

## Steering Linkage Inspection

**Important:** Replace damaged or broken steering linkage components. Do not attempt to repair these parts by welding.

1. Set the wheels in the straight ahead position.
2. Set the steering wheel in the locked position.
3. Raise the vehicle on one side so that one of the front tires is approximately 25 mm (1 in) off the floor.
4. Position a dial indicator at the edge of the wheel rim.
5. Move the same wheel back and forth without moving the steering wheel.

The dial indicator should not read above 2.74 mm (0.108 in).

6. If the gauge reading exceeds specifications, inspect the following components for looseness:
  - The linkage pivots
  - The ball studs
7. Replace any damaged or worn linkage pivots.
8. Replace any damaged or worn ball studs.
9. Repeat procedure on the opposite wheel.

## Tie Rod End Inspection

1. Tie rod ends are self adjusting for wear.
2. Tie rod ends require the following services:
  - Periodic lubrication
  - Periodic inspection
3. Replace the tie rod ends if they appear to be worn or loose.

## Idler Arm Inspection

1. Raise and suitably support the vehicle with safety stands. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Allow the front wheels to rotate freely.
3. Allow the steering mechanism to turn freely.
4. Position the wheels in a straight ahead position.
5. Position a dial indicator against the top of the idler arm grease cap.
6. Place a spring scale near the relay rod end of the idler arm.

### Important:

- Do not forcefully move the right tire and wheel assembly back and forth in order to cause an up and down movement of the idler arm. There is no control on the amount of force being applied to the idler arm.
  - Vehicle shimmy is not always caused by a loose idler arm. Before suspecting suspension or steering components, consider the following areas:
    - Dynamic imbalance
    - Runout
    - Force variation of tire and wheel assemblies
    - Road surface irregularities
  - Refer to Tires and Wheels and Vibration Diagnosis and Correction.
7. Apply 110 N·m (81 lb ft) of force upward and then downward while measuring the total distance that the arm moves.
  8. Measure the total distance the idler arm moves under the applied force specified. Allow no more than 3 mm (1/8 in) deflection in each direction, for a total of 6 mm (1/4 in).
  9. Replace the idler arm if it fails this test. Refer to *Idler Arm Replacement (RWD)* or *Idler Arm Replacement (4WD)*.

**Wheel Bearings Diagnosis (Utility and 4WD Pickup)**

Step	Action	Value(s)	Yes	No
DEFINITION: This vehicle uses an integral hub/bearing the front and rear wheels. Replace the hub/bearing if damage exists or if the hub/bearing exceeds the maximum lateral runout specification.				
1	1. Raise and suitably support the vehicle. Refer to <i>Lifting and Jacking the Vehicle</i> in General Information. 2. Remove the tire and the wheel. Refer to <i>Tire and Wheel Removal and Installation</i> in Tire and Wheels. 3. Install and fully seat the wheel nuts in order to securely retain the rotor to the hub and bearing. 4. Secure the <i>J 8001</i> to the steering knuckle. Ensure that the <i>J 8001</i> button contacts the rotor surface about 13 mm (0.500 in) from the outer edge of the brake rotor. 5. Set the <i>J 8001</i> to zero. 6. Use your hands in order to push and pull the rotor edge near the <i>J 8001</i> . Observe the dial on the <i>J 8001</i> .  Does the rotor movement measurement exceed the value shown?	0.1270 mm (0.005 in)	Go to Step 2	Go to Step 3
2	Replace the bearing and hub assembly. Refer to <i>Wheel Hub, Bearing, and Seal Replacement (4WD Pickup and Utilities)</i> in Front Suspension.  Is the repair complete?	—	System OK	—
3	1. Mark the relationship of the rotor to the hub. <b>Notice:</b> Whenever the brake rotor has been separated from the wheel bearing flange, clean any rust or foreign material from the mating surface of the rotor and flange with the <i>J 42450</i> hub cleaning kit. Failure to do this may result in increased lateral runout of the rotor and brake pulsation. 2. Remove the brake rotor. Refer to <i>Brake Rotor Replacement - Front</i> in Disc Brakes. 3. Clean any rust or foreign material from the mating surface of the rotor and the hub using <i>J 42450-A</i> . 4. Ensure that the <i>J 8001</i> button contacts the vertical surface of the hub as close as possible to the outer edge. 5. Set the <i>J 8001</i> to zero. 6. Rotate the hub one complete revolution. Inspect the runout indicated on the dial.  Does the runout indicated on the dial exceed the value shown?	0.040 mm (0.0015 in)	Go to Step 2	System OK

**Wheel Bearings Diagnosis (RWD Pickup)**

**Tapered Roller Bearing Diagnosis**

Consider the following factors when diagnosing bearing condition:

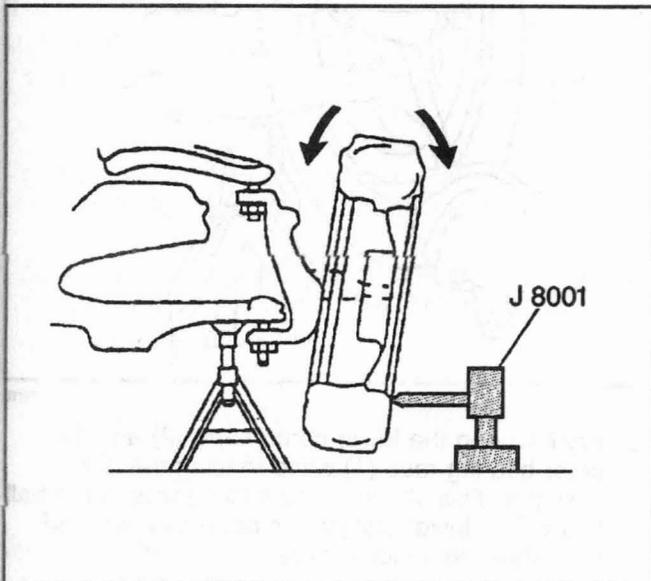
- General condition of all parts during disassembly and inspection.
- Classify the failure with the aid of the illustrations.
- Determine the cause.
- Make all repairs following recommended procedures.

## Diagnostic Information and Procedures

### Ball Joint Wear Check

#### Tools Required

J 8001 Dial Indicator



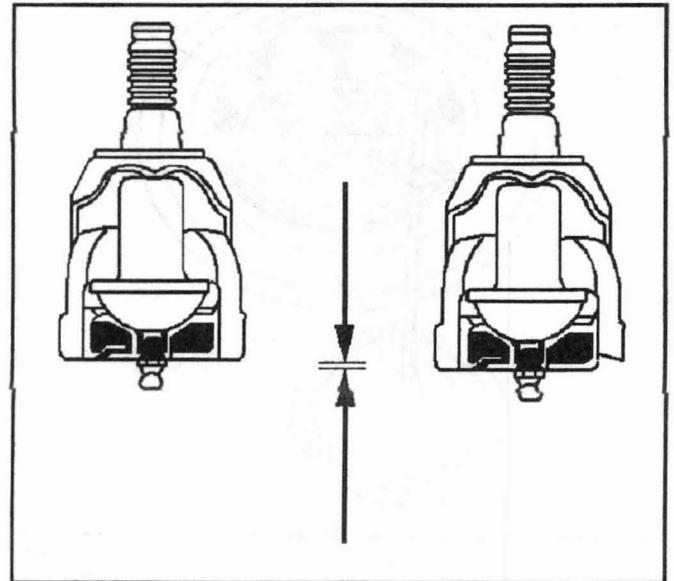
2007

#### Important:

- The vehicle must rest on a level surface.
  - The vehicle must be stable. Do not rock the vehicle on the floor stands.
  - The upper control arm bumper must not contact the frame.
1. Raise and support the vehicle with safety stands. Refer to *Lifting and Jacking the Vehicle* in General Information.
  2. Support the lower control arm with a floor stand or jack, as far outboard as possible, under the stabilizer bar bracket.

**Important:** If a seal is cut or torn, replace the ball joint.

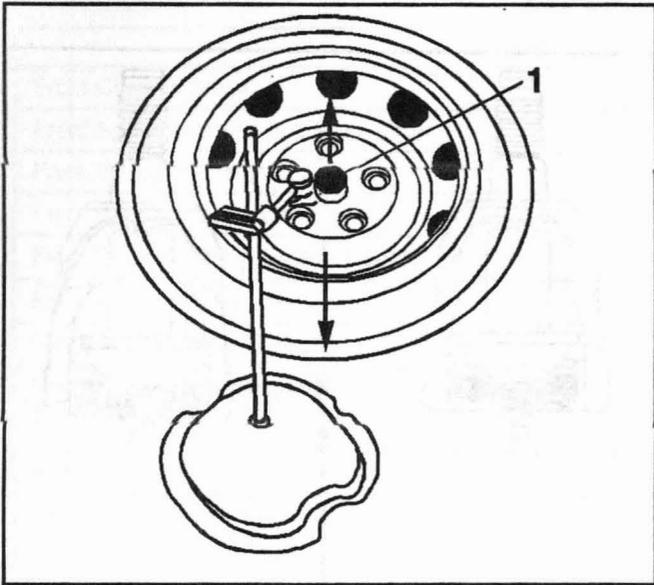
3. Wipe the ball joints clean. Check the seals for cuts or tears.
4. Adjust the wheel bearings, RWD only. Refer to *Wheel Bearing Adjustment*.
5. Check the ball joints for horizontal looseness.
  - 5.1. Position the dial indicator against the lowest outboard point on the wheel rim.
  - 5.2. Rock the wheel in and out while reading the dial indicator. This shows horizontal looseness in both joints.
  - 5.3. The indicator reading should be no more than 3.18 mm (0.125 in). If the reading is too high, check the lower ball joints for vertical looseness.



2008

6. For RWD vehicles, check the lower ball joints for wear and for vertical looseness using the following procedure:

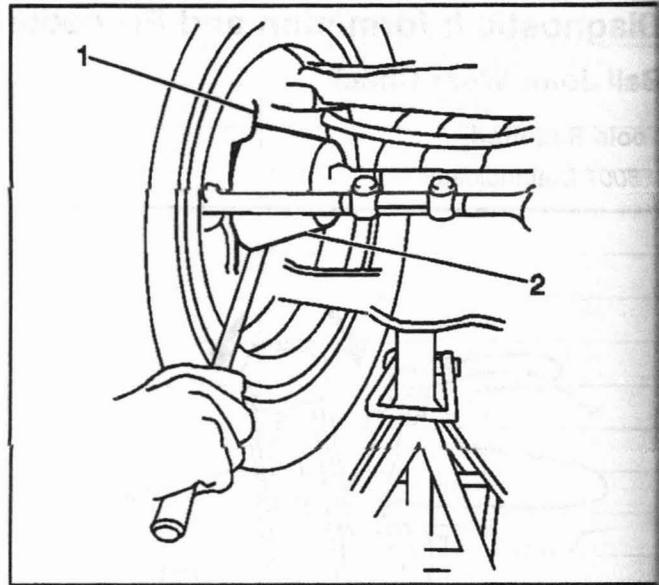
- 6.1. Inspect by sight the lower ball joint for wear. The position of the housing into which the grease fitting is threaded indicates wear. This round housing projects 1.27 mm (0.050 in) beyond the surface of the ball joint cover on a new ball joint. Under normal wear, the surface of the ball joint housing retreats inward very slowly.
- 6.2. First observe, then scrape a scale, a screwdriver, or a fingernail across the cover. If the round housing is flush with or inside of the cover surface, replace the ball joint.



2009

**Notice:** Refer to *Do not pry between the lower arm...* in Cautions and Notices.

7. For 4WD vehicles, place the vehicle on jack stands. Place a dial indicator (1) against the spindle in order to show vertical movement.



2010

8. Pry between the lower control arm (2) and the outer bearing race (1) while reading the dial indicator. This shows vertical looseness in the ball joints. The lower ball joint is not preloaded and may show some looseness.
9. If the indicator reading is more than 3.18 mm (0.125 in), replace the ball joint.
10. If the lower ball joint is within specifications, and there is too much horizontal looseness, check the upper ball joint for wear.
  - 10.1. Disconnect the ball joint from the steering knuckle.
  - 10.2. If you find any looseness or can twist the stud with your fingers, replace the ball joint.