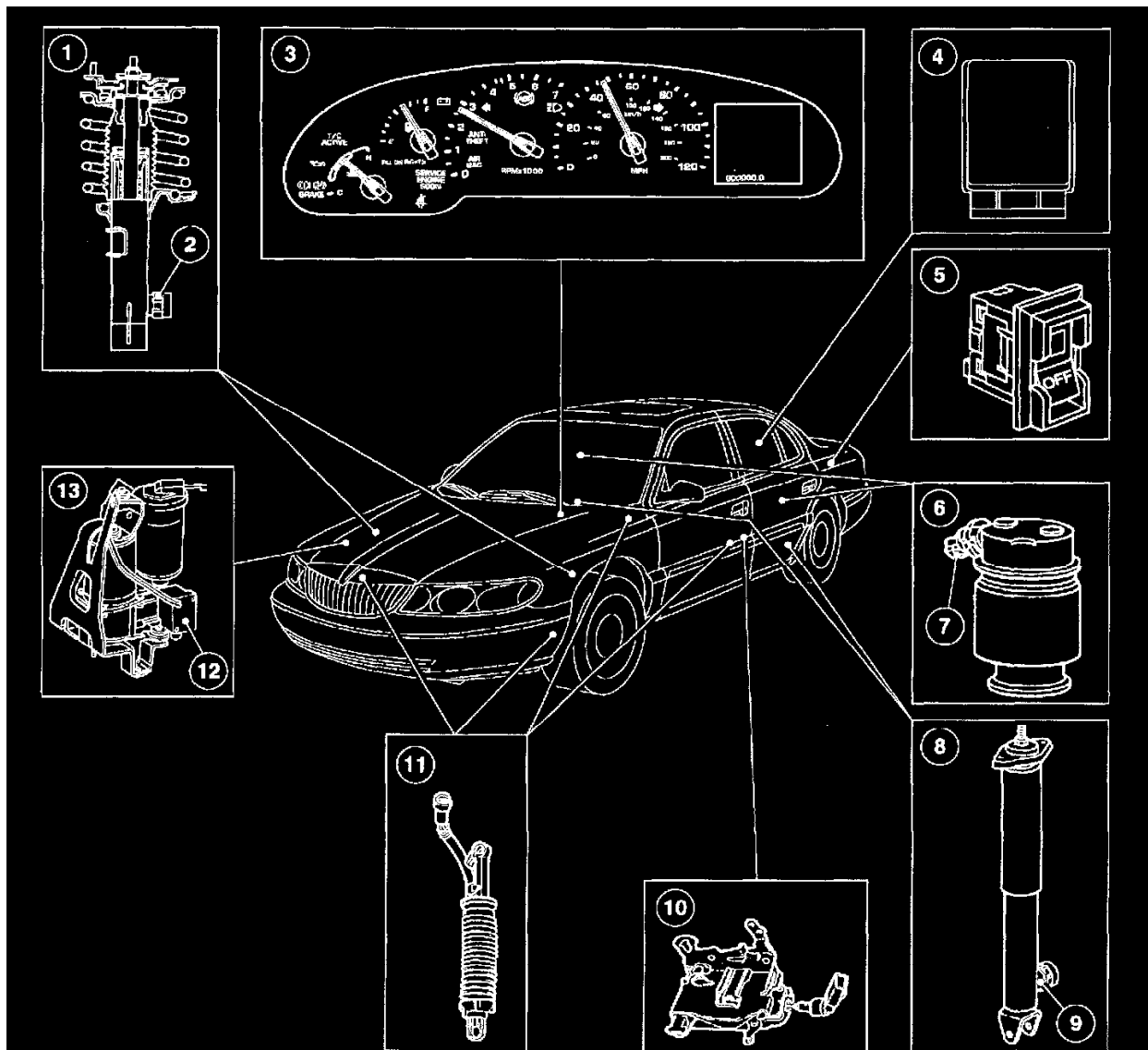


Suspension Control (Automatic - Electronic Level): Description and Operation



GF1594-A

Item	Description
1	Front Spring and Shock Absorber Assembly
2	Shock Actuator
3	Message Center Indicator

Item	Description
4	Vehicle Dynamic Module (VDM)
5	Rear Suspension Leveler Compressor Switch
6	Rear Air Spring

Item	Description
7	Air Spring Solenoid
8	Shock Absorber
9	Shock Actuator
10	Lamp Switch

Item	Description
11	Air Suspension Height Sensor
12	Vent Solenoid
13	Air Compressor

Part 2 Of 2

PRINCIPLES OF OPERATION

WARNING:

- Before repairing or installing any air suspension component(s), turn off the air suspension switch or disconnect the battery ground cable to prevent vehicle damage or personal injury.
- Do not attempt to install or inflate any rear air spring that has become unfolded to prevent vehicle damage or personal injury.
- Failure to observe the following procedures may result in a sudden failure of the air spring or suspension system.
- Any rear spring which is unfolded must be refolded prior to being installed in a vehicle.
- The air spring refolding procedure should only be used for an air spring which has never supported the vehicle's weight while in the

improperly folded position.

- Vehicles with an incorrectly folded air spring(s) found after the vehicle has been driven, must have a new air spring installed.
- Do not attempt to inflate any air spring which has been collapsed while uninflated from the rebound hanging position to the jounce stop.
- When installing a new air spring, care must be taken not to apply a load to the suspension until springs have been inflated using the air spring fill procedure.
- After inflating an air spring in hanging position, it must be inspected for proper shape.

DUAL ACTION SYSTEM

The suspension system incorporates a rear load leveling system that maintains the vehicle at the proper ride height under varying conditions of vehicle load, and an optional road calibrated suspension ride control system that varies the damping of the shock absorbers between soft and firm.

The rear load leveling system uses air springs to support the vehicle weight. The quantity of air in the rear air spring is controlled by the vehicle dynamic module (VDM) to maintain a predetermined vehicle ride height. Each air spring has an air spring solenoid to control air flow into and out of each air spring.

The optional ride control system uses four shocks with electronically controlled actuators. The shock actuators are internally mounted on the lower bodies of the front spring and shock assemblies and the rear shocks. The action of the shock actuators is controlled by the VDM. The VDM sends a signal to an appropriate shock actuator which switches to either soft or firm damping. Normally the shock actuator setting is in a soft, luxury car mode. This is done by causing an electric current flow through the actuator, which induces electromagnetic force that moves the shock actuator from a firm to a soft position. When driving situations require, the setting is switched to a firm, high performance control mode. This is done by removing power to the actuator, allowing the shock actuator to return to the firm mode.

The shock actuators are not replaced separately. If testing indicates an actuator failure, the entire shock absorber must be replaced.

VEHICLE DYNAMIC MODULE

A microprocessor controls the air suspension and ride control systems. The microprocessor and its support hardware are contained in the Vehicle Dynamic Module (VDM). It responds to signals from various sensors in the vehicle to maintain the desired ride height while the vehicle is either moving or stopped. It accomplishes this by opening and closing solenoid valves. It also turns on the compressor through the compressor relay or opens the vent solenoid in response to signal inputs from the air suspension height sensor. It also controls the shock actuators, if equipped.

Normally, the VDM uses a 45-second averaging interval to determine when fill and vent operations are needed. However, door switch signals' inputs can override the 45-second averaging interval so fill and vent operations can begin immediately, if needed.

AIR SUSPENSION SERVICE SWITCH

The air suspension service switch provides the system enable signal to the vehicle dynamic module in the ON position only.

AIR COMPRESSOR

The compressor contains a thermal overload circuit breaker. The circuit breaker automatically resets after a cool down period and after being tripped by excessive compressor motor heat.

The air compressor assembly consists of the compressor pump, electric motor, and vent solenoid (must be installed as an assembly).

AIR SUSPENSION HEIGHT SENSOR

The air suspension height sensor provides a continuous voltage signal corresponding to vehicle ride height. For instance, when the sensor is fully compressed, the voltage signal sent to the Vehicle Dynamic Module (VDM) is 4.5 volts. When the sensor is fully extended, the voltage signal to the VDM is 0.5 volt.

Each one of the air suspension height sensors measures the actual difference between known reference points so that the VDM can respond to variations in ride height.

If the wheel speed and travel are above a predetermined level, the shock actuators are switched to the firm position. This reduces the chance of grounding out the suspension when traveling over rough road surfaces.

Body roll during extended, high lateral-force turns (freeway exits) are also neutralized to prevent unwanted leveling actions at these times.

AIR SPRING SOLENOID VALVE

Never rotate an air spring solenoid valve to the release slot in the end cap fitting until all pressurized air has escaped from the spring to prevent damage or injury.

The air spring solenoid allows air to enter and exit the air spring during leveling corrections. The air spring solenoid valve is electrically operated and controlled by the VDM.

VENT SOLENOID

The vent solenoid allows air to escape from the system during venting corrections. The vent solenoid is located in the air compressor cylinder head and shares a common electrical connector with the motor. The vent solenoid is enclosed in the cylinder head casting, which forms an integral vent solenoid housing that allows the vent solenoid tip to enter the pressurized side of the system. Air leakage past the vent solenoid tip is prevented by an O-ring seal.

When it is determined that a corner of the vehicle is high, the vent solenoid opens to provide an escape route for the pressurized air. The vehicle will not lower unless the air spring solenoid is also opened to allow air to leave the springs.