

# A/C Maintenance & Service: Keep 'em Cool

Now is the **time to ensure**  
your customers' vehicles are **ready**  
for the **hot weather** ahead.





You need objective standards for judging whether or not the A/C is performing properly. While the traditional dial-type thermometer is accurate, a non-contact infrared unit is faster-acting.

**S**pring is well upon us and soon the weather will be soaring into the torrid temps of summer. It's time to inspect your customers' air conditioning systems and have the vehicles completely ready for the hot weather. It's much better to have the A/C system ready to use when needed, rather than have a customer discover that the system isn't working properly when that first blast of infernal air hits. The alternative is having your shop swamped with vehicles, driven by sweaty, stressed customers, all wanting you to "fix it right away."

You can maintain customer confidence, avoid stress (for both the shop and the customer) and look like a hero, by simply discussing with each customer the need to inspect the system now and bring it up to specifications. You must make your points convincing to the customer so that he or she realizes the need to check it now, rather than later, when the A/C is needed and your shop is busy.

Before inspecting or performing A/C maintenance, always ask the customer for any background history of the vehicle and look for labels on the system or within the engine compartment that would indicate any prior repair, retrofit or maintenance. This knowledge can be invaluable in saving time and money.

### Inspecting the System

Inspection of the A/C system consists of three main parts: operational, visual, and pressure. Leak testing is a separate issue, which we'll get to later.

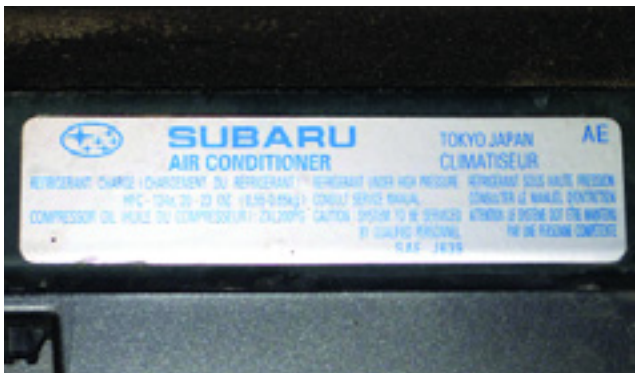
The first step is to inspect the system for proper operation. The question here should be: "Is the system cooling properly?" These quick steps can help isolate any problems:

Test the output temperature by running the system with a thermometer in the center vent output. Or, use a non-contact infrared pyrometer. Compare the results to the Subaru specifications.



Check the output temperature of the center vent to find out the truth.

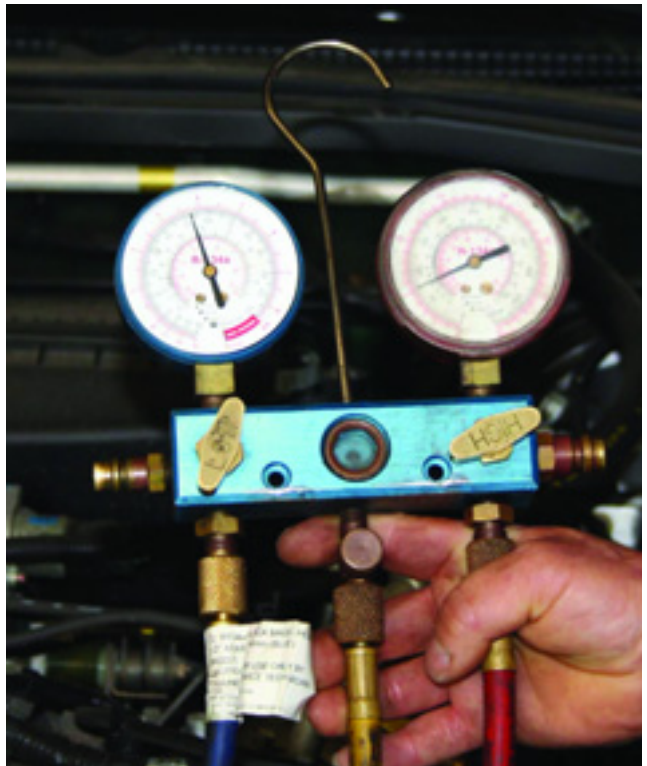
- Make sure the fan switch is functioning in all positions.
- Check that the volume of air exiting the vents is adequate, indicating the proper operation and sealing of the blend doors. Remember, these cars don't have a valve that stops coolant flow to the heater core. So, whenever a customer complains that the air coming out of the ducts isn't cold enough, a blend door problem is a possibility.
- Listen for any odd or unusual noises, both inside the vehicle and under the hood, such as squealing from the blower or groaning or rattling from the A/C compressor.
- A visual inspection should follow, either to locate the source of a malfunction or to find any potential problems:
- Inspect the compressor drive belt for proper tension, excessive wear, cracks or glazing, which could affect compressor operation.
- Inspect component mounts, brackets and fasteners for damage, breakage or wear that could be potential sources of problems, especially rattles and vibrations.
- Inspect all refrigerant system connections for signs of refrigerant and oil leakage.
- Inspect all electrical connectors for corrosion and damage.



*The A/C label under the hood gives the correct amount of refrigerant for the system . . .*

Nothing will work right if the charge is too low, or too high. The A/C label you'll find under the hood gives you the basic amount of R-134a that the system is designed to operate on. If you're not evacuating the A/C, however, you need to hook up your gauge set and check pressures. For most Subaru models, proceed as follows:

- With the ambient temperature between 86 and 95 deg. F., park the car in the shade.
- Open the windows.



*. . . but you still need your gauge set to find out the real state of the charge.*



## A/C Maintenance and Service: Keep 'em Cool

- Hold rpm at 1,500.
- Set the controls on Max and Recirc, and switch the blower to high.
- Read your gauges. Low side pressure should be between 18 and 28 psi, that of the high side 213 to 242 psi.

Remember, common causes of high head pressure are a condenser that's blocked by trash and electric fans that aren't turning on.

### The Causes of Poor Cooling

Poor cooling can be due to many reasons other than low refrigerant charge or leakage, including:

- Compressor operation.
- The system refrigerant charge and type. This includes:
  - Contaminated refrigerant.
  - Air that has entered the system.
  - Too much oil in the system.
  - A sealant that has been added to the system that could be blocking or restricting controls or screens.
- System controls. This includes:
  - Temperature (blend) door movement and proper position.
  - Defective or improperly operating thermostatic expansion valve.
  - Restricted or missing orifice tube.
  - Defective or improperly operating compressor clutch cycling switches.
  - Defective or improperly operating evaporator temperature sensors, thermistors or thermostatic switches.
  - Defective controls switches (in variable displacement compressors).
- Airflow circuits. Including:
  - Clogged evaporator core fins.
  - Plugged cabin air filter.
  - System mode door position.

- Fan motor, fan clutch and electrical components.
- Condenser experiencing insufficient air flow.
- Cooling system malfunctions.
- Internally blocked system components.
- Improper or poorly functioning replacement parts.

### Leaker?

When Subaru vehicles leave the factory, the A/C service access valves are covered with caps. These service valve caps are there for two reasons:

- The cap keeps debris from getting into the valve and possibly the system.
- The cap has a built-in seal to help prevent refrigerant loss.



*A missing service valve cap can be the source of a small refrigerant leak. The cap contains a seal to help keep refrigerant from leaking.*

If the service valve caps are missing, it is a sign that the system may have been worked on in the past. Ask the customer if he or she has receipts or records of, or recalls, any past A/C work. This may give you a history of the vehicle's history. Missing service valve caps need to be replaced for the reasons stated above.

When inspecting a service valve, also inspect the seal within the cap. Always check for any leakage with the caps in place.

## A/C Maintenance and Service: Keep 'em Cool

### Sniffer

**Note:** Subaru of America suggests the use of a “sniffer” with a Halide tip before resorting to the use of fluorescent dye.

If there is adequate refrigerant in the system to engage the compressor, use the steps below to check for leaks. If there is little or no refrigerant in the system, add enough to overcome the low pressure cutout and engage the compressor, then follow these steps:

- Visually check for leaks.
- Move the vehicle away from any wind or shop fans.

Operate the A/C system for approximately 10 minutes, and confirm that the high-side pressure shows at least 100 psi (690 kPa, or 7.03 kg/cm<sup>2</sup>).

- Shut the engine off.
- Remove the gauges, if installed, and install the service valve caps.
- Start detecting for leaks on the high side of the system at the compressor, then work your way to the expansion valve. By the time you check the low side of the system, the pressures should have equalized.
- Check the low side of the system, starting at the compressor and work toward the expansion valve.
- Remove the resistor block from the evaporator case and check for leaks within the case.

When performing a leak check procedure, keep the following in mind:

- There could be more than one leak.
- Always operate leak detection devices according to the manufacturer’s guidelines.
- Some leaks may occur only at cold ambient temperatures when components contract. As internal system pressures increase, the leak may seal.
- Some combination condenser/receiver drier assemblies have an additional leak check point at the bottom of the condenser.



*Many technicians find using a sniffer frustrating, so they prefer UV or blacklight leak detection.*



*You need a means of injecting the UV dye into a system under pressure. This Tracer Products set-up uses individual cartridges, which makes billing the customer more straightforward.*

### UV: The Final Authority

If a leak cannot be located visually or by using a “sniffer”, some mechanics will introduce a dye into the system. When using dye:

- Follow the dye manufacturer’s guidelines on how to introduce the dye and the amount of dye to be introduced. An overcharge of dye can reduce the efficiency of the system, or even damage the compressor.
- Remember to clean any remaining dye from the exterior of the system after repairs are made.
- After the leak has been located and repaired, perform another inspection to verify that the system is free of leaks.

## A Word About Oil

It is of utmost importance to use the correct oil for the type of compressor and refrigerant system. R-12 systems, of course, use mineral oil. Subaru R-134a refrigerant systems use different viscosities of poly alkaline glycol (PAG) oils, depending on the type of compressor. A label on the back of the compressor shows the viscosity and capacity of PAG for that particular system. Remember: PAG oil does not completely emulsify with R-134a, so you cannot verify the system charge level using a sight glass.

*To avoid problems, use only the amount of PAG oil specified for the vehicle's system. A tag on the compressor gives the proper amount.*



Every SOA service compressor comes with a full system charge of the proper oil. To keep from over-oiling the system, which can result in poor cooling performance and even damage to the compressor, you may need to drain some oil from the new unit. So, remember to measure the amount of oil you dumped out of the old compressor.

## Recharging & Recycling

When you find it necessary to recharge and/or recycle the refrigerant in the system, be sure to follow the usage guidelines of the recycling/recharging equipment manufacturer and the A/C system specifications requirements of the model and year of the vehicle.

Be sure to place a label on the vehicle as evidence of any work that has been done on the system in the way of a retrofit from R-12 to 134-a.

Subaru offers the correct specs on the Subaru Tech Information System website at <http://techinfo.subaru.com>.

The website also carries the helpful Subaru Technicians Reference Booklet for Heating, Ventilation and Air Conditioning (HVAC), Module 603, item #MSA5P0137C. ■