

Air Suspension Description and Operation

[Air Suspension](#)

The primary mission of the air suspension system is the following for the rear suspension under loaded and unloaded conditions:

- Keep vehicle visually level
- Maintain optimal ride height

The air suspension system consists of the following items:

- Two compressor assemblies
- Air suspension module
- Electronically controlled air suspension relay
- Air suspension sensors
- Ride height switch
- Air suspension exhaust valve
- Air suspension inflator switch and fill valve
- Air suspension pressure sensor
- Air suspension inlet valves
- Rear air springs

[Compressor Assemblies](#)

The air suspension system consist of 2 compressor assemblies. Both compressors run simultaneously and are controlled by one relay. One compressor has the exhaust valve mounted on its cylinder head. Each compressor has its own thermal limit switch. The compressors are a positive displacement air pump, powered by a 12-volt DC permanent magnet motor. A thermal limit switch protects each compressor. The thermal limit switch is normally closed and provides a ground signal to the air suspension module. If there is an overtemperature condition the thermal limit switch will open and signals the air suspension module to deactivate the compressor relay. The compressors will stop running and a DTC will set. Intake air for the compressors is drawn through an intake filter and line that is attached to the fuel filler pipe in the left rear wheel area. The air compressor assemblies are mounted to a bracket that is located under the rear center of the vehicle. The compressor air dryer is mounted next to the air compressors. It contains a moisture absorbing chemical that dries the compressed air before it is delivered to the rear air springs. Moisture is removed from the dryer and returned to the atmosphere when air is exhausted from the air springs during vehicle lowering.

[Air Suspension Module](#)

The air suspension module will conduct several self tests at every ignition activation, while other tests do not commence until wheel speed is detected at the wheel speed sensors. During self test if any of the module components are found to be malfunctioning a DTC will set and the

corresponding telltale is activated. The telltale message that the air suspension module can display is SERVICE SUSPENSION SYSTEM. Each DTC consists of one current and one history DTC. History codes will be cleared after 100 consecutive malfunction-free ignition cycles or with a scan tool. The air suspension module communicates with other modules in the vehicle via class 2. The leveling function will be disabled when any door or liftgate is open or when the inflator is being used. To prevent energizing the electronically controlled air suspension relay or air suspension inlet valves during normal ride motions the air suspension module provides a calibrated delay before leveling the vehicle.

Electronically Controlled Air Suspension Relay

Both air compressors are controlled by the air suspension module by the use of a relay. The relay and wiring are protected with a 60-amp fuse. The air suspension module will only activate the compressor relay when the engine is running.

Air Suspension Sensors

The rear air suspension sensors are potentiometers which detect height changes at the rear of the vehicle. The sensors relay the height changes to the air suspension module. The sensors are mounted to the frame at the rear wheel area on the left and right sides. The activation arm is attached to the upper control arms of the rear suspension.

Ride Height Switch

Extended ride height is used to increase vehicle ground clearance. When the ERH switch is activated the vehicle will raise 2 inches at the rear. The extended ride height will only occur if vehicle speed is less than 64 km/h (40 mph) with the liftgate and all doors closed with the engine running. When the switch is activated the switch LED will flash while the vehicle is transitioning to extended ride height. When the vehicle reaches extended ride height switch LED will be on continuously. The vehicle will return to normal height when the switch is activated again and the switch LED will go OFF. The vehicle will automatically return to normal height if vehicle speed increases over 64 km/h (40 mph) and the switch LED will turn OFF.

Air Suspension Exhaust Valve

The air suspension exhaust valve is used to exhaust air from the air springs and lower the vehicle. The air suspension exhaust valve is mounted on the head of one of the air compressors. The air suspension exhaust valve is controlled by the air suspension module.

Air Suspension Inflator Switch and Fill Valve

The inflator system consist of a inflator hose to provide a means of inflating objects and a switch with a LED located in the rear compartment. The inflator will only function when the engine is running and the vehicle is in PARK. The switch LED will be illuminated with the inflator ON. The inflator function will have priority over leveling functions.

Air Suspension Pressure Sensor

The air suspension system uses the air pressure sensor to monitor system pressure. The air suspension module uses that signal to determine if there is a leak in the system and to maintain

a minimum air pressure in the system.

[Air Suspension Inlet Valves](#)

The air suspension system has 2 inlet valves. One for the right air spring and one for the left air spring. The valves are mounted to the valve block with the air suspension pressure sensor and is located next to the compressor. The valves are activated and controlled independently by the air suspension module.

[Rear Air Springs](#)

The air springs are mounted in the frame in the same location were the coil spring is mounted for a vehicle without air suspension. Support pieces are affixed to the axle for the air springs.

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