

# Service Precaution: Horizontal Expansion Valves in R1234yf Systems

In automotive A/C systems, the expansion valve regulates the flow of high-pressure, high-temperature liquid refrigerant to the evaporator, creating a pressure drop that leads to a significant temperature reduction. This process enables efficient absorption of heat from ambient air, which produces cool air for the vehicle's interior.



Expansion valve is in a vertical position in most vehicles.



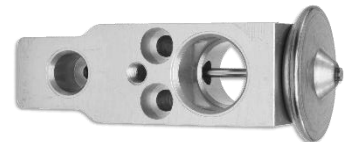
Typical expansion valve location against the firewall on the passenger side.

Generally, the expansion valve is located at the engine firewall on the passenger side of the vehicle in a vertical position, but some late model vehicles with R1234yf systems may have the expansion valve in a horizontal position.



The expansion valve plunger glides up and down to control the flow of refrigerant to the evaporator.

In the vertical position, oil flows down the plunger, keeping it lubricated.



OIL POOLS UNDER PLUNGER

The expansion valve is positioned horizontally in some R1234yf systems.

In the horizontal position, it is more likely the valve will get stuck due to lack of lubrication.

R1234yf systems with the expansion valve in a horizontal position may complicate A/C system diagnosis because the horizontal position limits lubrication of the expansion valve's internal plunger. If the internal plunger gets stuck in an open or closed position, A/C performance will suffer.

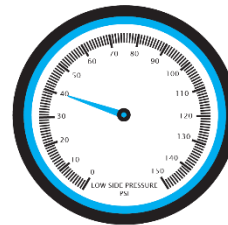


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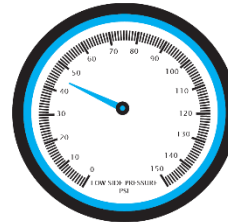
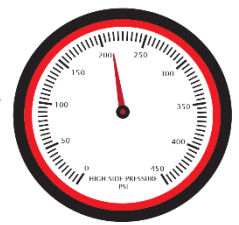
When diagnosing an R1234yf system where the expansion valve is in a horizontal position, take note of the following precautions and recommendations for service and diagnosis:

- Manufacturer specified oil amount is critical to A/C system performance, more so in systems with R1234yf and/or an oil-retentive compressor as they operate with a minimal oil making these systems more sensitive to under/overcharging.
- Use gauges to assess A/C performance at various settings to pinpoint exactly when the system is or isn't cooling.
  - Cool the interior of vehicle to the point that the blower can be turned to low speed (expansion valve minimum position). Then, turn the clutch off and turn the blower to high speed.

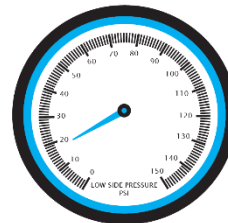
- Monitor the high and low side gauges during this process to see how fast the low side reaches ambient pressure/temperature.
- Ideally, the high side will fall fast because the compressor has stopped pumping, and the low side should gradually climb to ambient pressure/temperature with no noticeable jerking.
- If there is a sudden rise/fall on the low side with noticeable jerking, this indicates the valve movement is restricted. In this case, the expansion valve should be replaced.



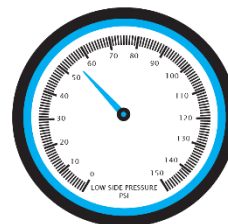
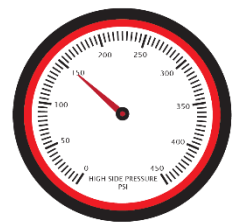
Normal Readings



Overcharged or air blocked in the condenser



Low charge



Weak Compressor

