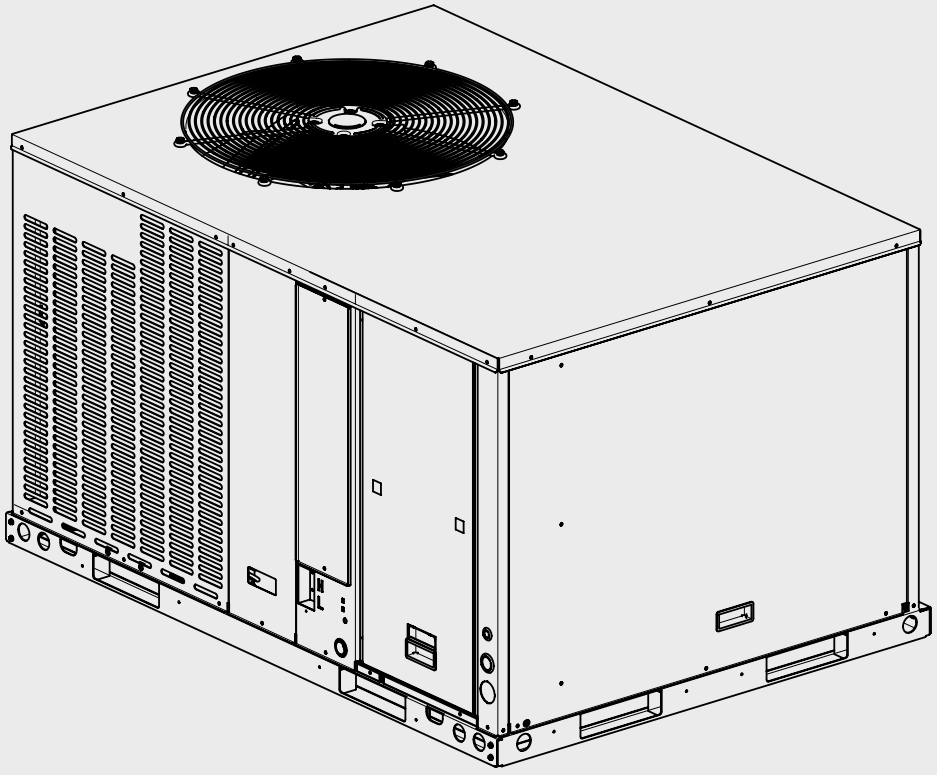
Installation and Operating Instructions

# Packaged Heat Pump
# **PL5 Series Packaged Unit**

3-5 Ton Capacity | R-454B



BTC 911003201 A / 02.2026

AHRI CERTIFIED®
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Unitary Small HP
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

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Intertek

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# 1 Key to Symbols and Safety Instructions

## 1.1 Key to Symbols

**Warnings**

In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimizing danger are not taken.

The following keywords are defined and can be used in this document:

**DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.

***NOTICE***

**NOTICE** is used to address practices not related to personal injury.

**Important information**

The info symbol indicates important information where there is no risk to people or property.

## 1.2 Explanation of Symbols Displayed on the Unit

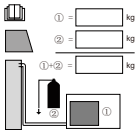
| Symbol | |
|---|---|
|   | WARNING<br>This symbol shows that this appliance uses a mildly flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire. |
|   | WARNING<br>This symbol shows that appliance shall be installed, operated and stored in a room with a floor area not less than the minimum room area. |
|  | CAUTION<br>This symbol shows that the operation manual should be read carefully. |
|  | CAUTION<br>This symbol shows that a service personnel should be handling this equipment with reference to the installation manual. |
|  | CAUTION<br>This symbol shows that information is available such as the operating manual or installation manual. |
|   | CAUTION<br>This symbol shows that when addition of charge is required by the manufacturer installation instructions for completing the REFRIGERATING SYSTEM. Recorded the resulting total REFRIGERANT CHARGE for each REFRIGERATING SYSTEM. |

*Table 1*

## 1.3 Safety

**Please read safety precautions before installation**

**WARNING**

**Electrical hazard 380 Volts DC!**

Failure to follow this warning could result in property damage, severe personal injury, or death.

WAIT 5 MINUTES after disconnecting power prior to touching electrical components as they may hold a dangerous charge of 380 VDC,then verify DC Voltage is less than 42 VDC at inverter TEST POINTS P-N.

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.

The manufacturer recommends installing only approved matched indoor and outdoor systems. The approved matchups are AHRI rated and indoor units must be equipped with R-454B TXV. Some of the benefits of installing approved matched indoor and outdoor split systems are maximum efficiency, optimum performance and the best overall system reliability.

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 installation work.

**WARNING**

**Personal injury, product damage!**

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.

**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-454B refrigerant. Use only R-454B approved service equipment. All R-454B systems with variable speed compressors use a POE oil (VG75 or equivalent )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.

**WARNING**

**Hot surface!**

May cause minor to severe burning. Failure to follow this Caution could result in property damage or personal injury.

Do not touch high temperature components such as the compressor.

**WARNING**

**Contains flammable 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. Flammable refrigerant used.

**WARNING**

**Contains lead!**

This product can expose you to chemicals including Lead and Lead components, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

**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.

**WARNING**

**Brazing or crimping 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 re-crimped or brazed, not soldered.

If refrigerant gas leaks during installation, ventilate the area immediately.

Comply with national gas regulations.

**WARNING**

**High current leakage!**

Grounding is required before connecting electrical supply. Failure to follow this warning could result in property damage, severe personal injury, or death.

**WARNING**

**Risk of fire!**

Mildly flammable refrigerant used.

Follow handling instructions carefully in compliance with national and local regulations.

**DANGER**

**Fire, explosion!**

Store in a well ventilated room without continuously operating flames or other potential ignition.

**WARNING**

**Risk of electric shock!**

Can cause injury or death. Disconnect all remote electric power supplies before servicing.

**WARNING**

**Risk of fire!**

Flammable refrigerant used. To be repaired only by trained service personnel. Do not puncture refrigerant tubing.

Dispose of properly in accordance with federal or local regulations. Flammable refrigerant used.

Flammable refrigerant used. Consult repair manual/owner's guide before attempting to service this product. All safety precautions must be followed.

Auxiliary devices which may be ignition sources shall not be installed in the ductwork, other than auxiliary devices listed for use with the specific appliance. See instructions.

**WARNING**

**Personal injury!**

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons who lack experience and knowledge, unless they are supervised or have been given instructions concerning the 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.

Any person who is involved with working on or opening a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority,which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment credential.

Servicing shall only be performed as recommended by the equipment manufacturer.

Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of a person competent in the use of flammable refrigerants.

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to minimize the risk of ignition.

**WARNING**

**Flammable refrigerant!**

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 that does not have continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn the unit.

Be aware that refrigerants may not contain an odour.

**WARNING**

**Safe handling of flammable refrigerant!**

Be sure the heat pump is grounded. In order to avoid electric shock, make sure that the unit is grounded and that the earth wire is not connected to a gas or water pipe, lightning conductor or telephone earth wire.

Do not operate the heat pump with wet hands. An electric shock may happen.

Do not operate the heat pump when using a room fumigation such as insecticide Failure to observe this precaution could cause the chemicals to become deposited in the unit,which could endanger the health of those who are hypersensitive to chemicals.

To avoid oxygen deficiency, ventilate the room sufficiently if equipment with a burner is used together with the heat pump.

Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause wetting of the building, furniture, etc.

Never touch the internal parts of the controller. Do not remove the front panel. Some parts inside are dangerous to touch, and machine troubles may occur.

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment permitted to be transported together will be determined by the applicable transport regulations.

Signs for similar appliances used in a work area are generally addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.

Storage package protection should be constructed such a way that mechanical damage to the equipment inside the package will not cause a leak of the REFRIGERANT CHARGE.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

Do not place appliances which produce open flame in places exposed to the air flow from the unit or under the indoor unit. It may cause incomplete combustion or deformation of the unit due to the heat.

Do not install the heat pump in a location where flammable gas may leak out. If the gas leaks out and stays around the heat pump, a fire may break out.

**WARNING**

**Flammable refrigerant!**

The appliance uses R-454B refrigerant.




***NOTICE***

**Indoor unit required!**

The indoor units must be matched with R-454B TXV. The model of R-454B TXV can be changed according to the system capacity.

**WARNING**

**Personal Injury, flammable refrigerant!**

When repairing the refrigerating system, comply with the following precautions prior to conducting work on the system:

- Work shall be undertaken according to controlled procedures to minimize the risk of the presence of flammable gases or vapors while the work is being performed.
- 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.
- 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 environment. 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.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available and easily accessible. Have a dry powder or $CO_2$ fire extinguisher adjacent to the charging area.
- When carrying out work in relation to a refrigerating system that involves exposing any pipe work, no sources of ignition shall be used 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, repair, or removal and disposal of the unit, during which refrigerant can possibly be released into the surrounding space. Prior to beginning work, 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 clearly displayed.

**WARNING**

**Personal Injury, flammable refrigerant!**

Ensure that the area is in the open or that it is adequately ventilated before opening 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 surroundings.

Where electrical components are being changed, they shall be fit according to their 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.
- Equipment marking must remain visible and legible. Markings and signs that are illegible shall be corrected.

**WARNING**

**Personal Injury, flammable refrigerant!**

Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substances which may corrode refrigerant containing components, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected against corrosion.

Repair and maintenance of 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 the fault has been dealt with.

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

**WARNING**

**Flammable refrigerant!**

Sealed electrical components shall be replaced.

Intrinsically safe components must be replaced.

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.

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

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 for the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.

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

If refrigerant leakage is found, brazing or crimping is required, and all refrigerants should be recovered from the system or isolated from the leakage point.

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.

Examples of leak detection fluids are:

- bubble method,
- fluorescent method agents.

**WARNING**

**Flammable refrigerant!**

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.
- 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. This process shall be repeated until no refrigerant is within the system. 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.

Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant they contain.

Cylinders shall be kept upright. Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.

If not already labeled, label the system when charging is complete.

Take extreme care not to overfill the refrigeration system.

**WARNING**

**Flammable refrigerant!**

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.

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended 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 reclaimed 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 vacuuming is not possible, make an opening so that refrigerant can be removed from various parts of the system.

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

g. Start the recovery machine and operate it in accordance with the manufacturer's instructions.

h. Do not overfill cylinders with 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 has been 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 refrigeration system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended 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.

**WARNING**

**Flammable refrigerant!**

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.

Do not use the heat pump for other purposes. In order to avoid any quality deterioration, do not use the unit for the cooling of precision instruments, food, plants, animals or works of art. Before cleaning, be sure to stop the operation, turn the breaker off or unplug the supply cord. Otherwise, electric shock and injury may occur.

To avoid electric shock or fire, make sure that a leak detector is installed. Never touch the air outlet or the horizontal blades while the swing flap is in operation. Fingers may be come caught or the unit may break down.

Never put any objects into the air inlet or outlet. Objects touching the fan at high speed can be dangerous. Never inspect or service the unit by yourself. Ask a qualified service person to perform this task.

Do not dispose of this product as unsorted municipal waste. This waste should be collected separately for special treatment. Do not dispose of electrical appliances as unsorted municipal waste. Use separate collection facilities. Contact your local government for information regarding the connection systems available.

If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, hazardous to one's health and well-being.

To prevent refrigerant leak, contact your dealer.

When the system is installed and operates in a small room, it is required to maintain the concentration of the refrigerant below the limit, in case a leak occurs. Otherwise, oxygen in the room may be affected, resulting in a serious accident.

The refrigerant in the heat pump is safe and normally does not leak.

If the refrigerant leaks into the room and encounters the fire of a burner, a heater or a cooker, a harmful gas could be released.

Turn off any combustible heating devices, ventilate the room, and contact the dealer where the unit was purchased.

Do not use the heat pump until a service person confirms that the refrigerant leak is repaired.

Keep ventilation openings clear of obstruction.

**WARNING**

**Product damage, personal injury!**

This outdoor unit must combine the indoor unit with refrigerant leak detection device.

These instructions are exclusively intended for qualified contractors and authorized installers. Work on the refrigerant circuit with mild flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with UL 60335-2-40, Section HH. The certificate of competence from an industry accredited body is required.

Work on electrical equipment may only be carried out by a qualified electrician.

Before initial commissioning, all safety – related points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

## 2 Component Location

### 2.1 3 Ton Model

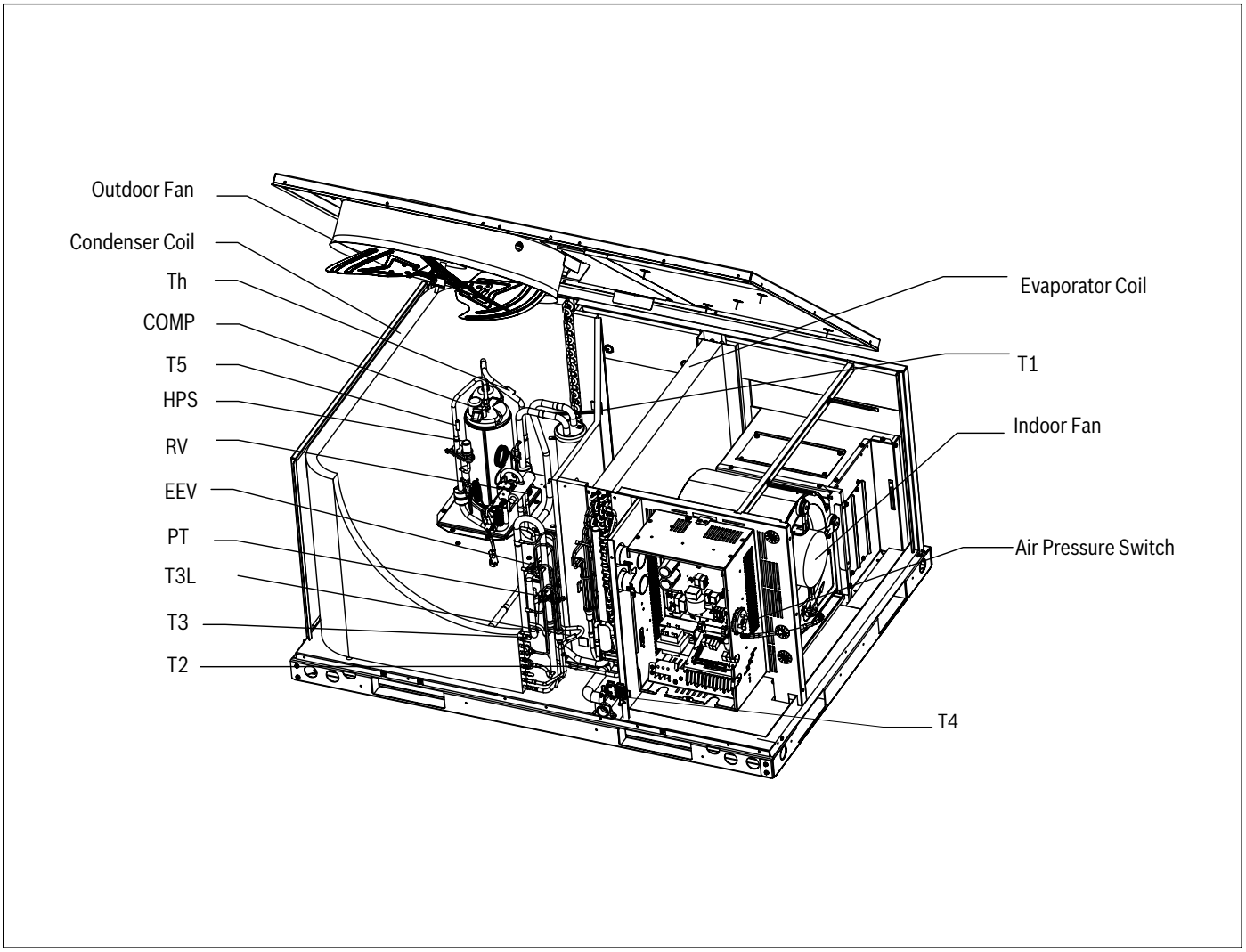



*Figure 1*

| Component | Descriptions | Component | Descriptions |
|---|---|---|---|
| HPS | High pressure switch | T5 | Comp. discharge temp. sensor |
| PT | Pressure transducer | T3L | Condenser outlet temp. sensor |
| T1 | Return air temp. sensor | Th | Comp. return temp. sensor |
| T2 | Indoor coil temp. sensor | EEV | Electronic expansion valve |
| T3 | Condenser temp. sensor | RV | Reversing valve |
| T4 | Ambient temp. sensor | COMP | Compressor |

*Table 2 Component Descriptions*

## 2.2 5 Ton Model

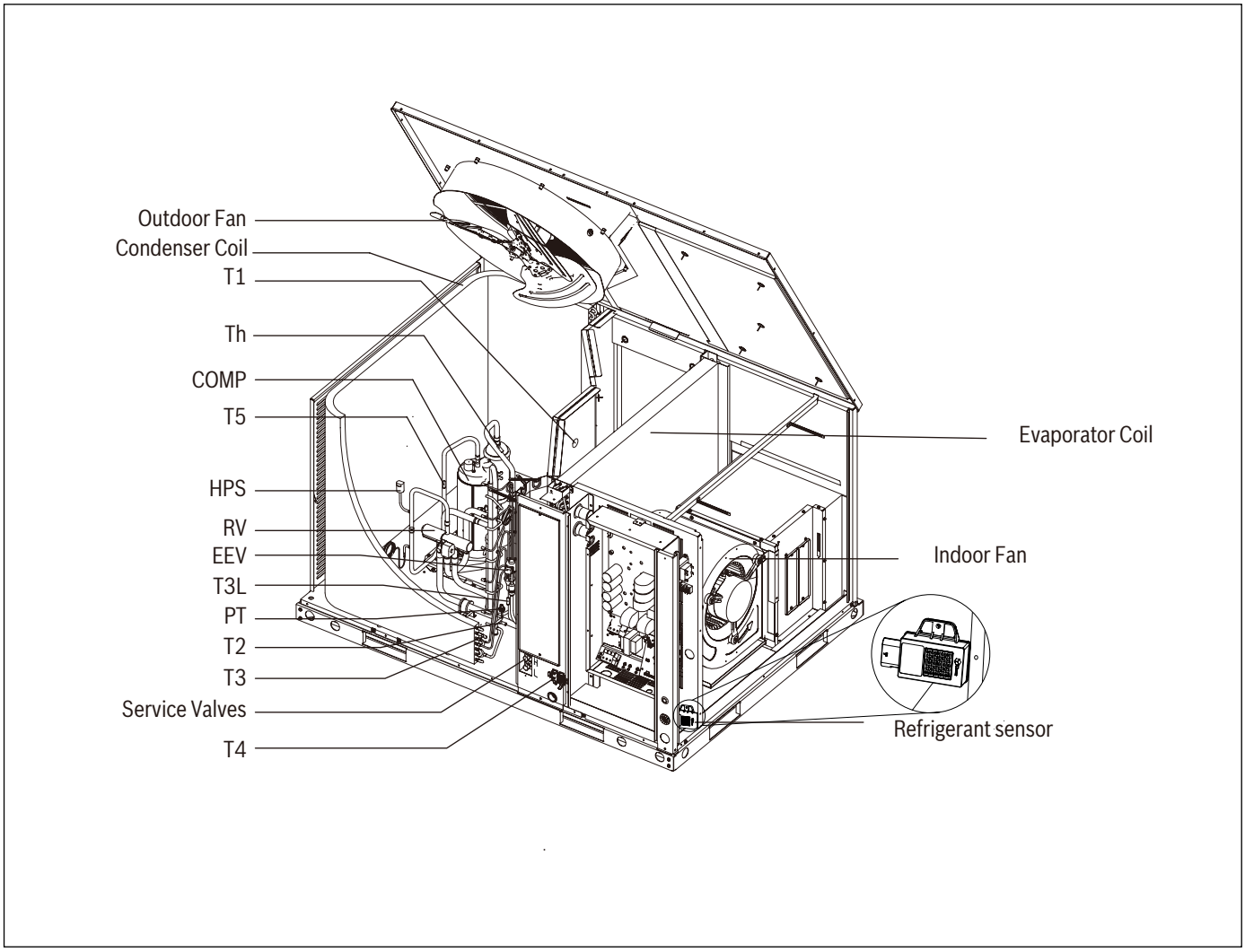



*Figure 2*

| Component | Descriptions | Component | Descriptions |
|---|---|---|---|
| HPS | High pressure switch | T5 | Comp. discharge temp. sensor |
| PT | Pressure transducer | T3L | Condenser outlet temp. sensor |
| T1 | Return air temp. sensor | Th | Comp. return temp. sensor |
| T2 | Indoor coil temp. sensor | EEV | Electronic expansion valve |
| T3 | Condenser temp. sensor | RV | Reversing valve |
| T4 | Ambient temp. sensor | COMP | Compressor |

*Table 3 Component Descriptions*

# 3 Dimensions

## 3.1 3 Ton Model

### 3.1.1 Unit Dimensions

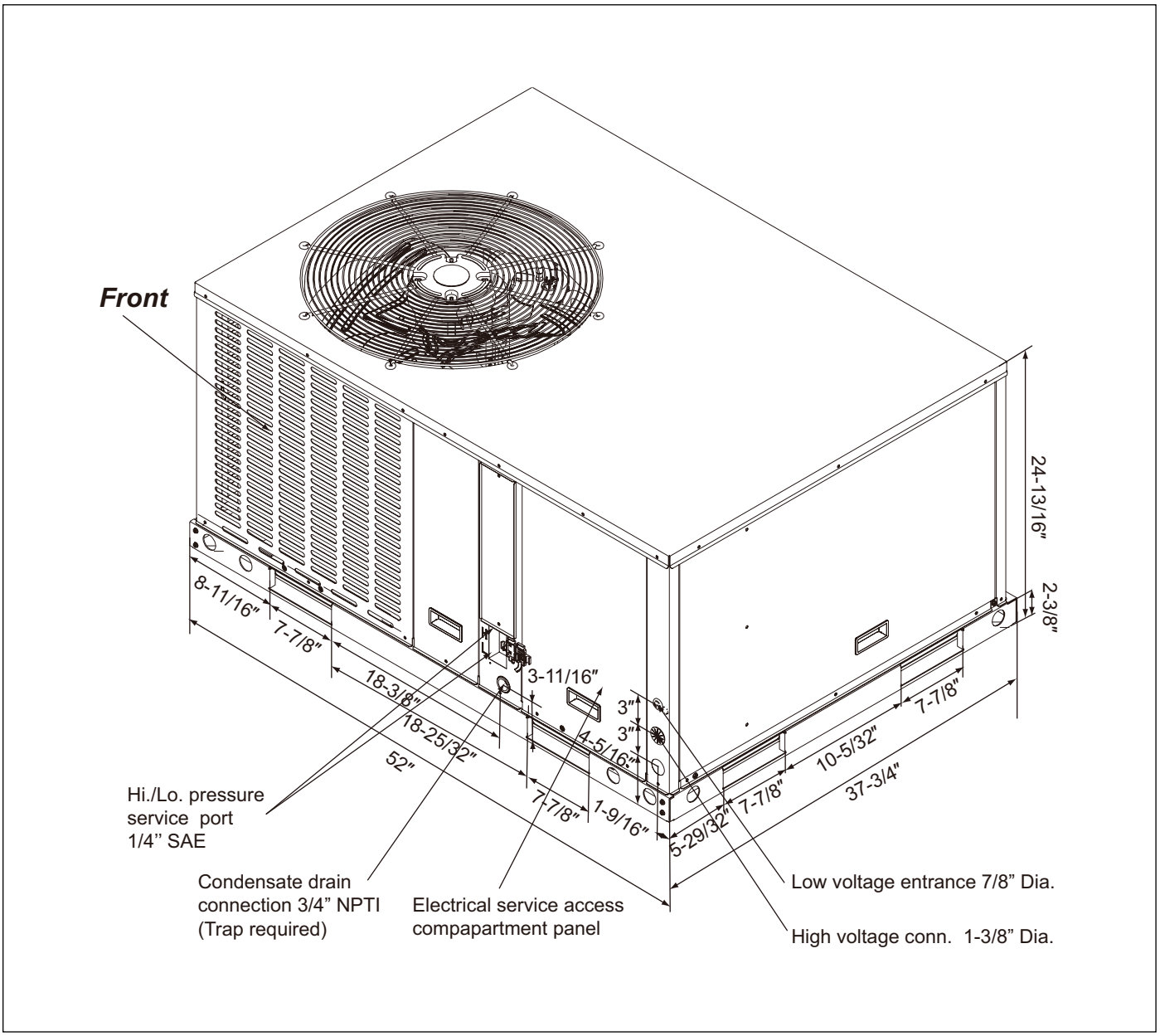



*Figure 3*

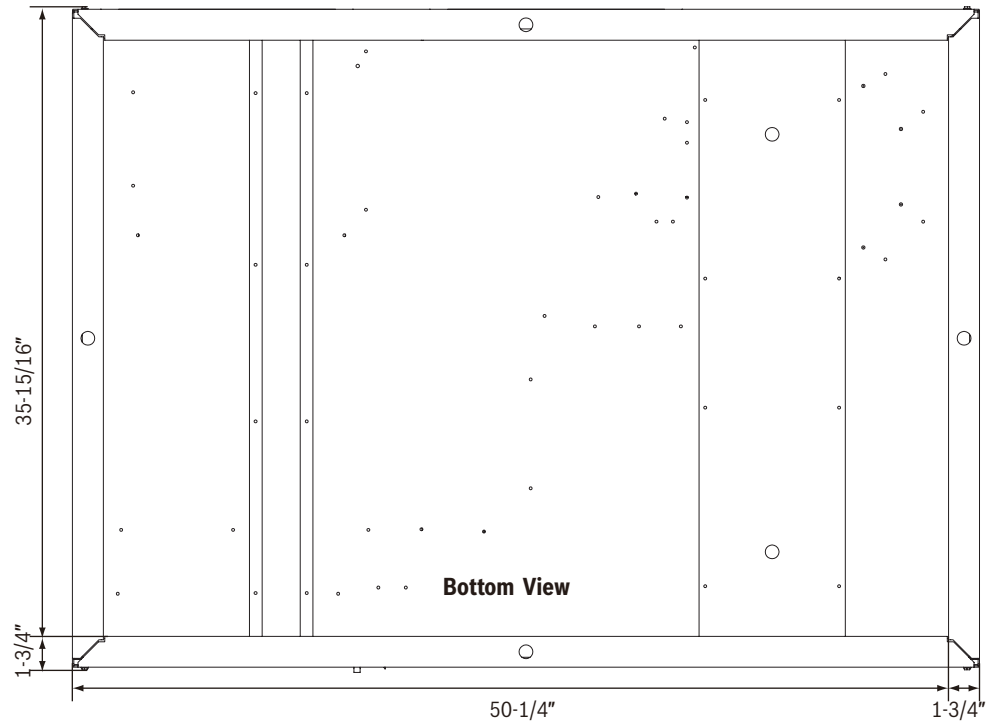
| Model Size | L - in | W - in | H- in |
|---|---|---|---|
| 3 Ton | 52 | 37-3/4 | 24-13/16 |

*Table 4 3 Ton Unit Dimensions*

| Model Size | Net Weight - lb [kg] | Gross Weight - lb [kg] |
|---|---|---|
| 3 Ton | 316 [143] | 322 [146] |

*Table 5 3 Ton Unit Weights*

### 3.1.2 Dimensions - Back and Bottom



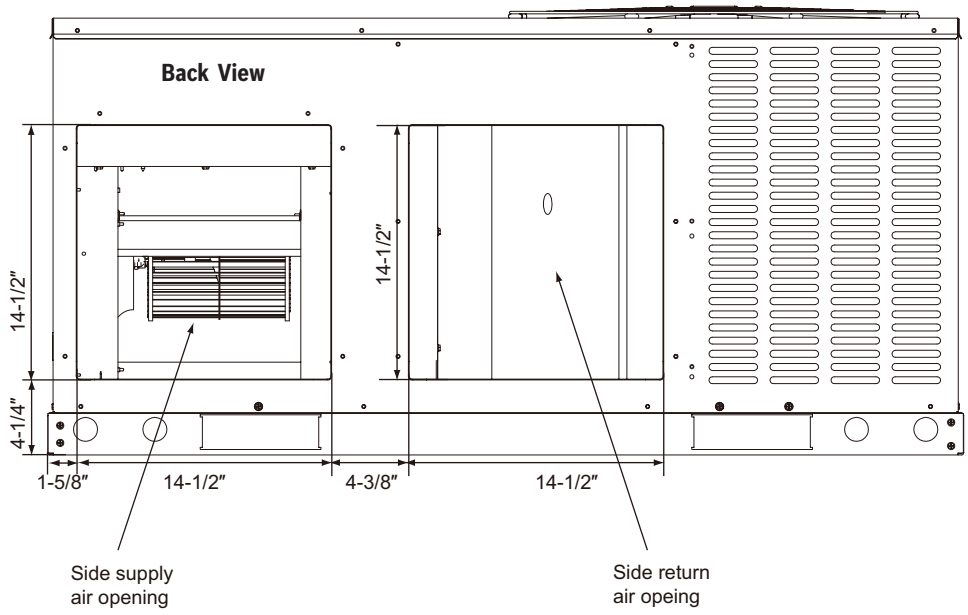




*Figure 4*

### 3.1.3 Dimensions - Left and Top

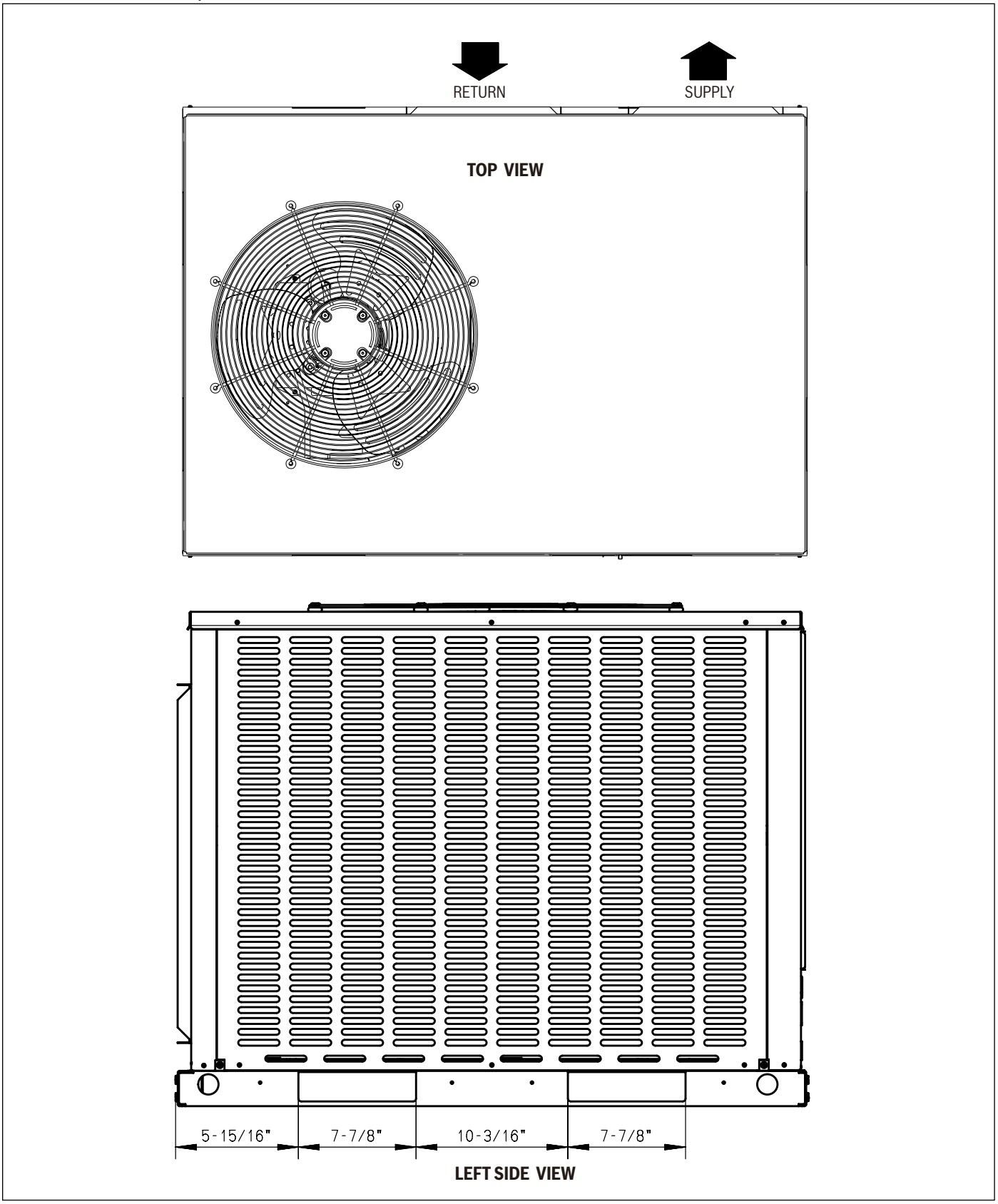



*Figure 5*

## 3.2 5 Ton Model

### 3.2.1 Unit Dimensions

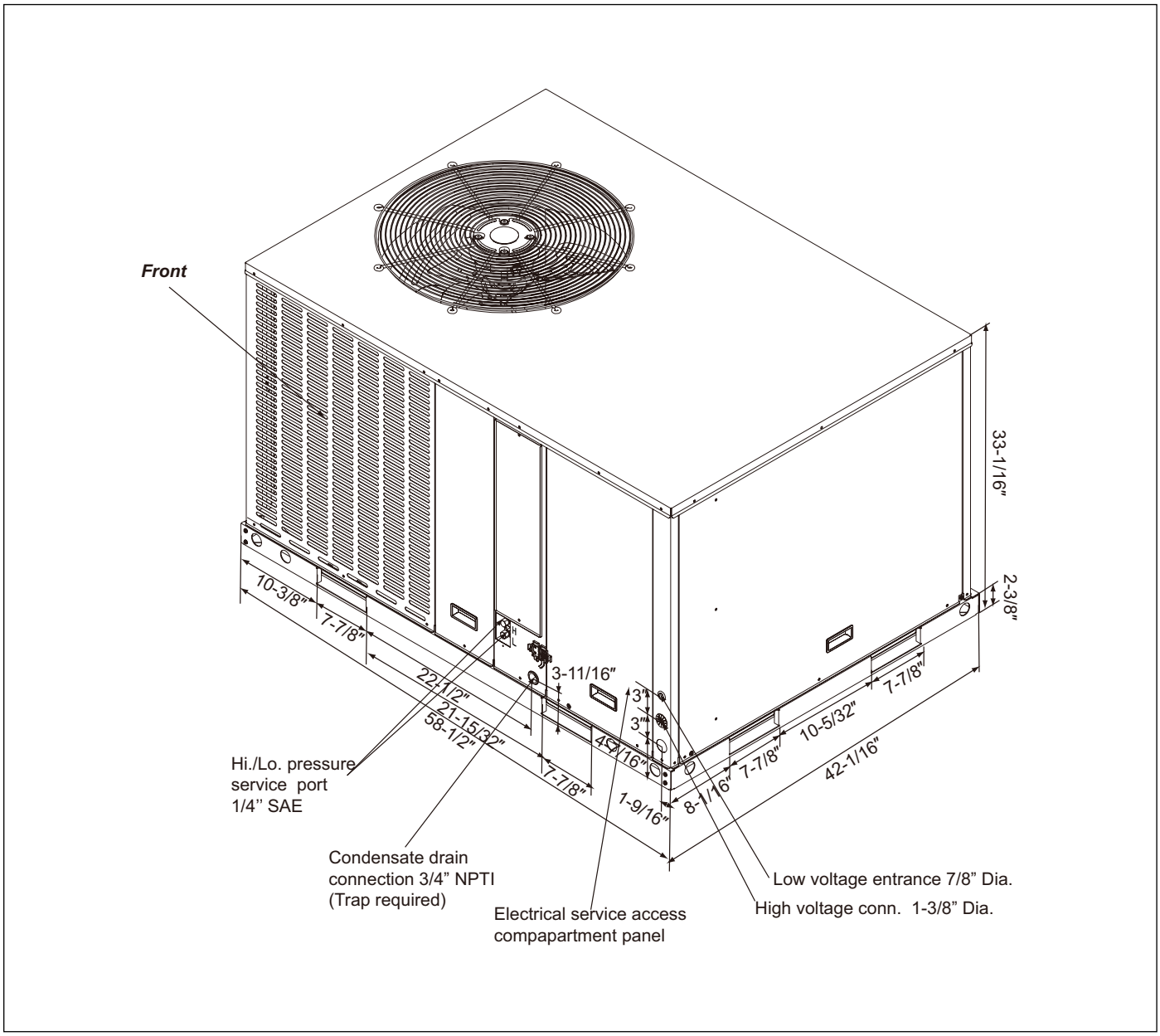



*Figure 6*

| Model Size | L - in | W - in | H - in |
|---|---|---|---|
| 5 Ton | 58-1/2 | 42-1/16 | 33-1/16 |

*Table 6 5 Ton Unit Dimensions*

| Model Size | Net Weight - lb [kg] | Gross Weight - lb [kg] |
|---|---|---|
| 5 Ton | 419 [190] | 428 [194] |

*Table 7 5 Ton Unit Weights*

### 3.2.2 Dimensions - Back and Bottom

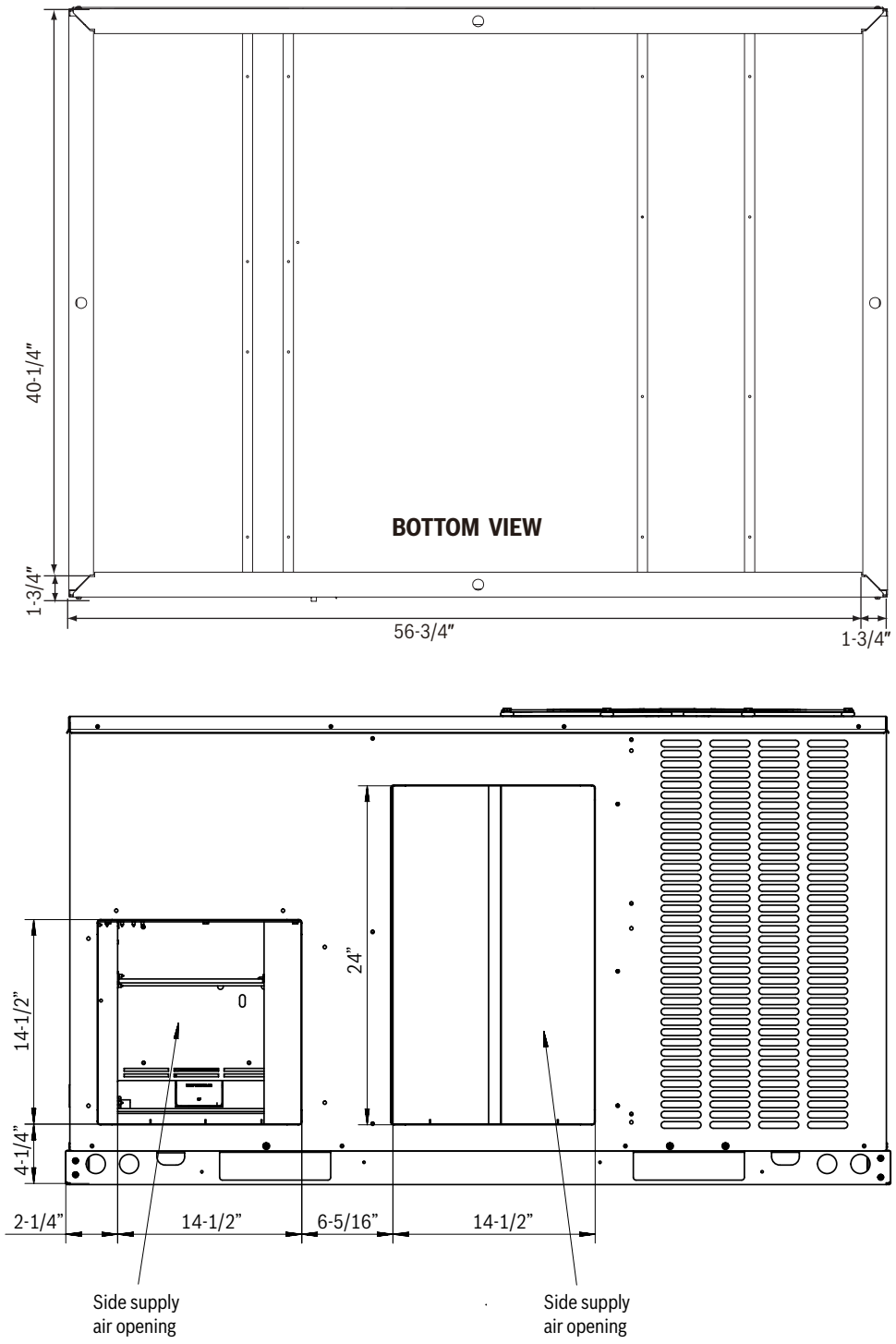



*Figure 7*

### 3.2.3 Dimensions - Left and Top

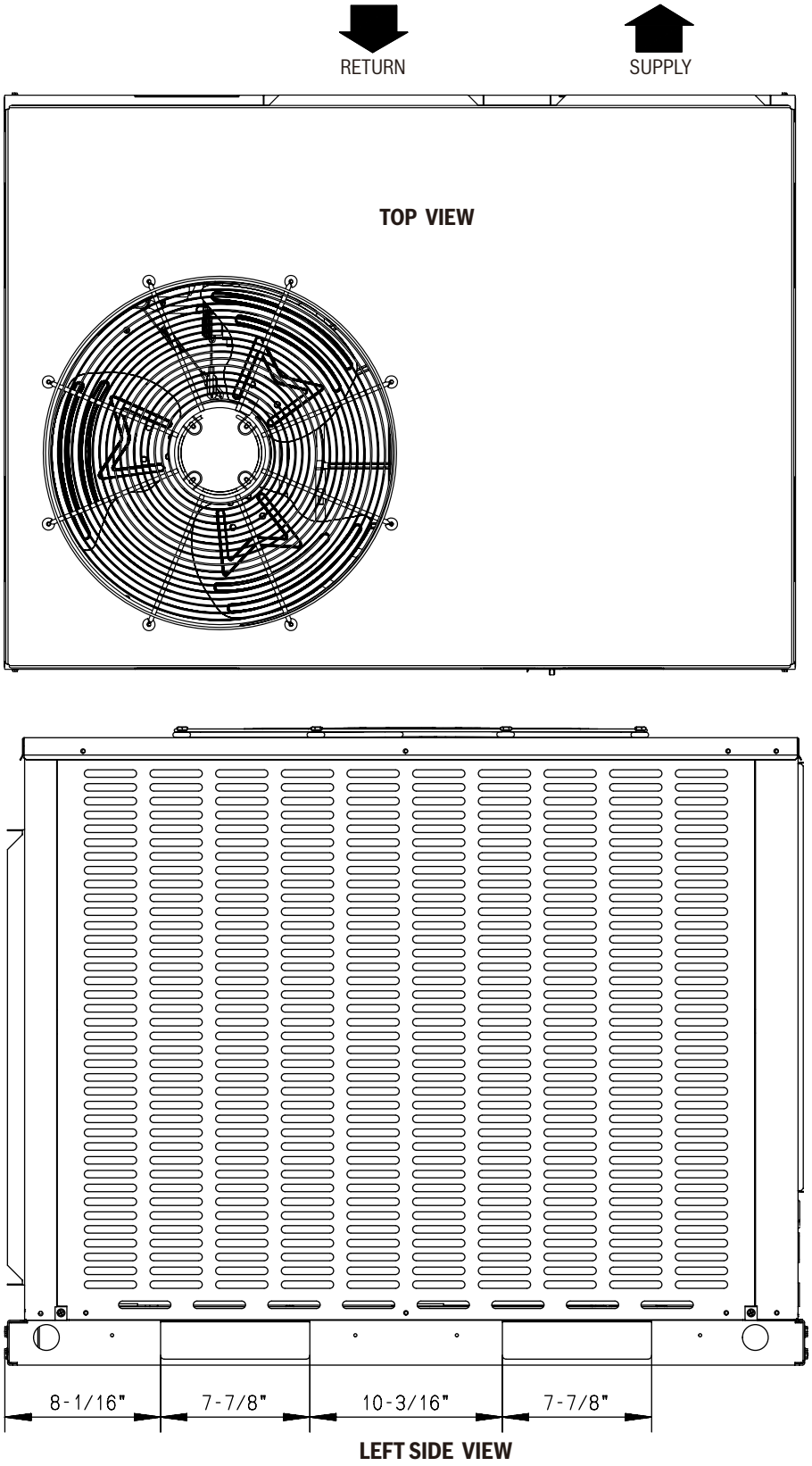



*Figure 8*

# 4 Installation

## 4.1 Pre-Installation

Before installation, carefully check the following:

1. Unit should be installed in accordance with national and local safety codes, including but not limited to ANSI/NFPS No. 70, local plumbing and wastewater codes and any other applicable codes.
2. For rooftop installation, be sure the structure has enough strength to support the weight of unit. Unit must be installed on a field supplied roof curb or rack and leveled.
3. For ground level installation, a field supplied level slab must be used.
4. Condenser airflow should not be restricted.
5. On applications when a roof curb is used, the unit must be positioned on the curb so the front of the unit is tight against the curb.

## 4.2 Rigging and Lifting

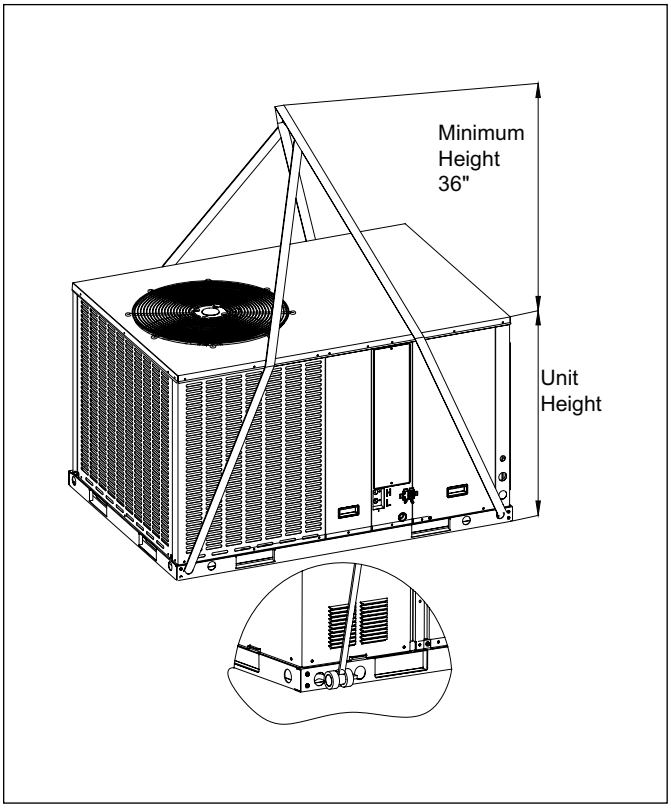



*Figure 9*

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails. Spreader bars, whose length exceeds the largest dimension across the unit, MUST be used across the top of the unit.

When rigging/lifting the unit, the minimum height between the top of the rigging cables' connection point and top of unit should be 36 inches. Refer to Figure 9.

**CAUTION**

Before lifting, make sure the unit weight is distributed equally on the rigging cables so it will lift evenly.

**CAUTION**

All panels must be secured in place when the unit is lifted. The condenser coils should be protected from rigging cable damage with plywood or other suitable material.

## 4.3 Location Restrictions

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 noise levels may be disturbing to building occupants.

Position unit to allow adequate space for unobstructed airflow, wiring, and serviceability.

Do not restrict outdoor airflow. An air restriction at either the outdoor air inlet or the fan discharge may be detrimental to compressor life.

Do not place the unit where water, ice, or snow from an overhang or roof will damage or flood the unit. Do not install the unit on carpeting or other combustible materials. Slab mounted units should be at least 2 inches (51 mm) above the highest expected water and runoff levels. Do not use unit if it has been under water.

Maintain a distance of 24 inches between units. Position unit so water,snow, or ice from roof or overhang cannot fall directly on unit.

See Figure 11 and Figure 12 for minimum clearance requirements.

**Cold climate considerations**

***NOTICE***

Precautions must 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 will permit condensate water to drain when the unit is in defrost mode. Ensure that drain holes in unit base pan are unobstructed, preventing drainage of defrost water (See Figure 13).
- If possible, avoid locations that are prone to snow drifts. If not possible, a snow drift barrier should be installed around the unit to prevent a build-up unit to prevent a build-up of snow on the sides of the unit.

Ensure that Condensate Drain side is pitched lower than the opposite side (see Figure 10).

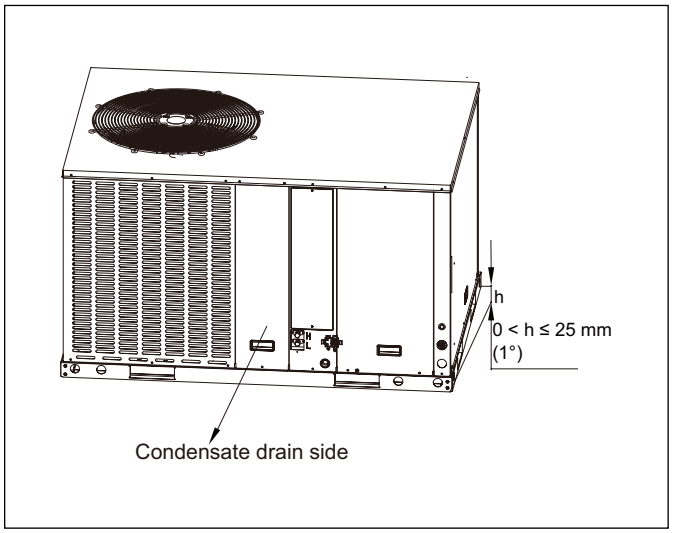



*Figure 10*

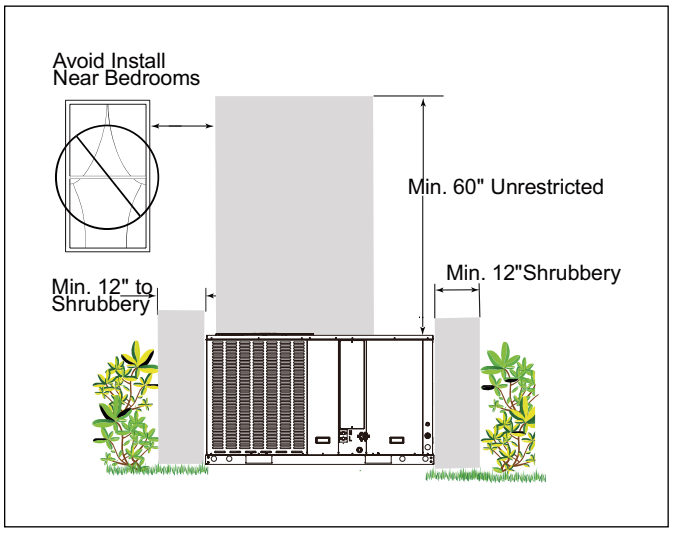



*Figure 11*

A minimum clearance of 24" should be maintained adjacent to all access/service panels. Refer to local code requirements for additional clearance requirements.

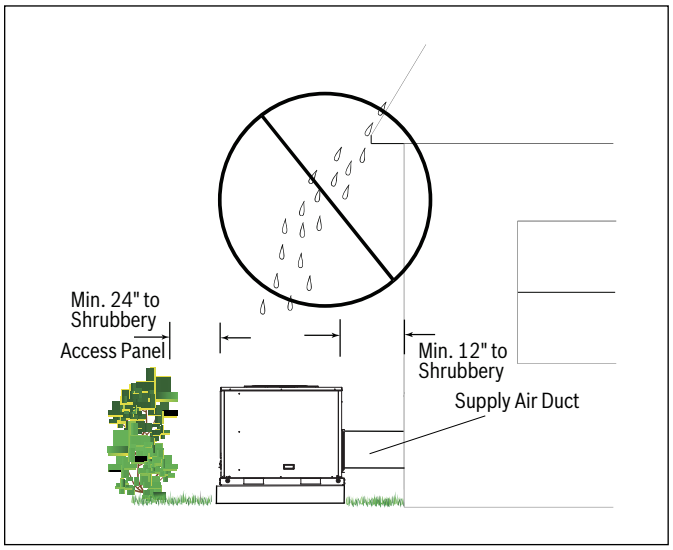



*Figure 12*

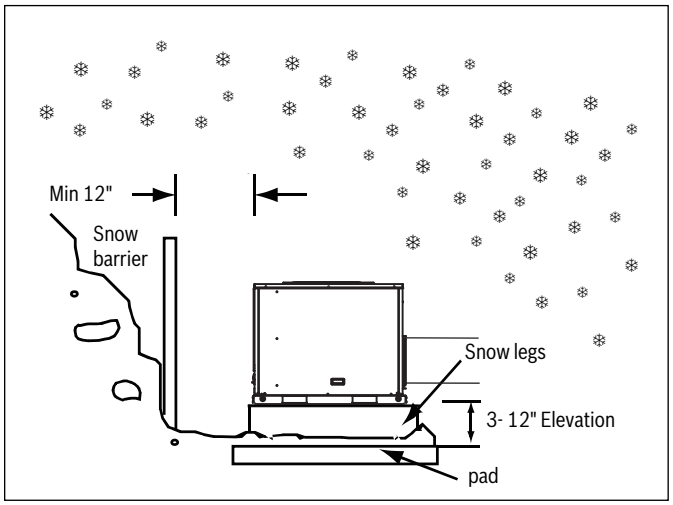



*Figure 13 Insulation Layer*

### Corrosive Environment

Exposure to a corrosive environment may shorten the life of the equipment, corrode metal parts, and/or negatively affect unit performance. Corrosive elements include, but are not limited to: sodium chloride, sodium hydroxide, sodium sulfate, and other compounds commonly found in ocean water, sulfur, chlorine, fluorine, fertilizers, and various chemical contaminants from industry/manufacturing plants. If installed in areas which may be exposed to corrosive environments, special attention should be given to the equipment placement and maintenance.

- Lawn sprinklers/hoses/wastewater should not spray directly on the unit cabinet for prolonged periods of time.
- In coastal areas: locate the unit on the side of the building or roof away from the waterfront.
- Fencing or shrubbery may provide some shielding protection to the unit, however minimum unit clearances must still be maintained.
- Every three months, wash the outdoor coil and any exposed cabinet surfaces.

## 4.4 Refrigerant Charge and Room Area Limitations

In UL/CSA 60335-2-40, R-454B refrigerant is classified as class A2L, which is mildly flammable. Therefore, R-454B refrigerant is suitable for systems needing additional refrigerant charge and which will limit the area of the rooms being served by the system.

Similarly, the total amount of refrigerant in the system shall be less than or equal to the allowable maximum refrigerant charge. The allowable maximum refrigerant charge depends on the area of the rooms being served by the system.

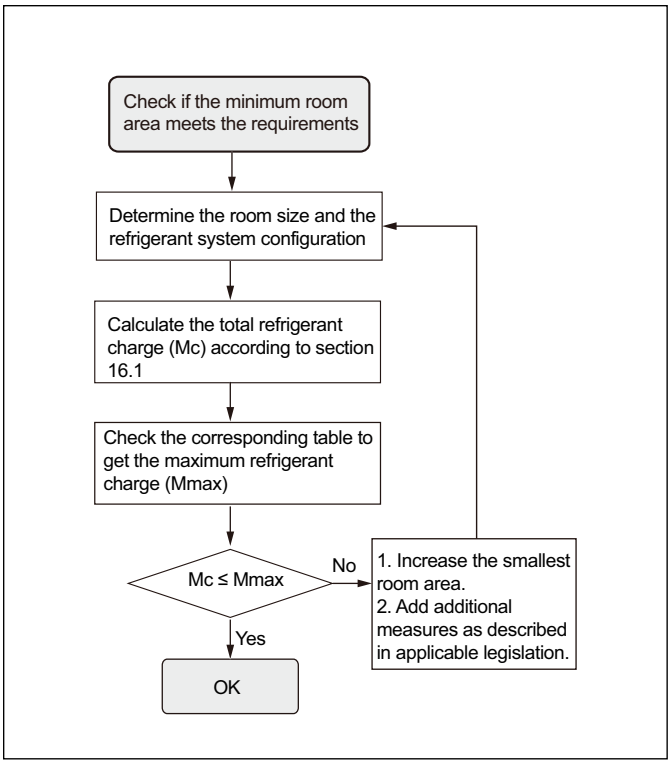



*Figure 14*

The terms in this section are explained as follows:

- Mc: The actual refrigerant charge in the system.
- A: the actual room area where the appliance is installed.
- $A_{min}$: The required minimum room area.
- $M_{max}$:The allowable maximum refrigerant charge in a room.
- $Q_{min}$: The minimum circulation airflow.
- $Anv_{min}$:The minimum opening area for connected rooms.
- $TA_{min}$: The total area of the conditioned space (For appliances serving one or more rooms with an air duct system).
- TA: The total area of the conditioned space connected by air ducts.

### 4.4.1 The Room Area Calculation Requirements

**CAUTION**

**Flammable Refrigerant!**

The space considered shall be any space which contains refrigerant-containing parts or into which refrigerant could be released.

The room area (A) of the smallest, enclosed, occupied space shall be used in the determination of the refrigerant quantity limits.

For determination of room area (A) when used to calculate the refrigerant charge limit, the following shall apply.

The room area (A) shall be defined as the room area enclosed by the projection to the base of the walls, partitions and doors of the space in which the appliance is installed.

Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

Units mounted higher than 70-55/64 inches and spaces divided by partition walls that are no higher than 62-63/64 inches shall be considered a single space. Rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliance to $A_{min}$, if the passageway complies with all of the following.

1. It is a permanent opening.
2. It extends to the floor.
3. It is intended for people to walk through.

The area of the connected rooms, on the same floor,connected by permanent opening in the walls and/or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to $A_{min,}$ provided all of the following conditions are met as shown in Figure 14.

**Low level opening:**

4. The opening shall not be less than $Anv_{min}$ in Table 8.
5. The area of any openings above 11-13/16 inches from the floor shall not be considered in determining compliance with $Anv_{min}$.
6. At least 50% of the opening area of $Anv_{min}$ shall be below 7-7/8 inches from the floor.
7. The bottom of the opening is not more than 3-15/16 inches from the floor.
8. The opening is a permanent opening that cannot be closed.
9. For openings extending to the floor the height shall not be less than 25/32 inch above the surface of the floor covering.

**High level opening:**

10. The opening shall not be less than 50% of $Anv_{min}$ in Table 8.
11. The opening is a permanent opening that cannot be closed.
12. The opening shall be at least 59 inches above the floor.
13. The height of the opening is not less than 25/32 inch.

**Room size requirement:**

14. The room into which refrigerant can leak, plus the connected adjacent room(s) shall have a total area not less than $A_{min}$. $A_{min}$ is shown in Table 10, Table 11 & Table 12.
15. The room area in which the unit is installed shall be not less than 20% $A_{min}$. $A_{min}$ is shown in Table 10, Table 11 & Table 12.

The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar arrangements that provide an airflow path between the connected rooms.

The minimum opening for natural ventilation ($Anv_{min}$) in connected rooms is related to the room area (A), the actual refrigerant charge of refrigerant in the system (Mc) , and the allowable MAXIMUM REFRIGERANT CHARGE in the system ($M_{max}$), $Anv_{min}$ can be determined according to Table 8.

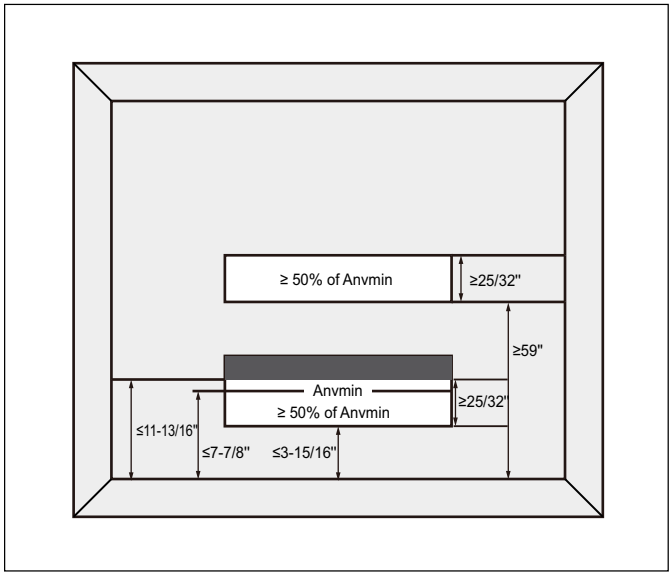



*Figure 15*

The minimum opening area for connected rooms:

| A | | $m_c$ | | $m_{max}$ | | $Anv_{min}$ | |
|---|---|---|---|---|---|---|---|
| ft² | m² | lb-oz | kg | lb-oz | kg | ft² | m² |
| 100 | 9.2 | 15-8 | 7 | 3-6 | 1.5 | 2.0 | 0.19 |
| 120 | 11.1 | 15-8 | 7 | 4-1 | 1.8 | 1.8 | 0.18 |
| 140 | 13.0 | 15-8 | 7 | 4-11 | 2.1 | 1.7 | 0.17 |
| 160 | 14.8 | 15-8 | 7 | 5-6 | 2.4 | 1.6 | 0.16 |
| 180 | 16.7 | 15-8 | 7 | 6-1 | 2.7 | 1.5 | 0.15 |
| 200 | 18.5 | 15-8 | 7 | 6-12 | 3.0 | 1.4 | 0.14 |
| 220 | 20.4 | 15-8 | 7 | 7-7 | 3.3 | 1.3 | 0.13 |
| 240 | 22.2 | 15-8 | 7 | 8-2 | 3.6 | 1.2 | 0.12 |
| 260 | 24.1 | 15-8 | 7 | 8-13 | 3.9 | 1.1 | 0.11 |
| 280 | 26.0 | 15-8 | 7 | 9-7 | 4.3 | 0.9 | 0.10 |
| 300 | 27.8 | 15-8 | 7 | 10-2 | 4.6 | 0.8 | 0.09 |
| 320 | 29.7 | 15-8 | 7 | 10-13 | 4.9 | 0.7 | 0.08 |
| 340 | 31.5 | 15-8 | 7 | 11-8 | 5.2 | 0.6 | 0.07 |
| 360 | 33.4 | 15-8 | 7 | 12-3 | 5.5 | 0.5 | 0.05 |
| 380 | 35.3 | 15-8 | 7 | 12-14 | 5.8 | 0.4 | 0.04 |
| 400 | 37.1 | 15-8 | 7 | 13-9 | 6.1 | 0.3 | 0.03 |
| 420 | 39.0 | 15-8 | 7 | 14-3 | 6.4 | 0.1 | 0.02 |
| 440 | 40.8 | 15-8 | 7 | 14-14 | 6.7 | 0.0 | 0.01 |
| 460 | 42.7 | 15-8 | 7 | 15-9 | 7.0 | 0.0 | 0.00 |

*Table 8*

*Note: Take the Mc=15 lb 8 oz as an example.*

For appliances serving one or more rooms with an air duct system, The room area calculation shall be determined based on the total area of the conditioned space (TA) connected by ducts taking into consideration that the circulating airflow distributed to all the rooms by the appliance integral indoor fan will mix and dilute the leaking refrigerant before entering any room.

### 4.4.2 The Allowed Maximum Refrigerant Charge and Required Minimum Room Area

If the fan incorporated to an appliance is continuously operated or operation is initiated by a REFRIGERANT DETECTION SYSTEM with a sufficient CIRCULATION AIRFLOW rate, the allowable maximum refrigerant charge ($M_{max}$) and the required minimum room area ($A_{min}/TA_{min}$) is shown in Table 9 as well as Table 10, Table 11 & Table 12.

The allowable maximum refrigerant charges:

| A/TA | | $m_{max}$ | | A/TA | | $m_{max}$ | |
|---|---|---|---|---|---|---|---|
| ft² | m² | lb-oz | kg | ft² | m² | lb-oz | kg |
| 30 | 2.8 | 0-14 | 0.4 | 250 | 23.2 | 8-6 | 3.8 |
| 40 | 3.7 | 1-5 | 0.6 | 260 | 24.2 | 8-9 | 3.9 |
| 50 | 4.6 | 1-9 | 0.7 | 270 | 25.1 | 9-0 | 4.1 |
| 60 | 5.6 | 1-16 | 0.9 | 280 | 26.0 | 9-7 | 4.3 |
| 70 | 6.5 | 2-3 | 1 | 290 | 26.9 | 9-11 | 4.4 |
| 80 | 7.4 | 2-10 | 1.2 | 300 | 27.9 | 10-2 | 4.6 |
| 90 | 8.4 | 2-14 | 1.3 | 310 | 28.8 | 10-5 | 4.7 |
| 100 | 9.3 | 3-5 | 1.5 | 320 | 29.7 | 10-12 | 4.9 |
| 110 | 10.2 | 3-8 | 1.6 | 330 | 30.7 | 11-0 | 5.0 |
| 120 | 11.1 | 3-15 | 1.8 | 340 | 31.6 | 11-7 | 5.2 |
| 130 | 12.1 | 4-3 | 1.9 | 350 | 32.5 | 11-10 | 5.3 |
| 140 | 13.0 | 4-10 | 2.1 | 360 | 33.4 | 12-2 | 5.5 |
| 150 | 13.9 | 5-1 | 2.3 | 370 | 34.4 | 12-5 | 5.6 |
| 160 | 14.9 | 5-5 | 2.4 | 380 | 35.3 | 12-12 | 5.8 |
| 170 | 15.8 | 5-12 | 2.6 | 390 | 36.2 | 13-0 | 5.9 |
| 180 | 16.7 | 5-15 | 2.7 | 400 | 37.2 | 13-7 | 6.1 |
| 190 | 17.7 | 6-6 | 2.9 | 410 | 38.1 | 13-14 | 6.3 |
| 200 | 18.6 | 6-10 | 3.0 | 420 | 39.0 | 14-1 | 6.4 |
| 210 | 19.5 | 7-1 | 3.2 | 430 | 39.9 | 14-8 | 6.6 |
| 220 | 20.4 | 7-4 | 3.3 | 440 | 40.9 | 14-12 | 6.7 |
| 230 | 21.4 | 7-11 | 3.5 | 450 | 41.8 | 15-3 | 6.9 |
| 240 | 22.3 | 7-15 | 3.6 | 460 | 42.7 | 15-6 | 7.0 |

*Table 9*

The required minimum room area:

| $m_c$ | | $A_{min}/TA_{min}$ | | $m_c$ | | $A_{min}/TA_{min}$ | |
|---|---|---|---|---|---|---|---|
| lb-oz | kg | ft² | m² | lb-oz | kg | ft² | m² |
| 2-2 | 1.0 | 65.1 | 6.1 | 10-2 | 4.6 | 299.1 | 27.8 |
| 2-9 | 1.2 | 78.1 | 7.3 | 10-9 | 4.8 | 312.1 | 29.0 |
| 3-0 | 1.4 | 91.1 | 8.5 | 11-0 | 5.0 | 325.1 | 30.3 |
| 3-7 | 1.6 | 104.1 | 9.7 | 11-7 | 5.2 | 338.2 | 31.5 |
| 3-15 | 1.8 | 117.1 | 10.9 | 11-14 | 5.4 | 351.2 | 32.7 |
| 4-6 | 2.0 | 130.1 | 12.1 | 12 -5 | 5.6 | 364.2 | 33.9 |
| 4-13 | 2.2 | 143.1 | 13.3 | 12-12 | 5.8 | 377.2 | 35.1 |
| 5-4 | 2.4 | 156.1 | 14.5 | 13-3 | 6.0 | 390.2 | 36.3 |
| 5-11 | 2.6 | 169.1 | 15.8 | 13-10 | 6.2 | 403.2 | 37.5 |
| 6-2 | 2.8 | 182.1 | 17.0 | 14-1 | 6.4 | 416.2 | 38.7 |
| 6-9 | 3.0 | 195.1 | 18.2 | 14-8 | 6.6 | 429.2 | 39.9 |
| 7-0 | 3.2 | 208.1 | 19.4 | 14-15 | 6.8 | 442.2 | 41.1 |
| 7-7 | 3.4 | 221.1 | 20.6 | 15-6 | 7.0 | 455.2 | 42.3 |
| 7-15 | 3.6 | 234.1 | 21.8 | 15-14 | 7.2 | 468.2 | 43.5 |
| 8-6 | 3.8 | 247.1 | 23.0 | 16-5 | 7.4 | 481.2 | 44.7 |
| 8-13 | 4.0 | 260.1 | 24.2 | 16-12 | 7.6 | 494.2 | 46.0 |
| 9-4 | 4.2 | 273.1 | 25.4 | 17-3 | 7.8 | 507.2 | 47.2 |
| 9-11 | 4.4 | 286 | 26.6 | | | | |

*Table 10*

The required minimum room area if installed at an altitude over 2000 ft:

| Altitude - m | | 601-800 | | 801-1000 | | 1001-1200 | | 1201-1400 | | 1401-1600 | | 1601-1800 | | 1801-2000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Altitude - ft | | 1970-2625 | | 2626-3280 | | 3281-3938 | | 3940-4593 | | 4596-5250 | | 5251-5905 | | 5908-6562 | |
| $m_c$ | | $A_{min}/TA_{min}$ | | | | | | | | | | | | | |
| lb-oz | kg | ft² | m² | ft² | m² | ft² | m² | ft² | m² | ft² | m² | ft² | m² | ft² | m² |
| 2 | 0.9 | 60.2 | 5.6 | 62.0 | 5.8 | 63.2 | 5.9 | 64.9 | 6.1 | 66.1 | 6.2 | 67.9 | 6.4 | 69.7 | 6.5 |
| 3 | 1.4 | 90.3 | 8.4 | 93.0 | 8.7 | 94.7 | 8.8 | 97.4 | 9.1 | 99.1 | 9.3 | 101.8 | 9.5 | 104.5 | 9.7 |
| 4 | 1.8 | 120.4 | 11.2 | 123.9 | 11.6 | 126.3 | 11.8 | 129.8 | 12.1 | 132.2 | 12.3 | 135.7 | 12.7 | 139.3 | 13.0 |
| 5 | 2.3 | 150.5 | 14.0 | 154.9 | 14.4 | 157.8 | 14.7 | 162.3 | 15.1 | 165.2 | 15.4 | 169.6 | 15.8 | 174.1 | 16.2 |
| 6 | 2.7 | 180.5 | 16.8 | 185.9 | 17.3 | 189.4 | 17.6 | 194.7 | 18.1 | 198.2 | 18.5 | 203.5 | 19.0 | 208.9 | 19.4 |
| 7 | 3.2 | 210.6 | 19.6 | 216.8 | 20.2 | 220.9 | 20.6 | 227.1 | 21.1 | 231.3 | 21.5 | 237.5 | 22.1 | 243.7 | 22.7 |
| 8 | 3.6 | 240.7 | 22.4 | 247.8 | 23.1 | 252.5 | 23.5 | 259.6 | 24.2 | 264.3 | 24.6 | 271.4 | 25.3 | 278.5 | 25.9 |
| 9 | 4.1 | 270.8 | 25.2 | 278.8 | 25.9 | 284.1 | 26.4 | 292.0 | 27.2 | 297.3 | 27.7 | 305.3 | 28.4 | 313.3 | 29.1 |
| 10 | 4.5 | 300.9 | 28.0 | 309.7 | 28.8 | 315.6 | 29.4 | 324.5 | 30.2 | 330.4 | 30.7 | 339.2 | 31.6 | 348.1 | 32.4 |
| 11 | 5.0 | 331.0 | 30.8 | 340.7 | 31.7 | 347.2 | 32.3 | 356.9 | 33.2 | 363.4 | 33.8 | 373.1 | 34.7 | 382.9 | 35.6 |
| 12 | 5.4 | 361.0 | 33.6 | 371.7 | 34.6 | 378.7 | 35.2 | 389.3 | 36.2 | 396.4 | 36.9 | 407.0 | 37.9 | 417.7 | 38.8 |
| 13 | 5.9 | 391.1 | 36.4 | 402.6 | 37.4 | 410.3 | 38.2 | 421.8 | 39.2 | 429.5 | 39.9 | 441.0 | 41.0 | 452.5 | 42.1 |
| 14 | 6.4 | 421.2 | 39.2 | 433.6 | 40.3 | 441.8 | 41.1 | 454.2 | 42.2 | 462.5 | 43.0 | 474.9 | 44.2 | 487.3 | 45.3 |
| 15 | 6.8 | 451.3 | 42.0 | 464.6 | 43.2 | 473.4 | 44.0 | 486.7 | 45.3 | 495.5 | 46.1 | 508.8 | 47.3 | 522.1 | 48.5 |
| 16 | 7.3 | 481.4 | 44.8 | 495.5 | 46.1 | 505.0 | 47.0 | 519.1 | 48.3 | 528.5 | 49.1 | 542.7 | 50.5 | 556.9 | 51.8 |
| 17 | 7.7 | 511.4 | 47.6 | 526.5 | 49.0 | 536.5 | 49.9 | 551.6 | 51.3 | 561.6 | 52.2 | 576.6 | 53.6 | 591.7 | 55.0 |
| 18 | 8.2 | 541.5 | 50.4 | 557.5 | 51.8 | 568.1 | 52.8 | 584.0 | 54.3 | 594.6 | 55.3 | 610.5 | 56.8 | 626.5 | 58.2 |
| 19 | 8.6 | 571.6 | 53.1 | 588.4 | 54.7 | 599.6 | 55.8 | 616.4 | 57.3 | 627.6 | 58.4 | 644.5 | 59.9 | 661.3 | 61.5 |
| 20 | 9.1 | 601.7 | 55.9 | 619.4 | 57.6 | 631.2 | 58.7 | 648.9 | 60.3 | 660.7 | 61.4 | 678.4 | 63.1 | 696.1 | 64.7 |

*Table 11*

| Altitude - m | | 2001-2200 | | 2201-2400 | | 2401-2600 | | 2601-2800 | | 2801-3000 | | 3001-3200 | | Above 3200 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Altitude - ft | | 6565-7218 | | 7221-7874 | | 7877-8530 | | 8533-9186 | | 9190-9843 | | 9846-10500 | | Above 10500 | |
| mc | | $A_{min}/TA_{min}$ | | | | | | | | | | | | | |
| lb-oz | kg | ft² | m² | ft² | m² | ft² | m² | ft² | m² | ft² | m² | ft² | m² | ft² | m² |
| 2 | 0.9 | 71.4 | 6.7 | 73.8 | 6.9 | 75.5 | 7.1 | 77.9 | 7.3 | 80.3 | 7.5 | 82.6 | 7.7 | 82.6 | 7.7 |
| 3 | 1.4 | 107.1 | 10.0 | 110.6 | 10.3 | 113.3 | 10.6 | 116.8 | 10.9 | 120.4 | 11.2 | 123.9 | 11.6 | 123.9 | 11.6 |
| 4 | 1.8 | 142.8 | 13.3 | 147.5 | 13.7 | 151.0 | 14.1 | 155.8 | 14.5 | 160.5 | 15.0 | 165.2 | 15.4 | 165.2 | 15.4 |
| 5 | 2.3 | 178.5 | 16.6 | 184.4 | 17.2 | 188.8 | 17.6 | 194.7 | 18.1 | 200.6 | 18.7 | 206.5 | 19.2 | 206.5 | 19.2 |
| 6 | 2.7 | 214.2 | 19.9 | 221.2 | 20.6 | 226.5 | 21.1 | 233.6 | 21.8 | 240.7 | 22.4 | 247.8 | 23.1 | 247.8 | 23.1 |
| 7 | 3.2 | 249.8 | 23.3 | 258.1 | 24.0 | 264.3 | 24.6 | 272.6 | 25.4 | 280.8 | 26.1 | 289.1 | 26.9 | 289.1 | 26.9 |
| 8 | 3.6 | 285.5 | 26.6 | 295.0 | 27.4 | 302.0 | 28.1 | 311.5 | 29.0 | 320.9 | 29.9 | 330.4 | 30.7 | 330.4 | 30.7 |
| 9 | 4.1 | 321.2 | 29.9 | 331.8 | 30.9 | 339.8 | 31.6 | 350.4 | 32.6 | 361.0 | 33.6 | 371.7 | 34.6 | 371.7 | 34.6 |
| 10 | 4.5 | 356.9 | 33.2 | 368.7 | 34.3 | 377.5 | 35.1 | 389.3 | 36.2 | 401.1 | 37.3 | 412.9 | 38.4 | 412.9 | 38.4 |
| 11 | 5.0 | 392.6 | 36.5 | 405.6 | 37.7 | 415.3 | 38.6 | 428.3 | 39.8 | 441.3 | 41.0 | 454.2 | 42.2 | 454.2 | 42.2 |
| 12 | 5.4 | 428.3 | 39.8 | 442.4 | 41.1 | 453.0 | 42.1 | 467.2 | 43.5 | 481.4 | 44.8 | 495.5 | 46.1 | 495.5 | 46.1 |
| 13 | 5.9 | 464.0 | 43.1 | 479.3 | 44.6 | 490.8 | 45.6 | 506.1 | 47.1 | 521.5 | 48.5 | 536.8 | 49.9 | 536.8 | 49.9 |
| 14 | 6.4 | 499.6 | 46.5 | 516.2 | 48.0 | 528.5 | 49.1 | 545.1 | 50.7 | 561.6 | 52.2 | 578.1 | 53.8 | 578.1 | 53.8 |
| 15 | 6.8 | 535.3 | 49.8 | 553.0 | 51.4 | 566.3 | 52.7 | 584.0 | 54.3 | 601.7 | 55.9 | 619.4 | 57.6 | 619.4 | 57.6 |
| 16 | 7.3 | 571.0 | 53.1 | 589.9 | 54.8 | 604.0 | 56.2 | 622.9 | 57.9 | 641.8 | 59.7 | 660.7 | 61.4 | 660.7 | 61.4 |
| 17 | 7.7 | 606.7 | 56.4 | 626.8 | 58.3 | 641.8 | 59.7 | 661.9 | 61.5 | 681.9 | 63.4 | 702.0 | 65.3 | 702.0 | 65.3 |
| 18 | 8.2 | 642.4 | 59.7 | 663.6 | 61.7 | 679.5 | 63.2 | 700.8 | 65.2 | 722.0 | 67.1 | 743.3 | 69.1 | 743.3 | 69.1 |
| 19 | 8.6 | 678.1 | 63.0 | 700.5 | 65.1 | 717.3 | 66.7 | 739.7 | 68.8 | 762.1 | 70.8 | 784.5 | 72.9 | 784.5 | 72.9 |
| 20 | 9.1 | 713.8 | 66.4 | 737.4 | 68.5 | 755.0 | 70.2 | 778.6 | 72.4 | 802.2 | 74.6 | 825.8 | 76.8 | 825.8 | 76.8 |

*Table 12*

The minimum circulation airflow:

| mc | | $Q_{min}$ | | $m_c$ | | $Q_{min}$ | |
|---|---|---|---|---|---|---|---|
| lb-oz | kg | CFM | m³/h | lb-oz | kg | CFM | m³/h |
| 2-2 | 1.0 | 118 | 200 | 10-2 | 4.6 | 540 | 917 |
| 2-9 | 1.2 | 141 | 240 | 10-9 | 4.8 | 564 | 957 |
| 3-0 | 1.4 | 165 | 280 | 11-0 | 5.0 | 587 | 997 |
| 3-7 | 1.6 | 188 | 319 | 11-7 | 5.2 | 611 | 1037 |
| 3-15 | 1.8 | 212 | 359 | 11-14 | 5.4 | 634 | 1077 |
| 4-6 | 2.0 | 235 | 399 | 12 -5 | 5.6 | 658 | 1117 |
| 4-13 | 2.2 | 259 | 439 | 12-12 | 5.8 | 681 | 1157 |
| 5-4 | 2.4 | 282 | 479 | 13-3 | 6.0 | 704 | 1197 |
| 5-11 | 2.6 | 306 | 519 | 13-10 | 6.2 | 728 | 1236 |
| 6-2 | 2.8 | 329 | 559 | 14-1 | 6.4 | 751 | 1276 |
| 6-9 | 3.0 | 352 | 599 | 14-8 | 6.6 | 775 | 1316 |
| 7-0 | 3.2 | 376 | 638 | 14-15 | 6.8 | 798 | 1356 |
| 7-7 | 3.4 | 399 | 678 | 15-6 | 7.0 | 822 | 1396 |
| 7-15 | 3.6 | 423 | 718 | 15-14 | 7.2 | 845 | 1436 |
| 8-6 | 3.8 | 446 | 758 | 16-5 | 7.4 | 869 | 1476 |
| 8-13 | 4.0 | 470 | 798 | 16-12 | 7.6 | 892 | 1515 |
| 9-4 | 4.2 | 493 | 838 | 17-3 | 7.8 | 916 | 1555 |
| 9-11 | 4.4 | 517 | 878 | | | | |

*Table 13*

**CAUTION**

**Min. room area and airflow required!**

The allowable maximum refrigerant charge in Table 9 or the required minimum room area in Table 10, Table 11 & Table 12 is available only if the following conditions are met:

- Minimum velocity of 3.28 ft/s, which is calculated as the indoor unit airflow divided by the nominal face area of the outlet. And the grill area shall not be deducted.
- Minimum airflow rate must meet the corresponding values in Table 13, which is related to the actual refrigerant charge of the system (Mc).
- R-454B refrigerant leakage sensor is installed.

The maximum refrigerant limit described above applies to unventilated areas. If adding additional measures, such as areas with mechanical ventilation or natural ventilation, the maximum refrigerant charge can be increased, or the minimum room area can be reduced.

R-454B refrigerant leakage sensor is designed for the indoor unit, meets the incorporated circulation airflow requirements the maximum refrigerant charge or minimum room area can be determined according to Table 9 or Table 10, Table 11 & Table 12.

**CAUTION**

**Min. room area and airflow required!**

If the actual room area, air outlet height, and refrigerant charge amount are not reflected in the above table, the most severe cases need to be considered according to the data in Table 8, Table 9, Table 10, Table 11, Table 12 & Table 13.

## 5 Airflow Performance

Airflow performance data is based on cooling performance with a coil and no filter in place. Check the performance table (Table 14) for appropriate unit size selection.

External static pressure should stay within the minimum and maximum limits shown in the table below in order to ensure proper operation of both cooling, heating, and electric heating operation.

For instructions on how to select fan speeds, refer to Section 6 of this manual.

| Model Size | Motor Speed | | SCFM | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | External Static Pressure - in WC [kPa] | | | | | | | | |
| | | | 0[0] | 0.1[.02] | 0.2[.05] | 0.3[.07] | 0.4[.10] | 0.5[.12] | 0.6[.15] | 0.7[.17] | 0.8[.20] |
| 3 Ton | Tap 1 | SCFM | 986 | 941 | 891 | 844 | 800 | 747.2 | 689 | / | / |
| | | Watts | 108 | 118 | 128 | 139 | 149 | 159 | 169 | / | / |
| | | Amps | 1.2 | 1.26 | 1.32 | 1.39 | 1.45 | 1.52 | 1.58 | / | / |
| | Tap 2 | SCFM | 1098.7 | 1047.6 | 1003.4 | 965.8 | 931.2 | 897.1 | 864.1 | 814.9 | 745.3 |
| | | Watts | 151 | 165 | 177 | 188 | 199 | 208 | 217 | 228 | 236 |
| | | Amps | 1.47 | 1.56 | 1.65 | 1.72 | 1.8 | 1.86 | 1.92 | 2 | 2.07 |
| | Tap 3 | SCFM | 1239.6 | 1194 | 1150.8 | 1114.9 | 1080.9 | 1048.5 | 1016.1 | 996.3 | 959.4 |
| | | Watts | 204 | 220 | 234 | 248 | 259 | 270 | 281 | 288 | 299 |
| | | Amps | 1.83 | 1.94 | 2.04 | 2.13 | 2.21 | 2.29 | 2.37 | 2.41 | 2.49 |
| | Tap 4 | SCFM | 1378.8 | 1335.2 | 1292.9 | 1256.6 | 1223.9 | 1193.7 | 1164.7 | 1134.7 | 1104.2 |
| | | Watts | 273 | 289 | 305 | 319 | 333 | 345 | 357 | 369 | 379 |
| | | Amps | 2.31 | 2.43 | 2.53 | 2.64 | 2.74 | 2.82 | 2.9 | 2.99 | 3.06 |
| | Tap 5 | SCFM | 1539.3 | 1501.9 | 1459.8 | 1424.4 | 1393.5 | 1363.8 | 1326.8 | 1278.9 | 1231 |
| | | Watts | 370 | 389 | 407 | 425 | 441 | 457 | 463 | 461 | 459 |
| | | Amps | 2.99 | 3.12 | 3.25 | 3.37 | 3.49 | 3.6 | 3.64 | 3.63 | 3.61 |
| 5 Ton | Tap 1 | SCFM | 1442.8 | 1375.6 | 1307.9 | 1245.6 | 1184.3 | 1114.8 | 1044 | / | / |
| | | Watts | 159 | 169 | 179 | 189 | 199 | 210 | 221 | / | / |
| | | Amps | 1.35 | 1.43 | 1.5 | 1.58 | 1.65 | 1.74 | 1.82 | / | / |
| | Tap 2 | SCFM | 1518.7 | 1450.1 | 1384.3 | 1328.4 | 1271.3 | 1216.9 | 1160.7 | / | / |
| | | Watts | 185 | 198 | 211 | 223 | 234 | 244 | 255 | / | / |
| | | Amps | 1.65 | 1.74 | 1.84 | 1.92 | 2 | 2.07 | 2.14 | / | / |
| | Tap 3 | SCFM | 1849 | 1781.7 | 1721.9 | 1664 | 1615 | 1560 | 1513 | 1463 | 1410 |
| | | Watts | 311 | 325 | 340 | 356 | 370 | 382 | 394 | 406 | 418 |
| | | Amps | 2.56 | 2.66 | 2.76 | 2.87 | 2.97 | 3.06 | 3.15 | 3.23 | 3.32 |
| | Tap 4 | SCFM | 2037 | 1980 | 1925 | 1874 | 1829 | 1786 | 1733 | 1685 | 1642 |
| | | Watts | 407 | 425 | 443 | 460 | 477 | 493 | 508 | 523 | 536 |
| | | Amps | 3.25 | 3.37 | 3.5 | 3.62 | 3.74 | 3.85 | 3.95 | 4.05 | 4.14 |
| | Tap 5 | SCFM | 2272 | 2220 | 2166 | 2123 | 2071 | 2020 | 1977 | 1942 | 1881 |
| | | Watts | 564 | 581 | 599 | 617 | 636 | 654 | 671 | 687 | 694 |
| | | Amps | 4.34 | 4.46 | 4.58 | 4.7 | 4.83 | 4.96 | 5.08 | 5.18 | 5.23 |

*Table 14*

*Bold outlined areas represent airflow outside of the required 300-450 cfm/ton range.*

*1 Silent Mode --- low stage speed.*

*2 Factory Default --- low stage speed.*

*3 Silent Mode --- high stage speed. Or High Static Pressure Mode --- low stage speed.*

*4 Factory Default --- high stage speed.*

*5 High Static Pressure Mode --- high stage speed.*

NOTES:

1. This table is only used to select the highest blower speed.
2. The rated airflow of systems without electric heater kits requires between 300 and 450 cfm/ton range. The rated airflow of systems with electric heater kits requires between 350 and 450 cfm/ton range.
4. The air distribution system has the greatest effect on airflow. Therefore, the contractor should use only industry-recognized procedures.
5. Duct design and construction should be carefully done. System performance can be lowered dramatically through poor design or workmanship.
6. Air supplier ducts should be located along the perimeter of the conditioned space and properly sized. Improper location or insufficient air flow may cause drafts or noise in the ductwork.
7. Installers should balance the air distribution system to ensure proper quiet airflow to all rooms in the home. An air velocity meter or airflow hood can be used to balance and verify branch and system airflow (CFM).
8. Factory Default maximum static pressure 0.6 in WC If static pressure exceeds 0.6 in WC please dial code to Tap (5).

## 5.1 EHK Pressure Drop Table

| Heater Model | Pressure Drop - Inches W.C. | | | | | |
|---|---|---|---|---|---|---|
| STANDARD CFM (SCFM) | 900 | 1000 | 1100 | 1200 | 1300 | 1400 |
| 5 kW | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 |
| 7.5 kW | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 |
| 10 kW | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 |
| 15 kW | / | / | 0.1 | 0.1 | 0.1 | 0.1 |

*Table 15*

| Heater Model | Pressure Drop - Inches W.C. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| STANDARD CFM (SCFM) | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 |
| 5 kW | 0.1 | 0.1 | 0.1 | 0.1 | 0.15 | 0.15 | 0.15 | 0.15 |
| 7.5 kW | 0.1 | 0.1 | 0.1 | 0.1 | 0.15 | 0.15 | 0.15 | 0.15 |
| 10 kW | 0.1 | 0.1 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| 15 kW | / | / | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| 20 kW | / | / | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.25 |

*Table 16*

## 6 Indoor Fan Motor Function

### System Operation and Function

This unit can run with either 4 Stage Fan Control or 2 Stage Fan Control. The factory default is 4 Stage Fan Control. To change the factory default parameters, refer to the information provided below.

### Four Stage Fan Control

When configured for 4 stage fan control the fan speed will automatically change according to the temperature difference between T1 (return air temperature) and Ts (estimated thermostat set point). Higher differences in temperature between T1 and Ts relate to higher fan speeds. This fan control is supported by either a single or two stage thermostat.

The ECM Constant Torque motor has 5 selectable speed taps. The unit can use up to 4 fan speeds by setting the SW6-4 dip switch to the "ON" position (default). For determining the required airflow, refer to the Airflow Performance Table (Table 14). To select the fan speeds, change SW6-1 and SW6-2 dip switches, refer to Table 17 for dip switch speed configuration.

| SW6-4 | SW6-1 | SW6-2 | Model | High | Mid-High | Mid | Low |
|---|---|---|---|---|---|---|---|
| ON* | OFF | OFF | Cool | 2 | 1 | 1 | 1 |
| | | | Heat | 3 | 2 | 1 | 1 |
| | OFF | ON | Cool | 3 | 2 | 1 | 1 |
| | | | Heat | 4 | 3 | 2 | 1 |
| | ON | OFF | Cool | 4 | 3 | 2 | 1 |
| | | | Heat | 5 | 4 | 3 | 2 |
| | ON | ON | Cool | 5 | 4 | 3 | 2 |
| | | | Heat | 5 | 4 | 3 | 2 |

*Table 17*

*Note: Default Fan Speed is SW6-4 ON, SW6-1 ON, SW6-2 OFF.

### Two Stage Fan Control

The unit supports two stage fan control which requires a two stage thermostat (Y1&Y2). When there is a call for Y2, the blower motor will turn to high speed setting. When there is a call for Y1, the blower motor will turn to low speed setting. Unit will run at low speed setting when there is only G call. It will run in high speed setting when there is W/W1/W2 signal (when the electric heat kit is on).

Customers can select two stage fan control by setting the SW6-4 dip switch to the "OFF" position. Select the two fan speeds using the SW6-1 and SW6-2 dip switches, refer to Table 18. Refer to Airflow Performance Table (Table 14) for reference airflow.

If 2 stage thermostat is not available, single stage thermostat may be used, please refer to Wiring Diagram section for wiring instructions. If Y1 and Y2 are jumped, the unit will only run in high stage fan speed.

| SW6-4 | SW6-1 | SW6-2 | Model | High | Mid-High | Mid | Low |
|---|---|---|---|---|---|---|---|
| OFF | OFF | OFF | Cool | 2 | / | 1 | / |
| | | | Heat | 3 | / | 1 | / |
| | OFF | ON | Cool | 3 | / | 1 | / |
| | | | Heat | 4 | / | 2 | / |
| | ON | OFF | Cool | 4 | / | 2 | / |
| | | | Heat | 5 | / | 3 | / |
| | ON | ON | Cool | 5 | / | 3 | / |
| | | | Heat | 5 | / | 3 | / |

*Table 18*

### Anti-Cold Air Fan Delay

The Anti-Cold Air Fan Delay function utilizes a sensor (T2) located on the indoor coil and a pressure transducer (Pc) on the outdoor unit, which prevents the blower from turning on until the coil has reached a certain temperature. This feature prevents cold air blow during heating operation and is activated by setting SW6-3 dip switch to the "ON" position (default), refer to Table 19.

1. When SW6-3 dip switch is set to the "ON" position and the unit is in heating mode, the Anti-Cold Air Fan Delay function will activate based on the following entry conditions (all 3 conditions must be met):
    a. Indoor Coil Temperature (T2) < 83°F
    b. Electric heat kit is turned off
    c. There is a Y1 from the thermostat to the indoor unit
2. This function will deactivate if ONE OF the following exit conditions are met:
    a. T2 ≥ 90°F for more than 2 minutes
    b. Heater kit is turned on
    c. The system is NOT running Heat mode
    d. There is no longer a Y1 from the thermostat to the indoor unit
    e. There is a communication fault between indoor unit and outdoor unit
3. During heating mode, the blower motor will turn on in first stage fan speed if one of the following conditions of Anti-Cold Air is satisfied:
    a. T2 ≥ 90F
    b. Pc ≥ 435 psi
    c. Anti-Cold Air Fan Delay have been activated for 15 minutes

| SW6-3 | |
|---|---|
| ON* | Heat: Anti-Cold Air Fan Delay via Temp Sensor |
| OFF | Heat: Timed Fan Delay |

*Table 19*

### Heating Fan Delay

If SW6-3 dip switch is set to the "OFF" position (refer to Table 19), and the unit is in heating mode, the blower will operate with a 90 second delay with the fan speed dictated by Y1 or Y2 signal.

### Dehumidification (Optional)

The PL5 has an active dehumidification function that lowers the evaporator temperature and slows down the fan speed to dehumidify the space with a DH call from the thermostat. This function requires proper DH wiring from the indoor unit to the thermostat (with a humidistat).

If DH wire is not connected, the unit will still function normally, but will not be able to run in dehumidification mode.

## 7 Ductwork

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

**WARNING**

**Fire Hazard and Carbon Monoxide!**

Sheet metal ductwork run in unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous ductwork may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Ductwork must comply with National Fire Protection Association as tested by U/L Standard 181 for Class I Air Ducts. Check local codes for requirements on ductwork and insulation.

- Duct system must be designed within the range of external static pressure the unit is designed to operate against. It is important that the system airflow be adequate. Make sure supply and return ductwork, grills, special filters, accessories, etc. are accounted for in total resistance. See airflow performance tables in Section 5 of this manual.
- f Design the duct system in accordance with “ACCA” Manual “D” Design for Residential Winter and Summer Air Conditioning and Equipment Selection. Latest editions are available from: “ACCA” Air Conditioning Contractors of America, 1513 16th Street, N.W., Washington, D.C. 20036. If duct system incorporates flexible air duct, be sure pressure drop information (straight length plus all turns) shown in “ACCA” Manual “D” is accounted for in system.

If an elbow is included in the plenum close to the unit, it must not be smaller than the dimensions of the supply duct flange on the unit.

***NOTICE***

The front flange on the return duct (if connected to the blower casing) must not be screwed into the area where the power wiring is located. Drills or sharp screw points can damage insulation on wires located inside unit.

- The unit is provided with flanges on the supply and return air openings. All ductwork should be secured to the flanges using proper fasteners for the type of duct used and tape the duct-to unit joint as required to prevent air leaks.

***NOTICE***

When fastening ductwork to the side duct flanges on the unit, insert the screws through the duct flanges only. DO NOT insert the screws through the casing. Outdoor ductwork must be insulated and waterproofed.

Be sure to note supply and return openings. Refer to Figure 3 for information concerning supply and return air duct dimensions.

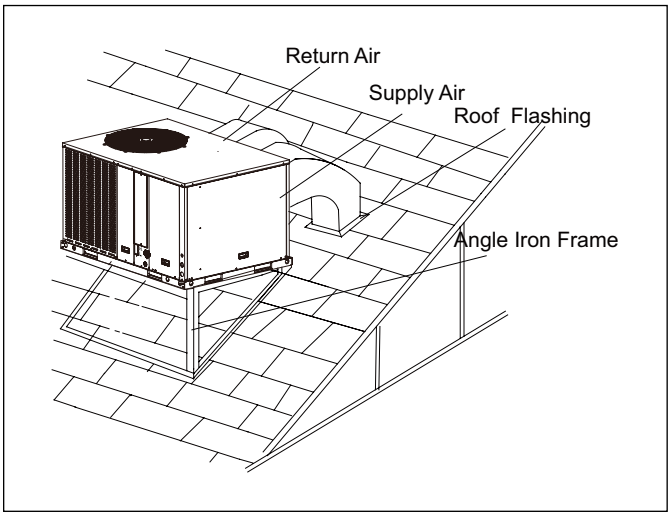



*Figure 16 Rooftop Installation - Frame Mounting*

***NOTICE***

A unit with electric heaters with an inlet or outlet duct that penetrates the building structure supporting the unit shall be provided with a mounting base of noncombustible material so designed that, after the unit is installed, there will be no open passages through the supporting structure that would permit flame or hot gases from a fire originating in the space below the supporting structure to travel to the space above that structure. If the unit is intended to be installed on a supporting structure of combustible material, the base shall be so designed that the required clearance will be maintained between the supporting unit mounting base, and shall extend not less than 3 in (76 mm) below the upper surface of the supporting structure, except that, in a unit designed for use only in a mobile home, the distance shall be not less than 3/4 in (19 mm).

**WARNING**

If appliances connected via an air duct system to one or more rooms are installed in a room with an area less than shown in section 4.4 Table 9, that room shall be without continuously operating open flames (e.g. an operating gas appliance) or other potential ignition sources (for e.g. an operating electric heater, hot surfaces). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest.

For appliances connected via an air duct system to one or more rooms, auxiliary devices which may be a potential ignition source shall not be installed in the duct work. Examples of such potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching devices.

For appliances connected via an air duct system to one or more rooms, only auxiliary devices approved by the appliance manufacturer or declared suitable with the refrigerant shall be installed in connecting ductwork.

## 8 Condensate Drain Connection

Unit should be installed in accordance with national and local safety codes, including but not limited to ANSI/NFPS No. 70, local plumbing and wastewater codes and any other applicable codes.

### 8.1 Install Drain Pipe

1. Ensure drain lines do not block access to front of the unit. Minimum clearance of 24 inches is required for filter, coil or blower removal and service access.
2. Make sure unit is leveled or pitched slightly towards primary drain connection so that water will drain completely from the pan.
3. Do not reduce drain line size to less than connection size provided on condensate drain pan.
4. All drain lines must be pitched downward away from the unit at a minimum of 1/8" per foot of line to ensure proper drainage.
5. 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.
6. The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the line.
7. Make provisions for disconnecting and cleaning of the primary drain line should it become necessary. Install a 2 inch trap in the primary drain line as close to the unit as possible. Make sure that the outlet of the trap is at least 1 inch lower than the drain pan condensate connection to allow proper drainage of the pan.

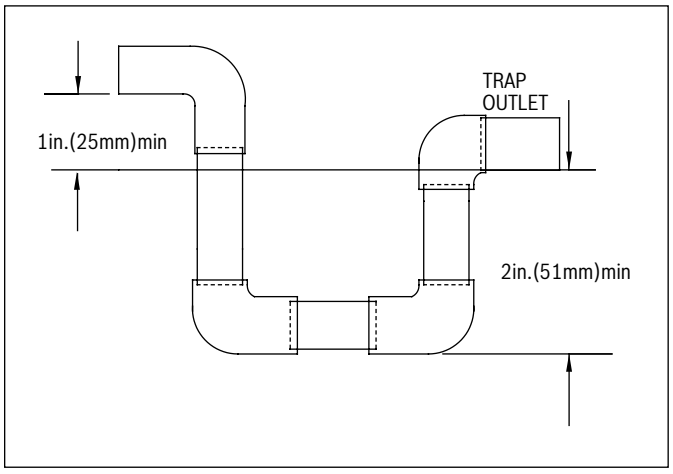



*Figure 17*

When making drain fitting connections to the drain pan, use a thin layer of Teflon paste, silicone or Teflon tape and install by hand tightening.

When making drain fitting connections to drain pan, do not overtighten. Over tightening fittings can split pipe connections on the drain pan.

## 9 Air Filter (Not Factory-Installed)

Filters and filter racks are not included with the unit and must be field supplied.

An external filter or other means of filtration must be properly sized for a maximum of 300 feet/minute air velocity or what is recommended for the type of filter installed.

Filter application and placement are critical to airflow, which may affect the heating and cooling system performance. Reduced airflow can shorten the life of the system's major components, such as motor, elements, heat relays, evaporator coil or compressor. Consequently, we recommend that the return air duct system have only one filter location. For systems without a return air filter grill, multiple filter grills can be installed at each of the return air openings.

If adding high efficiency filters or electronic air filtration systems, it is very important that the air flow is not reduced. If air flow is reduced the overall performance and efficiency of the unit will be reduced. It is strongly recommended that a professional installation technician is contacted to ensure such filtration systems are installed correctly.

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.

**WARNING**

**Fire hazard!**

Do not operate the system without filters. A portion of the dust suspended in the air may temporarily lodge in the duct runs and at the supply registers. Any circulated dust particles could be heated and charred by contact with the air handler elements. This residue could soil ceilings, walls, drapes, carpets and other articles in the house. Soot damage may occur with filters in place, when certain types of candles, oil lamps or standing pilots are burned.

| Model Size | No. | Size Recommended - in |
|---|---|---|
| 3 Ton | 1 | 20 x 20 x 1 |
| 5 Ton | 1 | 24 x 36 x 1 |

*Table 20*

# 10 Electrical Wiring

Field wiring must comply with the National Electric Code (NEC) and any applicable local ordinance.

**WARNING**

**Electrical shock!**

Disconnect all power to unit before installing or servicing. More than one disconnect switch may be required to de-energize the equipment. Hazardous voltage can cause severe personal injury or death.

## 10.1 Power Wiring

1. It is important that proper electrical power is available for connection to the unit being installed. See the unit nameplate, wiring diagram, and electrical data in the installation instructions for more detailed requirements. Voltage tolerance should not be over 10% from rating voltage.
2. If any of the wiring must be replaced, replacement wiring must be the same type as shown in nameplate, wiring diagram and electrical data sheet.
3. Install a branch circuit disconnect of adequate size to handle starting current, located within sight, and readily accessible to the unit.
4. Electric Heater: If the optional Electric Heat Kit is installed, the unit should be equipped with suitable circuit breakers or fuse. Refer to Tables 21 and 22 for more information. These breaker(s) protect the internal wiring in the event of a short circuit and serve as a disconnect. Circuit breakers installed within the unit do not provide over-current protection of the supply wiring and therefore may be sized larger than the branch circuit protection.

- Supply circuit power wiring must be 221°F minimum copper conductors only. Refer to Table 21 and Table 22 for ampacity, wire size and circuit protector requirements. Supply circuit protective devices may be either fuses or “HACR” type circuit breakers.1-3/8” knockouts inside the cabinet are provided for connection of power wiring to electric heater.
- Power wiring is connected to the power terminal block in unit electric cabinet. See Electric Heater Kit Installation Instructions for details.

5. See wiring diagram located on inside of control board access panel for proper wiring instructions.

## 10.2 Grounding

**WARNING**

**Electrical shock!**

The unit must be permanently grounded. Failure to do so can result in electrical shock causing personal injury or death.

- The unit must be electrically grounded in accordance with local codes and the National Electric Code (NEC).
- Grounding may be accomplished by attaching ground wire(s) to ground lug(s) provided in the unit wiring compartment.

## 10.3 Control Wiring

**WARNING**

**Fire hazard!**

Low voltage control wiring should not be run in conduit with high voltage wiring. Keep distance between the two conduits per local codes.

- 18 AWG color-coded low voltage wire should be used for lengths less than 50 ft For wire lengths longer than 50 ft, 16 AWG wire should be used.
- 7/8" knockout hole should be used to route control wires into the unit.
- After installation, ensure separation of low voltage and high voltage wiring is maintained.

Refer to Figure 19 for thermostat wiring diagrams.

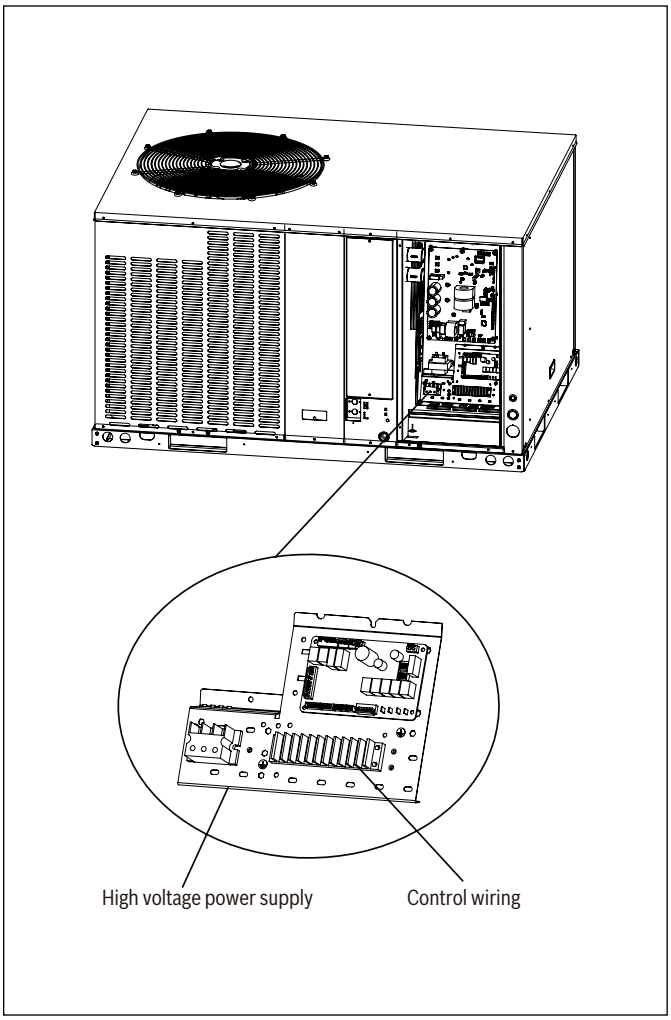
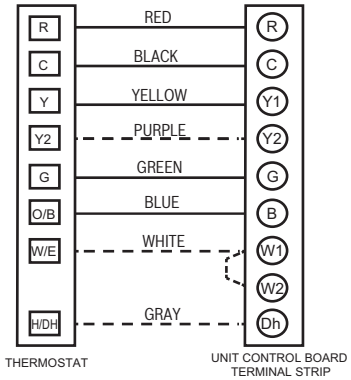
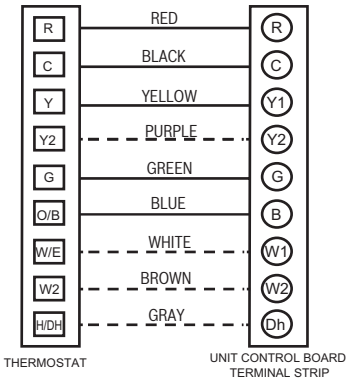



*Figure 18*

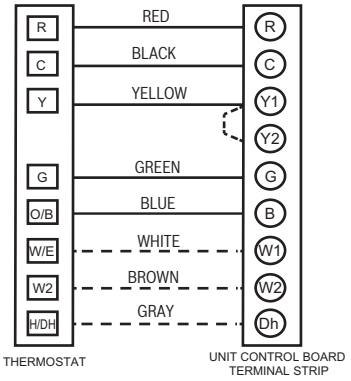
**Support 3H and 2C thermostat**



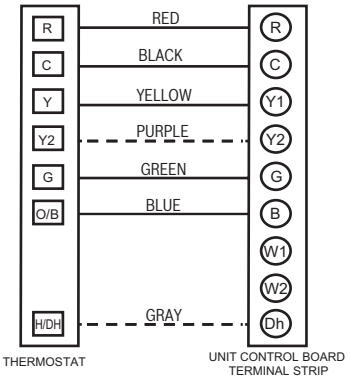

**Support 4H and 2C thermostat**



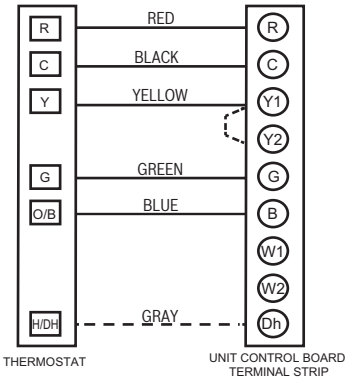

**Support 3H and 1C thermostat**




**Support 2H and 2C thermostat**




**Support 1H and 1C thermostat**




**Support 2H and 1C thermostat**

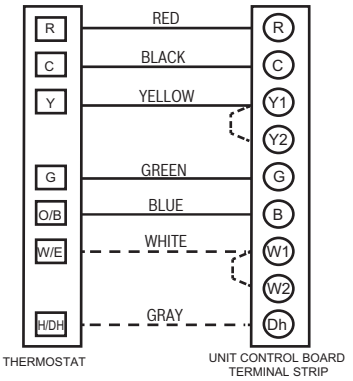



*Figure 19 Thermostat Wiring Diagram*

Dh wiring is optional and requires a thermostat with a humidistat. Dh functions as Active Dehumidication and will downstage the indoor fan speed and lower the evaporator coil temperature. System will operate according to normal sequence of operations if Dh wiring is absent.

Y2 wiring is optional for 4 speed fan control. For 2 stage fan control Y2 wiring is required.

Dashed lines in the above thermostat wiring diagrams refer to optional wiring (wiring for Dehumidification Function, Electric Heat, and 2 stage fan control). For thermostat wiring please refer to the Owner's Manual of the thermostat.

B wire must be connected, the reversing valve energizes in heating.

**WARNING**

**Electrical shock!**

Label all wiring prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

| Model Size | Voltage - Phase - Frequency | Compressors | | OD Fan Motors | Supply Blower Motor | Unit Circuit | |
|---|---|---|---|---|---|---|---|
| | | RLA | LRA | FLA | FLA | MCA1 (Amps) | Max Fuse2 Breaker3 Size(Amps) |
| 3 Ton | 208/230-1-60 | 17.0 | 52.0 | 2.1 | 4.3 | 27.7 | 35 |
| 5 Ton | 208/230-1-60 | 27.5 | 61.0 | 2.1 | 6.0 | 42.5 | 50 |

*Table 21 Electrical Data Without Electric Heat*

| Model Size | Heater Circuit Without Units (Dual Point) | | | | | |
|---|---|---|---|---|---|---|
| | Model | KW | Stages | Amps | MCA[1] [A] | Max Fuse[2] Breaker[3] Size [A]* |
| 3 Ton | S1-EHK-05J-15 | 3.8/5 | 1 | 18.1/20.8 | 23/26 | 25/30 |
| | S1-EHK-08J-15 | 5.6/7.5 | 1 | 27.1/31.3 | 34/40 | 35/40 |
| | S1-EHK-10J-15 | 7.5/10 | 1 | 36.1/41.7 | 46/53 | 50/60 |
| | S1-EHK-15J-15 | 11.3/15 | 2 | 54.2/62.5 | 68/79 | 70/80 |
| 5 Ton | S1-EHK-05J-15 | 3.8/5 | 1 | 18.1/20.8 | 23/26 | 25/30 |
| | S1-EHK-08J-15 | 5.6/7.5 | 1 | 27.1/31.3 | 34/40 | 35/40 |
| | S1-EHK-10J-15 | 7.5/10 | 1 | 36.1/41.7 | 46/53 | 50/60 |
| | S1-EHK-15J-15 | 11.3/15 | 2 | 54.2/62.5 | 68/79 | 70/80 |
| | S1-EHK-20J-15 | 15/20 | 2 | 72.2/83.3 | 91/105 | 100/110 |

*Table 22 Electrical Data With Electric Heat*

*1. Minimum Circuit Ampacity.*

*2. Maximum Over Current Protection per Standard UL 60335.*

*3. Fuse or HACR circuit breaker size field installed.*

** Max Fuse/Breaker Sizes are for electric heater ONLY (dual point electric heat). DOES NOT include breaker size for the unit.*

Refer to Electric Heat Kit Installation Manual, some heater kits include fuses from the manufacturer.

**WARNING**

**Electrical shock, fire hazard!**

Any power supply and circuits must be wired and protected in accordance with federal, state and local electrical codes.

The power supply to unit and to Electric Heat Kit must be separated (dual point).

# 11 Start Up

## 11.1 System Start Up

1. Ensure Sections 4-10 have been completed.
2. Set System Thermostat to OFF.




*Figure 20*

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

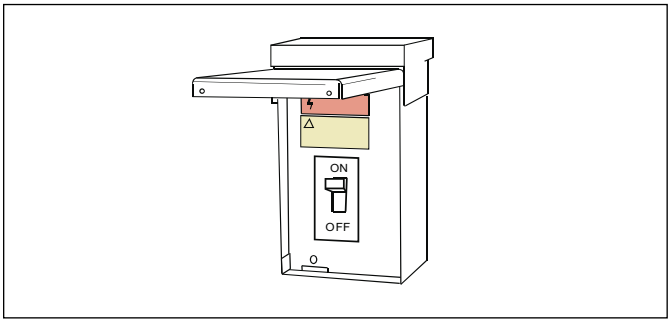



*Figure 21*

4. Wait 1 hour before starting the unit if compressor crankcase heater is used and the outdoor ambient temperature is below 70°F.

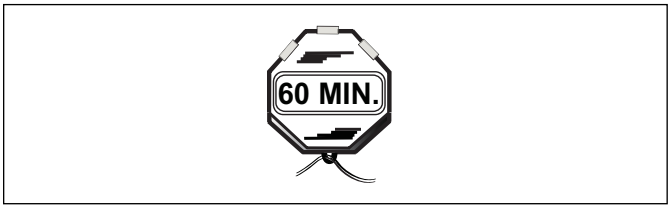



*Figure 22*

5. Set system thermostat to ON.




*Figure 23*

## 12 System Charge Adjustment

Units come precharged from the factory, 3 Ton units with 3 lb 14 oz and 5 Ton units with 6 lb 6 oz. Follow Section 12 for charge adjustments i.e if components have been replaced, or if there is a suspected leak.

### 12.1 Charging: Weigh-In Method (Recommended)

Weigh-in method is recommended 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.

| Model Size | Refrigerant Charge |
|---|---|
| 3 Ton | 3 lb 14 oz |
| 5 Ton | 6 lb 6 oz |

*Table 23*

### 12.2 Subcooling Charging and Refrigerant Adjustment In Cooling (Above 55°F Outdoor Temp.)

1. Check the outdoor ambient temperatures.

Subcooling (**in cooling mode**) is the only recommended method of charging above 55°F outdoor ambient temperatures. For outdoor ambient temperatures below 55°F, use weigh-in charge method.

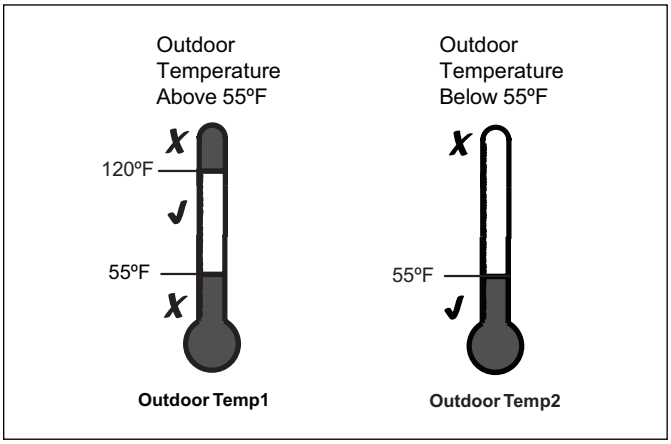



*Figure 24*

For best results the indoor temperature should be kept between 70°F to 80°F.

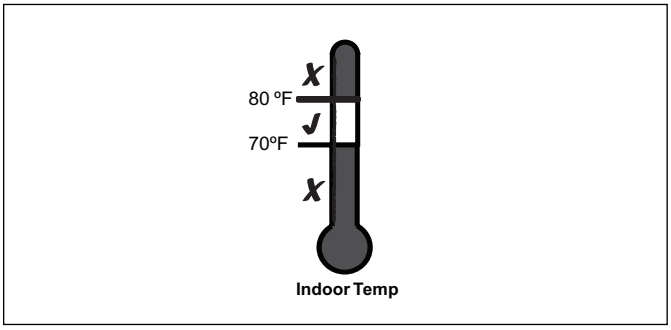



*Figure 25*

2. Stabilize the system.
3. After starting the system in cooling mode, short press “FORCE” button, and a “|— ” symbol should appear. System may take 10 minutes to ramp up. Operate the system for a minimum of 20 minutes.

After a 20 minute stabilization period operating at 100% capacity, maintain continuous operation while adjusting refrigerant charge. After adjusting, operate system for a minimum of 5 minutes for stabilization, otherwise repeat step 3.

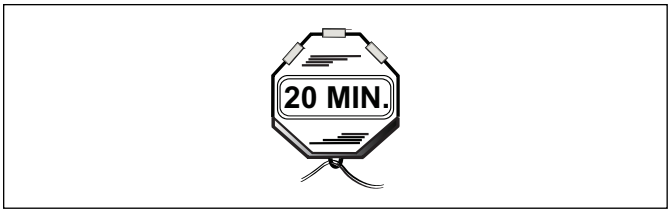



*Figure 26*

4. Calculate subcooling value on liquid line (According to Table 24)

- Measured Liquid Line Temp. = _____°F
- Measured Liquid Line Pressure = _____ psig
- Calculate subcooling value = _____°F

Ensure the temperature sampling position as shown above.

| Liquid Line Temp (°F) | Final Subcooling(°F) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| | Liquid Gauge Pressure (PSI) | | | | | | | |
| 55 | 164 | 167 | 170 | 172 | 175 | 178 | 181 | 184 |
| 60 | 178 | 181 | 184 | 187 | 191 | 194 | 197 | 200 |
| 65 | 194 | 197 | 200 | 203 | 206 | 210 | 213 | 217 |
| 70 | 210 | 213 | 217 | 220 | 223 | 227 | 230 | 234 |
| 75 | 227 | 230 | 234 | 238 | 241 | 245 | 249 | 252 |
| 80 | 245 | 249 | 252 | 256 | 260 | 264 | 268 | 272 |
| 85 | 264 | 268 | 272 | 276 | 280 | 284 | 288 | 292 |
| 90 | 284 | 288 | 292 | 297 | 301 | 305 | 309 | 314 |
| 95 | 305 | 309 | 314 | 318 | 323 | 327 | 332 | 336 |
| 100 | 327 | 332 | 336 | 341 | 346 | 351 | 355 | 360 |
| 105 | 351 | 355 | 360 | 365 | 370 | 375 | 380 | 385 |
| 110 | 375 | 380 | 385 | 390 | 396 | 401 | 406 | 412 |
| 115 | 401 | 406 | 412 | 417 | 422 | 428 | 433 | 439 |
| 120 | 428 | 433 | 439 | 445 | 450 | 456 | 462 | 468 |
| 125 | 456 | 462 | 468 | 474 | 480 | 486 | 492 | 498 |

*Table 24 R-454B Refrigerant Chart - Final Subcooling*

| Model Size | Design Subcooling |
|---|---|
| 3 Ton and 5 Ton | 12°F ± 4°F |

*Table 25*

5. Adjust refrigerant level to attain proper gauge pressure.

**Add refrigerant** if the subcooling reading from Table 24 is lower than the designed value (Table 25).

- Connect gauges to refrigerant bottle and unit as illustrated (Figure 27).
- Purge all hoses.
- Open tank.
- Stop adding refrigerant when subcooling matches the charging chart (Table 24) Final Subcooling value.

**Recover refrigerant** if the subcooling reading from Table 24 is higher than the designed value (Table 25).

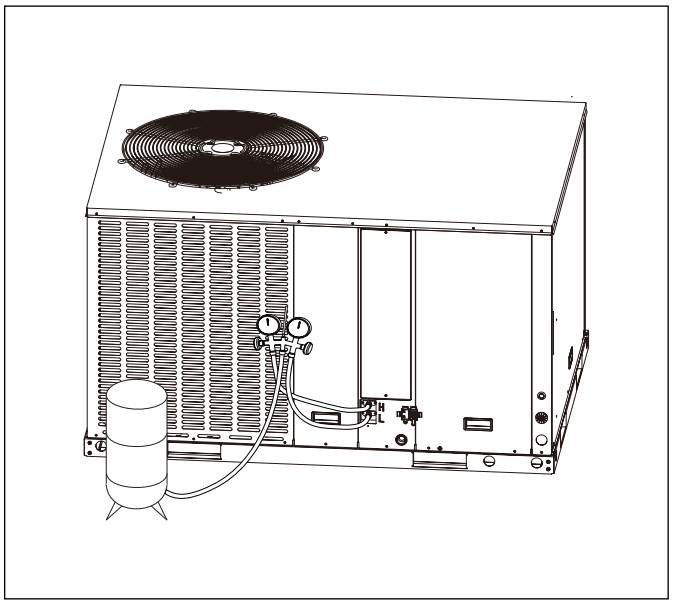


*Figure 27*

6. Stabilize the system.

- Wait 5 minutes for the system condition to stabilize between adjustments.

When the subcooling matches the chart, the system is properly charged.

- Remove gauges.
- Replace service port caps to prevent leaks. Tighten finger tight plus an additional 1/6 turn.

7. Record System Information for reference (Table 26). Record system pressures and temperatures after charging is complete.

The subcooling also can be calculated by pressing check button after getting T3 and T3L temperatures (refer to Table 31).

| Description | Value |
|---|---|
| Outdoor model number | |
| Measured Outdoor Ambient | °F |
| Measured Indoor Ambient | °F |
| Check Condenser Outlet Temp.(T3L) | °F |
| Check Condenser Temp.(T3) | °F |
| Calculate subcooling value =T3-T3L | °F |

*Table 26*

# 13 System Operation and Troubleshooting

## 13.1 Control Logic Description

- The variable speed system adopts the same 24 VAC 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. The target pressure can automatically adjust based on compressor operation so optimal capacity can be achieved. Target pressure can be manually adjusted (SW4) to achieve improved dehumidification and capacity demands.

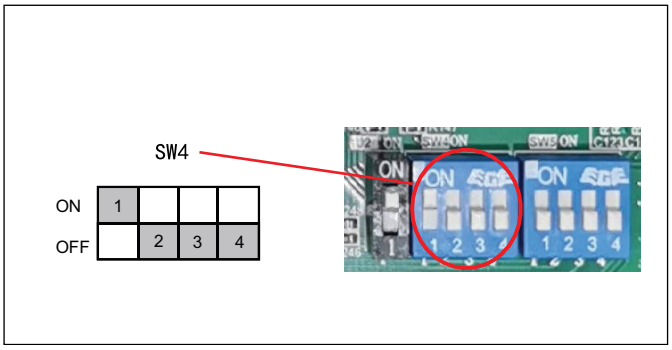



*Figure 28*

| Dip Switch | Position | Description |
|---|---|---|
| SW4-1 | ON | Must be set at "ON" position |
| | OFF | Unused |
| SW4-2 | ON | Decelerated cooling/heating |
| | OFF | Normal cooling/heating* |
| SW4-3 | ON | Unused |
| | OFF | Must be set at "OFF" position |
| SW4-4 | ON | Accelerated cooling/heating |
| | OFF | Normal cooling/heating* |

*Table 27*

*Factory Default

- Accelerated cooling/heating function changes the initial target coil temperature to provide "enhanced comfort" by increasing unit capacity.
- Decelerated cooling/heating function changes the initial target coil temperature to provide "softened comfort" by decreasing the rate of compressor speed change.

## 13.2 Sensors (Thermistors/Pressure Transducer)

- T1 = Return Air Temperature
  - Indoor Fan Control
- T2 = Indoor Coil Temperature
  - Anti-cold air function in heating mode
- T3 = Outdoor Coil Temperature
  - High/Low temperature protection
  - Outdoor fan control (cooling mode)
  - Defrost control (heating mode)
- T4 = Ambient Temperature
  - Operating condition permission
  - Defrosting condition permission
  - Outdoor fan control (heating mode)
- T5 = Compressor Discharge Temperature
  - High/Low temperature protection
  - Electronic Expansion Valve (EEV) (ODU/heating mode only)
- Th = Compressor Return Temperature
- T3L = Liquid Line Temperature
- TF = Control Board Module Temperature
  - Control board overheat protection
- Pressure transducer
  - Compressor frequency control
  - Electronic Expansion Valve (EEV) control (in both heating and cooling modes)
  - High pressure protection (heating mode)
  - Low pressure protection (cooling mode)

## 13.3 Defrost Description

- The Demand Defrost Control (DDC) monitors the ODU coil temperature using thermistor (T3). A second thermistor (T4) monitors outdoor ambient temperature. Based on these parameters, as well as accumulative run time and high pressure, the DDC calculates proper initiation of defrost.
- Any one of the below three conditions is required to enter defrost:

1. The calculated temperature difference between the outdoor temperature (T4) and the coil temperature (T3) is called Delta T. After Delta T is achieved and continues for 3 minutes.
   - T4 ≥ 39°F, Delta T = 18°F
   - T4 ≥ 30°F, Delta T = 16°F
   - T4 ≥ 19°F, Delta T = 14°F
   - When T4 < 19°F, T3 < 9°F, accumulative compressor run time ≥ 88 minutes.
2. After "Minimum Run Time" (MRT) is achieved. MRT is based on outdoor ambient temperature (T4), for example:
   - MRT is 4 hours when: T4 < 23°F
   - MRT is 2 hours when: 23°F ≤ T4 < 39°F
   - MRT is 55 minutes when: Last defrost cycle was at least 8 minutes
3. After the high pressure saturation temperature drops below 82°F for 20 minutes when 14°F ≤ T4 < 29°F.

- Defrost will terminate once outdoor coil temperature (T3) reaches 64°F for a period of 1 minute or defrost time has exceeded 8 minutes.
- Defrost Termination Settings (SW5) offers different defrost termination options for enhanced defrost for different geographical and outdoor conditions.

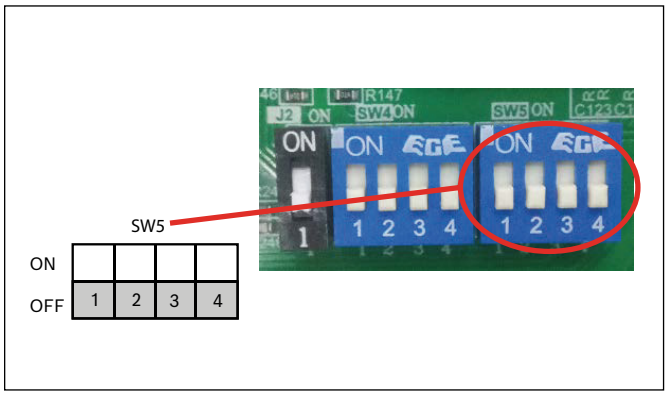



*Figure 29*

| Dip Switch | Position | Description |
|---|---|---|
| SW5-1 | ON | Enter Defrost - Heating time reduced 10% |
| | OFF | Normal* |
| SW5-2 | ON | Exit Defrost - Defrosting extended for 120 seconds |
| | OFF | Normal* |
| SW5-3 | ON | Reserved |
| | OFF | Must be set at "OFF" Position |
| SW5-4 | ON | Reserved |
| | OFF | Must be set at "OFF" Position |

*Table 28*

- Manual Defrost:

4. System must have a call for heat and have been operating for a minimum of 8 minutes.
5. Press "Force" button on inverter board for 6 seconds to begin forced defrost.
6. Wait approximately 40 seconds for defrost to initiate.
7. Once defrost initiates, the display will indicate "dF".
8. Defrost test will terminate automatically, after which the display will indicate running speed.
9. If a second defrost test is required, repeat steps 2-5 after 5 minutes.

## 13.4 Compressor Crankcase Heater Description

Refrigerant migration during the OFF cycle can result in noisy start-ups, therefore a CrankCase Heater (CCH) is used to minimize refrigerant migration thereby minimizing start-up noise and/or bearing "wash out". All CCHs must be installed on the lower half of the compressor shell. Its purpose is to warm the compressor during the OFF cycle, driving refrigerant from compressor. After extended shutdown periods in cold weather, it is recommended to allow CCH to be energized for at least 12 hours prior to compressor operation by applying line voltage to heat pump with thermostat OFF.

- CCH operation energizes:

1. First time line voltage is applied and compressor discharge temperature T5 < 54°F.
2. Compressor stops running for 3 hours and compressor discharge temperature T5 < 54 °F.
3. In process of defrosting

- CCH operation de-energizes:

4. Compressor discharge temperature T5 ≥ 61°F.
5. Compressor starts running.

## 13.5 Reversing Valve Operation

- Reversing valve energizes during heat mode and de-energizes in cool mode. The input voltage of reversing valve is 220 V.

During a heat call on first time operation the unit will run about 1 minute in cooling to build up pressure for reversing valve to change.

### 13.6 Air Pressure Switch Description

An air pressure switch is installed on the blower housing of a 3 Ton model to detect the pressure difference between the supply duct and the electronic control box to determine whether the indoor airflow meets the minimum airflow requirements of electric heat kit. If indoor airflow is below the range required in Table 14, the pressure difference between two sides of the air pressure switch may be lower than the required minimum value, and the air pressure switch will shut off the electric heat kit until the airflow requirement is met.

If indoor airflow meets the requirement but the electric heat kit is not turning on, check for the following:

- The signal wire of air pressure switch is disconnected.
- Silicone tube of air pressure switch is bent or blocked.
- Air pressure switch is physically damaged.

### 13.7 R-454B Refrigerant Sensor Description

The 5 Ton unit comes with a factory installed R-454B Refrigerant leakage sensor located under the Electric Control Box. Before powering on the unit, verify that the sensor is plugged into the CN26 port on the indoor control board. See the figure below for reference.

**⚠ WARNING**

**Fire, explosion, personal injury!**

LEAK DETECTION SYSTEM installed on indoor unit. Unit must be powered except for service.

***NOTICE***

**Product damage!**

R-454B refrigerant leakage sensor is designed for the indoor unit. The operation of fan can be initiated by the R-454B refrigerant sensor, which meets the incorporated circulation airflow requirements.

The allowed maximum refrigerant charge ($M_{max}$) and the required minimum room area ($A_{min}$) can be determined according to Table 9 as well as Table 10, Table 11 & Table 12.

**⚠ CAUTION**

**Fire Hazard!**

Only the factory supplied or specified refrigerant leakage sensor model in the manual shall be used.

The R-454B refrigerant leakage sensor must be used to activate the refrigerant shutoff device,the alarm device, incorporated circulation airflow or other emergency controls, which shall give an electrical signal at a predetermined alarm setpoint in response to leaked refrigerant.

The location of leakage sensors shall be chosen in relation to the different installation scenarios. Please refer to the indoor unit installation manual for specific requirements.

The installation of the refrigerant leakage sensor shall allow access for checking, repair or replacement by an authorized person.

The refrigerant leakage sensor shall be installed so its function can be verified easily.

The refrigerant leakage sensor shall be protected to prevent tampering or unauthorized resetting of the pre-set value.

To be effective, the refrigerant leakage sensor must be electrically powered at all times after installation, other than when servicing.

If the refrigerant leakage sensor detects a refrigerant leak, the fan will be turned on to the maximum, the compressor will stop running. Immediately leave the leak area and notify a professional for handling.

The service life of the refrigerant sensor is 15 years, and it should be replaced after the service life.

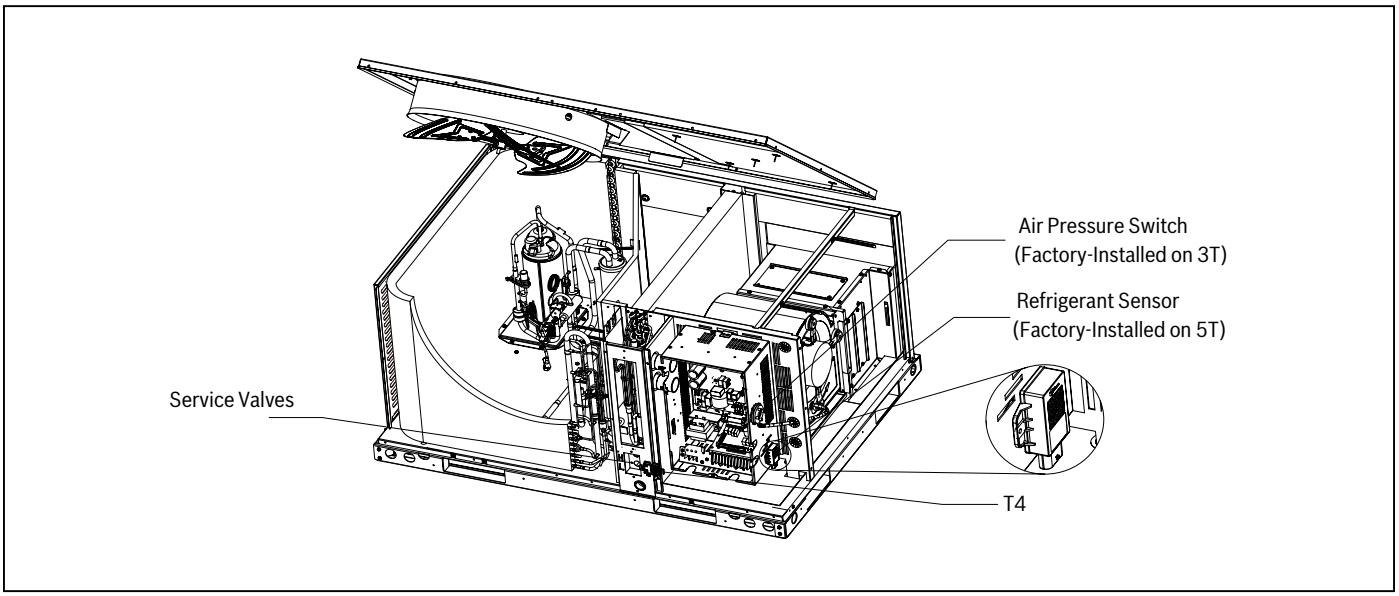



*Figure 30*

### 13.8 Protection Functions

- Outdoor coil temperature protection (T3)
    i. If T3 > 147°F, compressor is de-energized.
    ii. If T3 < 129°F, compressor is energized.
- Ambient temperature protection (T4)
    i. If 23°F ≤ T4 < 120°F, unit can operate in cooling.
    ii. If 0 °F ≤ T4 < 86°F, unit can operate in heating.
    iii. If T4 < 0°F for 3 minutes, heat pump will provide 24 V control to indoor unit energizing electric heat (if installed).



See Product Specification for extended performance data.

- Discharge Temperature (DT) protection (T5)
    i. If DT > 230°F during cooling mode, the compressor will stop.
    ii. If DT < 185°F during cooling mode, the compressor will restart.
    iii. If DT > 230°F during heating mode, the compressor will stop.
    iv. If DT < 185°F during heating mode, the compressor will restart.
- High Pressure (HP) protection (mechanical open/close pressure switch)
    i. High Pressure Switch opens at P > 580 psig the compressor and outdoor fan stop.
    ii. High Pressure Switch closes at P < 435 psig the compressor and outdoor fan restart.
- Low Pressure (LP) protection
    i. If Low Pressure < 21.8 psi for 5 minutes during cooling mode, the compressor and outdoor fan will stop. The system will attempt to run again after 3 minutes.
- Module (inverter) protection (TF)
    i. If TF > 203°F, the compressor and outdoor fan will stop.
    ii. If TF < 158°F, the compressor and outdoor fan will restart.

### 13.9 Fault Code Table

| Code | Fault Description (Sensor) |
|---|---|
| AtL | Ambient Temperature Limited(T4) |
| b1 | Temperature sensor fault in indoor unit (T1) |
| b2 | Temperature sensor fault in indoor unit (T2) |
| b3 | R-454B refrigerant sensor hardware fault in indoor unit |
| b4 | R-454B refrigerant sensor communication fault in indoor unit |
| b5 | Communication fault between indoor unit and outdoor unit |
| b7 | R-454B refrigerant leakage protection in indoor unit |
| b8 | R-454B refrigerant sensor over service life in indoor unit |
| b9* | Dip Switch SW7-2 does not match R-454B refrigerant sensor configuration |
| C3 | The coil sensor is unplugged in cooling (T3) |
| E41 | Temperature sensor fault (T3) |
| E42 | Temperature sensor fault (T3L) |
| E43 | Temperature sensor fault (T4) |
| E44 | Temperature sensor fault (T5) |
| E45 | Temperature sensor fault (Th) |
| E51 | Outdoor unit high/low input voltage protection |
| E52 | Outdoor unit high/low DC bus voltage protection |
| E7 | Compressor discharge sensor is unplugged (T5) |
| E81 | EEVA coil solenoid fault |
| EA | Control program does not match drive program in outdoor unit |
| Eb | Dip Switch SW4-1 set incorrectly |
| F1 | High pressure switch fault (HPS) |
| F2* | 5 times (P21) protection in 100 minutes, system lockout |
| F41 | Pressure sensor fault |
| H01 | Drive chip Communication fault in outdoor unit |
| J00-JCF | Compressor driver fault |
| n00-nCF | Outdoor fan motor driver fault |
| o37 | Lack of refrigerant |
| P0 | Compressor IPM temperature protection |
| P1 | High pressure switch protection (HPS) |
| P11 | High pressure protection in cooling/heating (Pc) |
| P21 | Low pressure protection in cooling/heating (Pe) |
| P31 | Outdoor unit over current protection |
| P32 | Compressor over current protection |
| P4 | High compressor discharge temperature protection (T5) |
| P5 | Condensor coil temperature protection in cooling (T3) |
| PF | Evaporator freezing protection |
| PH | Low discharge superheat protection |

*Table 29*

* Fault requires hard restart

### 13.10 System Protection Status Codes

| Code | Description |
|---|---|
| L88 | Running indication under T3 limited condition |
| H88 | Forced operation mode |
| P88 | Running indication under high pressure |
| U88 | Running indication under low pressure |
| A88 | Running indication under return oil mode |
| C88 | Running indication under current limited condition |
| d88 | Running indication under T5 limited condition |
| F88 | Running indication under COMP. IPM Temp. limited condition |
| r88 | Running indication under compressor ratio  limited condition |
| J88 | Running indication under low voltage limited condition |
| dF8 | Running indication under defrost mode |

*Table 30*

** If the first digit shown on the control board LED is one of the following protection codes (followed by two numerical digits which show the current compressor frequency in Hz), the unit will continue to run but in a limited condition.*

### 13.11 Parameter Point Check Table

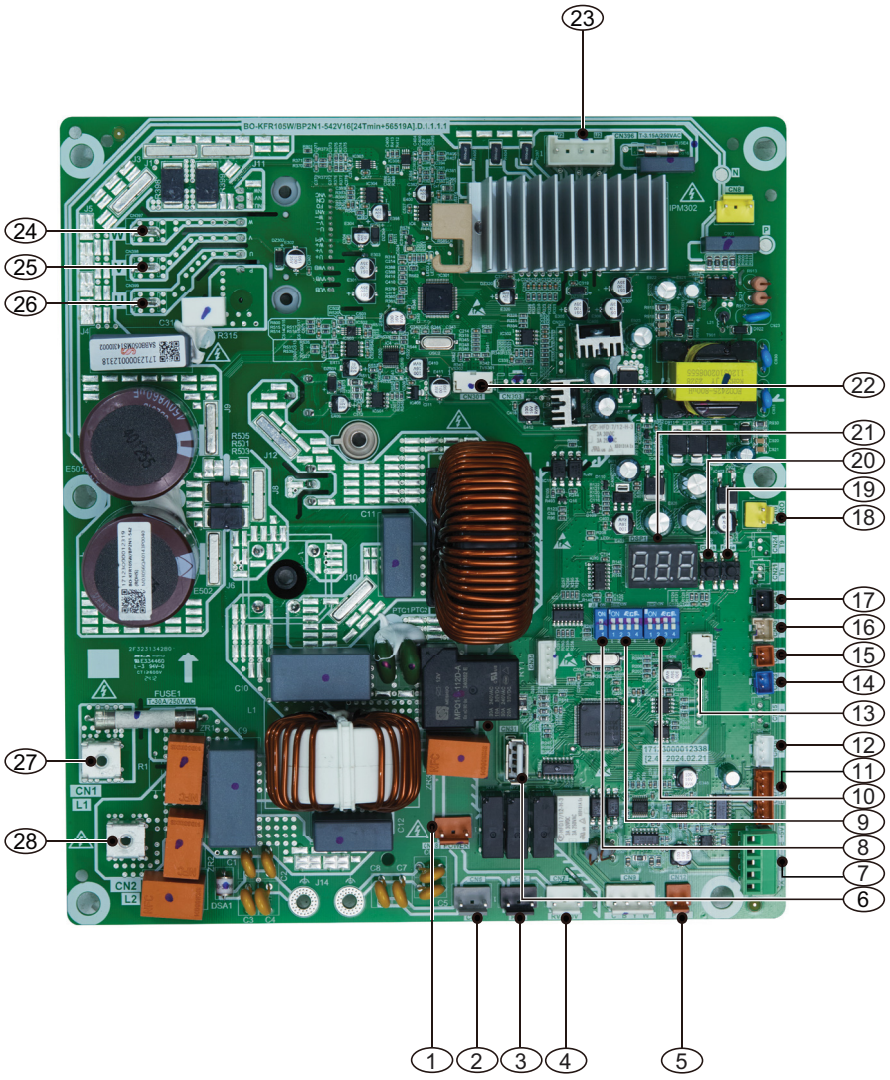
- To display system parameters, press the “Check” button to index through the series of parameters available. The first time you press the “Check” button, it will display the sequence, and after 1 second it will display the value of the parameter. If you press the “Check” button again, it will display the next sequence. Refer to Figure 31 and Figure 32 for check button location on the control board.
- Normal Status, last two digits will display under the following conditions:
  i. Unit not operating (Standby Mode); “outdoor ambient temperature”.
  ii. Unit operating; displays “compressor operating frequency”.
- After 20 seconds on same parameter, the display will revert back to normal status.
- If a system protection is active, first digit will display “status code”.

| No. | Point check content | Example | Remark |
|---|---|---|---|
| 0 | Outdoor unit capacity | RH5 | RH5 = Packaged Heat Pump 5 Ton,<br>RH3 = Packaged Heat Pump 3 Ton |
| 1 | Outdoor unit mode | 2 | 0 standby, 2 cooling, 3 heating |
| 2 | Outdoor unit set compressor speed | 56 | Hz |
| 3 | System last fault code | E4 | |
| 4 | T3: outdoor coil temperature | 108 | °F |
| 5 | T3L: outdoor coil outlet temperature | 102 | °F |
| 6 | T4: outdoor ambient temperature | 95 | °F |
| 7 | T5: compressor discharge temperature | 140 | °F |
| 8 | Th: compressor suction temperature | 55 | °F |
| 9 | Compressor IPM temperature | 120 | °F |
| 10 | Pe: evaporating pressure | 130 | psig |
| 11 | Pc: condensing pressure | 320 | psig |
| 12 | Tes: target evaporating temperature (only for cooling mode) | 43 | °F |
| 13 | Te: evaporating temperature | 43 | °F |
| 14 | Tcs: target condensing temperature (only for heating mode) | 106 | °F |
| 15 | Tc: condensing temperature | 106 | °F |
| 16 | Target value of the compressor discharge superheat (only for heating mode) | 36 | °F |
| 17 | Compressor discharge superheat | 36 | °F |
| 18 | Compressor Suction superheat | 10 | °F |
| 19 | Openings of EEV | 200 | 0-480P |
| 20 | Fan speed stage | 8 | (0-10) |
| 21 | Outdoor unit fan current | 1 | A |
| 22 | Compressor current | 10 | A |
| 23 | Outdoor unit input current | 10 | A |
| 24 | Outdoor unit input voltage | 230 | V |
| 25 | Outdoor unit DC bus voltage | 380 | V |
| 26 | Outdoor unit power | 200 | Outdoor unit * 0.1 kW |
| 27 | Continuous running time of the compressor | 35 | minutes/0-999/Maintain at maximum |
| 28 | Outdoor unit main control software version | 11 | Version |
| 29 | Indoor unit Heat Kit Staging | 1 | 0~3 |
| 30 | T1: indoor unit return air temperature | 80 | °F |
| 31 | T2: indoor unit coil temperature | 55 | °F |
| 32 | Indoor unit software version | 11 | Version |
| 33 | Reserved | - - | - - |
| 34 | Reserved | - - | - - |
| 35 | Remark“--” | - - | - - |

*Table 31*

## 13.12 Control Board Overviews

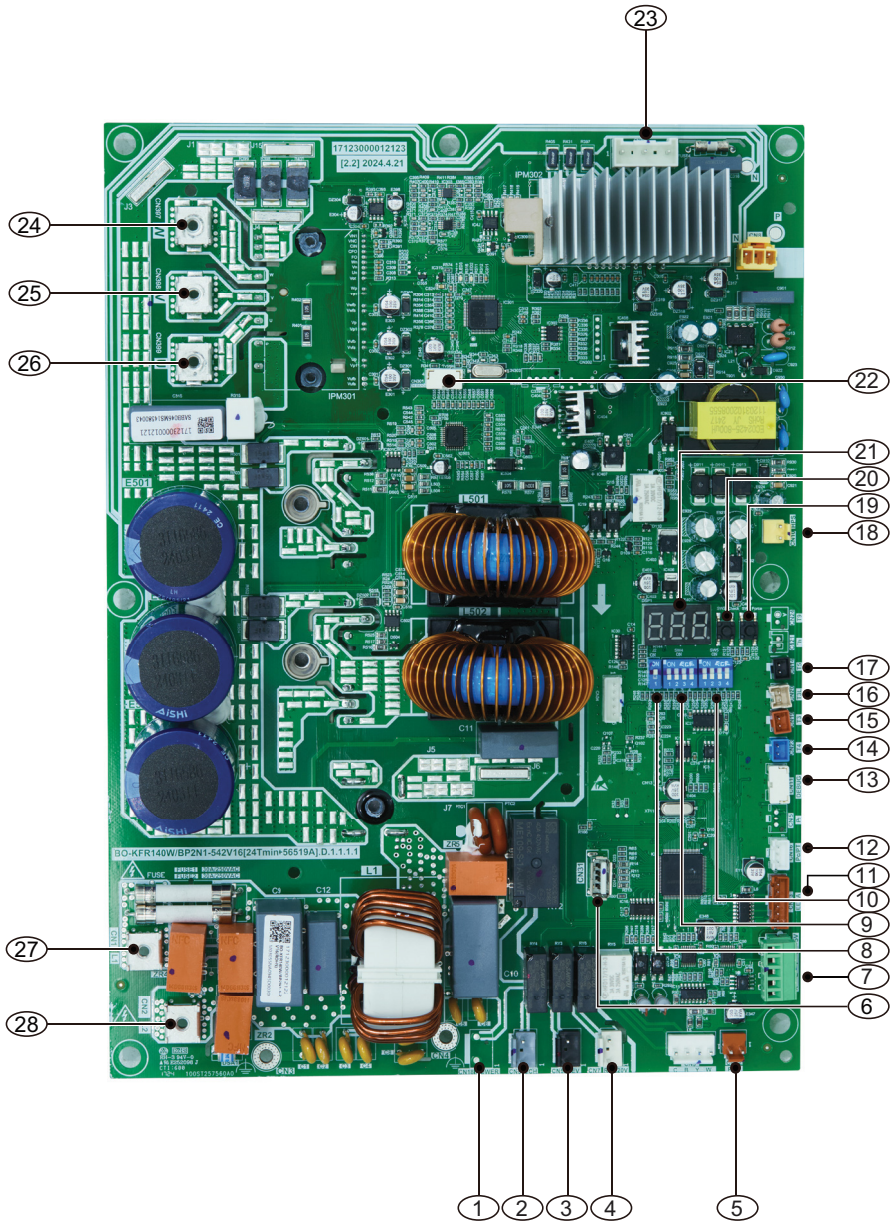
### 13.12.1 Outdoor Unit Control Board for 3 Ton Model




| No. | Function Description |
|---|---|
| 1 | Power output（Reserve） |
| 2 | Compressor crankcase heater port |
| 3 | Solenoid valve port PEV |
| 4 | Reversing valve port |
| 5 | Indoor unit comm. bus port |
| 6 | USB port |
| 7 | Gateway wire connections |
| 8 | J2 Dip SWITCH:Control logic settings |
| 9 | SW4 Dip SWITCH:Control logic settings |
| 10 | SW5 Dip SWITCH:Control logic settings |
| 11 | EEVA port |
| 12 | Pressure transducer port |
| 13 | Debug |
| 14 | T4 sensor port |
| 15 | T3 sensor port |
| 16 | T3L sensor port |
| 17 | T5 sensor port |
| 18 | High pressure switch port |
| 19 | SW1 FORCE BUTTON |
| 20 | SW2 CHECK BUTTON |
| 21 | Digital tube |
| 22 | Debug |
| 23 | Fan motor port |
| 24 | Compressor: W port |
| 25 | Compressor: V port |
| 26 | Compressor: U port |
| 27 | Power input |
| 28 | Power input |

*Figure 31*

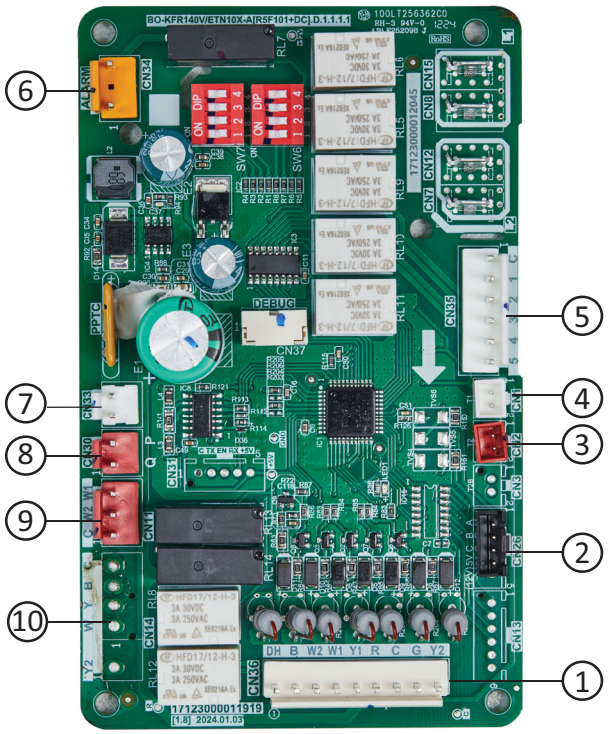
### 13.12.2 Outdoor Unit Control Board for 5 Ton Model




| No. | Function Description |
|---|---|
| 1 | Power output（Reserve） |
| 2 | Compressor crankcase heater port |
| 3 | Solenoid valve port PEV |
| 4 | Reversing valve port |
| 5 | Indoor unit comm. bus port |
| 6 | USB port |
| 7 | Gateway wire connections |
| 8 | J2 Dip SWITCH:Control logic settings |
| 9 | SW4 Dip SWITCH:Control logic settings |
| 10 | SW5 Dip SWITCH:Control logic settings |
| 11 | EEVA port |
| 12 | Pressure transducer port |
| 13 | Debug |
| 14 | T4 sensor port |
| 15 | T3 sensor port |
| 16 | T3L sensor port |
| 17 | T5 sensor port |
| 18 | High pressure switch port |
| 19 | SW1 FORCE BUTTON |
| 20 | SW2 CHECK BUTTON |
| 21 | Digital tube |
| 22 | Debug |
| 23 | Fan motor port |
| 24 | Compressor: W port |
| 25 | Compressor: V port |
| 26 | Compressor: U port |
| 27 | Power input |
| 28 | Power input |

*Figure 32*

### 13.12.3 Indoor Unit Control Board




| No. | Function description |
|---|---|
| **1.** | Thermostat wire connection terminal |
| **2.** | R-454B refrigerant sensor port |
| **3.** | T2 sensor port |
| **4.** | T1 sensor port |
| **5.** | Blower motor port |
| **6.** | Alarm output |
| **7.** | Transformer port |
| **8.** | Communication port (To ODU board) |
| **9.** | Electric Heat Kit signal port |
| **10.** | Reserved |

*Figure 33*

## 13.13 Error Code Troubleshooting

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **AtL** | Ambient Temperature Limited Condition |

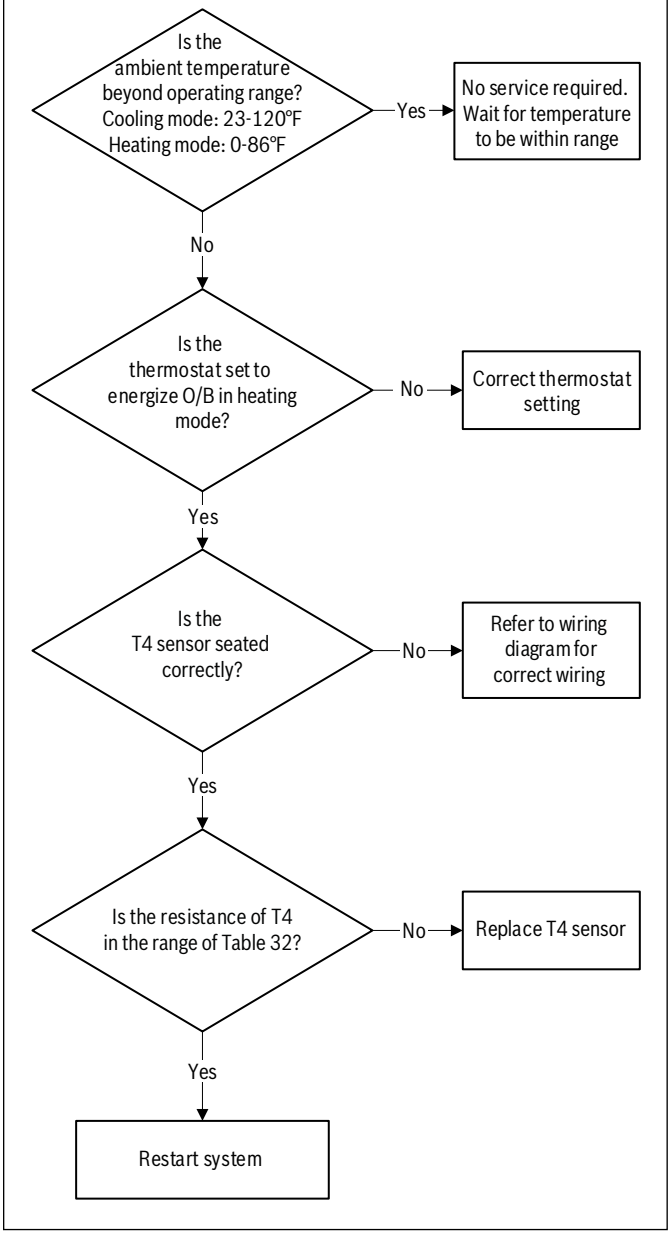



*Figure 34*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **b1** | Indoor unit T1 sensor fault |

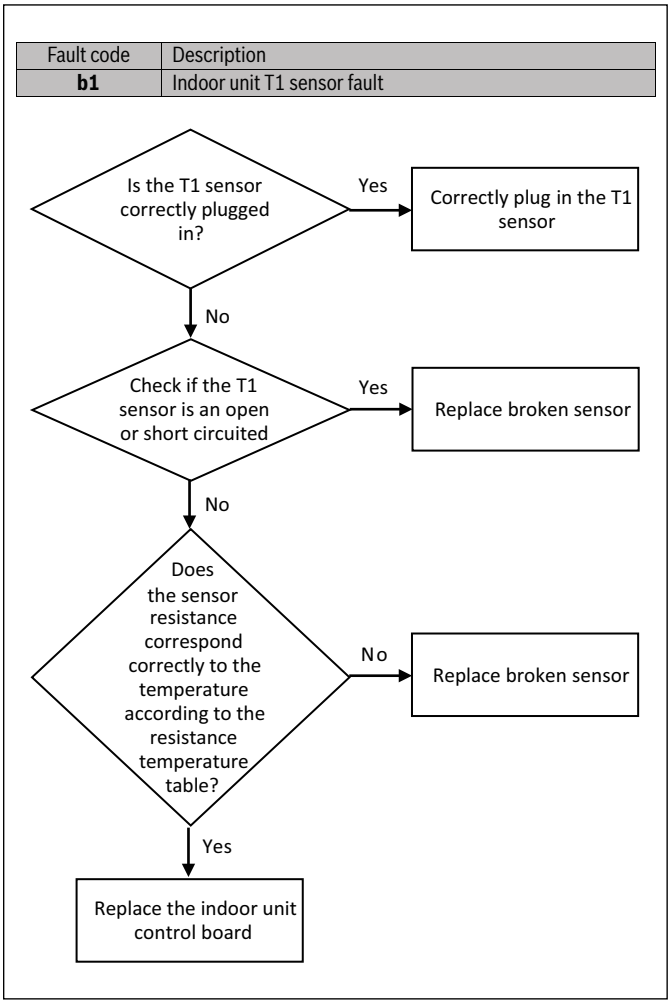



*Figure 35*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

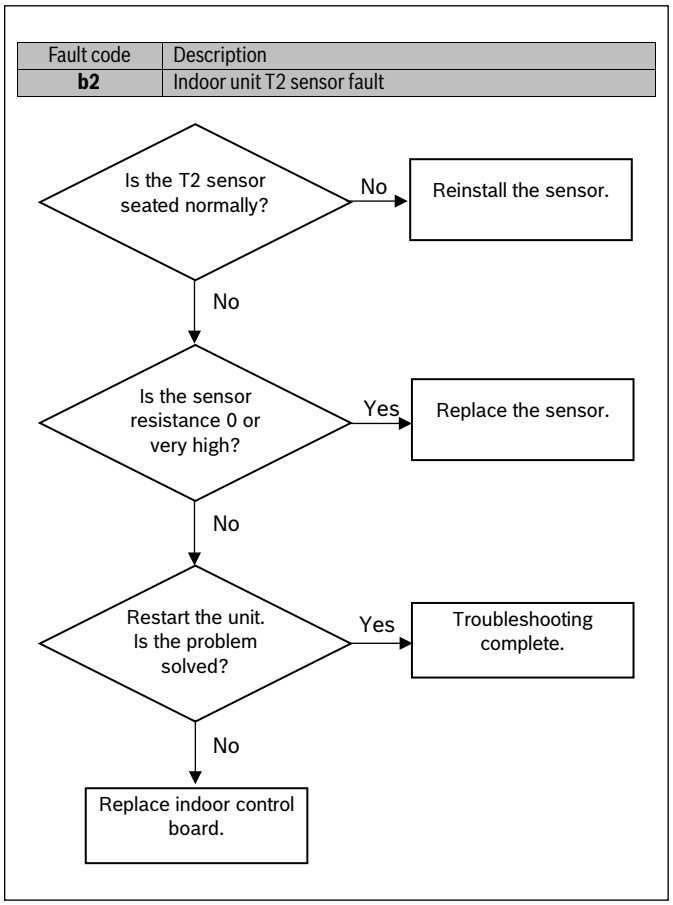



*Figure 36*

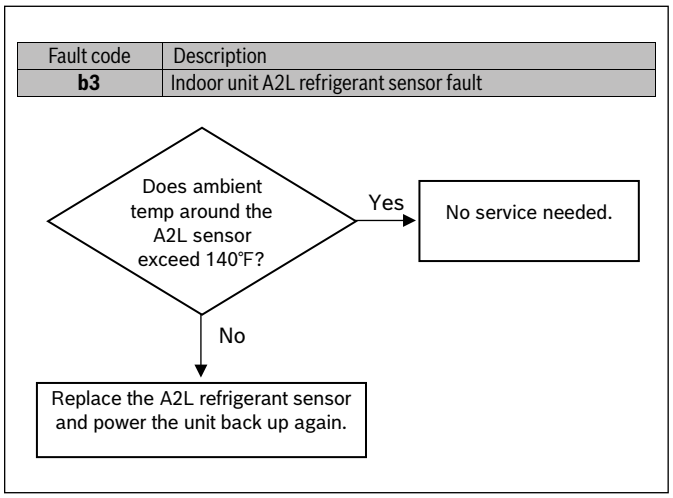



*Figure 37*

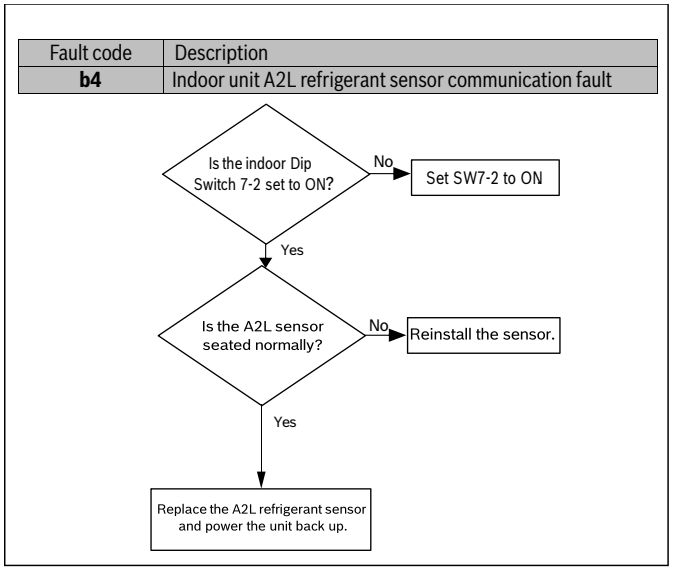



*Figure 38*

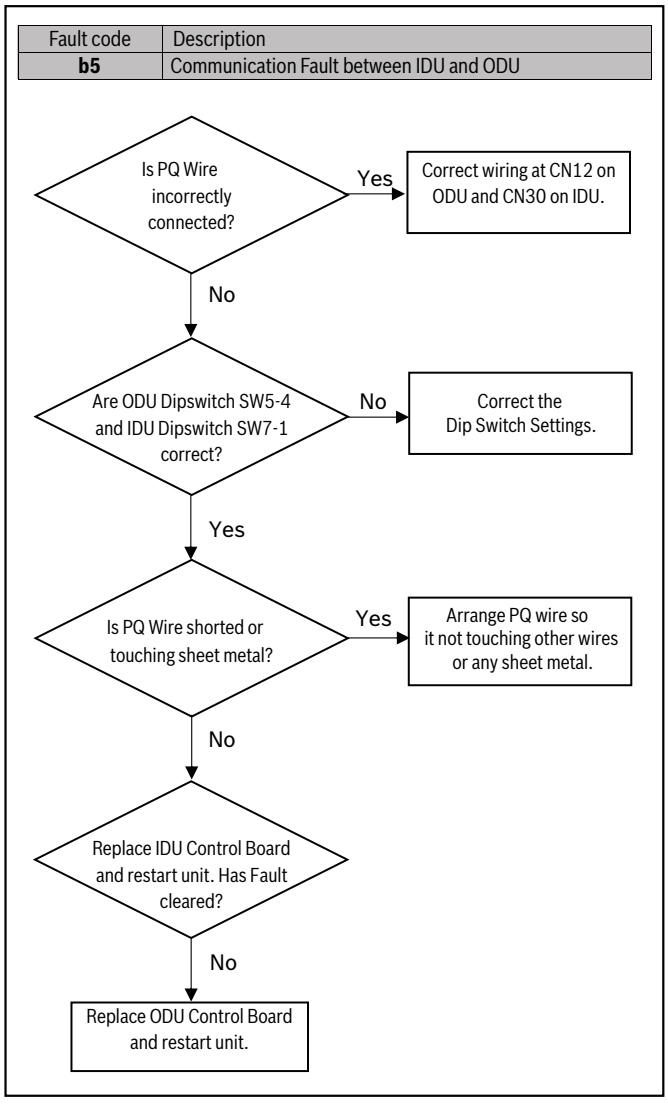



*Figure 39*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

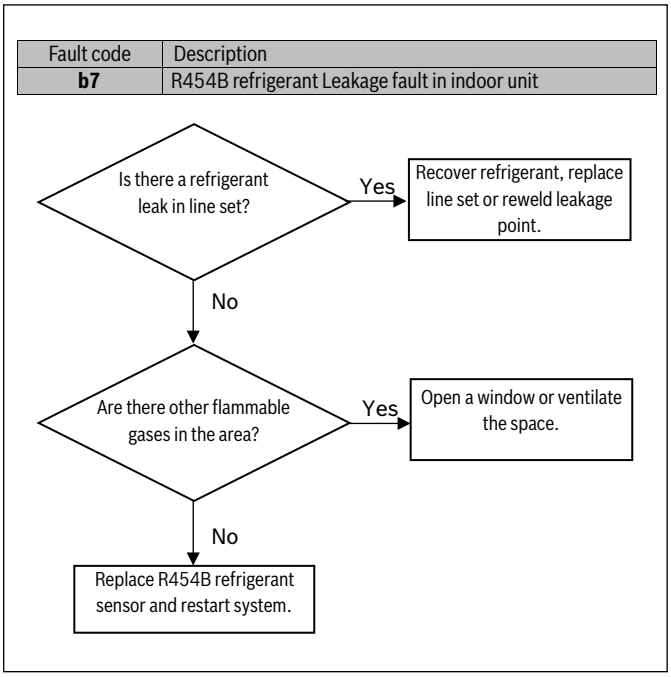



*Figure 40*

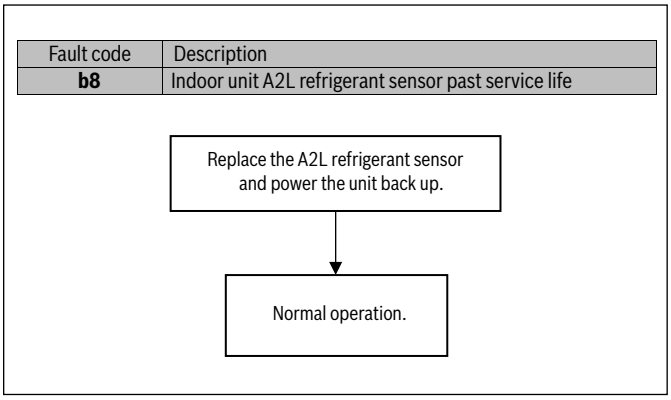



*Figure 41*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

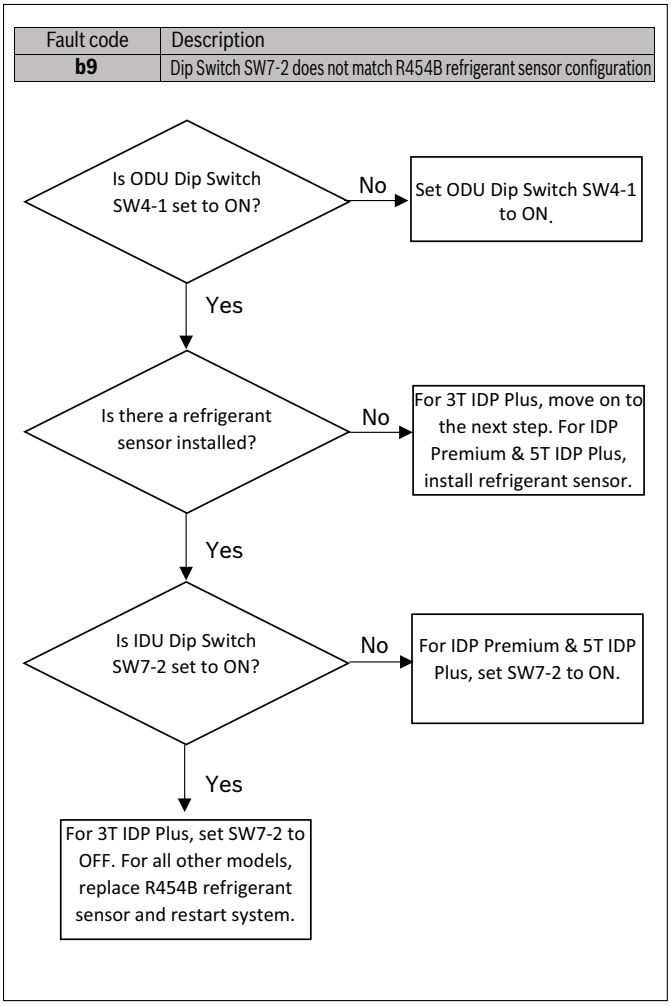



*Figure 42*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **C3** | T3 sensor is not reading correctly in cooling |

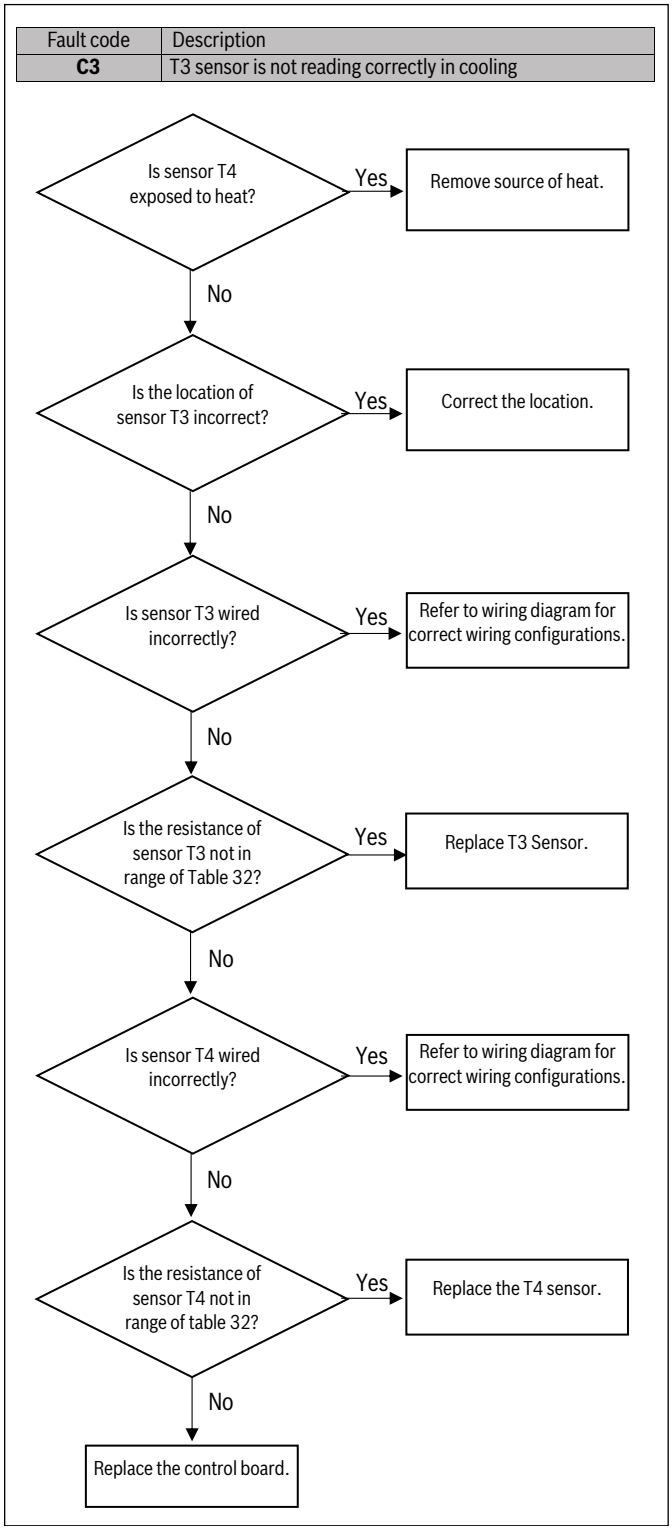



*Figure 43*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E41** | T3 temperature sensor fault |

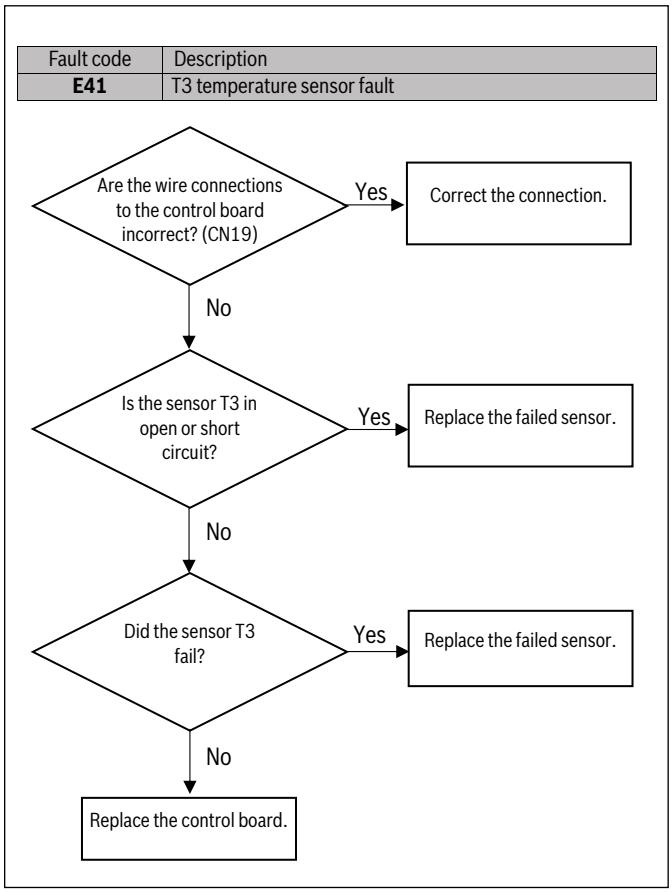



*Figure 44*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E42** | T3L temperature sensor fault |

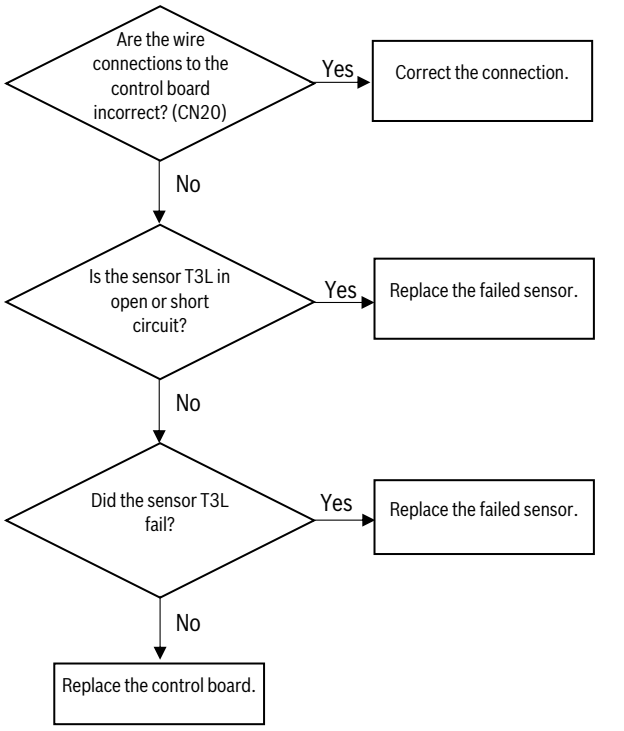



*Figure 45*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E43** | T4 temperature sensor fault |

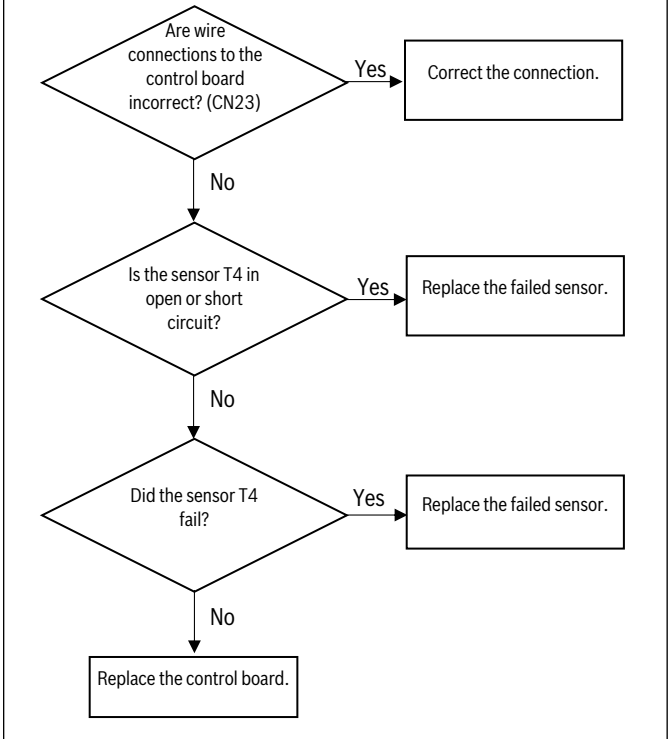



*Figure 46*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E44** | T5 temperature sensor fault |

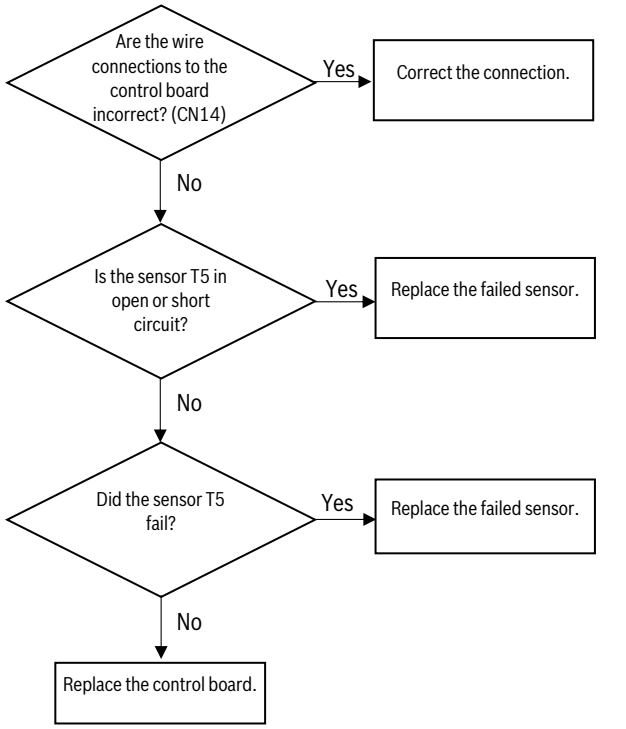



*Figure 47*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E45** | Th temperature sensor fault |

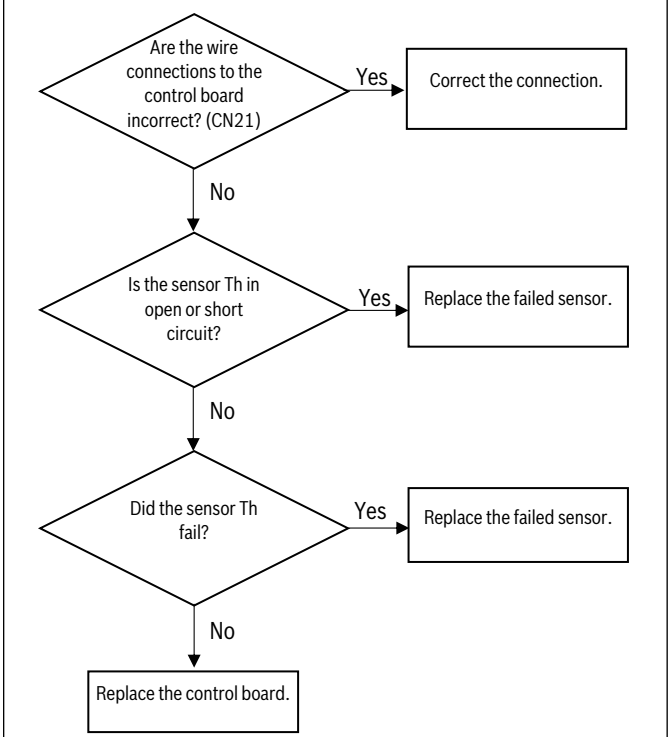



*Figure 48*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E51** | Outdoor unit high/low input voltage protection |

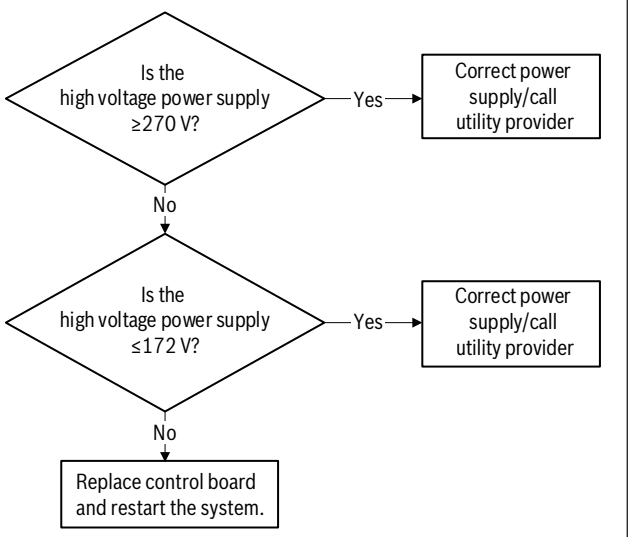



*Figure 49*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **E52** | Outdoor unit high/low DC bus voltage protection |

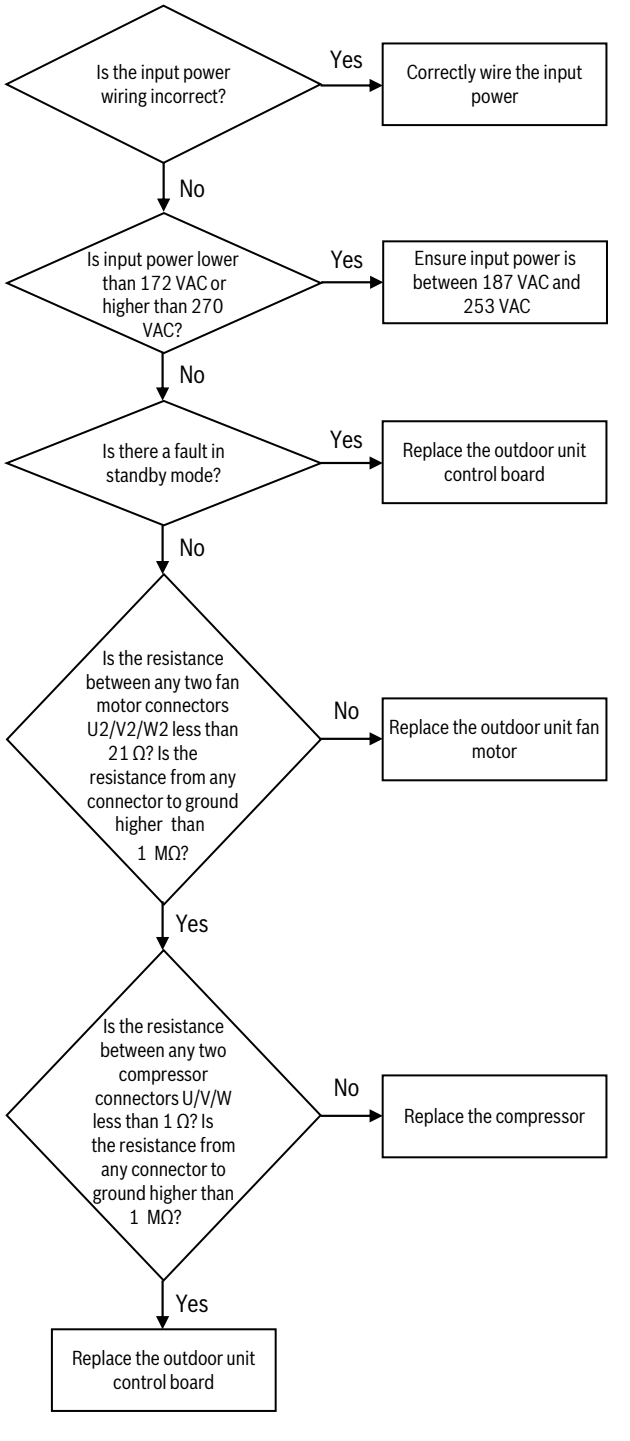



*Figure 50*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

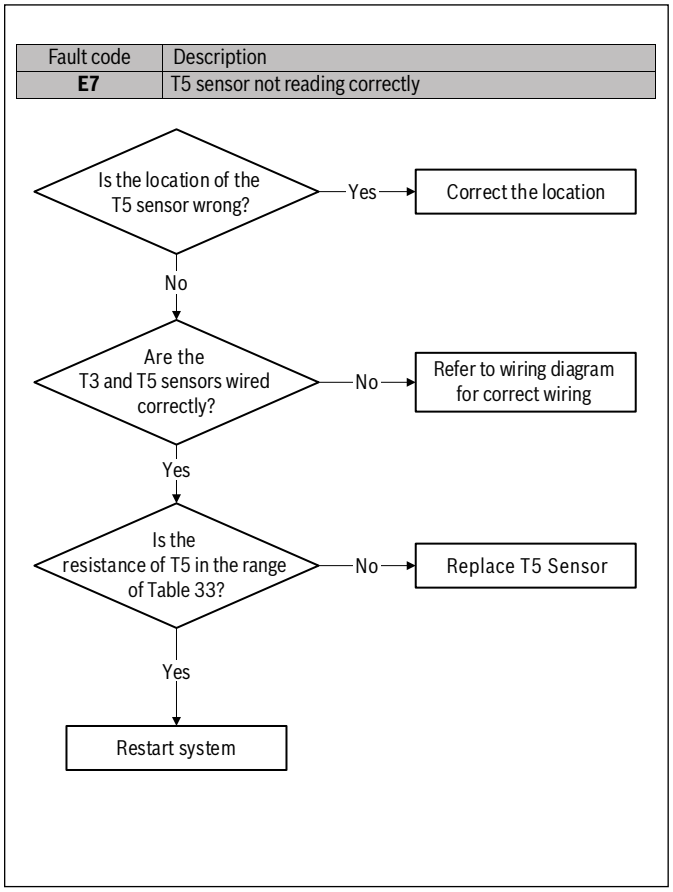



*Figure 51*

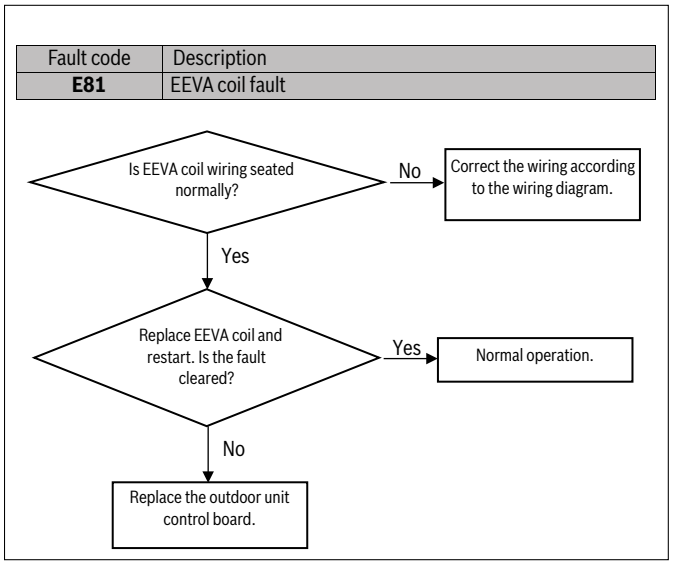



*Figure 52*

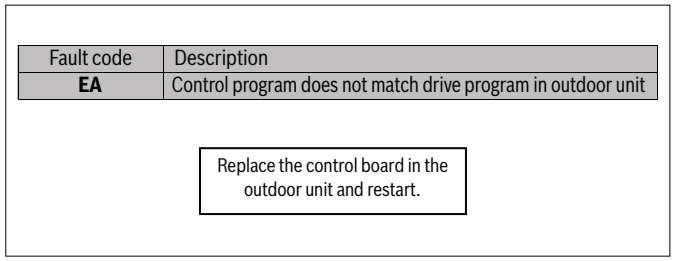



*Figure 53*

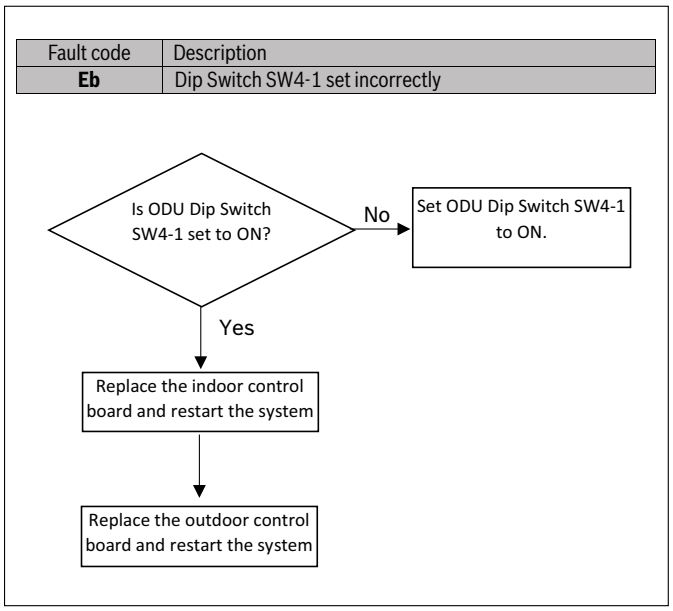



*Figure 54*

| Fault code | Description |
|---|---|
| **F1** | High pressure switch fault (HPS) |

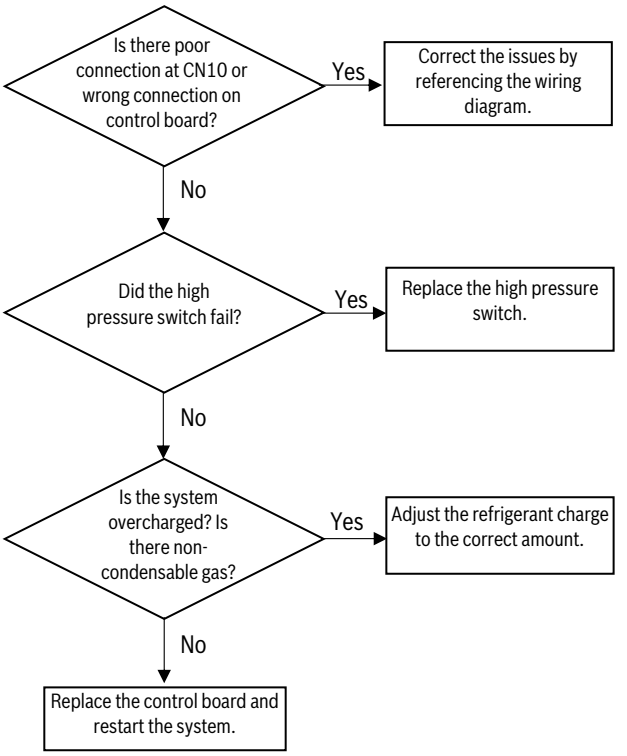



*Figure 55*

| Fault code | Description (Sensor) |
|---|---|
| **F41** | Pressure Transducer Fault (PT) |

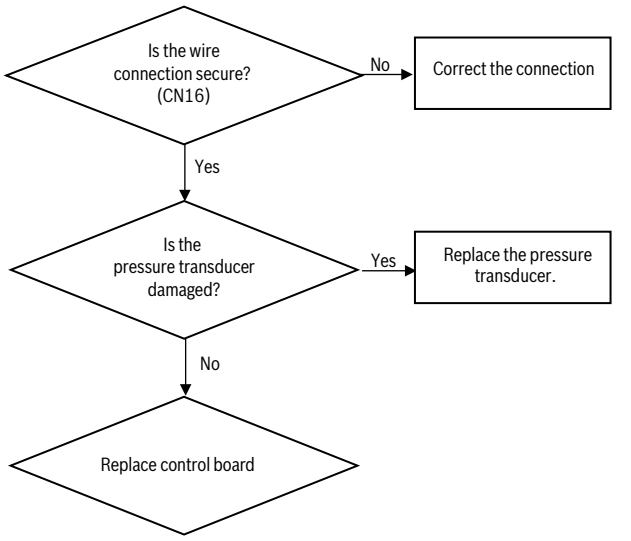



*Figure 56*

| Fault code | Description |
|---|---|
| **H01** | ODU drive chip communication fault |

Replace the outdoor control board and restart the system

*Figure 57*

| Fault code | Description |
|---|---|
| **J00-JCF** | Compressor chip fault |

Replace the outdoor control board and restart the system

*Figure 58*

| Fault code | Description |
|---|---|
| **n00-nCF** | Blower chip fault |

Replace the outdoor control board and restart the system

*Figure 59*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **P0** | Compressor IPM temperature protection |

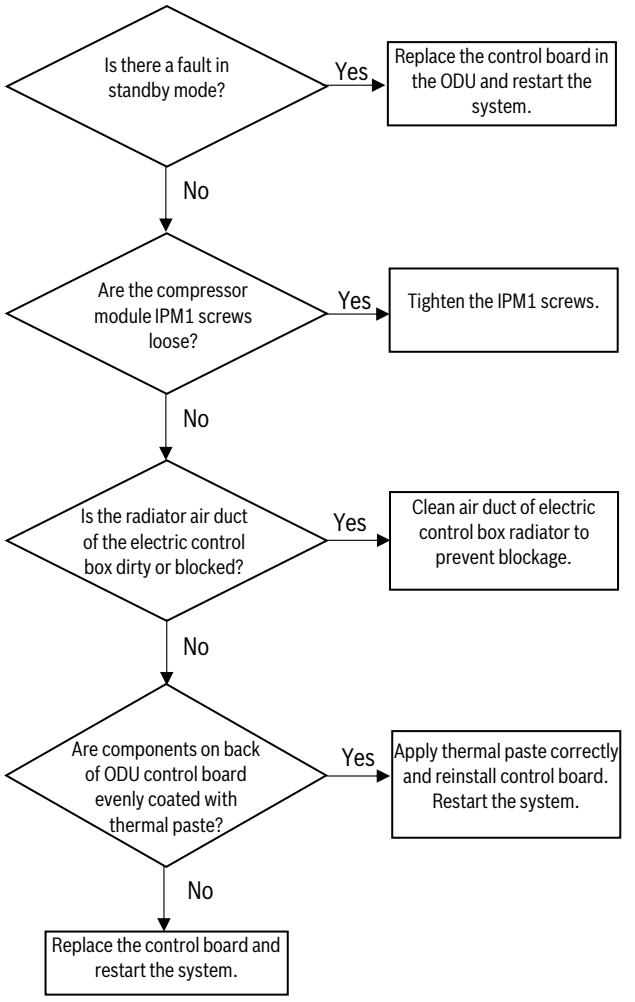



*Figure 60*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **P1** | High pressure switch (HPS) protection |

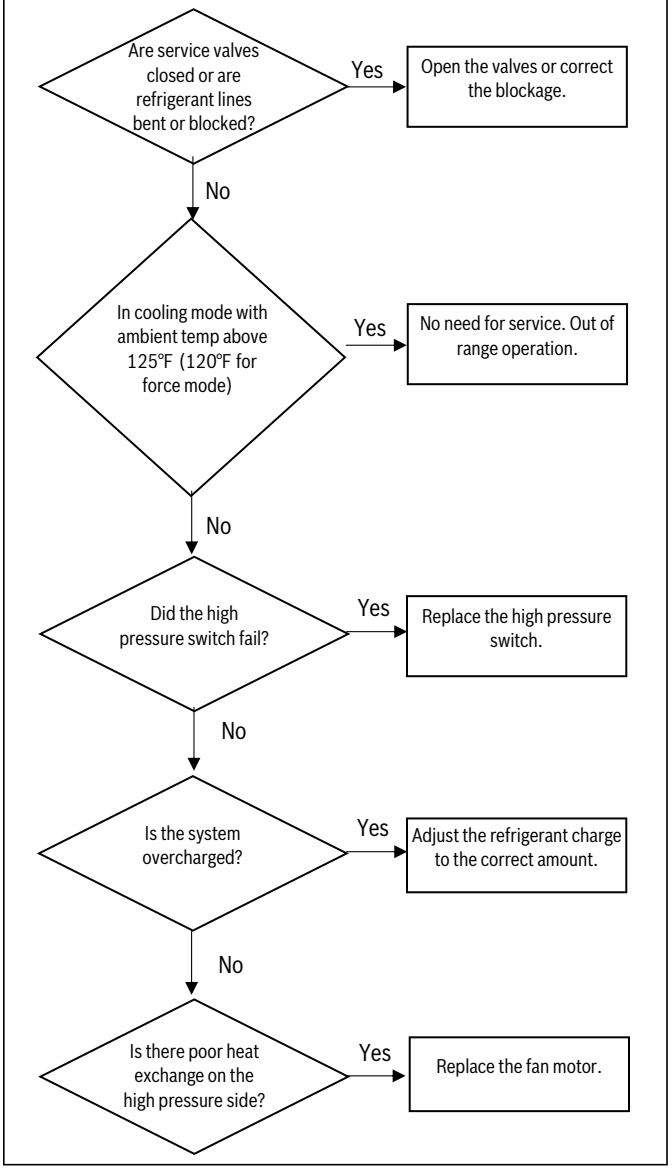



*Figure 61*

**WARNING**

**Hazardous voltage!**

When measuring resistance, make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **P11** | High pressure protection in cooling/heating (Pc) |

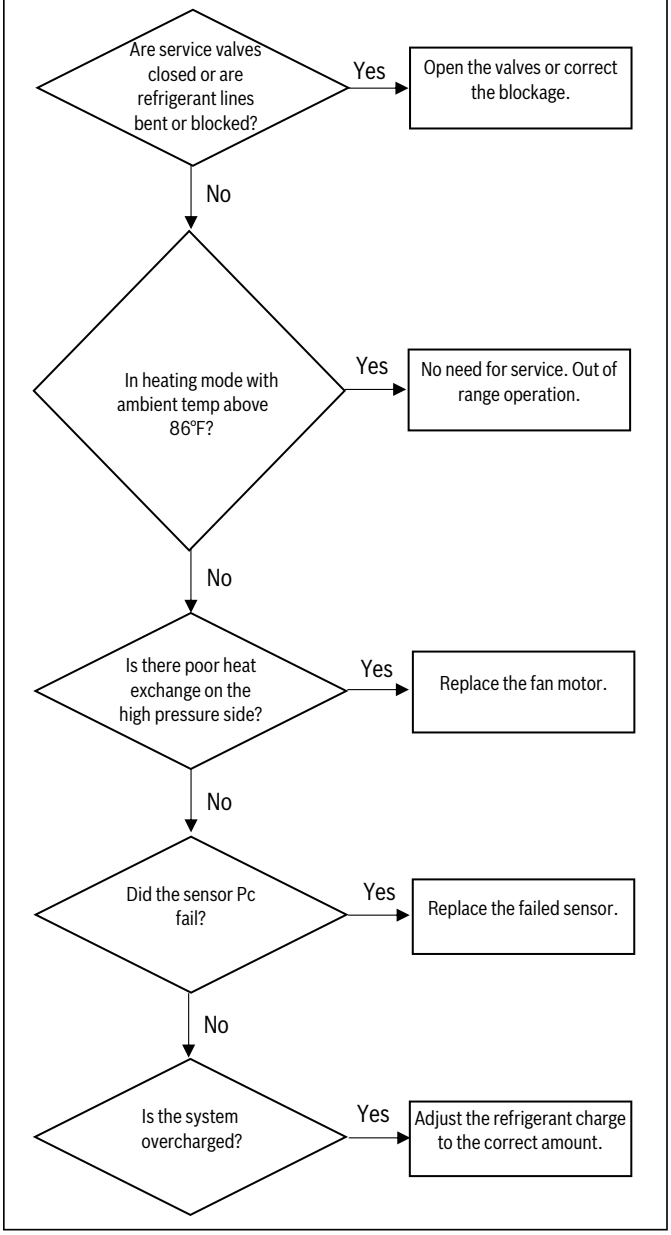



*Figure 62*

| Fault code | Description (Sensor) |
|---|---|
| **P21** | Low pressure protection |
| **F2** | System lockout, P21 occurs 5 times in 100 minutes |

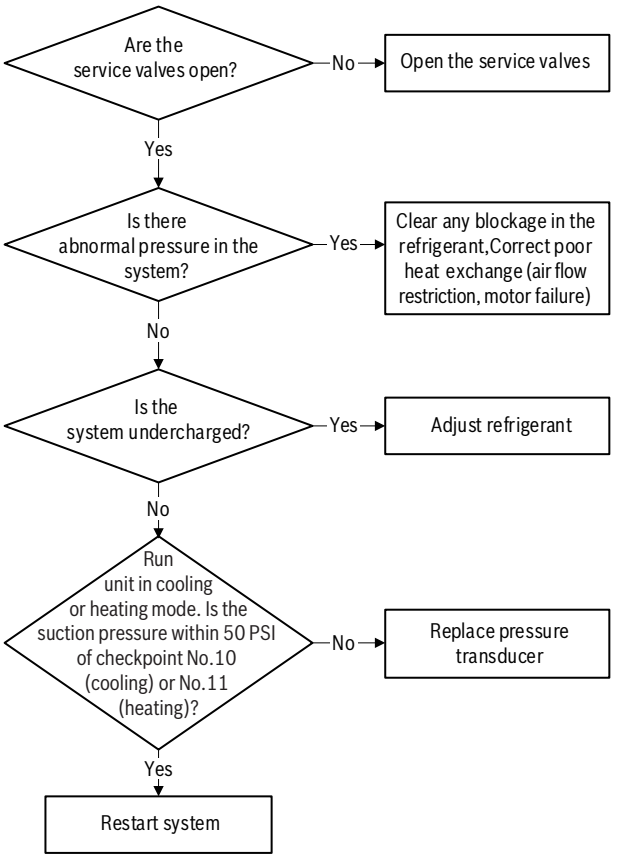



*Figure 63*

**WARNING**

**Hazardous voltage!**

When measuring resistance , make sure the unit is powered off and wait 3 minutes before taking measurement.

| Fault code | Description |
|---|---|
| **P31** | Outdoor unit input over current protection |

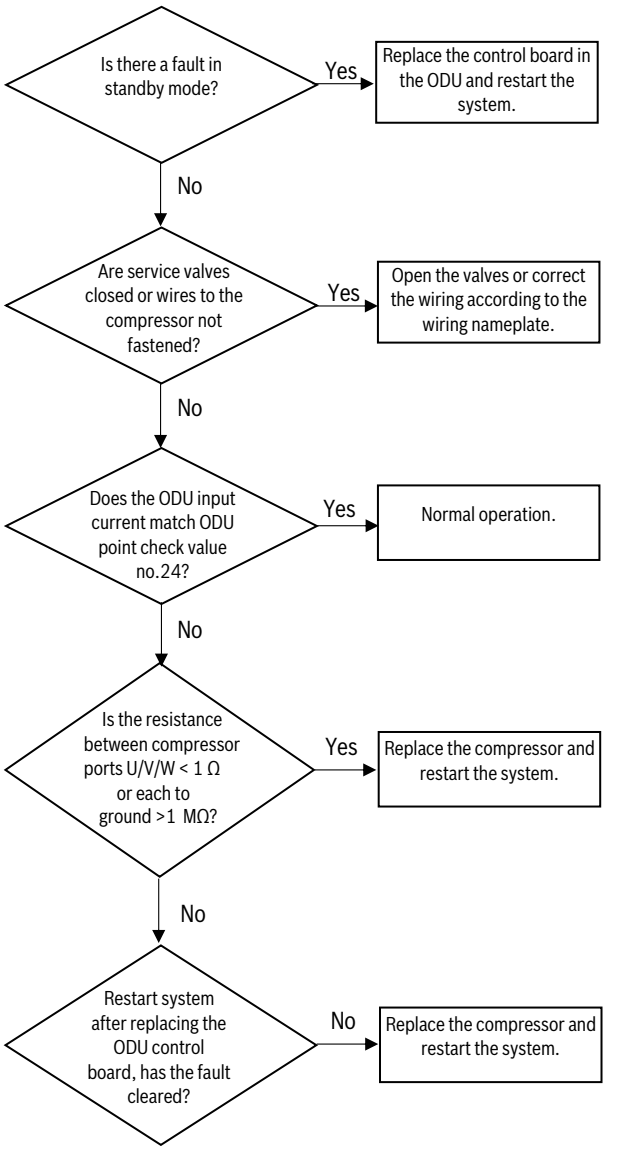



*Figure 64*

| Fault code | Description |
|---|---|
| **P32** | Compressor over current protection |

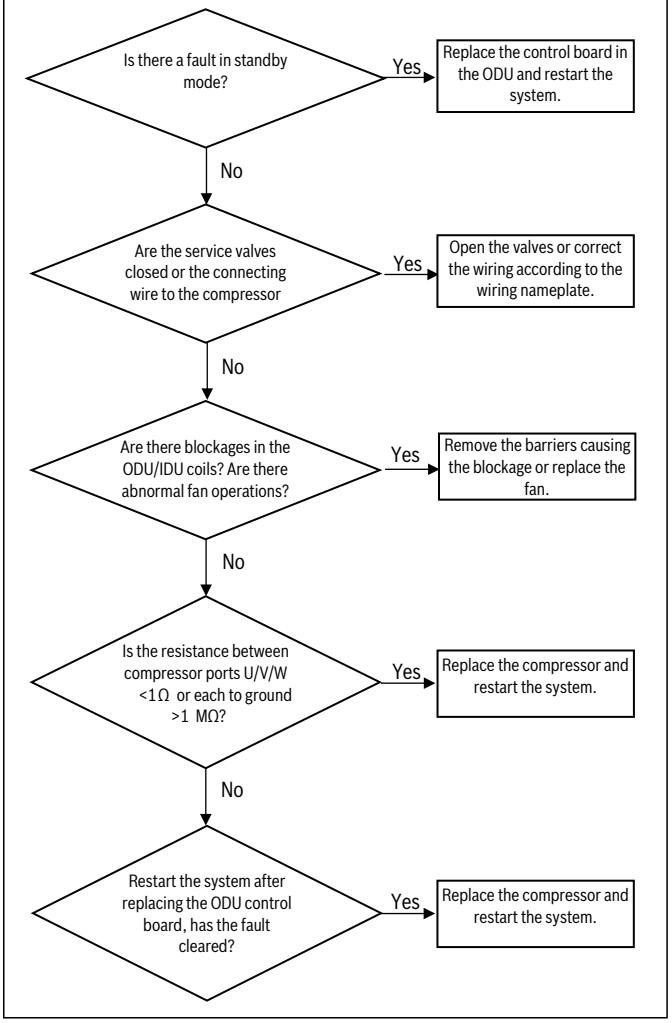



*Figure 65*

| Fault code | Description |
|---|---|
| **P4** | High compressor discharge temperature protection (T5) |

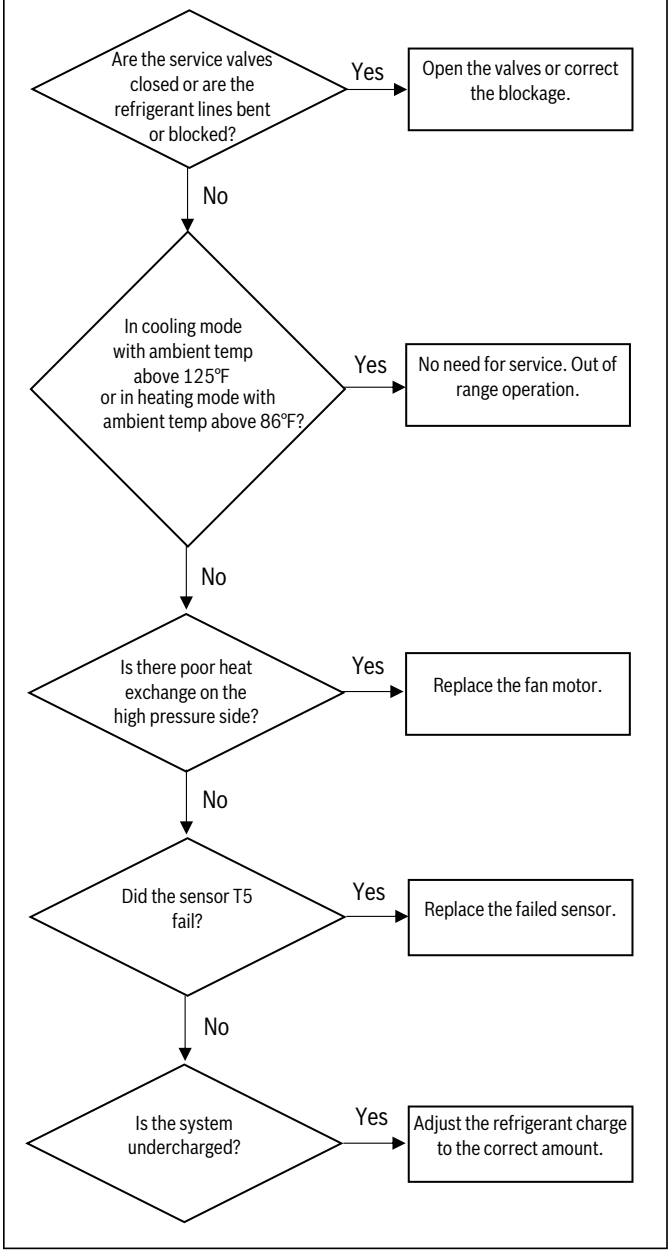



*Figure 66*

| Fault code | Description |
|---|---|
| **P5** | Condenser coil temperature (T3) protection in cooling |

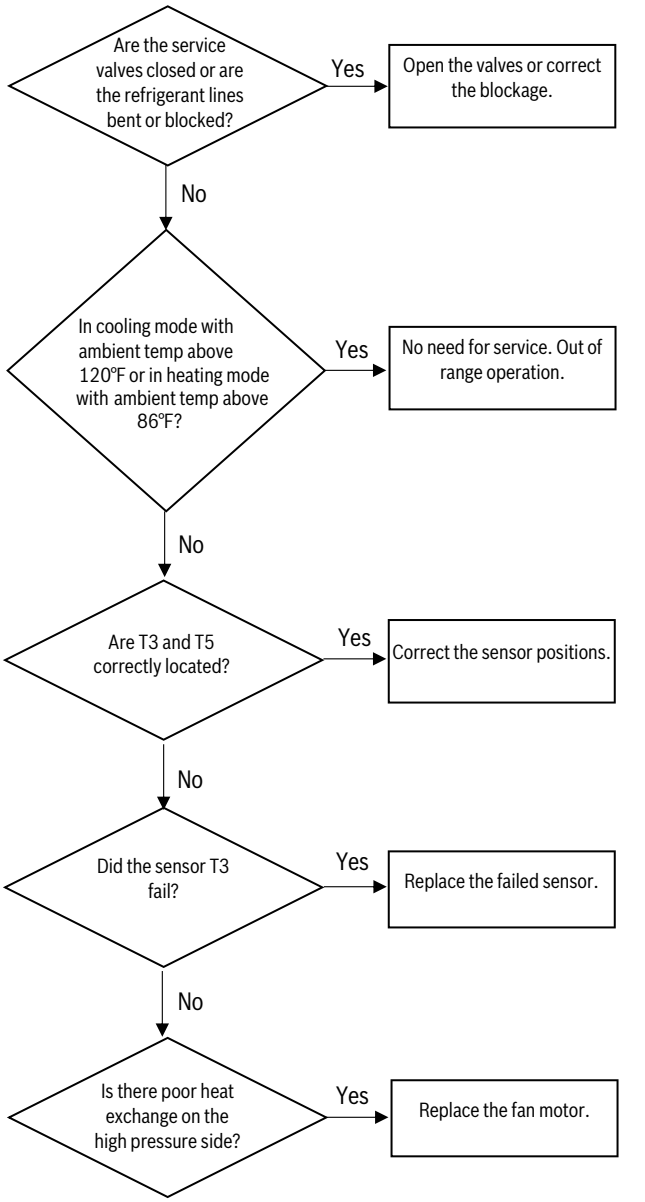



*Figure 67*

| Fault code | Description |
|---|---|
| **PF** | Evaporator freezing protection |

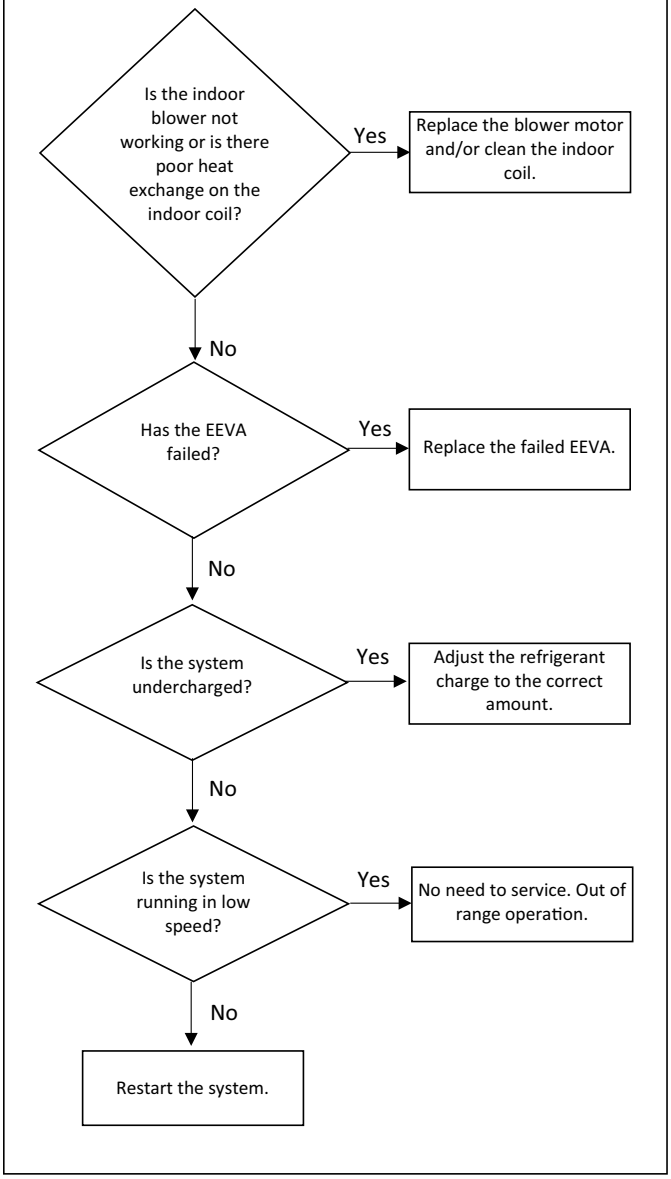



*Figure 68*

| Fault code | Description |
|---|---|
| **PH** | Low discharge superheat protection |

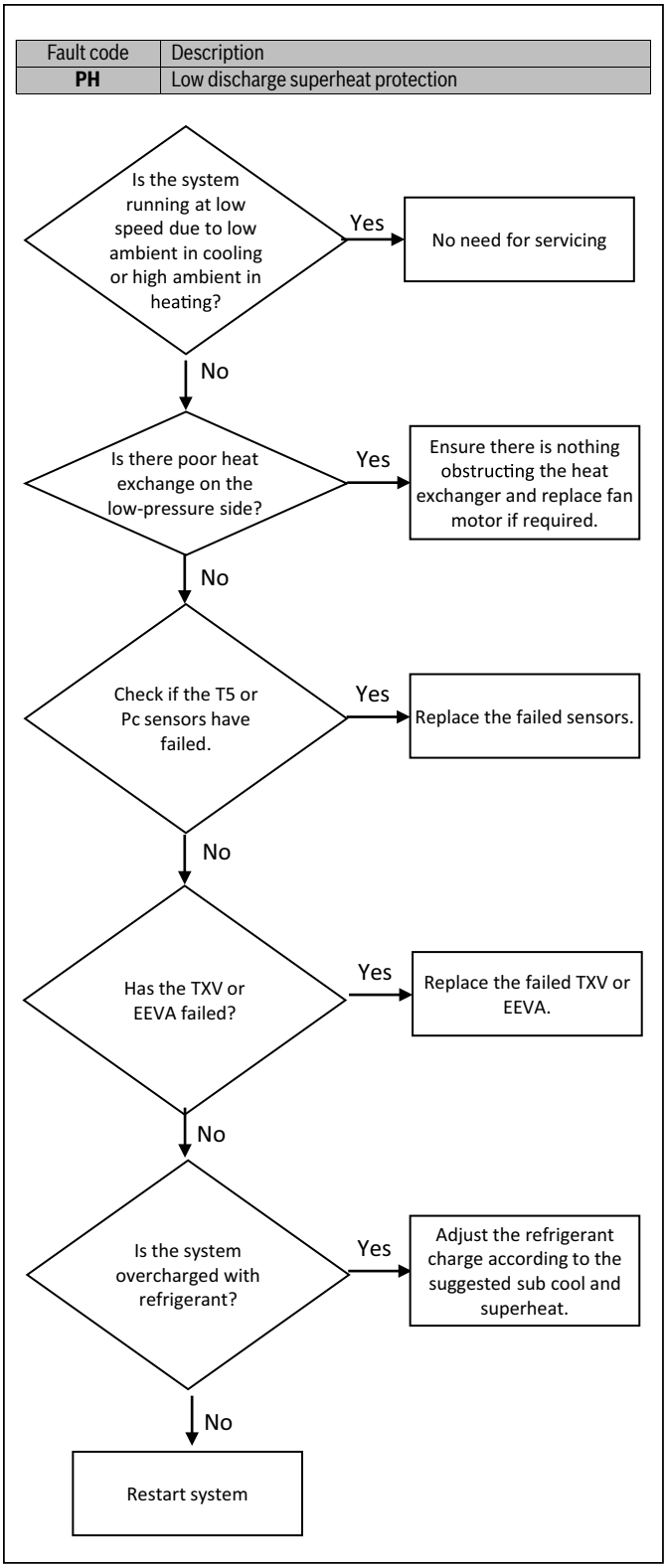



*Figure 69*

### 13.14 LED Flashing Troubleshooting

Indoor unit fault codes can be diagnosed via observing the behavior of LED1. The number of flashes per cycle correspond to certain faults as described below.

| Number of flashes | Description |
|---|---|
| Continuous Flashing | R454B refrigerant Leakage fault in indoor unit |

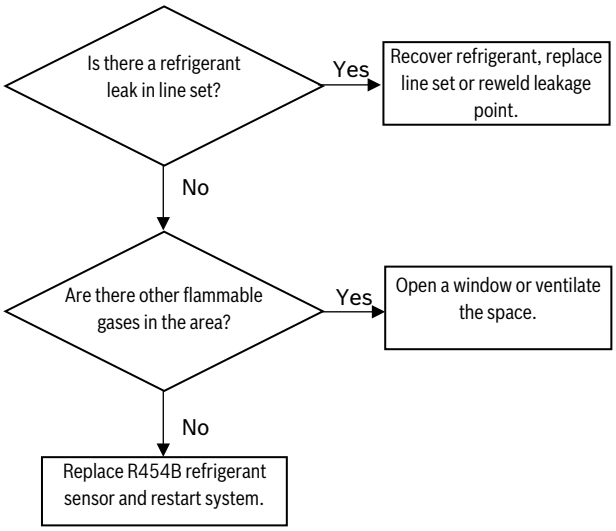



*Figure 70*

| Number of flashes | Description |
|---|---|
| 1 | Indoor unit T1 sensor fault |

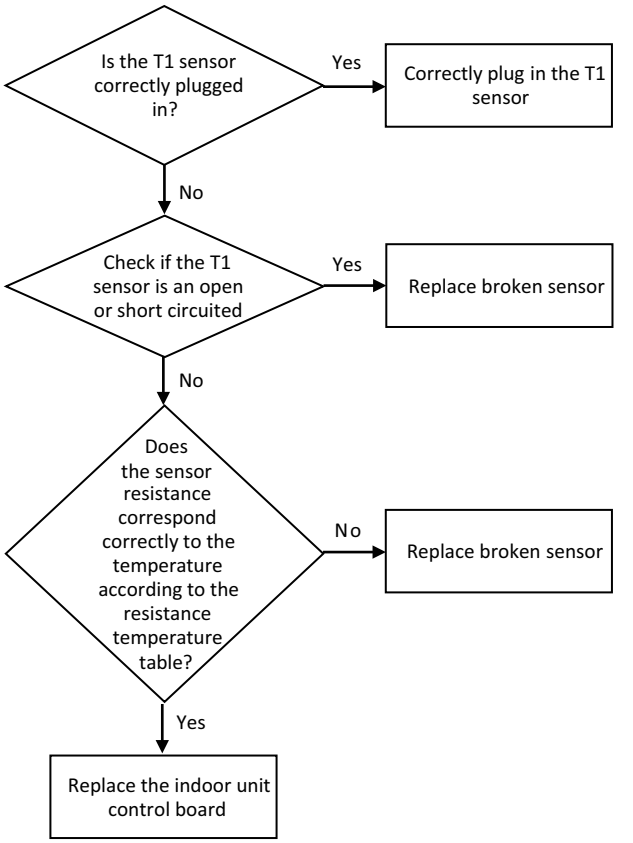



*Figure 71*

| Number of flashes | Description |
|---|---|
| 2 | Indoor unit T2 sensor fault |

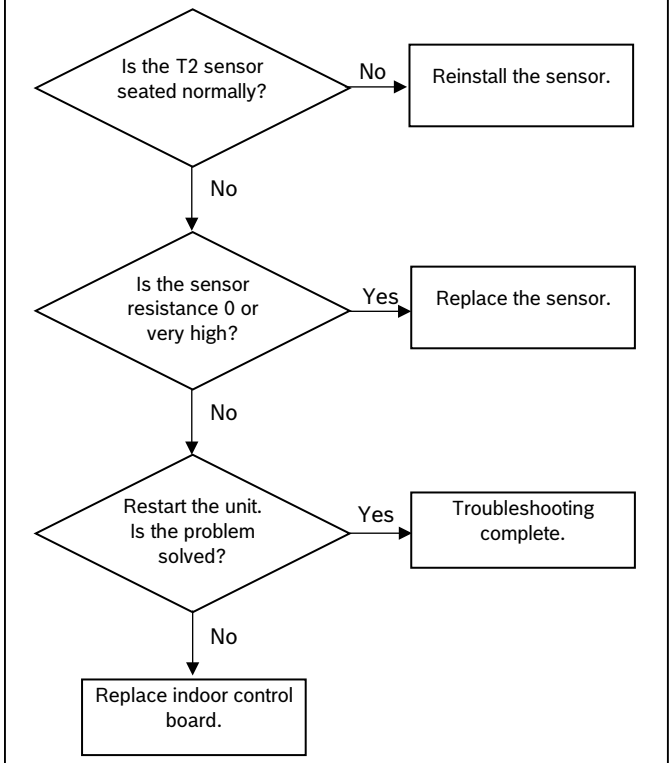



*Figure 72*

| Number of flashes | Description |
|---|---|
| 3 | Indoor unit A2L refrigerant sensor fault |

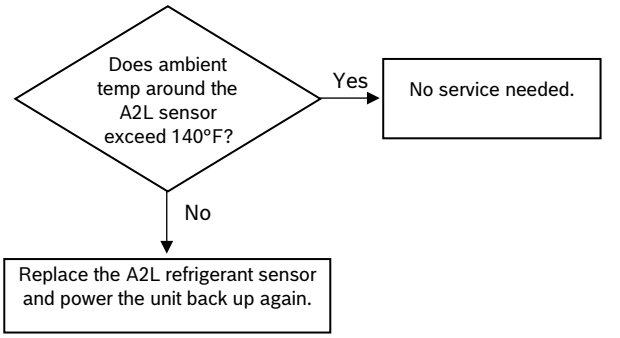



*Figure 73*

| Number of flashes | Description (Sensor) |
|---|---|
| 4 | Indoor unit A2L refrigerant sensor communication fault |

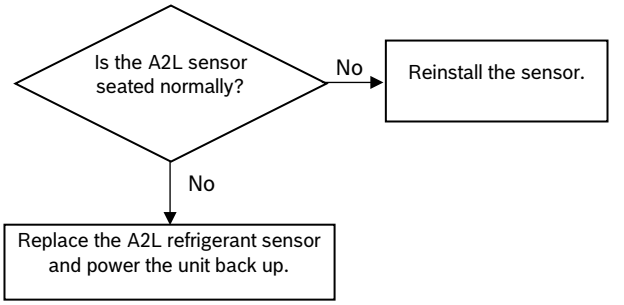



*Figure 74*

| Number of flashes | Description |
|---|---|
| 5 | Communication Fault between IDU and ODU |

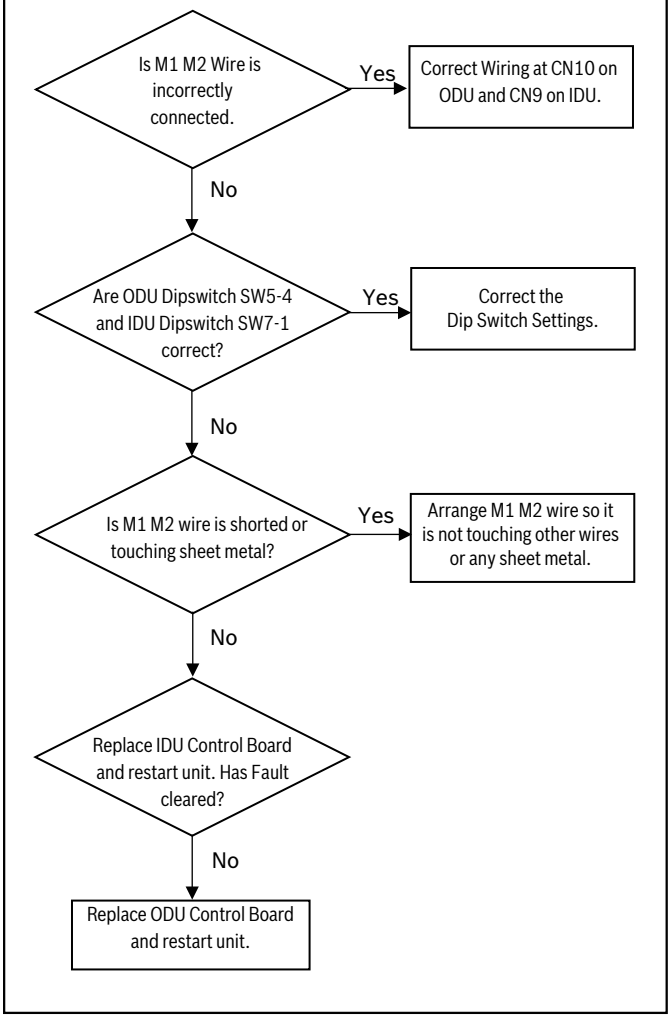



*Figure 75*

| Number of flashes | Description |
|---|---|
| 8 | Indoor unit A2L refrigerant sensor past service life |

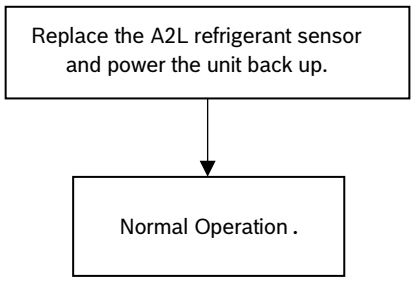



*Figure 76*

| Number of flashes | Description |
|---|---|
| 9 | Dip Switch SW7-2 does not match R454B refrigerant sensor configuration |

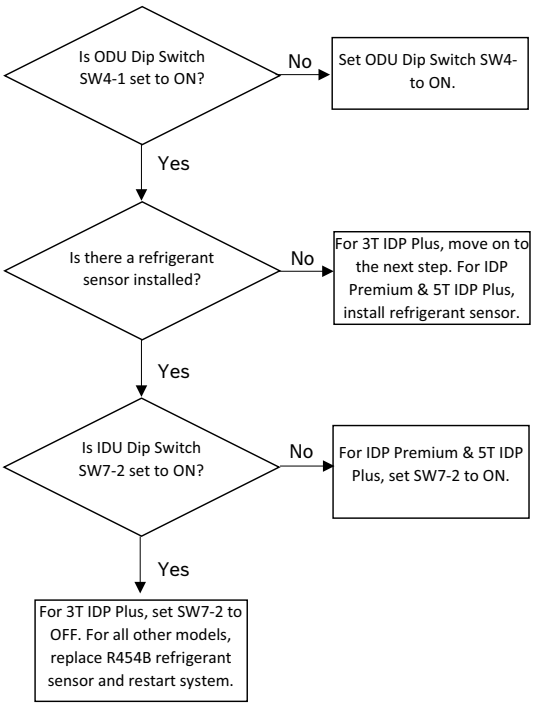



*Figure 77*

### 13.15 Temperature and Resistance Relationship Tables (for Sensors T2,T3,T3L,T4,Th)

| Temperature - °F | Temperature - °C | Resistance - kΩ |
|---|---|---|
| -20 | -28.89 | 218.11 |
| -15 | -26.11 | 154.74 |
| -10 | -23.33 | 129.74 |
| -5 | -20.56 | 107.73 |
| 0 | -17.78 | 99.54 |
| 10 | -12.22 | 71.80 |
| 20 | -6.67 | 49.65 |
| 30 | -1.11 | 36.71 |
| 40 | 4.44 | 27.39 |
| 50 | 10.00 | 20.61 |
| 60 | 15.56 | 15.65 |
| 70 | 21.11 | 11.99 |
| 80 | 26.67 | 9.27 |
| 90 | 32.22 | 7.23 |
| 100 | 37.78 | 5.68 |
| 110 | 43.33 | 4.51 |
| 120 | 48.89 | 3.61 |
| 130 | 54.44 | 2.90 |
| 140 | 60.00 | 2.35 |
| 150 | 65.67 | 1.91 |
| 160 | 71.11 | 1.57 |
| 170 | 76.67 | 1.28 |
| 180 | 82.22 | 1.00 |
| 190 | 87.78 | 0.91 |
| 200 | 93.33 | 0.76 |
| 210 | 98.89 | 0.65 |
| 220 | 104.44 | 0.56 |

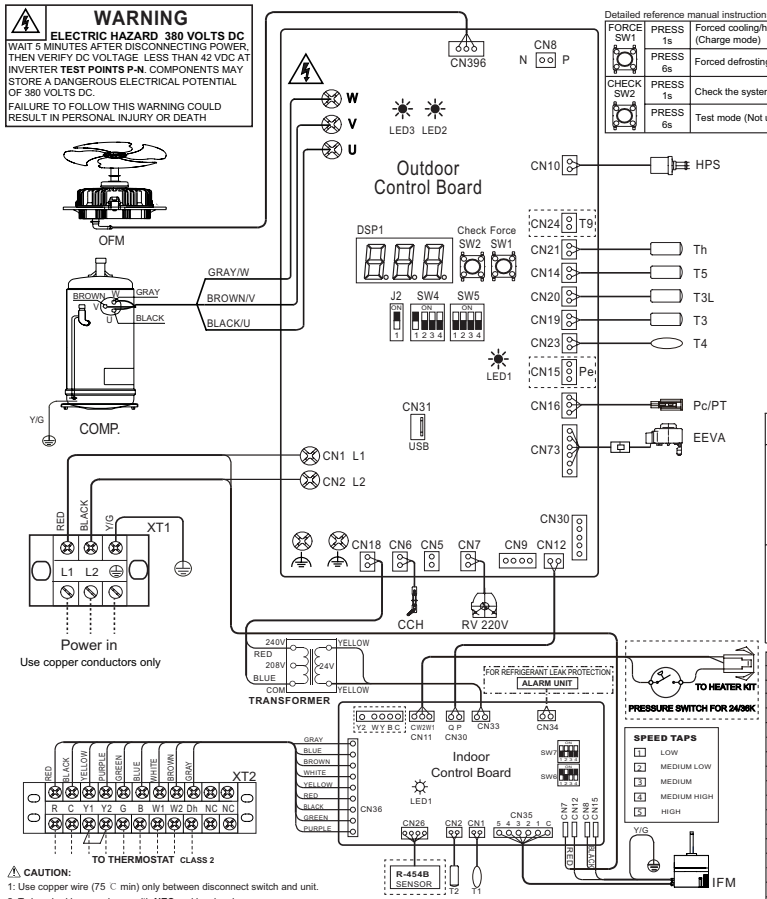
*Table 32*

### 13.16 Temperature and Resistance Relationship Tables (for T5)

| Temperature - °F | Temperature - °C | Resistance (kΩ) |
|---|---|---|
| -20 | -28.89 | 862.00 |
| -15 | -26.11 | 725.82 |
| -10 | -23.33 | 612.41 |
| -5 | -20.56 | 600.13 |
| 0 | -17.78 | 505.55 |
| 10 | -12.22 | 362.74 |
| 20 | -6.67 | 265.40 |
| 30 | -1.11 | 195.60 |
| 40 | 4.44 | 146.70 |
| 50 | 10.00 | 110.71 |
| 60 | 15.56 | 84.47 |
| 70 | 21.11 | 65.41 |
| 80 | 26.67 | 50.90 |
| 90 | 32.22 | 40.15 |
| 100 | 37.78 | 31.81 |
| 110 | 43.33 | 25.51 |
| 120 | 48.89 | 20.53 |
| 130 | 54.44 | 16.71 |
| 140 | 60.00 | 13.64 |
| 150 | 65.67 | 11.21 |
| 160 | 71.11 | 9.31 |
| 170 | 76.67 | 7.75 |
| 180 | 82.22 | 6.50 |
| 190 | 87.78 | 5.47 |
| 200 | 93.33 | 4.65 |
| 210 | 98.89 | 3.95 |
| 220 | 104.44 | 3.38 |

*Table 33*

## 13.17 Wiring Diagram




Detailed reference manual instructions

| | | |
|---|---|---|
| FORCE SW1 | PRESS 1s | Forced cooling/heating (Charge mode) |
| | PRESS 6s | Forced defrosting |
| CHECK SW2 | PRESS 1s | Check the system parameters |
| | PRESS 6s | Test mode (Not used) |

* The factory default

J2 Set capacity: ON 1 OFF — For 36/60K model *; For 24/48K model

| | | |
|---|---|---|
| SW4-1 | ON | Must be set at ON position * |
| | OFF | Unused |
| SW4-2 | ON | Decelerate cooling/heating |
| | OFF | Normal * |
| SW4-3 | ON | Unused |
| | OFF | Normal * |
| SW4-4 | ON | Accelerated cooling/heating |
| | OFF | Normal * |
| SW5-1 | ON | Heating time reduced 10% |
| | OFF | Normal * |
| SW5-2 | ON | Defrosting extended for 120 seconds |
| | OFF | Normal * |
| SW5-3 | ON | Unused |
| | OFF | Normal * |
| SW5-4 | ON | Unused |
| | OFF | Unused * |

| | | |
|---|---|---|
| LED1 GREEN | Solid ON | Main board powered on |
| | OFF | Power off |
| LED2 RED | Solid ON | Compressor running |
| | 2s ON 2s OFF | Standby |
| | 0.2s ON 0.2s OFF | Communication fault with main control chip |
| | Blink | Driver fault |
| | OFF | Power off |
| LED3 RED | Solid ON | Fan running |
| | 2s ON 2s OFF | Standby |
| | 0.2s ON 0.2s OFF | Communication fault with main control chip |
| | Blink | Driver fault |
| | OFF | Power off |

| CODE | Fault description |
|---|---|
| AtL | Ambient Temperature Limited(T4) |
| b1 | Temperature sensor fault in indoor unit (T1) |
| b2 | Temperature sensor fault in indoor unit (T2) |
| b3 | R-454B refrigerant sensor fault in indoor unit |
| b4 | R-454B refrigerant sensor communication fault in indoor unit |
| b5 | Communication fault between indoor unit and outdoor unit |
| b7 | R-454B refrigerant leakage protection in indoor unit |
| b8 | R-454B refrigerant sensor over service life in indoor unit |
| b9 | (SW7-2) does not match R-454B refrigerant sensor |
| C3 | The coil sensor is seated fault in cooling (T3) |
| E41 | Temperature sensor fault（T3） |
| E42 | Temperature sensor fault（T3L） |
| E43 | Temperature sensor fault（T4） |
| E44 | Temperature sensor fault（T5） |
| E45 | Temperature sensor fault（Th） |
| E51 | Outdoor unit high/low input voltage protection |
| E52 | Outdoor unit high/low DC bus voltage protection |
| E7 | Compressor discharge sensor is seated fault (T5) |
| E81 | EEVA coil fault |
| EA | Control program does not match drive program in outdoor unit |
| Eb | Outdoor unit（SW4-1） does not match indoor unit |
| F1 | High pressure switch protection (HPS) |
| F2 | 5 times (P21/o37) protection in 100 minutes, system lockout |
| F4 | Pressure sensor fault |
| H01 | Drive chip Communication fault in outdoor unit |
| J00-JCF | Compressor drive fault |
| n00-nCF | Fan drive fault |
| o37 | Lack of refrigerant |
| P0 | Compressor IPM temperature protection(TF) |
| P1 | High pressure switch protection (HPS) |
| P11 | High pressure protection in heating (PT) |
| P21 | Low pressure protection in cooling (PT) |
| P31 | Outdoor unit input over current protection |
| P32 | Compressor over current protection |
| P4 | High compressor discharge temperature protection (T5) |
| P5 | Condensor coil temperature protection in cooling (T3) |
| PF | Evaporator freezing protection |
| PH | Low discharge superheat protection |

| CODE | Description |
|---|---|
| ⊢ | Forced operation mode |
| " (top) | Running indication under high pressure |
| _ (bottom) | Running indication under low pressure |
| A | Running indication under return oil mode |
| C | Running indication under current limited condition |
| d | Running indication under T5 limited condition |
| F | Running indication under COMP. IPM Temp. limited condition |
| r | Running indication under compressor ratio limited condition |
| U | Running indication under low voltage limited condition |
| dF | Running indication under defrost mode |

⚠ **CAUTION:**

1: Use copper wire (75 ℃ min) only between disconnect switch and unit.

2: To be wired in accordance with **NEC** and local codes.

3: If any of the original wires, as supplied, must be replaced. Use the same or equivalent type wires.

4: If the input voltage is 208 V, please change the transformer tap by taking the red wire to **208V** terminal.

5: When using two-stage thermostat,remove the wire between Y1 and Y2.

6: The rated operating condition of **ALARM** is 24 VAC/1A or 30 VDC/1A or 250 VAC/1A. Please refer to the manual for wiring methods.

| | DIP SWITCH | | Y1 OR G (MIN) | Y1+Y2 OR W1/W2(MAX) |
|---|---|---|---|---|
| SW6-1,2 FAN SPEED TAPS | 24/48K | COOL | 1 | 2 |
| | | HEAT | 1 | 3 |
| | 36/60K | COOL | 1 | 3 |
| | | HEAT | 2 | 4 |
| | 24/48K | COOL | 2 | 4 |
| | | HEAT | 3 | 5 |
| | 36/60K | COOL | 3 | 5 |
| | | HEAT | 3 | 5 |
| SW6-3 | ANTI-COOLAIR * | | | |
| | NON-ANTI-COOLAIR | | | |
| SW6-4 | AUTO FAN CONTROL * | | | |
| | TWO STAGE FAN CONTROL | | | |
| SW7-1 | UNUSED | | | |
| | UNUSED * | | | |
| SW7-2 | R-454B REFRIGERANT SENSOR | | | |
| | NON-R-454B REFRIGERANT SENSOR | | | |
| SW7-3 SW7-4 | UNUSED * | | | |

| | |
|---|---|
| HPS | High pressure switch |
| Pc/PT | High pressure sensor |
| T1 | Inlet airflow temp. sensor |
| T2 | Indoor unit coil temp. sensor |
| T3 | Outdoor coil temp. sensor |
| T3L | Outdoor coil outlet temp. sensor |
| T4 | Ambient temp. sensor |
| T5 | Comp. discharge temp. sensor |
| Th | Comp. suction temp. sensor |
| EEVA | A electronic expansion valve |
| RV | Reversing valve |
| CCH | Compressor crankcase heating |
| IFM | Indoor fan motor |
| OFM | Outdoor fan motor |
| COMP. | Compressor |
| Temp. | Temperature |
| T9 | Reserved |

| INDOOR CONTROL BOARD LED1 | CONTENT |
|---|---|
| STEADY ON | NORMAL OPERATION |
| OFF | POWER SUPPLY FAILURE |
| KEEP FLASHING | REFRIGERANT LEAK PROTECTION |
| 1 FLASH/CYCLE | TEMPERATURE SENSOR FAULT (T1) |
| 2 FLASH/CYCLE | TEMPERATURE SENSOR FAULT (T2) |
| 3 FLASH/CYCLE | R-454B REFRIGERANT SENSOR FAULT |
| 4 FLASH/CYCLE | R-454B REFRIGERANT SENSOR COMMUNICATION FAULT |
| 5 FLASH/CYCLE | COMMUNICATION FAULT BETWEEN IDU AND ODU |
| 8 FLASH/CYCLE | R-454B REFRIGERANT SENSOR OVER SERVICE LIFE |
| 9 FLASH/CYCLE | (SW7-2) DOES NOT MATCH R-454B REFRIGERANT SENSOR |

| Number | Point check content |
|---|---|
| 0 | Outdoor unit capacity: RH5=Heat pump 5 ton |
| 1 | Outdoor unit mode: 0-standby,2-cooling,3-heating |
| 2 | Outdoor unit set compressor speed |
| 3 | System last fault code |
| 4 | T3:outdoor coil temp. (°F) |
| 5 | T3L: outdoor coil outlet temp. (°F) |
| 6 | T4:outdoor ambient temp. (°F) |
| 7 | T5:compressor discharge temp. (°F) |
| 8 | Th:compressor suction temp. (°F) |
| 9 | TF:compressor IPM temp. (°F) |
| 10 | Pe:evaporating pressure (psig) |
| 11 | Pc:condensing pressure (psig) |
| 12 | Tes:target evaporating temp. (°F) (only for cooling mode) |
| 13 | Te:evaporating temp. (°F) |
| 14 | Tcs:target condensing temp. (°F) (only for heating mode) |
| 15 | Tc:condensing temp. (°F) |
| 16 | Target value of the compressor discharge superheat (°F) (only for heating mode) |
| 17 | Compressor discharge superheat (°F) |
| 18 | Compressor suction superheat (°F) |
| 19 | Openings of EEVA (P) |
| 20 | Fan speed stage |
| 21 | Outdoor unit fan current (A) |
| 22 | Compressor current (A) |
| 23 | Outdoor unit input current (A) |
| 24 | Outdoor unit input voltage (V) |
| 25 | Outdoor unit DC bus voltage (V) |
| 26 | Outdoor unit power (0.1kW) |
| 27 | Continuous running time of the compressor(min) |
| 28 | Outdoor unit main control software version |
| 29 | Indoor unit Heat Kit Stage |
| 30 | T1: inlet airflow temp. (°F) |
| 31 | T2: indoor unit coil temp. (°F) |
| 32 | Indoor unit software version |
| 33 | Reserved |
| 34 | Reserved |
| 35 | Remark"--" |

*Figure 78*

# 14 Maintenance

For continuing high performance and to minimize possible equipment failure, periodic maintenance must be performed on this equipment.

## 14.1 Cleaning Precautions

**WARNING**

Any unit repairs must be performed by qualified service personnel only.

**WARNING**

**Electrical shock!**

Always turn off your heat pump and disconnect its power supply before cleaning or maintenance.

**CAUTION**

When removing filter, do not touch metal parts in the unit. The sharp metal edges can cut you.

***NOTICE***

- Do not use chemicals or chemically treated cloths to clean the unit.
- Do not use benzene, paint thinner, polishing powder or other solvents to clean the unit.
- Do not operate the system without a filter in place.

## 14.2 Regular Maintenance

Your heat pump must be inspected regularly by a qualified service technician.

1. Inspect the air filter every ninety days or as often as needed. If blocked or obstructed, clean or replace at once.

**Your annual system inspection must include:**

2. Inspection and/or cleaning of the blower wheel housing and motor.
3. Inspection and cleaning of indoor and outdoor coils as required.
4. Inspection and/or cleaning of the indoor coil drain pan and drain lines, as well as auxiliary drain pan and lines.
5. Check all electrical wiring and connections. Correct as needed, referring to the wiring diagram. (Refer to Figure 78).

# 15 Disposal

**WARNING**

**Disposal!**

Disposal of unit or components must be performed by qualified service personnel only.

Components and units must be properly disposed in accordance with federal or local regulations.

Components and accessories from the units are not part of ordinary domestic waste.

Complete units, compressors, motors etc. are only to be disposed of via qualified disposal specialists.

This unit uses hydrogen fluorocarbons. Please contact the dealer when you want to dispose of this unit. Law requires that the collection, transportation and disposal of refrigerants must conform with the regulations governing the collection and destruction of hydrofluorocarbons.

**BHC Group Heating & Cooling**
**5005 York Drive**
**Norman, OK 73069**

**BTC 911003201 A / 02.2026**

**BHC Group Heating & Cooling reserves the right to make changes without notice due to continuing engineering and technological advances.**

**French Version: Scan the QR code on the unit to access the complete library of documents, including those available in French.**

**Version française: Scannez le code QR sur l'unité pour accéder à toute la documentation, y compris les documents disponibles en français.**