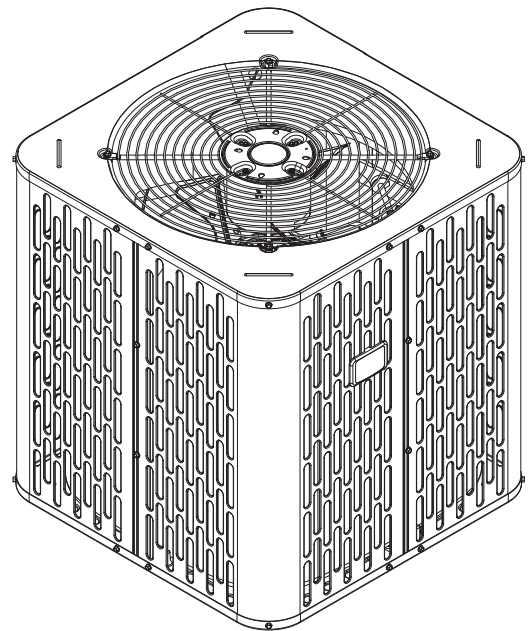


# Installation, Operation, and Maintenance

## Condensing Units

A5AC3018A  
A5AC3024A  
A5AC3030A  
A5AC3036A  
A5AC3042A  
A5AC3048A  
A5AC3060A



*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.

- Store the appliance in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).
- Do not pierce or burn.
- Be 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

- Updated unit dimensions and weights.
- Updated Refrigerant Line Considerations.

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# Pre-Installation

## General

### ⚠ WARNING

#### Safety Hazard!

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- To be repaired only by trained service personnel.
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- Dispose of properly in accordance with federal or local regulations.

### ⚠ WARNING

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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

#### 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.

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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

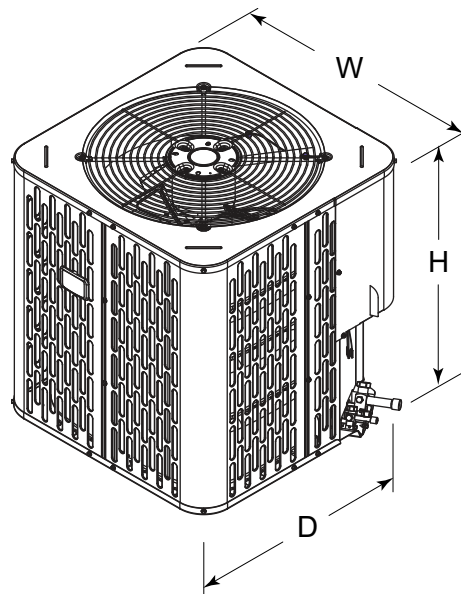
**Unit Location Considerations****Unit Dimensions and Weight****Table 2. Unit dimensions and weight**

Models	H x D x W (in.)	Weight (lb) <sup>(a)</sup>
A5AC3018A	29 x 26 x 26	134
A5AC3024A	29 x 26 x 26	134
A5AC3030A	29x 30 x 30	163
A5AC3036A	29 x 30 x 30	161
A5AC3042A	37 x 30 x 30	193
A5AC3048A	37 x 34 x 34	220
A5AC3060A	37 x 34 x 34	220

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

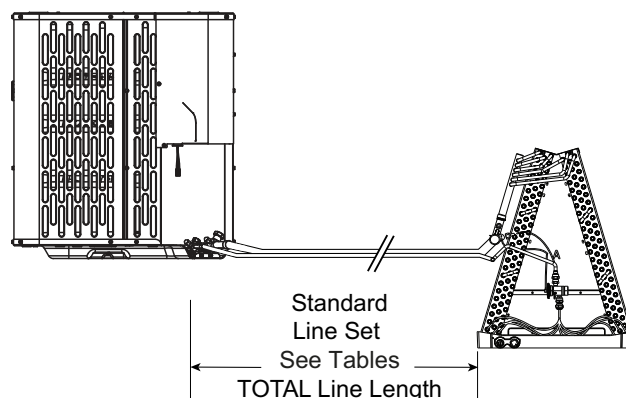
When mounting the outdoor unit on a roof, be sure the roof will support the unit's weight.

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

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

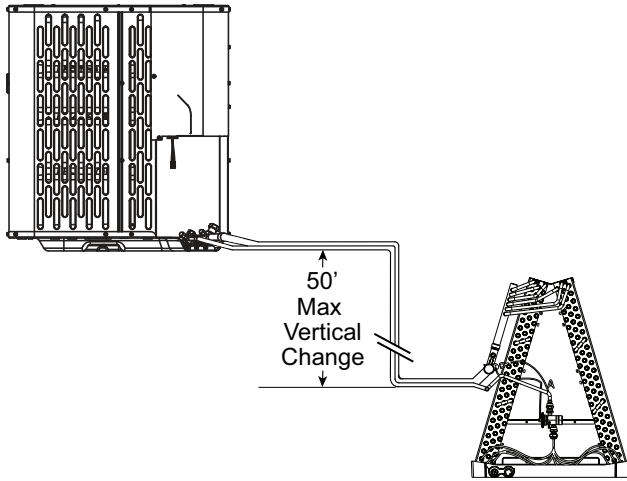
- The maximum total length of refrigerant lines from outdoor to indoor unit should not exceed 150 feet (including lift).
- The maximum vertical change should not exceed 50 feet.
- Service valve connection diameters are shown in [Table 3, p. 9](#).

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

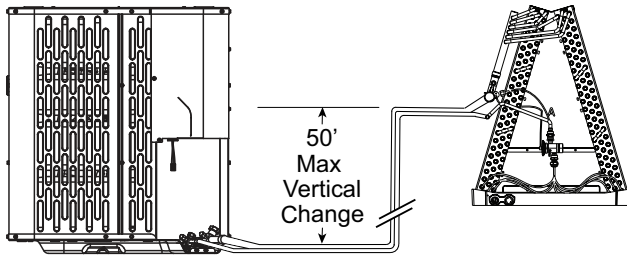
**Figure 2. Refrigerant total line length limit**



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



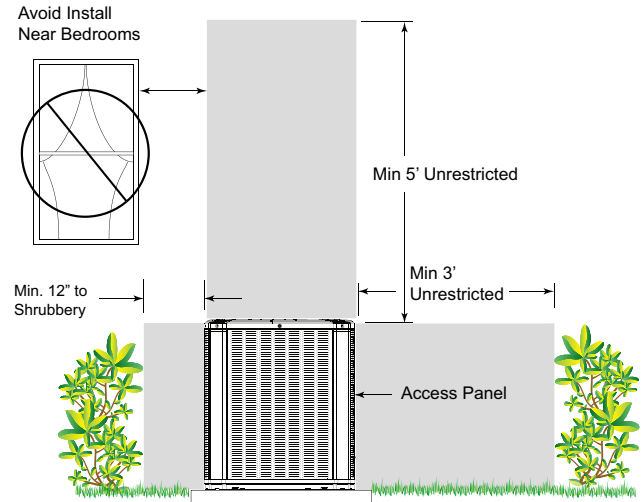
**Figure 4. Refrigerant piping vertical change limit**



### Suggested Locations for Best Reliability

- Ensure the top discharge area is unrestricted for at least five (5) feet above the unit.
- Three (3) feet clearance must be provided in front of the control box (access panels) and any other side requiring service.
- It is not recommended to install in a location where noise may distract the building occupants. Some examples of these types of locations are sleeping quarters and by windows of a living area. Please discuss location with the building owner prior to installation.
- Avoid locations such as near windows where condensation and freezing defrost vapor can annoy a customer.
- Position the outdoor unit a minimum of 12-inch from any wall or surrounding shrubbery to ensure adequate airflow.
- Outdoor unit location must be far enough away from any structure to prevent excess roof runoff water or icicles from falling directly on the unit.

**Figure 5. Suggested locations for best reliability**



## Unit Preparation

### Prepare the Unit for Installation

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

## 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
A5AC3018A	3/4	5/16	3/4	5/16
A5AC3024A	3/4	5/16	3/4	5/16
A5AC3030A	3/4	5/16	3/4	5/16
A5AC3036A	3/4	5/16	3/4	5/16
A5AC3042A	7/8	5/16	7/8	5/16
A5AC3048A	7/8	5/16	7/8	5/16
A5AC3060A	7/8	5/16	7/8	5/16

**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
A5AC3018A	5/8	3/8	3/4	5/16
A5AC3024A	5/8	3/8	3/4	5/16
A5AC3030A	5/8	3/8	3/4	5/16
A5AC3036A	5/8	3/8	3/4	5/16
A5AC3042A	3/4	3/8	7/8	5/16
A5AC3048A	3/4	3/8	7/8	5/16
A5AC3060A	3/4	3/8	7/8	5/16

### Factory Charge

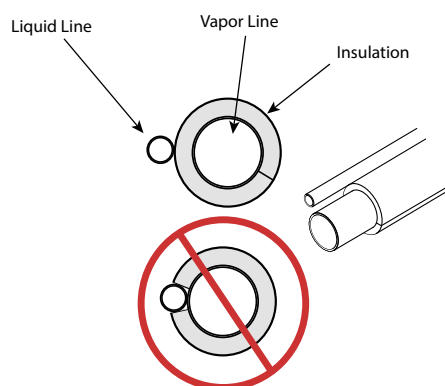
The outdoor condensing units are factory charged with the system charge required for the outdoor condensing unit, ten (10) ft. of tested connecting line, and the smallest rated indoor evaporative coil match. Always verify proper system

charge via subcooling (TXV/EEV) or superheat (fixed orifice) per the unit nameplate.

### Refrigerant 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 6. Refrigerant line insulation**



### Refrigerant Line Routing

#### Precautions

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

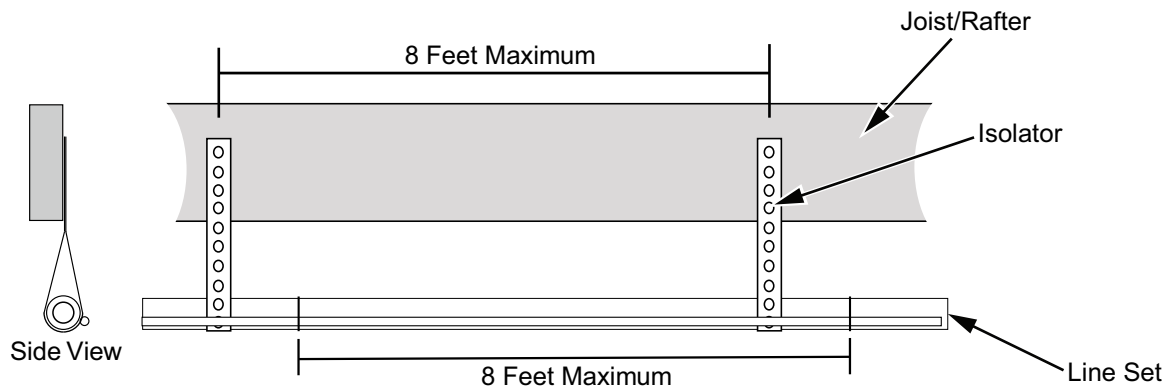
Comply with national, state, and local codes when isolating line sets from joists, rafters, walls, or other structural elements.

For example:

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

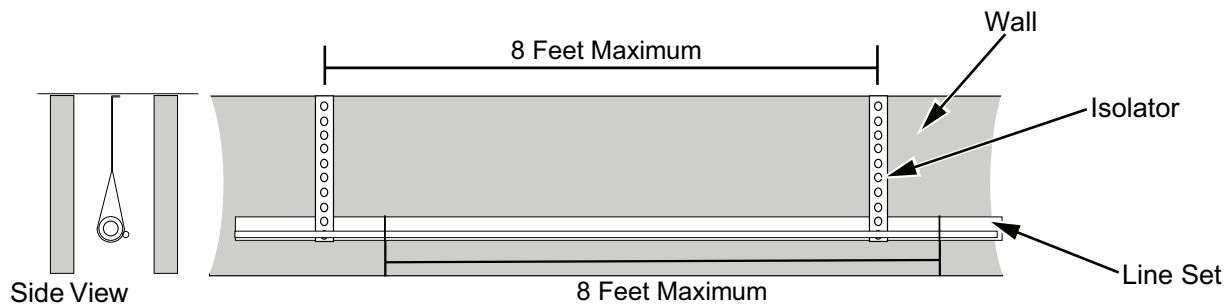
Secure the vapor line from joists using isolators every 8 feet. Secure the liquid line directly to the vapor line using tape, wire, or other appropriate method every 8 feet.

**Figure 7. Isolation from joist/rafter**

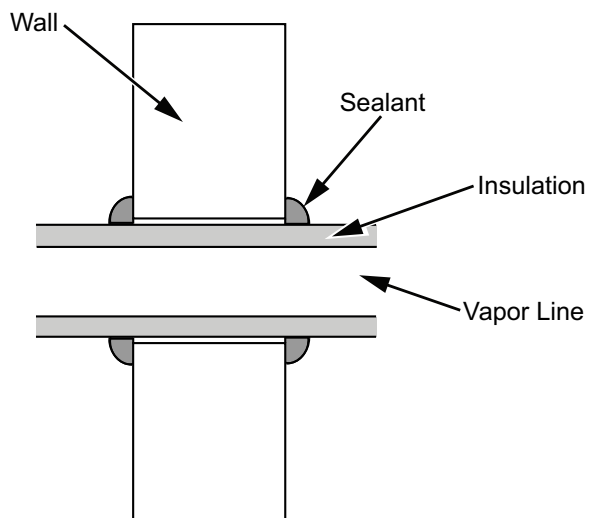


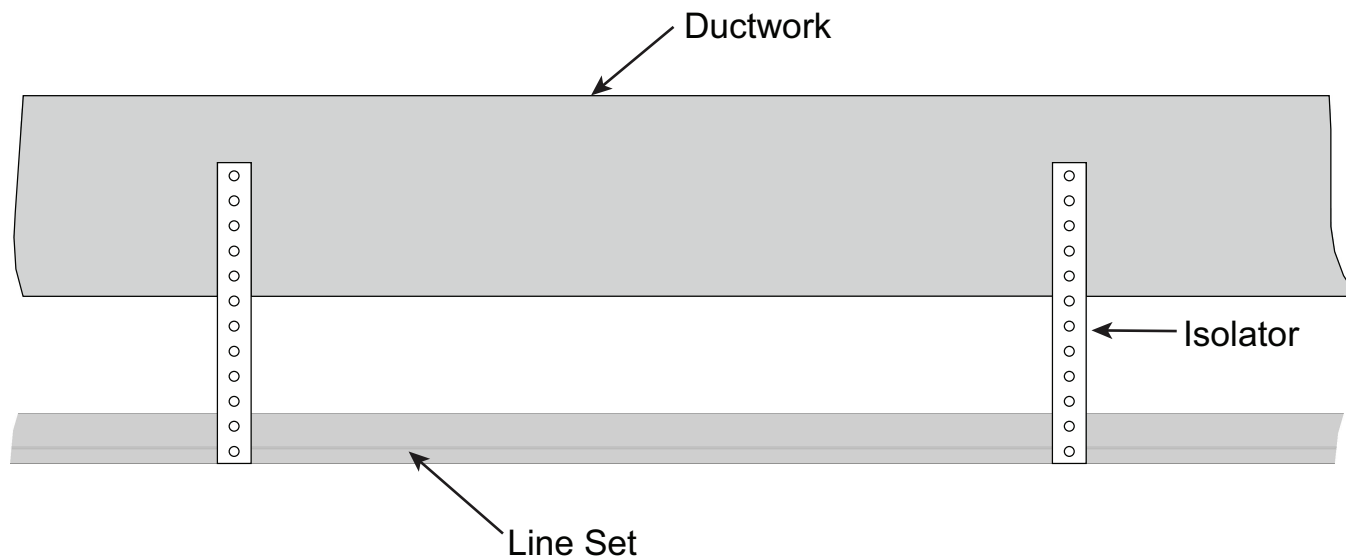
Secure the vapor line using isolators every 8 feet. Secure the liquid line directly to the vapor line using tape, wire, or other appropriate method every 8 feet.

**Figure 8. Isolation in wall spaces**



**Figure 9. Isolation through wall**



**Figure 10. Incorrect lineset installation**

Do not hang line sets from ductwork.

## Refrigerant Line Brazing

### Braze the Refrigerant Lines

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.

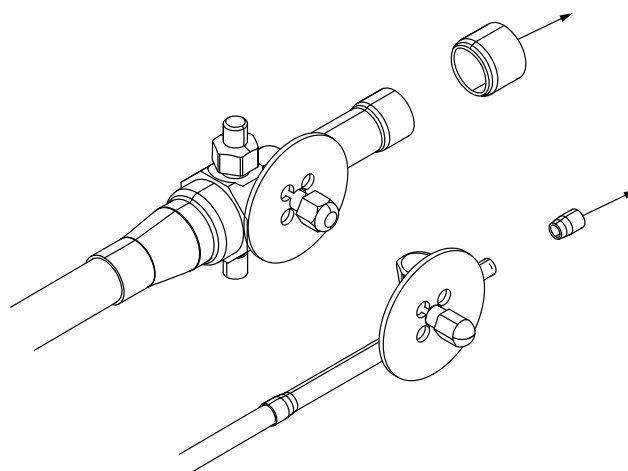
4. Wrap a wet rag around the valve body to avoid heat damage and continue the dry nitrogen purge.
  - a. Braze the refrigerant lines to the service valves.
  - b. For units shipped with a field-installed external drier, check liquid line filter driers directional flow arrow to confirm correct direction 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.

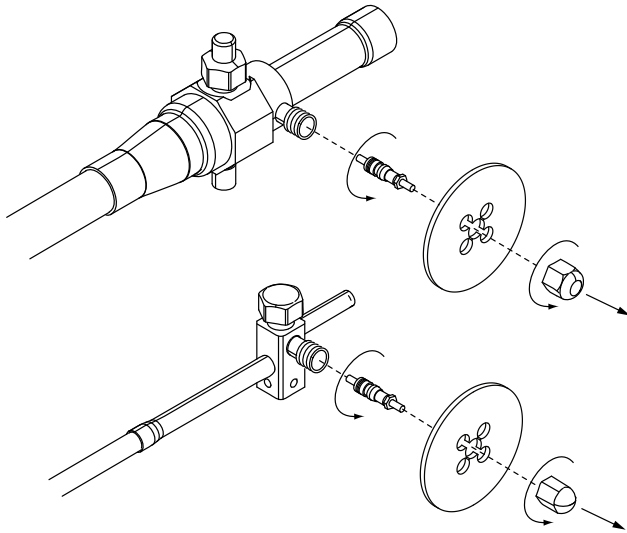
#### Notes:

- Install drier in Liquid Line.
- Precautions should be taken to avoid heat damage to basepan during brazing. It is recommended to keep the flame directly off of the basepan.

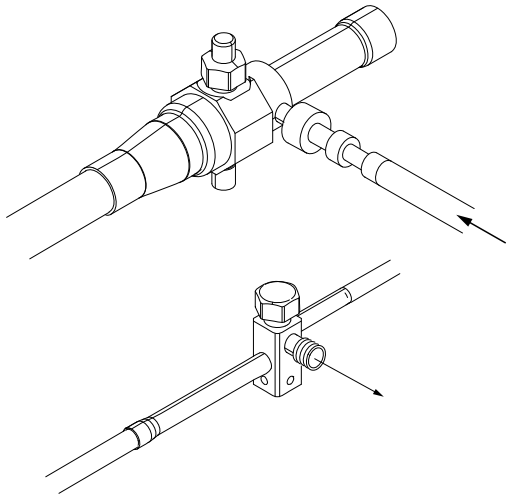
5. Replace the pressure tap valve cores and plastic tabs after the service valves have cooled.

**Figure 11. Removal of caps or plugs from pipe ends**

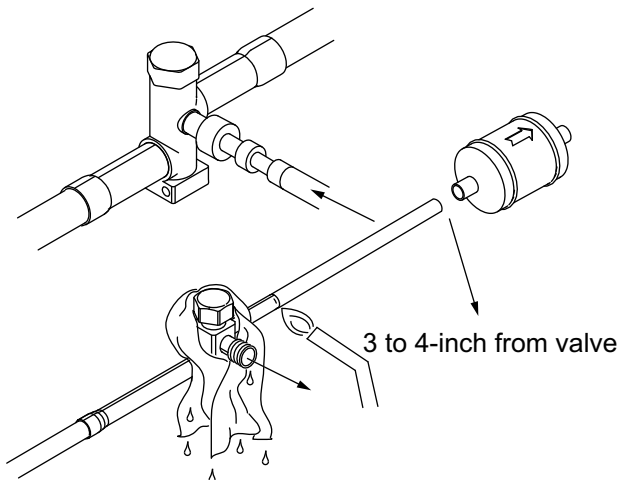
**Figure 12. Removal of pressure cap and valve cores from service valves**



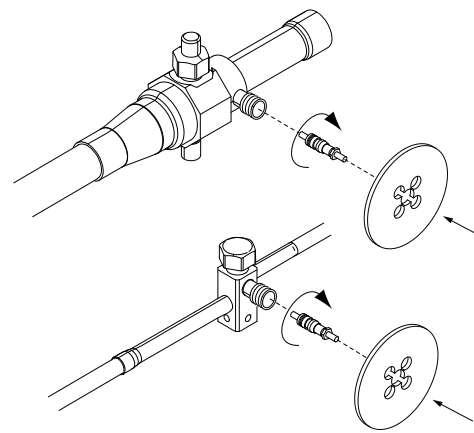
**Figure 13. Purging of refrigerant lines**



**Figure 14. Wrapping of wet rag**



**Figure 15. Re-installation of pressure valve cores and plastic tabs**



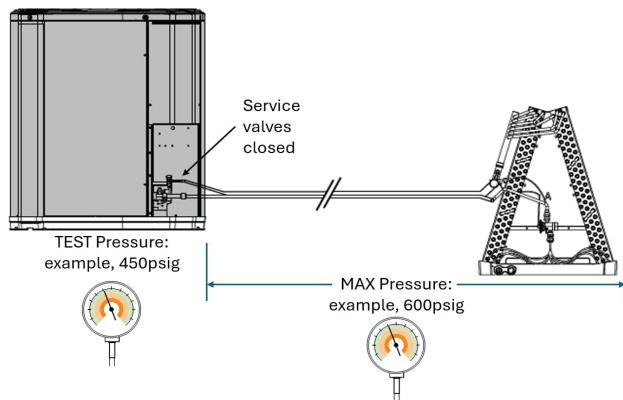
## Refrigerant Line Leak Check

### Check for Leaks

After completion of field piping for split systems, the field pipework shall be pressure tested with nitrogen and then vacuum tested prior to refrigerant charging.

#### Important:

1. Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.
2. The following leak detection methods are deemed acceptable for all refrigerant systems:
  - Electronic leak detectors calibrated for R-454B (with a sensitivity of 5 grams/year).
  - Bubble method.
3. The outdoor unit should not be tested higher than 450 psig for servicing or component replacement. The indoor unit and linesets should be tested to the max pressure specified on the outdoor or indoor unit nameplate. The service valves should be closed when pressure testing the evaporator coil and linesets to separate the outdoor unit from the indoor unit.

**Figure 16. Refrigerant line leak check****1. Final Pressure Check:**

Isolate the outdoor unit from the evaporator coil and linesets using the service valves. Pressurize the evaporator coil and linesets to the max pressure specified 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. The system should show no loss of pressure once pressurized. Once the pressure test is complete follow the steps for evacuation.

**2. Preliminary Pressure Check (\*Optional):**

Pressurize the refrigerant lines and evaporator coil to 150 psig using dry nitrogen. Check for leaks by using a soapy solution or bubbles at each brazed location. Remove pressure and repair any leaks before continuing.

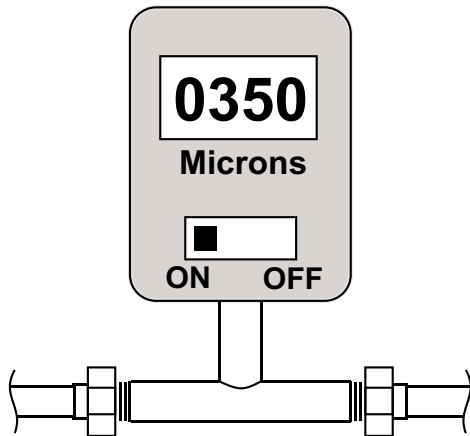
# Evacuation and Servicing

## 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 17. 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 18. Stop watch**



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

## Servicing

- If repairs must be made after system is charged, properly and safely remove or isolate refrigerant and purge the section of the system needing repair with nitrogen gas or oxygen-free nitrogen prior to opening the circuit.

- The Refrigerant charge shall be recovered into the correctly marked recovery cylinders.
- Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and the ventilation is available.
- 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.
- Ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. Only use cylinders designated for the recovered refrigerant and labelled for the refrigerant. Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order.
- 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. Ensure any associated electrical components are sealed.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder. Do not mix refrigerants.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that A2L refrigerant does not remain within the lubricant.

## Service Valves

### Open the Gas Service Valve First

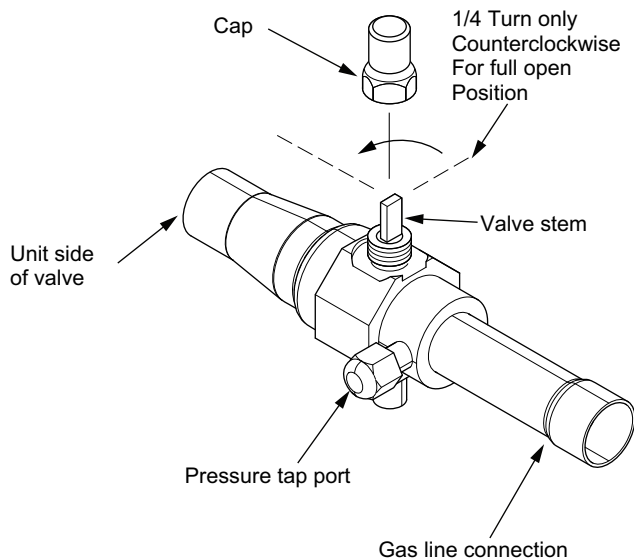
**Important:** Leak check and evacuation must be completed before opening the service valves.

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

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

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

**Figure 19. Gas service valve**



### Open the Liquid Service Valve Second

#### **⚠ WARNING**

##### **System Charge!**

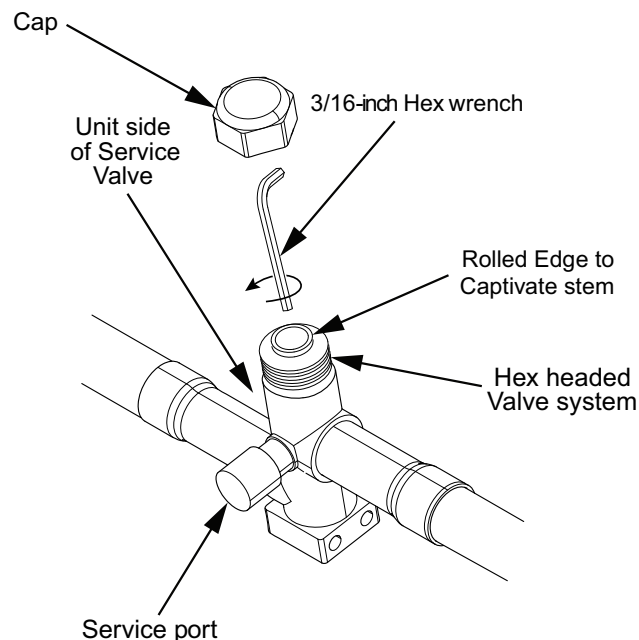
Failure to follow instructions below could result in abrupt release of system charge and could result in serious injury or property damage.

When opening the suction and liquid line service valve, turn the valve stem counter-clockwise 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 service valve cap.
2. Fully insert 3/16-inch hex wrench into the stem and back out counter-clockwise until valve stem just touches the rolled edge (approximately five (5) turns).
3. Replace the valve cap to prevent leaks. Tighten finger tight plus an additional 1/6 turn.

**Figure 20. Liquid service valve**





# Electrical

## Low Voltage

### Low Voltage Maximum Wire Length

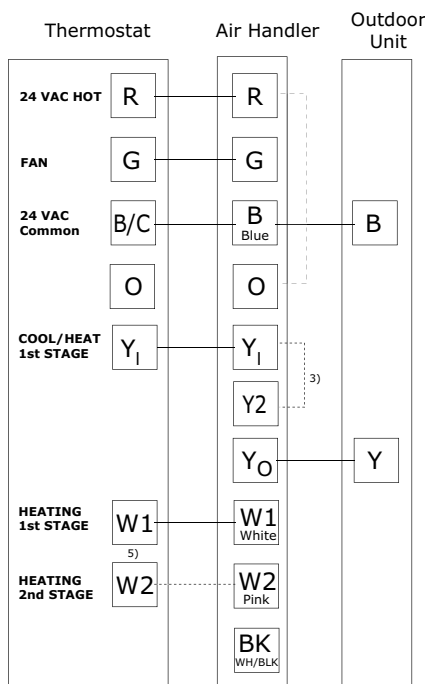
The following table defines the maximum total length of low voltage wiring from the outdoor unit, to the indoor unit, and to the thermostat.

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

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

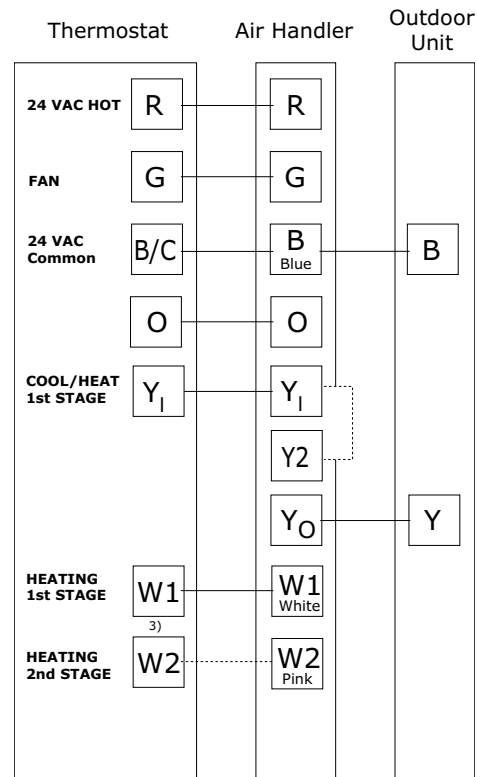
### Low Voltage Connection Diagrams

**Figure 21. Single stage, AC with 5TEM6**



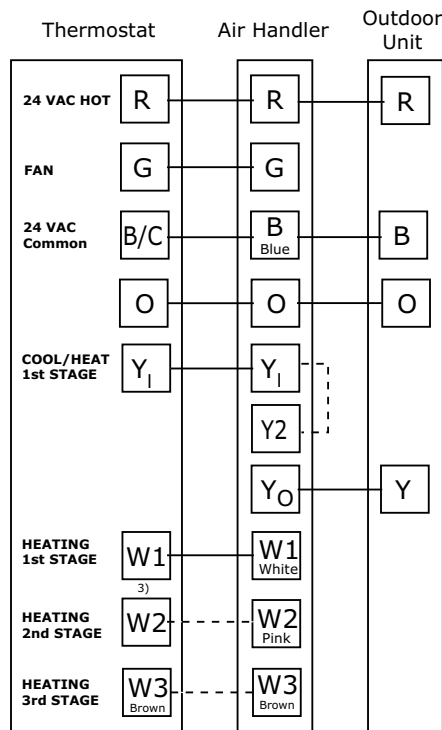
1. Units with pigtails require wirenuts for connections.
2. Cap all unused wires.
3. When BK is used, do not connect Y2 at the air handler.
4. When BK is used, cut the jumper between R and BK on the control board. See indoor wiring schematic for details.
5. In AC systems, for multiple stages of electric heat, jumper W1 and W2 together if comfort control has only one stage of heat.

**Figure 22. Single stage, AC with 5TEM4**



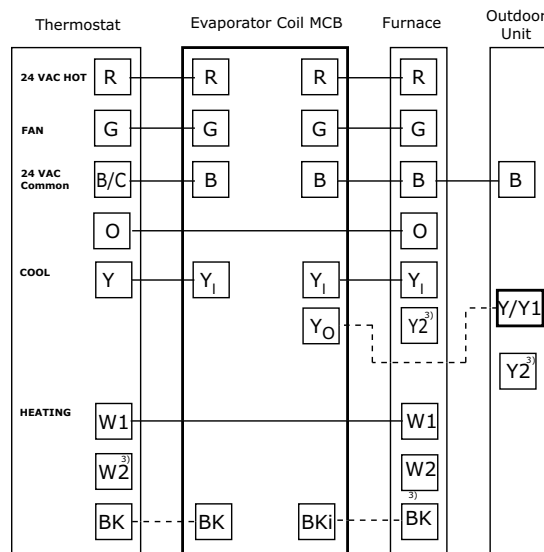
1. Units with pigtails require wirenuts for connections.
2. Cap all unused wires.
3. In AC systems for multiple stages of electric heat, jumper W1 and W2 together if comfort control has only one stage of heat.

Figure 23. Single stage, AC with 5TAM5



1. Units with pigtails require wirenuts for connections.
2. Cap all unused wires.
3. In AC systems for multiple stages of electric heat, jumper W1 and W2 together if comfort control has only one stage of heat.

Figure 24. AC with furnace



1. Units with pigtails require wirenuts for connections.
2. Cap all unused wires.
3. For 24V control, connect factory supplied harness to circuit board at evaporator. Complete all other wiring connections at the furnace.
4. For 2 stage systems, connect W2 to W2 and Y2 to Y2.

## Mitigation Board Guidelines

- The approved ID/OD combination will provide sufficient safe ventilation in case of a leak.
- Refer to Indoor Unit Installer's Guide for correct specifications on indoor unit install.
- All systems require mitigation boards so an altitude adjustment factor may be required.
- Mitigation Control Board needs to be included in an A2L System.

## 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.

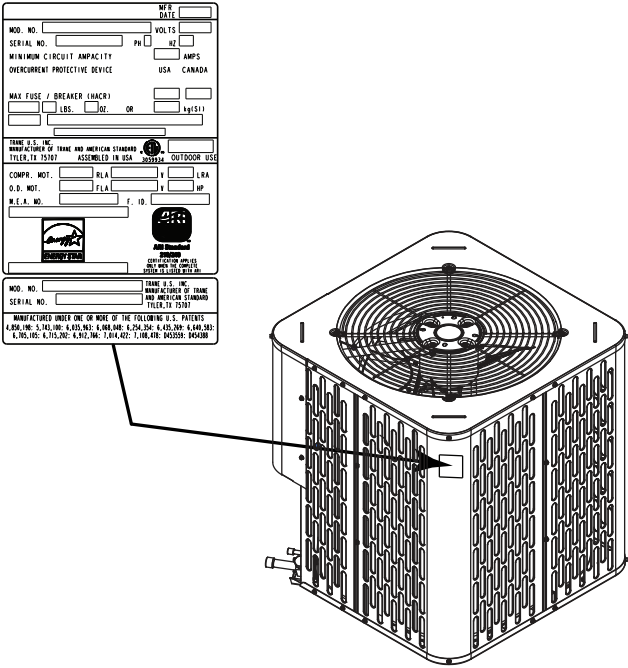
When it is necessary to work with live electrical components, have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks.

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 25. 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.

# System Start-Up

1. Confirm that “[Refrigerant Line Brazing](#),” p. 11 through “[High Voltage](#),” p. 17 have been completed.
2. Turn on the disconnect(s) to apply power to the indoor and outdoor units.
3. Wait one hour before starting the unit if the compressor crankcase heater accessory is used and the outdoor ambient is below 70° F.
4. Set system thermostat to ON.

# System Charge Adjustment

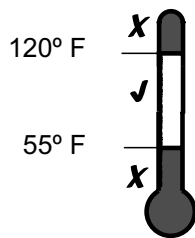
**Note:** For systems using a indoor piston metering device, refer to the Superheat charging method and chart.  
For systems using a TXV or EEV indoor metering device, refer to Subcool charging method and charts.

## Temperature Measurements

Check the outdoor temperatures.

Subcooling (in cooling mode) is the only recommended method of charging above 55°F ambient outdoor temperature.

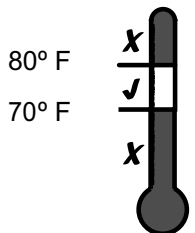
**Figure 26. Outdoor temperature**



**Note:** For Superheat (In Cooling Mode), refer to the Superheat Charging Table.

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

**Figure 27. Indoor temperature**



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

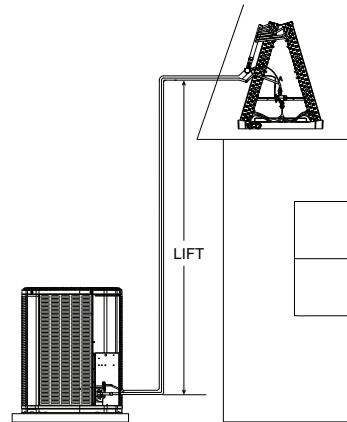
## Subcooling Charging in Cooling (Above 55° F Outdoor Temp.)

1. Determine the refrigerant line total length and lift.

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

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

**Figure 28. Refrigerant line total length and lift**



2. Determine the final subcooling value using total line length and lift measured in [Step 1.](#) and the tables below.

**Table 6. Subcool charging corrections table (for line length and rise) - models 018A, 024A, 030A, and 036A**

018A, 024A, 030A, 036A			
Vapor Line	Liquid Line	Liquid Line	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			
Legacy Lineset			

**Table 7. Subcool charging corrections table (for line length and rise) - models 042A, and 048A**

042A, 048A			
Vapor Line	Liquid Line	Liquid Line	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			
Legacy Lineset			

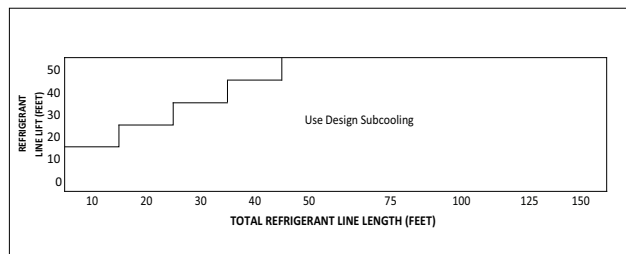
**Table 8. Subcool charging corrections table (for line length and rise) - model 060A**

060A			
Vapor Line	Liquid Line	Liquid Line	Lift
7/8	5/16	150	50
1-1/8	5/16	75	50
7/8	3/8	150	50
1-1/8	3/8	75	50
<b>Note:</b>			
Ratings/Primary			
Legacy Lineset			

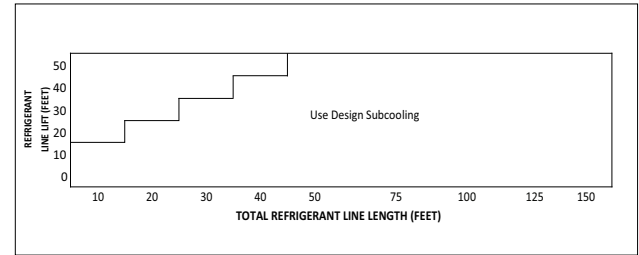
**Table 9. R-454B refrigerant charging chart**

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

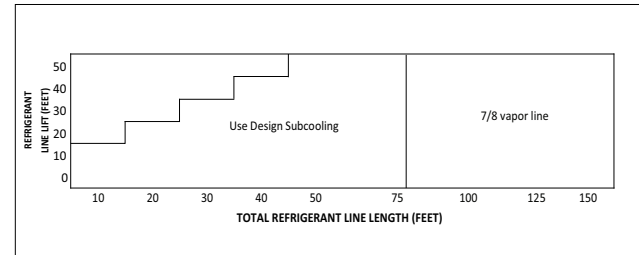
**Figure 29. Subcool Charging Corrections – models 018A, 024A, 030A and 036A**



**Figure 30. Subcool Charging Corrections – models 042A and 048A**



**Figure 31. Subcool Charging Corrections – models 048A and 060A**



Design Subcooling Value = \_\_\_\_\_ ° F

(from nameplate or Service Facts)

Subcooling Correction = \_\_\_\_\_ ° F

Final Subcooling Value = \_\_\_\_\_ ° F

## Charging the Unit

1. Attain Proper Gauge Pressure. Using the Standard R-454B Subcool Charging Chart, adjust refrigerant level to attain proper gauge pressure.

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

Add refrigerant in the Liquid Gauge Pressure is lower than the chart value

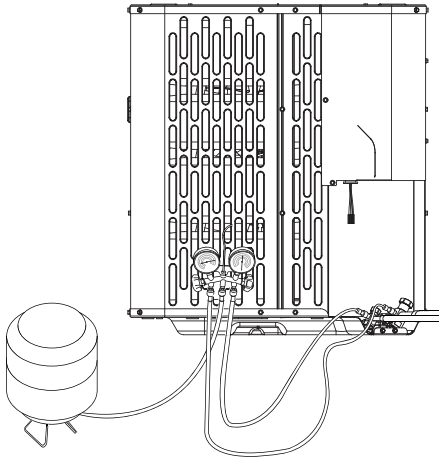
- a. Connect gauges to refrigerant bottle and unit are illustrated.
- b. Purge all hoses.
- c. Place refrigerant bottle on a scale and then open bottle.
- d. Stop adding refrigerant when liquid line refrigerant and Liquid Gauge Pressure match the charging chart.

## System Charge Adjustment

### Notes:

- Recover refrigerant if the Liquid Gauge Pressure is higher than the chart value.
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Cylinders shall be kept in an appropriate position according to the instructions. Ensure that the REFRIGERATION SYSTEM is earthed prior to charging the system with refrigerant.

Figure 32. Charging the unit



**Note:** When the Liquid Line Temperature and Gauge Pressure approximately match 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.
3. Record System Information for reference. Record system pressures and temperatures after charging is complete.

Outdoor model number = \_\_\_\_\_

Measured Suction Line Temp = \_\_\_\_\_ ° F

Measured Outdoor Ambient = \_\_\_\_\_ ° F

Liquid Gauge Pressure = \_\_\_\_\_ PSIG

Measured Indoor Ambient = \_\_\_\_\_ ° F

Suction Gauge Pressure = \_\_\_\_\_ PSIG

Measured Liquid Line Temp = \_\_\_\_\_ ° F

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

2. Stabilize the system.

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

Figure 33. Stop watch





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

	Indoor Wet Bulb Temp (F)																													
Outdoor Dry Bulb Temp. (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	

Using a digital psychrometer, measure the return air wet-bulb temperature at the unit just before the coil. Also measure the outdoor dry-bulb temperature. Use these temperatures to locate the target superheat on the charging table. Do not attempt to charge the system if these conditions fall outside of this charging table.

Add refrigerant to decrease total superheat. remove refrigerant to increase total superheat. Always allow 10 to 15 minutes of operation after any refrigerant or air flow change prior to determining the final superheat.

## Weigh-In Method for Charging

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

### Calculating Charge Using the Weigh-In Method

1. Measure in feet the distance between the outdoor unit and the indoor unit and record on Line 1. Include the entire length of the line from the service valve to the IDU (minus 10 ft).

Line length (ft) = \_\_\_\_\_

2. Enter the charge multiplier (0.47 oz./ft for 3/8-inch and 0.30 oz./ft for 5/16-inch).
3. Multiply the total length of refrigerant tubing (Line 1) times the value on Step 2. Record the result on Line 3 of the Worksheet.

Step 1 x Step 2 = \_\_\_\_\_

4. This is the amount of refrigerant to weigh-in prior to opening the service valves.  
Refrigerant = \_\_\_\_\_
5. Complete the 'Total System Charge' charge rating label below and label located on the outside of the unit with a permanent marker.

**Note:** Complete the 'Total System Charge' chart when final charging is complete.

- a. Charge added at Factory = \_\_\_\_\_ lb/ozc.
- b. Charge added at install = \_\_\_\_\_ lb/oz
- c. Total System Charge (a + b) = \_\_\_\_\_ lb/oz

6. Return to site for adjustment.

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

# Checkout Procedures

## Operational and Checkout Procedures

Final phases of this installation are the unit Operational and Checkout Procedures. To obtain proper performance, all units must be operated and charge adjustments made.

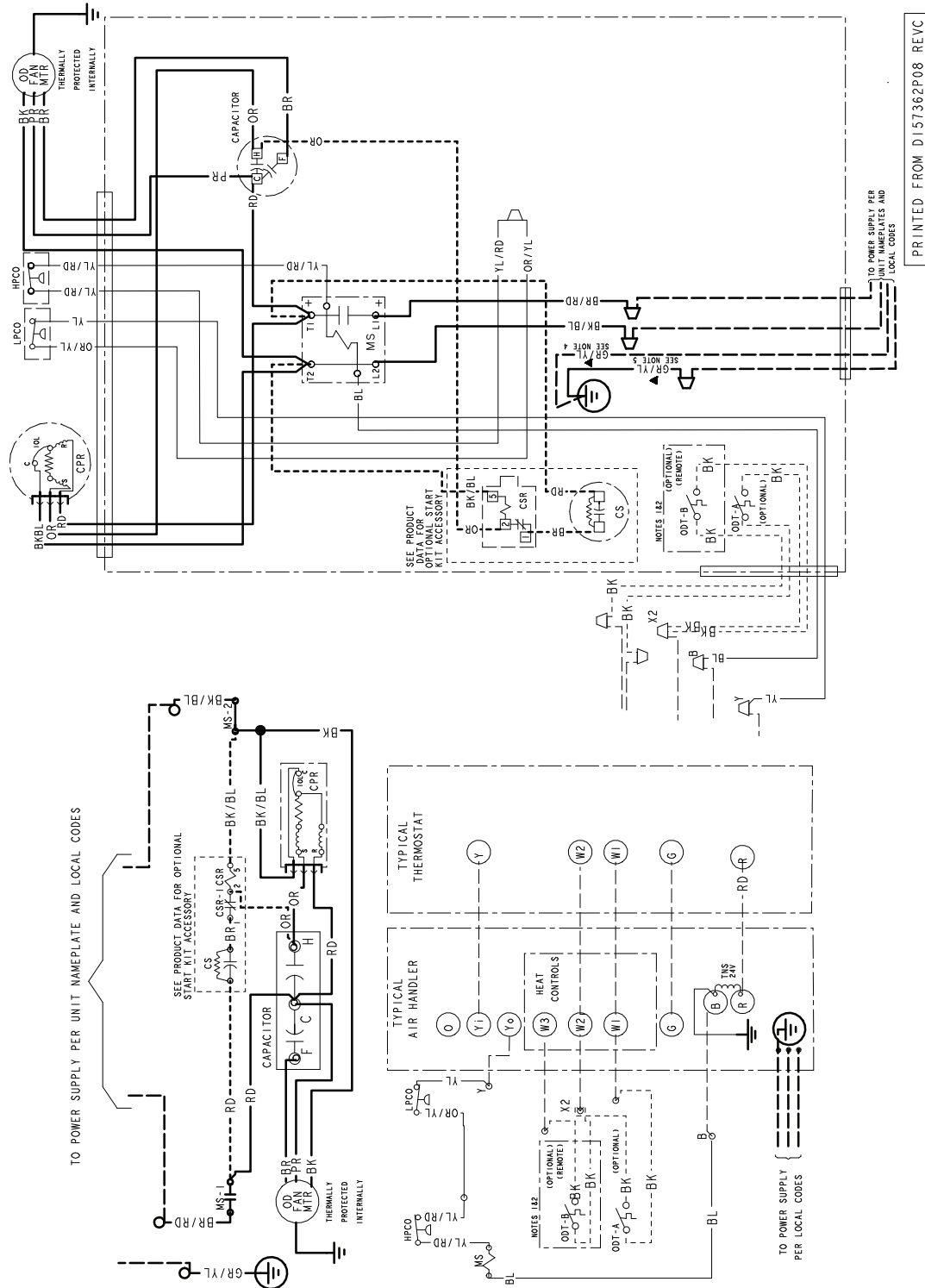
**Important:** *Perform a final unit inspection to be sure that factory tubing has not shifted during shipment. Adjust tubing if necessary so tubes do not rub against each other when the unit runs. Also be sure that wiring connections are tight and properly secured.*

After installation has been completed, it is recommended that the entire system be checked against the following list:

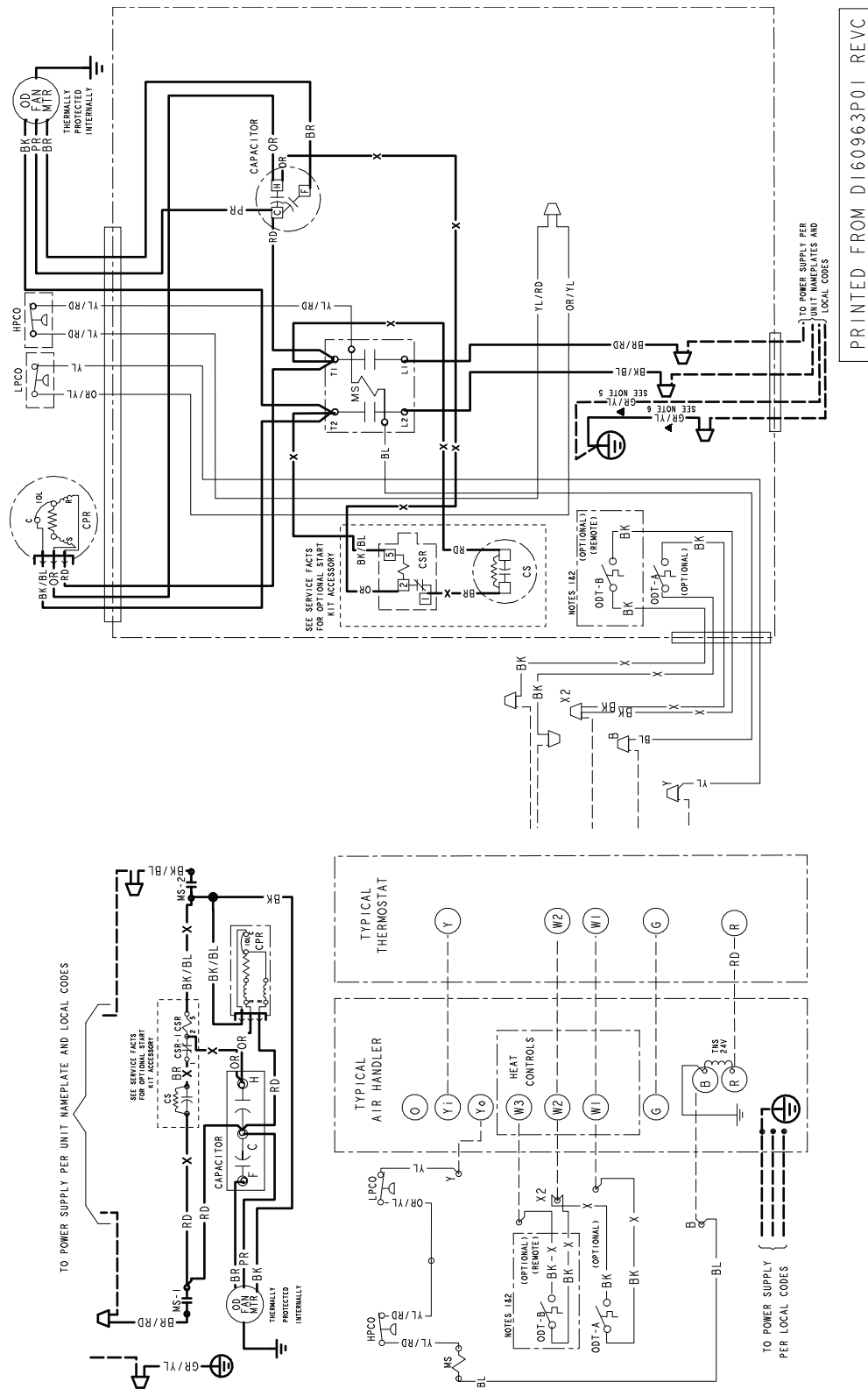
- ☐ Leak check refrigerant lines.
- ☐ Properly insulate suction lines and fittings.
- ☐ Properly secure and isolate all refrigerant lines.
- ☐ Seal passages through masonry. If mortar is used, prevent mortar from coming into direct contact with copper tubing.
- ☐ Verify that all electrical connections are tight.
- ☐ Observe outdoor fan during on cycle for clearance and smooth operation.
- ☐ Be sure that indoor coil drain line drains freely. Pour water into drain pan.
- ☐ Be sure that supply registers and return grilles are open and unobstructed.
- ☐ Be sure that a return air filter is installed.
- ☐ Be sure that the correct airflow setting is used. (Indoor blower motor).
- ☐ Operate complete system in each mode to ensure safe operation.
- ☐ Confirm refrigerant leak detection system is operational.
- ☐ Confirm refrigerant quantity is marked on OD unit.

# Wiring Diagrams

**Figure 34. Wiring diagram - models 018, 024, 030, 036, 042, and 048**



**Figure 35. Wiring diagram - model 060**



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**Figure 36. 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 MIN.
4. USE COOPER CONDUCTOR 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

CF FAN CAPACITOR  
CN WIRECONNECTOR  
CPR COMPRESSOR  
CR RUN CAPACITOR  
CS STARTING CAPACITOR  
CSR CAPACITOR SWITCHING RELAY  
F INDOOR FAN RELAY  
HPCO HIGH PRESSURE CUTOUT SWITCH  
LPCO LOW PRESSURE CUTOUT SWITCH  
IOL INTERNAL OVERLOAD PROTECTOR  
SM SYSTEM ON-OFF SWITCH  
MS COMPRESSOR MOTOR CONTACTOR  
ODA OUTDOOR ANTICIPATOR  
OFT OUTDOOR FAN THERMOSTAT  
ODS OUTDOOR TEMPERATURE SENSOR  
ODT OUTDOOR THERMOSTAT  
SC SWITCH OVER VALVE SOLENOID  
TDL DISCHARGE LINE THERMOSTAT  
TNS TRANSFORMER

 MAGNETIC COIL  
 GROUND  
 JUNCTION  
 CAPACITOR  
 WIRE NUT OR TERMINAL  
 TRANSFORMER  
 FUSE  
 TERMINAL BLOCK/BOARD  
 RELAY CONTACT (N.O.)  
 RELAY CONTACT (N.C.)  
 24 V } FIELD INSTALLED  
 LINE V } FACTORY WIRING

 THERMISTOR  
 TEMP ACTUATED SWITCH  
 INTERNAL OVERLOAD PROTECTION  
 PRESSURE ACTUATED SWITCH  
 RESISTOR OR HEATING ELEMENT  
 MOTOR WINDING  
 POL. PLUG FEMALE HOUSING (MALE TERMINALS)  
 POL. PLUG MALE HOUSING (FEMALE TERMINALS)  
 24 V } FACTORY WIRING  
 24 V } FIELD WIRING  
 - - - - - FIELD INSTALLED 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	LTBL LIGHT BLUE	

**▲ NOTE:**

MATERIAL: WHITE POLYPROPYLENE SUITABLE FOR USE IN OUTDOOR ENVIRONMENT.  
ADHESIVE: PRESSURE SENSITIVE ADHESIVE WITH RELEASE PAPER SUITABLE FOR OUTDOOR APPLICATION ON PAINTED OR GALVANIZED SHEET METAL SURFACES.  
SIZE: 8 1/2" X 11"

# Pressure Curves

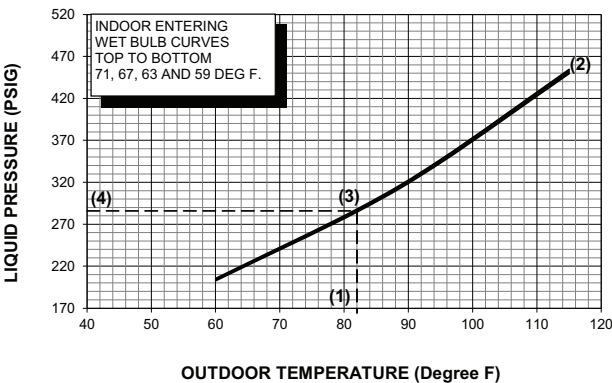
Cooling performance can be checked when the outdoor temperature is above 65° F.

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 discharge or suction pressure in left column.

**Figure 37. Pressure curves - model A5AC3018A1**



OD Model	Cooling @SCFM
A5AC3018A1	600

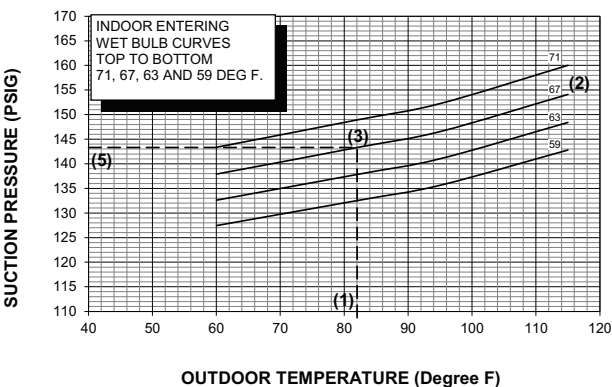


Figure 38. Pressure curves - models A5AC3024A1,A5AC3030A1,A5AC3036A1,A5AC3042A1, and A5AC3048A1

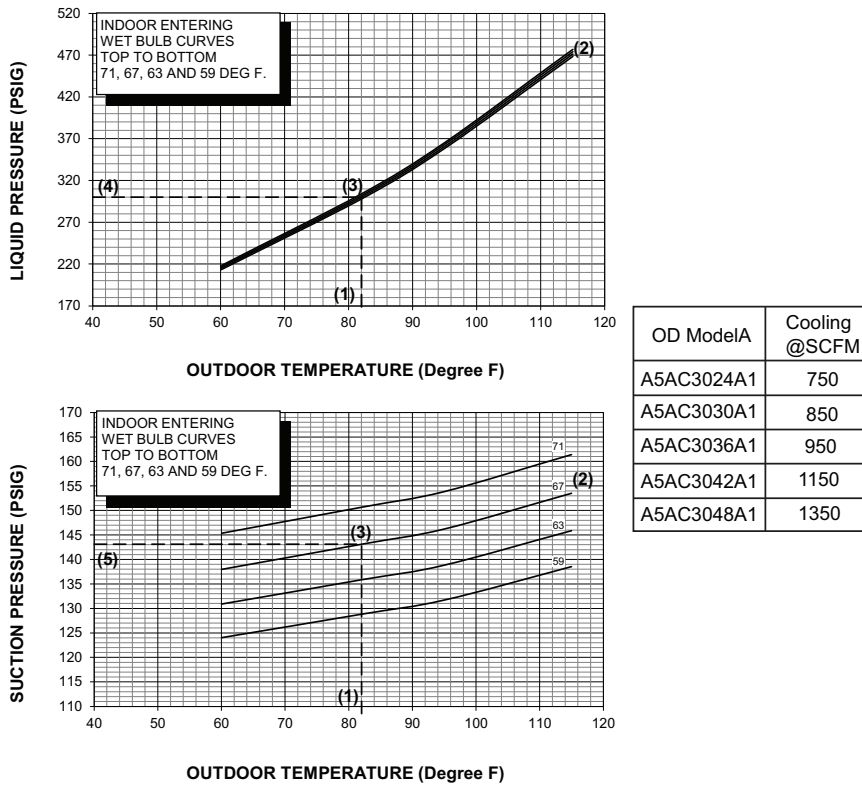
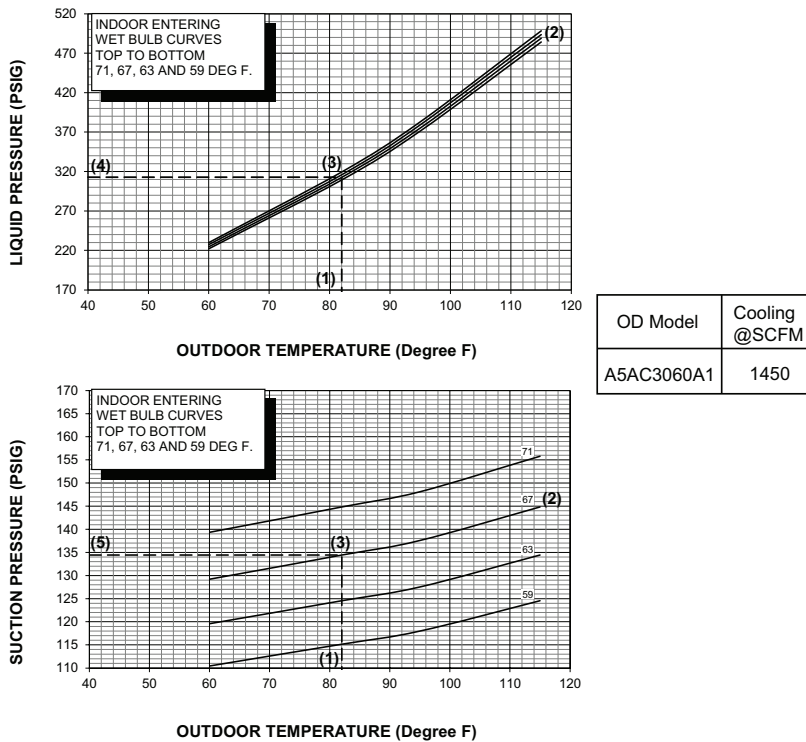


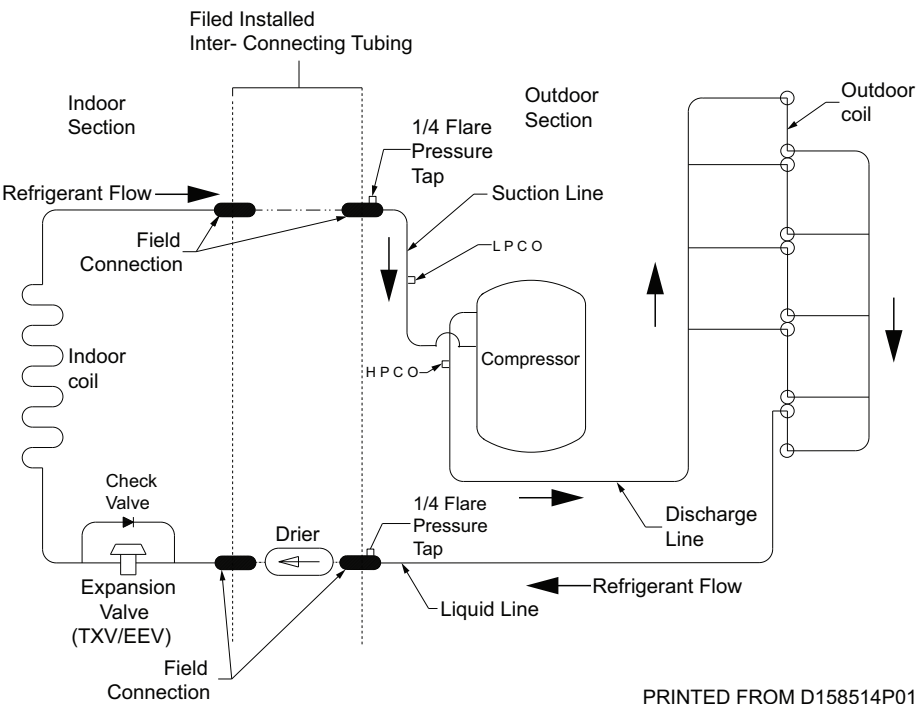
Figure 39. Pressure curves - model A5AC3060A1



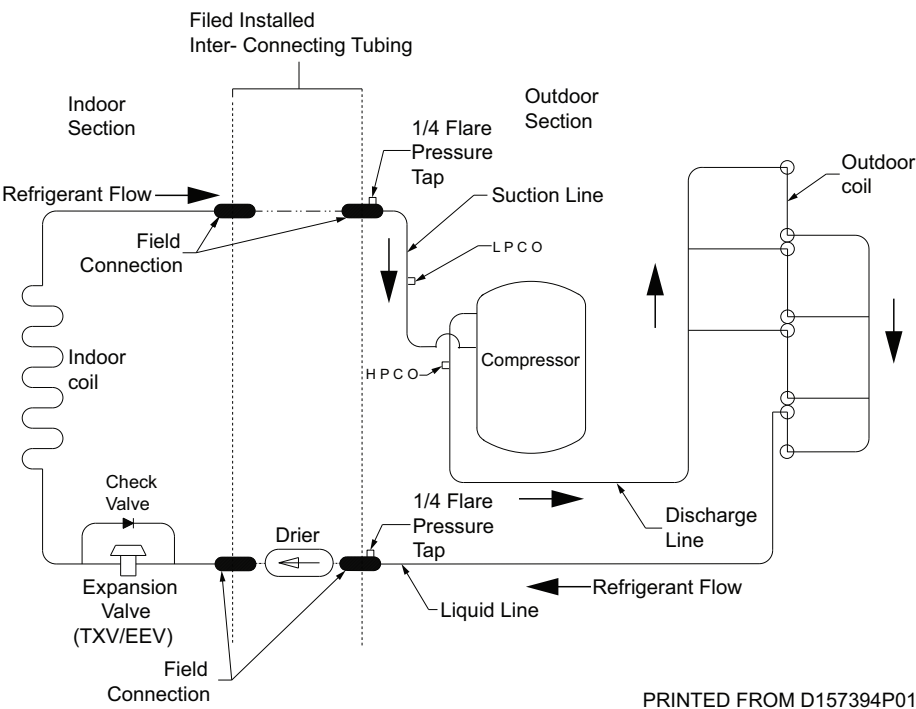


# Refrigeration Circuits

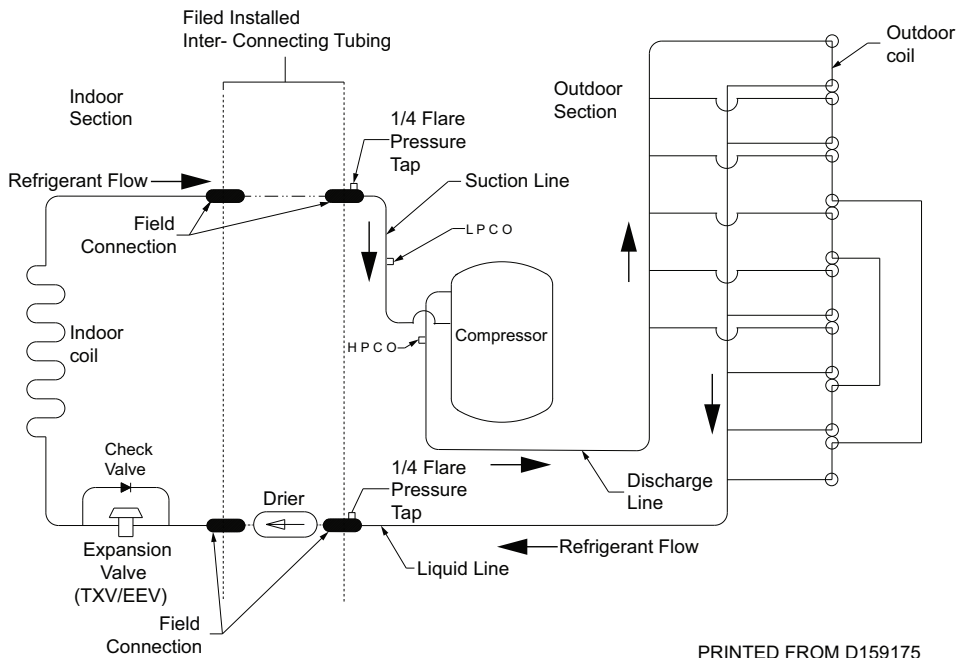
**Figure 40. Refrigeration cycle for models 018, 030, and 042**



**Figure 41. Refrigeration cycle for models 024 and 036**



**Figure 42. Refrigeration cycle for models 048 and 060**



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## 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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