

# INSTALLER'S GUIDE

18-HE141D1-1A-EN

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

## R-454B TXV Kit:

5AYTXVH3A1836A

5AYTXVH3A4248A

5AYTXVH3A6000A

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

**IMPORTANT** — These instructions do not cover all variations in systems nor 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.

### 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 literatures and on the tags, stickers, and labels, and that are attached to the equipment.

### WARNING

**RISK OF FIRE!**  
Flammable refrigerant used. To be repaired only by trained service professional. Do not puncture refrigerant tubing. Dispose of properly in accordance with federal or local regulations.

### WARNING

**PRESSURIZED REFRIGERANT!**  
Failure to follow this Warning could result in personal injury.  
System contains oil and refrigerant under high pressure. Recover refrigerant to relieve pressure before opening the system. Do not use non-approved refrigerants or refrigerant substitutes or refrigerant additives.

### WARNING

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

Failure to following this warning could result in serious injury, death, or property damage.

The following requirements apply to the room where the cased coil is installed:

- All combustion appliances located in the same room that have continuous pilot lights are equipped with an effective flame arrest.
- Auxiliary devices which may be a potential ignition source, such as hot surfaces or electric switching devices, shall not be installed in the connecting ductwork unless they have been approved by the manufacturer or declared suitable with the refrigerant used.
- All indoor field-made joints of the field piping have been checked for refrigerant leaks after charging using an electronic leak detector calibrated for R-454B having a sensitivity of 5 grams per year or better.
- The room is constructed to ensure that should any refrigerant leak it will not stagnate and create a fire hazard.

**General Information**

The Thermostatic Expansion Valve (TXV) Kits are used to increase system efficiency and ratings.

**NOTE: This TXV kit is for R-454B refrigerant and must always match the refrigerant type listed on the name plate of the outside unit.**

**Kit Identification**

Confirm that the TXV Kit is correct for your system. See Table 1 to verify proper kit.

**Inspection**

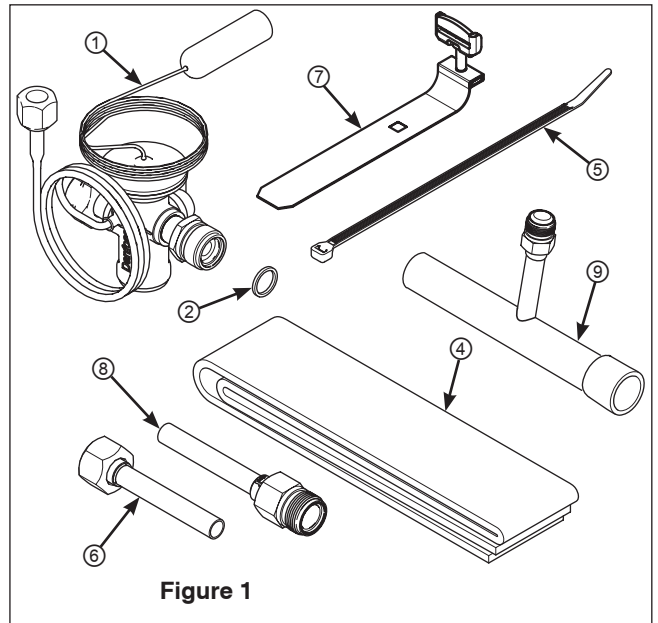
Check carefully for any shipping damage. Any damage must be reported to, and claims made against the transportation company immediately. Any missing parts should be reported to your supplier at once and replaced with authorized parts only.

**TXV Kit Contents**

Inspect contents for damage or missing items.

Each kit contains:

No.	Qty	Description
1	1	R-454B Expansion Valve
2	3	Teflon® O-ring
3	1	Installer's Guide (Not shown)
4	1	Bulb/TXV Insulation
5	1	Cable Tie
6	1	Inlet Tube Assembly
7	1	Sensing Bulb Strap
8	1	Outlet Tube Assembly
9	1	Vapor Line Adapter



**Figure 1**

**Information on Servicing**

All replacement parts shall be in accordance with the manufacturer's specifications.

**Prior to Beginning Work**

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following shall be completed prior to conducting work on the system:

- Work shall be undertaken under a controlled procedure to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment

being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed or intrinsically safe.

- If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system

or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- The following checks shall be applied to installations using flammable refrigerants:
  - marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
  - refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

**Repairs to Electrical Components**

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

- that capacitors are discharged; this shall be done in a safe manner to avoid possibility of sparking;
- that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

**Detection of Flammable Refrigerants**

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

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

- Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or

may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

- Bubble method leak detection fluids are suitable for use, but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

It is not recommended to detect leaks using fluorescent method agents due to the uncertainty in dye formulations and how these may react with refrigerants at high compression and discharge temperatures.

If a leak is suspected, all naked flames shall be removed/ extinguished.

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.

**Removal and Evacuation**

When breaking into the refrigerant circuit to make repairs - or for any other purpose - conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit;
- and open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants.

This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

### Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating system.

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.

See installation instructions below for further details.

### Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, 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.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

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. The compressor body shall not be heated by

an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

### Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that:
  - a. Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - b. All personal protective equipment is available and being used correctly;
  - c. The recovery process is supervised at all times by a competent person;
  - d. Recovery equipment and cylinders conform to the appropriate standards.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80 % volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labelled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerant, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

## Installation Instructions for coils

### ⚠ WARNING

#### RISK OF FIRE!

Failure to following this warning could result in serious injury, death, or property damage.

The following requirements apply to the room where the cased coil is installed:

- All combustion appliances located in the same room that have continuous pilot lights are equipped with an effective flame arrest.
- Auxiliary devices which may be a potential ignition source, such as hot surfaces or electric switching devices, shall not be installed in the connecting ductwork unless they have been approved by the manufacturer or declared suitable with the refrigerant used.
- All indoor field-made joints of the field piping have been checked for refrigerant leaks after charging using an electronic leak detector calibrated for R-454B having a sensitivity of 5 grams per year or better.
- The room is constructed to ensure that should any refrigerant leak it will not stagnate and create a fire hazard.

### ⚠ CAUTION

Do **NOT** open refrigerant valve at the outdoor unit until the refrigerant lines and coil have been brazed, evacuated, and leak checked. This would cause contamination of the refrigerant or possible discharge of refrigerant to the atmosphere.

1. Remove the mechanical fitting cap on the liquid line entering the coil.
2. Remove the existing piston, the piston housing, and the two (2) O-rings shown in Figure 2 inset, from the mechanical fitting in the liquid line.

**NOTE:** Before the TXV is installed, remove the piston.

**NOTE:** Remove the existing Teflon O-rings from the existing liquid line connections. New supplied O-rings must be used between the TXV fittings and line fittings.

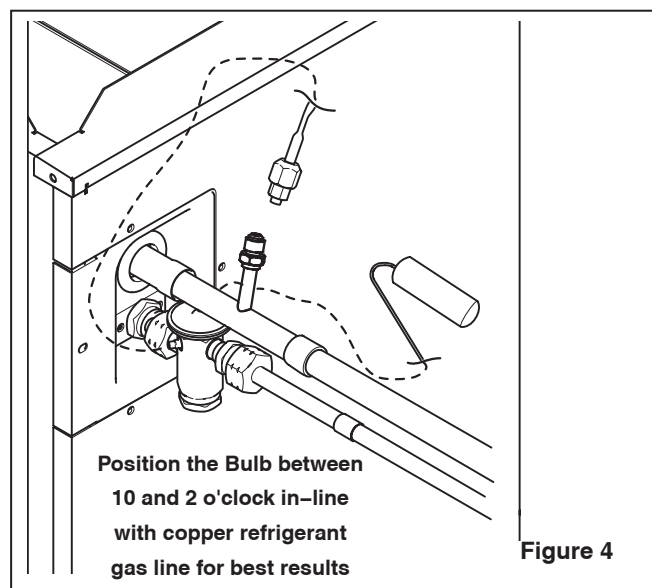
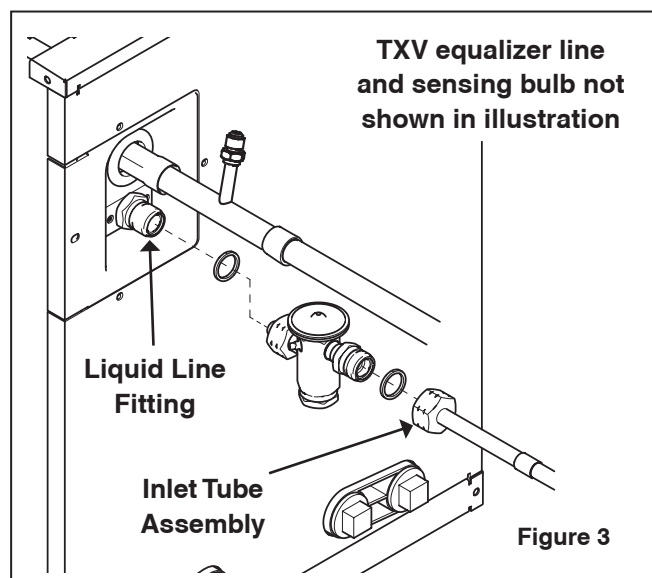
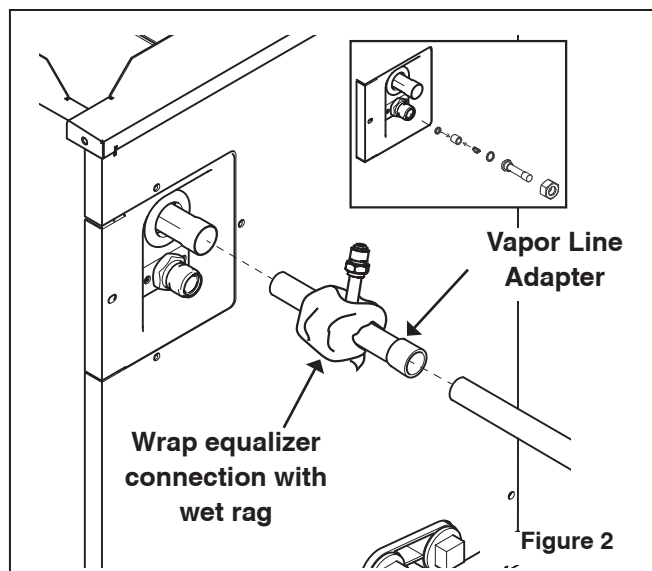
3. Braze the vapor line adapter to the coil refrigerant gas line. The fitting on the adapter must point upward to avoid interference with the TXV.

**IMPORTANT:** Wrap the adapter around the equalizer port connection with a wet rag when brazing connections to protect the braze alloy connecting the the equalizer port tube to the adapter.

4. Braze the field refrigerant gas line to the vapor line adapter.
5. Braze the field liquid line to the liquid line tube assembly.

#### TXV Installation Instructions

6. DO NOT oil threads. Before installing the TXV, install one O-ring on the Liquid Line Fitting. Install the other O-ring on the Inlet Tube Assembly. See Figure 3.



7. Connect the TXV by hand to ensure proper mating of threads. Tighten until bodies "bottom" or a definite resistance is felt. The valve will only fit in one direction of flow. Use a back-up wrench and tighten an additional 1/6 turn past finger tight.
8. Attach the Inlet Tube Assembly to the TXV. Use a back-up wrench and tighten 1/6 turn past finger tight.

**IMPORTANT: Correct tightening of the couplings is very important. Under- or over-tightening may result in a coupling leak.**

**IMPORTANT: Finger tighten then use a back-up wrench to tighten and additional 1/6 turn.**

9. Install the Equalizer Line, hand-tighten until flare bottoms, then use a back-up wrench to tighten securely an additional 1/6 turn.

**IMPORTANT: Replacing the liquid line filter drier is recommended if system has been commissioned. This is not necessary if this kit is being installed on a new coil.**

10. Use the supplied bulb strap to attach the sensing bulb onto a straight section of the refrigerant gas line. See Figure 5 for instructions on attaching the bulb strap. In some cases, the bulb strap is required when the new bulb size is different from the existing sensing bulb.

The entire length of the bulb must be in firm contact with the refrigerant gas line. The remote bulb tubing must not be allowed to touch a surface colder than the remote bulb location. The remote bulb tubing must be isolated from rubbing all other components.

11. Wrap the TXV and the sensing bulb with supplied insulation.
12. Use the cable tie to secure the extra lengths of the capillary tubing of the equalizer and sensing bulb.
13. Pressurize with dry nitrogen and leak test all joints to insure no leaks exist. Evacuate system to a minimum of 500 microns.
14. Open valves to outdoor unit if pumped-down or charge to a minimum of 50 psig static pressure. Start system and charge to appropriate level per the charging method recommended in the Outdoor Unit Installer's Guide.

**Installation Instructions for air handlers**

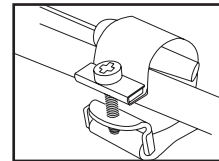
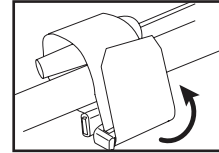
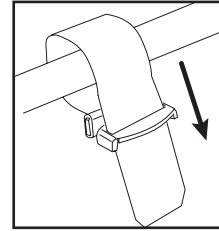
1. Pull back the insulation at the fitting connection. See Figure 6.
2. Using a back-up wrench, loosen the mechanical fittings.
3. Remove the piston from the mechanical fitting in liquid line. Remove and discard the O-ring.

**NOTE: Remove the piston.**

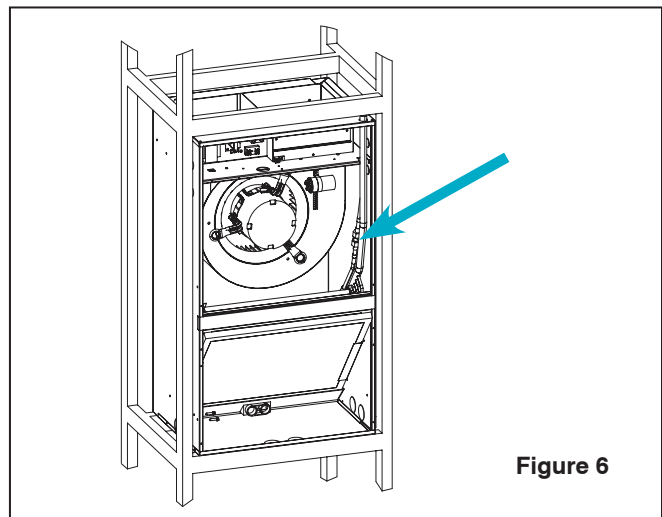
4. Install new O-ring on fitting. O-ring is supplied in kit.
5. Using a back-up wrench, reattach the fittings. Tighten until bodies "bottom" or a definite resistance is felt. The valve will only fit in one direction of flow. Use a back-up wrench and tighten an additional 1/6 turn.

**Make contact tight.**

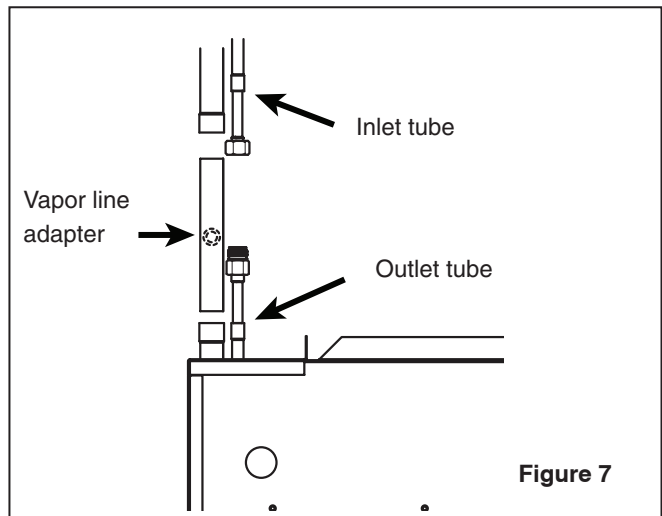
- Clean the suction line thoroughly before clamping the bulb in place.
- Bulb has to be mounted in tight contact with pipe. (TIP: Shine a flashlight between bulb and suction line, realign the bulb if light is visible.)
- Align the bulb with copper refrigerant gas line and position at 10 or 2 o'clock.
- Pull the bulb strap tight around the copper refrigerant gas line and bulb before tightening the screw.
- After tightening, it should not be possible to move the bulb by hand.



**Figure 5**



**Figure 6**



**Figure 7**

**IMPORTANT: Correct tightening of the couplings is very important. Under- or over-tightening may result in a coupling leak.**

6. Reinstall the insulation over the fittings.
7. Braze the outlet tube to the unit (male fitting).
8. Braze the inlet tube assembly (female fitting) to the field refrigerant line.
9. Braze vapor line adapter to vapor line making sure Schrader valve is towards the left side when viewing the front of the unit.

**TXV Installation Instructions**

10. DO NOT oil threads. To install the TXV, install one new O-ring over the Distributor Fitting (Figure 8). Install the other new O-ring over the Liquid Line Fitting and connect the adapters by hand to ensure proper mating of threads. The new O-rings are supplied in the kit. Tighten until bodies "bottom" or a definite resistance is felt. The valve will only fit in one direction of flow. Use a back-up wrench and tighten an additional 1/6 turn.

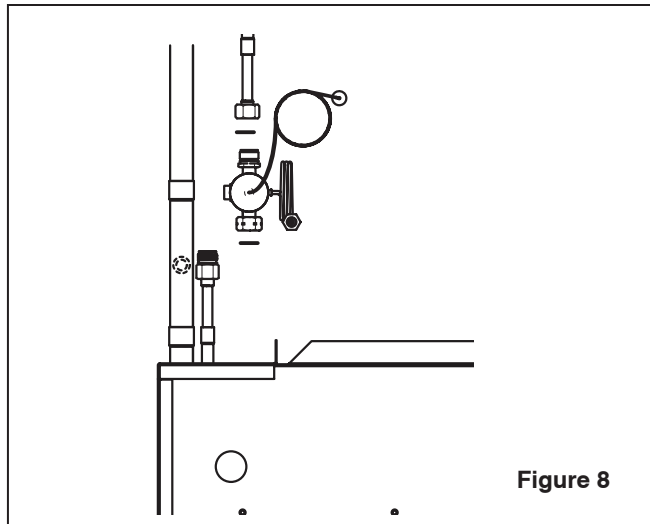
**IMPORTANT: Correct tightening of the couplings is very important. Under- or over-tightening may result in a coupling leak.**

**IMPORTANT: The arrow on the TXV will point downward towards unit when installed correctly.**

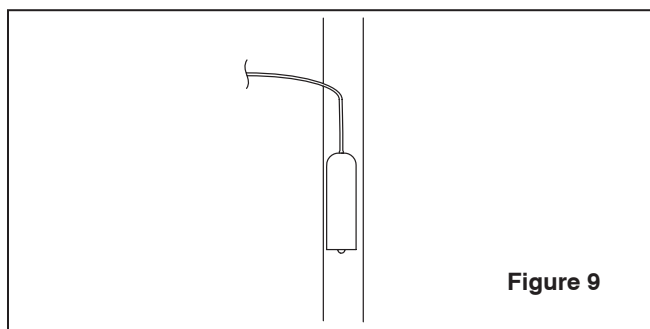
11. Install the Equalizer Line, hand-tighten until flare bottoms, then use a back-up wrench to tighten an additional 1/6 turn.
12. Orient the sensing bulb with the tube exiting out the top to the vapor line extension onto a straight section of the refrigerant gas line as shown in Figure 9. Use the supplied TXV bulb strap shown in Figure 5 to secure the bulb in place. In some cases, the bulb strap is required when the new bulb size is different from the existing sensing bulb.

The entire length of the bulb must be in firm contact with the refrigerant gas line. The remote bulb tubing must not be allowed to touch a surface colder than the remote bulb location. The remote bulb tubing must be isolated from rubbing all other components.

13. See the coil TXV installation on page 6 and follow Steps 11-14 to complete the installation.



**Figure 8**



**Figure 9**

**TABLE 1 TXV Matches**

System Tonnage	R-454B TXV Kit
1.5 - 3.0	5AYTXVH3A1836A
3.5 - 4.0	5AYTXVH3A4248A
5.0	5AYTXVH3A6000A