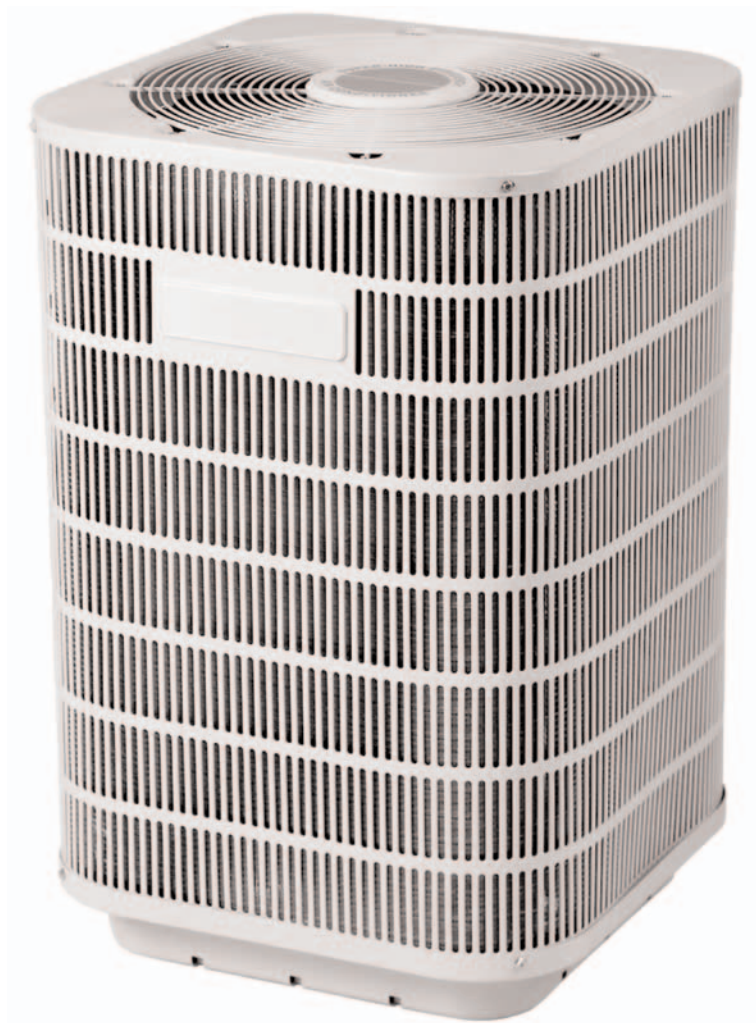


Installation, Operation and Maintenance

MODEL C10 & C12 SERIES — 1.5 THRU 5 TON Split System High Efficiency Air Conditioner



6800 Base Line, Wallaceburg, Ontario, N8A 5E5, Can. Tel: (519) 627-0791 Fax: (519) 627-4719
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TABLE OF CONTENTS

CONSUMER INFORMATION	
Introduction	2
Operation and Maintenance Instructions	3
DEALER INSTALLATION	
Codes	3
Condensing Unit	3
Evaporator & Condensate Drain	4
Suction & Liquid Lines	4
Replacement Application	5
Electrical Hook-Up	5
Field Charging Procedures	6, 7
Air Handler & Evaporator Match-ups	8
To Install Piston	8

CONGRATULATIONS

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.

INSPECTION AND UNPACKING

A thorough inspection of the shipping container should be made immediately upon receiving your 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.

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.

The instructions are for the use of qualified individuals specially trained and experienced in the installation of this type of equipment and related system components.

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.

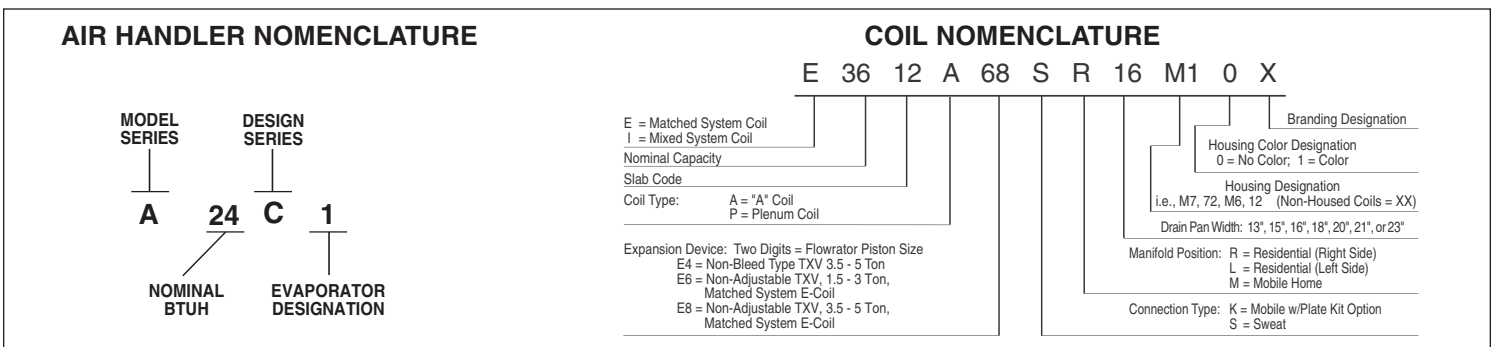
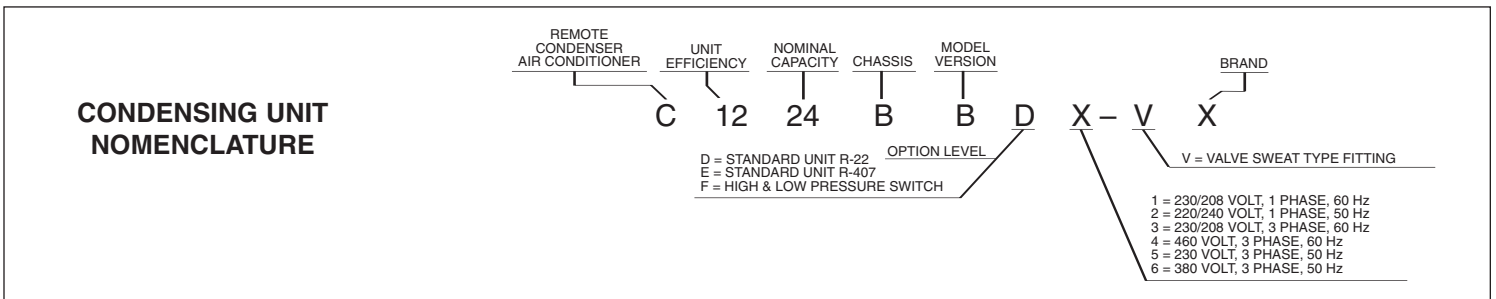


WARNING: IMPROPER INSTALLATION MAY DAMAGE EQUIPMENT, CAN CREATE A HAZARD, AND WILL VOID THE WARRANTY.



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.

SERIES NOMENCLATURE



OPERATION INSTRUCTIONS

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

Set the desired temperature on your thermostat temperature dial and set the fan switch to ON (for continuous air circulation) or to AUTOMATIC (for air circulation only when the air conditioning system is operating). If you desire to vary the thermostat temperature setting during the day for energy conservation (for example, while you are at work), do not

vary the setting more than 5 degrees of your normal temperature setting. Changing 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. You should also 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

1. Always install and keep filters clean. Check filters every 10 days to 2 weeks. Clean or replace if necessary.
2. Keep the condenser (outdoor coil) clean. Wash it down with a garden hose if necessary. 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.

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. Since the air conditioner is located outdoors, it is exposed to all weather elements. Treat it with a good automobile paste wax twice a year (in the spring and fall).



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

INSTALLATION

CODES: The installer SHALL comply with all local, state or provincial, 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 applicable National Electrical Code, local codes and recommendations made by the National Board of Fire Underwriters, or authorities having jurisdiction.

CONDENSING UNIT

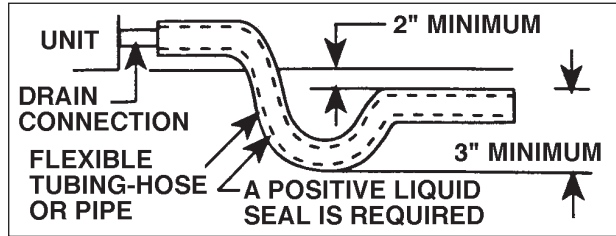
The condensing unit should be located outdoors as close as possible to the evaporator. Consider the following factors:

1. The air inlet SHALL be located at least 12" from a wall or other obstruction for unrestricted air flow.
2. The air outlet SHALL be located so as to direct discharged air away from the building. (Avoid low overhanging roofs to avoid recirculation of condenser discharge air on vertical discharge models.)
3. Mount the unit on a sturdy base approximately 4" to 6" above the ground. A concrete slab is recommended. If concrete blocks are used, be sure to use well-tamped gravel-fill beneath the blocks to prevent settling. If timbers are used, use at least 6" x 6" timbers plus gravel-fill to prevent settling.
4. A concrete slab should not be in contact with the building foundation to prevent possible sound or vibration transmission.
5. 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.
6. If practical, unit should be located on the south side of the structure away from northerly winds to minimize the effects of blowing snowdrifts and freezing rain. A wind screen or wind block can also be used. In areas known for snow accumulation, the unit should be elevated at least 18" above the ground.
7. 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.
8. 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.
9. Do not locate where heat, lint or exhaust fumes will be discharged on the unit (as from dryer vent). 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.

EVAPORATOR & CONDENSATE DRAIN

1. Refer to the instructions supplied with the evaporator coil.
2. When installing the evaporator, refer to page 8 for condenser evaporator match-up. The evaporator should be installed in an insulated plenum of proper size to accommodate the coil, whether it be of the "A" coil or "H" coil type design. Be sure no air can bypass the coil as this can seriously hamper unit operation.

3. Install condensate drain as shown below. Use drain connection size or larger.
4. Emergency drain facilities SHALL be installed on any application where water damage may occur due to overflow, leaking or sweating of condensate drain pan.



DO NOT OPERATE WITHOUT TRAP. UNIT MUST BE LEVEL OR SLIGHTLY INCLINED TOWARD DRAIN.

COPPER SUCTION & LIQUID LINES

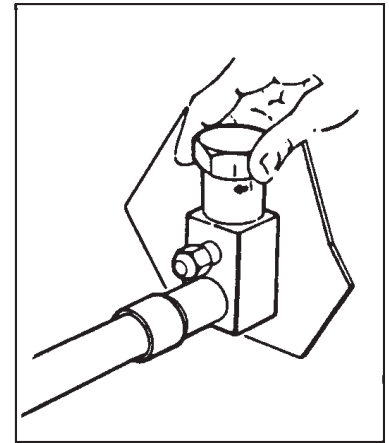
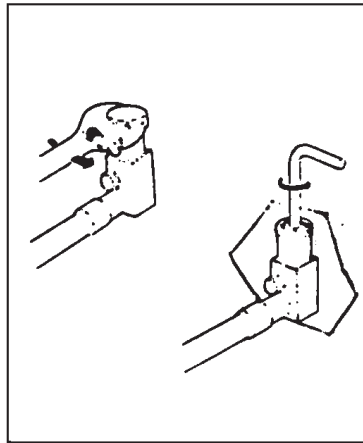
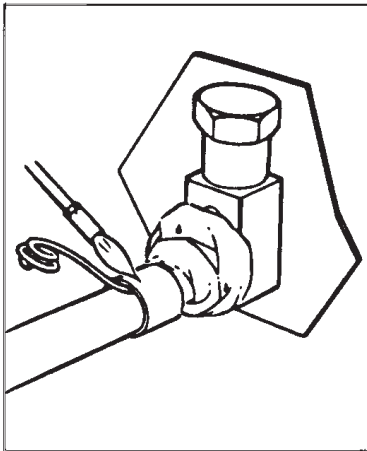
REFER TO THE CHARTS ON PAGE 8 FOR THE RECOMMENDED TUBE O.D. SIZES ON LIQUID AND SUCTION LINES.

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.

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

SWEAT-TYPE CONNECT FITTINGS



1. Remove the valve core from the schrader port. Wrap a wet rag around the copper stub. Flux the joint and braze with silphos rod containing at least 10% silver. **DO NOT USE SOFT SOLDER.** Replace the valve core after brazing.
2. Leak-check all braze joints at approximately 80 psi pressure, purge, and evacuate the lines. **NOTE: DO NOT USE AIR TO LEAK-CHECK BRAZE JOINTS. DRY NITROGEN SHOULD BE USED.**

3. This is not a back-seating valve. To open the valve cap, use an adjustable wrench. To open the valve, insert a hex wrench ($\frac{3}{16}$ " for the liquid line, $\frac{5}{16}$ " for the vapor line) into the stem and back out counterclockwise until the valve stem just touches the retaining ring. Do not over tighten.

4. Replace the valve cap finger-tight, then tighten an additional $\frac{1}{12}$ turn or $\frac{1}{2}$ hex flat. A metal-to-metal seal is now complete.



EVACUATION: If the installer is making up his own line sets, he SHALL make sure the tubing is clean of any impurities or moisture. 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 of the system.

SPECIAL INSTRUCTIONS FOR REPLACEMENT APPLICATION

When replacing an existing system, it is mandatory that a liquid line filter dryer (if not provided with the condensing unit) and a suction line filter, conforming to the dryer selection chart below, be installed in the new system if any of the original refrigerant-bearing components are to be used in the new installation. This is to assure that any contaminants left in the original components will not harm the new system. If any other evaporator coils other than those manufactured or approved by our company are used in the installation, **THE CLAIMED PERFORMANCE AND WARRANTY WILL BE VOID** without written notification and approval of such coils by our company.

DRYER SELECTION CHART (Alco, Parker Hanifin, Sporlan)

TONNAGE	LIQUID LINE FILTER DRYER	ALCO	SUCTION LINE FILTER PARKER HANIFIN	SPORLAN
2	053	35S5	SLD 8-5SV	C-165
2.5	053	35S5	SLD 8-5SV	C-305
3	083	45S6	SLD 13-6SV	C-306
3.5	163	45S6	SLD 13-6SV	C-306
4	163	45S6	SLD 13-6SV	C-307
5	165	45S7	SLD 13-7SV	C-307

Selection of dryers smaller than recommended will cause unsatisfactory pollution protection, excessive refrigerant charge and pressure drop. High pressure drops will result in reduced system capacities, higher system operating cost and increased failure rate.

ELECTRICAL HOOK-UP



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 (Name Plate Rating) and that constant voltage can be maintained to the unit. Unsatisfactory performance would otherwise result. The local power company should be contacted on 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.

FIELD CHARGING PROCEDURES

SUPERHEAT CHARGING *(for units with pistons)*

The superheat method is highly recommended for field charging or checking the existing refrigerant charge in a system. Because each installation is different in terms of indoor air flow, refrigerant line length, duct variations, etc., the factory charge may not be correct for every application. To assure the best performance from the air conditioner, the refrigerant charge should be checked and adjusted when needed on each installation.

For proper superheat readings, a standard low side refrigerant gauge and an accurate thermometer are needed. A mercury or stem type thermometer is not adequate for suction line temperatures. We recommend electronic thermocouple thermometers (available at most refrigeration wholesalers); however, an accurate remote bulb thermometer can be used. When measuring the line temperature, be sure the thermometer is well-insulated to assure accurate measurements. The chart on page 7 gives superheat values at various outdoor temperatures. Allow at least 5 minutes running time between charge adjustment for the unit to stabilize.

Chart on page 7 is based on 360 to 400 CFM/ton indoor airflow and 50% relative humidity. Use on systems that cool with fixed restrictor. SUCTION PRESSURE is 65 PSI which equals 38°F / 3.3°C on the R-22 scale of the low side gauge.

SUCTION LINE temperature taken at the unit is 70°F / 21.1°C.

70°F / 21.1°C minus 38°F / 3.3°C equals 32°F / 17.8°C superheat.

OUTDOOR TEMPERATURE is 90°F / 32.2°C, indoor temperature is

80°F / 26.7°C.

INTERSECTION of the indoor temperature and outdoor temperature lines occurs on the 12°F / 6.7°C superheat line.

ADD CHARGE to obtain 12°F / 6.7°C superheat.

INSTRUCTIONS

1. Measure suction pressure and determine evaporator refrigerant temperature on R-22 scale of low side gauge.
2. Measure suction line temperature on suction line at the outdoor unit.
3. Measure outdoor and indoor temperature.
4. Determine from the table what the superheat should be, considering the indoor and outdoor ambient temperatures. (Example indicates 12°F / 6.7°C superheat.)
5. Adjust charge if needed. Be sure unit is running at stabilized condition.

NOTE: If operating superheat is more than 5°F / 2.8°C above the chart value, add refrigerant. If below the chart value, remove refrigerant. If below the limit line, remove refrigerant. When removing refrigerant, always be certain to use standard reclaim procedures.

SUBCOOLING CHARGING *(for units with TXVs)*

The subcooling charging method is to be used on units which have Thermostatic Expansion Valves (TXV) as the expansion device. For proper subcooling readings, a standard high side gauge is required for pressure readings.

Use the chart on page 7 to determine the required subcooling value.

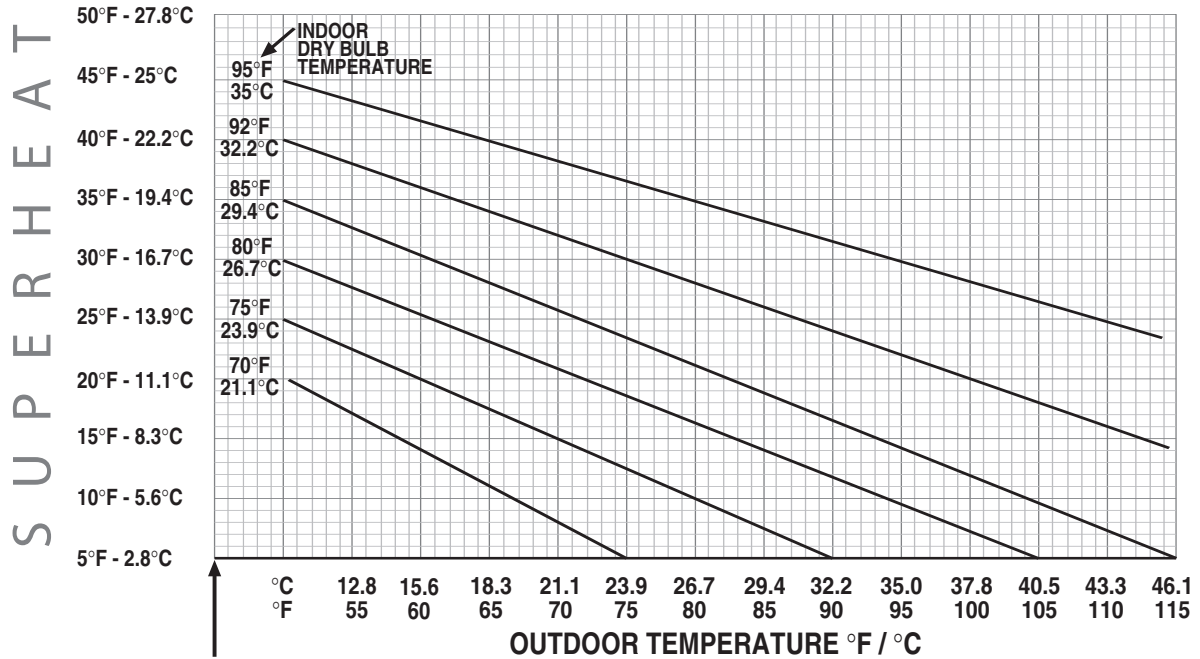
INSTRUCTIONS

1. Measure the outdoor air temperature. (T1)
2. Measure the liquid line pressure at the outdoor unit and determine condenser refrigerant temperature by the scale on the high side pressure gauge. (T2)

3. Measure the liquid line temperature on the liquid line at the outdoor unit. (T3)
4. Subtract T3 from T2. (T2 – T3) This is the subcooling value. Compare this value and the outdoor temperature (T1), to the charts on page 7. If the value is below the line, add refrigerant. If the value is above the line, remove refrigerant charge.

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

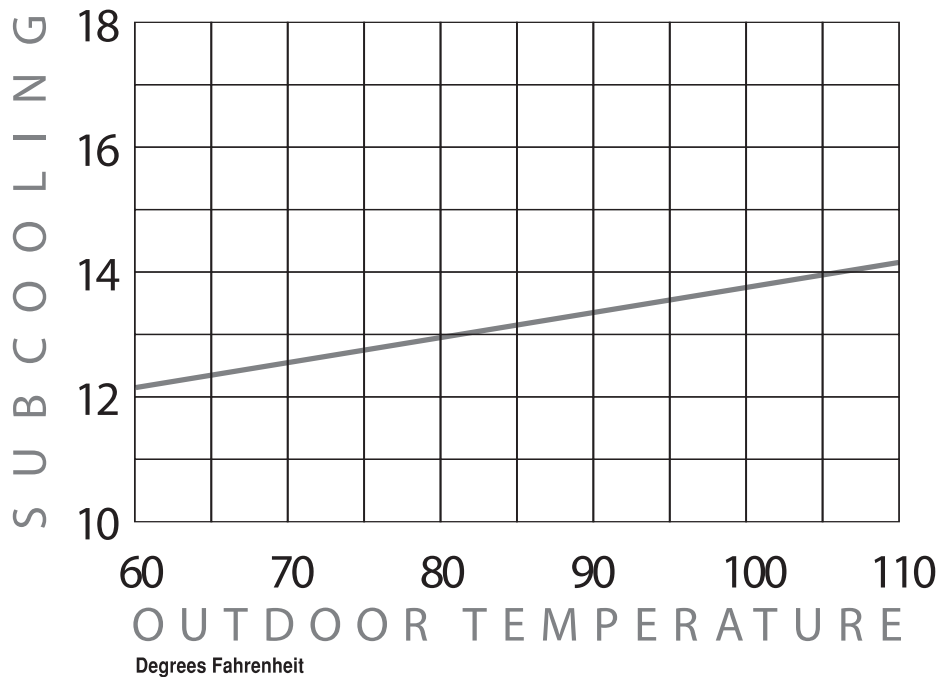
SUPERHEAT CHARGING CHART FOR UNITS WITH PISTONS



LINE LIMIT – DO NOT ADD CHARGE IF POINT FALLS BELOW THIS LINE.

Chart based on 350 to 400 CFM / ton indoor airflow and 50% relative humidity use on systems that cool with fixed restrictor.

SUBCOOLING CHART FOR UNITS WITH THERMOSTATIC EXPANSION VALVES



AIR HANDLER & EVAPORATOR MATCH-UPS

CONDENSER MODEL NUMBER	AIR HANDLER MODEL NUMBER	COIL** MODEL NUMBER <i>(Included with Air Handler)</i>	MINIMUM RECOMMENDED TUBE O.D. LIQUID LINE SUCTION LINE (in.)		
			15 ft	20 ft.	25 ft
C1018B	A24C1	E3009A16	5/16 5/8	5/16 5/8	3/8 3/4
C1024B	A24C1	E3009A16	5/16 5/8	5/16 5/8	3/8 3/4
C1030B	A36C1	E3618A16	5/16 3/4	5/16 3/4	3/8 3/4
C1036B	A36C1	E3618A16	3/8 3/4	3/8 3/4	3/8 7/8
C1042B	A42C1	E4824A20	3/8 3/4	3/8 3/4	3/8 7/8
C1048B	A48C1	E6026A20	3/8 7/8	3/8 7/8	3/8 1 1/8
C1060C	A60C1	E6037A21	3/8 7/8	3/8 7/8	3/8 1 1/8
C1218B	A24C1	E3009A16	5/16 5/8	5/16 5/8	3/8 3/4
*C1224B	A36C1	E3618A16	5/16 5/8	5/16 5/8	3/8 3/4
C1230B	A36C1	E3618A16	3/8 3/4	3/8 3/4	3/8 7/8
C1236B	A36C2	E4824A16	3/8 3/4	3/8 3/4	3/8 7/8
C1242C	A48C2	E6026A20	3/8 7/8	3/8 7/8	3/8 7/8
C1248C	A48C2	E6026A20	3/8 7/8	3/8 7/8	3/8 7/8
C1260C	A60C1	E6037A21	3/8 7/8	3/8 7/8	3/8 1 1/8

* For C1224B only, use LOW speed setting on Air Handler.

** Requires time delay relay to obtain SEER rating.

UNITS ARE FACTORY CHARGED FOR 25' OF LINE SET TUBING.

ADJUST CHARGE 0.41 oz PER FOOT OF VARIATION FROM CHART FOR 5/16" AND 5/8" LINE SET.

ADJUST CHARGE 0.65 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 3/8" AND 1 1/8" LINE SET.

TO INSTALL PISTON

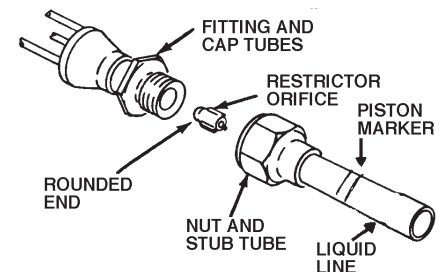
Depending on match-ups, the indoor piston may need to be changed. The indoor expansion device size and type are located on the outdoor unit's series and rating plate.

NOTE: THE C1260C AND C1048B MODELS REQUIRE A TXV KIT WHICH MUST BE PURCHASED AS AN ACCESSORY KIT AND IS REQUIRED TO COMPLETE THE SYSTEM INSTALLATION.

The piston is located in the distributor fitting on the liquid line.

To change the piston, remove stub tube nut (left-hand thread) and separate the liquid line from the distributor, then the piston. Install the correct piston with the rounded end toward the distributor. Reinstall the O-ring and stub nut (do not nick or handle the O-ring).

NOTE: ON PRECHARGED COIL, THE REFRIGERANT WILL HAVE TO BE REMOVED PRIOR TO CHANGING THE PISTON.



The information in this manual supersedes and replaces the previous instruction/operation manual with regard to split system heat pump products. 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 contact ECR:

6800 Base Line, Wallaceburg, Ontario, N8A 5e5, Can.
2201 Dwyer Avenue, Utica, New York, 13504, USA
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