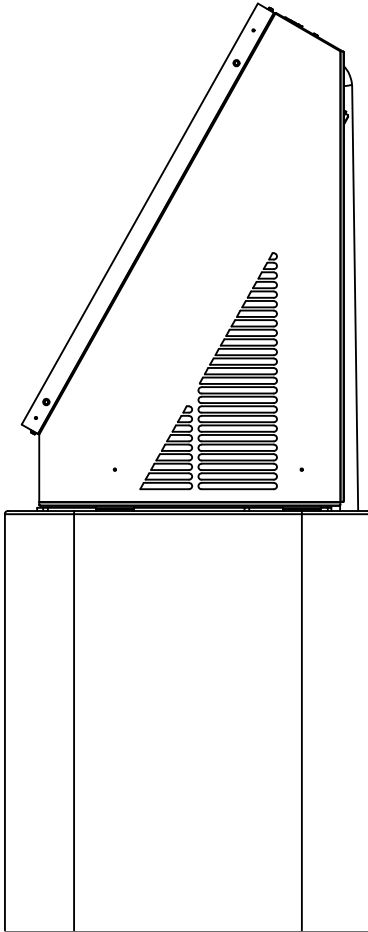




Model "Z"
Condenser Only
Solar HVAC
I/O/M manual

Air conditioning & Heating

Split System Heat Pump & Air Conditioner 3 Tons R410A



NOTE: Appearance of unit may vary.

ALL phases of this installation must comply with NATIONAL, STATE AND LOCAL CODES

IMPORTANT - This Document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

Note : The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are A.H.R.I. 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.




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Safety:

important- This document contains a wiring diagram and service information. This is customer property and is to remain with this unit. Please return to service information pack upon completion of work.


 **CAUTION**

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

 **WARNING**

HAZARDOUS VOLTAGE!


Failure to follow this warning could result in property damage, severe personal injury, or death. Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized.

 **WARNING**

REFRIGERANT OIL!


Any attempt to repair a central air conditioning product may result in property damage, severe personal injury, or death.

These units use R-410A refrigerant which operates at 50 to 70% higher pressures than R-22. Use only R-410A approved service equipment. Refrigerant cylinders are painted a "Rose" color to indicate the type of refrigerant and may contain a "dip" tube to allow for charging of liquid refrigerant into the system. All R-410A systems with variable speed compressors use a PVE oil that readily absorbs moisture from the atmosphere. To limit this "hygroscopic" action, the system should remain sealed whenever possible. If a system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.

 **CAUTION**

HOT SURFACE!


May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury. Do not touch top of compressor.

 **CAUTION**

CONTAINS REFRIGERANT!


Failure to follow proper procedures can result in personal illness or injury or severe equipment damage.

System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.

 **CAUTION**


GROUNDING REQUIRED!

Failure to inspect or use proper service tools may result in equipment damage or personal injury. Reconnect all grounding devices. All parts of this product that are capable of conducting electrical current are grounded. If grounding wires, screws, straps, clips, nuts, or washers used to complete a path to ground are removed for service, they must be returned to their original position and properly fastened.

 **WARNING**


SERVICE VALVES!

Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and/or property damage. Extreme caution should be exercised when opening the Liquid Line Service valve. Turn valve stem counterclockwise only until the stem contacts the rolled edge. No torque is required.

 **WARNING**

BRAZING REQUIRED!

Failure to inspect lines or use proper service tools may result in equipment damage or personal injury. If using existing refrigerant lines make certain that all joints are brazed, not soldered.

 **WARNING**

HIGH LEAKAGE CURRENT!

Failure to follow this warning could result in property damage, severe personal injury, or death. Earth connection essential before connecting electrical supply.

Model "Z" Part Number Scheme

SHR1Z- 23 4 5 67 8 910 11 - 12

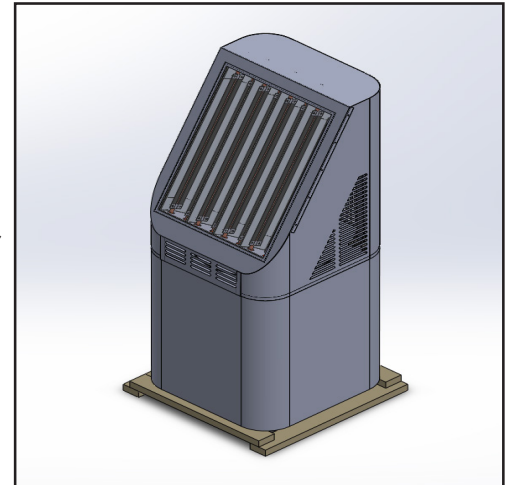
| Type (1) | BTU's (2,3) | Fan (4) | Voltage (5) | Electric Heat (6,7) | Heat Stages (8) |
|--|--|--|---|---------------------|-----------------|
| D - Cooling Only P - Heat Pump | 24 - 24,000 BTUs 36 - 36,000 BTUs 48 - 48,000 BTUs 60 - 60,000 BTUs | 0 - No Fan | G - 230 VAC 1 ϕ H - 230VAC 3 ϕ | 00 - No Heat | A - No Controls |
| Disconnect (9,10) | Configuration (11) | Options (12) | | | |
| 00 - No Disconnect 01 - 240V - 30A Fuse 11 - 240V - 30A Switch | 0 - Condenser Only | 0 - No Options D - Condenser Coil (UG) Y - Start Up 7 - Phase Monitor | | | |

Model "Z" Description

A Solar HVAC Residential Unit is more than twice as efficient as a standard residential split unit.

A solar box equipped with chambers lined with specialty reflective film is mounted to the top of the condensing unit. Through a patented process, ambient light is converted to thermal energy which reduces the energy demand on the compressor.

Units come with a 1-year parts warranty and 10 year compressor warranty.



2 Ton Cooling Only Condenser Dimensions

| Model | | SHRDZ-24 (2 Ton) | |
|----------------------|-----------------|------------------|----------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | |
| Cooling | Capacity | Btu/h | 24000 |
| | | W | 1920 |
| | EER | Btu/h, W | 12.5 |
| SEER | | 17.5 | |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 71 |

| (Outdoor Unit) Model | | SHRDZ-24 (2 Ton) | |
|-------------------------------|-----------------------------|------------------|--|
| Outdoor Weight | Net - Lbs (kg) | 257 (117) | |
| | *Gross - Lbs (kg) | 262 (119) | |
| Electrical Data 208/230 1φ | Minimum Circuit Ampacity | 17.7 A | |
| | Max. Overcurrent Protection | 30 A | |
| Electrical Data 208/230 3φ | Minimum Circuit Ampacity | 10.23 A | |
| | Max. Overcurrent Protection | 20 A | |
| Outdoor Noise Level (dB(A)) | | 78 | |
| Operation Temperatures (°F) | | 5 - 118 | |

* Gross = Net Weight + Shipping Box

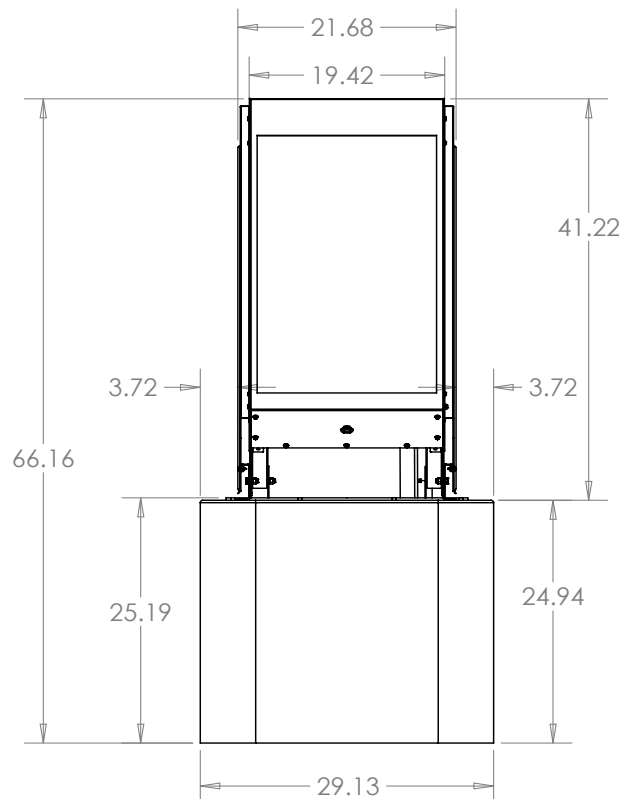
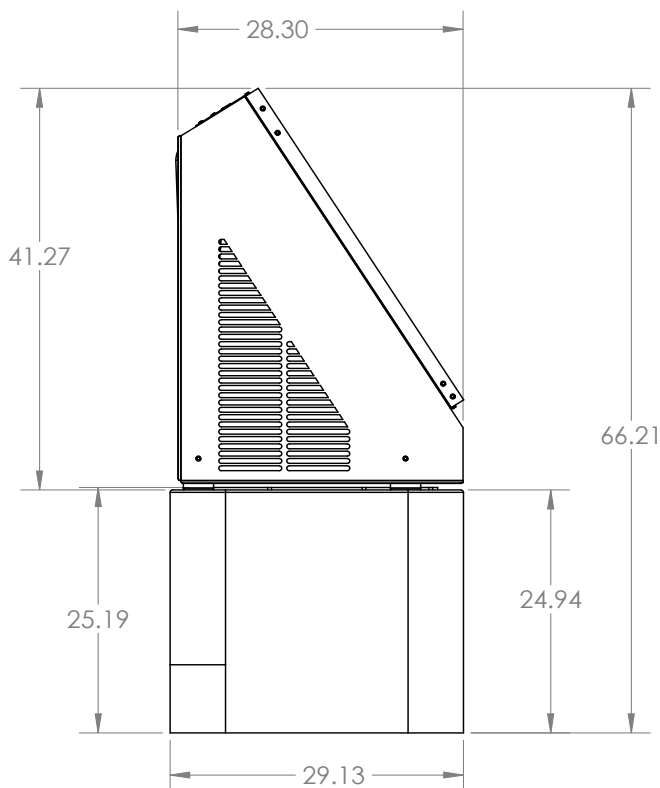
Note:

Unit should be UL 1995 listed

Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100

Note:

Face solar panels south for optimal performance.



2 Ton Heat Pump Condenser Dimensions

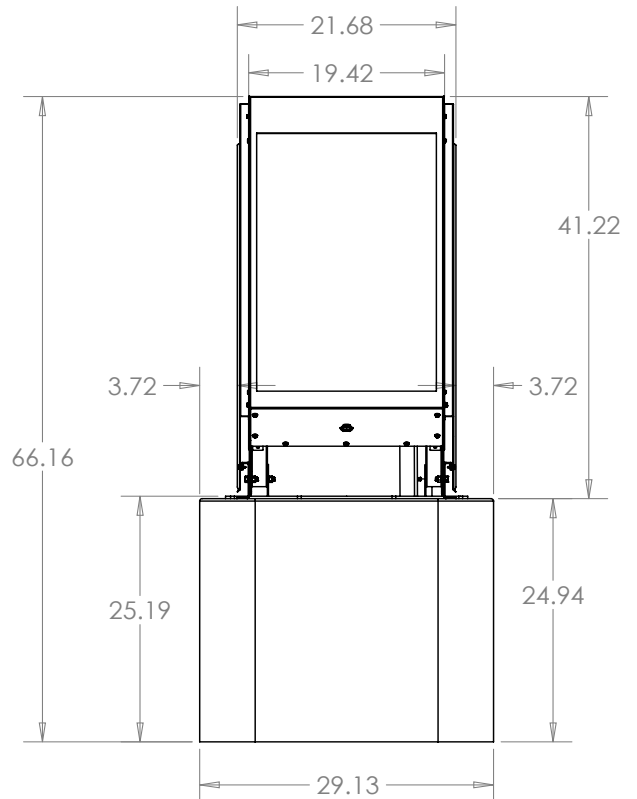
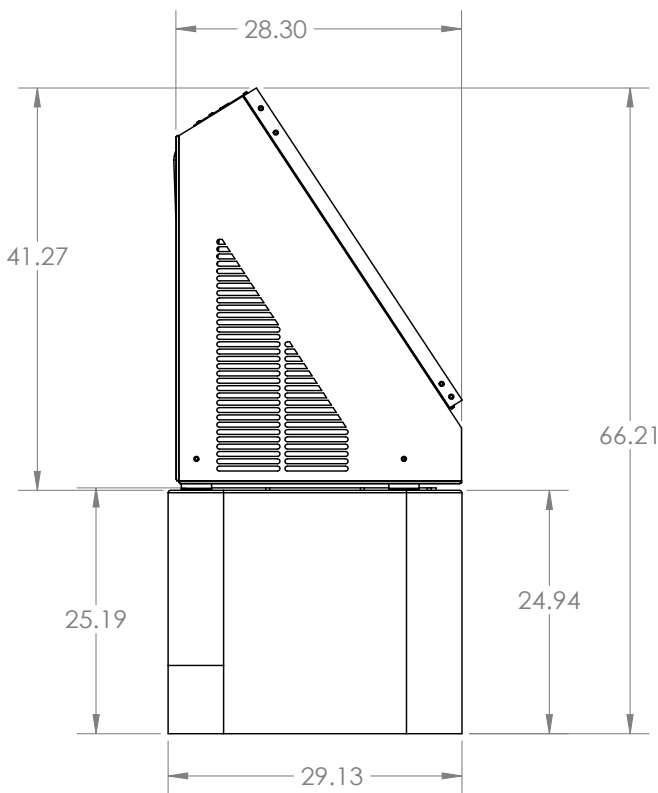
| Model | | SHRPZ-24 (2 Ton) | |
|----------------------|-----------------|------------------|----------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | 208-230V/60Hz |
| Cooling | Capacity | Btu/h | 24000 |
| | | W | 1920 |
| | EER | Btu/h, W | 12.5 |
| SEER | | | 17.5 |
| Heating | Capacity | Btu/h | 24000 |
| | COP | Btu/h.W | 3.66 |
| | HSPF | | 9.5 |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 71 |

| (Outdoor Unit) Model | | SHRPZ-24 (2 Ton) | |
|-------------------------------|-----------------------------|------------------|--|
| Outdoor Weight | Net - Lbs (kg) | 257 (117) | |
| | *Gross - Lbs (kg) | 262 (119) | |
| Electrical Data 208/230 1φ | Minimum Circuit Ampacity | 17.7 A | |
| | Max. Overcurrent Protection | 30 A | |
| Electrical Data 208/230 3φ | Minimum Circuit Ampacity | 10.23 A | |
| | Max. Overcurrent Protection | 20 A | |
| Outdoor Noise Level (dB(A)) | | 78 | |
| Operation Temperatures (°F) | | 5 - 118 | |

* Gross = Net Weight + Shipping Box
Note: Calculated E COP value with solar panel: 4.60

Note:
 Unit should be UL 1995 listed
 Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100

Note:
 Face solar panels south for optimal performance.



3 Ton Cooling Only Condenser Dimensions

| Model | | SHRDZ-36 (3 Ton) | |
|----------------------|-----------------|------------------|----------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | |
| Cooling | Capacity | Btu/h | 34500 |
| | | W | 2974 |
| | EER | Btu/h, W | 11.6 |
| SEER | | 17.5 | |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 71 |

Note:

Unit should be UL 1995 listed

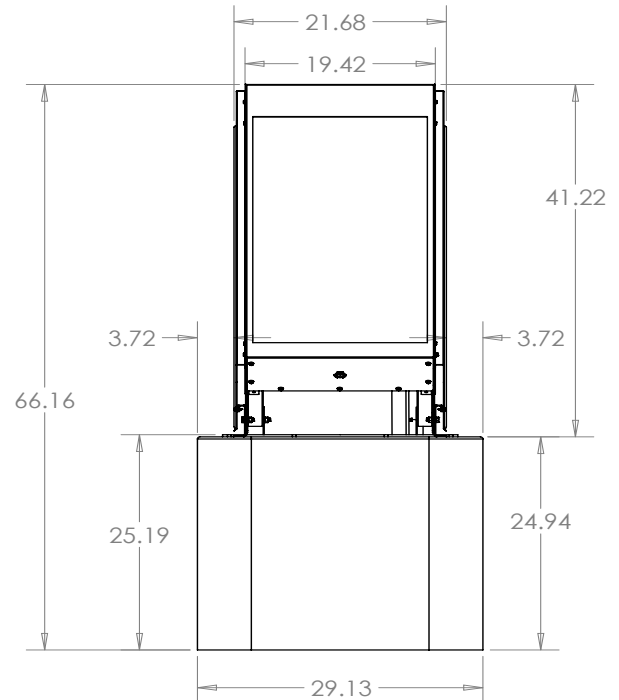
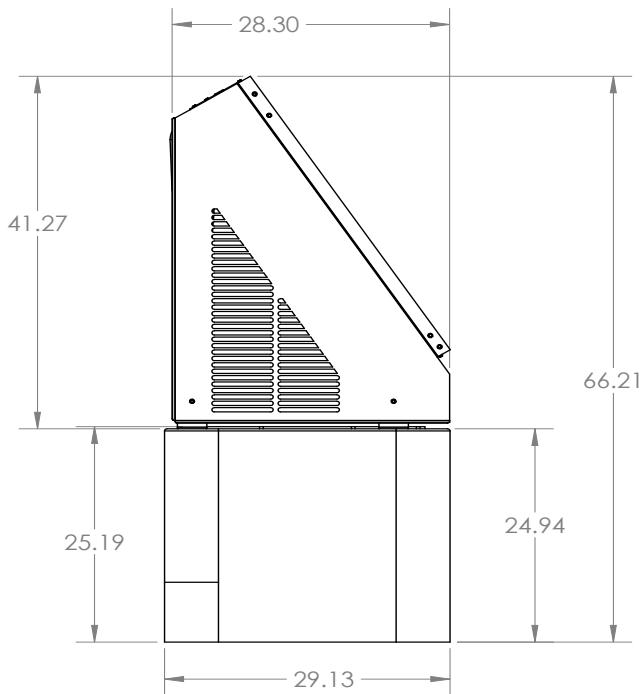
Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100

Note:

Face solar panels south for optimal performance.

| (Outdoor Unit) Model | | SHRDZ-36 (3 Ton) | |
|-------------------------------|-----------------------------|------------------|--|
| Outdoor Weight | Net - Lbs (kg) | 257 (117) | |
| | *Gross - Lbs (kg) | 262 (119) | |
| Electrical Data 208/230 1ϕ | Minimum Circuit Ampacity | 24.2 A | |
| | Max. Overcurrent Protection | 40 A | |
| Electrical Data 208/230 3ϕ | Minimum Circuit Ampacity | 13.98 A | |
| | Max. Overcurrent Protection | 20 A | |
| Outdoor Noise Level (dB(A)) | | 78 | |
| Operation Temperatures (°F) | | 5 - 118 | |

* Gross = Net Weight + Shipping Box



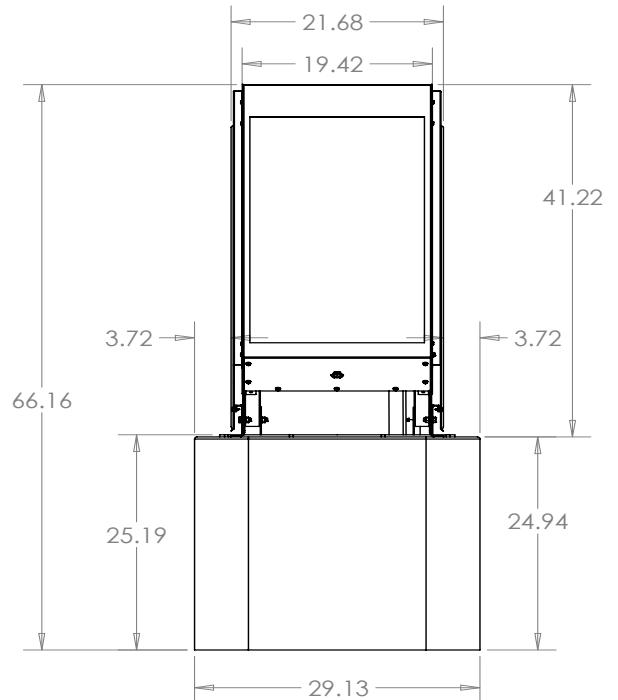
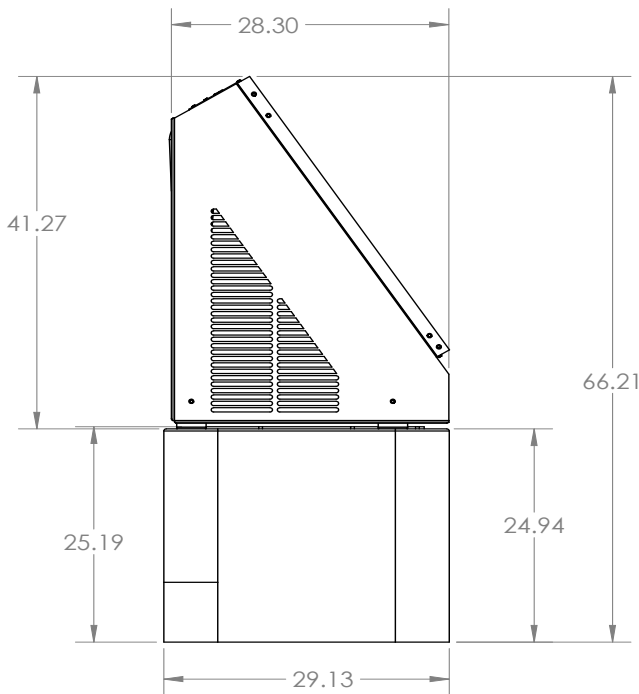
3 Ton Heat Pump Condenser Dimensions

| Model | | SHRPZ-36 (3 Ton) | |
|----------------------|-----------------|------------------|----------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | 208-230V/60Hz |
| Cooling | Capacity | Btu/h | 34500 |
| | | W | 2974 |
| | EER | Btu/h, W | 11.6 |
| | SEER | | 17.5 |
| Heating | Capacity | Btu/h | 34500 |
| | COP | Btu/h.W | 3.40 |
| | HSPF | | 9 |
| Compressor | Type | | Twin-rotary DC |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 71 |

| (Outdoor Unit) Model | | SHRPZ-36 (3 Ton) |
|-------------------------------|-----------------------------|------------------|
| Outdoor Weight | Net - Lbs (kg) | 257 (117) |
| | *Gross - Lbs (kg) | 262 (119) |
| Electrical Data 208/230 1φ | Minimum Circuit Ampacity | 24.2 A |
| | Max. Overcurrent Protection | 40 A |
| Electrical Data 208/230 3φ | Minimum Circuit Ampacity | 13.98 A |
| | Max. Overcurrent Protection | 20 A |
| Outdoor Noise Level (dB(A)) | | 78 |
| Operation Temperatures (°F) | | 5 - 118 |

* Gross = Net Weight + Shipping Box
Note: Calculated E COP value with solar panel: 4.25

Note:
 Unit should be UL 1995 listed
 Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100
Note:
 Face solar panels south for optimal performance.



4 Ton Cooling Only Condenser Dimensions

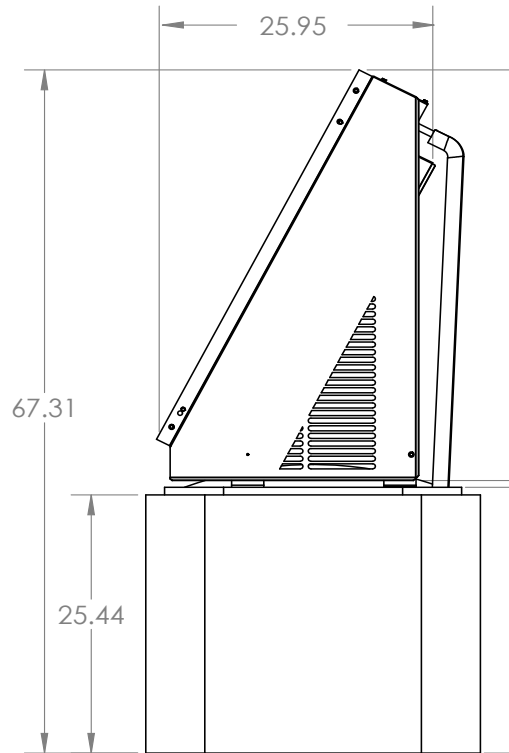
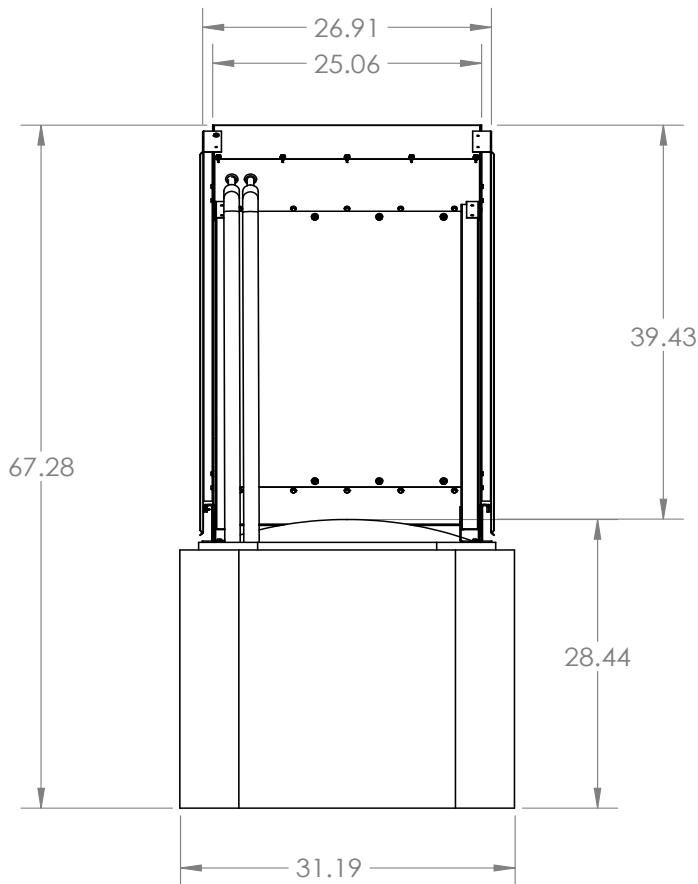
| Model | | SHRDZ-48 (4 Ton) | |
|----------------------|-----------------|------------------|--------------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | |
| | | 208-230V/60Hz | |
| Cooling | Capacity | Btu/h | 47000 |
| | | W | 4692 |
| | EER | Btu/h, W | 11.6 |
| SEER | | 17.5 | |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 79-5/8 |

Note:
 Unit should be UL 1995 listed
 Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100

Note:
 Face solar panels south for optimal performance.

| (Outdoor Unit) Model | | SHRDZ-48 (4 Ton) |
|-------------------------------|-----------------------------|------------------|
| Outdoor Weight | Net - Lbs (kg) | 301 (137) |
| | *Gross - Lbs (kg) | 306 (139) |
| Electrical Data 208/230 1ϕ | Minimum Circuit Ampacity | 31.9 A |
| | Max. Overcurrent Protection | 50 A |
| Electrical Data 208/230 3ϕ | Minimum Circuit Ampacity | 18.43 A |
| | Max. Overcurrent Protection | 20 A |
| Outdoor Noise Level (dB(A)) | | 79 |
| Operation Temperatures (°F) | | 5 - 118 |

* Gross = Net Weight + Shipping Box



4 Ton Heat Pump Condenser Dimensions

| Model | | SHRPZ-48 (4 Ton) | |
|----------------------|-----------------|------------------|--------------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | 208-230V/60Hz |
| Cooling | Capacity | Btu/h | 47000 |
| | | W | 4692 |
| | EER | Btu/h, W | 11.6 |
| | | SEER | 17.5 |
| Heating | Capacity | Btu/h | 46500 |
| | COP | Btu/h.W | 2.93 |
| | HSPF | | 9.5 |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 79-5/8 |

| (Outdoor Unit) Model | | SHRPZ-48 (4 Ton) |
|-------------------------------|-----------------------------|------------------|
| Outdoor Weight | Net - Lbs (kg) | 301 (137) |
| | *Gross - Lbs (kg) | 306 (139) |
| Electrical Data 208/230 1ϕ | Minimum Circuit Ampacity | 31.9 A |
| | Max. Overcurrent Protection | 50 A |
| Electrical Data 208/230 3ϕ | Minimum Circuit Ampacity | 18.43 A |
| | Max. Overcurrent Protection | 20 A |
| Outdoor Noise Level (dB(A)) | | 79 |
| Operation Temperatures (°F) | | 5 - 118 |

* Gross = Net Weight + Shipping Box

Note: Calculated E COP value with solar panel: 3.63

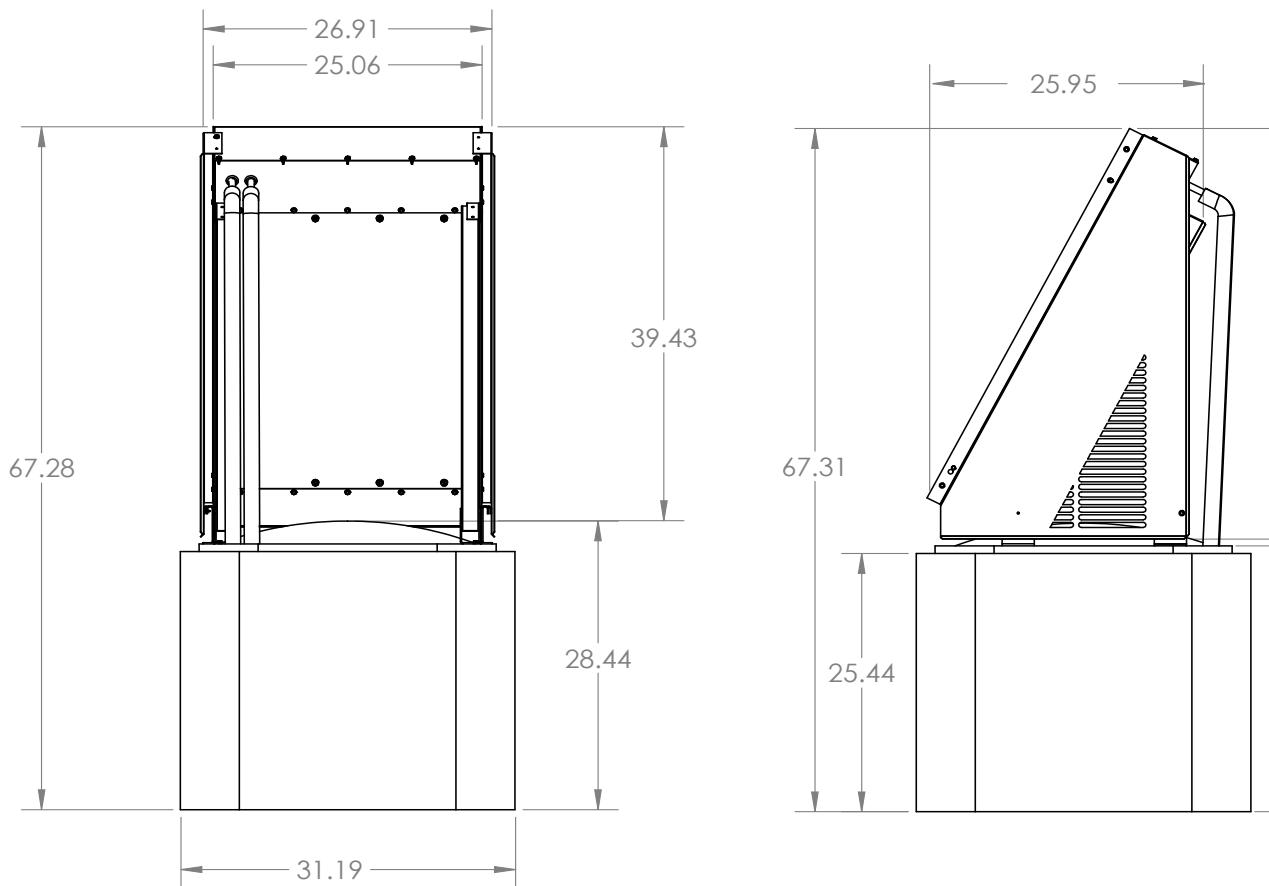
Note:

Unit should be UL 1995 listed

Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100

Note:

Face solar panels south for optimal performance.



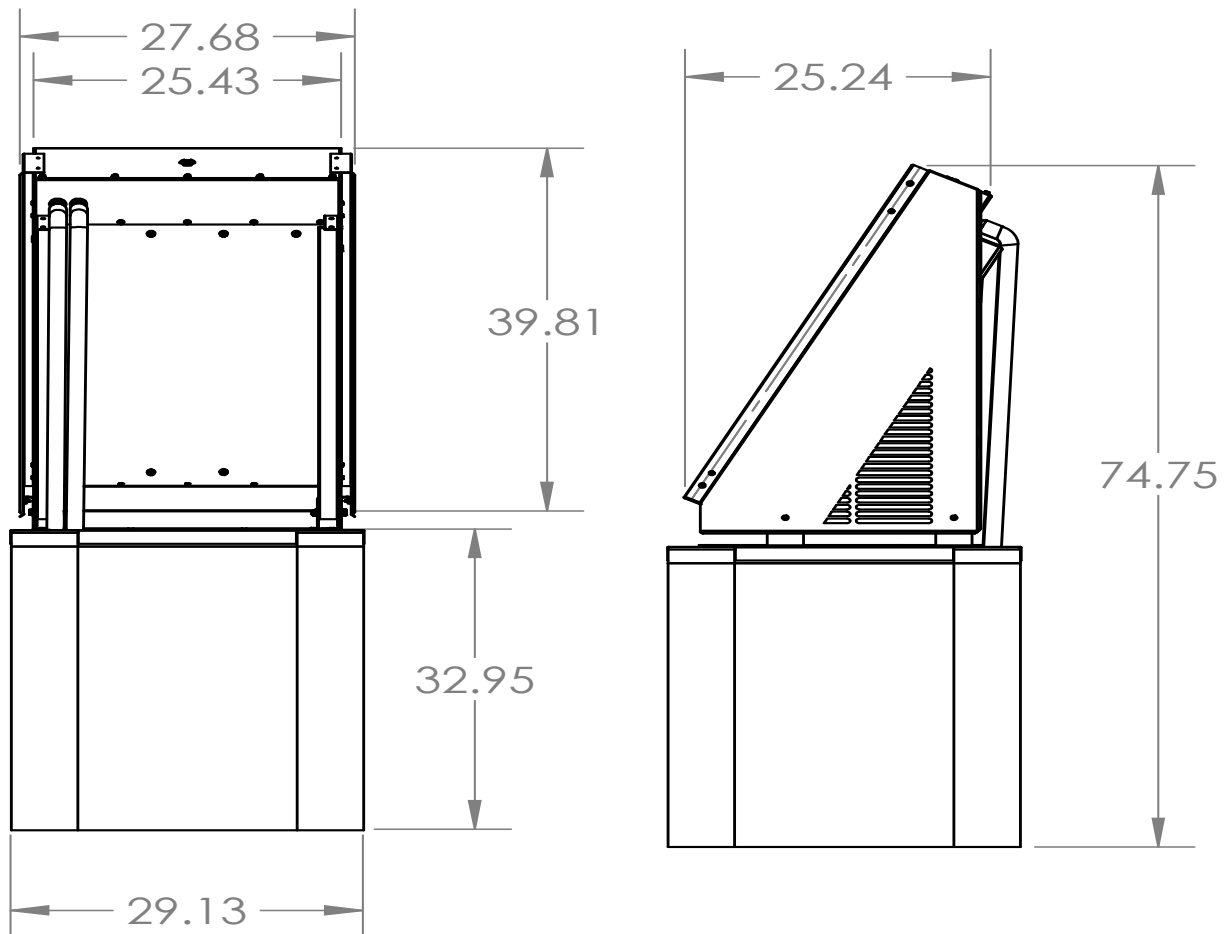
5 Ton Cooling Only Condenser Dimensions

| Model | | SHRDZ-60 (5 Ton) | |
|----------------------|-----------------|------------------|--------------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | 208-230V/60Hz |
| Cooling | Capacity | Btu/h | 56000 |
| | | W | 5185 |
| | EER | Btu/h, W | 10.8 |
| | | SEER | 17.5 |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 79-5/8 |

| (Outdoor Unit) Model | | SHRDZ-60 (5 Ton) |
|-------------------------------|-----------------------------|------------------|
| Outdoor Weight | Net - Lbs (kg) | 301 (137) |
| | *Gross - Lbs (kg) | 306 (139) |
| Electrical Data 208/230 1φ | Minimum Circuit Ampacity | 36.5 A |
| | Max. Overcurrent Protection | 60 A |
| Electrical Data 208/230 3φ | Minimum Circuit Ampacity | 21.09 A |
| | Max. Overcurrent Protection | 30 A |
| Outdoor Noise Level (dB(A)) | | 79 |
| Operation Temperatures (°F) | | 5 - 118 |

Note:
 Unit should be UL 1995 listed
 Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100
Note:
 Face solar panels south for optimal performance.

* Gross = Net Weight + Shipping Box



5 Ton Heat Pump Condenser Dimensions

| Model | | SHRPZ-60 (5 Ton) | |
|----------------------|-----------------|------------------|--------------------------|
| Code | | Outdoor Code | |
| Outdoor Power Supply | | V/Hz | 208-230V/60Hz |
| Cooling | Capacity | Btu/h | 56000 |
| | | W | 5185 |
| | EER | Btu/h, W | 10.8 |
| | SEER | | 17.5 |
| Heating | Capacity | Btu/h | 55000 |
| | COP | Btu/h.W | 3.16 |
| | HSPF | | 9.5 |
| Compressor | Type | Twin-rotary DC | |
| Outdoor Dimension | Packing (WxHxD) | Inch | 32-5/8 x 32-5/8 x 79-5/8 |

| (Outdoor Unit) Model | | SHRPZ-60 (5 Ton) |
|-------------------------------|-----------------------------|------------------|
| Outdoor Weight | Net - Lbs (kg) | 301 (137) |
| | *Gross - Lbs (kg) | 306 (139) |
| Electrical Data 208/230 1φ | Minimum Circuit Ampacity | 36.5 A |
| | Max. Overcurrent Protection | 60 A |
| Electrical Data 208/230 3φ | Minimum Circuit Ampacity | 21.09 A |
| | Max. Overcurrent Protection | 30 A |
| Outdoor Noise Level (dB(A)) | | 79 |
| Operation Temperatures (°F) | | 5 - 118 |

* Gross = Net Weight + Shipping Box

Note: Calculated E COP value with solar panel: 3.89

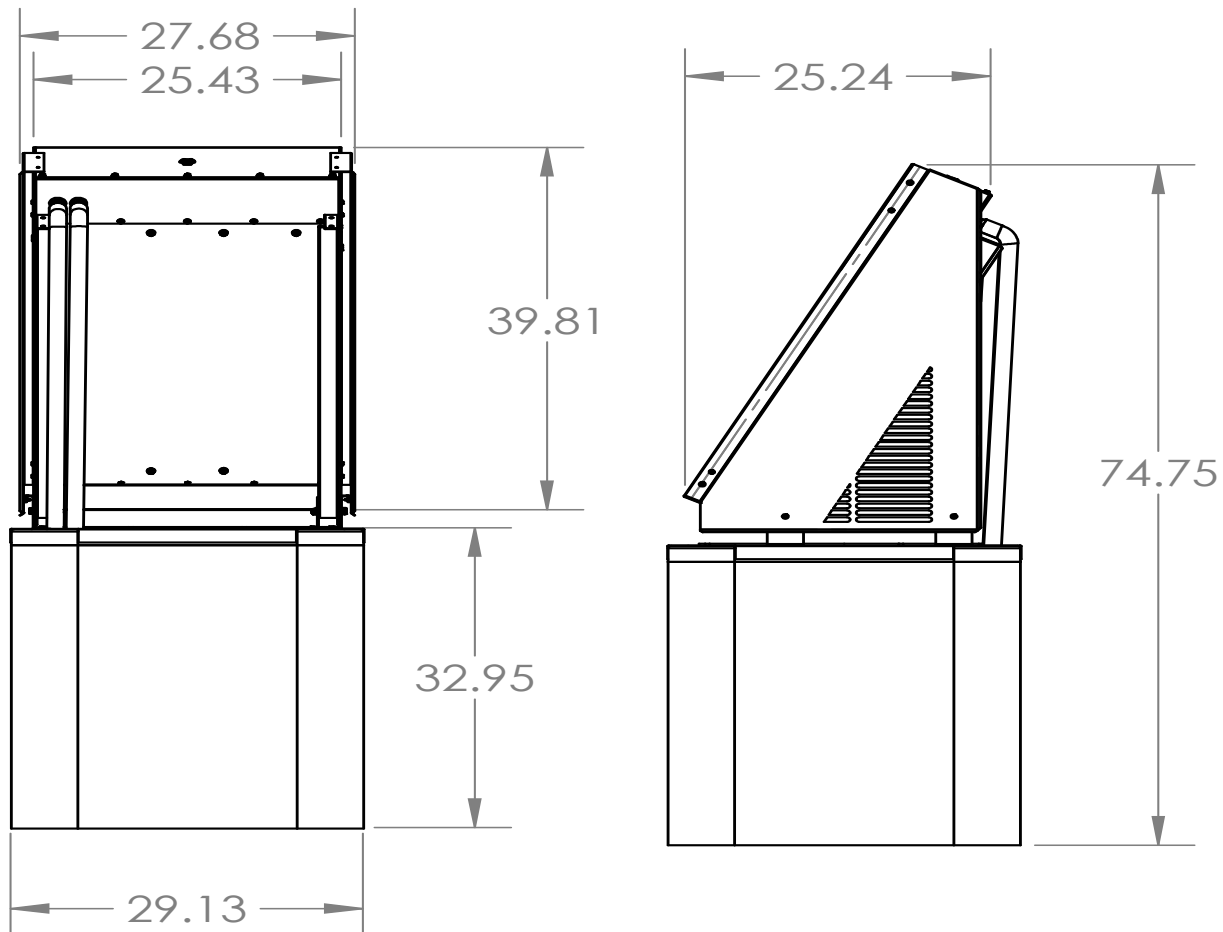
Note:

Unit should be UL 1995 listed

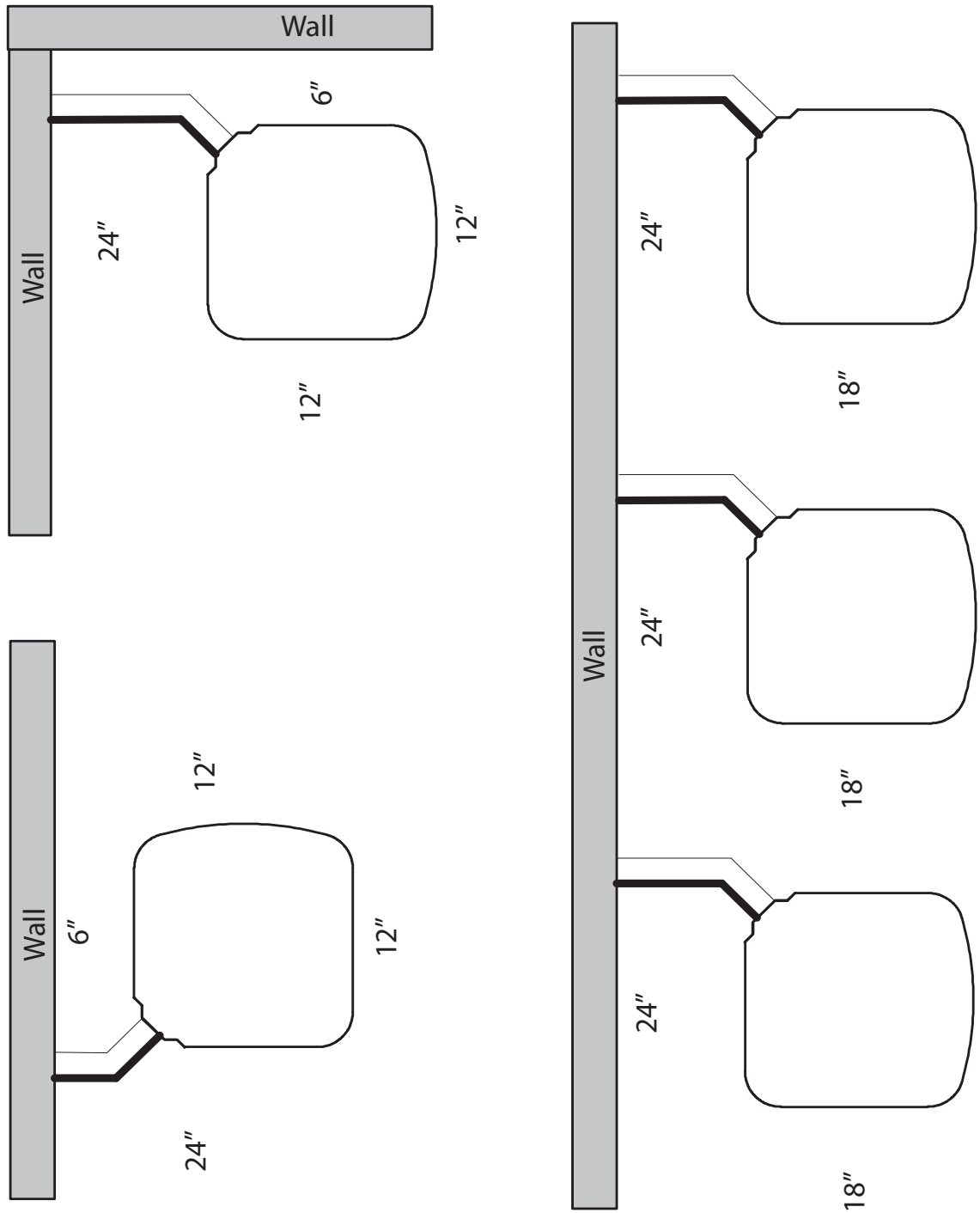
Unit should be OG-100 Certified to the Solar certification on ICC901/SRCC100

Note:

Face solar panels south for optimal performance.



Model "Z" Condenser Clearances



* - Unit Type (Cooling Only (D) or Heat Pump (P))

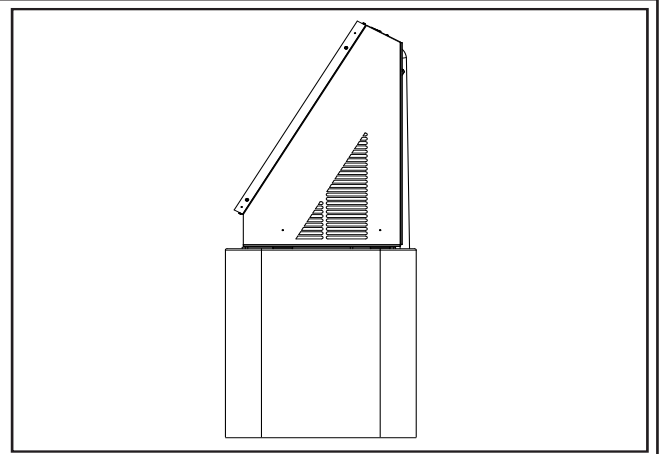
** - BTU's - x 1000 (24, 36, 48, 60)

Unit Location Considerations

Dimensions

The unit's weight values is on the carton box.

When mounting the outdoor unit on a roof, be sure the roof will support the unit's weight. Property selected isolation is recommended to prevent sound or vibration transmission to the building structure.



Refrigerant Piping Limits

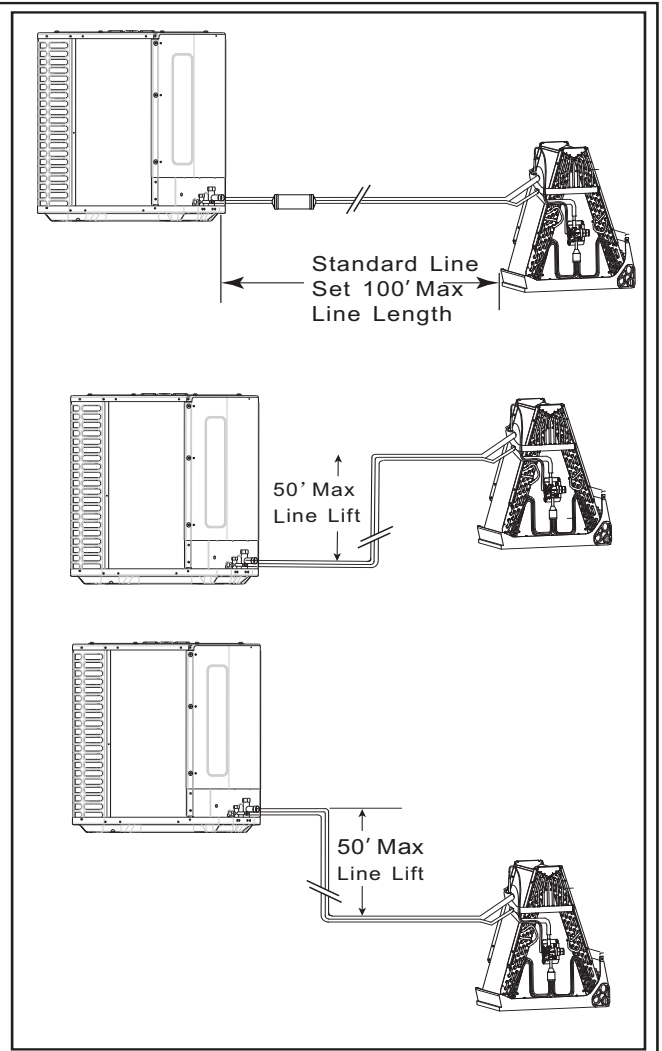
Maximum line length = 100 feet.

Maximum vertical length = 50 feet.

Compressor crankcase heat is required for line lengths over 50 feet.

Use only the line diameters indicated in Table 5. 1.

Such as the connecting tube is more than 60 feet, does not use large Suction line than recommend.



Unit Location Considerations (cont'd)

Location Restrictions

Ensure the top discharge area is unrestricted for at least 60 inches above the unit.

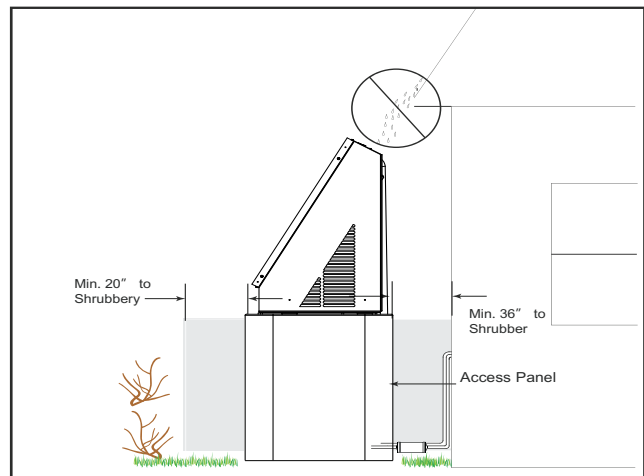
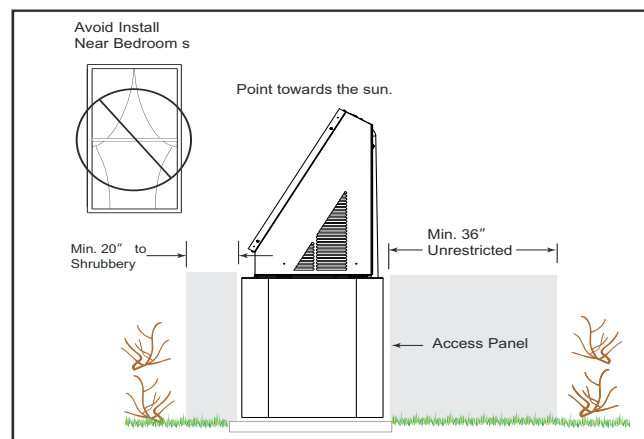
Clearance must be provided in front of the control box (access panels) and any other side requiring service.

Do not locate close to bedrooms, operational sounds may be objectionable.

Position the outdoor unit a minimum of 20 inches from any wall or surrounding shrubbery to ensure adequate airflow.

Outdoor unit location must be far enough away from any structure to prevent excess roof runoff water from pouring directly on the unit.

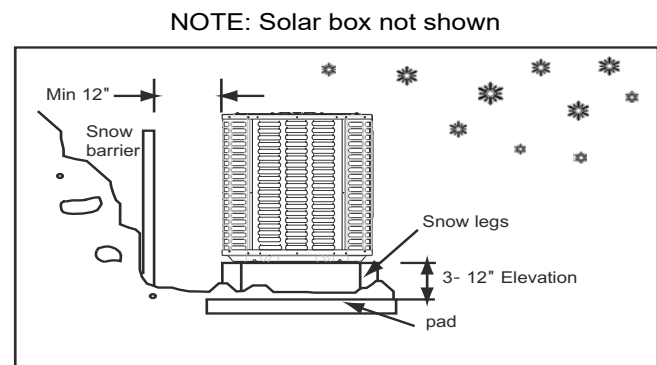
This unit meets Miami-Dade wind rating and seismic zone 5 requirements.



Cold Climate Considerations (Heat Pump Only)

Note: It is recommended that these precautions be taken for units being installed in areas where snow accumulation and prolonged below-freezing temperatures occur.

- 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.

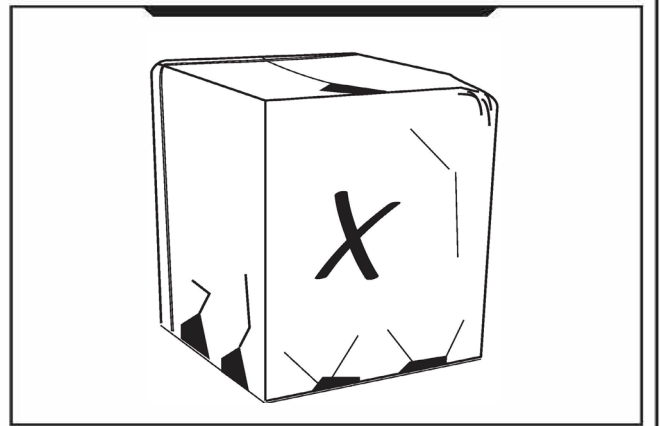


Unit Preparation

Prepare The Unit For Installation

STEP 1 - 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.



Setting the Unit

Pad Installation

NOTE: Solar box not shown

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.

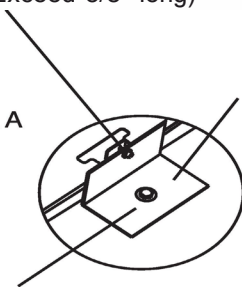
IMPORTANT NOTE:

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.

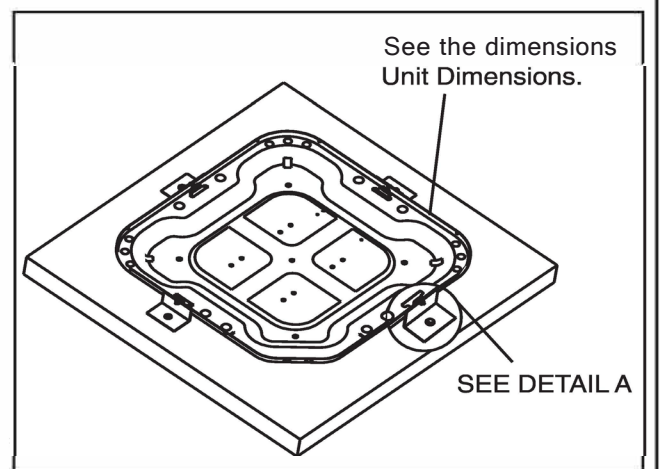
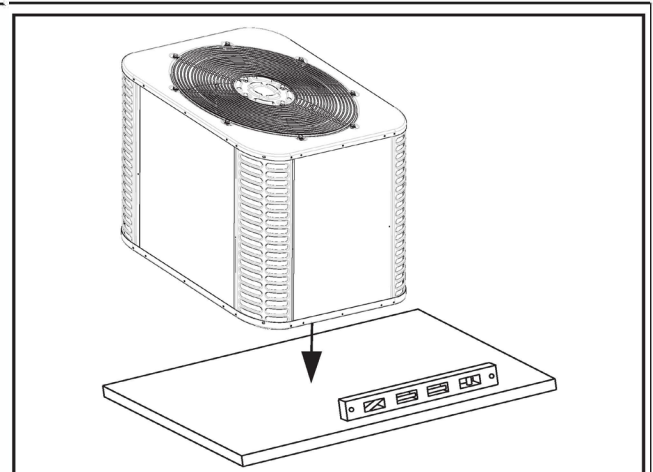
#10 X 3/8" Self Tapping Screws
(Don't Exceed 3/8" long)

Brackets:
2" width, 3/64", 14 ga
thickness, height as required;
provided by distributor.

DETAIL A



7/16" X 3" Hex Washer Head Concrete Screws
(7/16" Pilot Hole Needed. Pilot Hole Should Be 1/4"
Deeper Than The Fastener Embedment. This unit meets
Miami-Dade wind rating and seismic zone 5 requirements.)



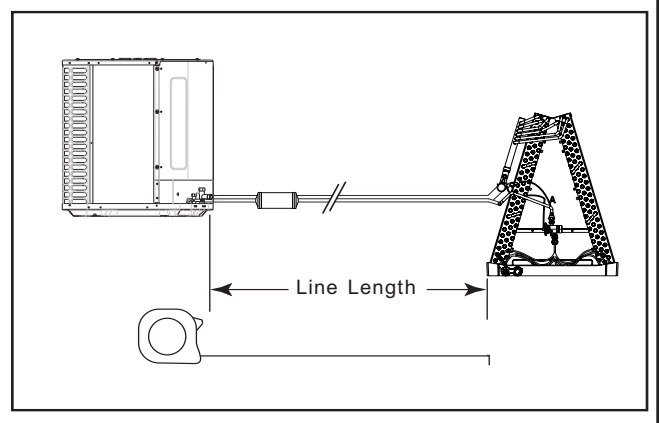
Refrigerant Line Considerations

Refrigerant Line and Service Valve Connection Sizes

| Model | Line Sizes | | Service Valve Connection Sizes | |
|-------|--------------|-------------|--------------------------------|------------------------|
| | Suction Line | Liquid Line | Suction Line Connection | Liquid Line Connection |
| 24/36 | 3/4 | 3/8 | 3/4 | 3/8 |
| 48/60 | 7/8 | 3/8 | 7/8 | 3/8 |

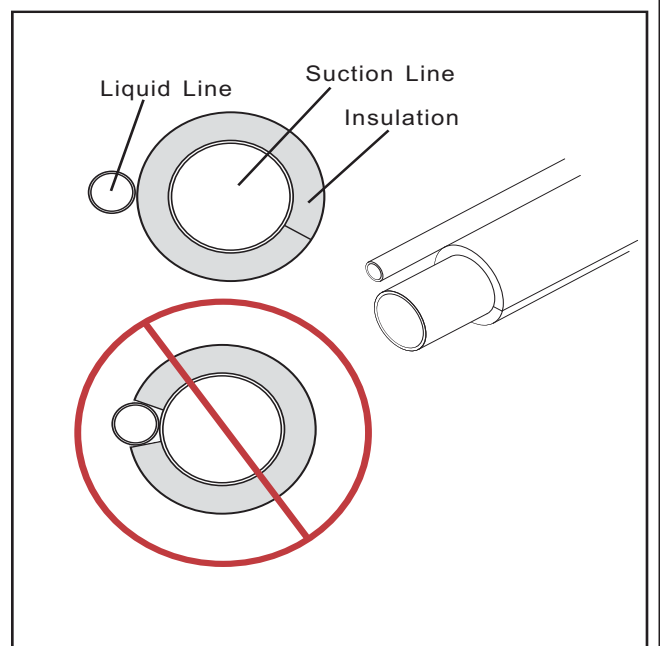
Required Refrigerant Line Length

Determine the required line length.



Refrigerant Line Insulation

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.



Refrigerant Line Considerations (cont'd)

Reuse Existing Refrigerant Lines

⚠ CAUTION

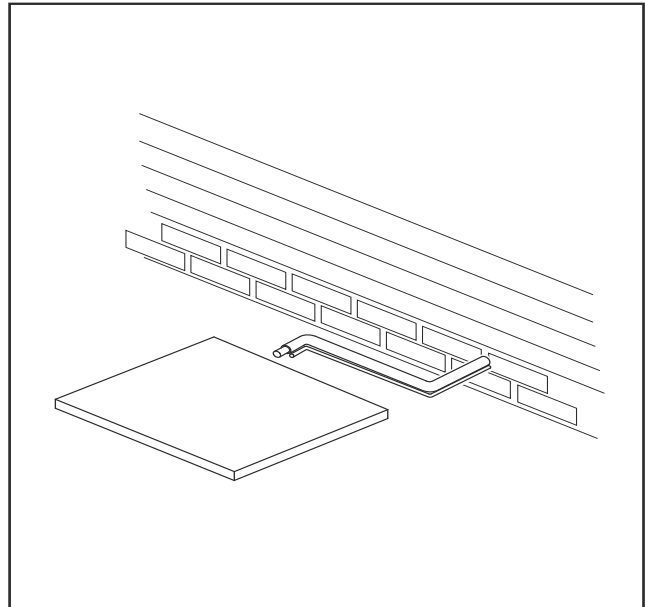
If using existing refrigerant lines make certain that all joints are brazed, not soldered.

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. Refer to Section 2.2 listed and Table 5.1.

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

Note: The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the manufacturer's split systems are A.H.R.I. 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.



Refrigerant Line Routing

Precautions

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

For Example:

When the refrigerant lines have to be fastened to floor joists or other framing in a structure, use isolation type hangers.

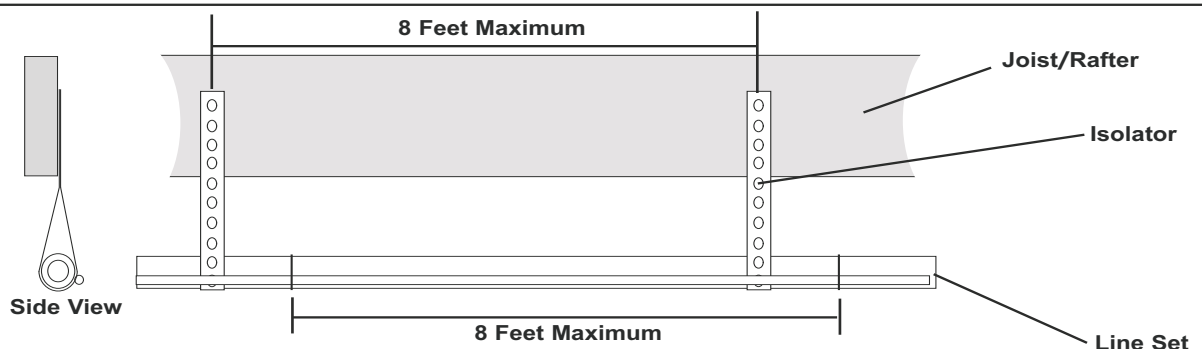
Isolation hangers should also be used when refrigerant lines are run in stud spaces or enclosed ceilings.

Where 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 90° turns.

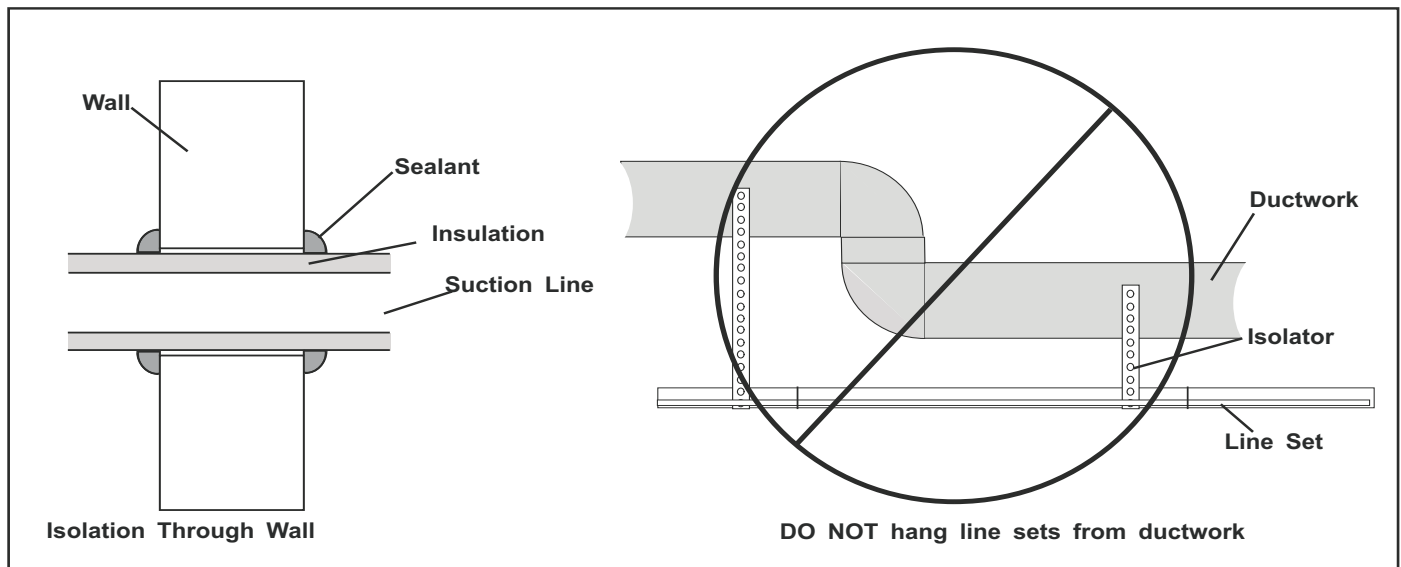
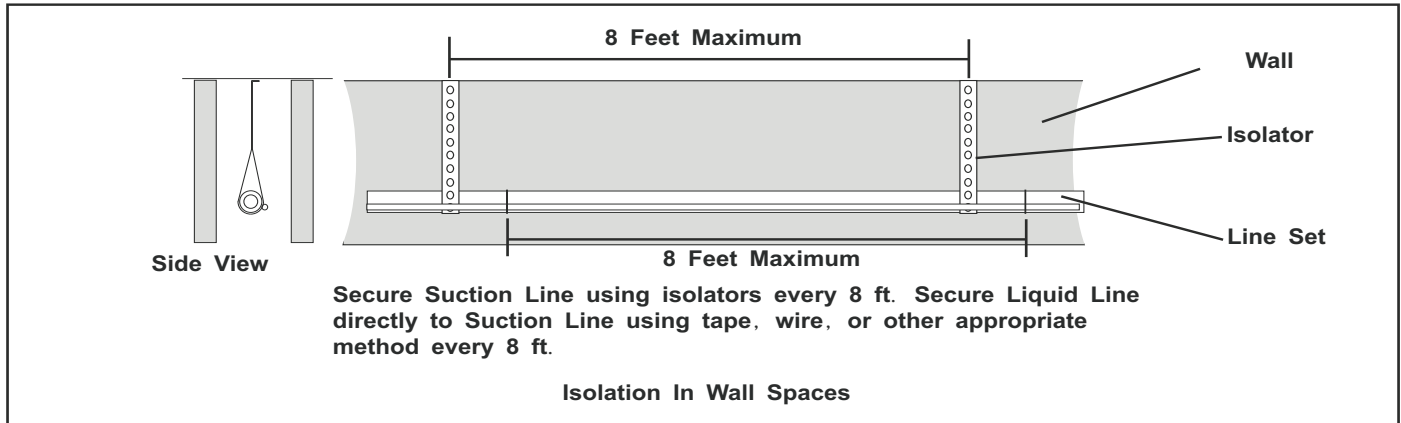
Comply with National, State, and Local Codes when isolating line sets from joists, rafters, walls, or other structural elements.



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 From Joist/Rafter

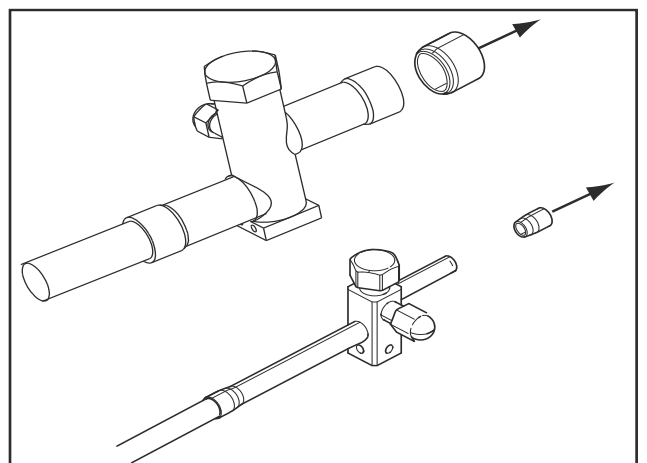
Refrigerant Line Considerations (cont'd)



Refrigerant Line Brazing

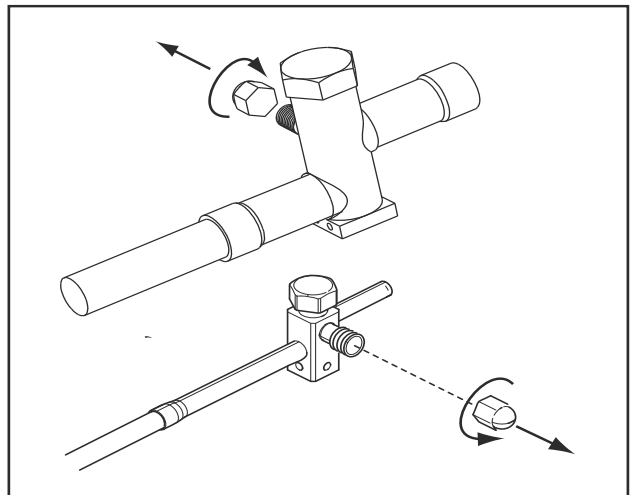
Braze The Refrigerant Lines

STEP 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.



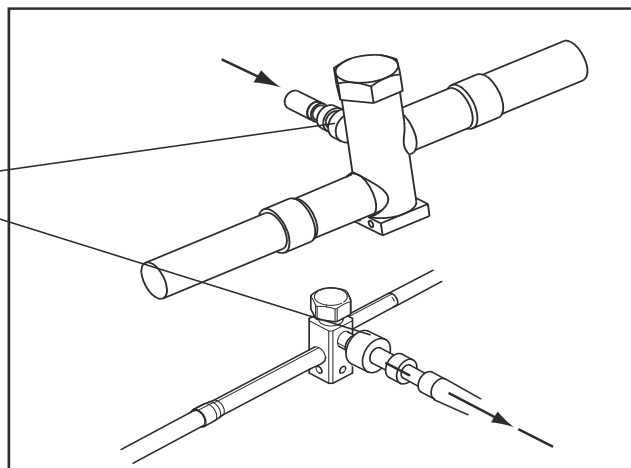
Refrigerant Line Considerations (cont'd)

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



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

This pipe must have a thimble



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

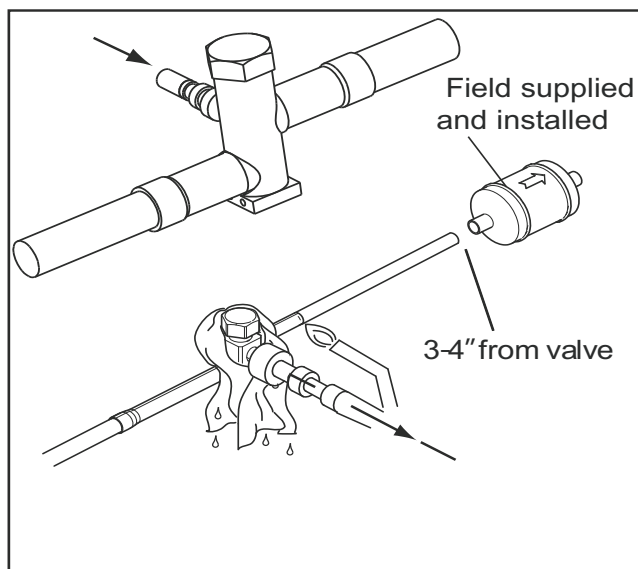
Braze the refrigerant lines to the service valves.

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.

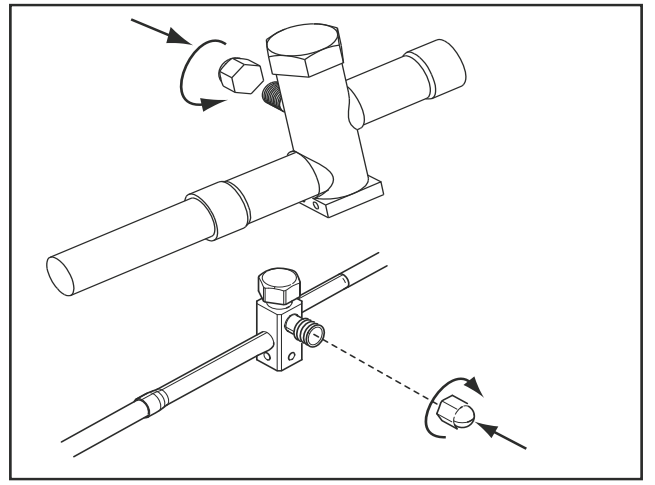
Important: Remove the wet rag before stopping the dry nitrogen purge.

Note: Install drier in Liquid Line.



Refrigerant Line Considerations (cont'd)

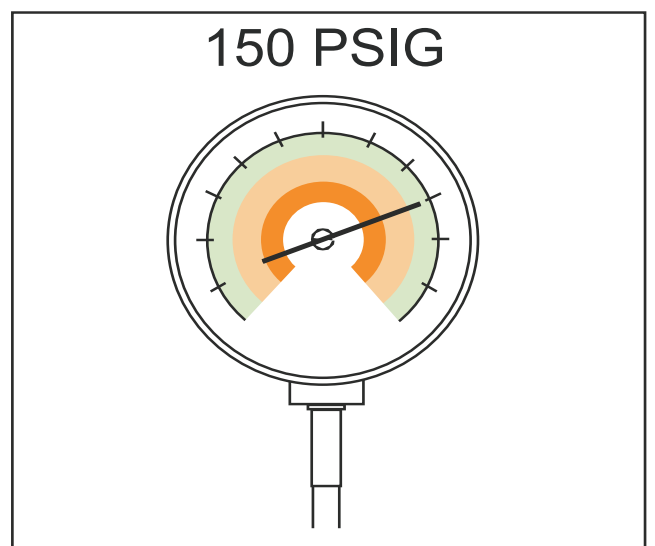
STEP 5 - Replace the pressure tap caps after the service valves have cooled.



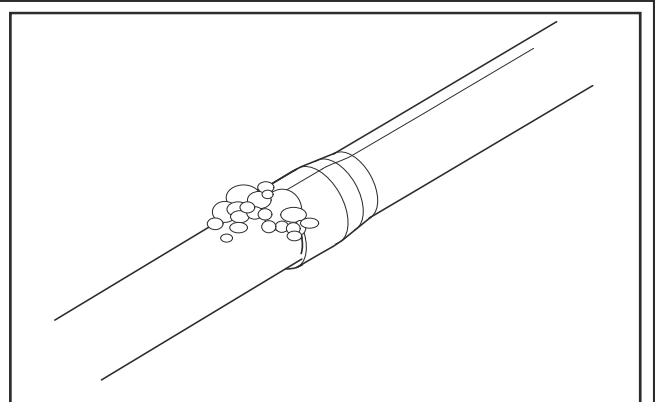
Refrigerant Line Leak Check

Check For Leaks

STEP 1 - Pressurize the refrigerant lines and evaporator coil to 150 PSIG using dry nitrogen.



STEP 2 - Check for leaks by using a soapy solution or bubbles at each brazed location.



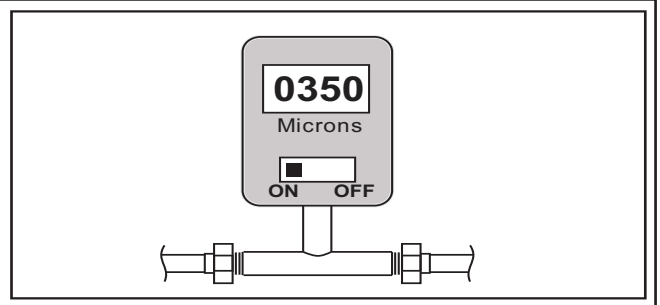
Refrigerant Line Considerations (cont'd)

Evacuation

Evacuate the Refrigerant Lines and Indoor Coil

Important: Do not open the service valves until the refrigerant lines and indoor coil leak check and evacuation are complete.

STEP 1- Evacuate until the micron gauge reads no higher than 350 microns, then close the valve to the vacuum pump.



STEP 2- Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one (1) minute.

Once evacuation is complete blank off the vacuum pump and micron gauge, and close the valves on the manifold gauge set.



Service Valves

Open the Service Valves

⚠ WARNING

Extreme caution should be exercised when opening the Liquid Line Service Valve. Turn counterclockwise until the valve stem just touches the rolled edge. No torque is required. Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and /or property damage.

Important: Leak check and evacuation must be completed before opening the service valves.

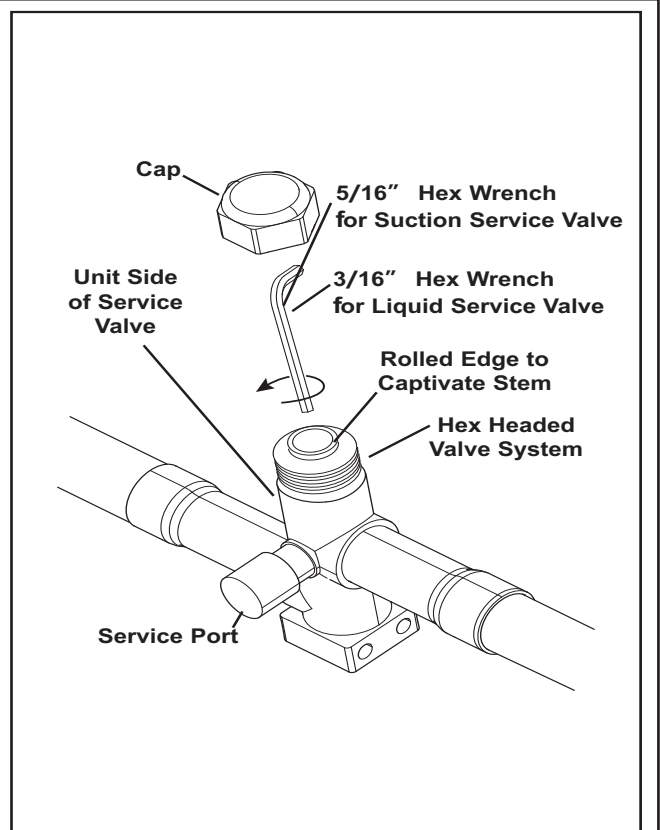
Important: The Suction Service Valve must be opened first BEFORE opening the Liquid Service Valve!

STEP 1 - Remove service valve cap.

STEP 2 - Fully insert hex wrench into the stem and back out counterclockwise until valve stem just touches the rolled edge (approximately five (5) turns.)

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

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



Electrical - Low Voltage

Low Voltage Maximum Wire Length

Table 11.1 defines the maximum total length of low voltage wiring from the outdoor unit, to the indoor unit, and to the thermostat.

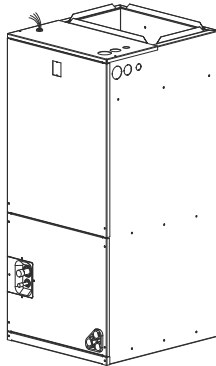
Field provided bushing or strain relief is required at the low voltage wire entry point.

Table 11.1

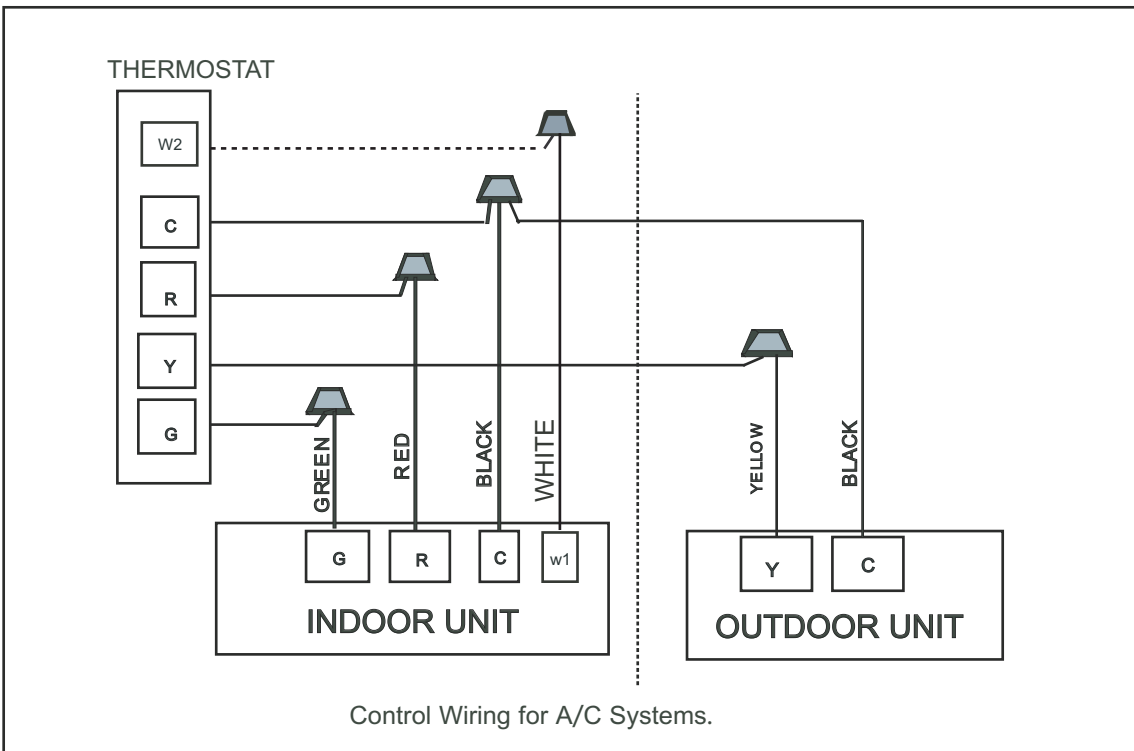
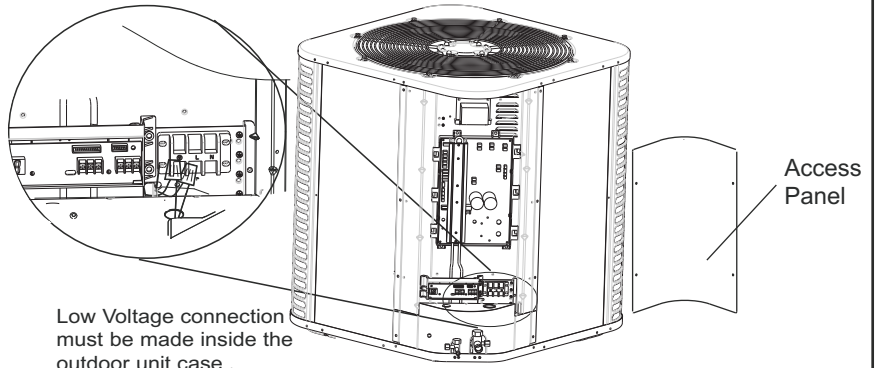
| 24 VOLTS | |
|-----------|-----------------|
| WIRE SIZE | MAX.WIRE LENGTH |
| 18 AWG | 150 Ft. |
| 16 AWG | 225 Ft. |
| 14 AWG | 300 Ft. |

Low Voltage Hook-up Diagrams

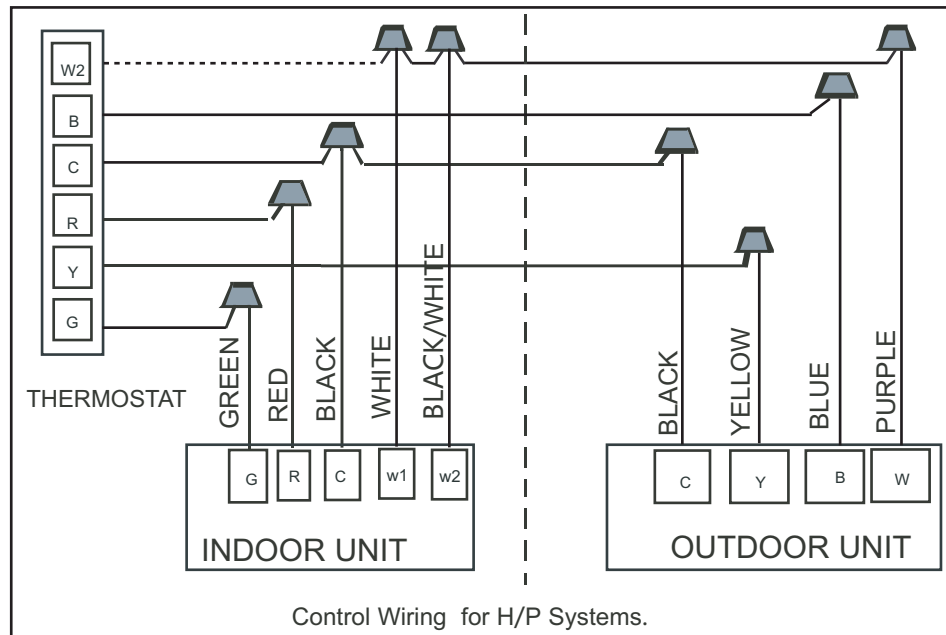
Air Handler Hook-up Diagram



NOTE: Solar box not shown



Electrical - Low Voltage (cont'd)



Notes:

1. Be sure power supply agrees with equipment nameplate.
2. Power wiring and grounding of equipment must comply with local codes.
3. Low voltage wiring to be No. 18 AWG minimum conductor.
4. "-----" The electric auxiliary heat connection.

Electrical - High Voltage

High Voltage Power Supply

⚠ WARNING

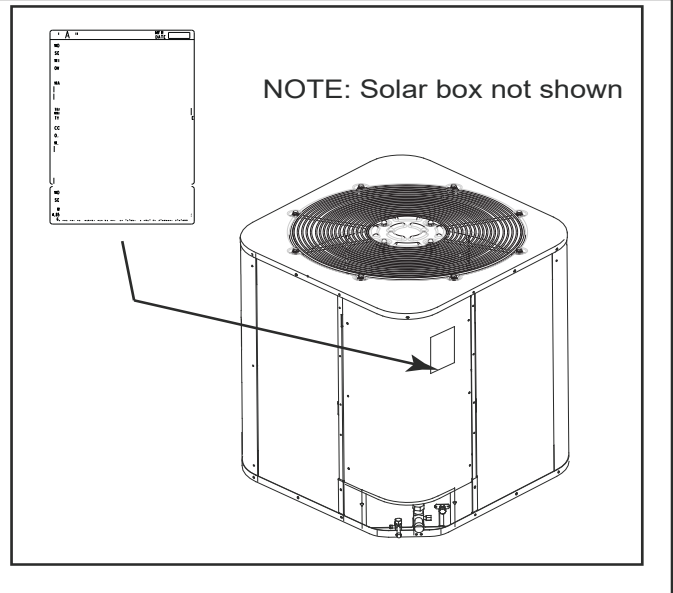
LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing, and troubleshooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

The high voltage power supply must agree with the equipment nameplate.

Power wiring must comply with national, state, and local codes.

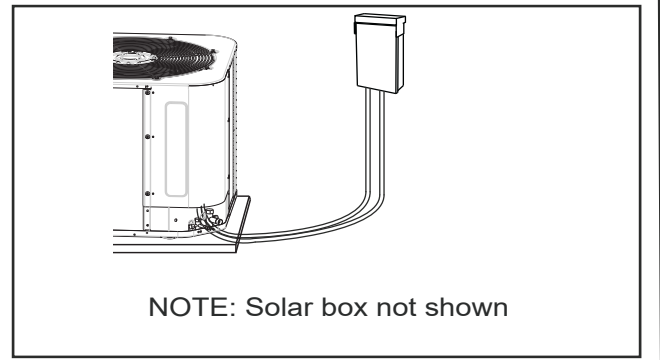
Follow instructions on unit wiring diagram located on the inside of the control box cover and in the Service Facts document included with the unit.



High Voltage Disconnect Switch

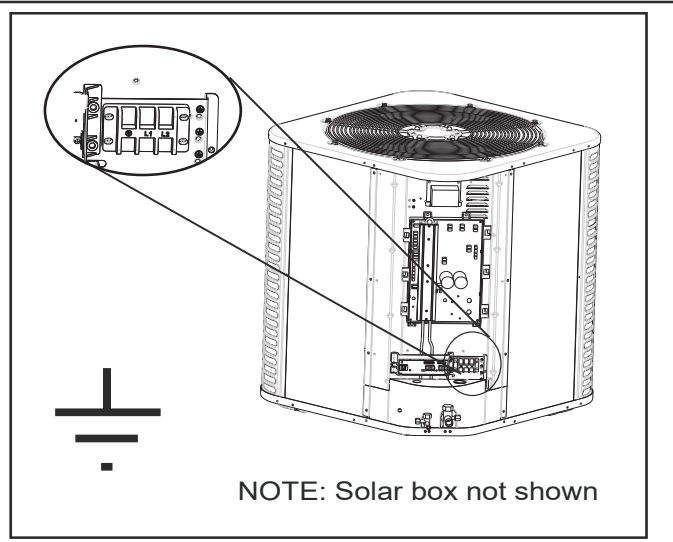
Install a separate disconnect switch at the outdoor unit.

Field provided flexible electrical conduit must be used for high voltage wiring.



High Voltage Ground

Ground the outdoor unit per national, state, and local code requirements.

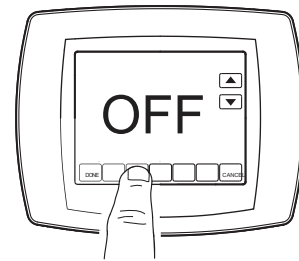


Start Up

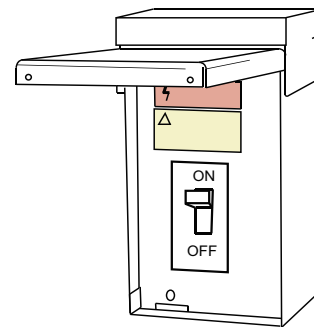
System Start Up

STEP 1 - Ensure Sections 6, 7, 8, 9, 10, 11, and 12 have been completed.

STEP 2 - Set System Thermostat to OFF.



STEP 3 - Turn on disconnect to apply power to the indoor and outdoor units.

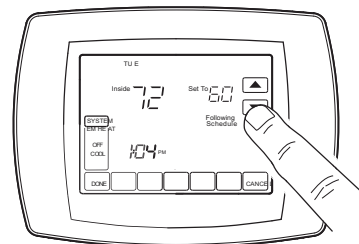


STEP 4 - Wait five (5) minutes before moving to Step 5 if no crankcase heater accessory is used,

Wait one (1) hour before starting the unit if compressor crankcase heater accessory is used and the Outdoor Ambient Temperature is below 70 °F.



STEP 5 - Set system thermostat to ON.



System Charge Adjustment

charging: weigh-In Method

weigh-In Method can be used for 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.

| A | B | C |
|------------|-------------------------|---|
| Model | Factory Charge | charge multiplier for interconnecting refrigerant tube length |
| All models | (The data on nameplate) | 0.6 oz/ft |

Note: The factory charge in the outdoor unit is sufficient for 15 feet of standard size interconnecting liquid line.

Table 19. New Installations — calculating charge using the weigh-In method

| | |
|---|---|
| <ol style="list-style-type: none"> 1. Measure in feet the distance between the outdoor unit and the indoor unit and record on (Line 1). Include the entire length of the line from the service valve to the IDU. 2. Enter the charge multiplier from column C. 3. Multiply the total length of refrigerant tubing (Line 1) times the value on step 2. Record the resulting value. 4. This is the amount of refrigerant to weigh-in prior to opening the service valves. | <p>New Installation weigh-In Method worksheet</p> <ol style="list-style-type: none"> 1. Line Length (ft) _____ 2. value from Column C x _____ 3. Refrigerant((Step1-15) x Step2) = _____ <p>Note: If line length is Less than 15 feet , Refrigerant=0,don' t charge.</p> |
|---|---|

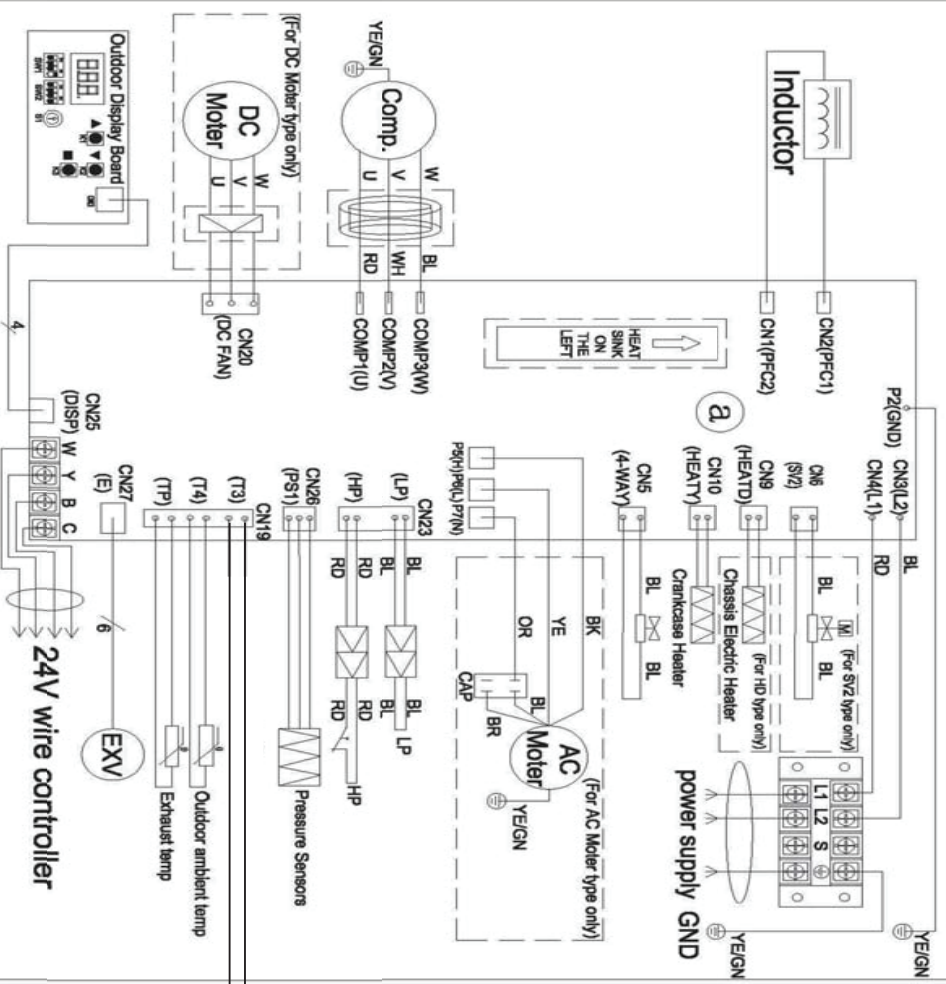
Table 20. Sealed-System Repairs — calculating charge using the weigh-In method.

| | |
|--|---|
| <ol style="list-style-type: none"> 1. Measure in feet the distance between the outdoor unit and the indoor unit and record on (Line 1). Include the entire length of the line from the service valve to the IDU. 2. Enter the charge multiplier from column C. 3. Multiply the total length of refrigerant tubing (Line 1) times the value on (Line 2). Record the result on (Line 3) of the worksheet. 4. Record the value in column B to Line 4 of the worksheet. 5. Add the values from step 3, step 4, and record the resulting value on Line 5. This is the amount of refrigerant to weigh-in. | <p>New Installation weigh-In Method worksheet</p> <ol style="list-style-type: none"> 1. Line Length (ft) _____ 2. value from Column C x _____ 3. (Step1-15) x step 2 = _____ 4. Factory charge (column B) + _____ 5. Refrigerant (steps 3+4) = _____ <p>Note: If line length is Less than 15 feet , Refrigerant=factory charge</p> |
|--|---|

Note: The only mode approved for setting validating system charge is using Charging Mode-cooling. Outdoor Temperature must be between 55°F and 120°F with Indoor Temperature kept between 70°F and 80°F.

Solar HVAC Wiring Diagram (SCH-0029-E v01.01)

ELECTRICAL WIRING DIAGRAM

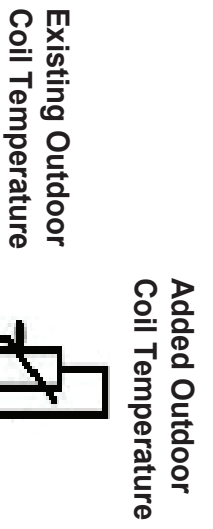


SW1 & SW2 For Outdoor Display Board switch setting:

| 1# | 2# | 3# | Model | 4# | Model |
|-----|-----|-----|--|-----|------------------------------------|
| OFF | OFF | OFF | Tra0=A, between A+X and A-X; Tra0=B, between B+X and B-X | ON | Cooling Spool Throttling (Indoor) |
| OFF | OFF | ON | Tra0=A-1'X, between A and 2 (A>2); Tra0=B+1'X, between B+2'X and B | OFF | Cooling Spool Throttling (Outdoor) |
| OFF | ON | OFF | Tra0=A, Tra0=B; system waiting until the switch change | | |
| OFF | ON | ON | Tra0=A-1'X, Tra0=B+1'X; system waiting until the switch change | | |
| ON | ON | ON | Tra0=A-2'X, Tra0=B+2'X; system waiting until the switch change | | |

SW2 DIP switch setting

| 1# | 2# | 3# | 4# |
|----|----------------|-----|--------------------------|
| ON | Manual defrost | OFF | Automatic defrost |
| ON | Celsius (°C) | OFF | Fahrenheit (°F) |
| | | ON | Heating Spool throttling |
| | | OFF | Heating EXV throttling |
| | | | No defined |

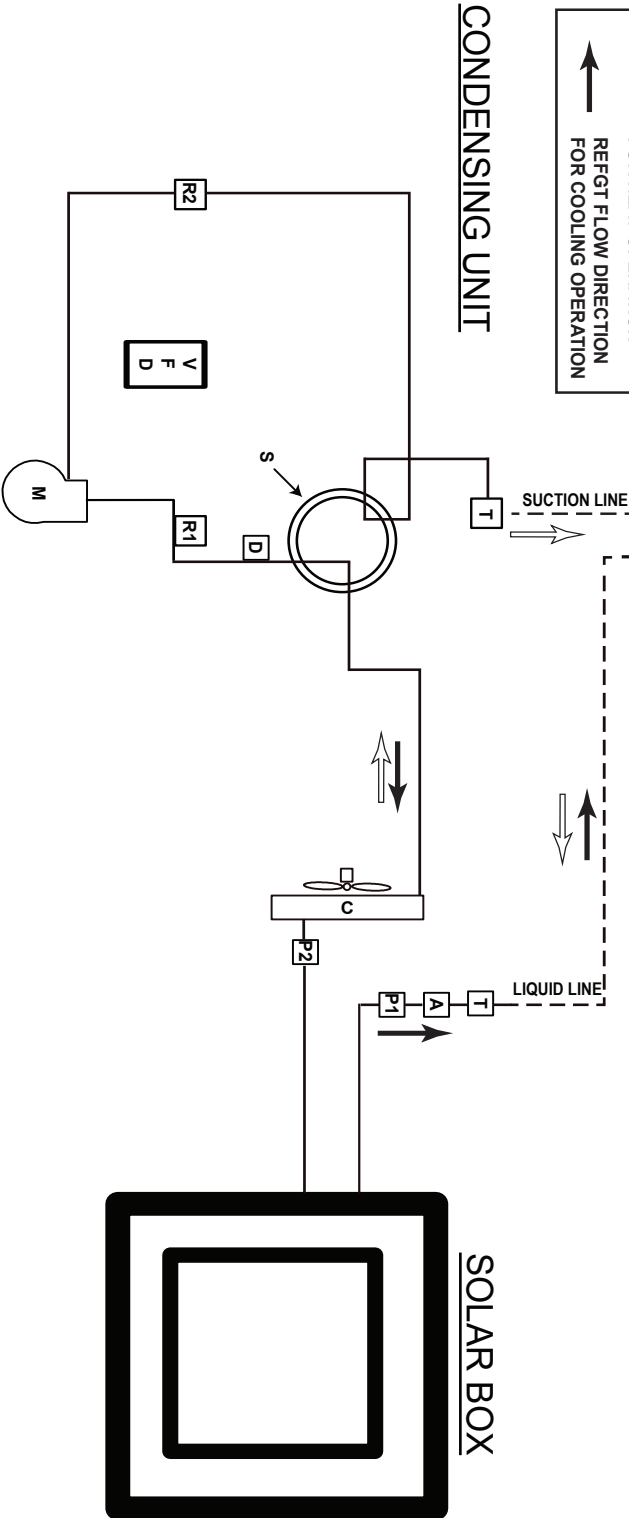
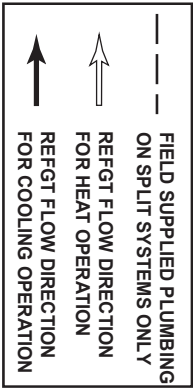
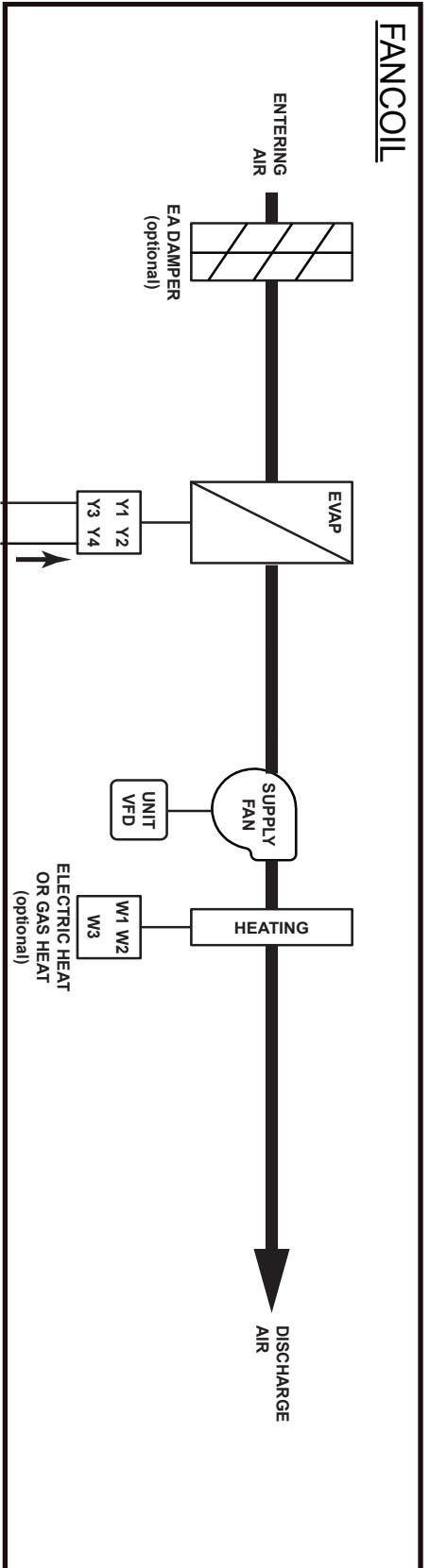


Solar HVAC Check Table

| Check Table | | | |
|-------------------------------|--|------|---|
| NUM | Display content | | |
| | | 16 | Frequency increase (Shift ; Actual value) |
| 01 | Outdoor power(Model) | 17 | Δ EV (step ; Actual value) |
| 02 | Run mode (0: Standby mode; 2:In cooling mode ; 3: In heating mode) | 18 | --- |
| | | 19 | IPM modular temp Tfin (°F ; Actual value) |
| 03 | Arget frequency (Hz ; Actual value) | 20 | Oil output (CC ; Actual value / 8) |
| 04 | Running frequency (Hz ; Actual value) | 21 | Target temp Tes/Tcs (°F ; Actual value) |
| 05 | Actual frequency (Hz ; Actual value) | 22 | Pressure value (PSI ; Actual value * 25) |
| 06 | Fan speed (High / low ; Actual value) | 23 | Pressure valve transform by T3 (PSI ; Actual value * 25) |
| 07 | Temp transform by pressure sensor (°F ; Actual value) | 24 | --- |
| 08 | T3 condensing temp (°F ; Actual value) | 25 | Target superheat (°F ; Actual value) |
| 09 | T4 outdoor ambient temp (°F ; Actual value) | 26 | Discharge temp superheat (°F ; Actual value) |
| 10 | T5 exhaust temp (°F ; Actual value) | 28 | Abillty test mode (1-40 ; Mode gear) |
| 11 | AC current (A ; Actual value) | 29 | Software version number (1-255) |
| 12 | Compressor current | 31 | Enter PI conrtio sign (0 or 1) |
| 13 | AC voltage (VAC ; Actual value * 2) | 34 | Frequency limit item |
| 14 | DC voltage (VDC ; Actual value / 2) | 37 | Last failure or protection code |
| 15 | EXV opening degree (step ; Actual value / 4) | | |
| Failure and Protection | | | |
| Code | Failure or protection definition | Code | Failure or protection definition |
| E4 | T4 outdoor air temperature sensor fault | P4 | Exhaust overheating protection |
| E6 | T3 Condensate temperature sensor failure | P5 | T3 condenser sensor high temp protection(In cooling mode) |
| E5 | T5 Exhaust temperature sensor fault | P6 | IPM protection |
| E9 | AC overvoltage/undervoltage protection | P8 | IPM high temperature protection (Ft) |
| E10 | EEPROM failure | P9 | DC fan motor error |
| E12 | IPM modular sensor error | P12 | Wet operation error |
| E13 | Pressure sensor error | P13 | High pressure abnormal error(In heating mode) |
| E14 | T3 or T5 sensor disconnect error | P14 | High compression ratio protection |
| E15 | High pressure switch error | P15 | Low compression ratio protection |
| H0 | Communication fault of master board and driver chip | L1 | DC cable bus low voltage protection |
| H1 | T3 sensor high temperature error(In cooling mode) (20 times P5 error within 180mins) | L2 | DC cable bus high voltage protection |
| | | L4 | MCE fault / sync / closed loop |
| H2 | High pressure switch error(20 times P1 error within 150 mins) | L5 | Zero speed protection |
| H3 | High pressure abnormal in heating mode (20 times P13 error within 180 mins) | L7 | Compressor phase loss protection ratio protection |
| | | L8 | Compressor stalls |
| H4 | IPM modular high temp error (20 times P8 within 120 mins) | L9 | Frequency limitation or decline by high pressure |
| H5 | Low pressure error (20 times P2 within 100 mins) | LA | Frequency limitation by voltage |
| H6 | Discharge temperature abnormal error(20 times P4 within 100 mins) | LC | Frequency limitation by condenser temp |
| H7 | Wet operation error (20 times P12 within 200 mins) | LD | Frequency limitation by discharge temp |
| H8 | T3 condenser sensor disconnect error (20 times E14 within 100 mins) | LE | Frequency limitation by IPM modular high temp |
| H12 | Discharge temp sensor disconnect error(20 times E14 within 180 mins) | LF | Frequency limitation by current |
| P1 | High pressure protection | d0 | Oil return |
| P2 | Low pressure protection | dF | Defrost |
| P3 | inverter overcurrent protection | dH | Force cooling |

Solar HVAC HP Piping Diagram (SCH-0005-P v01.00)

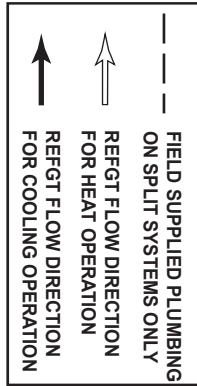
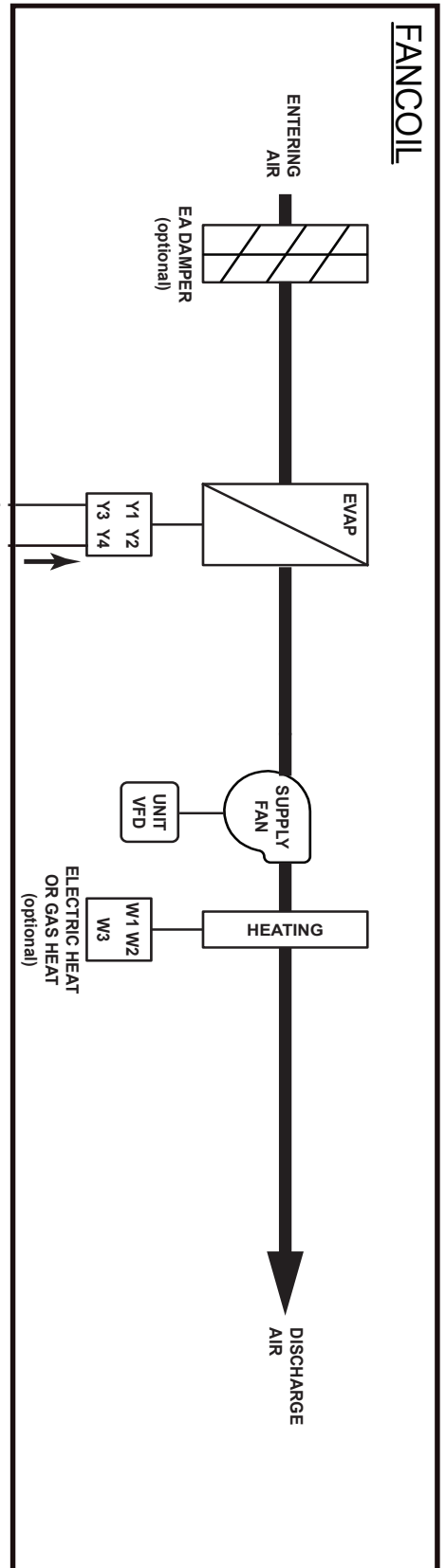
PIPE PER STAGE



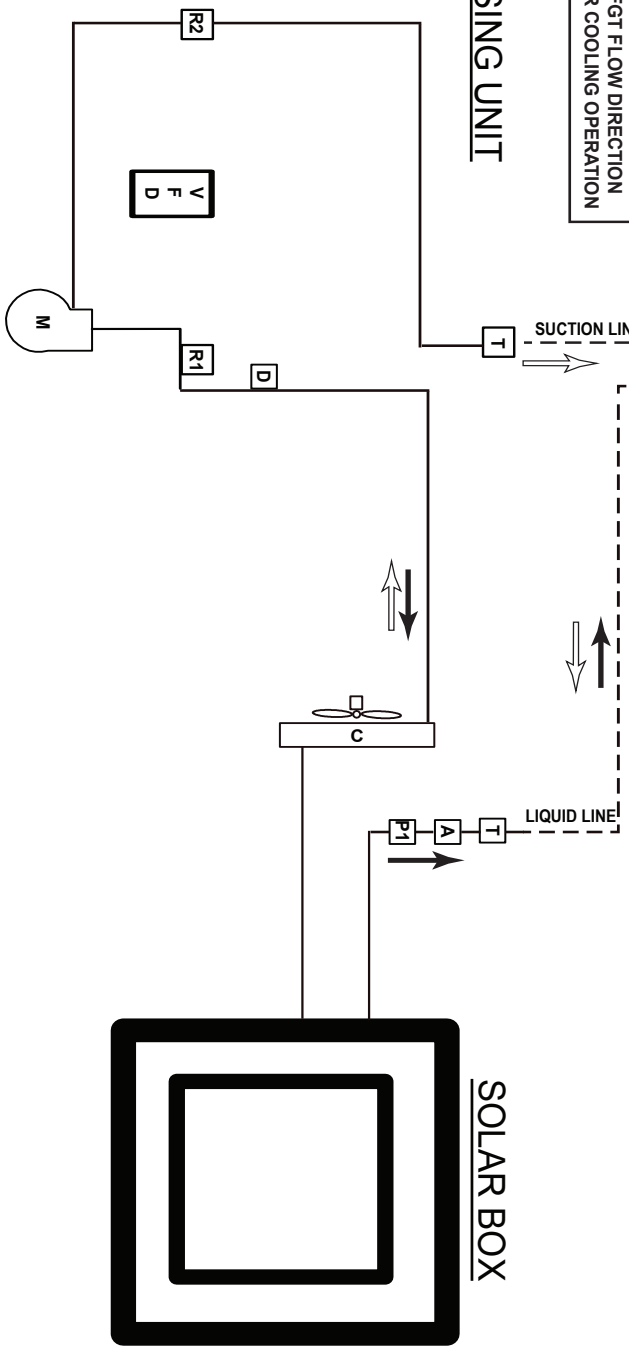
- A - FILTER DRIER
- C - CONDENSER COIL
- M - COMPRESSOR
- Q - LOW-AMBIENT CONTROL OPTION
- R1 - FACTORY HIGH PRESSURE SWITCH (Cooling)
- R2 - FACTORY HIGH PRESSURE SWITCH (Heat)
- S - REVERSING VALVE
- T - FACTORY MAINTENANCE VALVE
- V - VALVE
- P1 - Pressure Transducer (Normally Open Cooling)
- P2 - Pressure Transducer (Normally Closed Heating)

Solar HVAC Cool or Gas Heat Plumbing Diagram (SCH-0006-P v01.00)

PIPE PER STAGE



CONDENSING UNIT



- A - FILTER DRIER
- C - CONDENSER COIL
- M - COMPRESSOR
- Q - LOW-AMBIENT CONTROL OPTION

- R1 - FACTORY HIGH PRESSURE SWITCH (Cooling)
- R2 - FACTORY HIGH PRESSURE SWITCH (Heat)
- T - FACTORY MAINTENANCE VALVE
- V - VALVE

- P1 - Pressure Transducer (Normally Open Cooling)

Troubleshooting

9. Troubleshooting

9.1. Control logic description

1. Display board button function

▲ button: check button、setting button“+”

▼ button: check button、setting button“-”

■ button:

A、Short press: force cooling mode, display board will show “dH”;

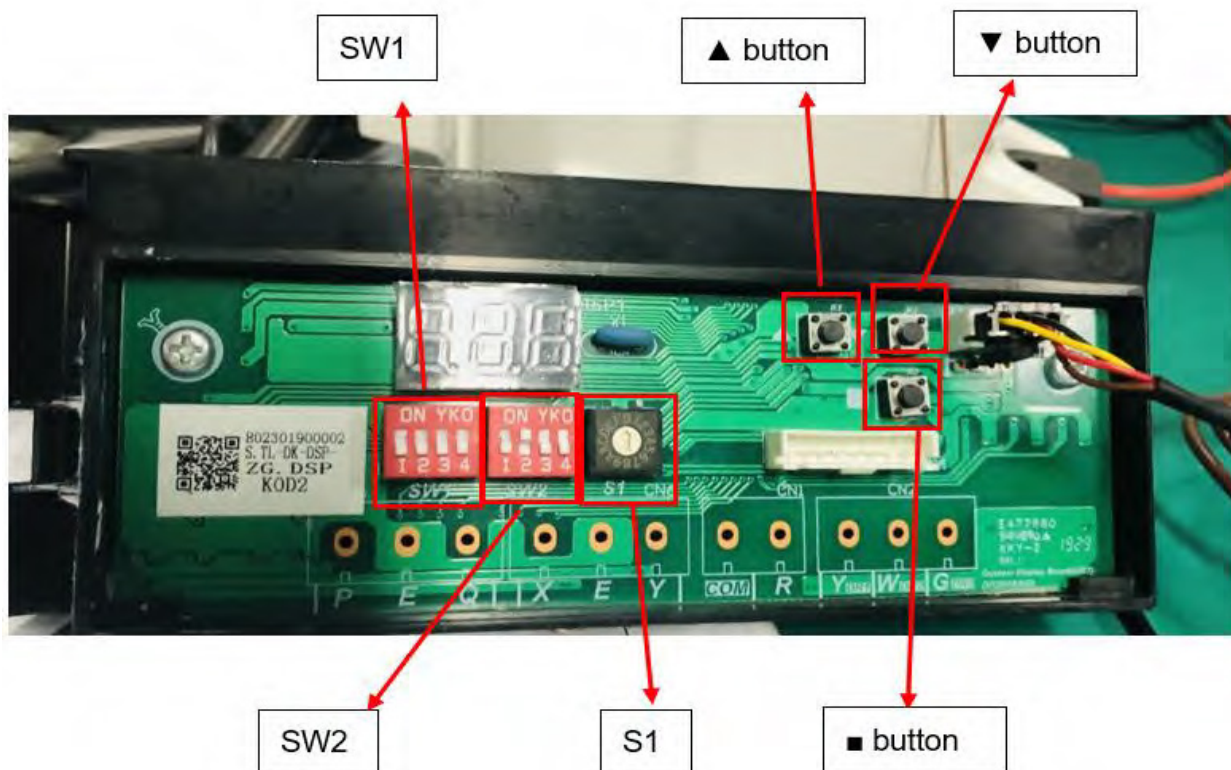
B、Long press: entering test mode, and you can change unit parameter manually:

When it show “Sc.”, then you can set Compressor Frequency manually, using “▲” and “▼”to change frequency.

Then press “■” button, display board will show “SF.”, then you can set fan speed manually, using “▲” and “▼”to change fan speed.

Then press “■” button, display board will show “SL.”, then you can set expansion valve open degree manually, using “▲” and “▼”to change expansion valve opening degree.

Then press “■” button, display board will show “SP.”, then you can set PFC switch manually, (0 means OFF, 1 means ON), using “▲” and “▼” to set PFC switch ;



Troubleshooting (cont'd)

SW1:

| 1st bit | 2nd bit | 3rd bit | 4th bit |
|--|---------|---------|--|
| Outdoor unit control logic(target evaporator temperature and target condensation temperature) setting, manufacture only. | | | ON: EXV throttling in cooling mode OFF: Piston throttling in cooling mode The function will be active after unit power off and power on. |

SW2:

| 1st bit | 2nd bit | 3rd bit | 4th bit |
|--|--|----------|--|
| ON: Manually defrost. OFF: Automatic defrost The function will be active immediately after bit change. | ON: Display as Fahrenheit OFF: Display as Celsius The function will be active after unit power off and power on. | Reserved | ON: EXV throttling in heating mode OFF: Piston throttling in heating mode The function will be active after unit power off and power on. |

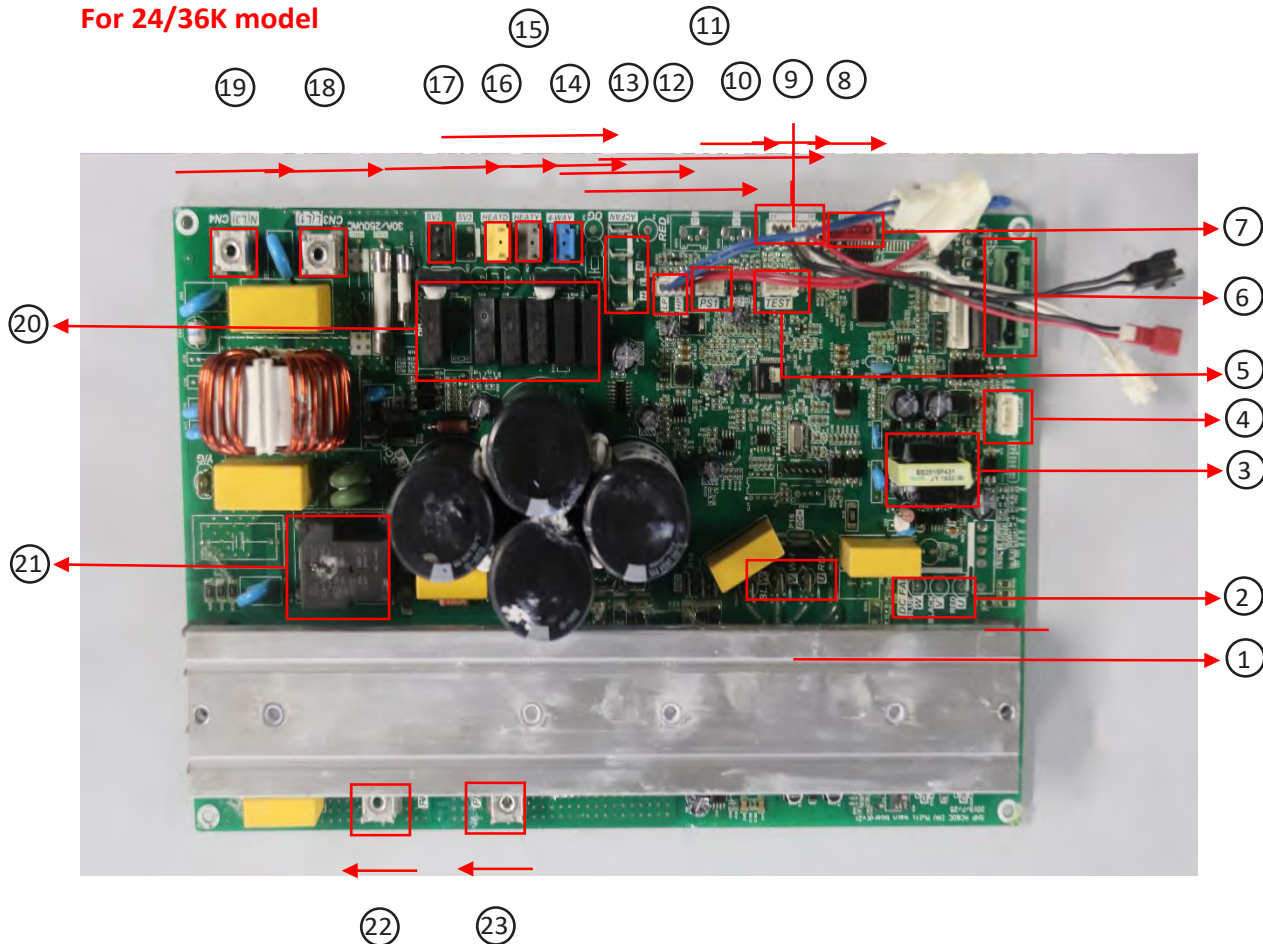
S1: Reserved

Troubleshooting (cont'd)

9.2 Parameter point check table

1). Top discharge outdoor unit

For 24/36K model

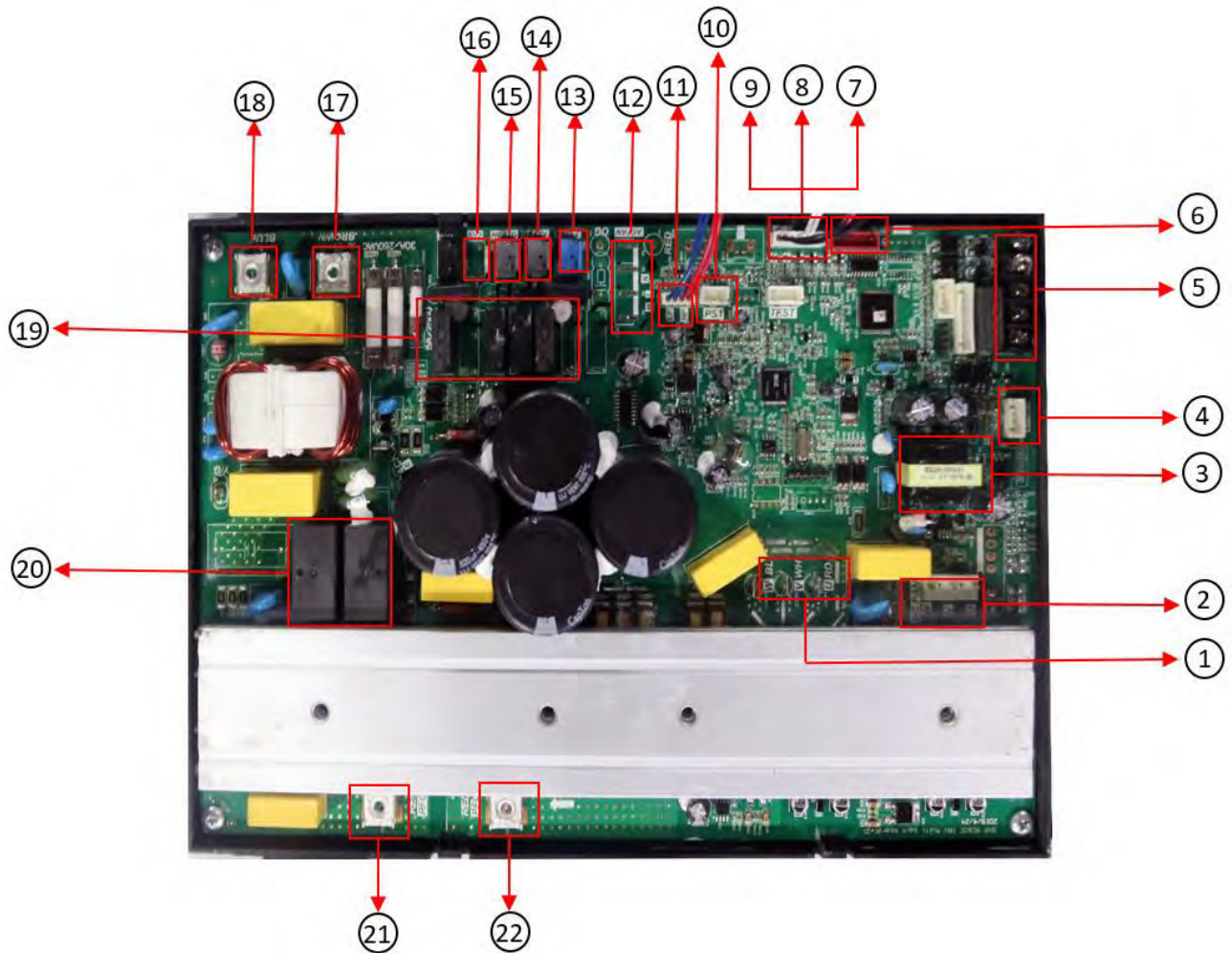


Function description for the corresponding position:

| No. | Content | No. | Content |
|-----|---|-------|--|
| 1 | Compressor wiring terminal | 12 | High/Low pressure switch ports |
| 2 | DC fan motor wiring terminal | 13 | AC fan motor wiring terminal |
| 3 | Transformer | 14 | Four-way valve control port |
| 4 | Outdoor display board wiring terminal | 15 | Crankcase Heating zone control terminal |
| 5 | Reserved | 16 | Chassis Electric Heater control terminal |
| 6 | 24V wire controller interface | 17 | Solenoid valve2 control terminal |
| 7 | EXV drive port | 18 | Power supply connecting terminal |
| 8 | Exhaust temperature sensor port(T5) | 19 | Power supply connecting terminal |
| 9 | Outdoor ambient temperature sensor port(T4) | 20/21 | Relay |
| 10 | Condenser temperature sensor port(T3) | 22 | Inductor wiring terminal 1 |
| 11 | Pressure sensors ports | 23 | Inductor wiring terminal 2 |

Troubleshooting (cont'd)

For 48/60K model



Function description for the corresponding position:

| No. | Content | No. | Content |
|-----|---|-----|--|
| 1 | Compressor wiring terminal | 12 | AC fan motor wiring terminal |
| 2 | DC fan motor wiring terminal | 13 | Four-way valve control port |
| 3 | Transformer | 14 | Crankcase Heating zone control terminal |
| 4 | Outdoor display board wiring terminal | 15 | Chassis Electric Heater control terminal |
| 5 | 24V wire controller interface | 16 | Solenoid valve control terminal |
| 6 | EXV drive port | 17 | Power supply connecting terminal |
| 7 | Exhaust temperature sensor port(T5) | 18 | Power supply connecting terminal |
| 8 | Outdoor ambient temperature sensor port(T4) | 19 | Relay |
| 9 | Condenser temperature sensor port(T3) | 20 | Relay |
| 10 | Pressure sensors ports | 21 | Inductor wiring terminal 1 |
| 11 | High/Low pressure switch ports | 22 | Inductor wiring terminal 2 |

Troubleshooting (cont'd)

9.3 Error codes

| CODE | FAULT DESCRIPTION |
|------|--|
| E4 | T4 Outdoor ambient temperature sensor error |
| E5 | T5 Discharge temperature sensor error |
| E6 | T3 Condenser temperature sensor error |
| E9 | AC under voltage protection |
| E10 | EEPROM error |
| E12 | IPM modular sensor error |
| E13 | HLP Pressure sensor error |
| E14 | T3 or T5 sensor disconnect error |
| E15 | High pressure switch error |
| H0 | Communication error of main chip and IPM chip |
| H1 | T3 sensor high temperature error(In cooling mode) (20 times P5 error within 180mins) |
| H2 | High pressure switch error(20 times P1 error within 150 mins) |
| H3 | High pressure abnormal in heating mode (20 times P13 error within 180 mins) |
| H4 | IPM modular high temp error (20 times P8 within 120 mins) |
| H5 | Low pressure error (20 times P2 within 100 mins) |
| H6 | Discharge temperature abnormal error(20 times P4 within 100 mins) |
| H7 | Wet operation error (20 times P12 within 200 mins) |
| H8 | T3 condenser sensor disconnect error (20 times E14 within 100 mins) |
| H12 | Discharge temp sensor disconnect error(20 times E14 within 180 mins) |
| P1 | High pressure protection |
| P2 | Low pressure protection |
| P3 | DC over current protection |
| P4 | T5 Discharge temperature abnormal error |
| P5 | T3 Condenser sensor high temp protection(In cooling mode) |
| P6 | IPM module protection |
| P8 | IPM high temperature protection (Ft)M high temperature protection (Ft) |
| P9 | DC fan motor error |
| P12 | Wet operation error |
| P13 | High pressure abnormal error(In heating mode) |
| P14 | High compression ratio protection |
| P15 | Low compression ratio protection |
| L1 | DC cable bus low voltage protection |

Troubleshooting (cont'd)

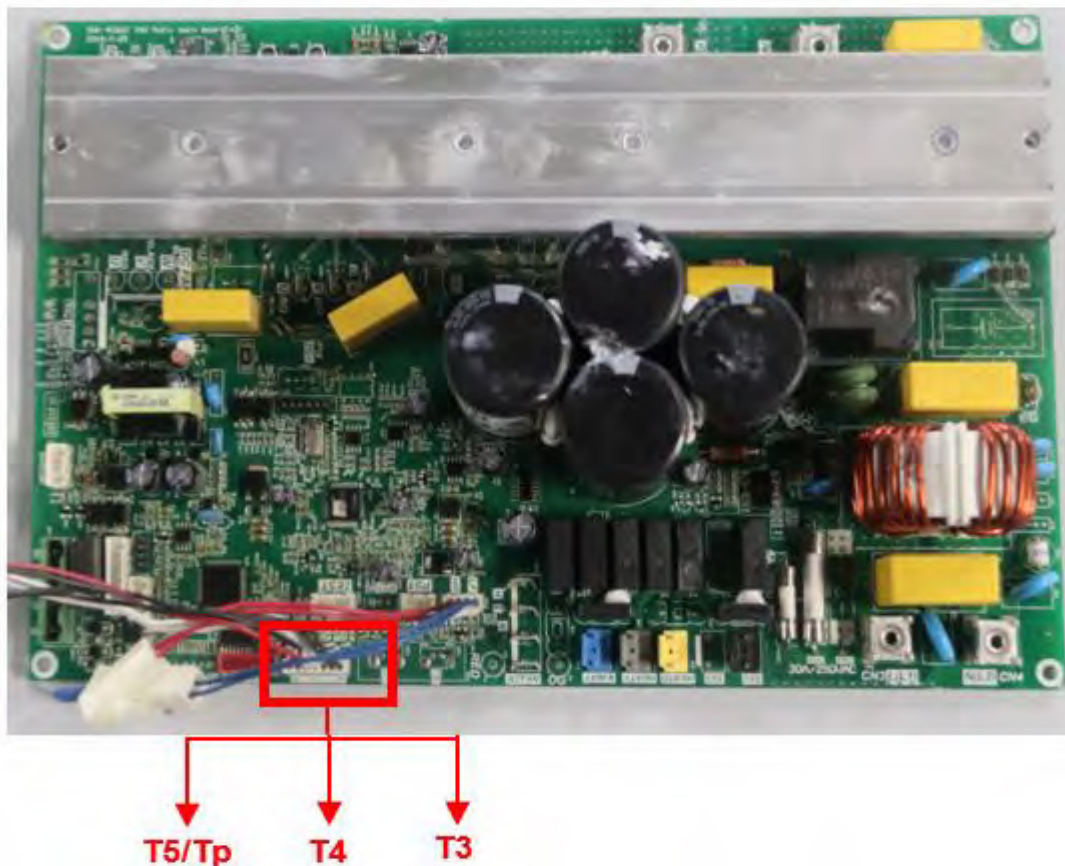
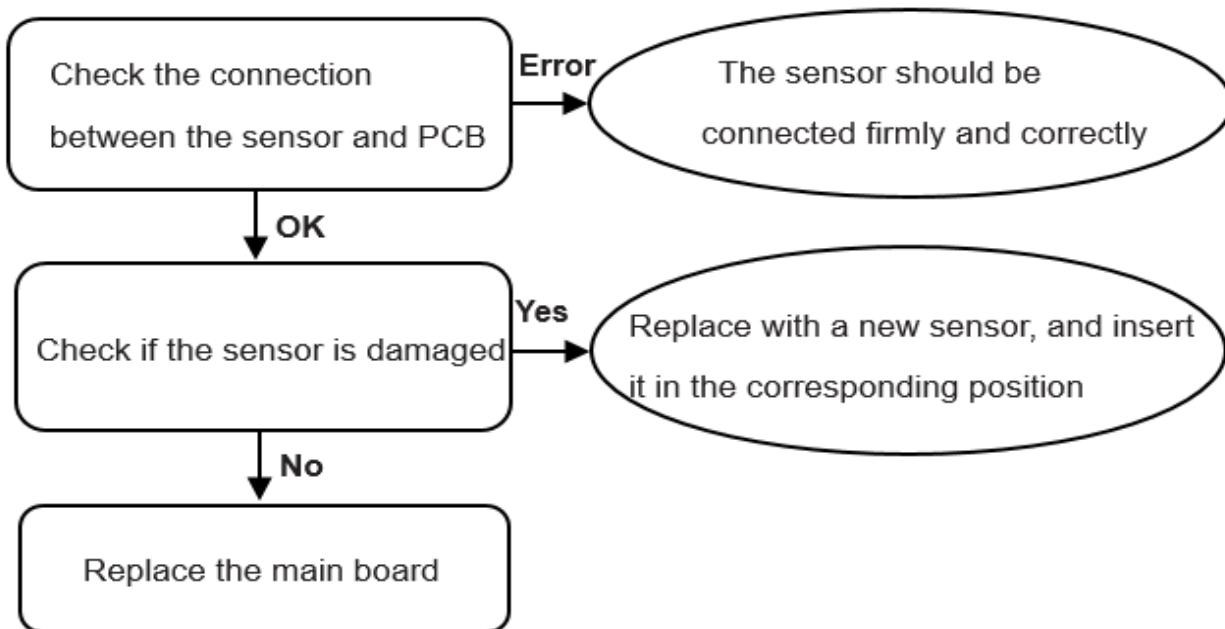
9.3 Error codes continued

| | |
|----|---|
| L2 | DC cable bus high voltage protection |
| L4 | MCE fault / sync / closed loop |
| L5 | Zero speed protection |
| L7 | Compressor phase loss protection ratio protection |
| L8 | Compressor stalls |
| L9 | Frequency limitation or decline by high pressure |
| LA | Frequency limitation by voltage |
| LC | Frequency limitation by condenser temp. |
| LD | Frequency limitation by discharge temp |
| LE | Frequency limitation by IPM modular high temp |
| LF | Frequency limitation by current |
| d0 | Oil return |
| dF | Defrost |
| dH | Force cooling |

Troubleshooting (cont'd)

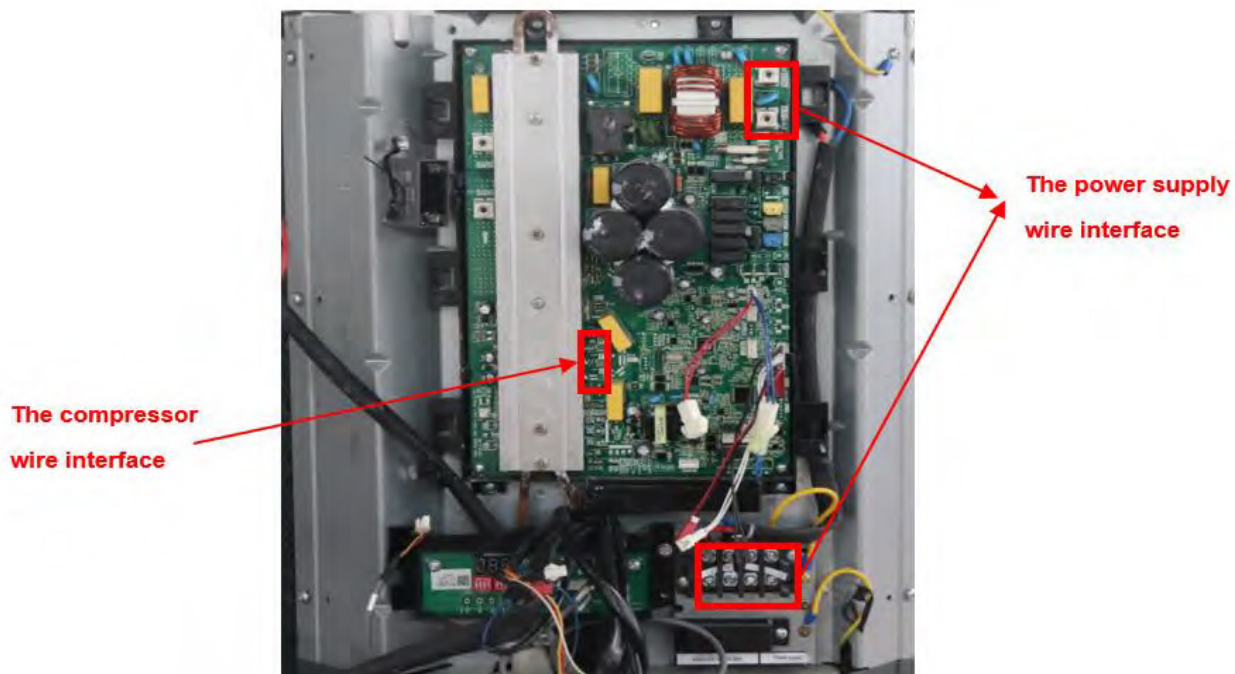
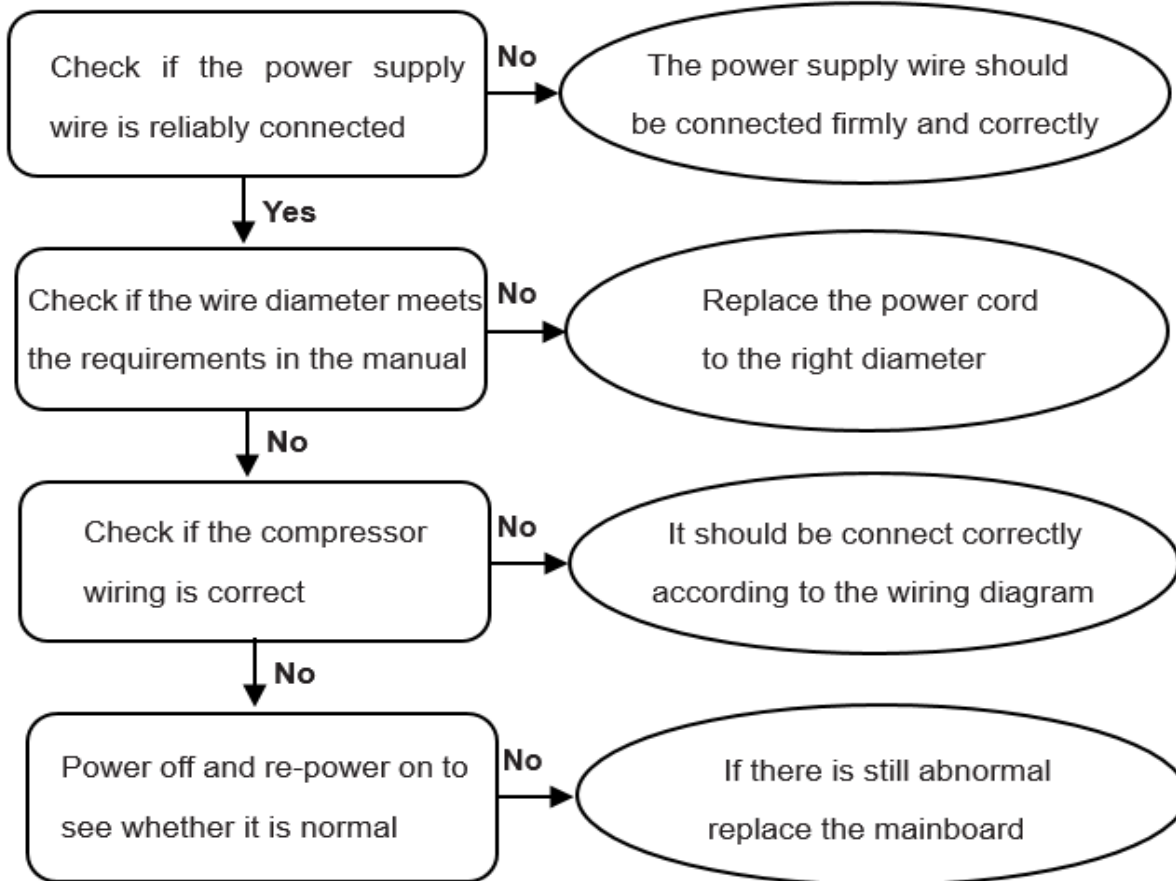
9.4 Troubleshooting guidelines

E4/E5/E6 (T4/T5/T3 temperature sensors error)



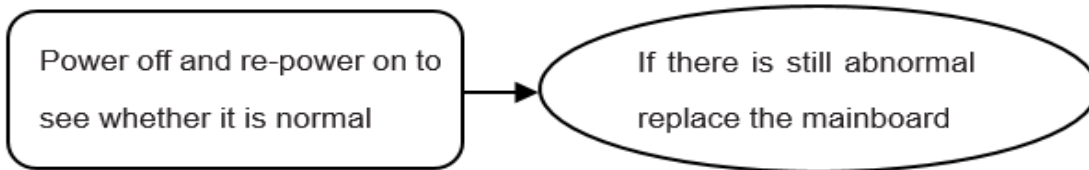
Troubleshooting (cont'd)

E9 (AC under voltage protection)

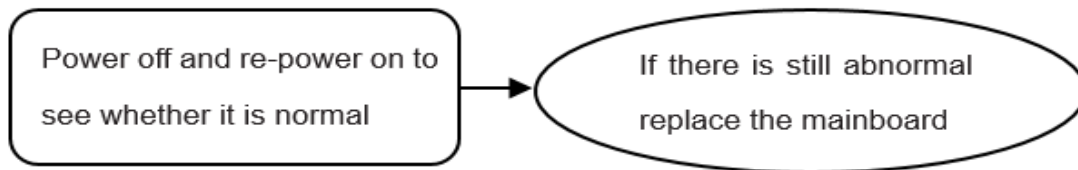


Troubleshooting (cont'd)

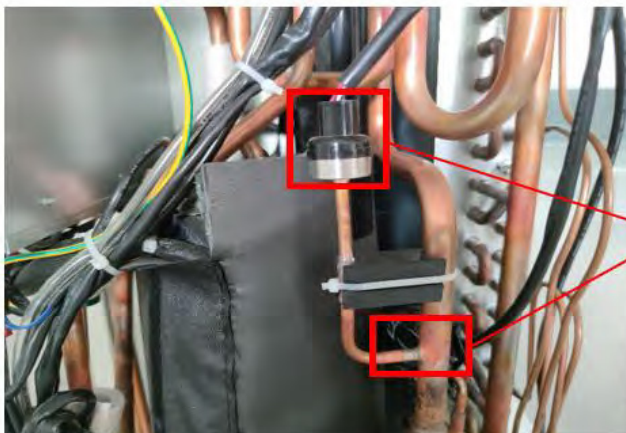
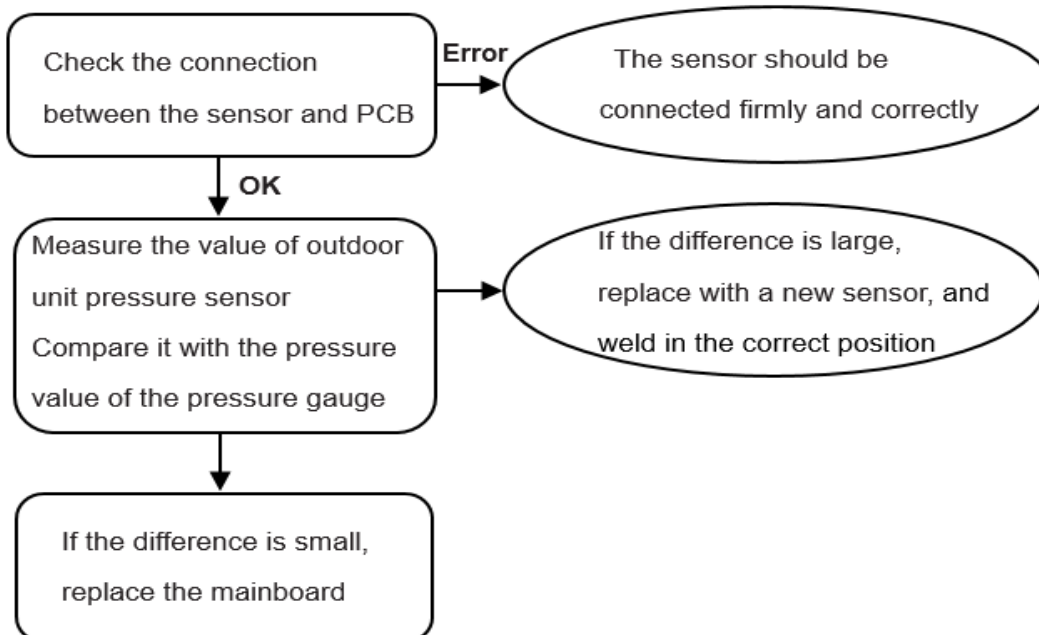
E10 (EEPROM failure)



E12 (IPM modular sensor error)



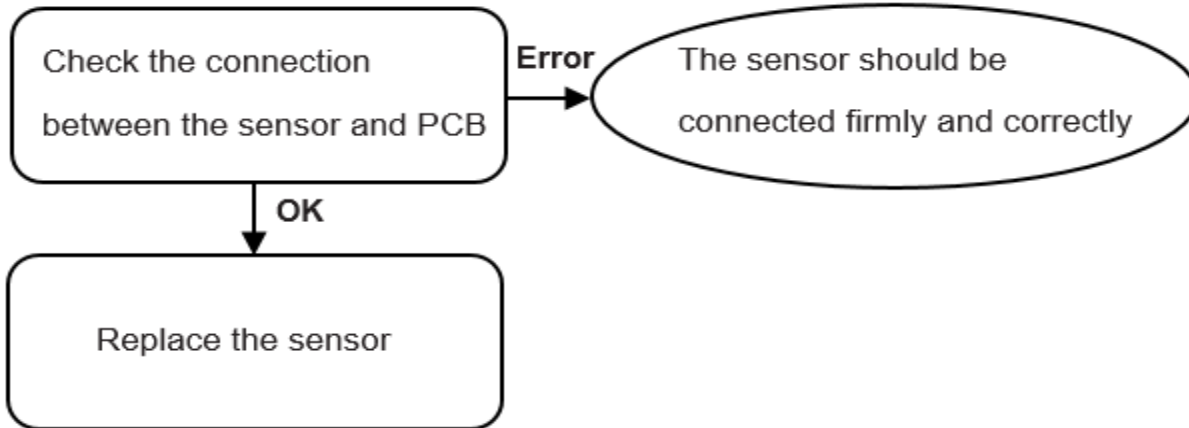
E13 (HLP Pressure sensor error)



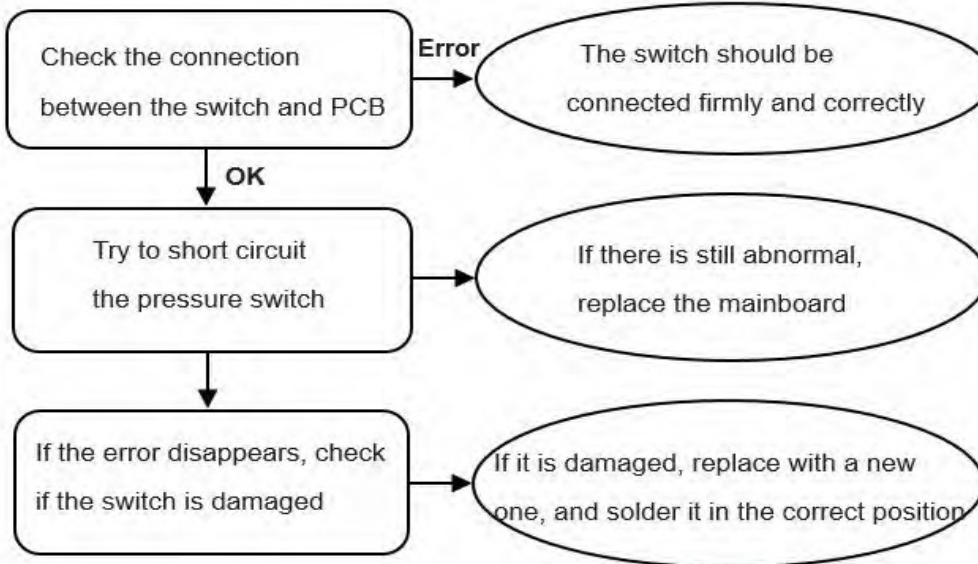
The pressure sensor should be soldered in the correct position

Troubleshooting (cont'd)

E14/H8/H12 (T3 or T5 sensor disconnect error)



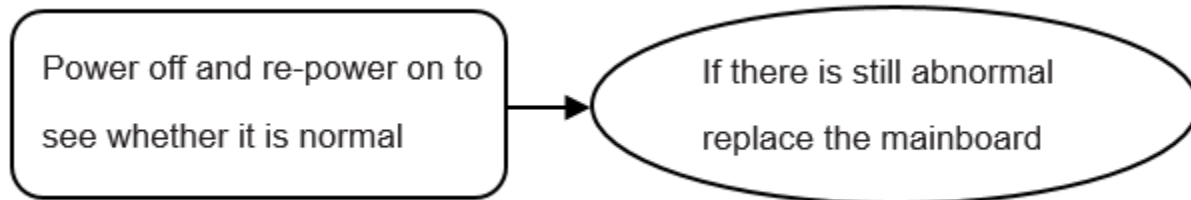
E15 (High pressure switch error)



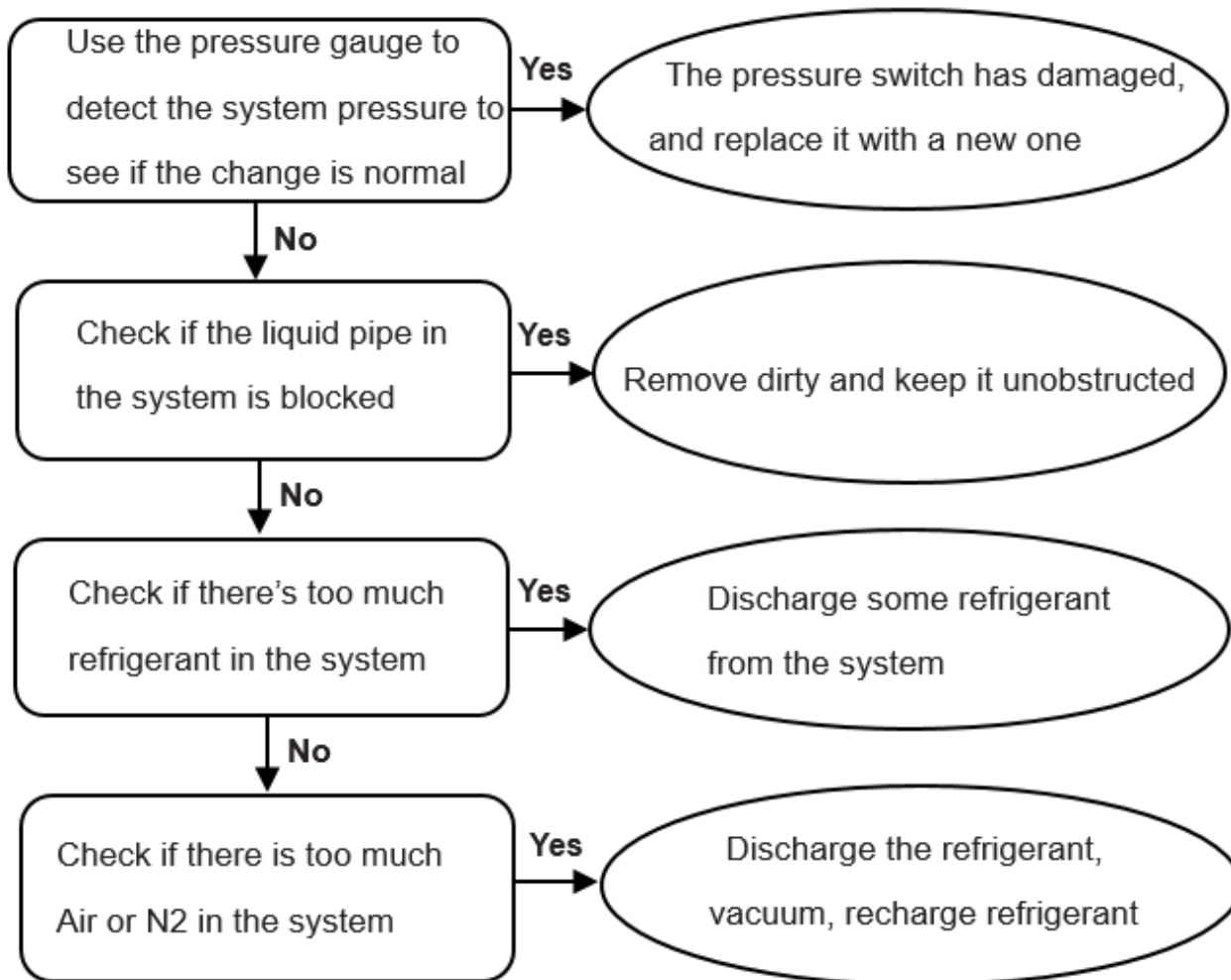
The high pressure switch should be soldered in the correct position

Troubleshooting (cont'd)

H0 (Communication error of main chip and IPM chip)

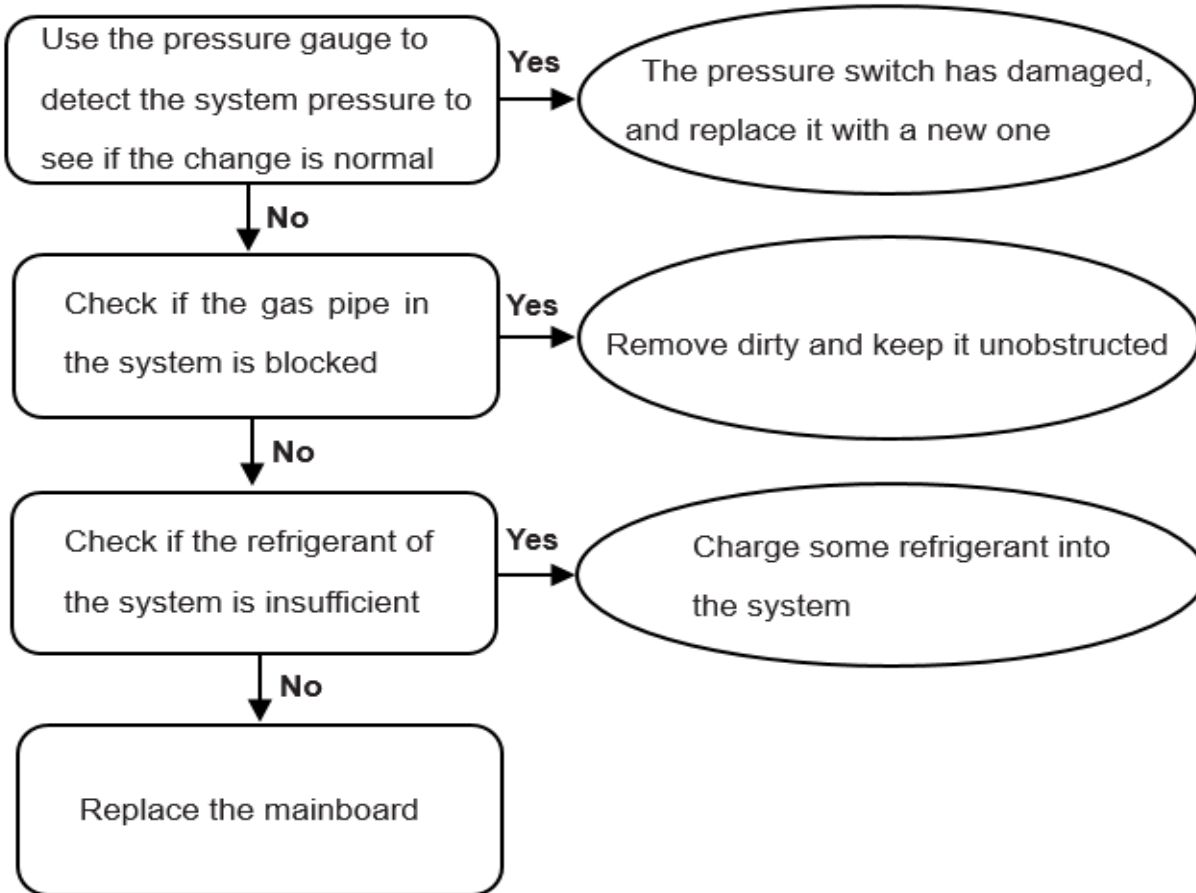


P1/H2 (High pressure switch protection)

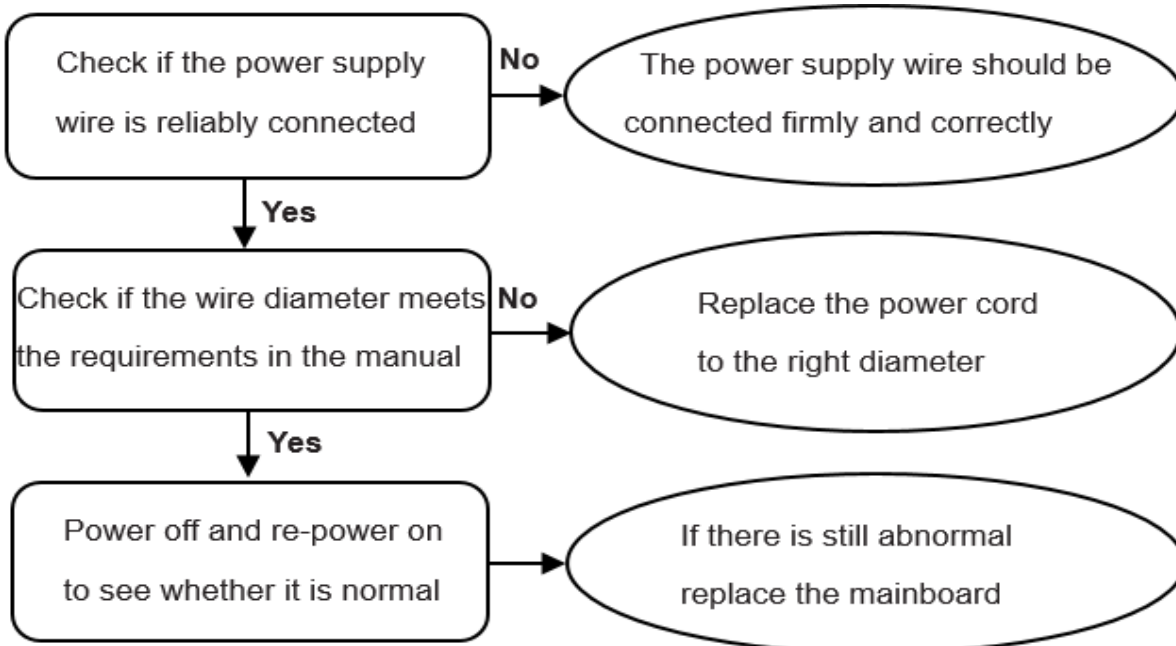


Troubleshooting (cont'd)

P2/H5 (Low pressure switch protection)

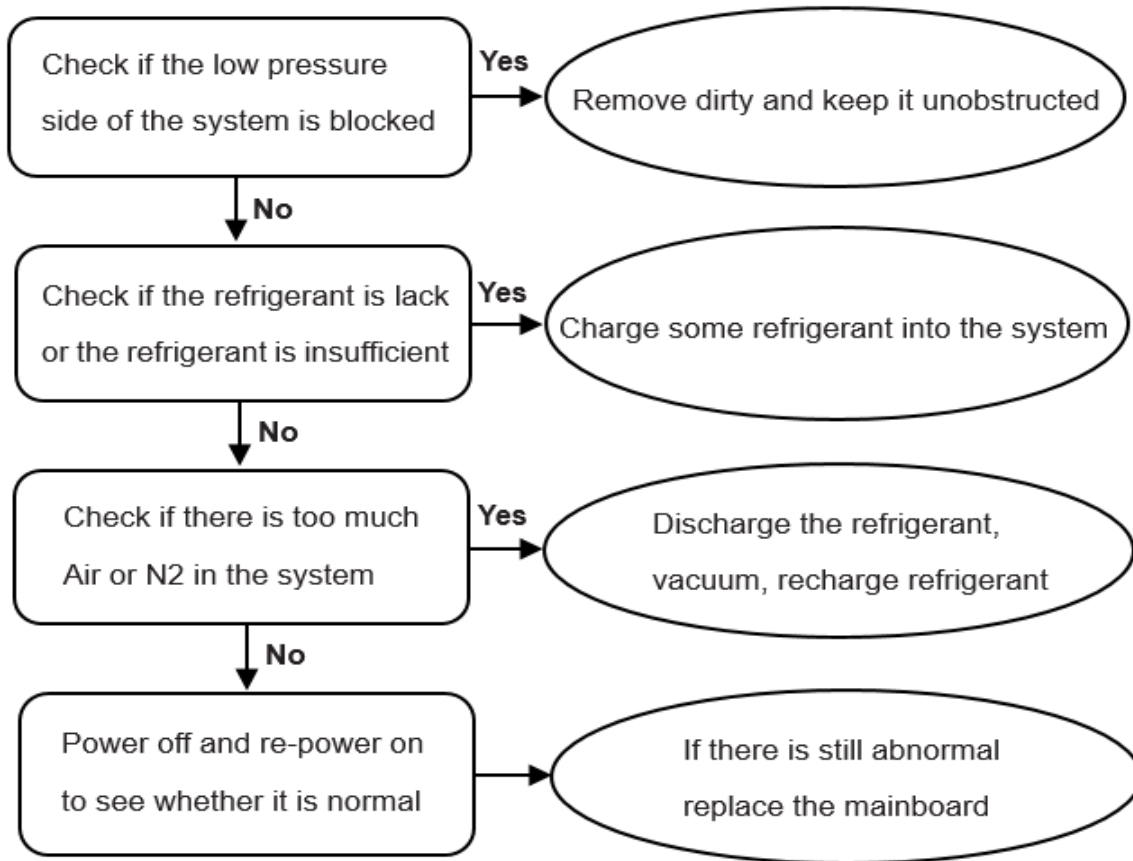


P3 (Inverter over current protection)

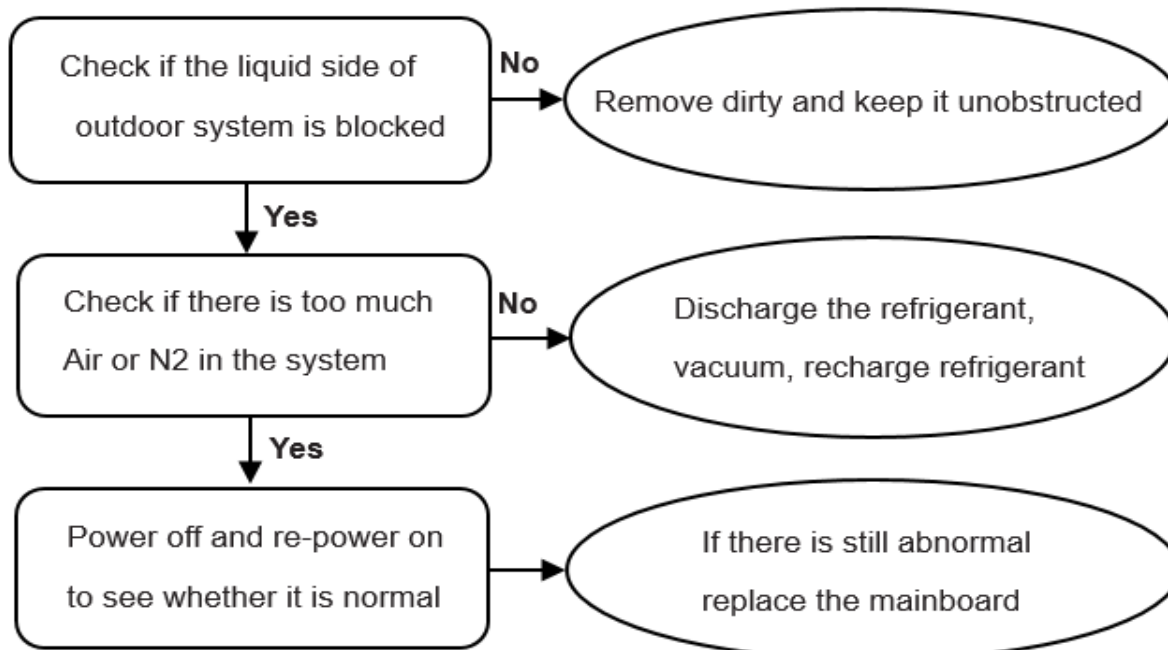


Troubleshooting (cont'd)

P4/H6 (T5 Discharge temperature abnormal error)

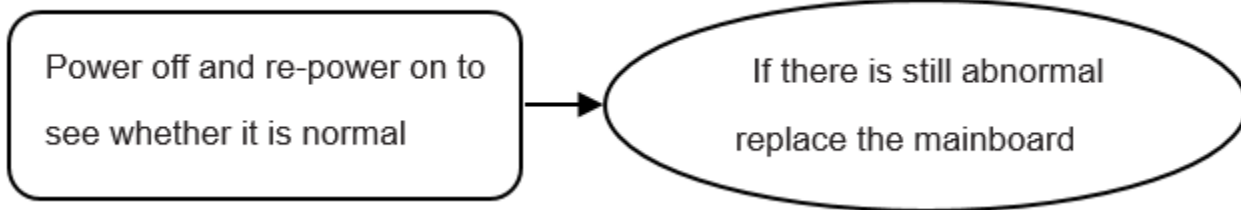


P5/H1 (T3 condenser sensor high temp protection)

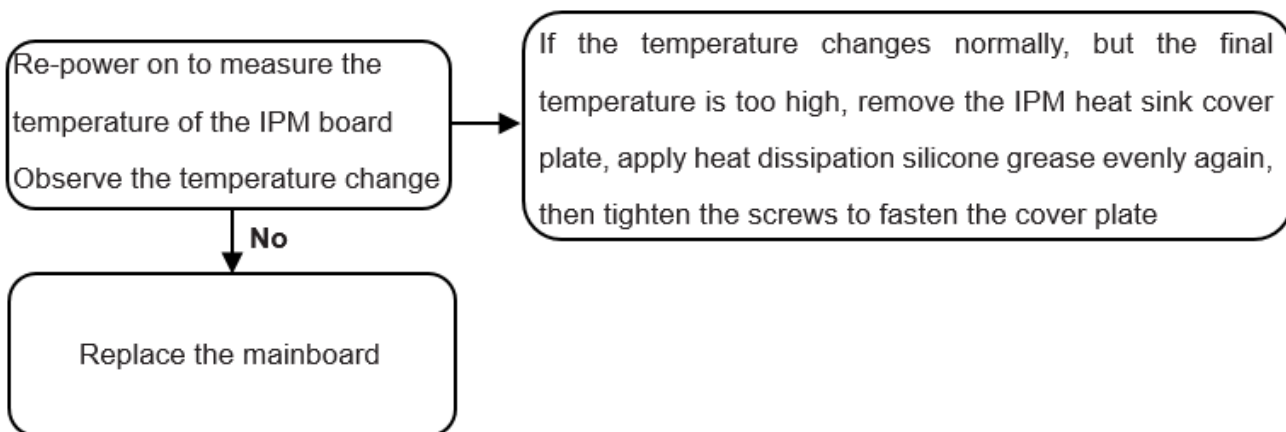


Troubleshooting (cont'd)

P6 (IPM module protection)



P8/H4 (IPM high temperature protection)

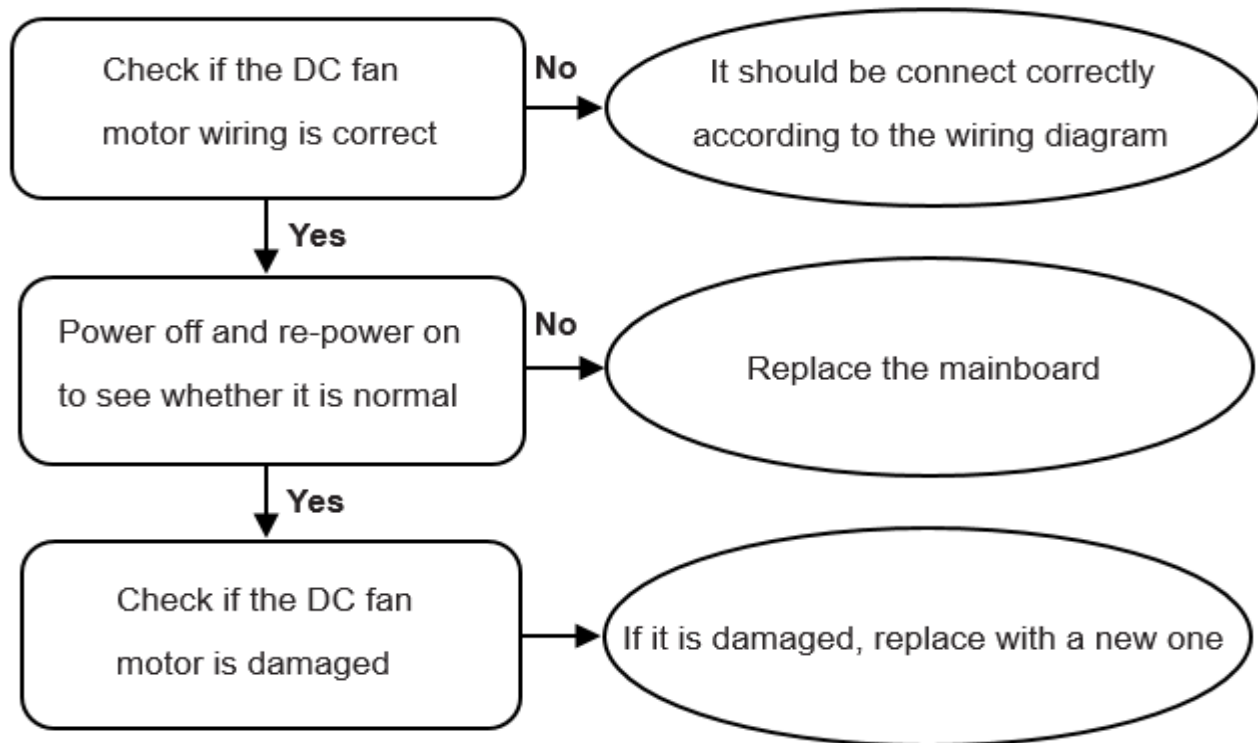


**IPM heat sink cover plate
should be fastened**

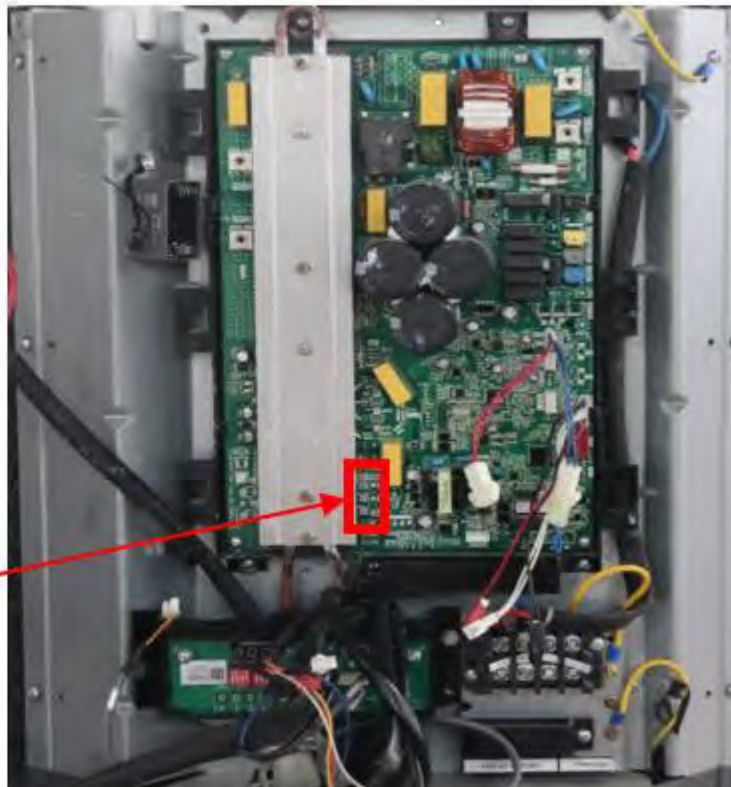


Troubleshooting (cont'd)

P9 (DC fan motor error)

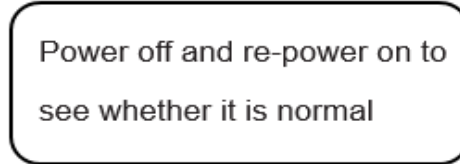


**The DC fan motor
wire interface**

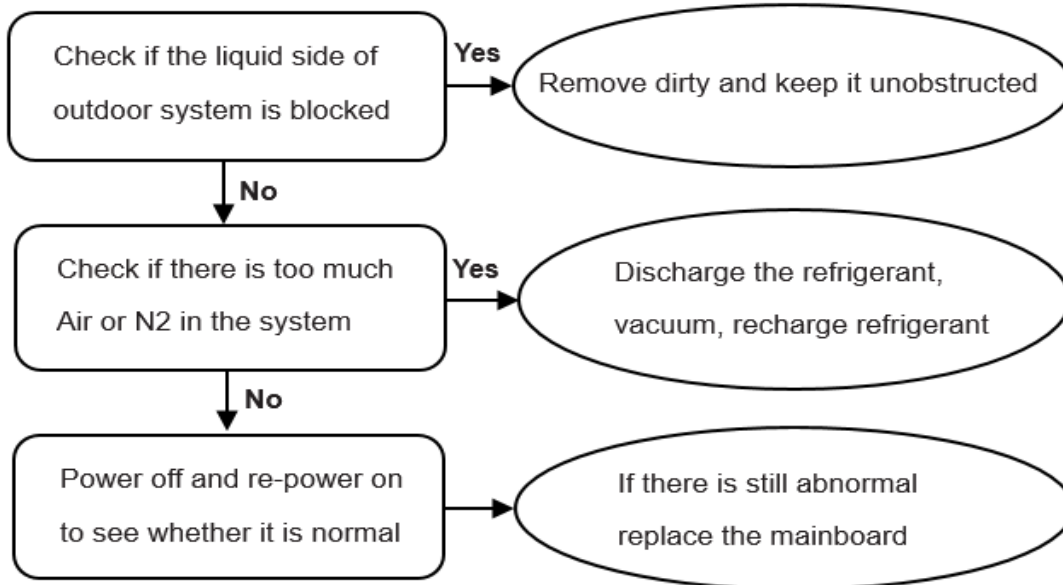


Troubleshooting (cont'd)

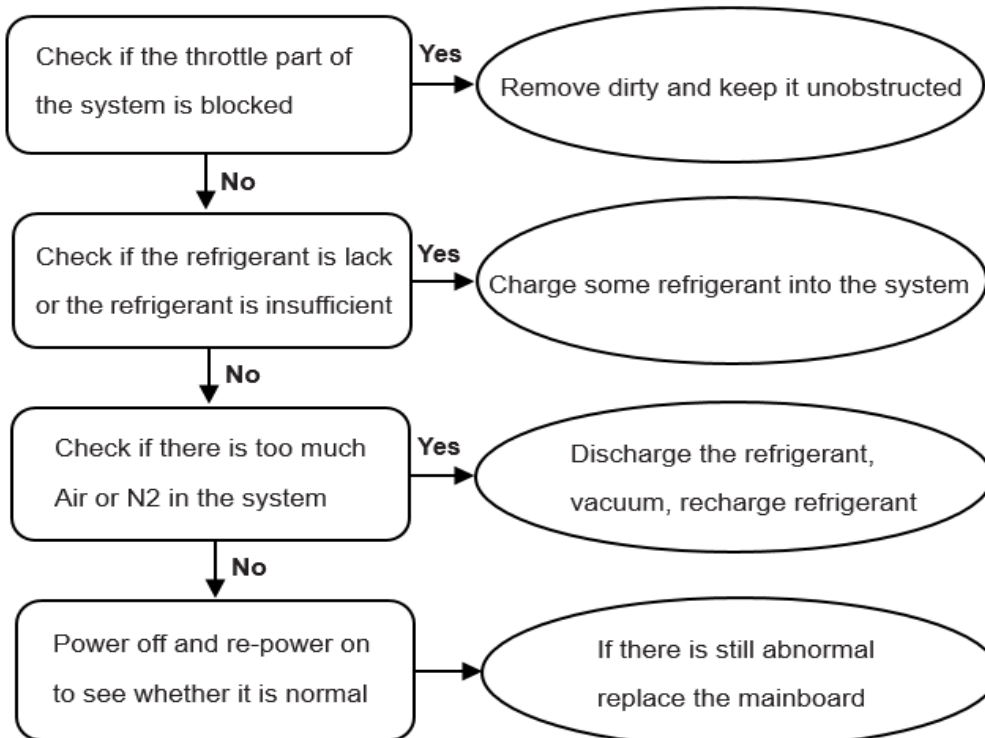
P12/H7 (Wet operation error)



P13/H3 (High pressure abnormal error-In heating mode)

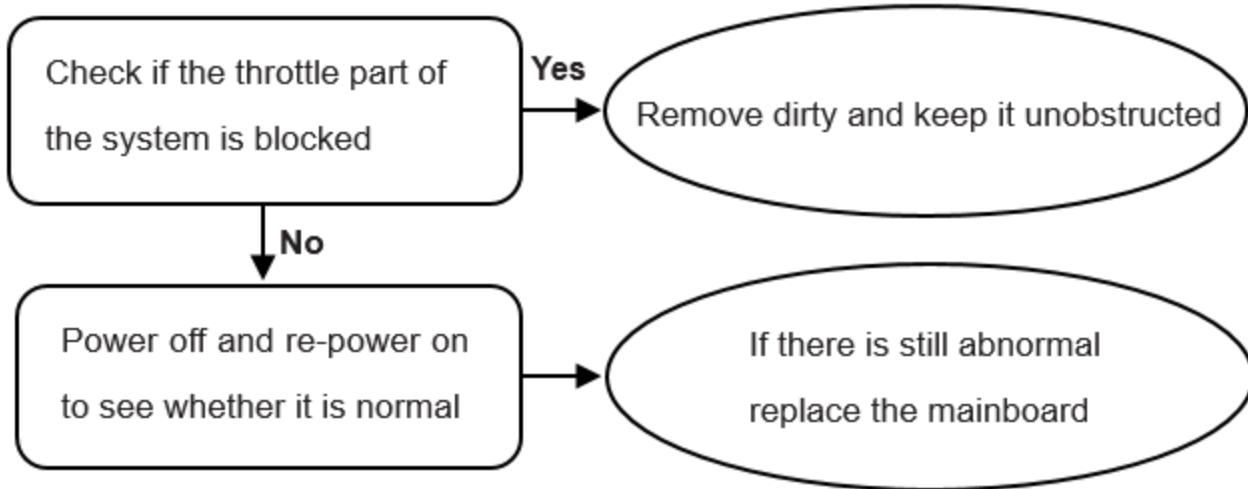


P14 (High compression ratio protection)

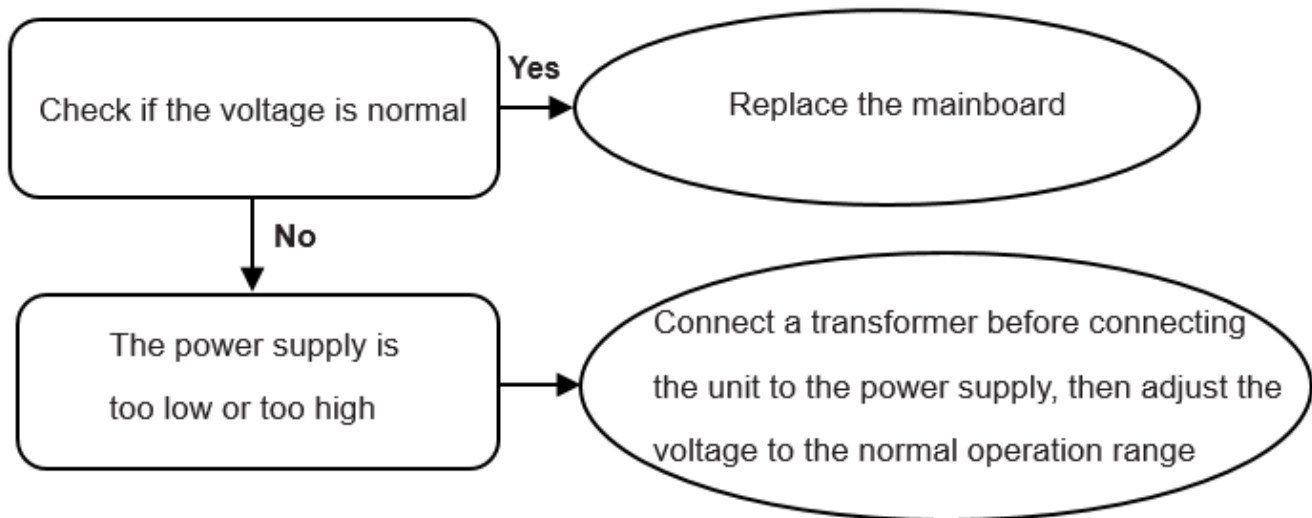


Troubleshooting (cont'd)

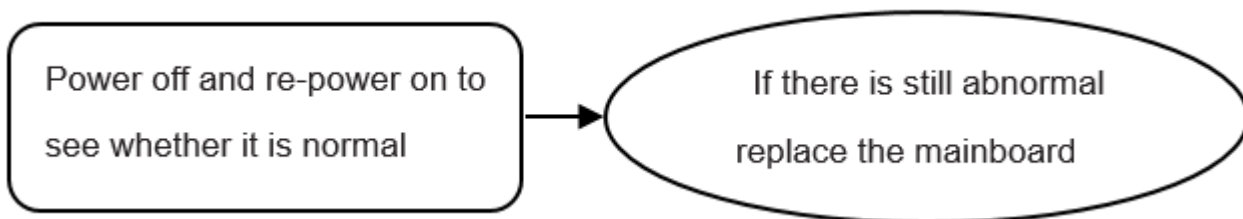
P15 (Low compression ratio protection)



L1/L2(DC cable bus low/high voltage protection)



L4-L8 (IPM module subdivision protection)



L9-LE (Frequency limitation protection, not error)