THEME: AC SYSTEM DIAGNOSTICS
LOOP COMPONENTS TEMPERATURE

BACKGROUND

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 loop, and within every AC cycle. Among the crucial factors determining the process, temperature is one of the key aspects, and 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 element has a nominal range of temperatures in which they operate properly. **Temperatures beyond the nominal range – too high or too low - can indicate a number of potential issues related to the component itself, other components in the loop, other components in the system or the consumables applied.** 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 temperatures 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 distributors worldwide or at www.nissens.com/climate

COMPONENTS TO MEASURE AND PROPER OPERATION TEMPERATURES

COMPONENT	WHERE TO MEASURE	TEMPERATURE
Evaporator	Surface	0-5 °C / 32-41 °F
Expansion valve	Directly on the unit	2-5 °C / 35-41 °F
Compressor suction line	Evaporator to compressor line	5-15 °C / 41-59 °F
Receiver dryer	Directly on the unit	30-50 °C / 86-122 °F
Line	Condenser to receiver dryer line	30-50 °C / 86-122 °F
Compressor	Directly on the unit	60-90 °C / 140-194 °F
Condenser outlet	...to receiver dryer	40-60 °C / 104-140 °F
Condenser inlet	...from compressor	60-90 °C / 140-194 °F
Condenser	Inlet - outlet	Temperature difference between inlet and outlet

TYPICAL PROBLEMS CAUSING THE COMPONENT TO EXCEED ITS 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 the 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)
- **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.

For more precise problem explanations related to each of the key loop components, please consult Nissens' Technical Poster, AC System Diagnostics - Loop Components Temperature.