

Split-System Installation Notes & Details

The split-system heat pump compressor, coil-in-coil water-to-refrigerant heat exchanger, 4-way refrigerant valve, TXV, and control electronics and relays, are located in a different location (B).

The finned tube air-to-refrigerant heat exchanger is located in the (A) location. A refrigerant line set pair connects the (B) equipment to the (A) equipment. If the total length of the line set is 44 feet, with a 27-foot vertical rise. The liquid line is 3/8" OD and the vapor line is 3/4" OD. The line set dimensions were recommended by the manufacturer and the HVAC technician, based upon the 2.5 Ton compressor and the line length and rise. Consult before just installing, Length & Rise must be considered.

Line set sizing is tradeoff. Larger diameter tubing results in less pressure drop during operation and would improve system efficiency, but can cause other problems. The gas velocity in the larger gas line has to be fast enough to prevent the compressor oil from pooling in low spots along the line set. Too large a diameter can cause refrigerant pooling and oil trapping.

A larger diameter liquid line also needs more system refrigerant and this can cause problems with liquid refrigerant pooling in the compressor when the unit is off. Too much liquid refrigerant in the compressor can cause startup problems such oil dilution and liquid injection into the compression mechanism. The Emerson Copeland Scroll compressor (model ZPS31K5E-PFV) in the 2.5 Ton Miami HP unit has a maximum refrigerant charge rating of 128 oz., as per Emerson Application Bulletin AE4-1311 R8 (1.5 to 5 Ton ZPS*K4 and ZPS*K5 Copeland Scroll UltraTech™ Compressors, July 2013).

A refrigerant charge is greater than this value requires a crankcase heater and/or an accumulator. The crankcase heater boils the liquid refrigerant in the off system and causes it to accumulate in other areas where it will not cause a startup problem. The installed split-system required an R-401A refrigerant charge of 100 oz. and neither a [crankcase heater](#) or [accumulator](#) were installed.

If using line sets PDM GelCopper Pre-Insulated copper lines. The lines are insulated with 1/2" low-density, closed-cell, polyethylene foam that is rated for high-temperature R-410A use. The 3/4" line has an outer diameter just under 2". Both the 3/8" line and 3/4" lines and placing inside an interior 2x4 stud walls, and each line is run in 2" EMT (Electrical Metallic Tubing) as a protection against nails, screws, picture hooks, etc. that could conceivably be used in future. **Just a Thought.**

The copper line sets are brazed to the copper tubing of the compressor in location (B) and the copper tubing of the air-handler in location (A). Brazing is performed at a temperature of approximately 1200 °F. Copper corrodes rapidly in the presence of oxygen at this temperature. In order to prevent the formation of copper-oxide soot inside the lines, they must be purged of oxygen and a low flow of nitrogen gas must be continuously run through the line sets while the brazing is performed. Failure to do this contaminates the interior of line with copper soot that can clog filters or internal TXV ports, or damage the compressor scrolls.