

R-410a Refrigerant

R-410A is a blended refrigerant (a near azeotropic of R-32 and R-125) formulated as a non-ozone depleting replacement for R-22 in residential and commercial air conditioners and heat pumps. R-410A exhibits higher operating pressures and refrigerant capacity than R-22. Due to the higher pressures, ensure that all service tools used for charging an R-410A system are designed for use with R-410A.

Even though R-410A retains a similar composition in both the liquid and vapor phases, it is recommended that the system be charged with liquid refrigerant only. Refer to the instructions printed on your refrigerant cylinder to verify that the cylinder is oriented properly for charging.

!! Systems utilizing R-410A absolutely cannot be charged to the site glass.

!! R-410A must be charged as a liquid. Charging as a gas may result in refrigerant separation and improper unit operation.

System Charging

Do not attempt to charge the system prior to completion of installation. All interlocking wiring, refrigerant piping, condenser piping, ductwork, and control sensors must be installed for proper system charging. Do not attempt to charge until initial air and water/glycol balancing has been completed. Do not attempt to charge systems at conditions where they would not normally operate.

After completing all system piping connections and prior to introducing any refrigerant in to the system, pressure the system to 150 psig with dry nitrogen. Once the system has been pressurized, monitor the pressure to verify that there are no leaks in the system.

In order to dehydrate the system, a high vacuum pump must be used to pull vacuum. Draw a vacuum of at least 500 microns and hold the vacuum for at least 2 hours. Proper system evacuation is essential to ensure compressor life.

To break vacuum on the system, supply liquid R-410A to the liquid line or receiver port. For split systems,

a starting refrigerant charge is typically noted in the mechanical section or shipped with a charge in the condensing section (refer to condenser section labeling). You will need to add additional charge for line sets longer than indicated. If recharging a packaged system, the system charge will be noted on the unit's name plate. Weigh in the initial charge. The majority of the system's charge should readily be dispensed to the system at this point.

Turn the system on. Offset sensors or set points as necessary to operate the compressor continuously while charging the system. Refer to the controller or thermostat manual for more information.

!! System must be charged slowly. Add charge and allow the system to settle. R-410A can easily be overcharged, particularly when both ambient conditions and evaporator load are high.

Add refrigerant to allow the discharge pressure to rise to 325-420 psig. Note that equipment with flooded head pressure control valves will need to exceed 300 psig in order for the head pressure valve to fully open.

Measure the liquid subcooling near the outlet of the condenser and superheat near the thermal expansion valve's sensing bulb. System should be charged to approximately 10-20°F subcooling with a tolerance of $\pm 3^\circ\text{F}$ (systems with receivers will typically be on the low side). System superheat should be approximately 12-15°F and must not exceed 20°F. Continue to add liquid refrigerant as necessary meet adequate subcooling requirements.

Hot Gas Reheat

If the unit is equipped with hot gas reheat, the unit's charge must be checked with the hot gas reheat valve open. After completing the initial charging procedure and allowing the unit to settle, open the hot gas reheat valve by offsetting set points/sensor readings or manually through the micro-controller. Adjust system charge if necessary.

Heat Pump Operation

If the unit is a heat pump, switch the unit from cooling to heating operation and verify that the system pressures remain in the acceptable ranges.