

Contractor Service Tips



Expansion Valves

Q: What is the difference between an 'automatic expansion valve' and a 'thermal expansion valve'?

The automatic expansion valve was the first valve developed to eliminate the need of having a refrigeration engineer manually adjust a hand-operated expansion valve. The valve is designed to maintain a constant pressure at the outlet of the valve. By keeping the pressure constant, it indirectly controls the temperature as well.

There are however two major disadvantages to this type of valve. First, as the load decreases (causing a drop in evaporator pressure) the valve will tend to open so as to maintain the outlet pressure. In doing so however, excess refrigerant is fed to the evaporator resulting in liquid slugging and potentially damaging the compressor. Second, as the load increases (causing an increase in evaporator pressure) the valve will tend to close so as to maintain the outlet pressure. Unfortunately this results in starving of the evaporator at a time when the load is highest.

These disadvantages have resulted in the automatic expansion valve being replaced by thermal expansion valves (TXV) in most applications. The TXV responds to the superheat at the outlet of the evaporator and as a result is more responsive to the actual load resulting in a more efficient system.

Q: So, is there ever an appropriate application for an automatic expansion valve?

There remain some applications where automatic expansion valves offer an advantage. In applications where it is important to prevent the evaporator pressure (and temperature) from getting too low, the Automatic Expansion Valve is a natural. Some examples of this include water coolers and drink dispensing equipment. If the evaporator of a water cooler were allowed to drop below 32 degrees F, it would freeze and potentially rupture, much like the water pipes in your home. To prevent this, Automatic Expansion Valves are often used in these type applications. They are adjusted so as to maintain an operating pressure several psi above the freezing point thereby eliminating the need for secondary controls.