

THEME: AC SYSTEM DIAGNOSTICS

OPERATING PRESSURE R134A

BACKGROUND

The working pressures diagnostics method is an easy and cost effective way to troubleshoot major problems within the AC system operation. The temperature and pressure variations taking place inside the loop and within an AC cycle are crucial for the refrigerant's change of state, enabling the system to operate and to produce cool air inside the cabin. In terms of pressure operation, the AC loop is divided in two sections - high-pressure side and low-pressure side. Reading the relations between pressures, is a reliable and easy way to determine the most common malfunctions of the system or components.

PROBLEM

Operating pressures on the high- and low-pressure sides need to remain within a particular range to ensure optimal performance of the AC system. **Having either the LP or HP reading outside of their preferred ranges can mean an array of problems that needs to be found and eliminated.** Typically, the most common result of various malfunctions is poor performance of the system, meaning that there is not enough cool air delivered in the vehicle's cabin.

RECOMMENDED SOLUTION

To perform an effective pressure diagnostics, several crucial conditions must be observed. First, use of the right tools - a separate pressure gauges manifold or gauges integrated with a filling station are recommended. LP and HP gauges must be connected correctly to the vehicle's system, respectively to the low- and high-pressure side's service ports.

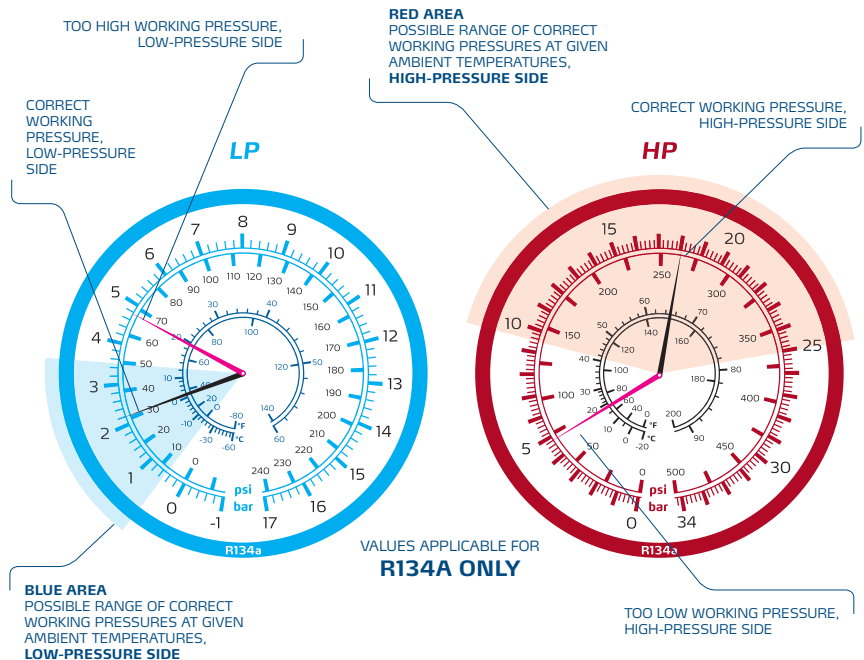
Before the test, make sure the system is in an operational condition. This requires a correct level of refrigerant charge, with at least 1,5 bar/25 PSI of static pressure to run the compressor. To determine that, static pressures* of the system should be read before starting the engine. LP and HP pressure gauge indications should be very nearly to equal on both sides. Too low static pressure indicates a low system charge and probable leak that must be found and repaired.

After the static pressures test is passed, operational pressures can be measured. For reliable outcomes, the vehicle must achieve its operational characteristics. The engine must get started, set to idling and maximum cold air production, and around 70% of the blow power must be set for the AC system. The engine must get to its proper operational temperature of 80- 90°C/180-200°F.

Now the LP and HP gauge readings need to be considered. To determine failures, the gauges' indications must be referred to a table with R134a operating pressure values for HP and LP. Please notice, the values will vary depending on conditions such as ambient temperature and compressor type (fixed/variable displacement).

*The actual static pressure will depend on the ambient temperature. To control if it is correct, refer to a static pressures table applicable for R134A.

APPROPRIATE AND IMPROPER OPERATIONAL PRESSURE VALUES, R134A



TYPICAL PROBLEMS CAUSING THE LP/HP OPERATIONAL PRESSURES TO REGISTER OUTSIDE THE REGULAR VALUES

- **System improper charge** – too low or to high amount of refrigerant
- **Improper use of additives** – mainly excessive use of UV dye causing system overpressure
- **Component and system inner blockages and restrictions** – caused by impurities, debris, moisture or corrosion in the system, improper use of additives (leak stop agents), consequence of overheating and carbonized lubricant particles – mostly exposed to clogs are the expansion valve, receiver dryer and condenser (thin micro tubes)
- **Malfunction of condenser fan**
- **Malfunction of air circulation system** – cabin filter, interior blower, heater, thermostatic valve, etc.
- **Malfunction of compressor** – steering – clutch/valves, power drive or operation in general
- **Malfunctioning condenser** – restricted heat exchange caused by missing fins, fin corrosion, soiled surface, leakages, bent tubes and fins, etc.

For more precise troubleshooting related to the system operational LP/HP pressures, as well as for listing of the proper operational pressures, please consult Nissens' AC System Operating Pressures (R134A) poster.

For more info visit www.nissens.com/climate

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