recover until re-energized. |
| L0 | IPM A protection | |
| PE | Fan A protection | |
| P9 | Fan B protection | |
| L9 | IPM module high temperature protection | Lock protection if triggered 20 times in 120 minutes; cannot recover until re-energized. |
| E0 | Fluorine deficiency protection | Lock protection if triggered 5 times in 100 minutes; cannot recover until re-energized. |
| H0 | Wet operation protection | Lock protection if triggered 20 times in 200 minutes; cannot recover until re-energized. |
| J2 | 485 Communication failure | |
| d0 | Oil return | |
| dF | Defrost | |
| dH | Forced cooling | |

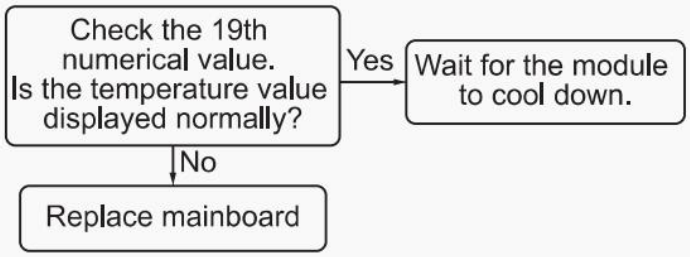
## 6.Trouble shooting



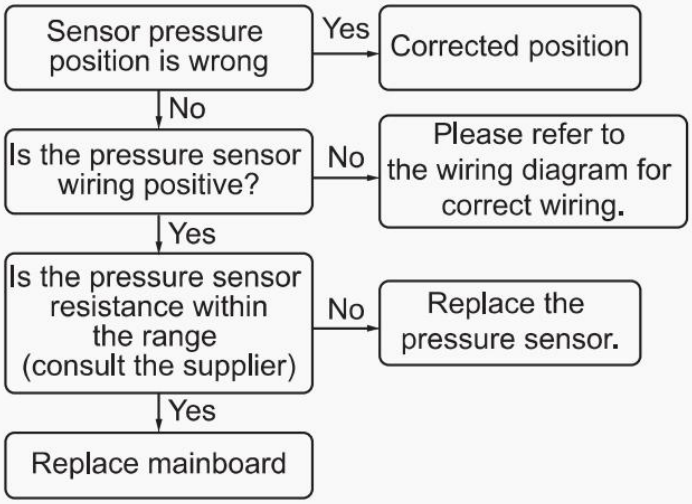



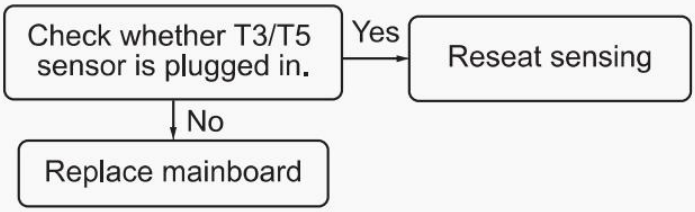
## L9 (IPM module high temperature protection)

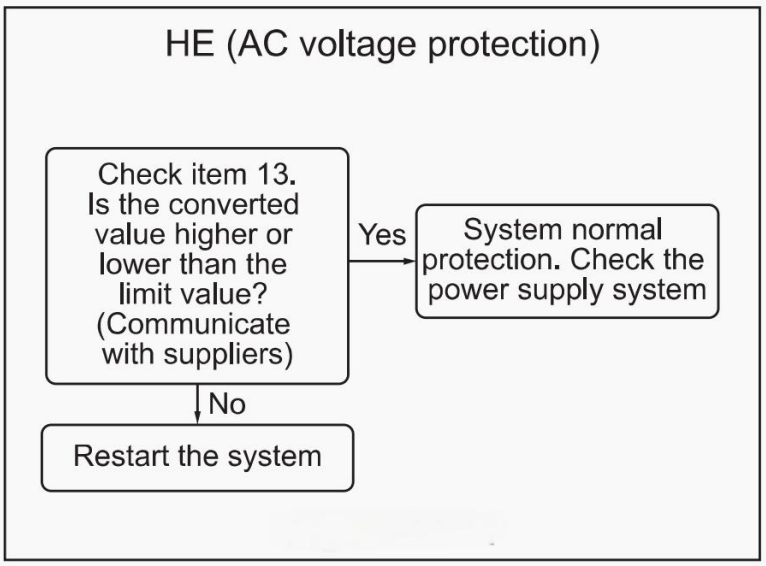


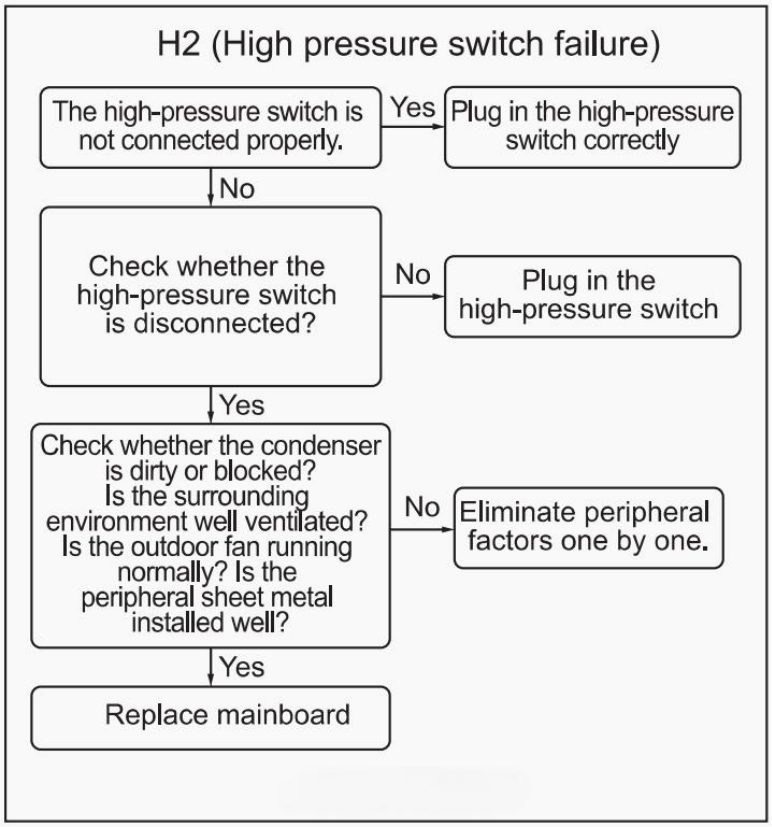

## F1/F4(HLP pressure sensor failure)

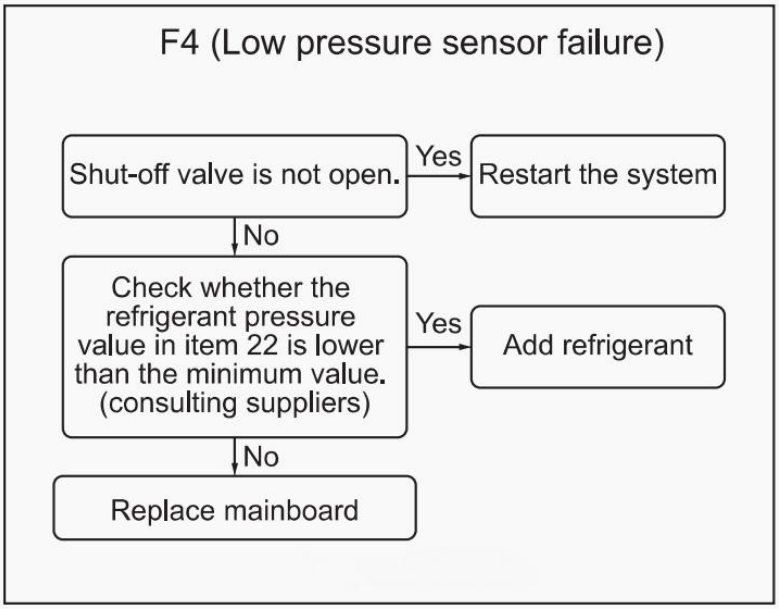


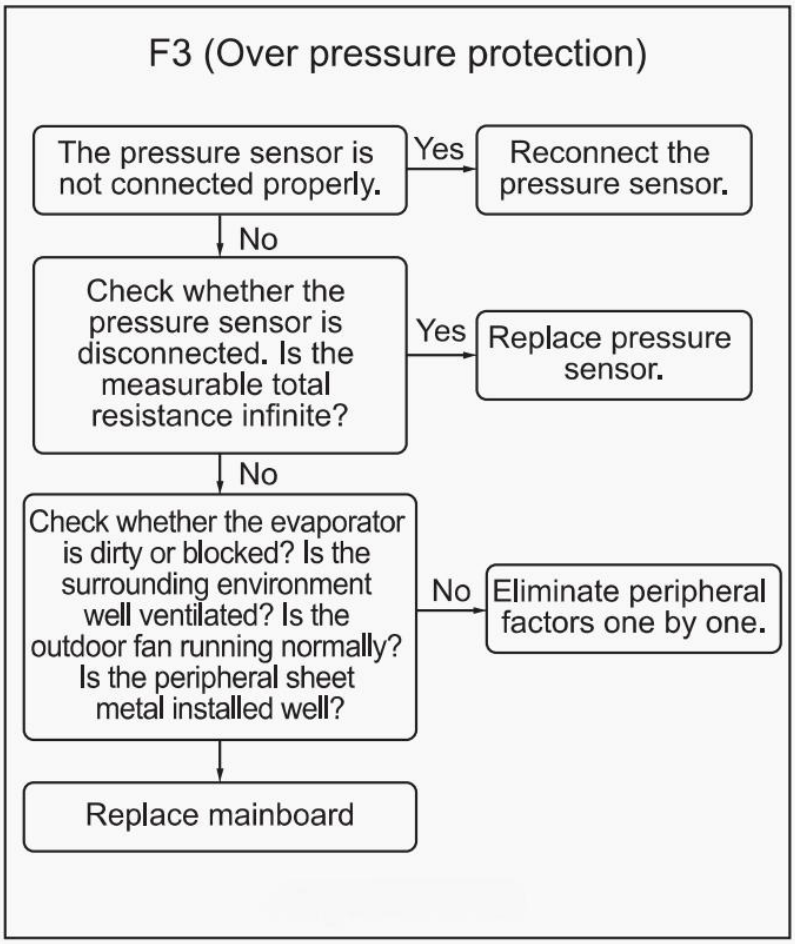

## C2/C3 (T3 / T5 sensor is not tightly plugged in, and the unit stands by abnormally)

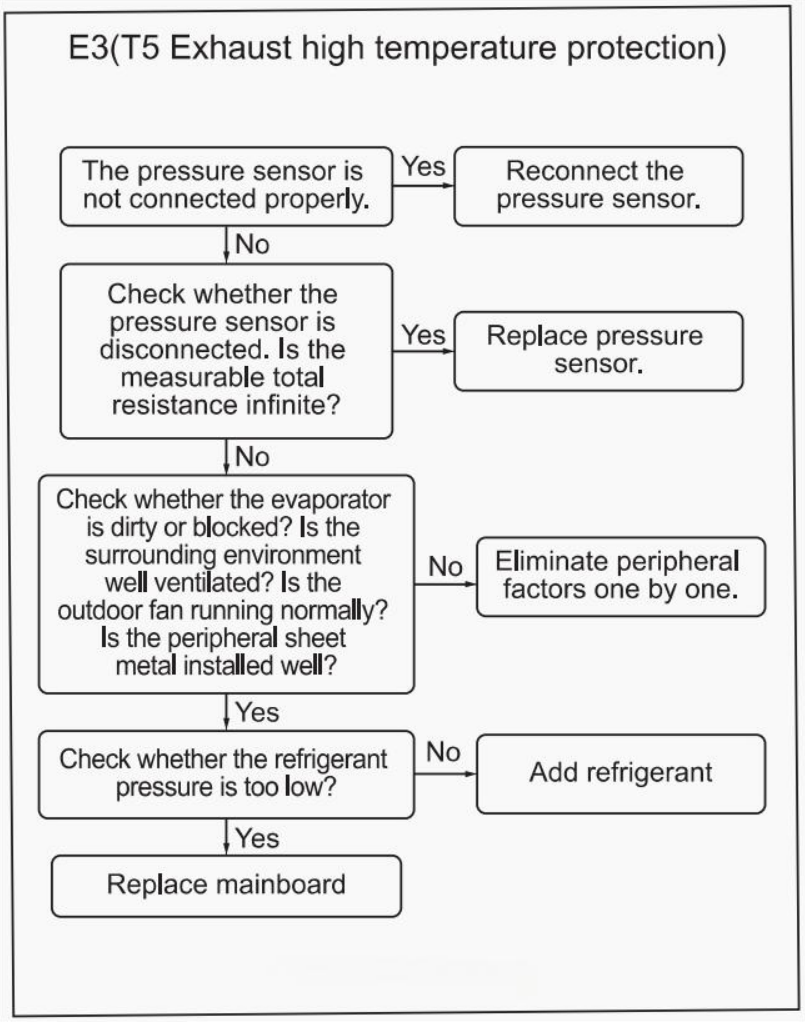



HE (AC voltage protection)
Check item 13. Is the converted value higher or lower than the limit value? (Communicate with suppliers)
Yes
System normal protection. Check the power supply system
No
Restart the system


H2 (High pressure switch failure)
The high-pressure switch is not connected properly.
Yes
Plug in the high-pressure switch correctly
No
Check whether the high-pressure switch is disconnected?
No
Plug in the high-pressure switch
Yes
Check whether the condenser is dirty or blocked? Is the surrounding environment well ventilated? Is the outdoor fan running normally? Is the peripheral sheet metal installed well?
No
Eliminate peripheral factors one by one.
Yes
Replace mainboard


F4 (Low pressure sensor failure)
Shut-off valve is not open.
Yes
Restart the system
No
Check whether the refrigerant pressure value in item 22 is lower than the minimum value. (consulting suppliers)
Yes
Add refrigerant
No
Replace mainboard


F3 (Over pressure protection)
The pressure sensor is not connected properly.
Yes
Reconnect the pressure sensor.
No
Check whether the pressure sensor is disconnected. Is the measurable total resistance infinite?
Yes
Replace pressure sensor.
No
Check whether the evaporator is dirty or blocked? Is the surrounding environment well ventilated? Is the outdoor fan running normally? Is the peripheral sheet metal installed well?
No
Eliminate peripheral factors one by one.
Replace mainboard


E3(T5 Exhaust high temperature protection)
The pressure sensor is not connected properly.
Yes
Reconnect the pressure sensor.
No
Check whether the pressure sensor is disconnected. Is the measurable total resistance infinite?
Yes
Replace pressure sensor.
No
Check whether the evaporator is dirty or blocked? Is the surrounding environment well ventilated? Is the outdoor fan running normally? Is the peripheral sheet metal installed well?
No
Eliminate peripheral factors one by one.
Yes
Check whether the refrigerant pressure is too low?
No
Add refrigerant
Yes
Replace mainboard

## H0 (Wet operation protection)

System normal protection

## LF (Overcurrent protection of primary side)

Check whether the evaporator is dirty or blocked? Is the surrounding environment well ventilated? Is the outdoor fan running normally? Is the peripheral sheet metal installed well?

Yes → Eliminate peripheral factors one by one.

No → Replace mainboard

## L0(T5 IPM A protection)

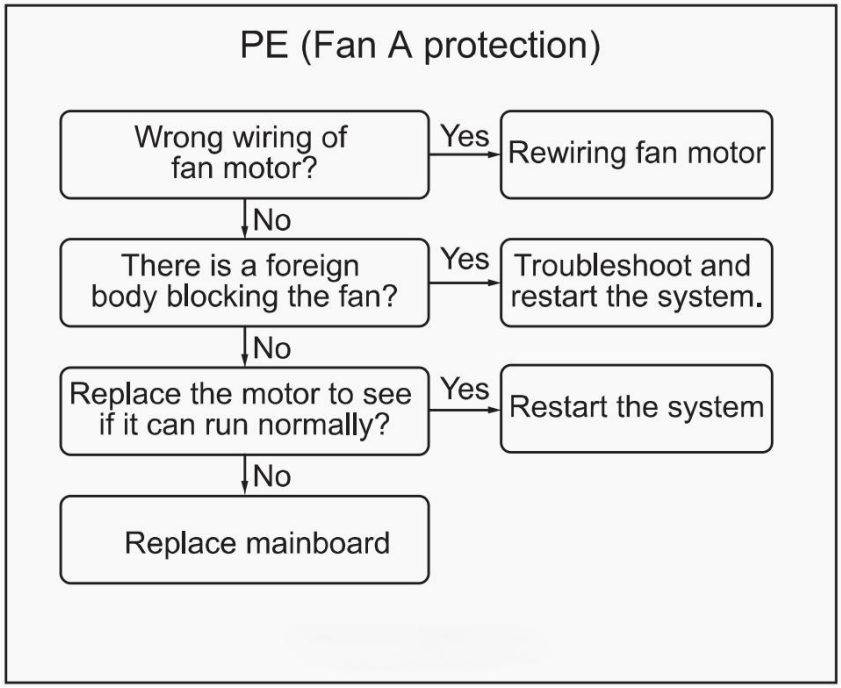
1. Check the frequency limit items and contact the supplier.
2. Replace the mainboard.

## J2（485 Communication failure）

Check whether the connections are made to the correct positions

No → Ensure connections are securely made to the corresponding positions.

Yes → Replace the PCB


PE (Fan A protection)
Wrong wiring of fan motor?
Yes
Rewiring fan motor
No
There is a foreign body blocking the fan?
Yes
Troubleshoot and restart the system.
No
Replace the motor to see if it can run normally?
Yes
Restart the system
No
Replace mainboard

# 7.Product function

## 7.1Defrost

**Defrost logic.**

**INV:** Compressor speed.

**PI:** The compressor enters the automatic control stage (non-start, oil return; automatically adjust the speed according to the temperature requirement).

**D:** Fixed coefficient. The default value is 1.5, which can be adjusted according to different models.

**F:** Fixed coefficient. The default value is 50, which can be adjusted according to different models.

**Pc:** Condensing pressure.

**T1:** IDU return wind temperature

**T2:** Indoor coil temperature

**T3:** Middle part temperature of outdoor heat exchanger.

**T4:** Ambient temperature.

**TS:** The set temperature value.

**Defrost conditions are as follows:**

First, defrost based on the T3 temperature value as the main reference:

When the unit is in heating mode, the compressor enters PI stage time ≥15 minutes and the compressor cumulatively runs time ≥30 minutes, if any of the following conditions is met, the unit will enter defrost mode:

1) T3 < -1℃, T3 < -8℃×D+T4 for 3 minutes;

2) -10℃≤T4 < -5℃, T3 < -15℃, the compressor cumulatively runs for 2 hours;

3) T4 < -10℃, T3≤-30℃ for 3 minutes, the compressor cumulatively runs for 1.5 hours;

4) T4 < -10℃, the compressor cumulatively runs time≥4 hours;

When the temperature sensor is loose, causing T3 to be overly high ,the defrost will be based on the cumulative operation time in heating mode as main reference:

When the unit is in heating mode, the compressor enters PI stage time ≥15 minutes and the compressor cumulatively runs time ≥30minutes, if any of the following conditions is met, the unit will enter defrost mode:

1) T4＜-5℃， cumulative running time in heating mode ≥D×3.5h;

2) -5℃≤T4＜6℃， cumulative running time in heating mode≥D×2h;

3) Last defrost mode run time≥7 minutes, cumulative running time in heating mode>D×50 minutes;

**Defrost mode exit conditions are as follows:**

When INV ≠ 0 (compressor is powered and running), if any of the following conditions is met, the unit will exit defrost mode:

1) T3 ≥ 15°C for F seconds;

2) Pc≥1.8MPa；

3)Defrost mode run time≥ 10 minutes;

After the unit exits defrost mode, it will re-enter defrost mode when the next defrost signal is received.

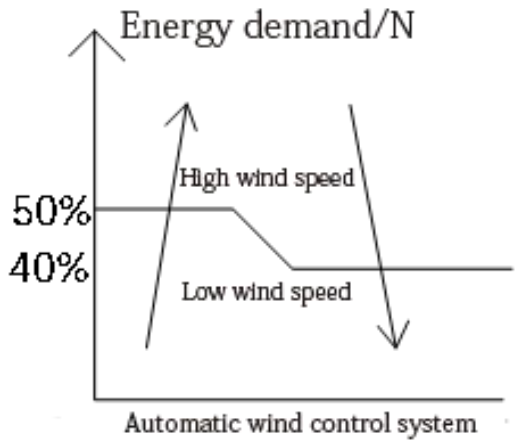
## 7.2 IDU fan control

**Note：** The wired and the thermostat have different signal output methods. For different air supply modes, please refer to the actual output damper.

| Wired | 24V Thermostat | Actual output |
|---|---|---|
| Low fan speed/Medium fan speed | G+Y1/Y1 | Low air volume |
| High fan speed/Ultra-high fan speed | G+Y1+Y2 | High air volume |
| Automatic fan speed | Only air supply mode | Automatic air volume |

1) Connect the wired:
Low fan speed, high fan speed and automatic fan speed can be selected on the wired. The actual output fan speed is shown in the table.

The automatic risk control logic for the refrigeration mode of the wired.




When operating automatically, the machine will shut down and run at low wind when the temperature is reached.

2) Connect the thermostat:
When the system is in cooling mode/heating mode, the low and high fan speed can be switched on the thermostat as needed. When the outdoor unit is in the off state or standby state, the indoor unit can be selected as the only air supply mode on the thermostat.

## 7.3 Anti-freezing protection

**1. Wired+RS485 communication**

The operating time of the refrigeration mode compressor ≥ 3 minutes then determine the anti-freezing protection:

① When T2 is ≤2℃ for 2 minutes, it enters the initial anti-freezing stage. It needs to be calculated and cannot be increased; it can only be decreased. If T2 ＞ 5℃ for 2 minutes, exit the initial anti-freezing and operate according to the normal control logic.

② When T2 is ≤2℃ for 40 minutes or T2 is < -2℃ for 5 minutes, it enters the anti-freezing stage and the energy needs to change to 0.

**Exit conditions:**

T2 > 8℃ and the compressor has been shut down for more than 5 minutes. Exit the anti-freezing function and restart the operation.

**2. Wired+24V communication / Thermostat+RS485 communication / Thermostat+24V communication**

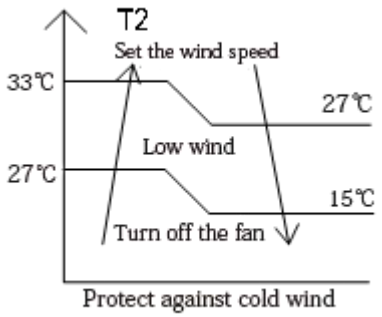
The anti-freezing protection is determined when the compressor running time in the refrigeration mode is ≥10 minutes.

When T2 ≤2℃ for 40 minutes or T2 < -2℃ for 5 minutes, enter the anti-freezing mode, disconnect the output of the indoor unit, and the indoor fan will automatically determine the operating wind speed.

**Exit conditions:**

T2 > 8 ℃ and compressor downtime > 5 minutes, exit the anti-freezing mode and restart the operation.

## 7.4 Protect against cold wind:(The electric auxiliary heating/electric heating model is ineffective)




**Note:**

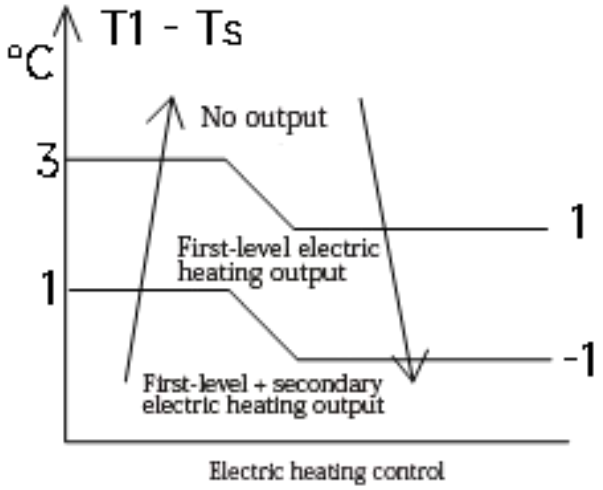
**24V thermostat:** there are mandatory for high wind, when the the signal of the indoor unit fan and the output demand signal of the compressor or demand signal for electric auxiliary heating gear;

**Electric heating machine:** so long as has the electric heating signal is forced high wind gear;

**Wired:** according to the line control air damper set to output itself, if machine is electrical heating, as long as there is electric heating signal is forced high wind gear;

## 7.5 Electric heating control: (Only effective for pure electric heating models)

Note：When it is a pure electric heating model, the energy demand is not calculated and the outdoor unit is in standby mode.
1) Connect the wired:
When the device is turned off, turn on the heating mode. Run it at high wind speed for 10 seconds first, and then determine the electric heating control. Switching mode to the heating fan must run 10 seconds and then judge the electric heating. within 10 minutes electric heating output logic output referring to the following:



Electric heating control

After the electric heating output for 10 minutes, if T1-Ts≤0℃ and the current T1-Ts≤ (Ts-$T1_{-1}$ 10 minutes ago), output the secondary electric heating; T1-Ts≤1℃, disconnect the output of the secondary electric heating;

2) Connect the thermostat:
1. Receive the First-level electric heating signal by the 24V thermostat and output First-level electric heating;
2. Receive the First-level + secondary electric heating signal by the 24V thermostat and output First-level + secondary electric heating;

## 7.6 Refrigerant detection function:

1) Judgment condition: When the gas LFL concentration ≥10%, the refrigerant is leaking. (The concentration is based on the value set by the refrigerant sensor manufacturer during UL certification.)
2) Recovery conditions: When the gas LFL concentration is less than 3% and lasts for 5 minutes, the sensor leakage fault is recovered.
When receiving sensor refrigerant leakage failure:
1.The circuit loop (OR) disconnects the output;
2.Warning control (RY4) closed output;
3.Forced the IDU fan in high wind;
4.lights flashing LED failures;
5.The ODU stop running;
After receiving sensor refrigerant leakage fault recovery, recovery IDU delay within 5 minutes.
3) During normal operation, the circuit loop (OR) normally closed.
4) Refrigerant detection sensor damage or communications failure, the ODU and IDU stop running.

## Appendix：R-T table:

| B25/50=3950±2%，R25=20K±3% | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Temp | | Resistance(KΩ) | | | Temp | | Resistance(KΩ) | | |
| （℃） | （℉） | Rmax | R(t)Normal | Rmin | （℃） | （℉） | Rmax | R(t)Normal | Rmin |
| -30 | -22 | 355.555 | 325.630 | 295.705 | 38 | 100 | 11.994 | 11.540 | 11.086 |
| -29 | -20 | 335.108 | 307.220 | 279.332 | 39 | 102 | 11.524 | 11.080 | 10.636 |
| -28 | -18 | 315.933 | 289.940 | 263.947 | 40 | 104 | 11.074 | 10.640 | 10.206 |
| -27 | -17 | 297.951 | 273.720 | 249.489 | 41 | 106 | 10.644 | 10.220 | 9.796 |
| -26 | -15 | 281.071 | 258.480 | 235.889 | 42 | 108 | 10.234 | 9.820 | 9.406 |
| -25 | -13 | 265.235 | 244.170 | 223.105 | 43 | 109 | 9.834 | 9.430 | 9.026 |
| -24 | -11 | 250.365 | 230.720 | 211.075 | 44 | 111 | 9.466 | 9.070 | 8.674 |
| -23 | -9 | 236.393 | 218.070 | 199.747 | 45 | 113 | 9.096 | 8.710 | 8.324 |
| -22 | -8 | 223.272 | 206.180 | 189.088 | 46 | 115 | 8.757 | 8.380 | 8.003 |
| -21 | -6 | 210.935 | 194.990 | 179.045 | 47 | 117 | 8.429 | 8.060 | 7.691 |
| -20 | -4 | 199.347 | 184.470 | 169.593 | 48 | 118 | 8.110 | 7.750 | 7.390 |
| -19 | -2 | 188.441 | 174.560 | 160.679 | 49 | 120 | 7.812 | 7.460 | 7.108 |
| -18 | 0 | 178.194 | 165.240 | 152.286 | 50 | 122 | 7.524 | 7.180 | 6.836 |
| -17 | 1 | 168.539 | 156.450 | 144.361 | 51 | 124 | 7.246 | 6.910 | 6.574 |
| -16 | 3 | 159.463 | 148.180 | 136.897 | 52 | 126 | 6.978 | 6.650 | 6.322 |
| -15 | 5 | 150.911 | 140.380 | 129.849 | 53 | 127 | 6.720 | 6.400 | 6.080 |
| -14 | 7 | 142.860 | 133.030 | 123.200 | 54 | 129 | 6.483 | 6.170 | 5.857 |
| -13 | 9 | 135.276 | 126.100 | 116.924 | 55 | 131 | 6.246 | 5.940 | 5.634 |
| -12 | 10 | 128.125 | 119.560 | 110.995 | 56 | 133 | 6.019 | 5.720 | 5.421 |
| -11 | 12 | 121.386 | 113.390 | 105.394 | 57 | 135 | 5.802 | 5.510 | 5.218 |
| -10 | 14 | 115.034 | 107.570 | 100.106 | 58 | 136 | 5.595 | 5.310 | 5.025 |
| -9 | 16 | 109.049 | 102.080 | 95.111 | 59 | 138 | 5.398 | 5.120 | 4.842 |
| -8 | 18 | 103.395 | 96.890 | 90.385 | 60 | 140 | 5.212 | 4.940 | 4.668 |
| -7 | 19 | 98.063 | 91.990 | 85.917 | 61 | 142 | 5.026 | 4.760 | 4.494 |
| -6 | 21 | 93.029 | 87.360 | 81.691 | 62 | 144 | 4.860 | 4.600 | 4.340 |
| -5 | 23 | 88.282 | 82.990 | 77.698 | 63 | 145 | 4.683 | 4.430 | 4.177 |
| -4 | 25 | 83.800 | 78.860 | 73.920 | 64 | 147 | 4.528 | 4.280 | 4.032 |
| -3 | 27 | 79.560 | 74.950 | 70.340 | 65 | 149 | 4.372 | 4.130 | 3.888 |
| -2 | 28 | 75.553 | 71.250 | 66.947 | 66 | 151 | 4.216 | 3.980 | 3.744 |
| -1 | 30 | 71.776 | 67.760 | 63.744 | 67 | 153 | 4.081 | 3.850 | 3.619 |
| 0 | 32 | 68.197 | 64.450 | 60.703 | 68 | 154 | 3.936 | 3.710 | 3.484 |
| 1 | 34 | 64.816 | 61.320 | 57.824 | 69 | 156 | 3.811 | 3.590 | 3.369 |
| 2 | 36 | 61.621 | 58.360 | 55.099 | 70 | 158 | 3.686 | 3.470 | 3.254 |
| 3 | 37 | 58.592 | 55.550 | 52.508 | 71 | 160 | 3.561 | 3.350 | 3.139 |
| 4 | 39 | 55.727 | 52.890 | 50.053 | 72 | 162 | 3.436 | 3.230 | 3.024 |
| 5 | 41 | 53.015 | 50.370 | 47.725 | 73 | 163 | 3.332 | 3.130 | 2.928 |
| 6 | 43 | 50.456 | 47.990 | 45.524 | 74 | 165 | 3.217 | 3.020 | 2.823 |
| 7 | 45 | 48.028 | 45.730 | 43.432 | 75 | 167 | 3.112 | 2.920 | 2.728 |
| 8 | 46 | 45.721 | 43.580 | 41.439 | 76 | 169 | 3.008 | 2.820 | 2.632 |
| 9 | 48 | 43.545 | 41.550 | 39.555 | 77 | 171 | 2.914 | 2.730 | 2.546 |
| 10 | 50 | 41.477 | 39.620 | 37.763 | 78 | 172 | 2.819 | 2.640 | 2.461 |
| 11 | 52 | 39.519 | 37.790 | 36.061 | 79 | 174 | 2.736 | 2.560 | 2.384 |
| 12 | 54 | 37.669 | 36.060 | 34.451 | 80 | 176 | 2.641 | 2.470 | 2.299 |
| 13 | 55 | 35.907 | 34.410 | 32.913 | 81 | 178 | 2.558 | 2.390 | 2.222 |
| 14 | 57 | 34.232 | 32.840 | 31.448 | 82 | 180 | 2.484 | 2.320 | 2.156 |
| 15 | 59 | 32.654 | 31.360 | 30.066 | 83 | 181 | 2.400 | 2.240 | 2.080 |
| 16 | 61 | 31.152 | 29.950 | 28.748 | 84 | 183 | 2.327 | 2.170 | 2.013 |
| 17 | 63 | 29.726 | 28.610 | 27.494 | 85 | 185 | 2.253 | 2.100 | 1.947 |
| 18 | 64 | 28.365 | 27.330 | 26.295 | 86 | 187 | 2.190 | 2.040 | 1.890 |
| 19 | 66 | 27.080 | 26.120 | 25.160 | 87 | 189 | 2.117 | 1.970 | 1.823 |
| 20 | 68 | 25.860 | 24.970 | 24.080 | 88 | 190 | 2.053 | 1.910 | 1.767 |
| 21 | 70 | 24.694 | 23.870 | 23.046 | 89 | 192 | 1.990 | 1.850 | 1.710 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 22 | 72 | 23.592 | 22.830 | 22.068 | 90 | 194 | 1.927 | 1.790 | 1.653 |
| 23 | 73 | 22.544 | 21.840 | 21.136 | 91 | 196 | 1.874 | 1.740 | 1.606 |
| 24 | 75 | 21.551 | 20.900 | 20.249 | 92 | 198 | 1.811 | 1.680 | 1.549 |
| 25 | 77 | 20.600 | 20.000 | 19.400 | 93 | 199 | 1.758 | 1.630 | 1.502 |
| 26 | 79 | 19.738 | 19.150 | 18.562 | 94 | 201 | 1.705 | 1.580 | 1.455 |
| 27 | 81 | 18.906 | 18.330 | 17.754 | 95 | 203 | 1.663 | 1.540 | 1.417 |
| 28 | 82 | 18.125 | 17.560 | 16.995 | 96 | 205 | 1.610 | 1.490 | 1.370 |
| 29 | 84 | 17.373 | 16.820 | 16.267 | 97 | 207 | 1.557 | 1.440 | 1.323 |
| 30 | 86 | 16.651 | 16.110 | 15.569 | 98 | 208 | 1.515 | 1.400 | 1.285 |
| 31 | 88 | 15.970 | 15.440 | 14.910 | 99 | 210 | 1.473 | 1.360 | 1.247 |
| 32 | 90 | 15.318 | 14.800 | 14.282 | 100 | 212 | 1.431 | 1.320 | 1.209 |
| 33 | 91 | 14.697 | 14.190 | 13.683 | 101 | 214 | 1.388 | 1.280 | 1.172 |
| 34 | 93 | 14.106 | 13.610 | 13.114 | 102 | 216 | 1.346 | 1.240 | 1.134 |
| 35 | 95 | 13.545 | 13.060 | 12.575 | 103 | 217 | 1.314 | 1.210 | 1.106 |
| 36 | 97 | 13.005 | 12.530 | 12.055 | 104 | 219 | 1.271 | 1.170 | 1.069 |
| 37 | 99 | 12.484 | 12.020 | 11.556 | 105 | 221 | 1.240 | 1.140 | 1.040 |

| B25/50=3950±2%，R25=50K±3% | | | | | | |
|---|---|---|---|---|---|---|
| Temp | | Resistance（KΩ） | | | Resistance tolerance% | |
| (℃) | (℉) | Rmax | R(t)Normal | Rmin | MAX(+) | MIN(-) |
| -30 | -22 | 966.754 | 876.526 | 786.298 | 10.29 | 10.29 |
| -29 | -20 | 908.098 | 824.335 | 740.572 | 10.16 | 10.16 |
| -28 | -18 | 853.332 | 775.555 | 697.778 | 10.03 | 10.03 |
| -27 | -17 | 802.185 | 729.949 | 657.713 | 9.90 | 9.90 |
| -26 | -15 | 754.398 | 687.295 | 620.192 | 9.76 | 9.76 |
| -25 | -13 | 709.736 | 647.388 | 585.040 | 9.63 | 9.63 |
| -24 | -11 | 667.979 | 610.037 | 552.095 | 9.50 | 9.50 |
| -23 | -9 | 628.922 | 575.064 | 521.206 | 9.37 | 9.37 |
| -22 | -8 | 592.377 | 542.306 | 492.235 | 9.23 | 9.23 |
| -21 | -6 | 558.169 | 511.611 | 465.053 | 9.10 | 9.10 |
| -20 | -4 | 526.136 | 482.837 | 439.538 | 8.97 | 8.97 |
| -19 | -2 | 496.128 | 455.853 | 415.578 | 8.84 | 8.84 |
| -18 | 0 | 468.006 | 430.539 | 393.072 | 8.70 | 8.70 |
| -17 | 1 | 441.643 | 406.782 | 371.921 | 8.57 | 8.57 |
| -16 | 3 | 416.916 | 384.477 | 352.038 | 8.44 | 8.44 |
| -15 | 5 | 393.715 | 363.526 | 333.337 | 8.30 | 8.30 |
| -14 | 7 | 371.940 | 343.841 | 315.742 | 8.17 | 8.17 |
| -13 | 9 | 351.492 | 325.337 | 299.182 | 8.04 | 8.04 |
| -12 | 10 | 332.284 | 307.936 | 283.588 | 7.91 | 7.91 |
| -11 | 12 | 314.235 | 291.568 | 268.901 | 7.77 | 7.77 |
| -10 | 14 | 297.267 | 276.164 | 255.061 | 7.64 | 7.64 |
| -9 | 16 | 281.310 | 261.662 | 242.014 | 7.51 | 7.51 |
| -8 | 18 | 266.299 | 248.005 | 229.711 | 7.38 | 7.38 |
| -7 | 19 | 252.172 | 235.139 | 218.106 | 7.24 | 7.24 |
| -6 | 21 | 238.872 | 223.013 | 207.154 | 7.11 | 7.11 |
| -5 | 23 | 226.345 | 211.580 | 196.815 | 6.98 | 6.98 |
| -4 | 25 | 214.544 | 200.798 | 187.052 | 6.85 | 6.85 |
| -3 | 27 | 203.422 | 190.625 | 177.828 | 6.71 | 6.71 |
| -2 | 28 | 192.936 | 181.024 | 169.112 | 6.58 | 6.58 |
| -1 | 30 | 183.048 | 171.960 | 160.872 | 6.45 | 6.45 |
| 0 | 32 | 173.719 | 163.400 | 153.081 | 6.32 | 6.32 |
| 1 | 34 | 164.916 | 155.313 | 145.710 | 6.18 | 6.18 |
| 2 | 36 | 156.604 | 147.670 | 138.736 | 6.05 | 6.05 |
| 3 | 37 | 148.757 | 140.446 | 132.135 | 5.92 | 5.92 |
| 4 | 39 | 141.343 | 133.614 | 125.885 | 5.78 | 5.78 |
| 5 | 41 | 134.338 | 127.151 | 119.964 | 5.65 | 5.65 |
| 6 | 43 | 127.717 | 121.036 | 114.355 | 5.52 | 5.52 |
| 7 | 45 | 121.458 | 115.249 | 109.040 | 5.39 | 5.39 |
| 8 | 46 | 115.537 | 109.769 | 104.001 | 5.25 | 5.25 |
| 9 | 48 | 109.935 | 104.579 | 99.223 | 5.12 | 5.12 |
| 10 | 50 | 104.635 | 99.663 | 94.691 | 4.99 | 4.99 |
| 11 | 52 | 99.618 | 95.004 | 90.390 | 4.86 | 4.86 |
| 12 | 54 | 94.868 | 90.589 | 86.310 | 4.72 | 4.72 |
| 13 | 55 | 90.369 | 86.402 | 82.435 | 4.59 | 4.59 |
| 14 | 57 | 86.106 | 82.431 | 78.756 | 4.46 | 4.46 |
| 15 | 59 | 82.067 | 78.664 | 75.261 | 4.33 | 4.33 |
| 16 | 61 | 78.238 | 75.089 | 71.940 | 4.19 | 4.19 |
| 17 | 63 | 74.608 | 71.696 | 68.784 | 4.06 | 4.06 |
| 18 | 64 | 71.165 | 68.475 | 65.785 | 3.93 | 3.93 |
| 19 | 66 | 67.899 | 65.416 | 62.933 | 3.80 | 3.80 |
| 20 | 68 | 64.800 | 62.510 | 60.220 | 3.66 | 3.66 |
| 21 | 70 | 61.858 | 59.749 | 57.640 | 3.53 | 3.53 |
| 22 | 72 | 59.065 | 57.124 | 55.183 | 3.40 | 3.40 |
| 23 | 73 | 56.413 | 54.629 | 52.845 | 3.27 | 3.27 |
| 24 | 75 | 53.894 | 52.257 | 50.620 | 3.13 | 3.13 |
| 25 | 77 | 51.500 | 50.000 | 48.500 | 3.00 | 3.00 |
| 26 | 79 | 49.324 | 47.853 | 46.382 | 3.07 | 3.07 |
| 27 | 81 | 47.251 | 45.810 | 44.369 | 3.15 | 3.15 |
| 28 | 82 | 45.277 | 43.865 | 42.453 | 3.22 | 3.22 |

| 29 | 84 | 43.396 | 42.013 | 40.630 | 3.29 | 3.29 |
|---|---|---|---|---|---|---|
| 30 | 86 | 41.605 | 40.250 | 38.895 | 3.37 | 3.37 |
| 31 | 88 | 39.896 | 38.570 | 37.244 | 3.44 | 3.44 |
| 32 | 90 | 38.267 | 36.969 | 35.671 | 3.51 | 3.51 |
| 33 | 91 | 36.714 | 35.443 | 34.172 | 3.58 | 3.58 |
| 34 | 93 | 35.232 | 33.989 | 32.746 | 3.66 | 3.66 |
| 35 | 95 | 33.818 | 32.602 | 31.386 | 3.73 | 3.73 |
| 36 | 97 | 32.469 | 31.279 | 30.089 | 3.80 | 3.80 |
| 37 | 99 | 31.181 | 30.017 | 28.853 | 3.88 | 3.88 |
| 38 | 100 | 29.951 | 28.813 | 27.675 | 3.95 | 3.95 |
| 39 | 102 | 28.776 | 27.663 | 26.550 | 4.02 | 4.02 |
| 40 | 104 | 27.654 | 26.566 | 25.478 | 4.10 | 4.10 |
| 41 | 106 | 26.581 | 25.517 | 24.453 | 4.17 | 4.17 |
| 42 | 108 | 25.556 | 24.516 | 23.476 | 4.24 | 4.24 |
| 43 | 109 | 24.577 | 23.560 | 22.543 | 4.32 | 4.32 |
| 44 | 111 | 23.640 | 22.646 | 21.652 | 4.39 | 4.39 |
| 45 | 113 | 22.744 | 21.772 | 20.800 | 4.46 | 4.46 |
| 46 | 115 | 21.886 | 20.936 | 19.986 | 4.54 | 4.54 |
| 47 | 117 | 21.065 | 20.137 | 19.209 | 4.61 | 4.61 |
| 48 | 118 | 20.280 | 19.373 | 18.466 | 4.68 | 4.68 |
| 49 | 120 | 19.527 | 18.641 | 17.755 | 4.75 | 4.75 |
| 50 | 122 | 18.807 | 17.941 | 17.075 | 4.83 | 4.83 |
| 51 | 124 | 18.117 | 17.271 | 16.425 | 4.90 | 4.90 |
| 52 | 126 | 17.456 | 16.629 | 15.802 | 4.97 | 4.97 |
| 53 | 127 | 16.822 | 16.014 | 15.206 | 5.05 | 5.05 |
| 54 | 129 | 16.216 | 15.426 | 14.636 | 5.12 | 5.12 |
| 55 | 131 | 15.633 | 14.861 | 14.089 | 5.19 | 5.19 |
| 56 | 133 | 15.075 | 14.321 | 13.567 | 5.27 | 5.27 |
| 57 | 135 | 14.539 | 13.802 | 13.065 | 5.34 | 5.34 |
| 58 | 136 | 14.025 | 13.305 | 12.585 | 5.41 | 5.41 |
| 59 | 138 | 13.532 | 12.828 | 12.124 | 5.49 | 5.49 |
| 60 | 140 | 13.059 | 12.371 | 11.683 | 5.56 | 5.56 |
| 61 | 142 | 12.604 | 11.932 | 11.260 | 5.63 | 5.63 |
| 62 | 144 | 12.168 | 11.511 | 10.854 | 5.71 | 5.71 |
| 63 | 145 | 11.749 | 11.107 | 10.465 | 5.78 | 5.78 |
| 64 | 147 | 11.346 | 10.719 | 10.092 | 5.85 | 5.85 |
| 65 | 149 | 10.959 | 10.346 | 9.733 | 5.92 | 5.92 |
| 66 | 151 | 10.587 | 9.988 | 9.389 | 6.00 | 6.00 |
| 67 | 153 | 10.229 | 9.644 | 9.059 | 6.07 | 6.07 |
| 68 | 154 | 9.885 | 9.313 | 8.741 | 6.14 | 6.14 |
| 69 | 156 | 9.554 | 8.995 | 8.436 | 6.22 | 6.22 |
| 70 | 158 | 9.237 | 8.690 | 8.143 | 6.29 | 6.29 |
| 71 | 160 | 8.930 | 8.396 | 7.862 | 6.36 | 6.36 |
| 72 | 162 | 8.636 | 8.114 | 7.592 | 6.44 | 6.44 |
| 73 | 163 | 8.352 | 7.842 | 7.332 | 6.51 | 6.51 |
| 74 | 165 | 8.080 | 7.581 | 7.082 | 6.58 | 6.58 |
| 75 | 167 | 7.818 | 7.330 | 6.842 | 6.66 | 6.66 |
| 76 | 169 | 7.565 | 7.088 | 6.611 | 6.73 | 6.73 |
| 77 | 171 | 7.321 | 6.855 | 6.389 | 6.80 | 6.80 |
| 78 | 172 | 7.087 | 6.631 | 6.175 | 6.88 | 6.88 |
| 79 | 174 | 6.861 | 6.415 | 5.969 | 6.95 | 6.95 |
| 80 | 176 | 6.643 | 6.207 | 5.771 | 7.02 | 7.02 |
| 81 | 178 | 6.433 | 6.007 | 5.581 | 7.09 | 7.09 |
| 82 | 180 | 6.231 | 5.814 | 5.397 | 7.17 | 7.17 |
| 83 | 181 | 6.036 | 5.628 | 5.220 | 7.24 | 7.24 |
| 84 | 183 | 5.848 | 5.449 | 5.050 | 7.31 | 7.31 |
| 85 | 185 | 5.667 | 5.277 | 4.887 | 7.39 | 7.39 |
| 86 | 187 | 5.492 | 5.111 | 4.730 | 7.46 | 7.46 |
| 87 | 189 | 5.324 | 4.951 | 4.578 | 7.53 | 7.53 |
| 88 | 190 | 5.161 | 4.796 | 4.431 | 7.61 | 7.61 |
| 89 | 192 | 5.005 | 4.648 | 4.291 | 7.68 | 7.68 |
| 90 | 194 | 4.853 | 4.504 | 4.155 | 7.75 | 7.75 |
| 91 | 196 | 4.708 | 4.366 | 4.024 | 7.83 | 7.83 |

| 92 | 198 | 4.566 | 4.232 | 3.898 | 7.90 | 7.90 |
|---|---|---|---|---|---|---|
| 93 | 199 | 4.431 | 4.104 | 3.777 | 7.97 | 7.97 |
| 94 | 201 | 4.300 | 3.980 | 3.660 | 8.05 | 8.05 |
| 95 | 203 | 4.173 | 3.860 | 3.547 | 8.12 | 8.12 |
| 96 | 205 | 4.052 | 3.745 | 3.438 | 8.19 | 8.19 |
| 97 | 207 | 3.933 | 3.633 | 3.333 | 8.26 | 8.26 |
| 98 | 208 | 3.820 | 3.526 | 3.232 | 8.34 | 8.34 |
| 99 | 210 | 3.710 | 3.422 | 3.134 | 8.41 | 8.41 |
| 100 | 212 | 3.604 | 3.322 | 3.040 | 8.48 | 8.48 |
| 101 | 214 | 3.501 | 3.225 | 2.949 | 8.56 | 8.56 |
| 102 | 216 | 3.402 | 3.132 | 2.862 | 8.63 | 8.63 |
| 103 | 217 | 3.307 | 3.042 | 2.777 | 8.70 | 8.70 |
| 104 | 219 | 3.214 | 2.955 | 2.696 | 8.78 | 8.78 |
| 105 | 221 | 3.126 | 2.872 | 2.618 | 8.85 | 8.85 |
| 106 | 223 | 3.040 | 2.791 | 2.542 | 8.92 | 8.92 |
| 107 | 225 | 2.956 | 2.712 | 2.468 | 9.00 | 9.00 |
| 108 | 226 | 2.876 | 2.637 | 2.398 | 9.07 | 9.07 |
| 109 | 228 | 2.798 | 2.564 | 2.330 | 9.14 | 9.14 |
| 110 | 230 | 2.724 | 2.494 | 2.264 | 9.22 | 9.22 |
| 111 | 232 | 2.651 | 2.426 | 2.201 | 9.29 | 9.29 |
| 112 | 234 | 2.581 | 2.360 | 2.139 | 9.36 | 9.36 |
| 113 | 235 | 2.513 | 2.296 | 2.079 | 9.43 | 9.43 |
| 114 | 237 | 2.447 | 2.235 | 2.023 | 9.51 | 9.51 |
| 115 | 239 | 2.384 | 2.176 | 1.968 | 9.58 | 9.58 |
| 116 | 241 | 2.322 | 2.118 | 1.914 | 9.65 | 9.65 |
| 117 | 243 | 2.264 | 2.063 | 1.862 | 9.73 | 9.73 |
| 118 | 244 | 2.206 | 2.009 | 1.812 | 9.80 | 9.80 |
| 119 | 246 | 2.150 | 1.957 | 1.764 | 9.87 | 9.87 |
| 120 | 248 | 2.097 | 1.907 | 1.717 | 9.95 | 9.95 |
| 121 | 250 | 2.044 | 1.858 | 1.672 | 10.02 | 10.02 |
| 122 | 252 | 1.994 | 1.811 | 1.628 | 10.09 | 10.09 |
| 123 | 253 | 1.946 | 1.766 | 1.586 | 10.17 | 10.17 |
| 124 | 255 | 1.897 | 1.721 | 1.545 | 10.24 | 10.24 |
| 125 | 257 | 1.852 | 1.679 | 1.506 | 10.31 | 10.31 |
| 126 | 259 | 1.807 | 1.637 | 1.467 | 10.39 | 10.39 |
| 127 | 261 | 1.764 | 1.597 | 1.430 | 10.46 | 10.46 |
| 128 | 262 | 1.721 | 1.557 | 1.393 | 10.53 | 10.53 |
| 129 | 264 | 1.680 | 1.519 | 1.358 | 10.60 | 10.60 |
| 130 | 266 | 1.640 | 1.482 | 1.324 | 10.68 | 10.68 |
| 131 | 268 | 1.601 | 1.446 | 1.291 | 10.75 | 10.75 |
| 132 | 270 | 1.564 | 1.411 | 1.258 | 10.82 | 10.82 |
| 133 | 271 | 1.527 | 1.377 | 1.227 | 10.90 | 10.90 |
| 134 | 273 | 1.491 | 1.344 | 1.197 | 10.97 | 10.97 |
| 135 | 275 | 1.457 | 1.312 | 1.167 | 11.04 | 11.04 |
| 136 | 277 | 1.422 | 1.280 | 1.138 | 11.12 | 11.12 |
| 137 | 279 | 1.389 | 1.249 | 1.109 | 11.19 | 11.19 |
| 138 | 280 | 1.356 | 1.219 | 1.082 | 11.26 | 11.26 |
| 139 | 282 | 1.324 | 1.189 | 1.054 | 11.34 | 11.34 |
| 140 | 284 | 1.292 | 1.160 | 1.028 | 11.41 | 11.41 |
| 141 | 286 | 1.261 | 1.131 | 1.001 | 11.48 | 11.48 |
| 142 | 288 | 1.230 | 1.103 | 0.976 | 11.56 | 11.56 |
| 143 | 289 | 1.200 | 1.075 | 0.950 | 11.63 | 11.63 |
| 144 | 291 | 1.171 | 1.048 | 0.925 | 11.70 | 11.70 |
| 145 | 293 | 1.141 | 1.021 | 0.901 | 11.77 | 11.77 |
| 146 | 295 | 1.112 | 0.994 | 0.876 | 11.85 | 11.85 |
| 147 | 297 | 1.083 | 0.968 | 0.853 | 11.92 | 11.92 |
| 148 | 298 | 1.055 | 0.942 | 0.829 | 11.99 | 11.99 |
| 149 | 300 | 1.027 | 0.916 | 0.805 | 12.07 | 12.07 |
| 150 | 302 | 0.998 | 0.890 | 0.782 | 12.14 | 12.14 |