



This introduction will discuss the basics of performance air conditioning and factors affecting the selection of the principle components needed to air condition any car with a conventional type system-

The compressor, the compressor bracket, the evaporator (inside car unit), the condenser (outside heat exchanger), hoses and fittings, the receiver/drier and a safety switch.

A Complex System Simplified - Basic Functions

Beginning with the compressor, it pumps refrigerant, in gas form, into the high pressure gas discharge line. This gas is loaded with heat it has absorbed from the air flowing over the evaporator coil inside the vehicle. As the heated high pressure gas reaches the condenser, the heat is carried off by the air flowing through the condenser. The refrigerant condenses into a liquid which becomes heavier and requires less space. The

more efficiently the refrigerant is condensed, the less room it uses in the system. This allows the refrigerant to lower pressures in the high pressure side of the air conditioner. The liquid refrigerant then pours into the receiver/drier where it falls to the bottom of the receiver. A pick-up tube fits into the receiver/drier almost reaching the bottom of the tank. The open end of the tube is always below the liquid level in the receiver/drier, if the system is fully charged. This provides pure liquid to the liquid line (between the drier pick-up tube and the expansion valve). The expansion valve is an orifice that varies in size according to the temperature of the evaporator coil. By changing size, it meters the refrigerant according to the demands of the evaporator. When warm, the orifice is largest and gets smaller as the evaporator gets colder. This orifice provides a pressure drop with the resulting drop in refrigerant temperature. The high pressure liquid pours into the larger opening of the evaporator and the low pressure liquid droplets begin to pick up heat which expands the refrigerant to a low pressure (super heated) gas which then returns to the compressor to start the cycle all over again.

Selecting a Condenser

The most difficult problem is getting a condenser large enough, in a place where the air is cool enough, and can flow across it well enough to remove the heat and condense the refrigerant adequately. The condenser has to provide a low resistance path for the condensed liquid to flow so pressure build up can be avoided

on the existing refrigerant. (Pressure here tends to reduce heat loss which tries to reduce condensation.)

The old vertical vs. horizontal tubes in the condenser comes into play here. On a tube and fin condenser tubes must run horizontally. On a parallel flow condenser the tanks run vertically but tubes must run horizontal as well. Why? Because oil flows with the refrigerant in the system and will settle in the lower loops of the condenser, thereby obstructing the flow of liquid. We have seen this single factor increase the internal pressure of the high pressure part of the air conditioner by fifty percent, reducing its ability to work.

Since the conversion to HFC-134a refrigerants in automotive air conditioning systems, we have had to increase the surface contact area of the condensers by about 20% for proper efficiency. This means larger overall size with a conventional tube and fin condenser. Unfortunately many hot rod applications don't allow that size increase. A new type condenser was the correct solution and Vintage Air pioneered that technology for the performance aftermarket.

Our new design Super Flow™ condensers launched back in 1991, provided that increase in capacity without additional size! By using flat tubes manifolded together so that the refrigerant flows through multiple tubes each pass, we get virtually 100% contact of the refrigerant with the condenser tube walls. This design also offers very low restriction in the pathway through the condenser. The Super Flow condenser is up to 40% more efficient than a comparable size copper tube and fin type condenser. That means we can get more

OEM SUPPORT PROJECTS

Vintage Air's OEM development division, partnered with Ford Motor Company to design and supply the climate control systems for the exciting Ford GT. The GT system incorporates the same proven Gen-IV technology and performance available to hot rodders with all of our Gen IV Custom Fit and Gen IV Sure Fit systems.

