AC Diagnostics - Component temperatures

Operation of the air-conditioning system depends on a change of the refrigerant's state that happens in the course of pressure and temperature variations inside the AC loop. Temperature-based diagnostics of components is considered as one of the basic methods to troubleshoot the system. It is easy, reliable and cost-effective. Temperature ranges of AC loop components can tell a trained diagnostician how well the system is running, and where problems are potentially located, as well as what those issues might be.

Problem

Depending on the pressure side where AC loop components are located, each component has a nominal range of temperatures in which it operates properly. Temperatures beyond the nominal range, too high or low, can indicate a number of potential issues related to the component itself, other components in the loop, or the consumables applied (refrigerant, fluids, dyes, etc). The most common result of various malfunctions is usually poor performance of the system, meaning that there is not enough cool air delivered in the vehicle's cabin.

Recommended Solution

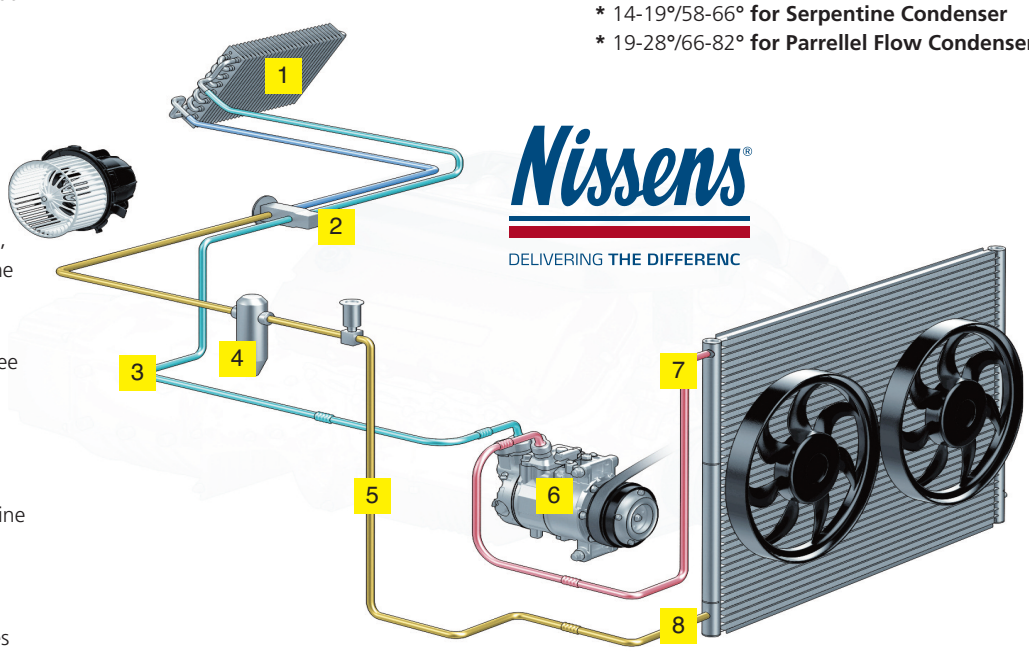
For a reliable and effective temperature diagnostic, Nissens recommends that several conditions are fulfilled prior to performing the temperature check. First, the diagnosing operator should study the given vehicle's AC system layout to determine location of the AC loop components, and ensure that there is free access to them for the temperature-measuring device. Second, the engine must be started, set to idle and a maximum cold air production and blow must be set for the AC system. The engine should achieve its proper operational temperature, which typically ranges between 80- 90°C/180- 200°F. Professional, digital thermometer devices are recommended for exact measurement - both as equipped with a sensing probe or infrared-based.

There are several places where temperatures should be measured: on specific components' surfaces, component lines, or in- and outlets.

For more precise instructions and components' proper operational temperatures, consult Nissens' Technical Poster, AC System Diagnostics - Loop Components Temperature, that can be obtained from Nissens distributors or at www.nissens.com/climate, as well as at Techtips.ie.

Component	Where to Measure	Temperature (°C/°F)
1 Evaporator	Surface	0-5°/32-41°
2 Expansion valve	Directly on the unit	2-5°/35-41°
3 Compressor suction line	Evaporator to compressor line	5-15°/41-59°
4 Receiver dryer	Directly on the unit	30-50°/86-122°
5 Line	Condenser to receiver dryer line	30-50°/86-122°
6 Compressor	Directly on the unit	60-90°/140-194°
7 Condenser outlet	On line to receiver dryer	40-60°/104-140°
8 Condenser inlet	On line from compressor	60-90°/140-194°
7 to 8 Across Condenser	**Difference between Inlet - outlet**	14-28°/58-82°*

* 14-19°/58-66° **for Serpentine Condenser**
* 19-28°/66-82° **for Parrellel Flow Condenser**



Typical problems causing components to exceed proper temperature range

- 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 expansion valve, receiver-dryer and condenser (thin micro tubes). A clog can be caused by ice forming within the system, which would result in an inconsistent/intermittent blockage.
- Malfunction of condenser fan
- Malfunction of air circulation system – cabin filter, interior blower, etc.
- Malfunction of compressor – steering – clutch/valves or operation in general
- Malfunctioning condenser – restricted heat exchange caused by missing fins, fin corrosion, soiled surface, leakages, bent tubes and fins, etc.