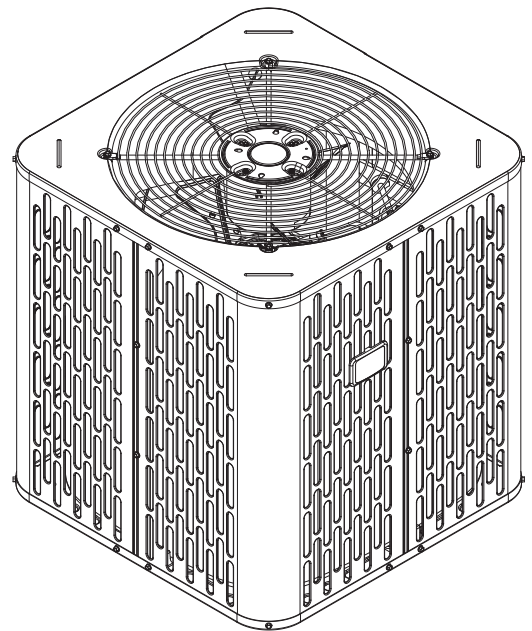


# Installation, Operation, and Maintenance

## Condensing Units

A5AC3018B  
A5AC3024B  
A5AC3030B  
A5AC3036B  
A5AC3042B  
A5AC3048B  
A5AC3060B



*Note: Graphics in this document are for representation only.  
Actual model may differ in appearance.*

### **⚠ SAFETY WARNING**

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

# Introduction

Read this manual thoroughly before operating or servicing this unit.

This document is customer property and is to remain with this unit. Return to the service information pack upon completion of work.

## Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:



### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



### CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.

### NOTICE

Indicates a situation that could result in equipment or property-damage only accidents.

## Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

## Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

## ⚠ WARNING

### Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

## ⚠ WARNING

### Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury.

Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER** **PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

**⚠ WARNING****Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

**⚠ WARNING****Cancer and Reproductive Harm!**

This product can expose you to chemicals, including lead, 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](http://www.P65Warnings.ca.gov).

**⚠ WARNING****Safety Hazard!**

Failure to follow instructions below could result in death or serious injury or property damage.

This unit is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

Do not allow children to play or climb on the unit or to clean or maintain the unit without supervision.

**⚠ WARNING****Safety Hazard!**

Failure to follow instructions below could result in death or serious injury and/or property damage. Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

**⚠ WARNING****Risk of Fire — Flammable Refrigerant!**

Failure to follow instructions below could result in death or serious injury, and equipment damage.

- To be repaired only by trained service personnel.
- Do not puncture refrigerant tubing.
- Dispose of properly in accordance with federal or local regulations.

**⚠ WARNING****Safety Hazard!**

Failure to follow instructions below could result in death or serious injury and/or property damage.

Only qualified personnel with adequate electrical and mechanical experience must repair the unit. The manufacturer or seller is not responsible for any interpretation or resulting liability.

**⚠ WARNING****System Charge!**

Failure to follow instructions below could result in abrupt release of system charge and could result in serious injury or property damage.

When opening the suction and liquid line service valve, turn the valve stem counterclockwise only until the stem contacts the rolled edge. Do not apply torque.

**⚠ WARNING****Ventilation Required!**

Failure to follow instructions below could result in death or serious injury or property damage.

Confirm the area is adequately ventilated before breaking into the system or conducting any hot work.

**⚠ WARNING****Safety Hazard!**

Failure to follow instructions below could result in death or serious injury and equipment or property damage.

- Do not use any items other than those approved by the manufacturer for the defrosting or cleaning process.
- Do not pierce or burn.
- Be cautious that refrigerants may be odorless.

### **⚠ WARNING**

#### **Live Electrical Components!**

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

### **⚠ CAUTION**

#### **Brazed Joints!**

Failure to follow instructions below could result in minor to moderate injury or equipment damage.

When using existing refrigerant lines, verify all joints are brazed and not soldered.

### **⚠ CAUTION**

#### **Hot Surface!**

Failure to follow instructions below could result in minor to severe burns.

**Do not touch top of compressor. It may be hot.**

### **⚠ CAUTION**

#### **Unit Contains R-454B Refrigerant!**

Failure to use proper service tools may result in equipment damage or personal injury.

Use only R-454B refrigerant and approved compressor oil.

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## Trademark

All trademarks referenced in this document are the trademarks of their respective owners.

## Revision History

Added figures for single-stage HP with A5AHV and single-stage HP with A5AHC to the Low Voltage Connection Diagrams section of the Electrical chapter.

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# Pre-Installation

## General

### WARNING

#### **Safety Hazard!**

Failure to follow instructions below could result in death or serious injury and/or property damage. Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

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#### **Risk of Fire — Flammable Refrigerant!**

Failure to follow instructions below could result in death or serious injury, and equipment damage.

- To be repaired only by trained service personnel.
- Do not puncture refrigerant tubing.
- Dispose of properly in accordance with federal or local regulations.

### WARNING

#### **Safety Hazard!**

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### CAUTION

#### **Unit Contains R-454B Refrigerant!**

Failure to use proper service tools may result in equipment damage or personal injury. Use only R-454B refrigerant and approved compressor oil.

### WARNING

#### **System Charge!**

Failure to follow instructions below could result in abrupt release of system charge and could result in serious injury or property damage. When opening the suction and liquid line service valve, turn the valve stem counterclockwise only until the stem contacts the rolled edge. Do not apply torque.

### WARNING

#### **Ventilation Required!**

Failure to follow instructions below could result in death or serious injury or property damage. Confirm the area is adequately ventilated before breaking into the system or conducting any hot work.

### WARNING

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Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

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### CAUTION

#### **Brazed Joints!**

Failure to follow instructions below could result in minor to moderate injury or equipment damage. When using existing refrigerant lines, verify all joints are brazed and not soldered.

### CAUTION

#### **Hot Surface!**

Failure to follow instructions below could result in minor to severe burns. Do not touch top of compressor. It may be hot.

### WARNING

#### **Cancer and Reproductive Harm!**

This product can expose you to chemicals, including lead, 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](http://www.P65Warnings.ca.gov).

**⚠ WARNING****Ventilation Required!**

Failure to follow instructions below could result in death or serious injury or property damage. Confirm the area is adequately ventilated before breaking into the system or conducting any hot work.

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

**Operating Range****Table 1. Operating range**

| Mode    | Model       | Operating Range |
|---------|-------------|-----------------|
| Cooling | 1.5 – 5 Ton | 55°F – 120°F    |

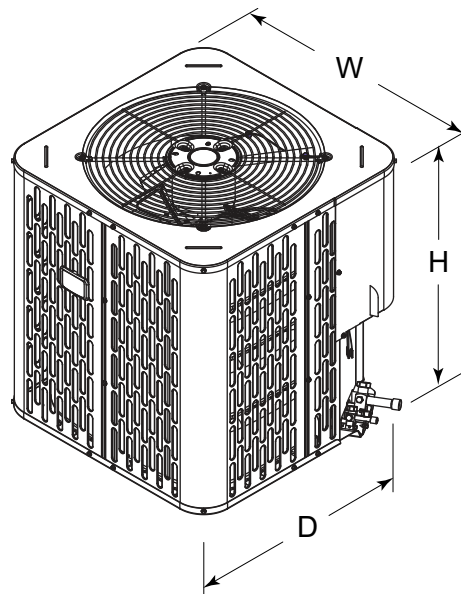
**Unit Location Considerations****Unit Dimensions and Weight****Table 2. Unit dimensions and weight**

| Models    | H x D x W (in.) | Weight (lb) <sup>(a)</sup> |
|-----------|-----------------|----------------------------|
| A5AC3018B | 29 x 24 x 24    | 130                        |
| A5AC3024B | 29 x 24 x 24    | 130                        |
| A5AC3030B | 29 x 24 x 24    | 130                        |
| A5AC3036B | 29 x 26 x 26    | 134                        |
| A5AC3042B | 29 x 30 x 30    | 144                        |
| A5AC3048B | 29 x 30 x 30    | 161                        |
| A5AC3060B | 29 x 34 x 34    | 161                        |

<sup>(a)</sup> Weight values are estimated uncrated.

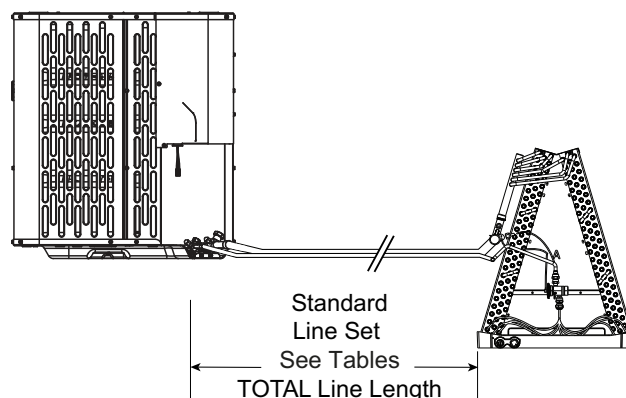
When mounting the outdoor unit on a roof, be sure the roof will support the unit's weight.

Properly selected isolation is recommended to alleviate sound or vibration transmission to the building structure.

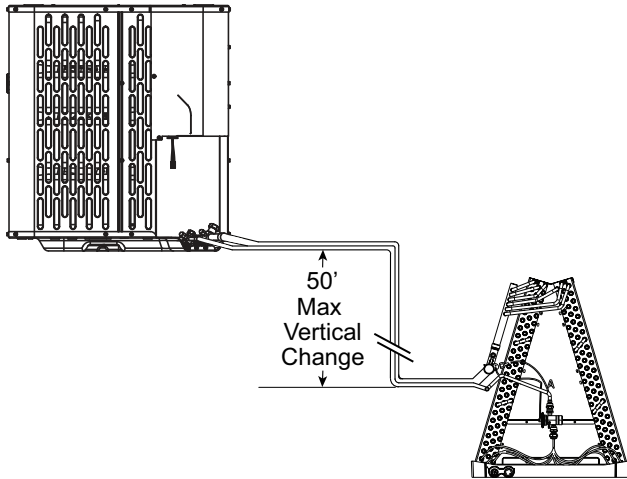
**Figure 1. Unit dimensions****Refrigerant Piping Limits**

- The maximum total length of refrigerant lines from outdoor to indoor unit should not exceed 150 feet (including lift).
- The maximum vertical change should not exceed 50 feet.
- Service valve connection diameters are shown in [Table 3, p. 9](#).

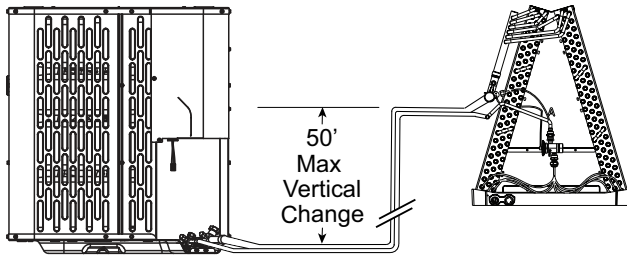
**Note:** For other line lengths, see the *Refrigerant Piping — Application Guide, (SS-APG006\*-EN)* or *Refrigerant Piping Software Program*.

**Figure 2. Refrigerant total line length limit**

**Figure 3. Refrigerant piping vertical change limit**



**Figure 4. Refrigerant piping vertical change limit**



## High Voltage

### High Voltage Power Supply

#### ⚠ WARNING

##### Live Electrical Components!

Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

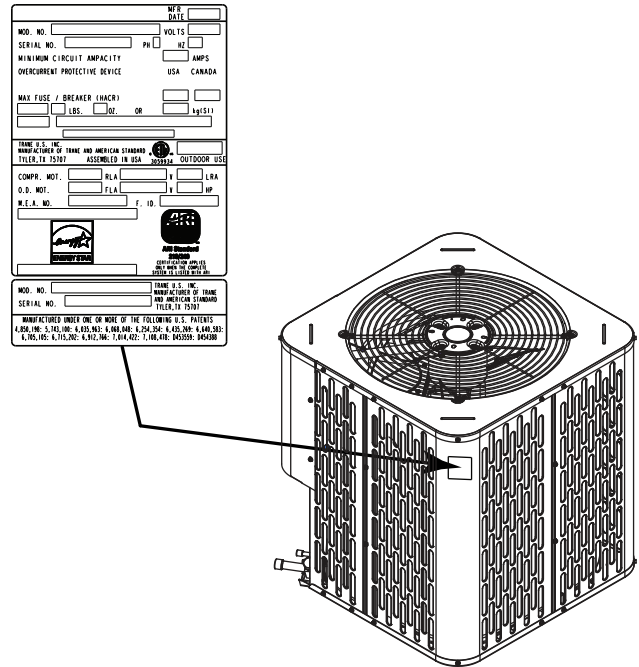
When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

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

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

Follow instructions on unit wiring diagram located on the inside of the control box cover and in the Installation, Operation, and Maintenance (IOM) document included with the unit.

**Figure 5. Nameplate location**



## High Voltage Disconnect Switch

Install a separate disconnect switch at the outdoor unit.

For high voltage connections, flexible electrical conduct is recommended whenever vibration transmission may create a noise problem within the structure.

## High Voltage Ground

Ground the outdoor unit per National, State, and Local code requirements.

#### ⚠ WARNING

##### Safety Hazard!

Failure to follow instructions below could result in death or serious injury, and property damage.

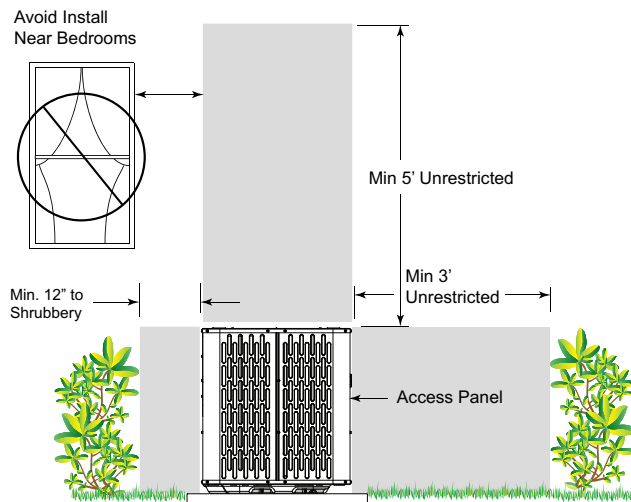
Confirm the cabling is protected from wear and tear, corrosion, excessive pressure, vibration, sharp edges, and any other adverse environmental effects.

## Suggested Locations for Best Reliability

- Confirm the top discharge area is unrestricted for at least five feet above the unit.
- Three feet clearance must be provided in front of the control box (access panels) and any other side requiring service.
- Avoid installing the unit in areas where operating noise may disturb occupants, such as sleeping quarters or living-area windows. Confirm the installation location with the building owner before proceeding.

- Avoid installing the unit near windows where condensation or defrost vapor may create a nuisance for occupants.
- Position the outdoor unit a minimum of 12 inches from any wall or surrounding shrubbery to ensure adequate airflow.
- Place the outdoor unit far enough from any structure to prevent excess roof runoff or icicles from falling directly onto it.

**Figure 6. Suggested locations for best reliability**



## Unit Preparation

### Prepare the Unit for Installation

Inspect the unit for damage and promptly report any damage to the carrier.

## Setting the Unit

### Pad Installation

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

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

For other applications refer to application guide.

## Refrigeration

### Refrigerant Line Considerations

**Table 3. Refrigerant line and service valve connection sizes**

| Model     | Rated Line Sizes (in.) |             | Service Valve Connection Sizes (in.) |                        |
|-----------|------------------------|-------------|--------------------------------------|------------------------|
|           | Vapor Line             | Liquid Line | Vapor Line Connection                | Liquid Line Connection |
| A5AC3018B | 3/4                    | 5/16        | 3/4                                  | 5/16                   |
| A5AC3024B | 3/4                    | 5/16        | 3/4                                  | 5/16                   |
| A5AC3030B | 3/4                    | 5/16        | 3/4                                  | 5/16                   |
| A5AC3036B | 3/4                    | 5/16        | 3/4                                  | 5/16                   |
| A5AC3042B | 3/4                    | 5/16        | 3/4                                  | 5/16                   |
| A5AC3048B | 7/8                    | 5/16        | 7/8                                  | 5/16                   |
| A5AC3060B | 1-1/8                  | 3/8         | 7/8                                  | 3/8                    |

**Table 4. Alternate refrigerant line and service valve connection sizes**

| Model     | Alternate Line Sizes (in.) |             | Service Valve Connection Sizes (in.) |                        |
|-----------|----------------------------|-------------|--------------------------------------|------------------------|
|           | Vapor Line                 | Liquid Line | Vapor Line Connection                | Liquid Line Connection |
| A5AC3018B | 5/8                        | 3/8         | 3/4                                  | 5/16                   |
| A5AC3024B | 5/8                        | 3/8         | 3/4                                  | 5/16                   |
| A5AC3030B | 5/8                        | 3/8         | 3/4                                  | 5/16                   |
| A5AC3036B | 5/8                        | 3/8         | 3/4                                  | 5/16                   |
| A5AC3042B | 7/8                        | 3/8         | 3/4                                  | 5/16                   |
| A5AC3048B | 3/4                        | 3/8         | 7/8                                  | 5/16                   |
| A5AC3060B | 7/8                        | 3/8         | 7/8                                  | 3/8                    |

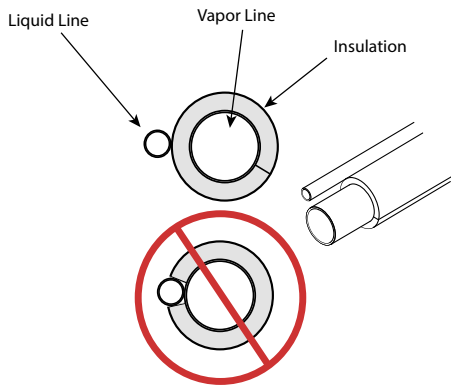
### Factory Charge

The outdoor condensing units are factory charged with the system charge required for the outdoor condensing unit, fifteen (15) ft. of tested connecting line, and the nominal rated indoor evaporative coil match. Always verify proper system charge via subcooling (TXV/EEV) or superheat (fixed orifice) per the unit nameplate.

### Line Insulation

**Important:** The vapor line must always be insulated. Do not allow the liquid line and vapor line to come in direct (metal-to-metal) contact.

**Figure 7. Refrigerant line insulation**



Comply with national, state, and local codes when isolating line sets from joists, rafters, walls, or other structural elements.

For example:

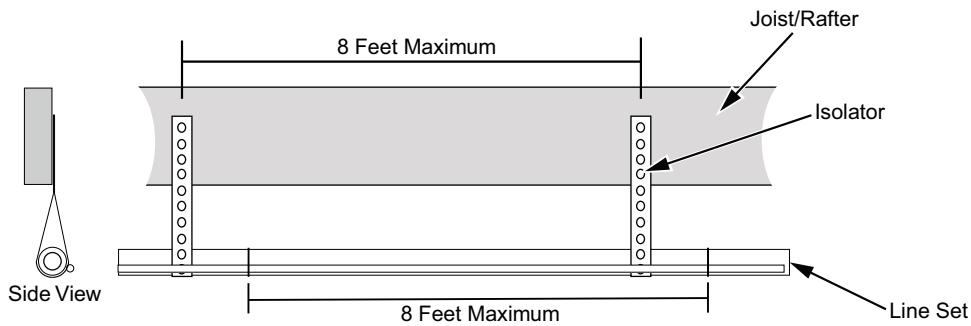
- Use isolation hangers when securing refrigerant lines to floor joists or other structural framing.
- Use isolation hangers when routing refrigerant lines through stud spaces or enclosed ceilings.
- Insulate and isolate refrigerant lines where they pass through walls or sills.
- Isolate the lines from all ductwork.
- Minimize the number of 90° turns.

Secure the vapor line from joists using isolators every 8 feet. Secure the liquid line directly to the vapor line using tape, wire, or other appropriate method every 8 feet.

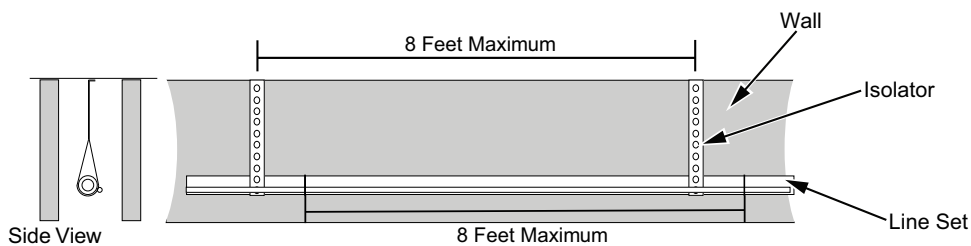
## Line Routing

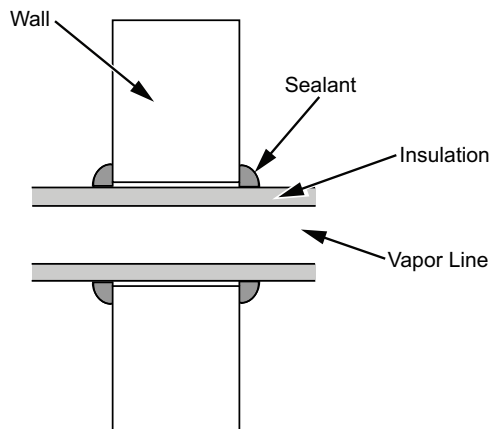
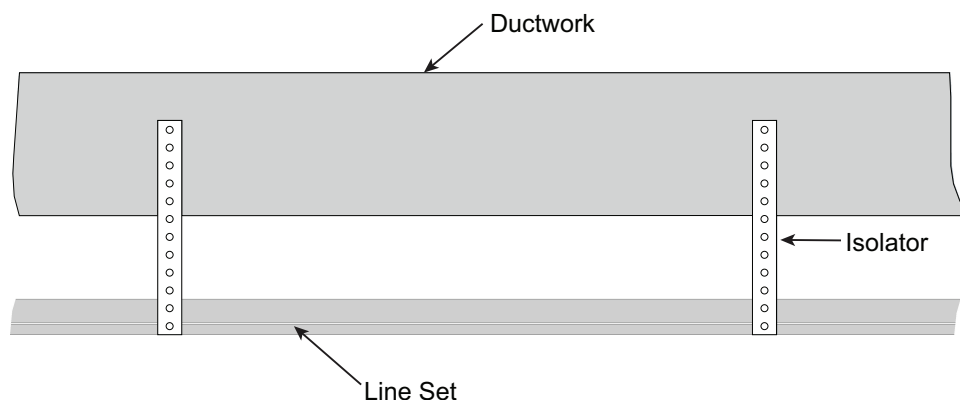
**Important:** Take precautions to prevent noise within the building structure due to vibration transmission from the refrigerant lines.

**Figure 8. Isolation from joist/rafter**



**Figure 9. Isolation in wall spaces**



**Figure 10. Isolation through wall****Figure 11. Incorrect lineset installation**

**Important:** Do not hang linesets from ductwork.

## Line Brazing

1. Remove caps or plugs. Use a deburring tool to deburr the pipe ends. Clean both internal and external surfaces of the tubing using an emery cloth.
2. Remove the pressure tap cap and valve cores from both service valves.
3. Purge the refrigerant lines and indoor coil with dry nitrogen.

**Note:** A2L equipment shall have red marked service ports and pipes through which refrigerant is serviced.

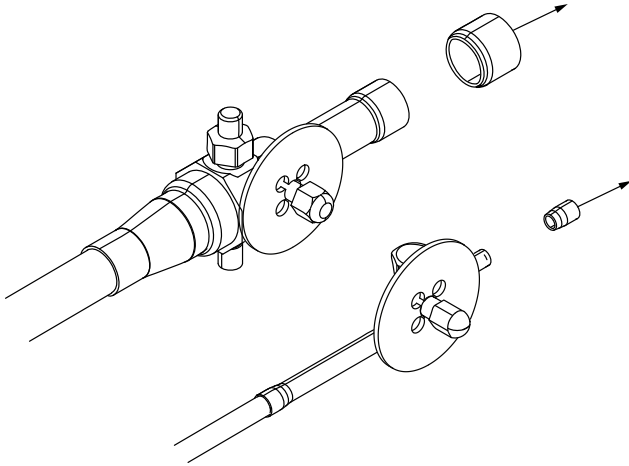
4. Wrap a wet rag around the valve body to avoid heat damage and continue the dry nitrogen purge.
  - a. Braze the refrigerant lines to the service valves.
  - b. For units shipped with a field-installed external drier, check liquid line filter driers directional flow arrow to confirm correct direction of refrigeration flow (away from outdoor unit and toward evaporator coil) as illustrated. Braze the filter drier to the liquid line.
  - c. Continue the dry nitrogen purge. Do not remove the wet rag until all brazing is completed.

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

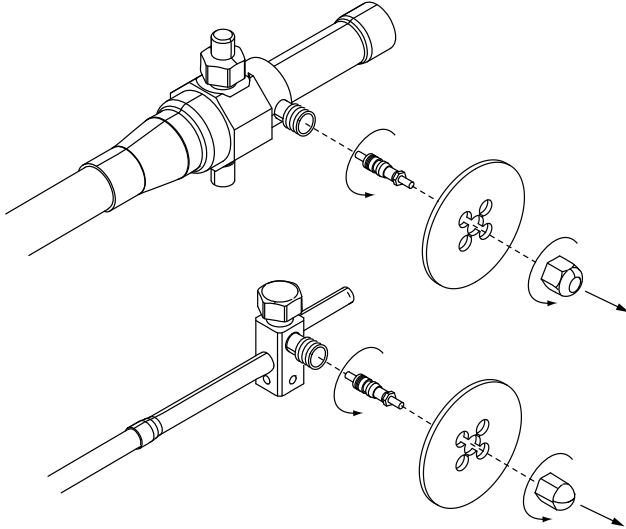
### Notes:

- Install the drier into the liquid line.
  - Precautions should be taken to avoid heat damage to the basepan during brazing. It is recommended to keep the flame directly off the basepan.
5. Replace the pressure tap valve cores and plastic tabs after the service valves have cooled.

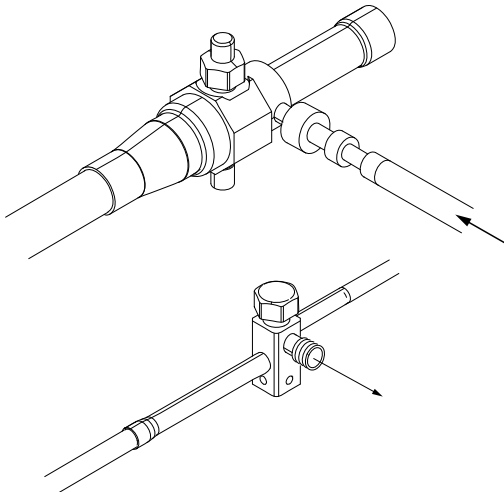
**Figure 12. Removal of caps or plugs from pipe ends**



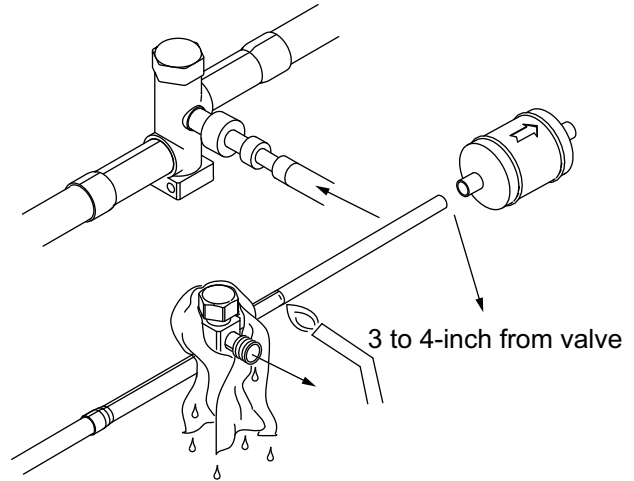
**Figure 13. Removal of pressure cap and valve cores from service valves**



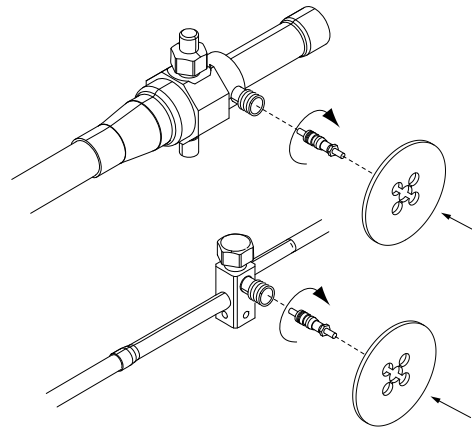
**Figure 14. Purging of refrigerant lines**



**Figure 15. Wrapping of wet rag**



**Figure 16. Re-installation of pressure valve cores and plastic tabs**

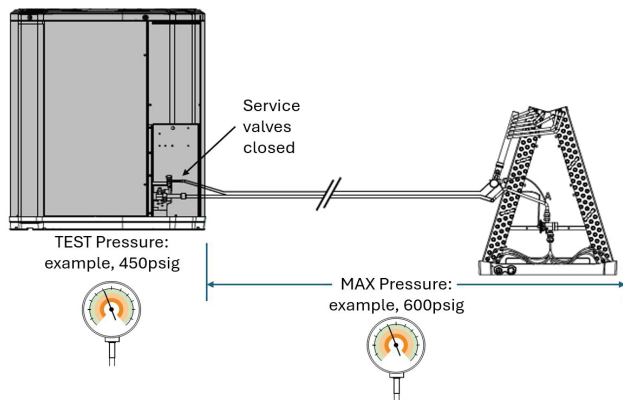


### Line Leak Check

After completing field piping for split system, pressure-test the field pipework with nitrogen, then perform a vacuum test prior to refrigerant charging.

### Important Considerations

- Do not use any ignition sources when searching for or detecting refrigerant leaks.
- The following leak detection methods are acceptable for all refrigerant systems:
  - Electronic leak detectors calibrated for R-454B (with a sensitivity of 5 grams/year).
  - Bubble method.
- Do not test the outdoor unit above 450 psig during service or component replacement. Test the indoor unit and linesets to the maximum pressure listed on the outdoor or indoor unit nameplate. Close the service valves when pressure-testing the evaporator coil and linesets to separate the outdoor unit from the indoor unit.

**Figure 17. Refrigerant line leak check****Final Pressure Check**

1. Use the service valve to isolate the outdoor unit from the evaporator coil and linesets.

2. Pressurize the evaporator coil and linesets to the max pressure listed on the outdoor or indoor unit nameplate for a minimum of 60 minutes.

Do not add additional refrigerant or test gas after reaching the evaporator coil specified pressure.

3. Verify the system maintains full pressure with no loss.
4. Complete the pressure test and proceed with the evacuation procedure.

**Preliminary Pressure Check (Optional)**

1. Use dry nitrogen to pressurize the refrigerant lines and evaporator coil to 150 psig.
2. Check each brazed location for leaks using a soapy solution or bubble test.
3. Remove pressure and repair any leaks before continuing.

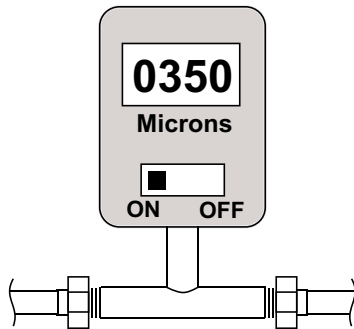
# Evacuation and Servicing

## Evacuate the Refrigerant Lines and Indoor Coil

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

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

**Figure 18. Observe micron gauge reading**



2. Observe the micron gauge. Evacuation is complete if the micron gauge does not rise above 500 microns in one minute.

**Figure 19. Stopwatch**



3. Once evacuation is complete, clear the vacuum pump and micron gauge, then close the valve on the manifold gauge set.

## Servicing

- If repairs are required after the system is charged, safely remove or isolate the refrigerant and purge the section needing repair with nitrogen or oxygen-free nitrogen before opening the circuit.
- The refrigerant charge shall be recovered into the correctly marked recovery cylinders.
- Keep the vacuum pump outlet away from potential ignition sources, and make sure ventilation is available.

- Before recharging the system, pressure-test it with the appropriate purging gas. After charging and before commissioning, perform a leak test. Conduct a follow-up leak test before leaving the site.
- Use only appropriate refrigerant recovery cylinders. Have enough cylinders available to hold the full system charge. Use only cylinders designated and labeled for the recovered refrigerant. Cylinders must include a pressure-relief valve and associated shut-off valves in good working order.
- Have a set of calibrated weighing scales available and in good working order. Use hoses with leak-free disconnect couplings, and keep them in good condition. Confirm that any associated electrical components are sealed.
- Return the recovered refrigerant to the refrigerant supplier in the correct recovery cylinder. Do not mix refrigerants.
- If compressors or compressor oils are removed, evacuate them to an acceptable level to confirm that no A2L refrigerant remains in the lubricant.

## Service Valves

### Open the Gas Service Valve First

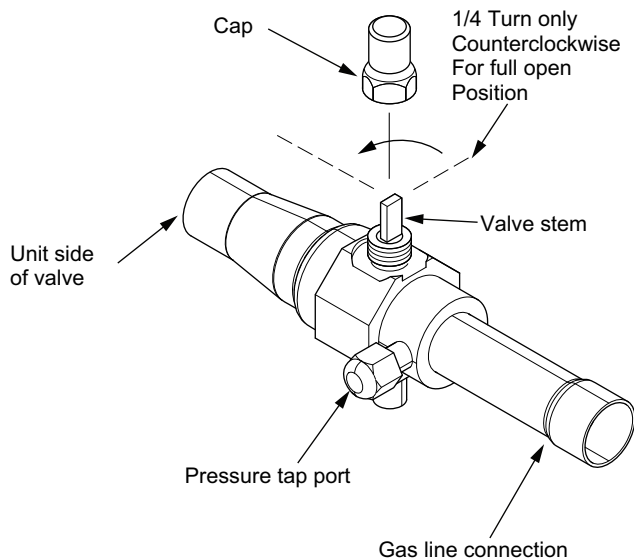
**Important:** Complete the leak check and evacuation must before opening the service valves.

**Note:** Do not vent refrigerant gases into the atmosphere.

1. Remove the valve stem cap.
2. Using an adjustable wrench, turn the valve stem 1/4 turn counterclockwise to the fully open position.
3. Replace the valve stem cap to prevent leaks. Finger-tighten plus an additional 1/6 turn.

**Note:** Service valves may be ball or angle style.

**Figure 20. Gas service valve**



### Open the Liquid Service Valve Second

#### **⚠ WARNING**

#### **System Charge!**

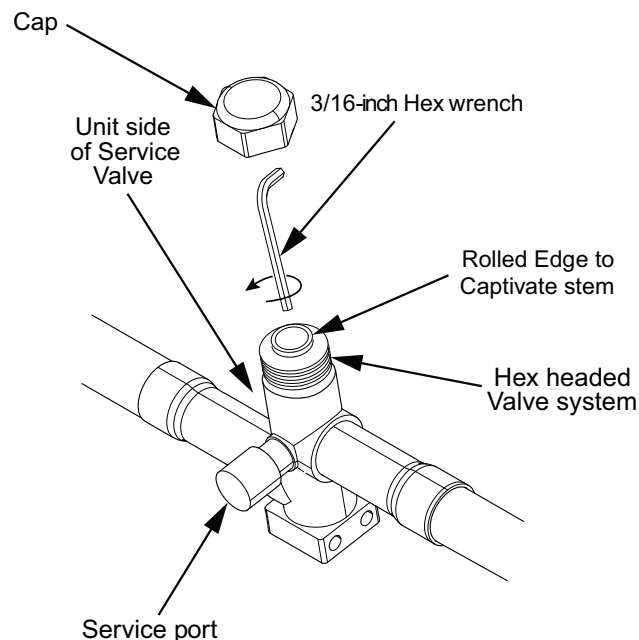
Failure to follow instructions below could result in abrupt release of system charge and could result in serious injury or property damage.

When opening the suction and liquid line service valve, turn the valve stem counterclockwise only until the stem contacts the rolled edge. Do not apply torque.

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

1. Remove the service valve cap.
2. Fully insert a 3/16-inch hex wrench into the stem and back out counterclockwise until the valve stem just touches the rolled edge (approximately five turns).
3. Replace the valve cap to prevent leaks. Finger-tighten plus an additional 1/6 turn.

**Figure 21. Liquid service valve**



# Electrical

## Maximum Wire Length

The following table defines the maximum total length of low voltage wiring from the outdoor unit, to the indoor unit, and to the thermostat.

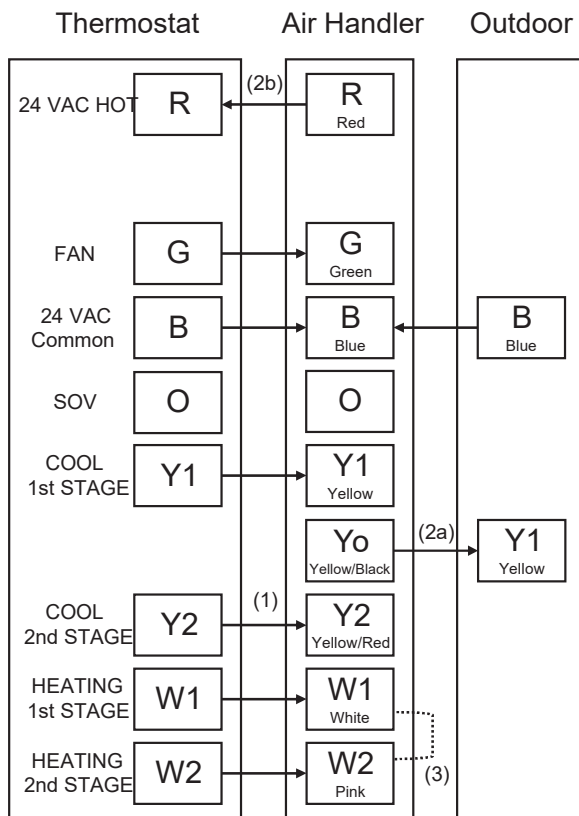
**Table 5. Low voltage maximum wire length**

| 24 Volts  |                           |
|-----------|---------------------------|
| Wire Size | Maximum Wire Length (ft.) |
| 18 AWG    | 150                       |
| 16 AWG    | 225                       |
| 14 AWG    | 300                       |

## Low Voltage Connection Diagrams

Additional sourced indoor air handler or furnaces are available. See the wiring diagram in the sourced air handler or furnace products for connection to outdoor and thermostat.

**Figure 22. Single-stage AC with A5AHC**



1. Separate Y1 and Y2 at the air handler.
2. Condensate switch, float switch, leak detector, etc. installation options:
  - a. Break Y1 to the outdoor so the outdoor shuts down but the indoor blower continues to run.

- b. Break R to the thermostat so the entire system shuts down.

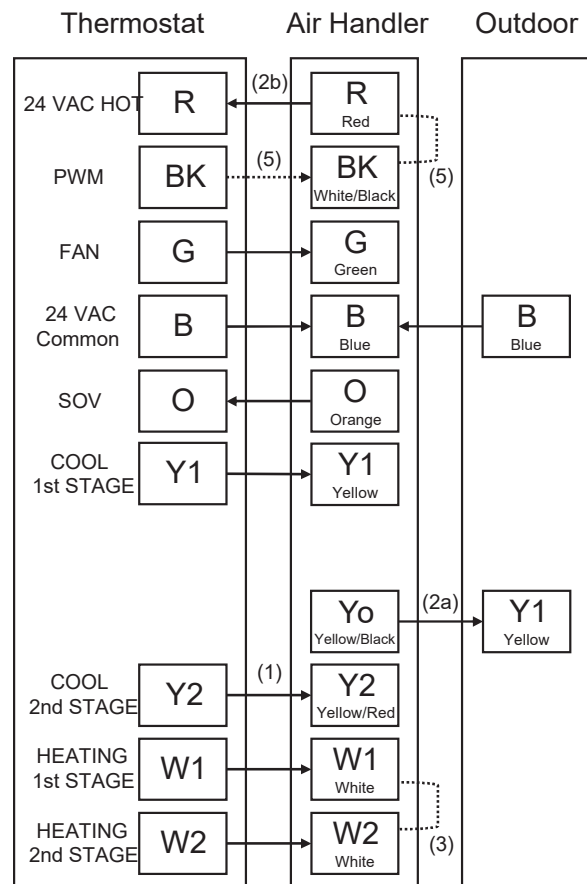
3. If thermostat only has one stage of heat, jumper W1 and W2 together.
4. To achieve rated performance, connect Y2 from the thermostat to the air handler Y2.

### Notes:

- AC models do not require O at the outdoor.
- Use wire nuts for all pigtail connections and cap all unused wires.

Additional sourced indoor air handler or furnaces are available. See the wiring diagram in the sourced air handler or furnace products for connection to outdoor and thermostat.

**Figure 23. Single-stage AC with A5AHV**



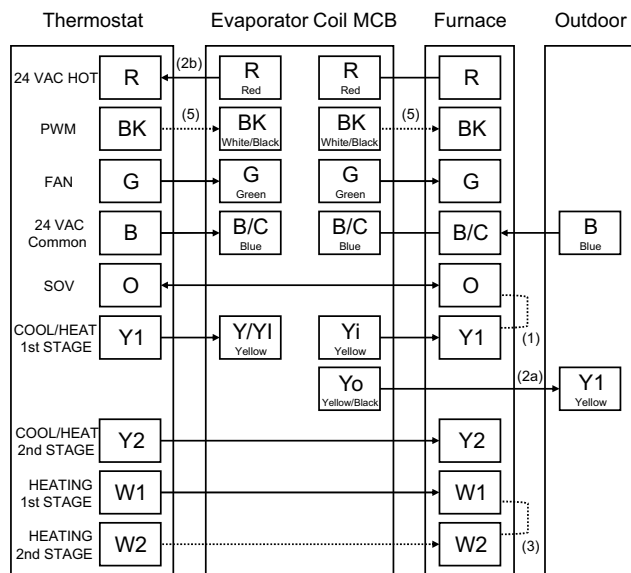
1. Separate Y1 and Y2 at the air handler.
2. Condensate switch, float switch, leak detector, etc. installation options:
  - a. Break Y1 to the outdoor so the outdoor shuts down but the indoor blower continues to run.
  - b. Break R to the thermostat so the entire system shuts down.

3. If thermostat only has one stage of heat, jumper W1 and W2 together.
4. To achieve rated performance, connect Y2 from the thermostat to the air handler Y2.
5. For BK functionality with select Trane thermostats: Separate BK from either R at the fan control board or G at the air handler harness and connect BK.
6. If thermostat only has one stage of heat, jumper W1 and W2 together.

**Notes:**

- *BK dehumidification reduces indoor airflow when active.*
- *Use wire nuts for all pigtail connections and cap all unused wires.*

**Figure 24. Single-stage AC with furnace**



1. Leave jumper for AC only OD system.
2. Condensate switch, float switch, leak detector, etc. installation options:
  - a. Break Y1 to the outdoor so the outdoor shuts down but the indoor blower continues to run.
  - b. Break R to the thermostat so the entire system shuts down.
3. If thermostat only has one stage of heat, jumper W1 and W2 together.
4. To achieve rated performance, connect Y2 from the thermostat to the air handler Y2.
5. For BK functionality with select Trane thermostats: Cut BK jumper at the furnace board and connect BK.

**Notes:**

- *BK dehumidification reduces indoor airflow when active.*
- *AC models do not require O at the outdoor.*
- *Use wire nuts for all pigtail connections and cap all unused wires.*

**Mitigation Board Guidelines**

- The approved ID/OD combination provides sufficient safe ventilation in case of a leak.
- All systems require mitigation boards so an altitude adjustment factor may be required.
- The mitigation control board needs to be included in an A2L System.

# System Start-Up

1. Confirm that all steps from Refrigerant Line Brazing through Electrical – Low Voltage Mitigation Board Guidelines are complete.
2. Turn on the disconnect(s) to power the indoor and outdoor units.
3. If the compressor crankcase heater accessory is used and the outdoor ambient is below 70°F, wait one hour before starting the unit.
4. Set the system thermostat to ON.

# System Charge Adjustment

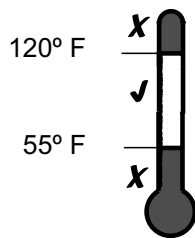
For systems using an indoor piston metering device, refer to the superheat charging method and chart. For systems using a TXV or EEV indoor metering device, refer to the subcool charging method and charts.

## Temperature Measurements

Check the outdoor temperatures.

Use subcooling in cooling mode as the only recommended charging method when the outdoor ambient temperature is above 55°F.

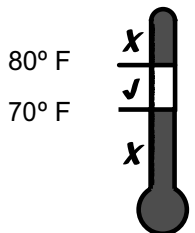
**Figure 25. Outdoor temperature**



**Note:** For Superheat (In Cooling Mode), refer to [Table 10](#), p. 21.

For best results, maintain the indoor temperature between 70°F to 80°F.

**Figure 26. Indoor temperature**



**Note:** Return in the spring or summer to accurately charge the system in cooling mode when the outdoor ambient temperature is above 55°F.

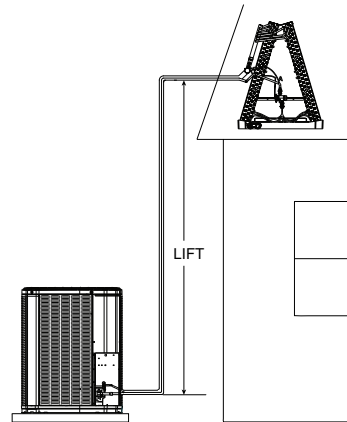
## Subcooling Charging in Cooling (Above 55°F Outdoor Temperature)

1. Determine the refrigerant line total length and lift.

Total Line Length = \_\_\_\_\_ Ft.

Vertical Change (Lift) = \_\_\_\_\_ Ft.

**Figure 27. Refrigerant line total length and lift**



2. Use the nameplate subcool value to determine line size limitations using the tables below and the measured values from [Step 1](#)..

**Table 6. Maximum line length and lift (018B, 024B, 030B, and 036B models)**

| 018B, 024B, 030B and 036B |             |        |      |
|---------------------------|-------------|--------|------|
| Vapor Line                | Liquid Line | Length | Lift |
| 5/8                       | 5/16        | 150    | 50   |
| 3/4                       | 5/16        | 150    | 50   |
| 5/8                       | 3/8         | 150    | 50   |
| 3/4                       | 3/8         | 150    | 50   |
| <b>Note:</b>              |             |        |      |
| Ratings/Primary           |             |        |      |
| Alternate Lineset         |             |        |      |

**Table 7. Maximum line length and lift (042B and 048B models)**

| 042B and 048B     |             |        |      |
|-------------------|-------------|--------|------|
| Vapor Line        | Liquid Line | Length | Lift |
| 3/4               | 5/16        | 150    | 50   |
| 7/8               | 5/16        | 150    | 50   |
| 3/4               | 3/8         | 150    | 50   |
| 7/8               | 3/8         | 150    | 50   |
| <b>Note:</b>      |             |        |      |
| Ratings/Primary   |             |        |      |
| Alternate Lineset |             |        |      |

## System Charge Adjustment

**Table 8. Maximum line length and lift (060B model)**

| 060B              |             |        |      |
|-------------------|-------------|--------|------|
| Vapor Line        | Liquid Line | Length | Lift |
| 7/8               | 3/8         | 150    | 50   |
| 1-1/8             | 3/8         | 75     | 50   |
| 7/8               | 3/8         | 150    | 50   |
| 1-1/8             | 3/8         | 75     | 50   |
| <b>Note:</b>      |             |        |      |
| Ratings/Primary   |             |        |      |
| Alternate Lineset |             |        |      |

**Table 9. R-454B refrigerant charging chart**

| Liquid Temp (°F) | Design Subcooling (°F)      |     |     |     |     |     |     |
|------------------|-----------------------------|-----|-----|-----|-----|-----|-----|
|                  | 8                           | 9   | 10  | 11  | 12  | 13  | 14  |
|                  | Liquid Gauge Pressure (PSI) |     |     |     |     |     |     |
| 55               | 170                         | 172 | 175 | 178 | 181 | 184 | 187 |
| 60               | 184                         | 187 | 190 | 194 | 197 | 200 | 203 |
| 65               | 200                         | 203 | 206 | 210 | 213 | 217 | 220 |
| 70               | 217                         | 220 | 223 | 227 | 230 | 234 | 238 |
| 75               | 234                         | 238 | 241 | 245 | 249 | 252 | 256 |
| 80               | 252                         | 256 | 260 | 264 | 268 | 272 | 276 |
| 85               | 272                         | 276 | 280 | 284 | 288 | 292 | 297 |
| 90               | 292                         | 297 | 301 | 305 | 309 | 314 | 318 |
| 95               | 314                         | 318 | 323 | 327 | 332 | 336 | 341 |
| 100              | 336                         | 341 | 346 | 351 | 355 | 360 | 365 |
| 105              | 360                         | 365 | 370 | 375 | 380 | 385 | 390 |
| 110              | 385                         | 390 | 396 | 401 | 406 | 412 | 417 |
| 115              | 412                         | 417 | 422 | 428 | 433 | 439 | 445 |
| 120              | 439                         | 445 | 450 | 456 | 462 | 468 | 474 |
| 125              | 468                         | 474 | 480 | 486 | 492 | 498 | 504 |

## Charging the Unit

1. Attain proper gauge pressure: Use the standard R-454B subcool charging chart to adjust the refrigerant level until the correct gauge pressure is reached.

**Note:** Use bubble point, per the included chart, for calculating subcooling.

Add refrigerant if the liquid gauge pressure is lower than the chart value.

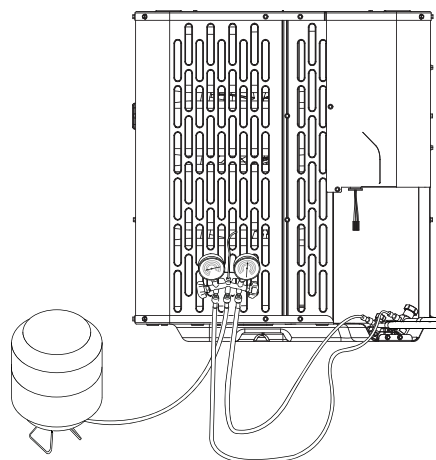
- a. Connect gauges to refrigerant bottle and unit as illustrated.
- b. Purge all hoses.

- c. Place the refrigerant bottle on a scale, then open the bottle.
- d. Stop adding refrigerant when the liquid line refrigerant and liquid gauge pressure match the charging chart.

### Notes:

- Recover refrigerant if the liquid gauge pressure is higher than the chart value.
- Prevent cross-contamination between refrigerants when using charging equipment.
- Keep cylinders in the proper position as instructed, and confirm that the refrigeration system is earthed before charging with refrigerant.

**Figure 28. Charging the unit**



2. Stabilize the system.
  - a. Wait 20 minutes for the system condition to stabilize between adjustments.

**Figure 29. Stopwatch**



**Note:** When the liquid line temperature and gauge pressure approximately match the chart, the system is properly charged.

- b. Remove the gauges.
- c. Replace the service port caps to help prevent leaks. Finger-tighten, then turn an additional 1/6 turn.
3. Record system information for reference. After charging is complete, record the system pressures and temperatures.  
 Outdoor model number = \_\_\_\_\_  
 Measured suction line temperature = \_\_\_\_\_ °F  
 Measured outdoor ambient = \_\_\_\_\_ °F  
 Liquid gauge pressure = \_\_\_\_\_ PSIG

Measured indoor ambient = \_\_\_\_\_ °F  
 Suction gauge pressure = \_\_\_\_\_ PSIG  
 Measured liquid line temperature = \_\_\_\_\_ °F

4. Complete the **Total System Charge** charge rating label below and label located on the outside of the unit with a permanent marker.
  - a. Charge added at factory = \_\_\_\_\_ lb/oz
  - b. Charge added at install = \_\_\_\_\_ lb/oz
  - c. Total system charge (a + b) = \_\_\_\_\_ lb/oz

**Table 10. Fixed orifice superheat charging table**

|                                   |     | Indoor Wet Bulb Temp (°F) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------------------------------|-----|---------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Outdoor Dry Bulb Temperature (°F) |     | 50                        | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 |
|                                   | 55  | 7                         | 9  | 10 | 11 | 12 | 14 | 15 | 17 | 18 | 20 | 21 | 23 | 24 | 26 | 27 | 29 | 30 | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  |
|                                   | 60  | 5                         | 7  | 8  | 9  | 10 | 12 | 13 | 15 | 16 | 18 | 19 | 21 | 22 | 24 | 25 | 27 | 28 | 30 | 31 | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  |
|                                   | 65  | —                         | —  | 4  | 6  | 8  | 10 | 11 | 13 | 14 | 16 | 17 | 18 | 19 | 21 | 22 | 24 | 25 | 27 | 28 | 27 | 31 | —  | —  | —  | —  | —  | —  | —  | —  |
|                                   | 70  | —                         | —  | —  | —  | 5  | 7  | 8  | 10 | 11 | 13 | 14 | 16 | 17 | 18 | 19 | 21 | 22 | 24 | 25 | 27 | 28 | 30 | 31 | —  | —  | —  | —  | —  | —  |
|                                   | 75  | —                         | —  | —  | —  | —  | —  | 5  | 6  | 7  | 9  | 10 | 12 | 14 | 16 | 18 | 19 | 21 | 22 | 24 | 26 | 28 | 29 | 31 | 32 | —  | —  | —  | —  | —  |
|                                   | 80  | —                         | —  | —  | —  | —  | —  | —  | —  | 4  | 6  | 7  | 9  | 10 | 11 | 12 | 14 | 16 | 18 | 19 | 21 | 23 | 25 | 26 | 28 | 29 | 31 | 33 | —  | —  |
|                                   | 85  | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | 4  | 6  | 7  | 9  | 10 | 13 | 14 | 16 | 18 | 20 | 21 | 23 | 24 | 26 | 28 | 29 | 30 | 31 | 32 |
|                                   | 90  | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 4  | 6  | 8  | 10 | 11 | 13 | 14 | 16 | 18 | 20 | 22 | 24 | 25 | 27 | 28 | 30 | 31 |
|                                   | 95  | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 4  | 6  | 8  | 10 | 13 | 14 | 16 | 18 | 20 | 22 | 23 | 25 | 26 | 28 | 29 |
|                                   | 100 | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 6  | 8  | 10 | 12 | 13 | 16 | 18 | 20 | 21 | 23 | 25 | 27 | 29 |
|                                   | 105 | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 4  | 6  | 7  | 9  | 11 | 13 | 15 | 18 | 20 | 22 | 24 | 26 | 28 |
|                                   | 110 | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 4  | 7  | 9  | 11 | 13 | 16 | 18 | 21 | 23 | 26 | 28 |
|                                   | 115 | —                         | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | —  | 6  | 9  | 12 | 14 | 16 | 19 | 21 | 24 | 26 |

5. Measure the return-air wet-bulb temperature at the unit just before the coil using a digital psychrometer.
6. Measure the outdoor dry-bulb temperature.
  - Use these temperatures to determine target superheat from the charging table. Do not charge the system if the conditions fall outside the table.
  - To decrease total superheat, add refrigerant.
  - To increase total superheat, remove refrigerant.
7. After any refrigerant or airflow change, allow the system to operate for 10 to 15 minutes before determining final superheat.

## Weigh-in Method for Calculating Charge

Use the weigh-in method in the following situations:

- During initial installation when replacing the system charge.
- When power is not available at the equipment site.

- When indoor or outdoor temperatures are outside the range required to verify charge using the subcooling method.

To calculate the charge:

1. Measure the distance in feet between the outdoor unit and the indoor unit, and record it on Line 1. Include the full line length from the service valve to the IDU, minus 15 ft.  
 Line length (ft) = \_\_\_\_\_
2. Enter the charge multiplier: 0.47 oz/ft for 3/8-inch tubing or 0.30 oz/ft for 5/16-inch tubing.
3. Multiply the total refrigerant tubing length from Line 1 by the value in Step 2. Record the result on Line 3 of the worksheet.  
 Step 1 x Step 2 = \_\_\_\_\_
4. Record this value as the amount of refrigerant to weigh in before opening the service valves.  
 Refrigerant = \_\_\_\_\_

## System Charge Adjustment

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5. Complete the **Total System Charge** rating label below and the label on the outside of the unit using a permanent marker.

Complete the **Total System Charge** chart after final charging is complete.

- a. Charge added at factory = \_\_\_\_\_ lb/oz  
b. Charge added at install = \_\_\_\_\_ lb/oz

c. Total system charge (a + b) = \_\_\_\_\_ lb/oz

6. Return to the site for adjustment.

**Important:** Return in spring or summer to accurately charge the system in cooling mode when the outdoor ambient is above 55°F.

# Operational and Checkout Procedures

The final phase of installation is completing the unit operational and checkout procedures. For proper performance, operate the unit and make any required charge adjustments.

1. Inspect factory tubing for any shifting during shipment.
2. Adjust the tubing to prevent tube-to-tube contact during operation.
3. Confirm all wiring connections are tight and secure.

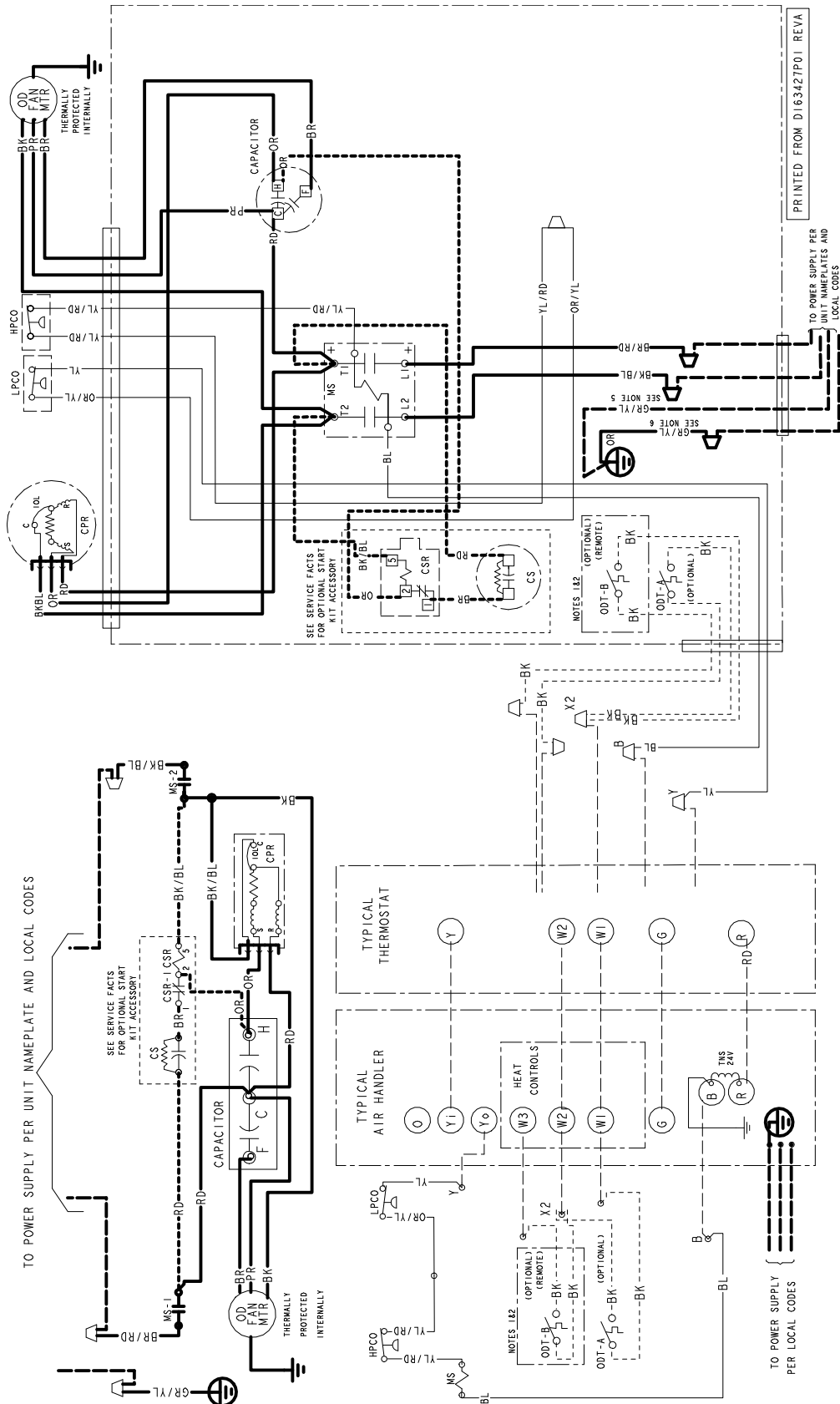
After installation is complete, check the following:

- ☐ Leak-check the refrigerant lines.
- ☐ Properly insulate the suction lines and fittings.
- ☐ Secure and isolate all refrigerant lines.
- ☐ Seal all passages through masonry. If mortar is used, prevent it from contacting the copper tubing.
- ☐ Verify that all electrical connections are tight.
- ☐ Observe the outdoor fan during operation for clearance and smooth operation.
- ☐ Verify that the indoor coil drain line drains freely by pouring water into the drain pan.
- ☐ Verify that supply registers and return grilles are open and unobstructed.
- ☐ Verify that a return air filter is installed.
- ☐ Verify that the correct airflow setting is used for the indoor blower motor.
- ☐ Confirm safe operation by operating the complete system in each mode.
- ☐ Confirm that the refrigerant leak detection system is operational.
- ☐ Confirm that the refrigerant quantity is marked on the outdoor unit.

**Figure 30. Wiring diagram – models 018B, 024B, 030B, 036B, and 042B**



25



**Figure 32. Wiring diagrams - notes and legend**

NOTES:

1. IF ODT-B IS NOT USED. ADD JUMPER BETWEEN W2 & W3 AT AIR HANDLER. IF USED, ODT-B MUST BE MOUNTED REMOTE OF CONTROL BOX IN AN APPROVED WEATHER PROOF ENCLOSURE.
2. IF ODT-A IS NOT USED. ADD JUMPER BETWEEN W1 & W2 AT AIR HANDLER.
3. LOW VOLTAGE (24 V) FIELD WIRING MUST BE 18 AWG MINIMUM.
4. USE COPPER CONDUCTORS ONLY!
5. FIELD GROUND MUST BE ATTACHED TO THE GROUND LUG ON THE RUNTRU AND AMERISTAR UNITS.
6. GROUND CONNECTION FOR TRANE/ AMERICAN STANDARD ONLY.

FOR CANADIAN INSTALLATIONS  
POUR INSTALLATIONS CANADIENNES

CAUTION: NOT SUITABLE FOR USE ON  
SYSTEMS EXCEEDING 150V-TO-GROUND  
ATTENTION: NE CONVIENT PAS AUX  
INSTALLATIONS DE PLUS DE 150 V A  
LA TERRE

### LEGEND ADDED NOTES AND TABLE FOR PAPER DETAILS.

|      |                              |
|------|------------------------------|
| CF   | FAN CAPACITOR                |
| CN   | WIRE CONNECTOR               |
| CPR  | COMPRESSOR                   |
| CR   | RUN CAPACITOR                |
| CS   | STARTING CAPACITOR           |
| CSR  | CAPACITOR SWITCHING RELAY    |
| ODT  | OUTDOOR THERMOSTAT           |
| HPCO | HIGH PRESSURE CUTOOUT SWITCH |
| LPCO | LOW PRESSURE CUTOOUT SWITCH  |
| MS   | COMPRESSOR MOTOR CONTACTOR   |
| TNS  | TRANSFORMER                  |
| IOL  | INTERNAL OVERLOAD PROTECTOR  |

|         |                                   |                              |
|---------|-----------------------------------|------------------------------|
| ————    | 24 V                              | } FACTORY<br>LINE V } WIRING |
| ————    | LINE                              |                              |
| ————    | 24 V                              | } FIELD<br>LINE V } WIRING   |
| ————    | LINE                              |                              |
| - - - - | FIELD INSTALLED<br>FACTORY WIRING |                              |

— COLOR OF WIRE  
BK/BL — COLOR OF MARKER

|    |       |    |        |    |        |
|----|-------|----|--------|----|--------|
| BK | BLACK | RD | RED    | OR | ORANGE |
| BL | BLUE  | WH | WHITE  | GR | GREEN  |
| BR | BROWN | YL | YELLOW | PR | PURPLE |
| PK | PINK  |    |        |    |        |

|  |                         |
|--|-------------------------|
|  | MAGNETIC COIL           |
|  | GROUND                  |
|  | JUNCTION                |
|  | CAPACITOR               |
|  | WIRE NUT OR<br>TERMINAL |
|  | TRANSFORMER             |

|  |                                              |
|--|----------------------------------------------|
|  | POL. PLUG FEMALE HOUSING<br>(MALE TERMINALS) |
|  | POL. PLUG MALE HOUSING<br>(FEMALE TERMINALS) |

|  |                              |
|--|------------------------------|
|  | TERMINAL BLOCK/BOARD         |
|  | RELAY CONTACT (N.O.)         |
|  | RELAY CONTACT (N.C.)         |
|  | THERMISTOR                   |
|  | TEMP ACTUATED SWITCH         |
|  | INTERNAL OVERLOAD PROTECTION |
|  | PRESSURE ACTUATED SWITCH     |
|  | RESISTER OR HEATING ELEMENT  |
|  | MOTOR WINDING                |

# Pressure Curves

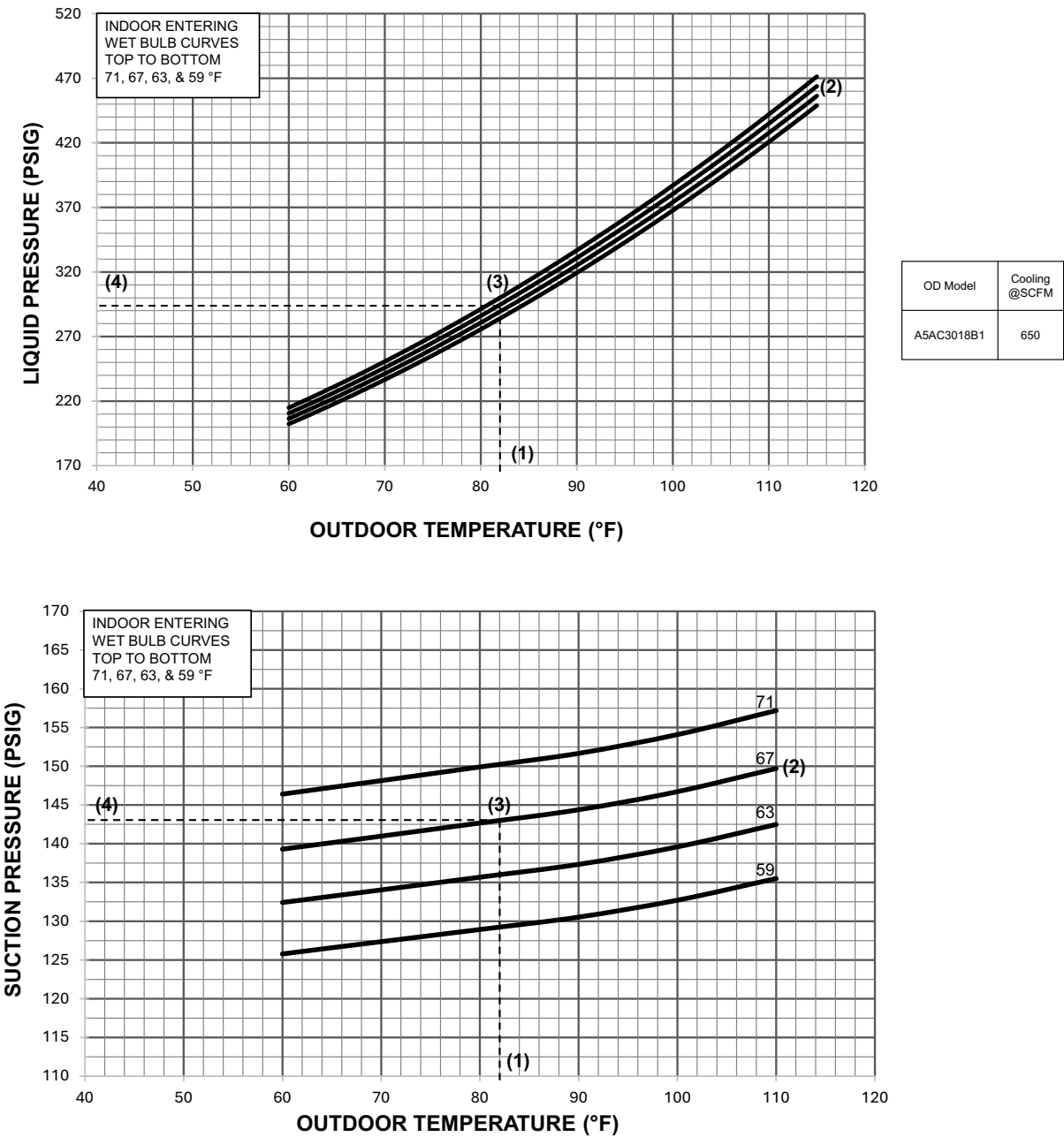
Cooling performance can be checked when the outdoor temperature is above 65° F.

To check cooling performance, select the proper indoor CFM, allow pressures to equalize. Measure indoor wet bulb temperature, outdoor temperature, liquid and suction pressures.

On the plots:

1. Locate outdoor temperature
2. Locate indoor wet bulb
3. Find intersection of OD temperature and ID W.B
4. Read liquid or suction pressure in left column.

Figure 33. Pressure curves - model A5AC3018B1



Pressure Curves

Figure 34. Pressure curves - models A5AC3024B1 and A5AC3042B1

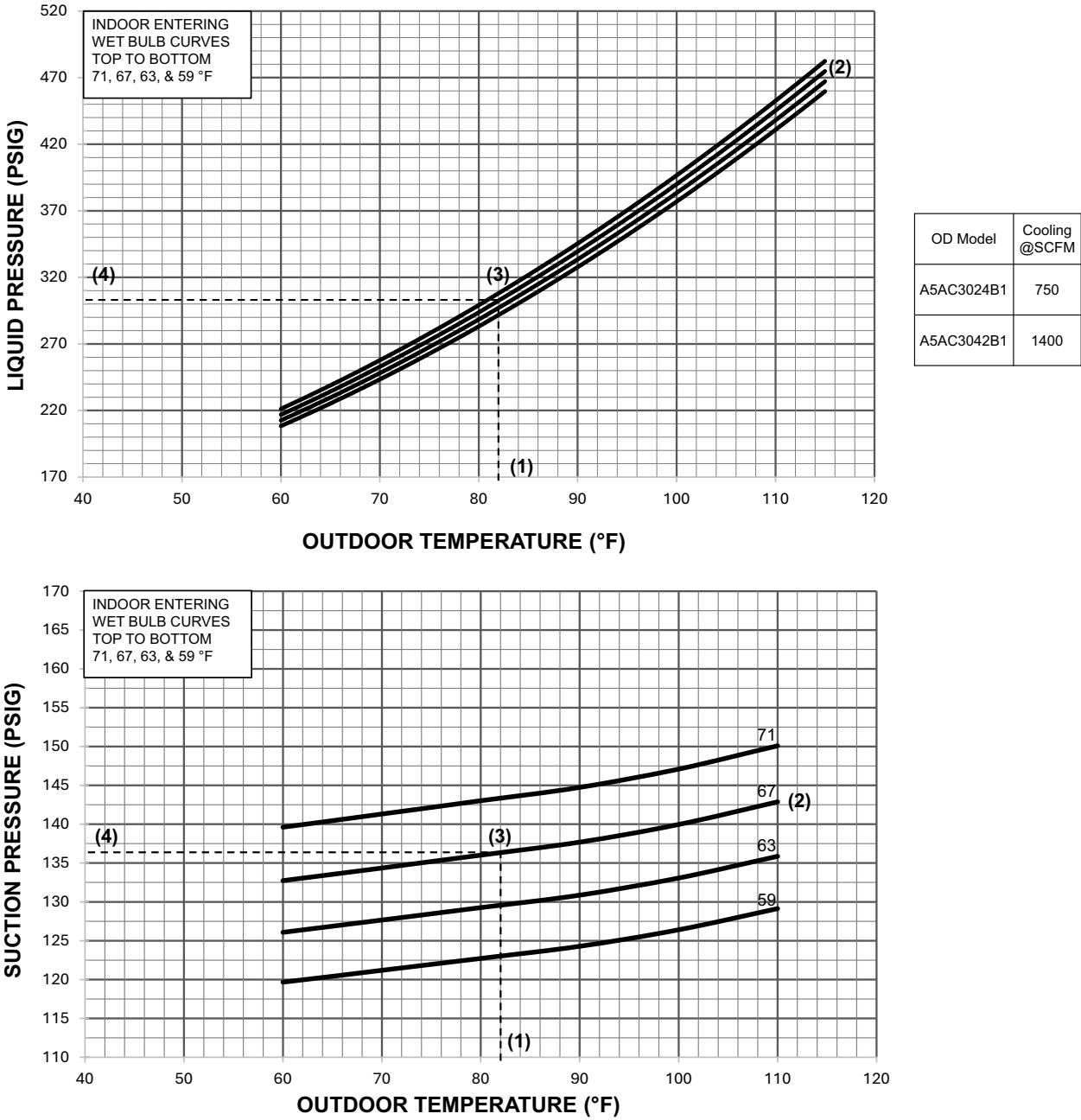
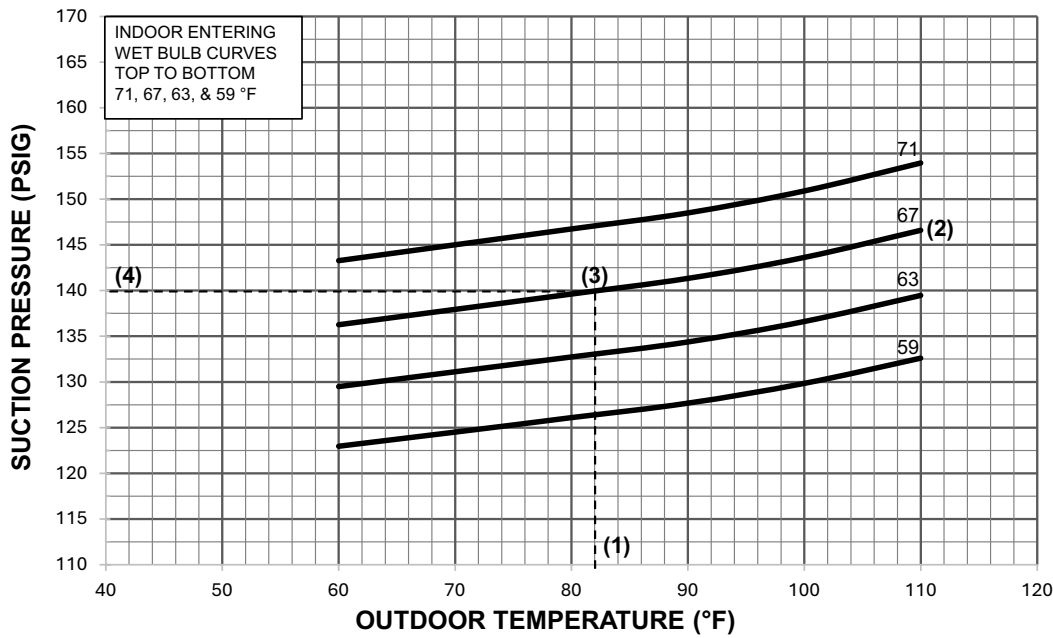
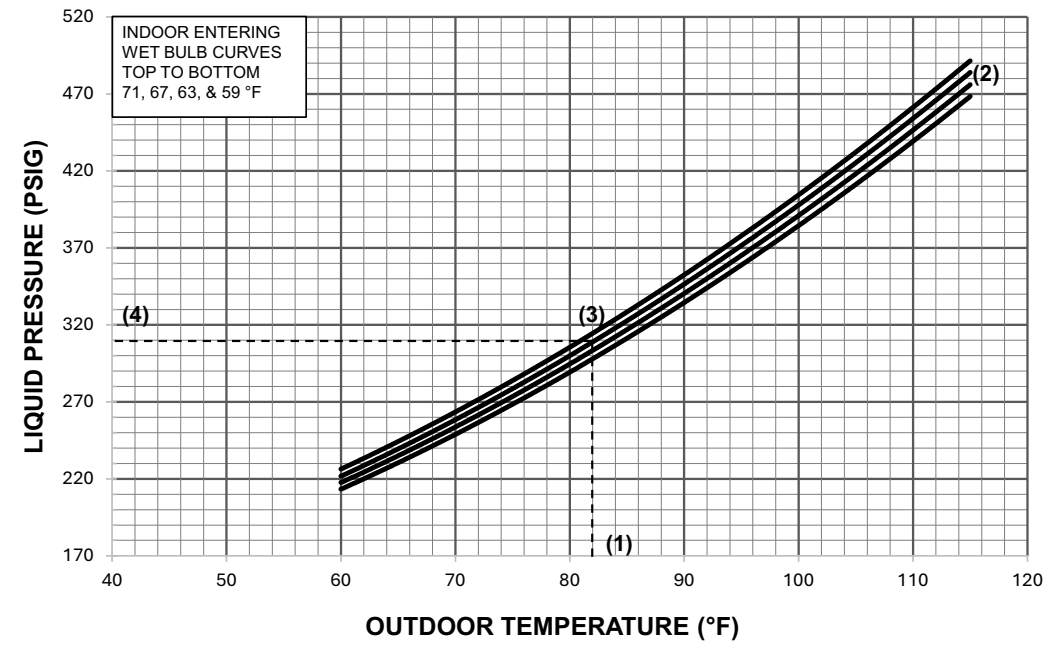
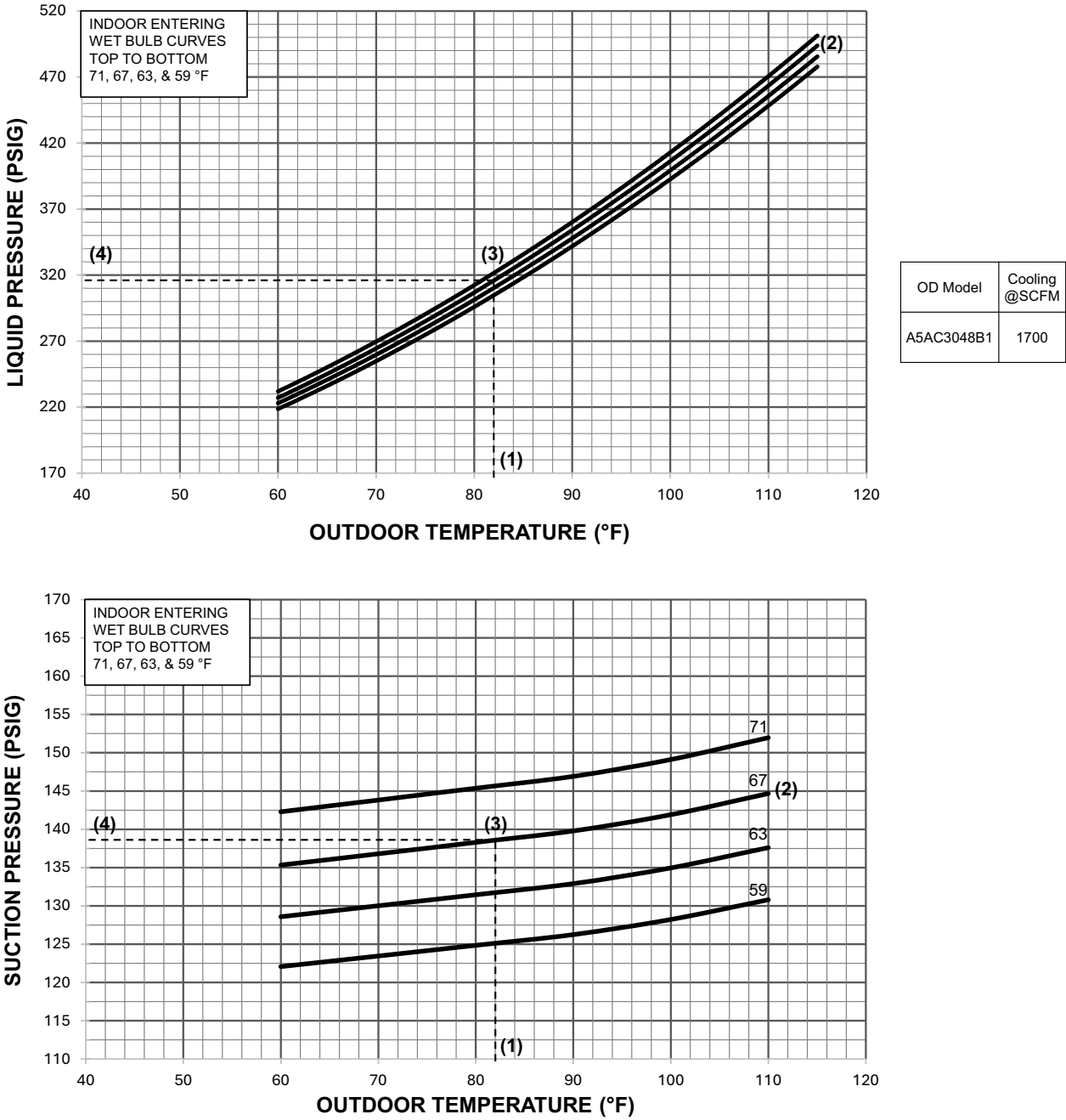


Figure 35. Pressure curves - models A5AC3030B1, A5AC3036B1 and A5AC3060B1



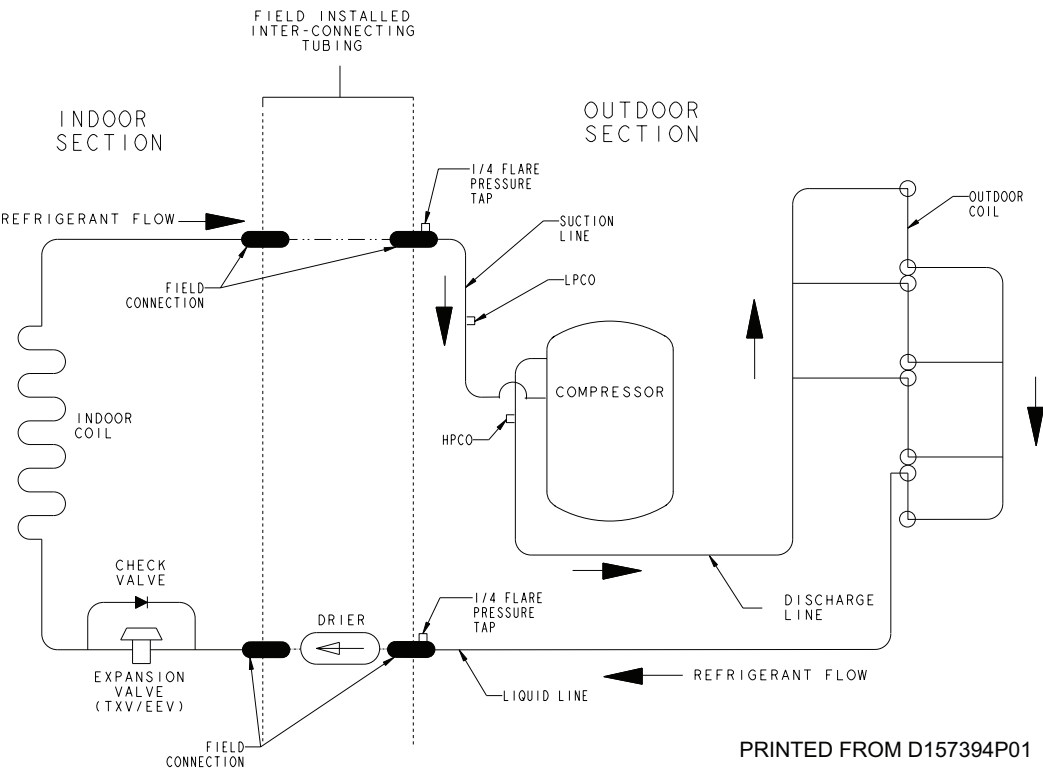
Pressure Curves

Figure 36. Pressure curves - model A5AC3048B1

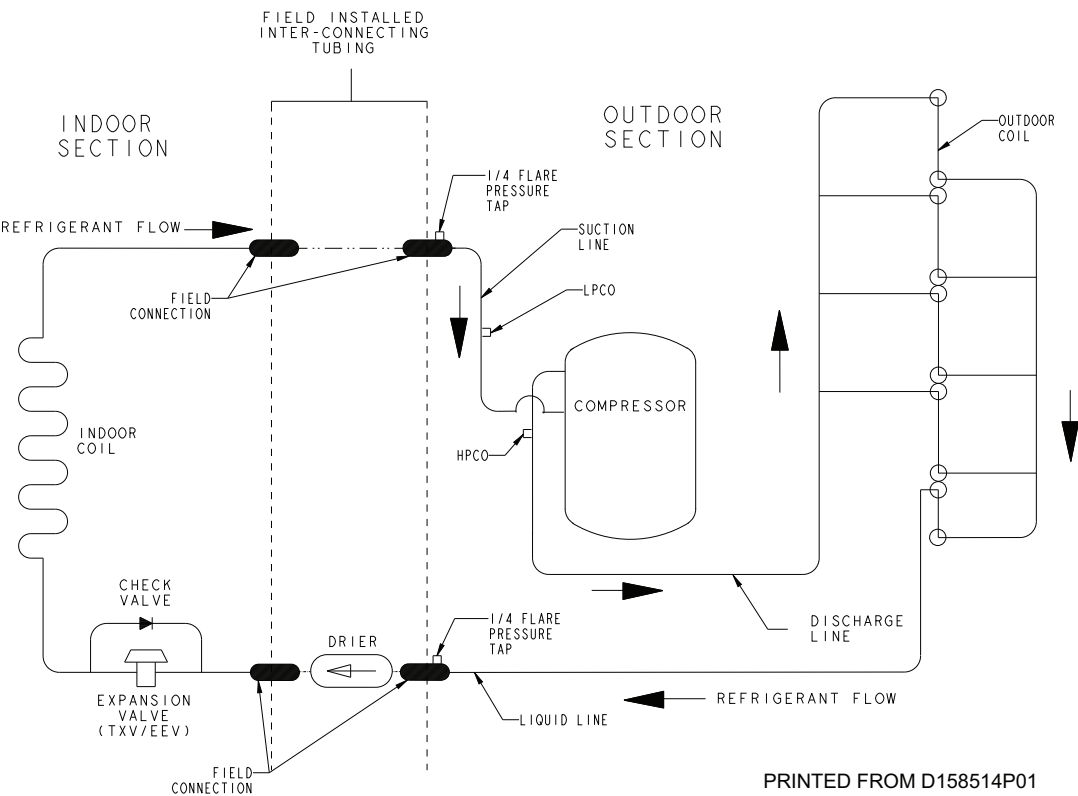


# Refrigeration Circuits

**Figure 37. Refrigeration cycle for models 018, 024, 030, 036, 042 and 048**



**Figure 38. Refrigeration cycle for model 060**



### Refrigerant Detection System

The approved ID/OD combination will provide sufficient safe ventilation.

Airflow provided is sufficient to cover minimum room area including adjustments for altitude. All systems require a refrigerant detection system so no altitude adjustment factors are required.

Installer must ensure refrigerant detection system is connected and placed in appropriate orientation per application.

The control system power shall not be interrupted to ensure the refrigerant detection system is always functioning.

Please reference Indoor Unit installers guide for correct specification on refrigerant detection system.







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