



**NUMBER:** 02-001-02

**GROUP:** Suspension

**DATE:** Jun. 10, 2002

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**SUBJECT:**

Special Offset Ball Joint - Allows Adjustment To Caster And Camber Angles

**OVERVIEW:**

This bulletin involves the replacement of one or both front upper ball joints when front end alignment specifications can not be obtained using normal alignment practices.

**MODELS:**

2001 - 2003	(TJ)	Wrangler
2001 - 2003	(WG)	Grand Cherokee
2001 - 2003	(WJ)	Grand Cherokee
2001	(XJ)	Cherokee

**SYMPTOM/CONDITION:**

The customer may experience a slight lead or drift to either side of the road. This condition may occur when there is no driver input to the steering system, or when the driver must maintain a constant input to the steering system in order to maintain a straight ahead direction of the vehicle.

**NOTE: THIS BULLETIN WILL NOT EFFECT SITUATIONS WHERE A LEAD OR DRIFT CONDITION IS PRESENT ONLY WHEN BRAKING.**

**DIAGNOSIS:**

The front end caster and/or camber angles on certain Jeep vehicles are fixed. For **Grand Cherokee** vehicles both the caster and camber angles are non-adjustable (fixed). For **Wrangler and Cherokee** vehicles only the camber angle is non-adjustable (fixed). The offset ball joints listed in this bulletin allow for the adjustment of these "fixed" front end alignment angles by an amount of up to 1.5 degrees. The offset ball joint should be used only as required.

It is **very important** that the following steps are performed in order and prior to any consideration being given towards the use of an offset ball joint(s).

1. Verify matching original equipment tires and wheels.
2. Verify correct tire inflation pressures.
3. Inspect for tire condition and abnormal wear. Refer to the appropriate Service Manual, Section 22 - Tires, for additional diagnostic assistance.
4. Inspect for and correct any worn or damaged steering and front suspension components.
5. Inspect for and correct any worn or damaged wheel bearings/hubs.
6. Verify that no brake drag is present (front or rear).

7. Road test the vehicle to determine if the slight lead or drift is present and not crown sensitive. While road testing, verify that the condition is present even when the transmission is in neutral.
8. If the condition is present, cross switch the front tires. If the condition follows the tires address the condition with the tire manufacturer.

If a slight lead or drift condition is still present after the above steps have been performed, perform the Repair Procedure.

**PARTS REQUIRED:**

Qty.	Part No.	Description
AR	05014876AC	Ball Joint - 0.5 degree
AR	05014877AC	Ball Joint - 1.0 degree
AR	05016972AC	Ball Joint - 1.5 degree

**EQUIPMENT REQUIRED:**

6289	Kit, Ball Joint Installation and Removal
	Four Wheel Alignment Machine

**REPAIR PROCEDURE:**

**WJ / WG Alignment Specifications (See Service Manual for Up-Country Specs.):**

ANGLE	TARGET	RANGE	MAX LT. TO RT. DIFF.
CASTER	+ 6.75°	+ 6.00° to + 7.50°	0.50°
CAMBER	- 0.37°	- 0.75° to 0.50°	0.50°
TOE (IN)	+ 0.20°	+ 0.14° to + 0.26°	0.06°

**TJ Alignment Specifications:**

ANGLE	TARGET	RANGE	MAX. LT TO RT DIFF.
CASTER	+ 7.00°	+ 6.00° to + 8.00°	0.50°
CAMBER	- 0.25°	- 0.88° to + 0.38°	0.50°
TOE (IN)	+0.30°	+0.24° to +0.36°	0.06°

**XJ Alignment Specifications:**

ANGLE	TARGET	RANGE	MAX. LT to RT DIFF
CASTER	+ 7.00°	+ 5.25° to + 8.50°	0.50°
CAMBER	- 0.25°	-0.75° to + 0.50°	0.50°
TOE (IN)	+ 0.20°	+0.14° to + 0.26°	0.05°

**CAMBER ADJUSTMENT:**

If cross camber is greater than 0.5 degrees, select the wheel furthest from the preferred value and replace that ball joint with the appropriate offset ball joint listed above. The target value of the adjusted side must equal the unadjusted side, providing a cross camber value of 0.0 degrees. Never compensate for drift with additional cross camber. This could compromise vehicle handling.

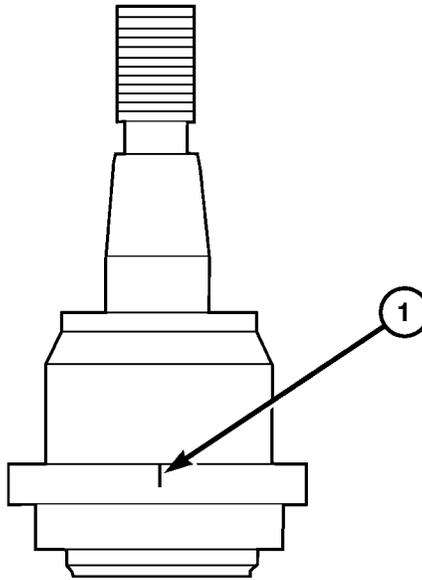
**CASTER ADJUSTMENT:**

If cross caster is greater than the specifications shown above, utilize the offset ball joint to reduce the cross caster. If individual caster is above the specifications, utilize the cam or shim adjustment where possible. Use the offset ball joints if the caster cannot be adjusted using the other methods. Target caster is shown above if two offset ball joints are used. Offset ball joints will not effect drive line (front propeller shaft) angles. If caster angles are changed using shims and cams, always road test the vehicle to verify that no drive line disturbance has been created. Verify that the steering wheel is centered. Never compensate for drift with additional cross caster. This could compromise vehicle handling.

**NOTE: TO PREVENT ERROR, RE-COMPENSATE THE ALIGNER HEADS EACH TIME A CHANGE IS MADE TO A SETTING ON THE BALL JOINT.**

**BALL JOINT INSTALLATION:**

1. Support the vehicle and front axle in a manner that will allow for the safe removal and installation of the respective upper ball joint(s).
2. Remove the tire and wheel assembly.
3. Remove the cotter pin, retainer, and nut used to secure the axle shaft to the wheel hub/bearing.
4. Mark the brake rotor to the axle hub/bearing for later assembly. This step will help to minimize brake rotor lateral runout.
5. Remove the two brake caliper slide pins. Remove the brake caliper, pads, and rotor.
6. Properly support the brake caliper. Do not use the brake line to support the caliper.
7. Remove the tie rod from the steering knuckle. Do not damage the boot.
8. Mark the wheel hub/bearing to the steering knuckle for later assembly. This step will help to minimize brake rotor lateral runout.
9. Remove the wheel hub/bearing and brake rotor shield. Carefully remove axle shaft.
10. Remove the upper and lower ball joint cotter pins and nuts.
11. Strike the steering knuckle with a brass hammer to loosen the steering knuckle from the ball joint. Lower the steering knuckle from the ball joints studs.
12. Remove the upper ball joint using the appropriate special tools from the #6289 - Ball Joint Installation and Removal Kit.
13. A ball joint positioning template is supplied in the new offset ball joint package. In addition, an index mark is located on the side of the new offset ball joint (Fig. 1). The ball joint index mark will be aligned to the respective mark on the template to obtain the desired angle.



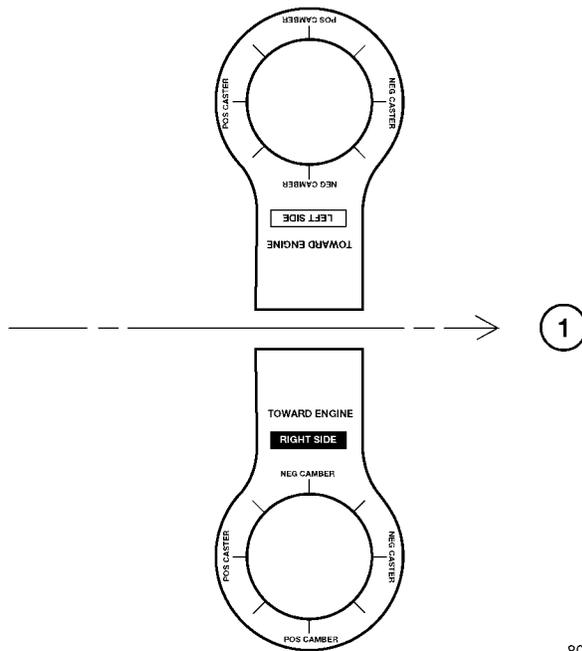
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**Fig. 1 BALL JOINT INDEX MARK**

1 - Ball Joint Index Mark

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14. Make sure the template is oriented correctly (Fig. 2). Position the template on top of the axle yoke.



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**Fig. 2 BALL JOINT POSITIONING TEMPLATE**

1 - Arrow Points To Front Of Vehicle

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15. By hand, temporarily friction fit the offset ball joint to the axle yoke. Position the ball joint index mark to the template to obtain the desired angle. Remove the template.

16. Press the ball joint into the axle yoke bore.
17. Verify that the ball joint is fully seated and is correctly positioned relative to the template.
18. Install the ball joint dust boot and grease fitting.
19. Install the steering knuckle. Tighten the lower ball joint nut to 109 Nm (80 ft. lbs.) and install a new cotter pin. Tighten the upper ball joint nut to 102 Nm (75 ft. lbs.) and install a new cotter pin.
20. Install the tie rod to the steering knuckle. Tighten the tie rod to knuckle attaching nut to 47 Nm (35 ft. lbs.) and install a new cotter pin.
21. Install the axle. Be careful not to damage the axle seal during installation.
22. Align the wheel hub/bearing and steering knuckle marks made during disassembly. Install the brake dust shield and the wheel hub/bearing. Tighten the wheel hub/bearing attaching bolts to 102 Nm (75 ft. lbs.).
23. Install the axle shaft washer and nut. Tighten the axle nut to 237 Nm (175 ft. lbs.). Install axle nut retainer and a new cotter pin.
24. Align the brake rotor mark to its corresponding mark on the wheel hub/bearing and install the brake rotor.
25. Install the brake caliper and brake pads to the steering knuckle. For Grand Cherokee tighten the caliper slide bolts to 35 Nm (26 ft. lbs.). For Wrangler and Cherokee tighten the caliper slide bolts to 15 Nm (11 ft. lbs.).
26. Grease the ball joint.
27. Install the tire and wheel assembly. Tighten lug nuts to 136 Nm (100 ft. lbs.).
28. If required, perform similar repair procedures to other side top ball joint.
29. Verify front wheel alignment.

**NOTE: TO PREVENT ERROR, RE-COMPENSATE THE ALIGNER HEADS EACH TIME A CHANGE IS MADE TO A SETTING ON THE BALL JOINT.**

***POLICY:***

Reimbursable within the provisions of the warranty.

***TIME ALLOWANCE:***

<b>Labor Operation No:</b>	<b>Description</b>	<b>Amount</b>
02-10-60-90	Ball Joint, Upper - Install One Side	3.5 Hrs.
02-10-60-91	Ball Joint, Upper - Install Both Sides	4.2 Hrs.

***FAILURE CODE:***

P8	New Part
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