

# Installation and Operation Manual

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

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

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

**Note:** The manufacturer recommends installing only approved matched indoor and outdoor systems. All of the 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.

## Condensing Units

### Models

A5AC3018A

A4AC3023A

A5AC3024A

A5AC3030A

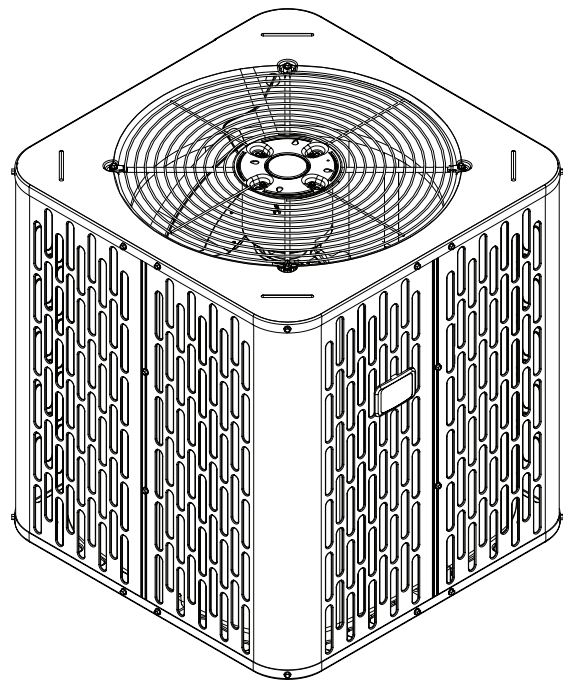
A5AC3035A

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.

## Section 1. Safety

**NOTE: R454B refrigerant is a blend and should only be added to the system in liquid form.**

### WARNING

#### HAZARDOUS VOLTAGE!

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

### WARNING

#### REFRIGERANT OIL!

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

Use only R-454B approved service equipment. All R-454B systems with variable speed compressors use variable speed compressor oil that readily absorbs moisture from the atmosphere. To limit this 'hygroscopic' action, the system should remain sealed whenever possible. If a system has been open to the atmosphere for more than 4 hours, the compressor oil must be replaced. Never break a vacuum with air and always change the driers when opening the system for component replacement.

### CAUTION

#### HOT SURFACE!

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

### WARNING

#### **RISK OF FIRE!**

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

### WARNING

#### BRAZING REQUIRED - IF USING MECHANICAL CONNECTIONS, ENSURE LEAK TEST IS NEGATIVE!

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

### CAUTION

#### CONTAINS REFRIGERANT!

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage. System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening system.

### CAUTION

#### GROUNDING REQUIRED!

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

### WARNING

#### SERVICE VALVES!

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

### WARNING

#### HIGH LEAKAGE CURRENT!

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

### WARNING

#### VENTILATION

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.

**Important:** If using other than copper pipe, follow manufacturer's installation instructions. Joints must be brazed or other UL/IMC/URMC approved joint that meets pressure requirements.

Mode	Model	Operating Range
Cooling	1.5 – 5 Ton	55°F – 120°F
Heating	1.5 – 5 Ton	0°F – 66°F

# Table of Contents

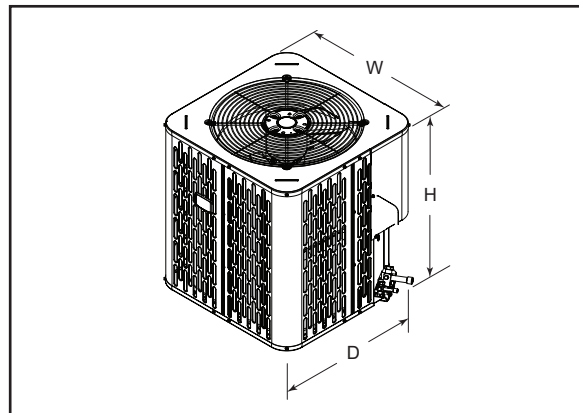
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## Section 2. Unit Location Considerations

### 2.1 Unit Dimensions and Weight

Table 2.1

Unit Dimensions and Weight		
Models	H x D x W (in)	Weight* (lb)
A5AC3018A	28.6 x 25.6 x 25.6	134
A5AC3024A	28.6 x 25.6 x 25.6	134
A5AC3030A	28.6 x 29.8 x 29.8	163
A5AC3036A	28.6 x 29.8 x 29.8	161
A5AC3042A	36.6 x 29.8 x 29.8	193
A5AC3048A	36.6 x 34.3 x 34.3	220
A5AC3060A	36.6 x 34.3 x 34.3	220
* Weight values are estimated.		



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

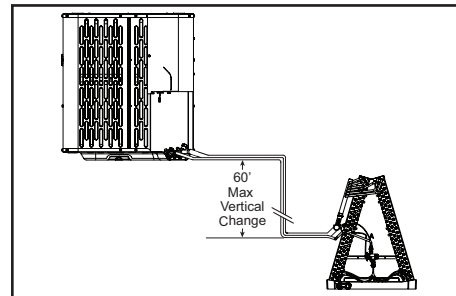
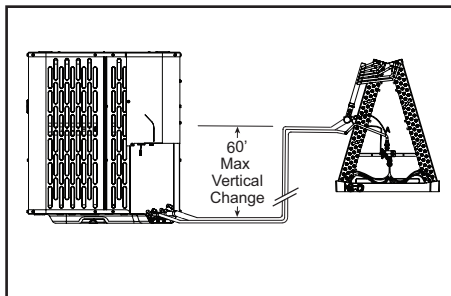
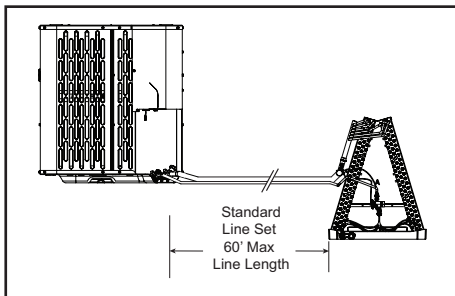
Properly selected isolation is recommended to alleviate sound or vibration transmission to the building structure.

### 2.2 Refrigerant Piping Limits

1. The maximum TOTAL length of refrigerant lines from outdoor to indoor unit should NOT exceed 150 feet\* (including lift).
2. The maximum vertical change should not exceed 50 feet\*.
3. Standard and alternate line sizes and service valve connection sizes are shown in Table 5.1.

\* See Table 5.1 for exceptions for certain tonnages.

**Note:** For other line lengths, Refer to Refrigerant Piping Application Guide, SS-APG006F-EN, or Refrigerant Piping Software Program.



### 2.3 Suggested Locations for Best Reliability

Ensure the top discharge area is unrestricted for at least five (5) feet above the unit.

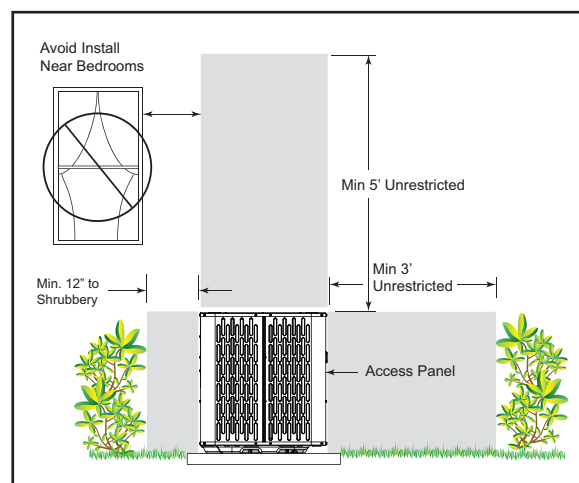
Three (3) feet clearance must be provided in front of the control box (access panels) and any other side requiring service.

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" 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.



## 2.4 Cold Climate Considerations

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

- Units should be elevated 3-12 inches above the pad or rooftop, depending on local weather. This additional height will allow drainage of snow and ice melted during defrost cycle prior to its refreezing. Ensure that drain holes in unit base pan are not obstructed preventing draining of defrost water.
- If possible, avoid locations that are likely to accumulate snow drifts. If not possible, a snow drift barrier should be installed around the unit to prevent a build-up of snow on the sides of the unit.

## Section 3. Unit Preparation

### 3.1 Prepare The Unit For Installation

**STEP 1** - Check for damage and report promptly to the carrier any damage found to the unit.

## Section 4. Setting the Unit

### 4.1 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" 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.

## Section 5. Refrigerant Line Considerations

### 5.1 Refrigerant Line and Service Valve Connection Sizes

**Table 5.1**

RATED LINE SIZES	Line Sizes		Service Valve Connection Sizes		Max Line & Lift Lengths	
	Vapor Line	Liquid Line	Vapor Line Connection	Liquid Line Connection	TOTAL Max Line Length (ft.)	Max Lift (ft.)
A5AC3018A	3/4	5/16	3/4	5/16	150	50
A5AC3024A	3/4	5/16	3/4	5/16	150	50
A5AC3030A	3/4	5/16	3/4	5/16	150	50
A5AC3036A	3/4	5/16	3/4	5/16	150	50
A5AC3042A	7/8	5/16	7/8	5/16	150	50
A5AC3048A	7/8	5/16	7/8	5/16	150	50
A5AC3060A	7/8	5/16	7/8	5/16	150	50

**Note:** For other line lengths, Refer to Refrigerant Piping Application Guide, SS-APG006F-EN, or Refrigerant Piping Software Program.

### 5.2 Factory Charge

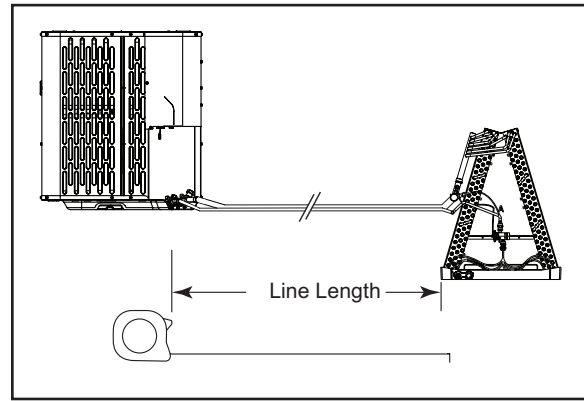
The outdoor condensing units are factory charged with the system charge required for the outdoor condensing unit, ten (10) feet of tested connecting line, and the smallest rated indoor evaporative coil match. Always verify proper system charge via subcooling (TXV/EEV) or superheat (fixed orifice) per the unit nameplate.

### 5.3 Required Refrigerant Line Length

Determine required line length and lift. You will need this later in STEP 2 of Section 14.

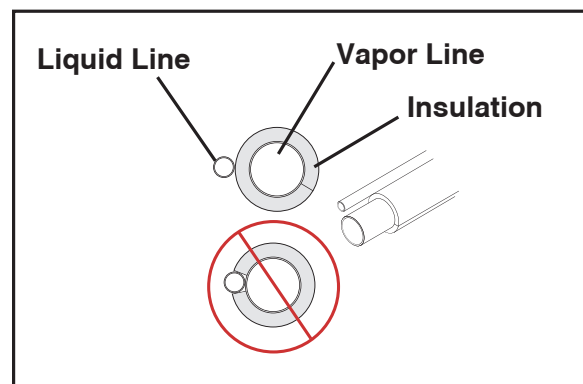
Total Line Length = \_\_\_\_\_ Ft.

Total Vertical Change (lift) = \_\_\_\_\_ Ft.



### 5.4 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.



### 5.5 Reuse Existing Refrigerant Lines

#### ⚠ CAUTION

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

For retrofit applications, where the existing indoor evaporator coil and/or refrigerant lines will be used, the following precautions should be taken:

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

## Section 6. Refrigerant Line Routing

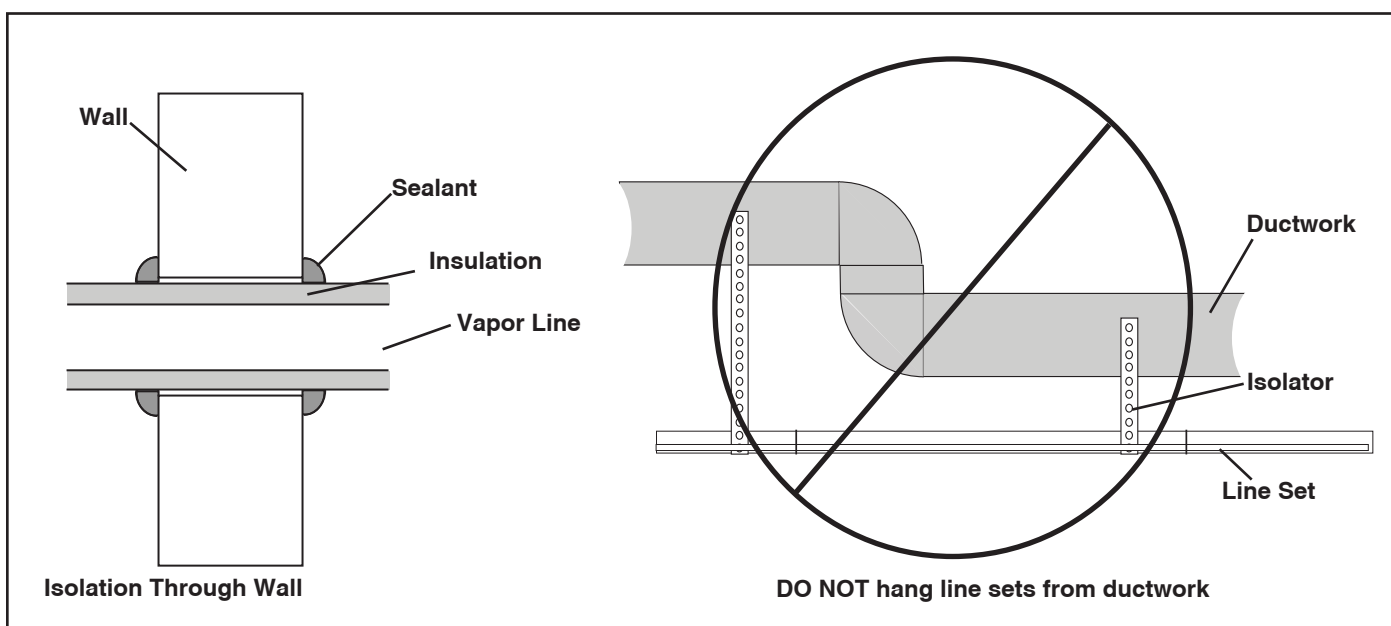
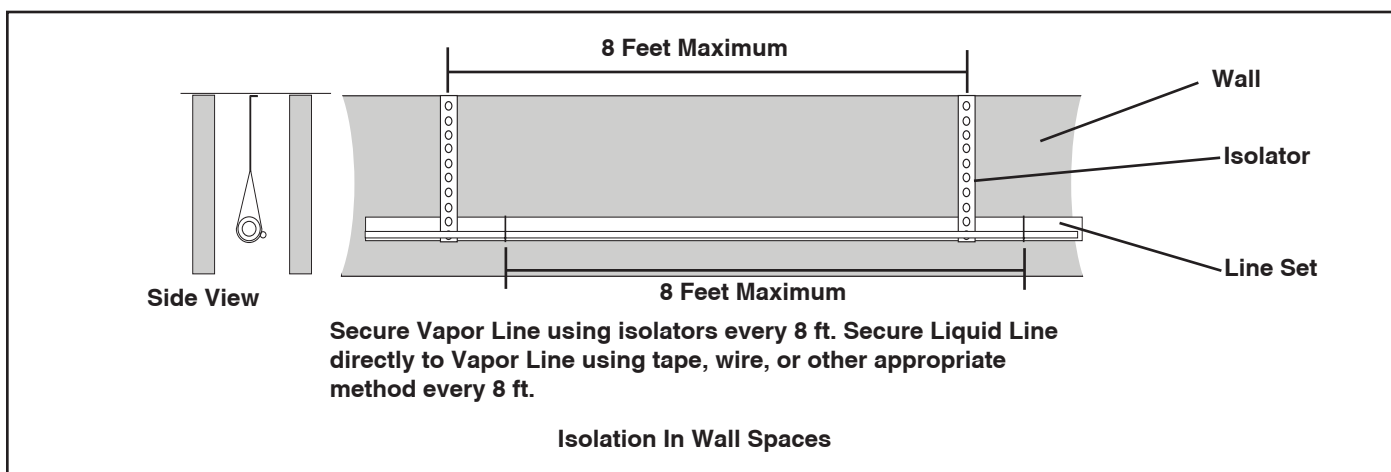
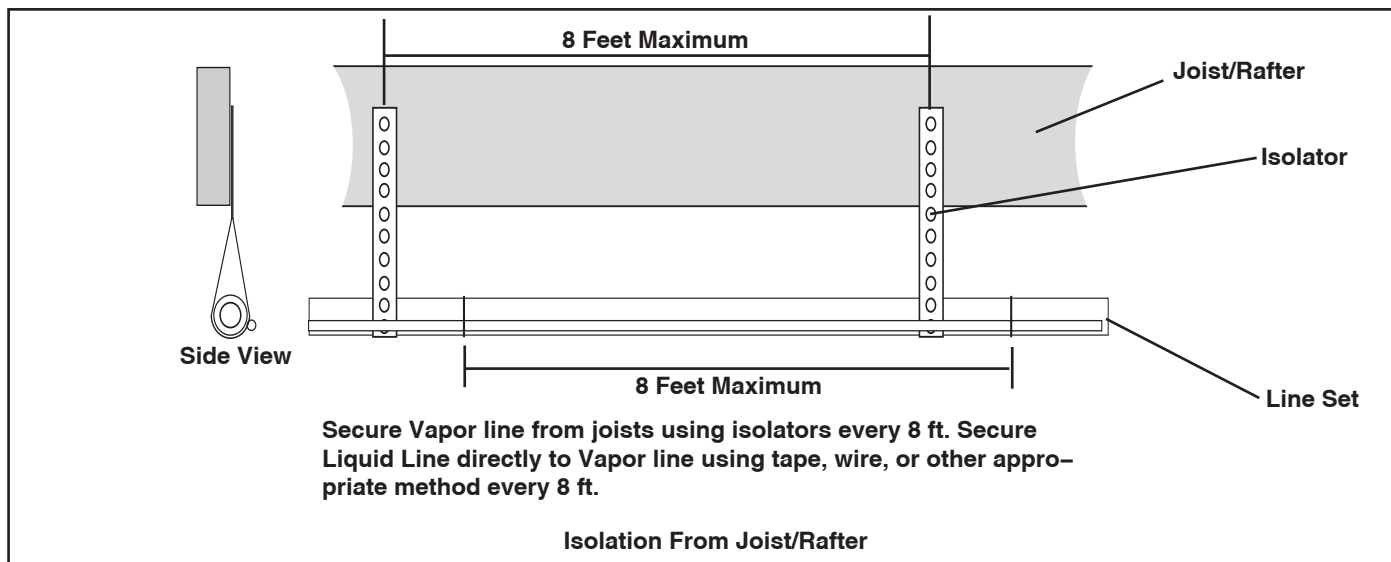
### 6.1 Precautions

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



## Section 7. Refrigerant Line Brazing

### 7.1 Braze The Refrigerant Lines

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

**STEP 2** - Remove the pressure tap cap and valve cores from both service valves.

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

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

Braze the refrigerant lines to the service valves.

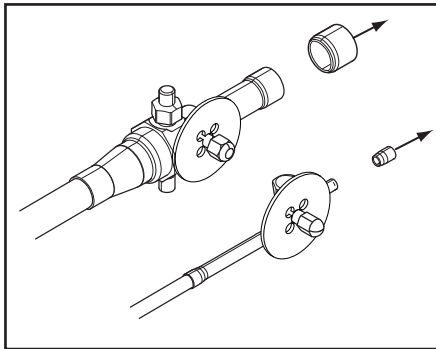
Continue the dry nitrogen purge. Do not remove the wet rag until all brazing is completed.

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

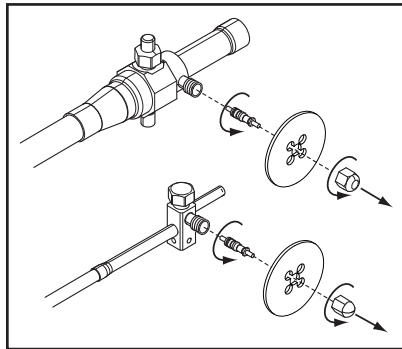
**Note:** Install drier in Liquid Line.

**NOTE:** Precautions should be taken to avoid heat damage to basepan during brazing. It is recommended to keep the flame directly off of the basepan.

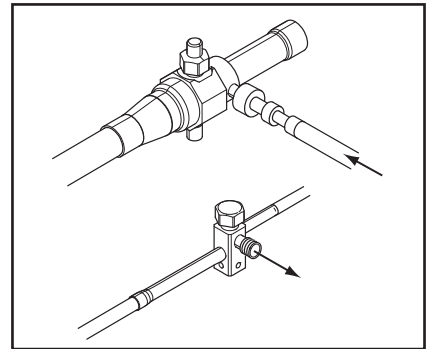
**STEP 5** - Replace the pressure tap valve cores after the service valves have cooled.



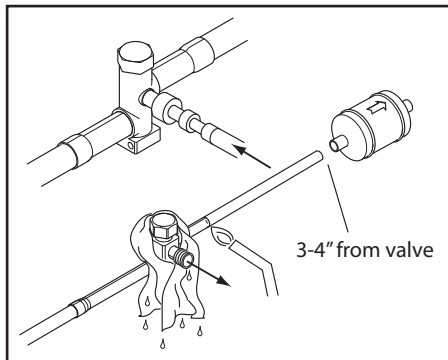
STEP 1



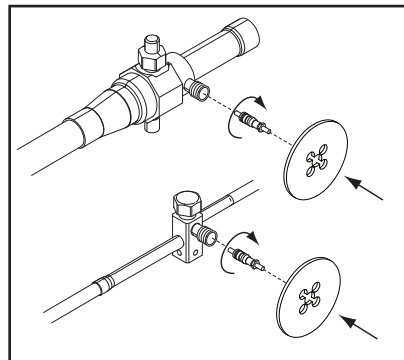
STEP 2



STEP 3



STEP 4



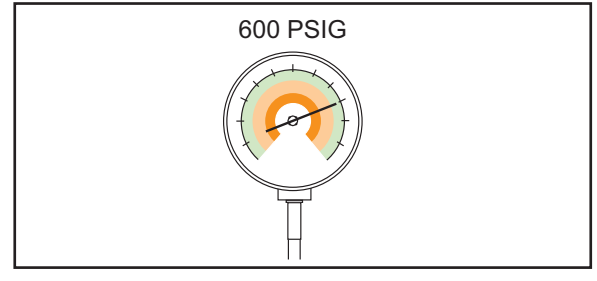
STEP 5



## Section 8. Refrigerant Line Leak Check

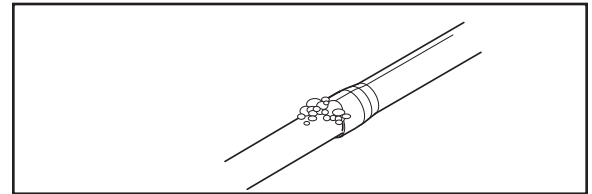
### 8.1 Check For Leaks

**STEP 1** - Pressurize the refrigerant lines and evaporator coil to 600 PSIG using dry nitrogen.



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

**Note:** Remove nitrogen pressure and repair any leaks before continuing.



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, according to the following requirements:

1. The minimum leak test pressure of the lineset and indoor coil shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
2. The test pressure after removal of pressure source shall be maintained for at least 1 hour with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.

**Important:** Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

**Important:** The following leak detection methods are deemed acceptable for all refrigerant systems:

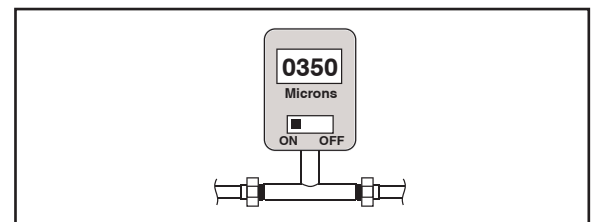
- Electronic leak detectors calibrated for R454B
- Bubble method

## Section 9. Evacuation and Servicing

### 9.1 Evacuate the Refrigerant Lines and Indoor Coil

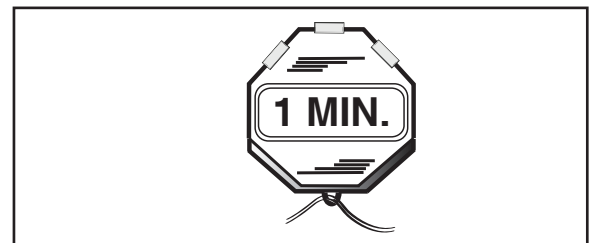
**Important:** Do not open the service valves until the refrigerant lines and indoor coil leak check and evacuation are complete.

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



**STEP 2** - Observe the micron gauge. Evacuation is complete, if the micron gauge does not rise above 500 microns in one (1) minute and 1500 microns in ten (10) minutes.

**STEP 3** - Once evacuation is complete, blank off the vacuum pump and micron gauge, and close the valve on the manifold gauge set.



Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.

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

- Electronic leak detectors calibrated for R454B
- Bubble method
- Fluorescent method agents

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

## 9.2 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 FLAMMABLE REFRIGERANT does not remain within the lubricant.

## Section 10. Service Valves

### 10.1 Open the Gas Service Valve

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

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

**STEP 1** - Remove valve stem cap.

**STEP 2** - Using an adjustable wrench, turn valve stem 1/4 turn counterclockwise to the fully open position.

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

### 10.2 Open the Liquid Service Valve

#### WARNING

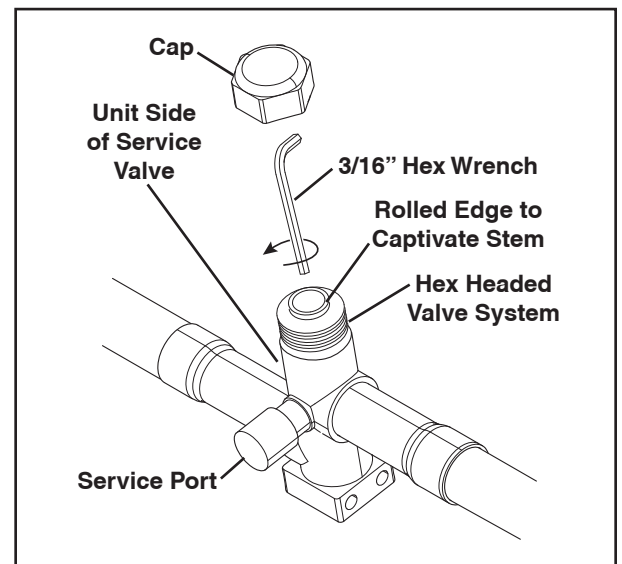
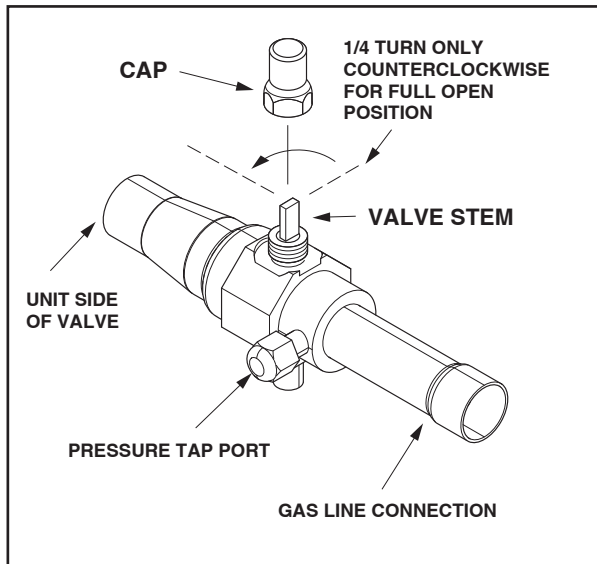
Extreme caution should be exercised when opening the Liquid Line Service Valve. Turn counterclockwise until the valve stem just touches the rolled edge. No torque is required. Failure to follow this warning will result in abrupt release of system charge and may result in personal injury and /or property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

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

**STEP 1** - Remove service valve cap.

**STEP 2** - Fully insert 3/16" hex wrench into the stem and back out counterclockwise until valve stem just touches the rolled edge (approximately five (5) turns.)

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



## Mitigation Board Guidelines

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

## Section 11. Electrical – Low Voltage

### 11.1 Low Voltage Maximum Wire Length

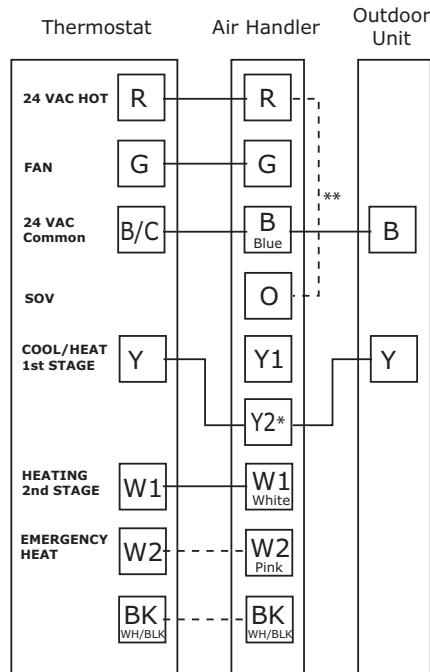
Table 11.1 defines the maximum total length of low voltage wiring from the outdoor unit, to the indoor unit, and to the thermostat.

**Table 11.1**

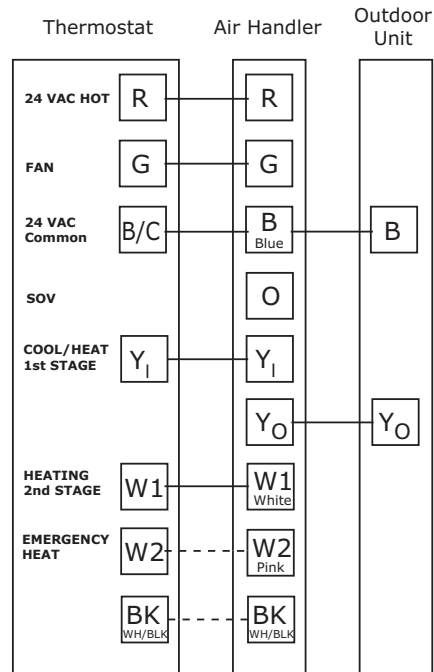
24 VOLTS	
WIRE SIZE	MAX. WIRE LENGTH
18 AWG	150 Ft.
16 AWG	225 Ft.
14 AWG	300 Ft.

## 11.2 Low Voltage Hook-up Diagrams

**With STEM 4, 5, C**

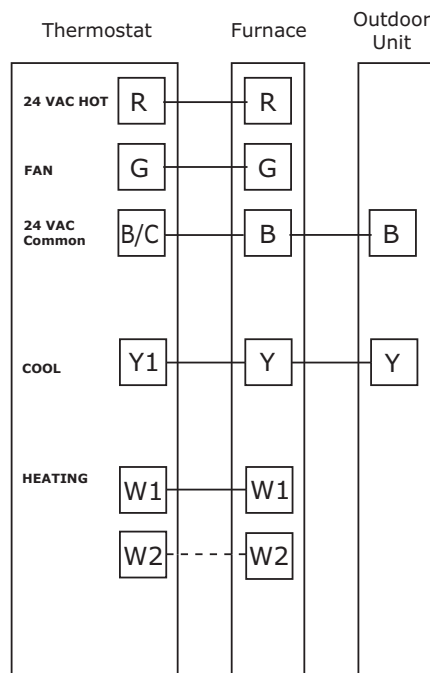


**With 5TAM5, X**

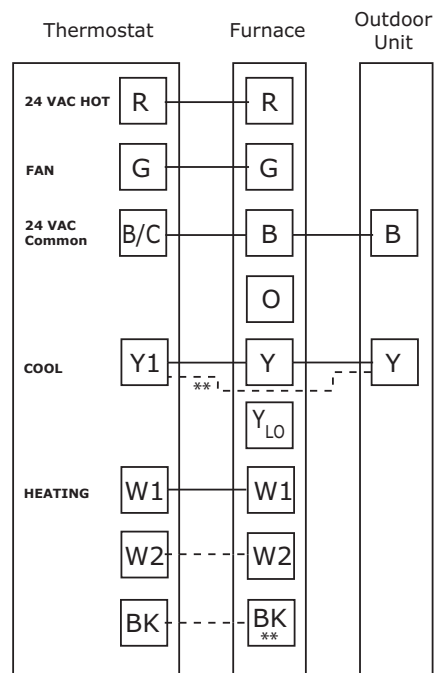


- Units with pigtails require wirenuts for connections. Cap all unused wires.
- In AC systems for multiple stages of electric heat, jumper W1 and W2 together if comfort control has only one stage of heat.
- TEM3/4 - Bypass air handler and connect Y from comfort control directly to OD unit
- \* TEM6 Only
- \*\* TEM6 only - When using a BK enabled comfort control, cut BK jumper and bypass Y1 and Y2 at the air handler. Connect BK from comfort control to BK of the air handler
- TAM4 only - Wire as shown, no BK is available
- TAM7 only - When using a BK enabled comfort control, cut BK jumper on the AFC and connect BK from comfort control to BK of the air handler

**With Furnace**



**With Variable Speed Furnace**



- Units with pigtails require wirenuts for connections. Cap all unused wires.
- In AC systems for multiple stages of heat, jumper W1 and W2 together if comfort control has only one stage of heat.
- \* If equipped with second stage heat
- \*\* When using a BK enabled comfort control, cut BK jumper and bypass Y and YLO at the furnace. Connect BK from comfort control to BK of the furnace

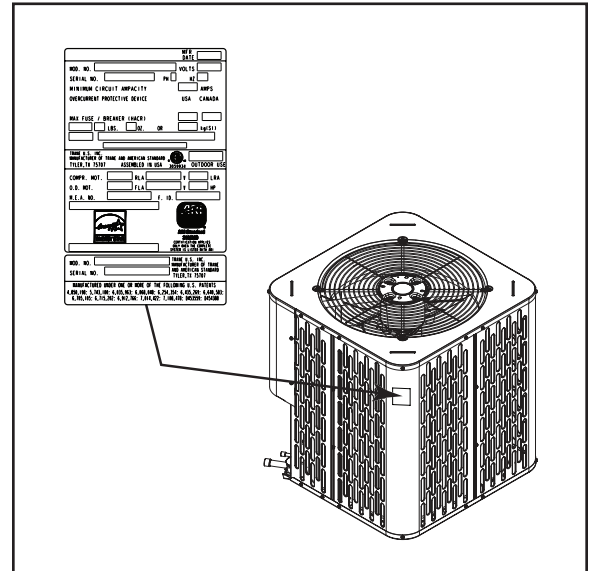
## Section 12. Electrical – High Voltage

### 12.1 High Voltage Power Supply

#### **⚠ WARNING**

##### **LIVE ELECTRICAL COMPONENTS!**

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



### 12.2 High Voltage Disconnect Switch

Install a separate disconnect switch at the outdoor unit.

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

### 12.3 High Voltage Ground

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

## Section 13. Start Up

### 13.1 System Start Up

**STEP 1** - Ensure Sections 7 through 12 have been completed.

**STEP 2** - Set System Thermostat to OFF.

**STEP 3** - Turn on disconnect(s) to apply power to the indoor and outdoor units.

**STEP 4** - Wait one (1) hour before starting the unit if compressor crankcase heater accessory is used and the Outdoor Ambient is below 70°F.

**STEP 5** - Set system thermostat to ON.

Section 14. System Charge Adjustment (Systems can be rated with TXV, EEV or Piston)

**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.

14.1 Temperature Measurements

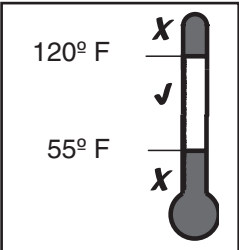
**STEP 1** - Check the outdoor temperatures.

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

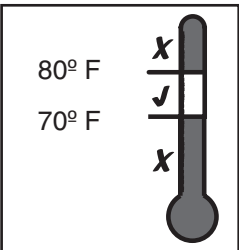
**Note:** For Superheat (In Cooling Mode), refer to the Superheat Charging Table

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

**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.



Outdoor Temp



Indoor Temp

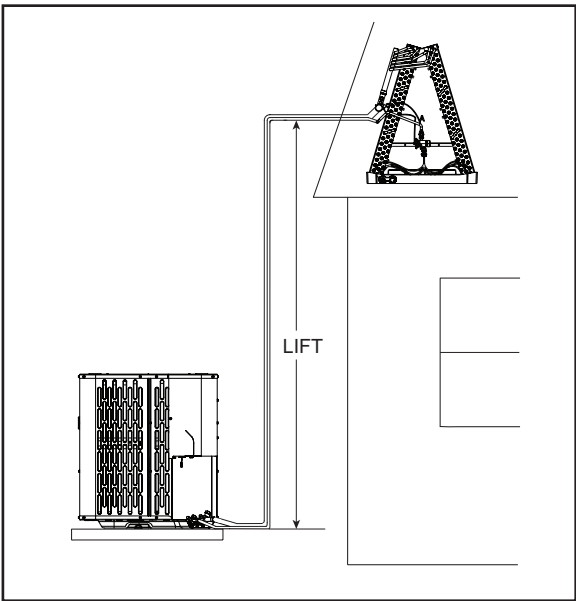
14.2 Subcooling Charging in Cooling (Above 55° F Outdoor Temp.)

**STEP 1** - Use the refrigerant line total length and lift measurements from Section 5 and use line length adders as shown in Section 5.2 if required.

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

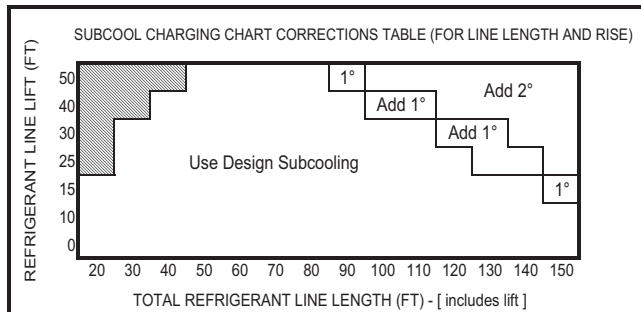
Vertical Change (Lift) = \_\_\_\_\_ Ft.

**Note:** Use this method when matched with a TXV or EEV indoor unit.

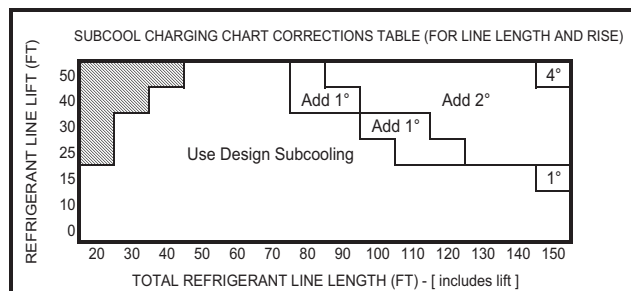


**STEP 2** - Determine the final subcooling value using total Line Length and Lift measured in STEP 1 and the charts below.

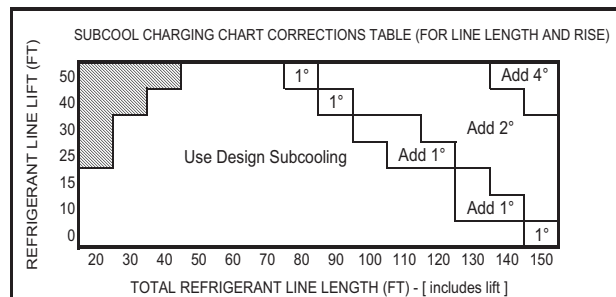
### 018 & 030 Models



### 024, 036 & 042 Models



### 048 & 060 Models



R-454B REFRIGERANT CHARGING CHART								
LIQUID TEMP (°F)	DESIGN SUBCOOLING (°F)							
	8	9	10	11	12	13	14	
	LIQUID GAGE 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	

Design Subcooling Value = \_\_\_\_\_ ° F  
(from nameplate or Service Facts)

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

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

### 14.3 Charging the Unit

#### STEP 1 - Attain Proper Gage Pressure.

Using the Standard R-454B Subcool Charging Chart, adjust refrigerant level to attain proper gage pressure.

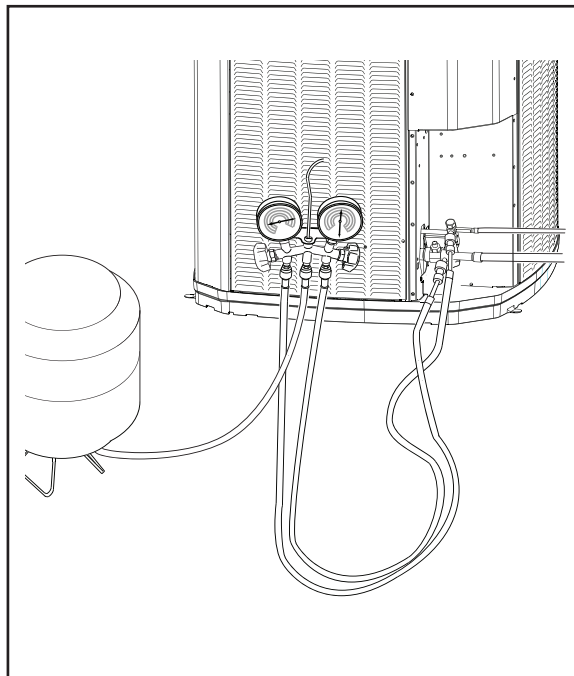
**Note:** Use bubble point, per the included chart, for calculating subcooling.

Add refrigerant in the Liquid Gage Pressure is lower than the chart value.

1. Connect gauges to refrigerant bottle and unit are illustrated.
2. Purge all hoses.
3. Place refrigerant bottle on a scale and then open bottle.
4. Stop adding refrigerant when liquid line refrigerant and Liquid Gage Pressure match the charging chart.

**Note:** Recover refrigerant if the Liquid Gage Pressure is higher than the chart value.

**Note:** Ensure that contamination of different refrigerants does not \_\_\_\_ when using charging equipment. Cylinders shall be kept in an appropriate position according to the instructions. Ensure that the REFRIGERATING SYSTEM is earther prior to charging the system with refrigerant.



#### STEP 2 - Stabilize the system.

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

**Note:** When the Liquid Line Temperature and Gage Pressure approximately match the chart, the system is properly charged.

2. Remove gages.
3. Replace service port caps to prevent leaks. Tighten finger tight plus an additional 1/6 turn.



#### STEP 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 Gage Pressure = \_\_\_\_\_ PSI

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

Suction Gage Pressure = \_\_\_\_\_ PSI

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

#### STEP 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



## 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.

### 14.4 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

**STEP 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.

**STEP 2** –Enter the charge multiplier (0.4 oz/ft). Each linear foot of interconnecting tubing requires the addition of 0.4 oz of refrigerant.

**STEP 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 4** –This is the amount of refrigerant to weigh-in prior to opening the service valves.

1. Line length (ft) \_\_\_\_\_

2. Charge multiplier x 0.4

3. Step 1 x Step 2 = \_\_\_\_\_

4. Refrigerant = \_\_\_\_\_

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

**STEP 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**.

## Section 15. Checkout Procedures

### 15.1 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.

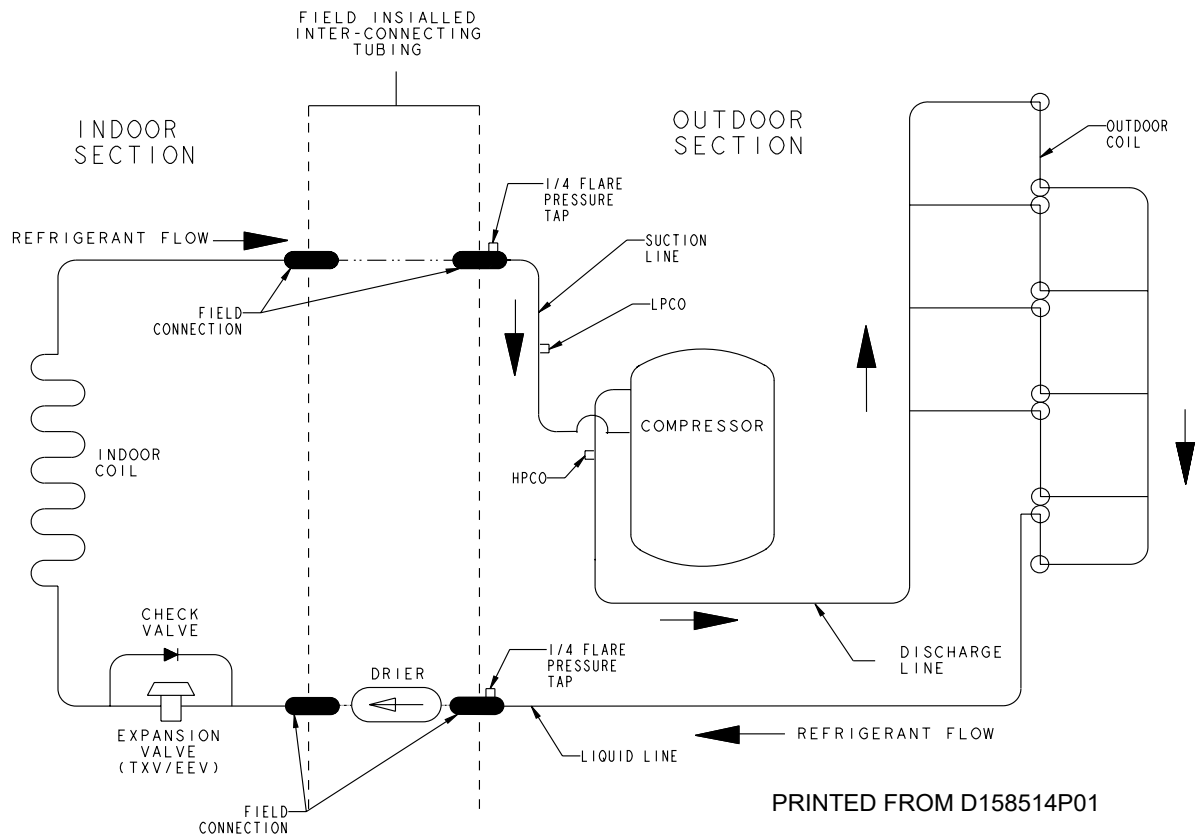
#### CHECKOUT PROCEDURE

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

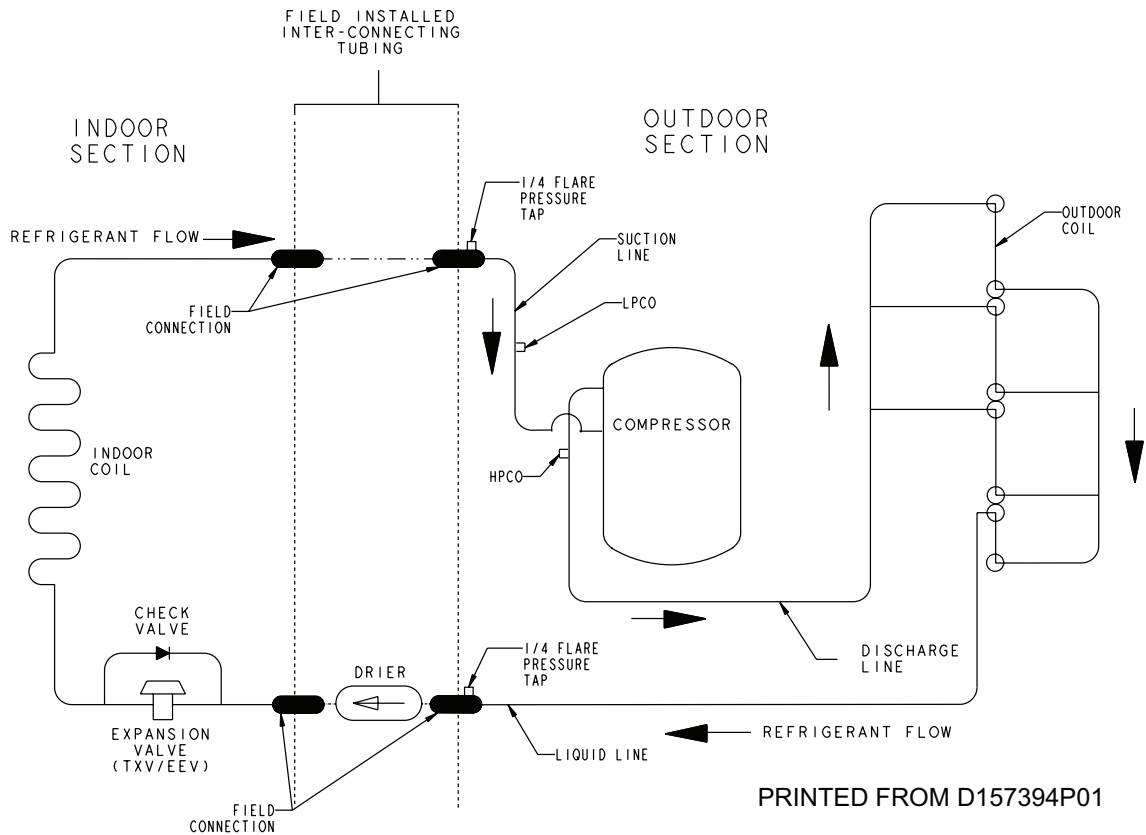
- |  |  |
|--|--|
| 1. Leak check refrigerant lines. .... [ ]  | 9. Be sure that a return air filter is installed. .... [ ]                               |
| 2. Properly insulate suction lines and fittings..... [ ]   | 10. Be sure that the correct airflow setting is used.<br>(Indoor blower motor) ..... [ ] |
| 3. Properly secure and isolate all refrigerant lines..... [ ]  | 11. Operate complete system in each mode to<br>ensure safe operation..... [ ]            |
| 4. Seal passages through masonry.<br>If mortar is used, prevent mortar from coming<br>into direct contact with copper tubing. .... [ ] |  |
| 5. Verify that all electrical connections are tight..... [ ]   |  |
| 6. Observe outdoor fan during on cycle for clearance<br>and smooth operation..... [ ]  |  |
| 7. Be sure that indoor coil drain line drains freely. Pour water<br>into drain pan..... [ ]  |  |
| 8. Be sure that supply registers and return grilles are open<br>and unobstructed..... [ ]  |  |

## Section 16. Refrigeration Circuits

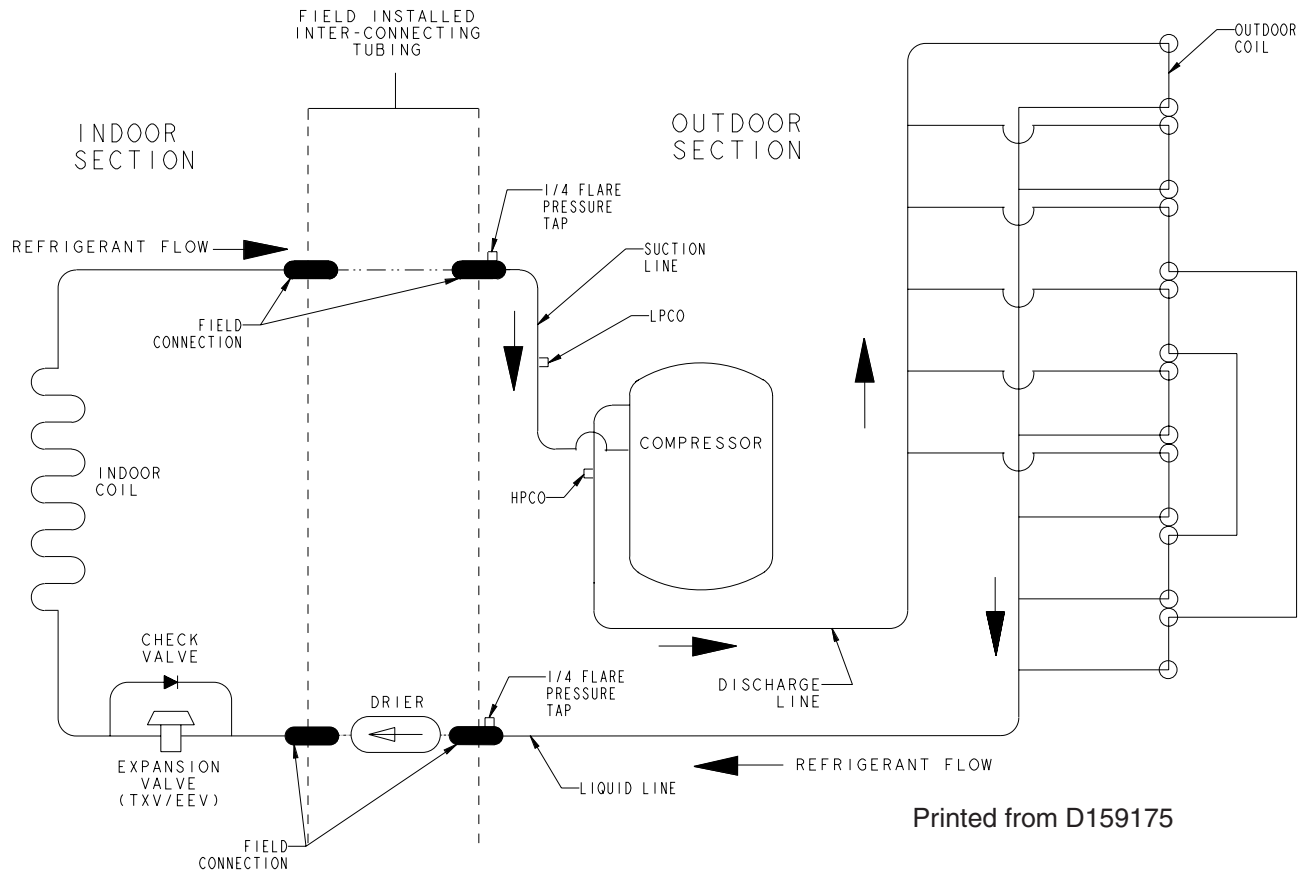
### 018, 030 & 042 Models



### 024 & 036 Models



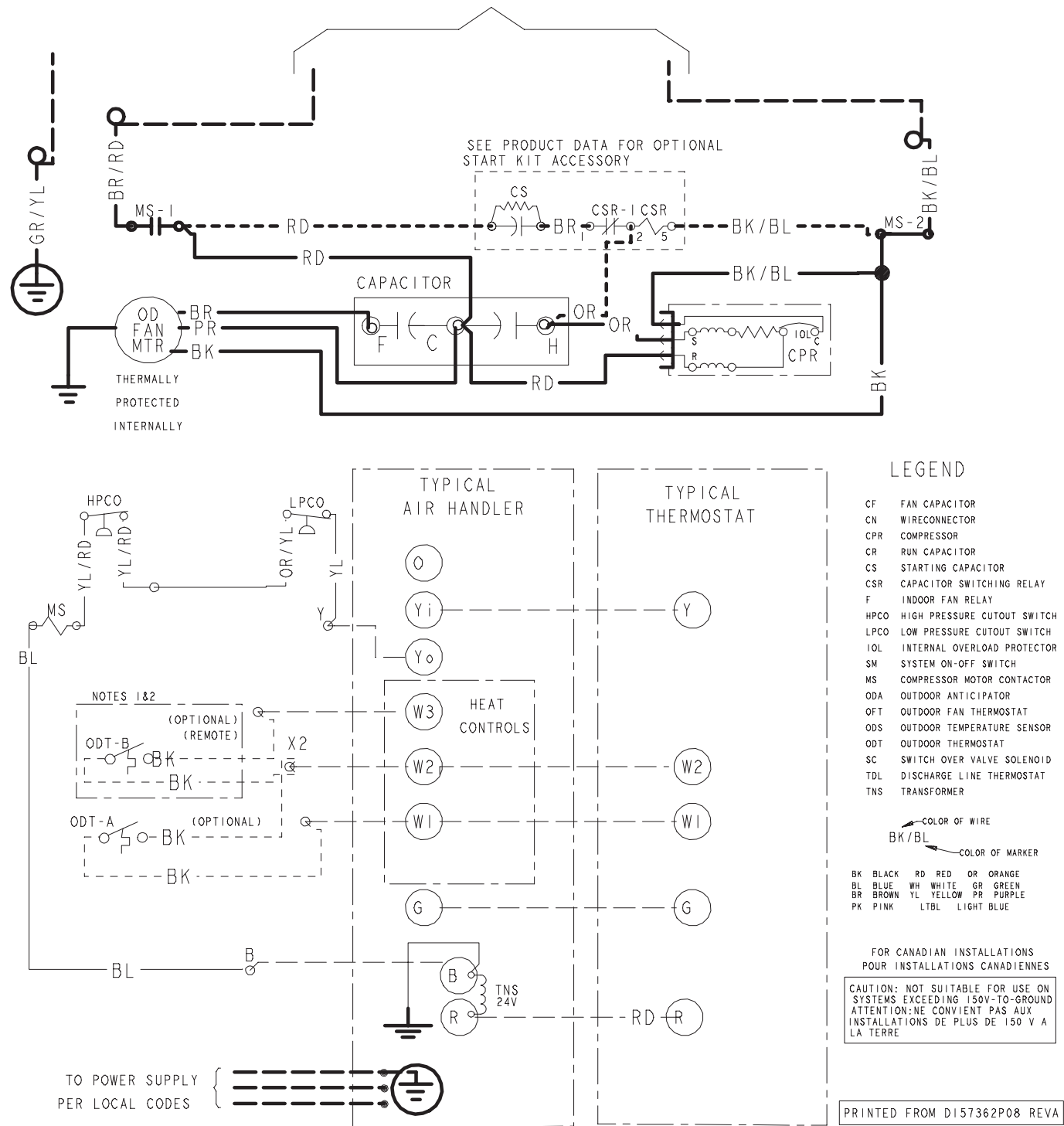
## 048 & 060 Models



Section 17. Wiring Diagrams

018 – 048 Models

TO POWER SUPPLY PER UNIT NAMEPLATE AND LOCAL CODES

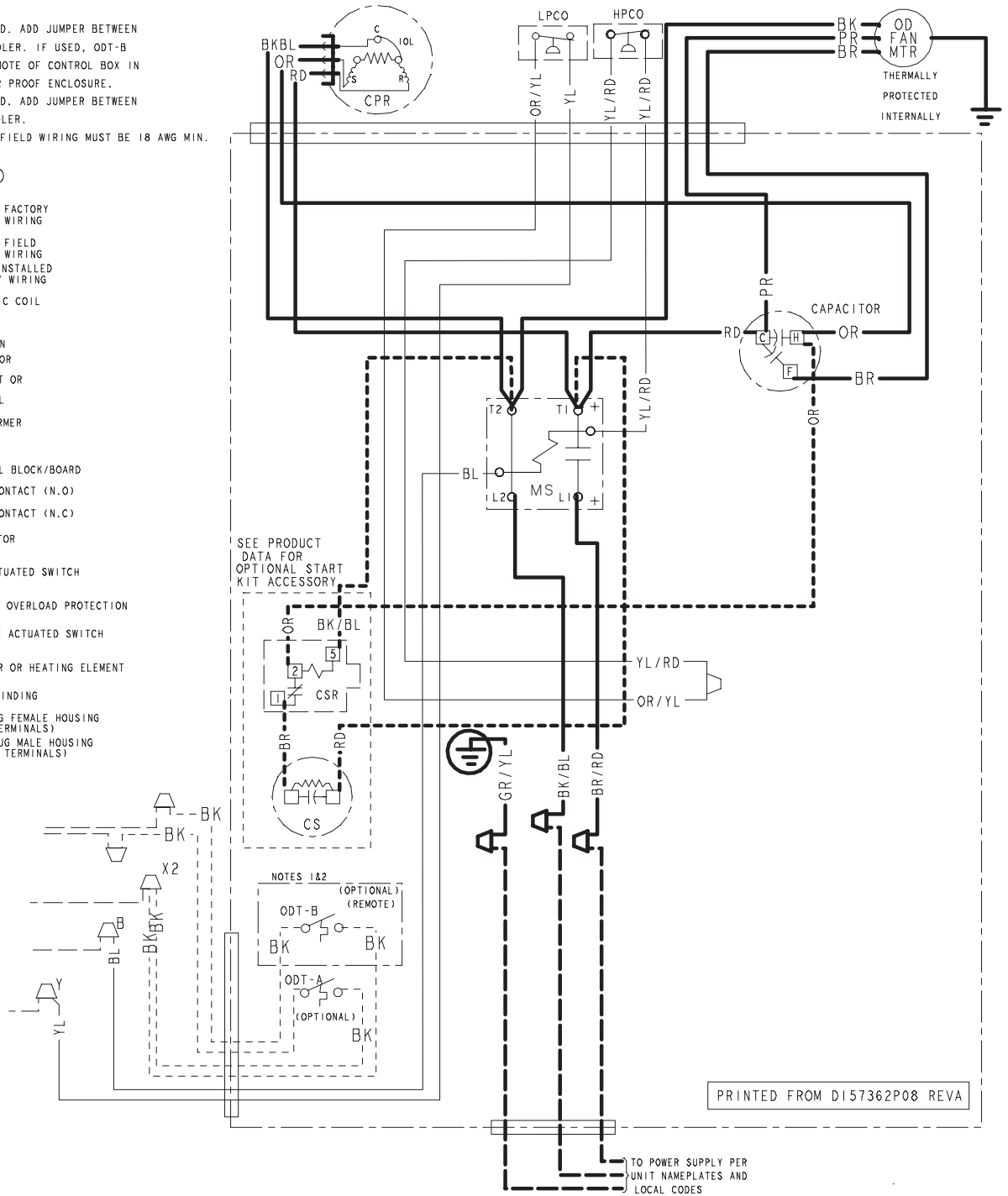
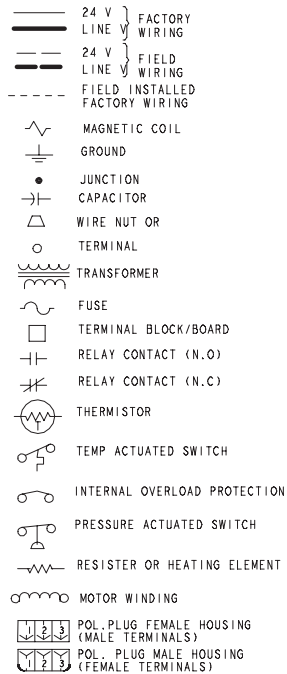


## 018 – 048 Models

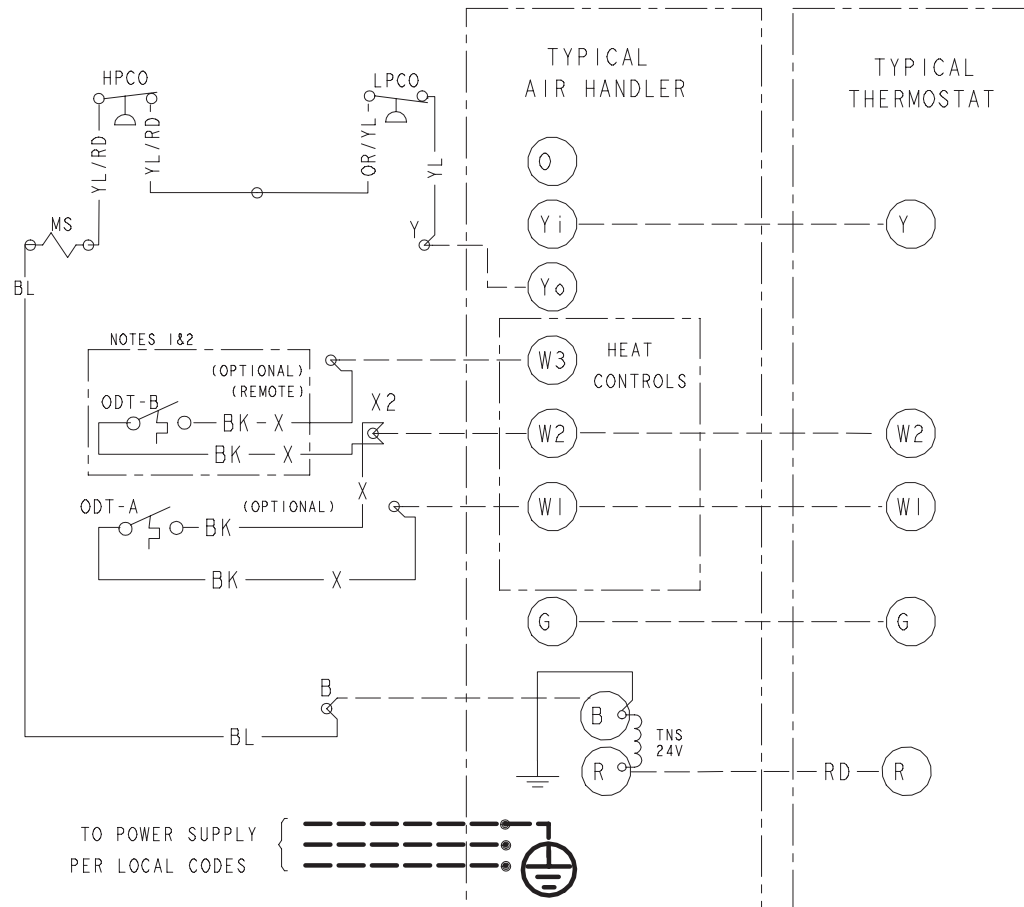
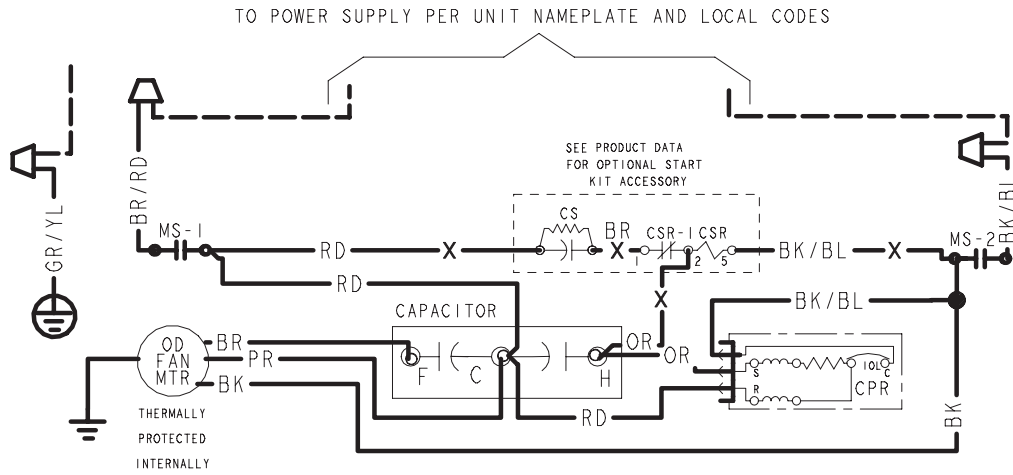
### NOTES:

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.

### LEGEND



## 060 Models

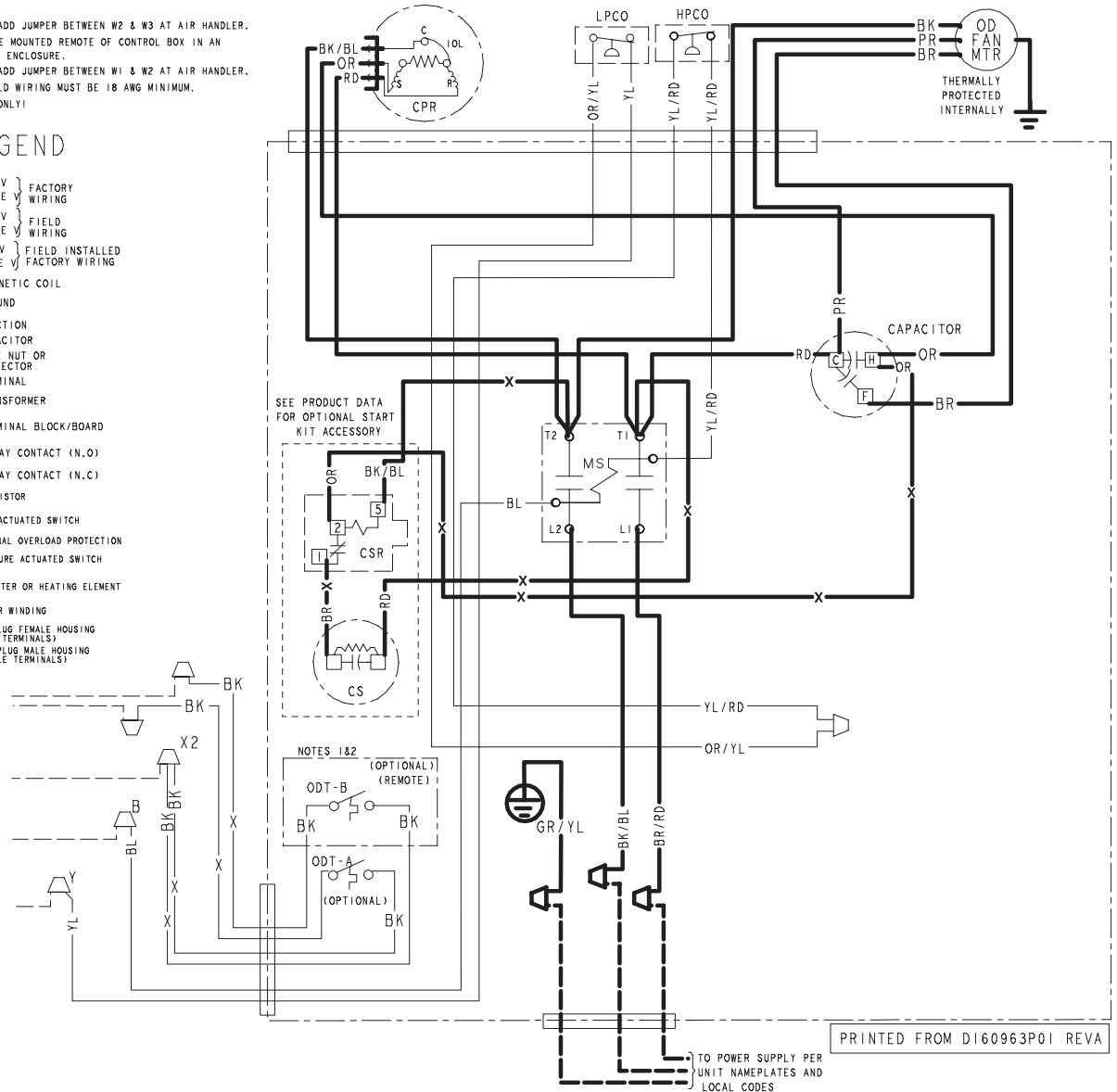
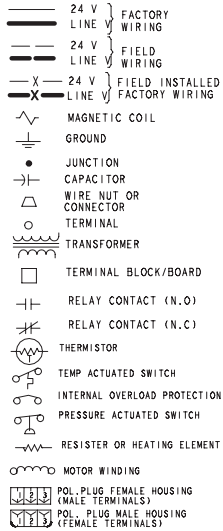


## 060 Models

### 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!

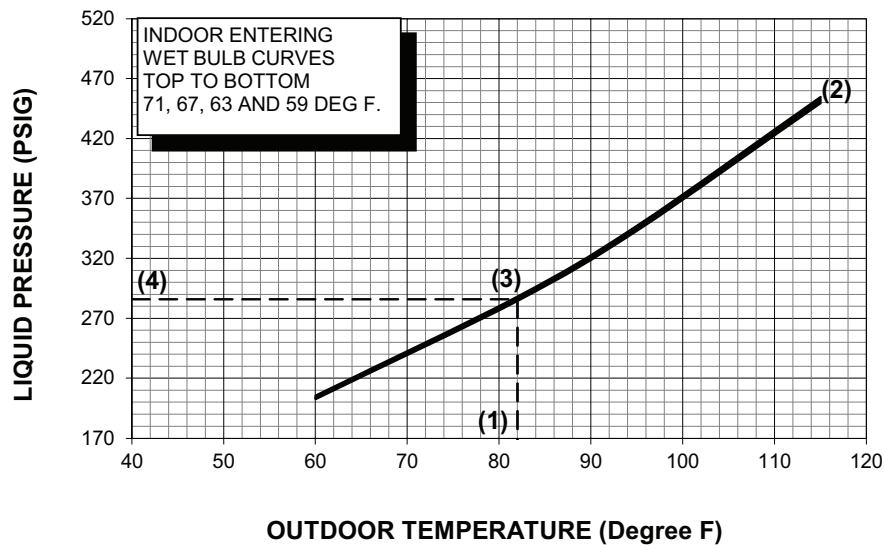
### LEGEND



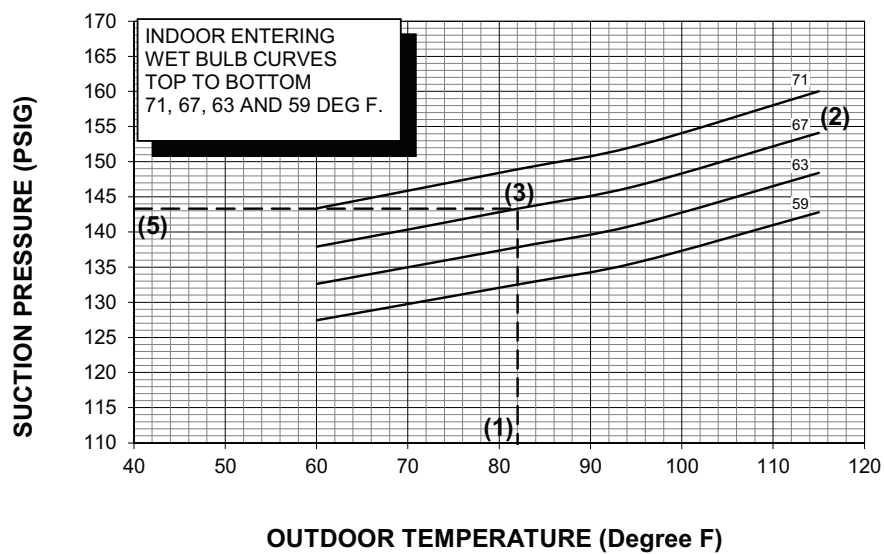


Section 18. Pressure Curves

PRESSURE CURVES (Refer below table for models)



OD Model	Cooling @SCFM
A5AC3018A1	600

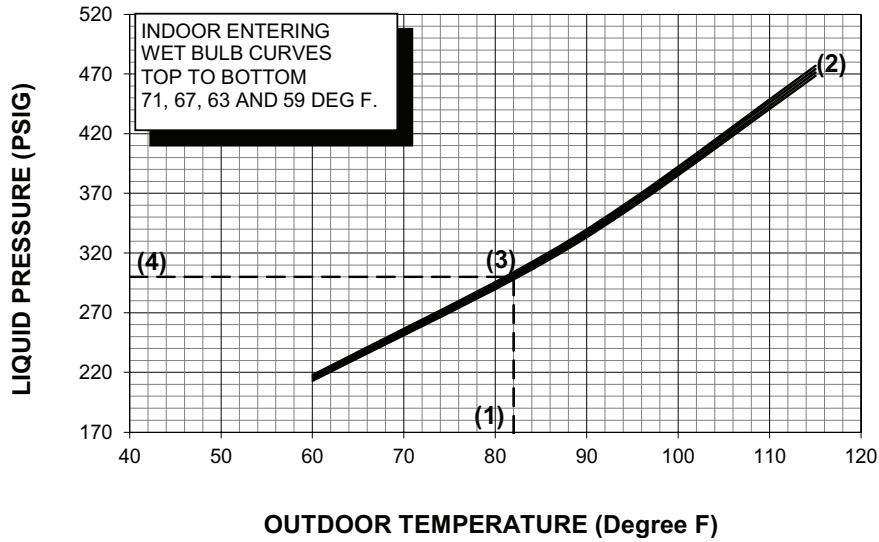


COOLING PERFORMANCE CAN BE CHECKED WHEN THE OUTDOOR TEMP IS ABOVE 65 DEG F.  
TO CHECK COOLING PERFORMANCE, SELECT THE PROPER INDOOR CFM, ALLOW PRESSURES TO STABILIZE. MEASURE INDOOR WET BULB TEMPERATURE, OUTDOOR TEMPERATURE, LIQUID AND SUCTION PRESSURES. ON THE PLOTS LOCATE OUTDOOR TEMPERATURE (1); LOCATE INDOOR WET BULB (2); FIND INTERSECTION OF OD TEMP. & ID W.B. (3); READ LIQUID (4) OR SUCTION (5) PRESSURE IN LEFT COLUMN .

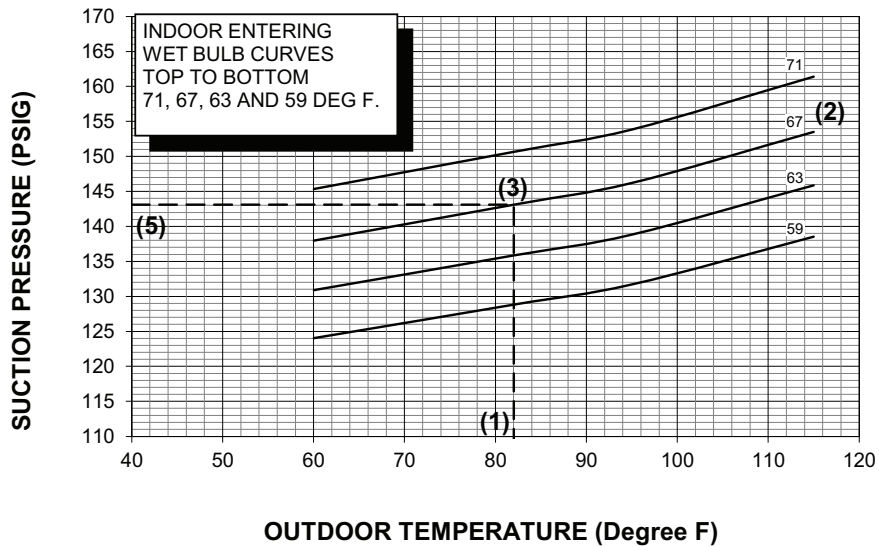
- EXAMPLE: (1) OUTDOOR TEMP. 82 F.  
(2) INDOOR WET BULB 67 F.  
(3) AT INTERSECTION  
(4) LIQUID PRESSURE @ 600 CFM IS 286 PSIG  
(5) SUCTION PRESSURE @ 600 CFM IS 143 PSIG

ACTUAL:  
LIQUID PRESSURE SHOULD BE +/- 10 PSI OF CHART  
SUCTION PRESSURE SHOULD BE +/- 3 PSIG OF CHART

## PRESSURE CURVES (Refer below table for models)



OD ModelA	Cooling @SCFM
A5AC3024A1	750
A5AC3030A1	850
A5AC3036A1	950
A5AC3042A1	1150
A5AC3048A1	1350



COOLING PERFORMANCE CAN BE CHECKED WHEN THE OUTDOOR TEMP IS ABOVE 65 DEG F.

TO CHECK COOLING PERFORMANCE, SELECT THE PROPER INDOOR CFM, ALLOW PRESSURES TO STABILIZE. MEASURE INDOOR WET BULB TEMPERATURE, OUTDOOR TEMPERATURE, LIQUID AND SUCTION PRESSURES. ON THE PLOTS LOCATE OUTDOOR TEMPERATURE (1); LOCATE INDOOR WET BULB (2); FIND INTERSECTION OF OD TEMP. & ID W.B. (3); READ LIQUID (4) OR SUCTION (5) PRESSURE IN LEFT COLUMN.

EXAMPLE: (1) OUTDOOR TEMP. 82 F.

(2) INDOOR WET BULB 67 F.

(3) AT INTERSECTION

(4) LIQUID PRESSURE @ 600 CFM IS 300 PSIG

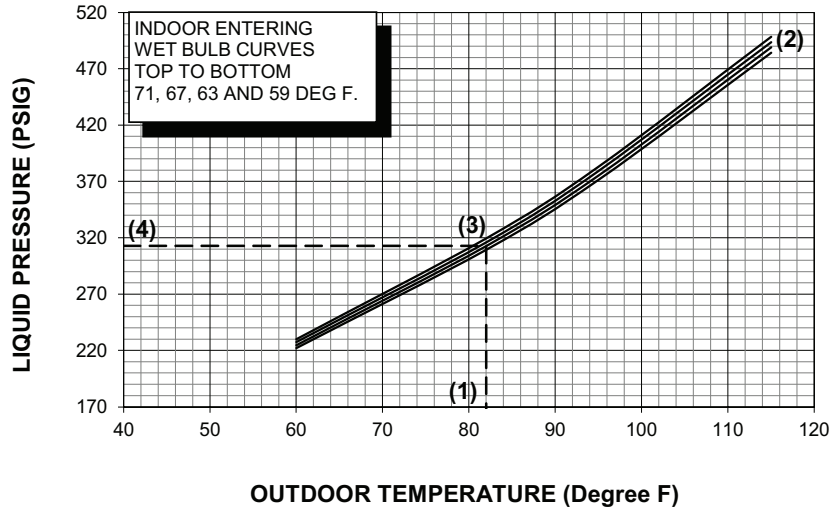
(5) SUCTION PRESSURE @ 600 CFM IS 143 PSIG

ACTUAL:

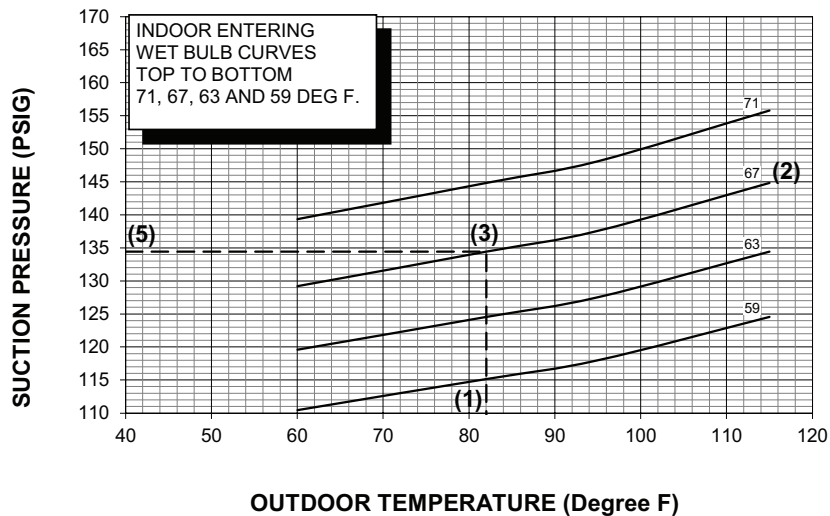
LIQUID PRESSURE SHOULD BE +/- 10 PSI OF CHART

SUCTION PRESSURE SHOULD BE +/- 3 PSIG OF CHART

## PRESSURE CURVES (Refer below table for models)



OD Model	Cooling @SCFM
A5AC3060A1	1450



**COOLING PERFORMANCE CAN BE CHECKED WHEN THE OUTDOOR TEMP IS ABOVE 65 DEG F.**

TO CHECK COOLING PERFORMANCE, SELECT THE PROPER INDOOR CFM, ALLOW PRESSURES TO STABILIZE. MEASURE INDOOR WET BULB TEMPERATURE, OUTDOOR TEMPERATURE, LIQUID AND SUCTION PRESSURES. ON THE PLOTS LOCATE OUTDOOR TEMPERATURE (1); LOCATE INDOOR WET BULB (2); FIND INTERSECTION OF OD TEMP. & ID W.B. (3); READ LIQUID (4) OR SUCTION (5) PRESSURE IN LEFT COLUMN.

EXAMPLE: (1) OUTDOOR TEMP. 82 F.

(2) INDOOR WET BULB 67 F.

(3) AT INTERSECTION

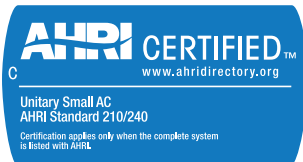
(4) LIQUID PRESSURE @ 600 CFM IS 313 PSIG

(5) SUCTION PRESSURE @ 600 CFM IS 134 PSIG

ACTUAL:

LIQUID PRESSURE SHOULD BE +/- 10 PSI OF CHART

SUCTION PRESSURE SHOULD BE +/- 3 PSIG OF CHART



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