






AWD and 4WD

Diagnostic Checks

There are some basic checks and tire inspections that can be performed in your service bay and on the road that can help isolate the cause of the driveline noise.

AWD/4WD Noise Diagnostic Overview

	Garage Shift *Safely operate vehicle in the service bay using all gear ranges without AWD/4WD *Safely operate vehicle in the service bay using all gear ranges with AWD/4WD engaged
	Road Test *Safely drive the vehicle without AWD/4WD engaged *Safely drive the vehicle in a suitable area with the AWD/4WD engaged (including HI and LO range as available) - Drive vehicle straight and in turns - Drive under a load and cruising - Attempt to re-create exact vehicle/road conditions suggested by owner
	Tire Check *Verify the same tire size *Check for uneven wear *Verify the same rolling circumference at all four tires *Verify proper inflation
	Operational Check *Verify proper operation *Ensure the concern is not a programmed default
	Concern Comparison *Isolate any noise using "chassis ears" or equivalent *Confirm any identified concern by comparing to like vehicle

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Diagnostic Checks (continued)

Garage Shift Check:

In the service bay, listen for noises or vibrations as you compare each gear range. Be sure to operate the vehicle in all ranges with the four-wheel drive system engaged in both Hi range and LO range. Check for noises, vibrations, or gear grinding during engagement.

Road Test Check:

Take the vehicle for a test drive, again operating the vehicle in all ranges including HI and LO ranges. Use the “auto” feature if your vehicle is so equipped. Drive in a straight line as well as in turns. Drive the vehicle with and without acceleration load. Try to detect driveline noise or vibrations. Try to recreate the same driving conditions as when the customer experiences the noise or vibration. Sometimes a bad road surface can cause unusual noises or vibrations. Remember, you can’t diagnose a problem if you can’t duplicate it.

Tire Check:

Check all tires to make sure they are all the same size and brand. Different brands may have different circumferences, even though they are the same size. Look for uneven tire wear. Tires with different tire wear will roll at different rates and speeds.



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Diagnostic Checks (continued)

Tire Inflation Check:

Always check your tire pressure. Proper and even tire pressure is very important especially with “on-demand” or “all-wheel” systems. A tire with low pressure will roll at a different rate than a tire at the proper pressure. As little as 2 pounds per square inch difference between tire pressures has been known to cause four-wheel drive system drivability concerns.

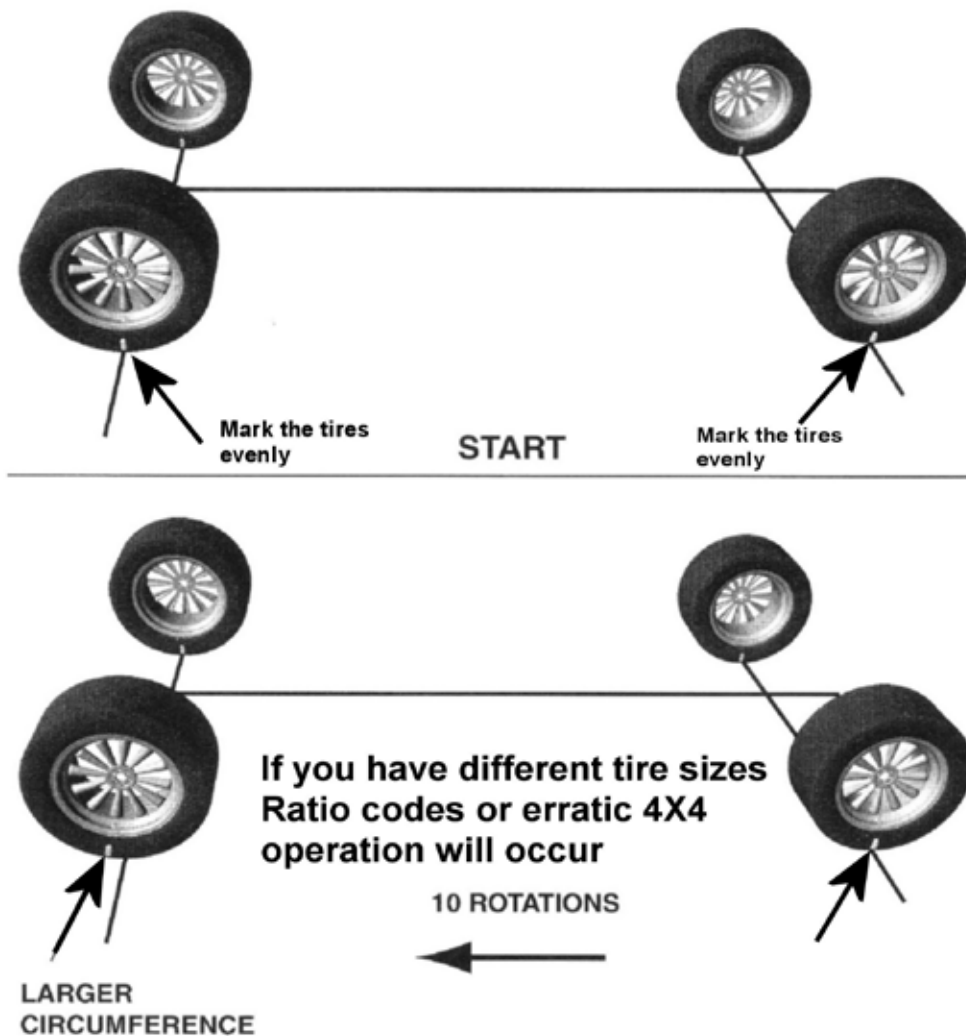


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Diagnostic Checks (continued)

Rolling Tire Circumference Check:

Performing the rolling tire circumference check is the easiest and fastest way to tell if you're having a tire circumference concern. Start by marking all the tires at the six o'clock position. Drive forward on a flat surface in a straight line for a minimum of 10 complete tire revolutions. Bring one tire back to the six o'clock position. Check all tires to verify that all tires are within $\frac{1}{2}$ " of the six o'clock position. Tires that do not match will have to be replaced, usually as a complete set (all four tires).



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Diagnostic Checks (continued)

Tire Replacement Criteria:

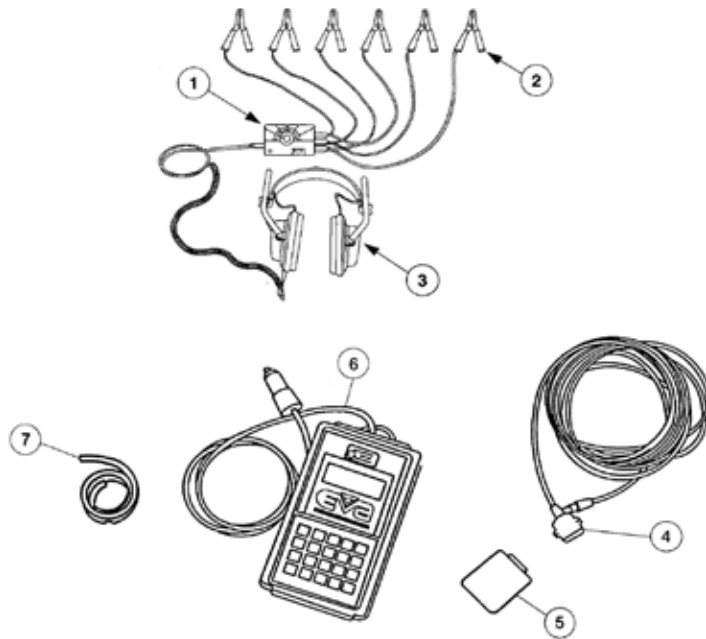
All four tires must be the same brand, size, and speed rating. If a tire must be replaced, the remaining tires must have at least 30% of the tread remaining. Any tires with less than 30% tread remaining, as compared with the new tire, will have to be replaced.

Default Operation:

Most electronic transfer case systems have sophisticated software or built-in logic. The TCCM or GEM system will not allow four-wheel low range to engage unless all parameters are met, and will stay in the previously commanded range. These parameters include but are not limited to, transmission in neutral and vehicle speed is less than three miles per hour. Some vehicles with the GEM system will not engage four-wheel low range if the GEM thinks that the drivers door is open.

Noise Isolation:

There are several tools available today to help isolate noises and vibrations. One of the most helpful tools out there is “Chassis Ears” or even a vacuum hose. “Chassis Ears” is an electronic stethoscope that is available from your local tool supplier. An Electronic Vibration Analyzer (EVA) is also available.



ChassisEAR and Electronic Vibration Analyzer Tools

Item	Description
1	Input Control (channel) Selector
2	Microphone Clamps
3	Headphones
4	Vibration Sensor

Item	Description
5	Software Cartridge
6	Electronic Vibration Analyzer
7	Holding Strap