



Subject:	IMPORTANCE OF REPLACING THE FDR, SUB COOLER INSERT OR ACCUMULATOR				TSB #:	8 4-08
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Initial Once Read:						

I am probably preaching to the converted, when it comes to replacing an FDR, sub cooler insert or the Accumulator, but it is still worthwhile reinforcing the reasons why, how they work and what's inside.

The importance of changing an FDR (filter drier receiver), sub cooler insert or the accumulator after an A/C system has been open to the ambient air (containing moisture) for repair is to ensure that any moisture that has entered the A/C system is absorbed. Moisture and refrigerant form a corrosive acid which attacks and corrodes the heat exchangers especially if they are made of aluminium. This is even more critical if your vacuum pump is not capable of "pulling" a vacuum of 30 in hg or -100kPa.

For a start let us look inside both of these components to understand what function they perform. Let us look at the FDR first.

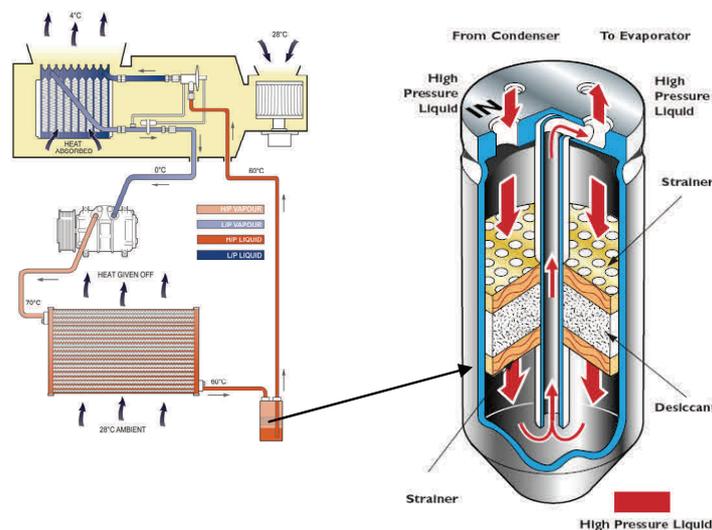
The FDR

The FDR is used in the CCTXV (cycling clutch thermostatic expansion valve) system. It is located on the High side of the A/C system and connected in the liquid tube circuit. The FDR is directional as indicated by an arrow on the label and the word "IN" stamped near the inlet port. The port with the word "IN" stamped must be connected to the condenser outlet tube.

The FDR has 3 major functions:

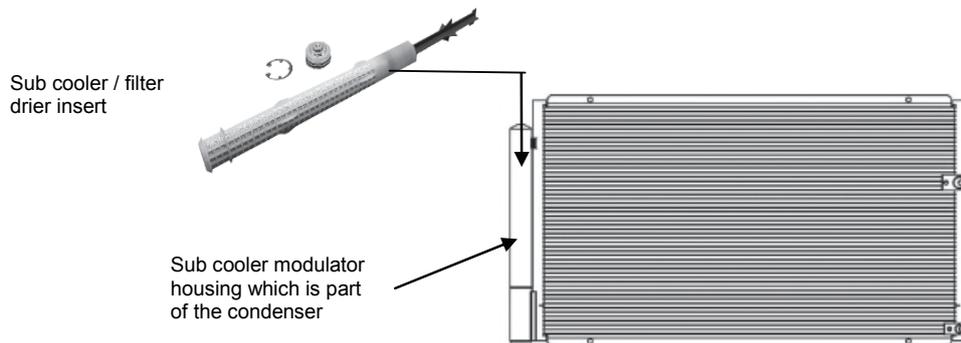
- Refrigerant storage, when required for increased A/C load.
- Filter contaminants such as aluminum particles, oil sludge, etc, to avoid blockages in the evaporator, orifice tube or condenser.
- Remove and break down any moisture contained in the refrigerant, to reduce acid forming and corrosion to components.

The hot high pressure liquid refrigerant from the condenser enters the FDR inlet and passes through the strainer plate and filter pads to remove any particles such as aluminum, seal material, dirt, etc, then the refrigerant passes through the desiccant. Desiccant is a number of tightly packed beads of "molecular sieve" or "silica gel" which is used to absorb moisture from the refrigerant.



The sub cooler insert

The sub cooler insert is located in a housing attached to the condenser and can be accessed for replacement, through removal of a circlip and screw plug. The insert actually contains desiccant beads in a bag, the bag being the contaminate filter, and is a part of the overall sub cooler modulator. The refrigerant passes through the desiccant during the last phase of the refrigerant change of state process.



The Accumulator

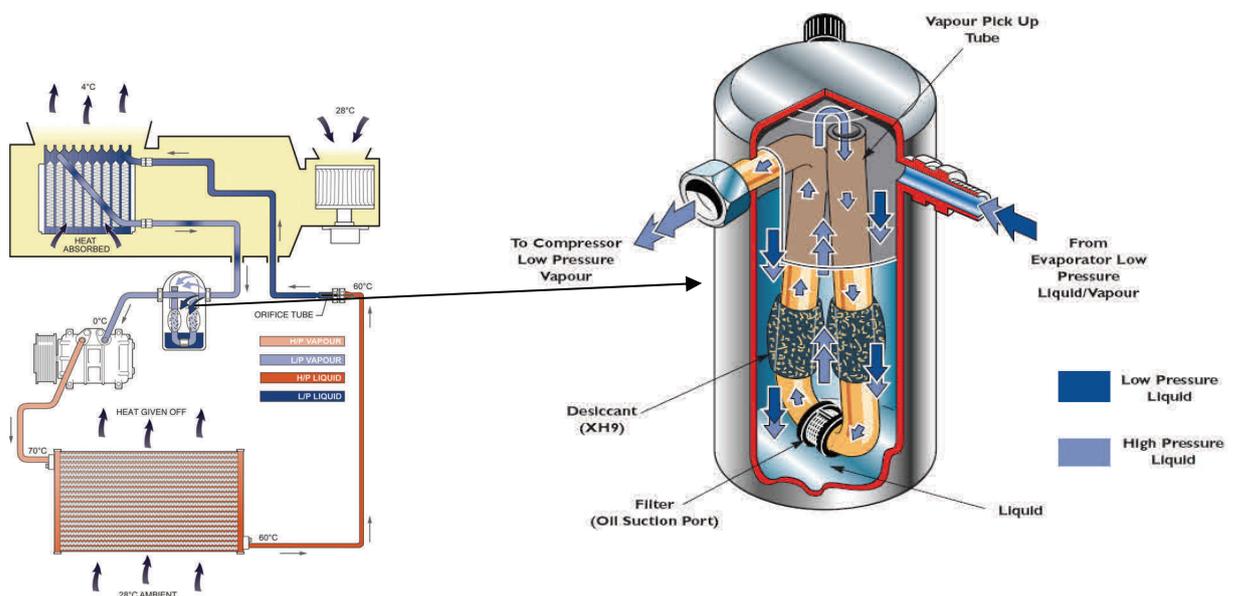
The accumulator has a similar function to the FDR but has a much larger body size, owing to the fact that the A/C systems require more refrigerant. The accumulator is also fitted to the low side of the CCOT (Cycling Clutch Orifice Tube) A/C system between the evaporator and the compressor, unlike the FDR which is fitted in the high side of the A/C of a CCTXV (Cycling Clutch Thermostatic Expansion Valve) A/C system.

If we look inside the accumulator (illustrated below) we will see that it is capable of containing a larger quantity of refrigerant liquid than the FDR, owing to the fact that the evaporator is always flooded.

The accumulator has 4 major functions:

- Refrigerant storage, when required for increased A/C load.
- Filter contaminants such as aluminum particles, oil sludge, etc, to avoid blockages in the evaporator, orifice tube or condenser.
- Remove and break down any moisture contained in the refrigerant, to reduce acid forming and corrosion to components.
- Separates refrigerant vapor from the refrigerant liquid, to prevent liquid refrigerant from entering the compressor.

The major function of the accumulator is the liquid and vapor separation. A mixture of refrigerant vapour and liquid enters the accumulator from the evaporator. As the liquid is heavier than the vapor it drops to the bottom whereas the vapor rises and is then "sucked" into the pick up tube and into the compressor.





Summary

- The desiccant beads contained within the FDR, sub cooler insert or the accumulator will break up and pass through the A/C system once they have absorbed their maximum amount of moisture. This will cause oil sludge, blockages at the TXV and the condenser, especially with the multi flow design.
- All the different makes and models of the FDR, sub cooler insert or accumulator have different quantities of desiccant beads which would mean that the maximum moisture absorption will also be different. In other words more beads, the more moisture absorption.
- The desiccant beads are also affected by the lubricating oil, especially if the system has been over filled with oil or the oil has been overheated.
- If an A/C system has no refrigerant in it, due to a leak, it will also have large quantities of air which contains moisture. This moisture must be removed.

Replacement Hints.

- Always connect the condenser outlet fitting to the FDR inlet.
- Always cap hoses and tubes when components are removed.
- Ensure that your vacuum pump can “pull” a vacuum of 30 in hg or -100 kPa.
- Fit the FDR, sub cooler insert or accumulator last to minimise the moisture absorption.
- Always add a quantity of the specified lubricating oil to the FDR or accumulator after a repair. Refer to the A/C system manufacturer’s information. If the information is not available add 25ml for an FDR and 40ml for an accumulator.

OEM A/C System Suppliers And Manufacturers Recommendations

Air International Thermal Systems, Denso Australia and Delphi Australia suggest that the FDR, sub cool insert or accumulator is replaced whenever the A/C system is open to the atmosphere for repair.