

Mercedes-Benz

Climate Control Quick Checks

Mercedes-Benz manufactures some of the best-engineered cars in the world. However, anyone who has a regular diet of Mercedes work in the shop quickly becomes familiar with the “different” way that Mercedes engineers design some of the systems on their vehicles. If you only see the occasional Benz in your shop, some of these differences in Mercedes-Benz systems may be confusing. These differences may be referred to by some as “over-engineering,” but once you understand the reasoning behind the differences, it becomes clear why these vehicles have achieved such enviable reliability record.

Most technicians have little trouble diagnosing and repairing a climate control system. Most heating and air conditioning systems are fairly straightforward and components and failures are common from one vehicle to the next. Holding true to the tradition of doing things a little differently, Mercedes Benz climate control systems have a few “twists” to consider when diagnosing problems in this area of the vehicle.

In this article, we will point out specific differences, offer pointers on common failure items, and give tips on some “simple fixes.” These might include complaints of difficulty maintaining heating during low-speed driving, inaccurate cabin temperature in Heat or A/C mode, or no heat situations.

Many technicians tend to “over-think” these types of problems, when often the problem has a simple solution. An understanding of some of the basic functions and components of the Benz systems will make them a little less mysterious and help you in diagnosing problems that often have simple solutions. Should these “quick-checks” fail, it may then be necessary to dig a little deeper for the solution. Remember, what at first appears to be a big problem may have a simple, inexpensive solution. This could make you look good in the eyes of the customer and it will allow you to get on to other things.

There are two basic types of climate control systems that have been installed on Mercedes vehicles. Both systems are similar in operation with one basic difference. The 190/190E series vehicles use a “manual” heating/air conditioning system that incorporates the ability to turn off the compressor function from the dash panel.

A fully automatic system was introduced with the 300 series, and continues on all later Mercedes-Benz models. For the purposes of this article, we will examine the later, fully automatic climate control system used on all models other than the 190/190E.

—By Pat Etwiler

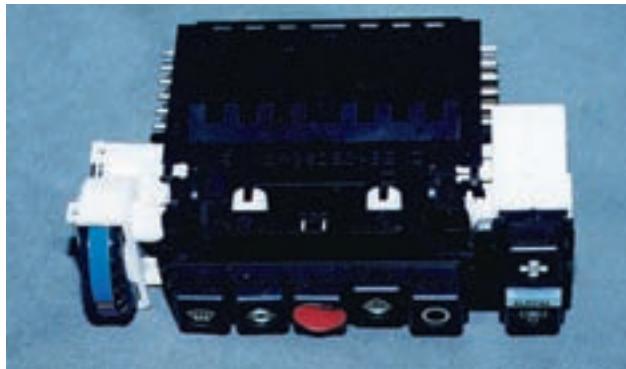


The climate control panel incorporates the temperature control wheel, mode selection buttons, and the fan switch. Moving the temperature control wheel (left arrow in photo) to full cold or full hot causes the system to ignore the information from the cabin temperature sensors and allows the system to produce either maximum heat or maximum cooling. In many cases of component failure or failure of the control head itself, the system will default to the full heat/defrost mode.

Keeping with the spirit of trying to turn a big problem into a simple one, the best place to begin your troubleshooting is at the fuse panel. Has someone removed or attached any new accessories to a fuse that may affect the climate control system? Are any of the fuses blown? Always consult the fuse chart for the vehicle you are working on at the time. Often the layout of the panels and the locations of individual fuses will change from model to model and from year to year.



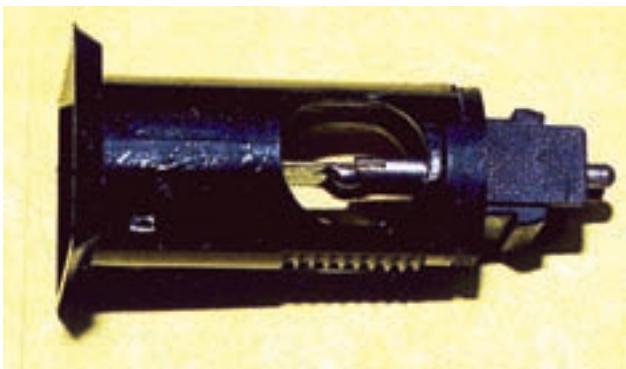
This is an example of a climate control relay/control unit from a 300E series vehicle. This unit controls mode switching, fan speeds, the heater control valve, and compressor function. The 420 SEL, 560 SEC, and 560 SEL series uses a separate fan control unit to control fan speed functions. This system is similar from year to year, but there are subtle differences. Before wasting a lot of time trying to identify components, check the wiring diagram and component location guide for the year and model in question.



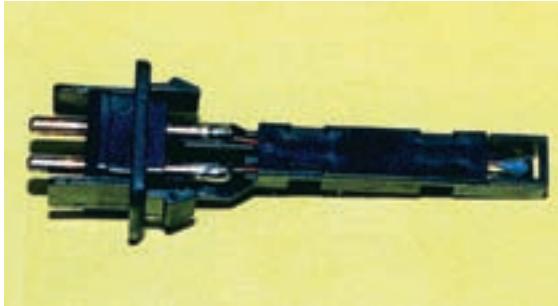
Remove the center dash trim panel, then inspect the climate control head assembly wiring harness connections. Examine the harness connectors for signs of overheating or discoloration, which may be the result of high current draw across the circuit involved. Remember that loose connections at individual harness pins can also cause high resistance. The high resistance produces extra heat, which can lead to failure of related components or the control head itself.



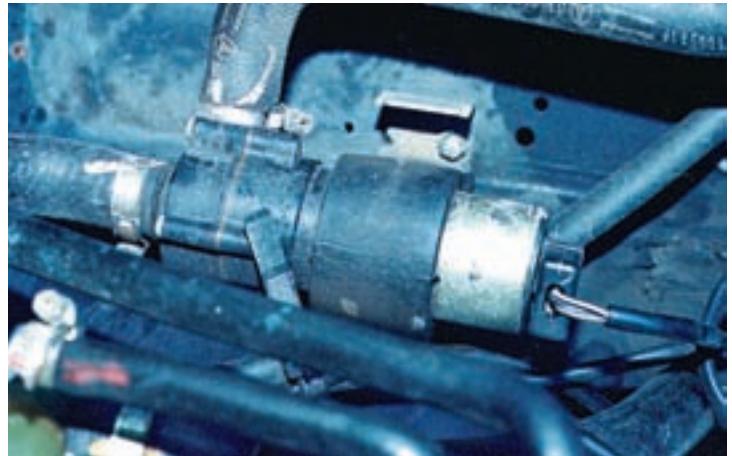
A common cause of incorrect cabin temperature is a failed inside air temperature sensor. These sensors measure cabin air temperature by measuring the temperature of air pumped across a sensor wire within the housing. This sensor wire can get contaminated with dust, dirt, and tobacco smoke to the point where it does not provide accurate information to the ECU. Many times cleaning the sensor wire with an electronic-safe spray cleaner will restore the sensor to life.



Another cause of inaccurate readings is failure of the small fan that pulls air across the sensor, through a connecting hose. A quick method to check for airflow across the sensor with the system running is to pass smoke from a match close to the sensor, then watch for it to be drawn into the port. If no airflow is present, check for a failed fan motor or disconnected air hose. The sensor on the 300 series is located near the dome lamp. All others are in a small grill atop the dash.



The heater air temperature sensor is located in the heater box, near the heat outlet. It can become contaminated and produce inaccurate readings. Use an electronics-safe spray cleaner, then re-check for proper operation. The evaporator temperature sensors (not shown), are located in the left side of the evaporator housing, above the accelerator pedal. The outside air temperature sensor is located under the fresh-air intake grill, near the air recirculation door. Test these for proper resistance according to the workshop manual.



Mercedes-Benz vehicles are equipped with an auxiliary water pump. Due to the flow configuration of the coolant from the engine to the heater, this pump is designed to keep a constant flow of coolant flowing to the heater, even under low speed and idle conditions. Failure of this pump can cause insufficient coolant flow and poor heating in low-speed traffic or idle conditions. If your customer's complaint is in this area, check the auxiliary pump for proper operation.



The heater control valve (Mercedes-Benz calls it the mono valve), is controlled by the ECU. Coolant demand is controlled and administered to the heater core from signals from the various temperature sensors, through the ECU, to this valve. This valve is the single largest failure item in the climate control system. Time and temperature take their toll on the small diaphragm within the valve, causing a total loss of heating due to the valves inability to react properly on demand.

The heater (mono) valve has suffered from a high failure rate, so Mercedes has provided a repair kit, as an alternative to complete replacement. This kit is a quick, simple solution to what may at first appear to be a major problem. If the electrical portion of the valve is sound (they usually are), install a repair kit and you are back in business. As previously stated, many problems associated with the climate control system have simple solutions, if you know where to look for them.

