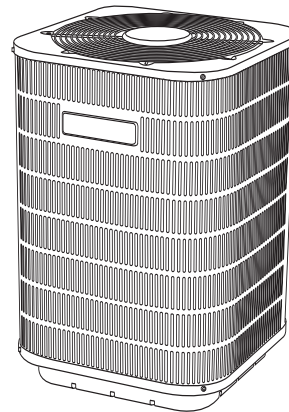


1.5 Through 5 Ton Split System Air Conditioner



THIS UNIT USES: R-410A Refrigerant
See precautions on page 5

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NOTE:

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS EQUIPMENT. READ THE ENTIRE INSTRUCTION MANUAL THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION.

INTRODUCTION

You have made a major investment in a fine piece of equipment. Keep your investment sound by reading these instructions before installing this unit. This will ensure that the full potential of this equipment is achieved. It will also be helpful in avoiding any needless service costs or operational problems. Included in these instructions are safety rules, installation, operation, and maintenance instructions.

Only the highest quality components were used in the construction of your unit. With proper maintenance, your system should provide years of economical, trouble-free service.

NOTES TO INSTALLER

The words "SHALL" and "MUST" indicate a requirement which is essential to satisfactory and safe product performance. The words "SHOULD" and "MAY" indicate a recommendation or advice which is not essential and not required but which may be useful or helpful.

Installation and service personnel are required by some locales to be licensed. Persons not qualified SHALL NOT install this equipment nor interpret these instructions.

This installation and maintenance manual is provided to ensure the proper installation and the most satisfactory performance of your equipment. The instructions contained herein SHALL NOT be deemed to extend, modify, alter or expand any of the representations contained in the limited warranty.

⚠ WARNING ⚠

A QUALIFIED INSTALLER MUST PERFORM INSTALLATION AND SERVICE.

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE, MAINTENANCE, OR USE CAN CAUSE EXPLOSION FIRE, ELECTRICAL SHOCK, OR OTHER CONDITIONS WHICH MAY CAUSE DEATH, PERSONAL INJURY, OR PROPERTY DAMAGE AND WILL VOID THE WARRANTY. REFER TO THIS MANUAL FOR PROPER INSTRUCTIONS.

DO NOT DESTROY THIS MANUAL. PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICE TECHNICIAN.

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS, OR OTHER COMBUSTIBLE MATERIALS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

BEFORE PERFORMING ANY WORK ON THIS EQUIPMENT, POWER SUPPLY MUST BE TURNED OFF AT THE HOUSEHOLD SERVICE BOX TO AVOID THE POSSIBILITY OF SHOCK, INJURY, DAMAGE TO EQUIPMENT, OR DEATH.

CONSULT A QUALIFIED INSTALLER FOR INFORMATION OR ASSISTANCE.

CODES

The installer SHALL comply with all local, state, and federal codes and/or regulations pertaining to this type of equipment and its installation. Such codes and/or regulations should take precedence over any recommendations contained herein in lieu of local codes. Installations SHALL be made in accordance with the National Electrical Code, local codes and recommendations made by the National Board of Fire Underwriters. Consult local building codes and National Electrical Code (NEC) for special requirements.

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

What You Need To Know About Safety Instructions

Warning and Important Safety Instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. Common sense, caution and care must be exercised when operating or cleaning tools and equipment.

Always contact your dealer, distributor, service agent or manufacturer about problems or conditions you do not understand.

⚠ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

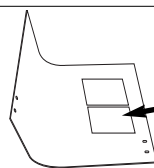
⚠ CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

INSPECTION AND UNPACKING

A thorough inspection of the shipping container should be made immediately upon receiving the unit. Look for any punctures or openings, and if it appears damage has occurred, it should be noted on the freight bill before signing. The delivering carrier should be contacted immediately to inspect damage, and no installation work should begin until this inspection is completed.

Locate rating plate on unit corner panel. It contains information needed to properly install unit. Check rating plate to be sure unit matches job specification.



Rating plate located inside control box cover

⚠ WARNING ⚠

DO NOT USE R-22 SERVICE EQUIPMENT OR COMPONENTS ON R-410A REFRIGERANT EQUIPMENT. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN EQUIPMENT DAMAGE, SERIOUS PERSONAL INJURY OR DEATH.

INSTALLATION

Condensing Unit Location

The condensing unit should be located outdoors as close as possible to the evaporator. Consider the following factors:

Clearances

The air inlet should be located at least 12" from a wall or other obstruction for unrestricted air flow.

The air outlet should be located so as to direct discharged air away from the building. Three feet of clearance around the unit and a minimum of six feet clearance above the unit is required to avoid recirculation of condenser discharge air on vertical discharge models. Avoid locating unit under low overhanging roofs.

Support

Mount the unit on a sturdy base approximately four to six inches above the ground. In areas known for snow accumulation, the unit should be elevated at least 18" above the ground. A concrete slab is recommended. Concrete slab should not contact the building foundation to prevent possible sound or vibration transmission.

Rooftop installation is acceptable in areas of low snow accumulations, provided the roof will support the unit and provisions are made for water drainage and the noise or vibration through the structure.

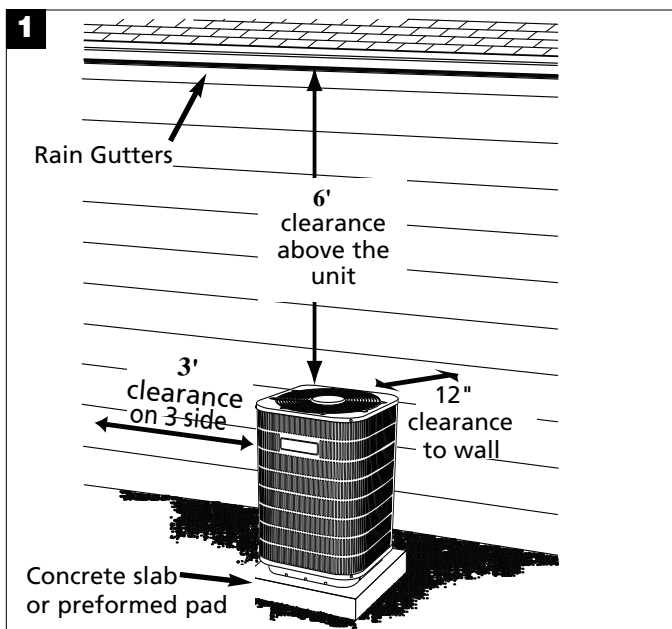
Exposure

Placement of the unit should be in a well-drained area, or the unit must be supported high enough so run-off will not enter the unit.

Avoid installations under roof overhangs without guttering. Water draining from the roof onto the unit could produce excessive noise and may cause ice to build up on the coil or fan during cold weather.

Locate unit away from windows, patios, decks, etc. where unit operation sound may disturb customer.

Do not locate where heat, lint or exhaust fumes will be discharged on the unit (as from dryer or furnace vent).



Proximity to Evaporator

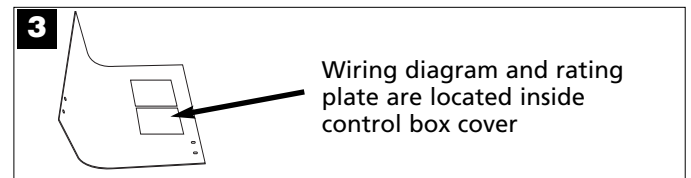
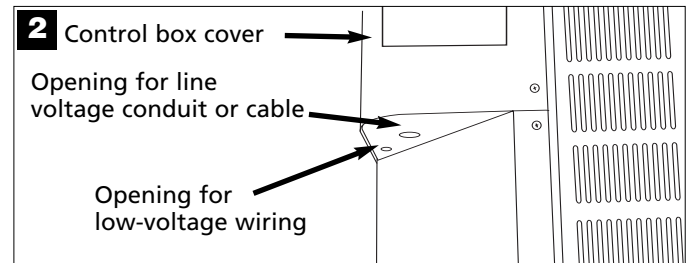
Locating the condenser as close as possible to the evaporator will increase the system capacities by reducing the line set refrigerant pressure drop, and will make the system less susceptible to liquid migrations due to less refrigerant charge.

Electrical Connections

⚠ DANGER ⚠
BEFORE PERFORMING ANY WORK ON THIS EQUIPMENT, POWER SUPPLY MUST BE TURNED OFF AT THE HOUSEHOLD SERVICE BOX TO AVOID THE POSSIBILITY OF SHOCK, INJURY, DEATH OR DAMAGE TO EQUIPMENT.

⚠ WARNING ⚠
ELECTRICAL EQUIPMENT SHOULD BE INSTALLED BY A QUALIFIED, LICENSED ELECTRICIAN. IMPROPER ELECTRICAL HOOK-UP MAY DAMAGE EQUIPMENT, CAN CREATE A HAZARD, CAUSE PERSONAL INJURY OR DEATH, AND WILL VOID THE WARRANTY.

1. The installer shall check available power to make certain it matches the unit rating plate (located inside control box cover) and that constant voltage can be maintained to the unit. Unsatisfactory performance would otherwise result. The local power company should be contacted regarding any problems or questions concerning power supply.



2. Install a line service disconnect switch within sight of the condensing unit. The line voltage service wiring for the condensing unit should include a fused disconnect switch.
3. Use correct wire size and fuse size. To ensure that adequate voltage will be available at the condensing unit, the line voltage service wiring must be of adequate size. Minimum recommended wire ampacities and maximum fuse sizes are listed on the unit name plate.
4. Two holes are provided in the control box.
 - a. One is for the connection of the line voltage conduit or cable. The hole is sized for 3/4" conduit.
 - b. One is for low-voltage wiring. (Refer to the wiring diagram attached to electrical box cover for connection.)
5. Be sure to ground the condensing unit by securing the ground wire to the grounding lug inside the control box.
6. Be sure to follow National Electrical Code and all local codes.

Electrical Connections (cont.)

Connect Control Wiring

1. Route 24 volt control wires through control wiring grommet and connect leads to control wiring.
2. Use No. 18 AWG color coded, insulated wire. If thermostat is located more than 100 ft. from unit, as measured along the control voltage wires, use No. 16 AWG wire to avoid excessive voltage drop.
3. All wiring must be NEC Class 1 and must be separated from incoming power leads. Use furnace transformer, fan coil transformer, or accessory transformer for control power.

Note: Use of available 24 volt accessories may exceed the minimum power requirement. Determine total transformer load and increase the transformer capacity or split the load with an accessory transformer as required.

Final wiring check

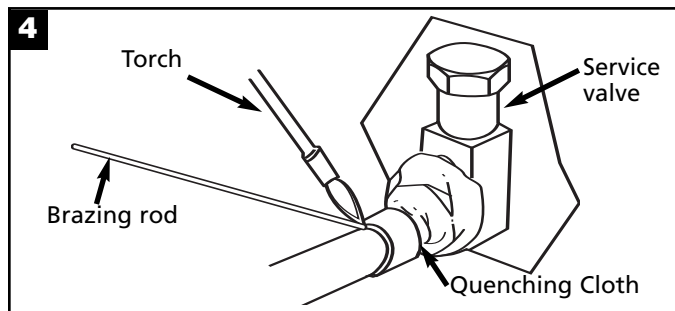
Check factory wiring and field wire connections to ensure terminations are secured properly. Check wire routing to ensure wires are not in contact with tubing, sheet metal, etc.

SERVICE VALVE CONNECTIONS

Braze joints

1. Remove the valve core from the schrader port. Wrap a quenching cloth around the service valve. Clean and flux the joint and braze with brazing rod containing at least 10% silver (such as silphos type brazing rod). DO NOT USE SOFT SOLDER. Replace the schrader valve core after brazing has cooled.
2. Leak-check all braze joints at approximately 80 psi pressure, purge, and evacuate the lines.

WARNING
DO NOT USE AIR TO LEAK-CHECK BRAZE JOINTS. DRY NITROGEN SHOULD BE USED TO LEAK-CHECK.



WARNING
ALWAYS HAVE A FIRE EXTINGUISHER AVAILABLE WHEN WORKING WITH AN OPEN FLAME.
ALWAYS USE SAFETY GLASSES, PROTECTIVE CLOTHING, AND WORK GLOVES.

Evacuation

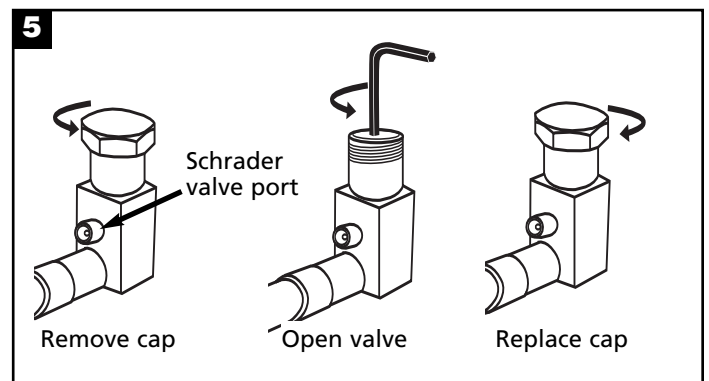
The outdoor unit is factory charged. Evacuation is necessary on the uncharged portions of the total system. Purge the system with dry nitrogen. Then connect a vacuum pump and a vacuum gage capable of accurately measuring below 1,000 microns vacuum depth. The deep vacuum method is the most positive way of assuring a system is free of air and liquid water.

WARNING
IF THE INSTALLER IS MAKING UP HIS OWN LINE SETS, HE MUST MAKE SURE THE TUBING IS CLEAN OF ANY IMPURITIES OR MOISTURE.

Opening the Service Valve (Step Valve)

NOTE: This is not a back-seating valve.

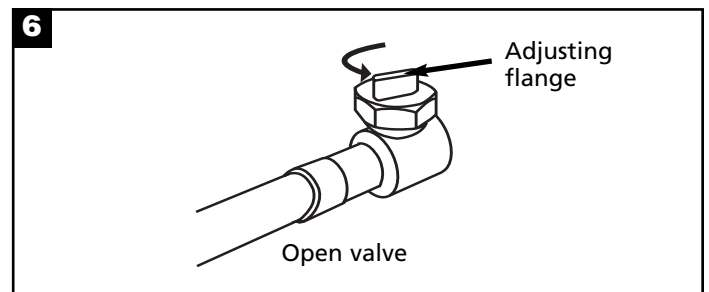
1. Remove the valve cap using an adjustable wrench.
2. Open the valve by inserting a hex wrench (3/16" for the liquid line, 5/16" for the vapor line) into the stem and back out counter-clockwise until the valve stem just touches the retaining ring. Do not over tighten.
3. Replace the valve cap finger-tight, then tighten an additional 1/12 turn or 1/2 hex flat. A metal-to-metal seal is now complete.



Opening the Service Valve (Straight Valve)

NOTE: This is not a back-seating valve.

Open the valve by using an adjustable wrench to turn the adjusting flange 1/4 turn counter-clockwise. The flange will come to a stop and the seal is now complete.



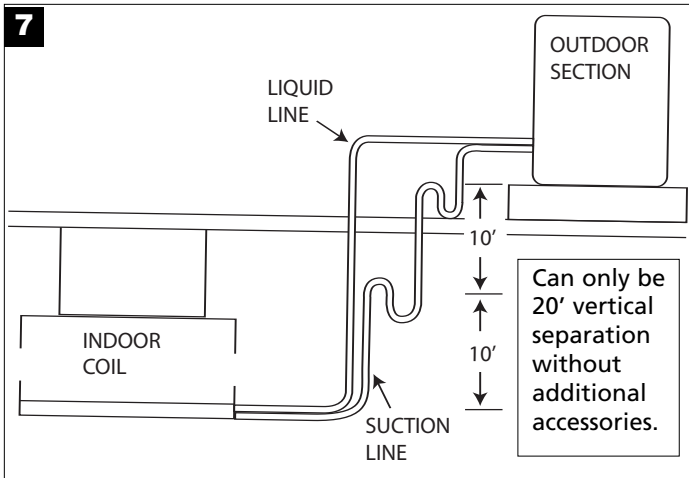
REFRIGERANT PIPING

The following guidelines should be followed when installing refrigerant piping. Comply with all local, state, and federal codes and/or regulations pertaining to this type of equipment and its installation.

1. Run the tubing by the most direct route and support every few feet. Do not run the lines underground unless they are in a chase. Leave enough material between structure and unit to absorb vibration.
2. Insulate the vapor line to prevent sweating and line loss. In underground chases, the vapor line should be insulated to provide vibration isolation between the vapor and liquid line. A minimum of 3/8" insulation is recommended in conditioned space and 1/2" to 3/4" in unconditioned space. Ensure that tubing insulation is pliable and completely surrounds vapor tube.
3. In general, the piping should be sloped toward the outdoor unit to prevent oil trapping. Where vertical risers occur, a suction line trap should be located at the base of the riser to assure proper oil return.

⚠ WARNING ⚠

REFRIGERANT LINE LENGTH MUST NOT EXCEED 75' ON HORIZONTAL RUNS AND 40' ON VERTICAL RISERS.



⚠ WARNING ⚠

IF THE INSTALLER IS MAKING UP HIS OWN LINE SETS, HE MUST MAKE SURE THE TUBING IS CLEAN OF ANY IMPURITIES OR MOISTURE. USE ONLY CLEAN AIR CONDITIONING AND REFRIGERATION GRADE SEAMLESS COPPER TUBING. PLUMBING GRADE COPPER IS INADEQUATE. TO ENSURE A CLEAN SYSTEM FREE OF ANY CONTAMINANTS, PURGING WITH DRY NITROGEN AND A DEEP VACUUM IS NECESSARY ON ALL SWEAT-TYPE MODELS AND ON THE UNCHARGED PORTIONS OF ALL MODELS NOT INCORPORATING PRECHARGED LINES. IT IS DESIRABLE TO PULL A VACUUM TO 1,000 MICRONS (29.96" HG) TO ENSURE TROUBLE FREE OPERATION.

Precautions

Refer to the chart below for the minimum recommended tube outside diameter sizes on liquid and suction lines. Ensure that vapor and liquid tube diameters are appropriate for unit capacity. Run refrigerant tubes as directly as possible by avoiding unnecessary turns and bends.

Undersized line sets will increase the refrigerant pressure drop between the indoor evaporator and outdoor unit, resulting in a decrease in system capacity. Oversizing the line sets may result in excessive refrigerant charge, thereby making the system more susceptible to liquid migration.

When passing refrigerant tubes through the wall, seal opening with RTV or other pliable silicon based caulk.

Avoid direct tubing contact with water pipes, duct work, floor joists, wall studs, floors, and walls.

Do not suspend refrigerant tubing from joists and studs with a rigid wire or strap which comes in direct contact with tubing.

When necessary, use hanger straps which are 1 in. wide and conform to shape of tubing insulation.

Isolate hanger straps from insulation by using metal sleeves bent to conform to shape of insulation.

Condensing units are available with pre-charged, sweat-type copper connecting fittings.

Units are factory charged for 15' of line set tubing.

- Adjust charge 0.65 oz per foot of variation from chart for 1/4" and 5/8" line set.
- Adjust charge 0.66 oz per foot of variation from chart for 3/8" and 3/4" line set.
- Adjust charge 0.67 oz per foot of variation from chart for 3/8" and 7/8" line set.
- Adjust charge 0.72 oz per foot of variation from chart for 1/2" and 1 1/8" line set.

LIQUID LINE SIZES

CONDENSER MODEL NUMBER	LINE SET LENGTH AND SIZE			
	15 FT LINE SET	25 FT LINE SET	50 FT LINE SET	75 FT* LINE SET
C18ABZ1VF	3/8"	3/8"	3/8"	3/8"
C24ABZ1VF	3/8"	3/8"	3/8"	3/8"
C30ABZ1VF	3/8"	3/8"	3/8"	3/8"
C36ACZ1VF	3/8"	3/8"	3/8"	3/8"
C42ACZ1VF	3/8"	3/8"	3/8"	3/8"
C48ACZ1VF	3/8"	3/8"	3/8"	3/8"
C60ACZ1VF	1/2"	1/2"	1/2"	1/2"

SUCTION LINE SIZES

CONDENSER MODEL NUMBER	LINE SET LENGTH AND SIZE			
	15 FT LINE SET	25 FT LINE SET	50 FT LINE SET	75 FT* LINE SET
C18ABZ1VF	3/4"	3/4"	3/4"	3/4"
C24ABZ1VF	3/4"	3/4"	3/4"	3/4"
C30ABZ1VF	3/4"	3/4"	3/4"	3/4"
C36ACZ1VF	7/8"	7/8"	7/8"	7/8"
C42ACZ1VF	7/8"	7/8"	7/8"	1 1/8"
C48ACZ1VF	7/8"	7/8"	7/8"	1 1/8"
C60ACZ1VF	1 1/8"	1 1/8"	1 1/8"	1 1/8"

* DO NOT EXCEED 75 FT MAX LINE SET LENGTH

R-410A Refrigerant Precautions

⚠ WARNING ⚠

DO NOT USE R-22 SERVICE EQUIPMENT OR COMPONENTS ON R-410A REFRIGERANT EQUIPMENT. FAILURE TO FOLLOW THIS WARNING COULD RESULT IN PERSONAL INJURY OR EQUIPMENT DAMAGE.

- R-410A refrigerant operates at much higher pressure than R-22 refrigerant
- Only use service equipment and replacement components designed to operate with R-410A refrigerant
- Recovery cylinder service pressure rating must be 400 psig, DOT 4BA400 or DOT BW400
- Hose pressure rating must be 700 psig
- Manifold set ratings should be 700 psig high side and 180 psig low side
- Leak detectors should be designed to detect R-410A refrigerant
- R-410A refrigerant systems should be charged ONLY with liquid refrigerant
- Only use liquid line filter driers with rated working pressures above 600 psig
- R-410A refrigerant is only compatible with POE oils
- POE oils absorb moisture rapidly. Do not expose oil to atmosphere.
- Use only TXV rated for use with R-410A refrigerant

SUB-COOLING CHARGING

Coils with TXVs should be charged 10-12 degrees (+ or – one degree) of sub-cooling. For proper sub-cooling readings, a standard high side gauge is required for pressure readings.

Use the chart below to determine the required sub-cooling value.

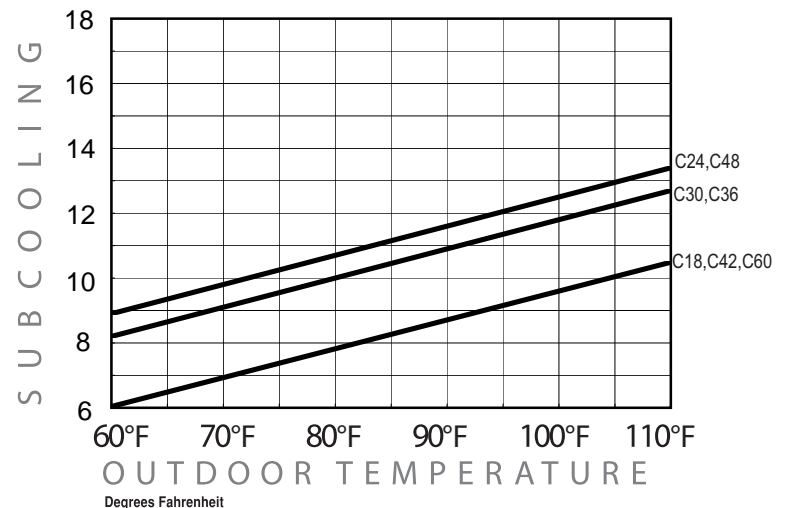
INSTRUCTIONS

1. Measure the outdoor air temperature. (T1)
2. Measure the liquid line pressure and determine the liquid refrigerant temperature by the scale on the high side pressure gauge. (T2) In cooling mode take reading at the indoor coil before TXV.
3. Measure the liquid line temperature on the liquid line. (T3) In cooling mode take reading at the indoor coil before TXV.
4. Subtract T3 from T2. (T2 – T3) This is the subcooling value. Compare this value and the outdoor temperature (T1), to the charts below. If the value is below the line, add refrigerant. If the value is above the line, remove refrigerant charge. When removing refrigerant, always use standard reclaim procedures.

NOTE: For the majority of installations no adjustment to the TXV setting is required. However, if the measured superheat at the evaporator is less than 4° or greater than 8° an adjustment is required. The adjustment stem is at the base of the valve under the flare nut. To increase superheat tighten the stem clockwise and to decrease superheat back-out the stem counter-clockwise. Use a 1/4" refrigeration service wrench for this function.

NOTE: When removing refrigerant, always use standard reclaim procedures.

SUB-COOLING CHART FOR UNITS WITH TXV



FINAL CHECKS FOR INSTALLER

1. Ensure that all wiring is routed away from tubing and sheet metal edges to prevent rub-through or wire pinching.
2. Ensure that all wiring and tubing is secure in unit before adding panels and covers.
3. Tighten service valve stem caps to 1/12 turn past finger tight.
4. Leave Owner's Manual with owner. Explain system operation and periodic maintenance requirements outlined in manual.

OPERATION INSTRUCTIONS

1. If the furnace and air conditioner are on separate thermostats, turn the furnace thermostat off during the cooling season to prevent simultaneous operation of the heating and cooling systems. Reverse the procedure during the heating season.

Adjust thermostat temperature and fan settings according to the thermostat manufacturer's recommendations. It is not recommended to vary the temperature settings more than 5 degrees. Varying the temperature more than 5 degrees or turning the thermostat off for periods less than 12 hours can actually cost you more in energy consumption than keeping the temperature constant. Consider indoor plants and pets when varying the temperature from the normal comfort level.

2. **IMPORTANT:** Wait at least 3 minutes after turning the air conditioner off before trying to restart. If an attempt is made to start the compressor before the refrigerant pressures are equalized, the compressor motor may trip on its overload. An additional waiting period will be required before restarting.

MAINTENANCE INSTRUCTIONS

For continuing high performance and to minimize possible equipment failure, periodic maintenance must be performed on this equipment. Frequency of maintenance may vary depending upon geographic areas, such as coastal applications.

⚠ WARNING ⚠

BE SURE THE UNIT DISCONNECT IS IN THE "OFF" POSITION AND THAT ALL ELECTRICAL POWER TO THE UNIT IS TURNED "OFF" BEFORE CLEANING THE SYSTEM.

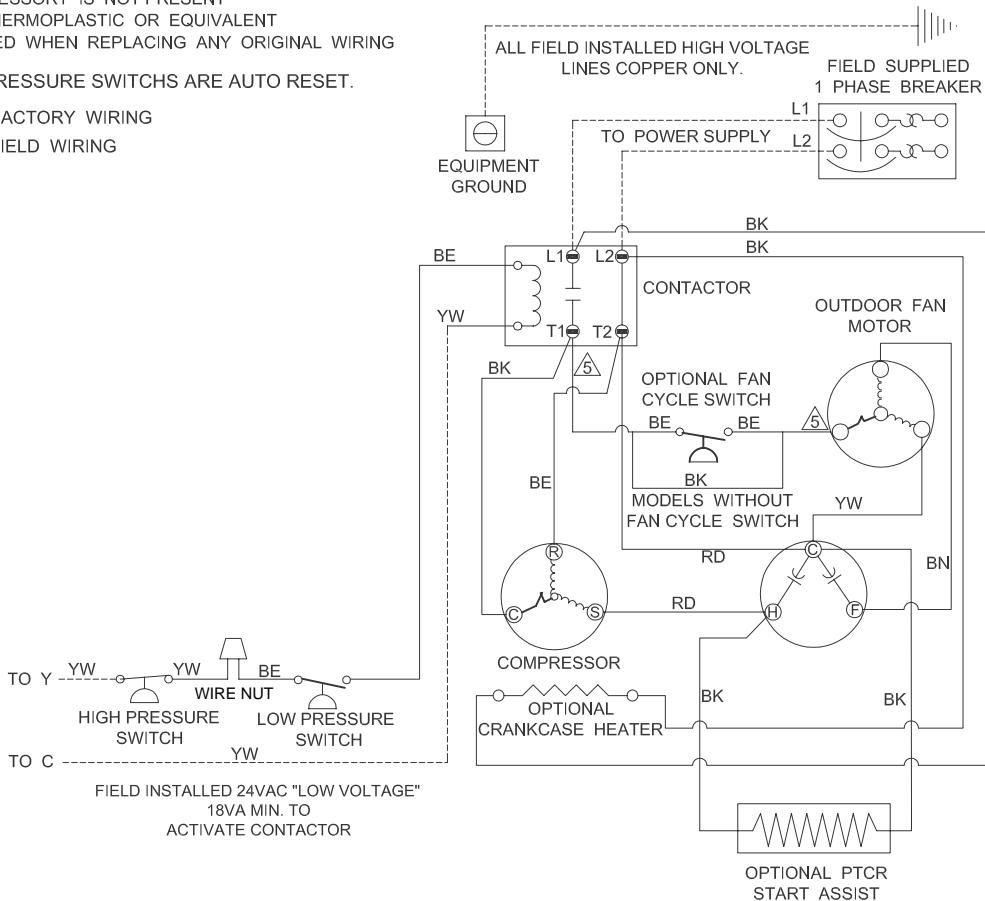
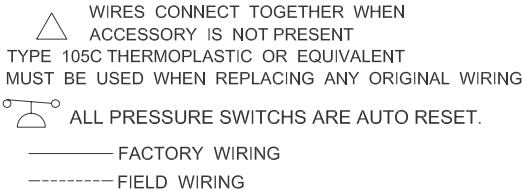
1. Keep the condenser (outdoor coil) clean. Wash it down with a garden hose if necessary.

⚠ WARNING ⚠

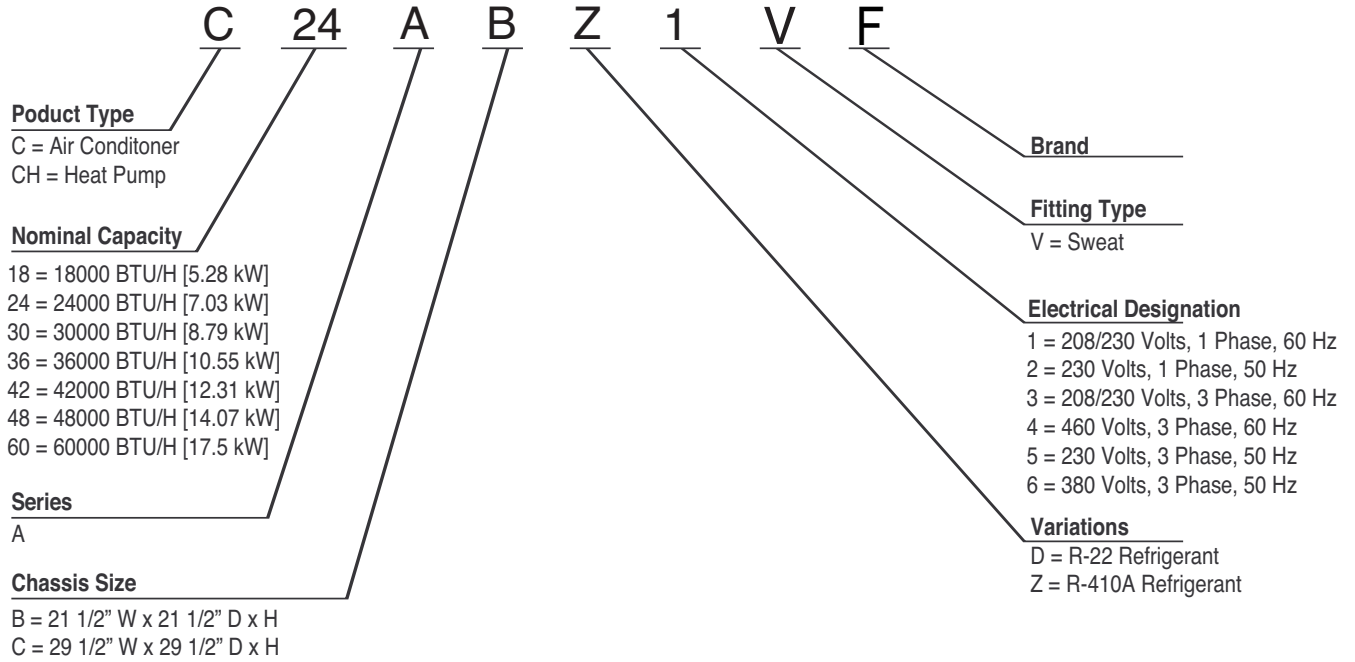
SERIOUS PERSONAL INJURY OR DEATH MAY RESULT IF WATER SPRAY IS DIRECTED TOWARD LIVE ELECTRICAL CONNECTIONS OR POWER SOURCES.

2. Remove any loose grass, leaves, papers, etc., from the area around the condenser coil. These could reduce the air supply through the coil and reduce the amount of cooling.
3. Always install and keep system filters clean. Consult your licensed Contractor for filter replacement schedules and instructions.

CIRCUIT DIAGRAM



**CONDENSING UNIT
NOMENCLATURE**



The information in this manual supersedes and replaces the previous instruction/operation manual. Illustrations cover the general appearance of the units at the time of publication and the manufacturer reserves the right to make changes in design and construction at any time without notice.

For replacement parts please, consult the installing dealer or contractor.

Airwell-Fedders North America
2 Centre Drive
Monroe Township, NJ 08831