

260 Driveshafts

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TABLE

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GENERAL

This repair group covers repair and replacement of front and rear driveshafts and driveshaft components.

See also:

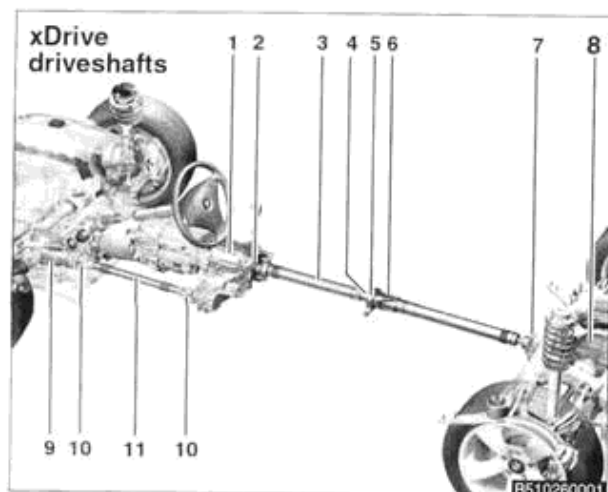
- **270 Transfer case**
- **310 Front Suspension** for front end components
- **311 Front Axle Differential** for front drive axle repairs
- **331 Rear Axle Differential** for rear drive axle repairs

Driveshafts overview

xDrive models are equipped with a transfer case bolted to the rear of the transmission, with front and rear driveshafts transferring power to front and rear differentials. Rear-drive models are equipped with a single driveshaft attached directly to the rear of the transmission.

1. xDrive transfer case
2. Flex-disc
3. Rear driveshaft
4. Crash element (aluminum driveshaft only)
5. Center bearing and mount
6. Center universal joint
7. CV joint
8. Rear differential
9. Front differential
10. Universal joint
11. Front driveshaft

Front driveshaft repairs are limited to replacement of the complete driveshaft. Rear driveshaft repairs consist of replacement of the flex-disc, CV joint, and center mount and bearing. If the rear driveshaft universal joint is defective, replace the complete driveshaft.



6-cylinder vehicles are equipped with aluminium or hybrid (aluminum-steel) rear driveshafts, whereas V8 model rear driveshafts are steel. Driveshafts are mounted with ZNS (shiny zinc-coated) fasteners. Be sure to replace ZNS fasteners with same.

Cautions

CAUTION—

- Be sure the wheels are off the ground before removing the driveshaft. Set the parking brake before removing the driveshaft.
- Use only ZNS (zinc-coated) fasteners to mount driveshafts.
- ZNS fasteners are designed to be used only once. Replace during reassembly.
- Do not move vehicle using engine power once a driveshaft is removed.
- Driveshafts are balanced to close tolerances. Whenever a driveshaft is removed or disassembled, mark mounting flanges and driveshaft sections with paint before proceeding with work. This ensures that the driveshaft can be reassembled and installed in exactly the original orientation.
- Do not allow rear driveshaft to hang from flex-joint or rear CV joint. The weight of the driveshaft may damage rubber joints or boots.

TROUBLESHOOTING

Driveshaft problems

Sources of driveline vibrations and noise may be difficult to pinpoint. Engine, transmission, front or rear axle or wheel vibrations may be transmitted through the driveshafts to the car body.

Noises in the interior of vehicle may be caused by:

- Differential problems
- Faulty wheel bearings
- Damaged drive axle(s)
- Worn or improperly inflated tires

Driveshaft noise or vibrations are usually caused by worn or damaged components.

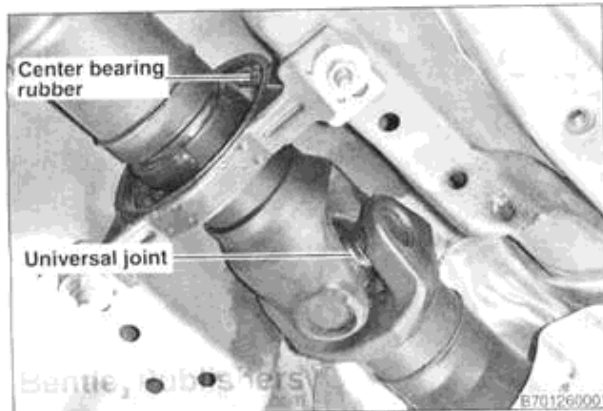
- To inspect or remove rear driveshaft, remove exhaust system and exhaust heat shield. See **180 Exhaust System**.

- Check driveshaft universal joint for play. Pull and twist driveshaft while watching universal joint. Specified tolerance for play is very small, so almost any noticeable play indicates a problem.

Universal joint play

Maximum allowable	0.15 mm (0.006 in)
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- Check fastener torque at flange connections.
- Check rear driveshaft flex-disc and center bearing rubber for deterioration or tearing.



- Check driveshaft for broken or missing balance weights. Weights are welded tabs on driveshaft tubes.
- Use paint to matchmark front and rear flanges. Remove driveshaft. See **Rear driveshaft, removing** in this repair group.
- Check rear driveshaft universal joint for wear or binding. If it is difficult to move or binds, replace driveshaft.
- Check rear driveshaft centering guide at output flange for damage or misalignment.
- Check runout at transmission or transfer case output flange and output shaft, and at rear differential input flange.

Driveshaft flange wear limits

Runout at transfer case output flange (max. allowable):	
• Axial play	0.10 mm (0.004 in)
• Radial play	0.07 mm (0.003 in)
Rear differential input flange radial play (measured at driveshaft center lip)	0.07 mm (0.003 in)

- Check bolt bores at transmission or transfer case output flange and front and rear differential input flanges for wear and elongation.
- Spin rear driveshaft center bearing and check for smooth operation without play.

If inspection reveals nothing wrong with driveshaft, it may need to be rebalanced. This can be done by a speciality driveshaft repair shop.

Sometimes a minor rear driveshaft vibration can be corrected by disconnecting at front flange and repositioning it 120° or 240° in relation to differential input flange.

Table a lists symptoms of rear driveshaft problems and their probable causes. Most of the repair information is contained within this repair group. There are references to other repair groups, where applicable.

Table a. Rear driveshaft problems and causes

Symptom	Probable cause	Corrective action
Vibration when starting off (forward or reverse).	Center bearing rubber deteriorated.	Inspect center bearing and rubber. Replace if necessary. See Center bearing assembly, replacing in this repair group.
	Flex-disc damaged or worn.	Inspect flex-disc. Replace if necessary. See Flex-disc, replacing in this repair group.
	Engine or transmission mounts faulty.	Inspect engine and transmission mounts. Align or replace, if necessary.
	Front centering sleeve worn, or driveshaft mounting flanges out of round.	Check front centering sleeve and replace if necessary. See Front centering sleeve, replacing in this repair group. Also check runout of driveshaft flanges.
	Universal joint worn or seized.	Check universal joint play and movement. Replace driveshaft if necessary.

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Front driveshaft, removing and installing

Table a. Rear driveshaft problems and causes (continued)

Symptom	Probable cause	Corrective action
Noise during on / off throttle or when engaging clutch.	Differential components worn or damaged (excessive pinion-to-ring-gear clearance).	Remove differential and repair. See 311 Front Axle Differential or 331 Rear Axle Differential .
	Drive axle or CV joint faulty.	Inspect drive axles and CV joints. Repair or replace as necessary. See 311 Front Axle Differential or 331 Rear Axle Differential .
Vibration at 25 to 30 mph (40 to 50 kph).	Front centering sleeve worn, or driveshaft mounting flanges out of round or damaged.	Check front centering sleeve and replace if necessary. See Front centering sleeve, replacing in this repair group. Also check runout of driveshaft flanges.
	Universal joint worn or seized.	Check universal joint play and movement. Replace driveshaft if necessary.
	Flex-disc damaged or worn.	Inspect flex-disc. Replace if necessary. See Flex-disc, replacing in this repair group.
	Center bearing rubber deteriorated.	Inspect center bearing. Replace if necessary. See Center bearing assembly, replacing in this repair group.
Vibration, audible rumble over 35 mph (60 kph).	Front centering sleeve worn, or driveshaft mounting flanges out of round or damaged.	Check front centering sleeve and replace if necessary. See Front centering sleeve, replacing in this repair group. Also check runout of driveshaft flanges.
	Mounting flange bolts loose or holes worn.	Remove rear driveshaft and check input and output flange bolts and holes. Replace if necessary.
	Rear driveshaft unbalanced.	Check driveshaft for loose or missing balance weights. Have driveshaft rebalanced or replace if necessary.
	Universal joint worn or seized.	Check universal joint play and movement. Replace rear driveshaft if necessary.
	Rear driveshaft center bearing faulty.	Replace center bearing. See Center bearing assembly, replacing in this repair group.
	Rear differential rubber bushing(s) faulty.	Inspect differential rubber bushing(s). Replace as necessary. See 33 Rear Axle Differential .

FRONT DRIVESHAFT SERVICE

If detecting vibration or noise from the front driveshaft, check front universal joints for play. Pull and twist driveshaft while watching universal joint. Specified tolerance for play is very small, so almost any noticeable play indicates a problem.

Universal joint play	
Maximum allowable	0.15 mm (0.006 in)

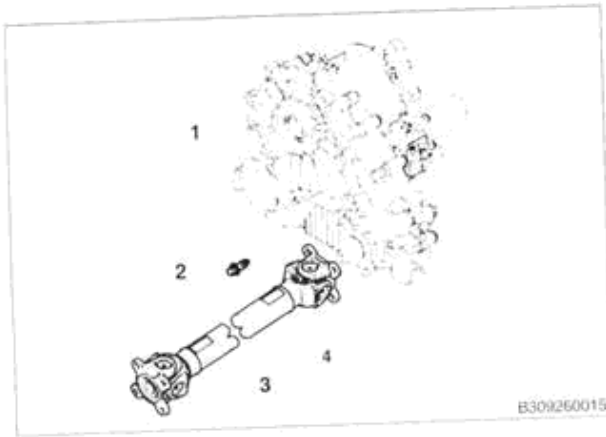
Front driveshaft, removing and installing

- Raise car and support safely.

WARNING—

- Make sure the car is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.

- Remove splash shields underneath engine and transmission.



— Remove front end reinforcement plate. Discard fasteners.

— If driveshaft is to be reinstalled, match mark mounting flanges with paint to preserve original orientation.

Front driveshaft components:

1. Transfer case
2. M8 ZNS bolt (replace with new)
 - Tighten to 20 Nm (15 ft-lb) + additional 45°
3. Driveshaft
4. Universal joint

— Working at front differential input flange, remove universal joint bolts.

— Working at transfer case flange, remove universal joint bolts and remove driveshaft.

— Installation is reverse of removal. Remember to:

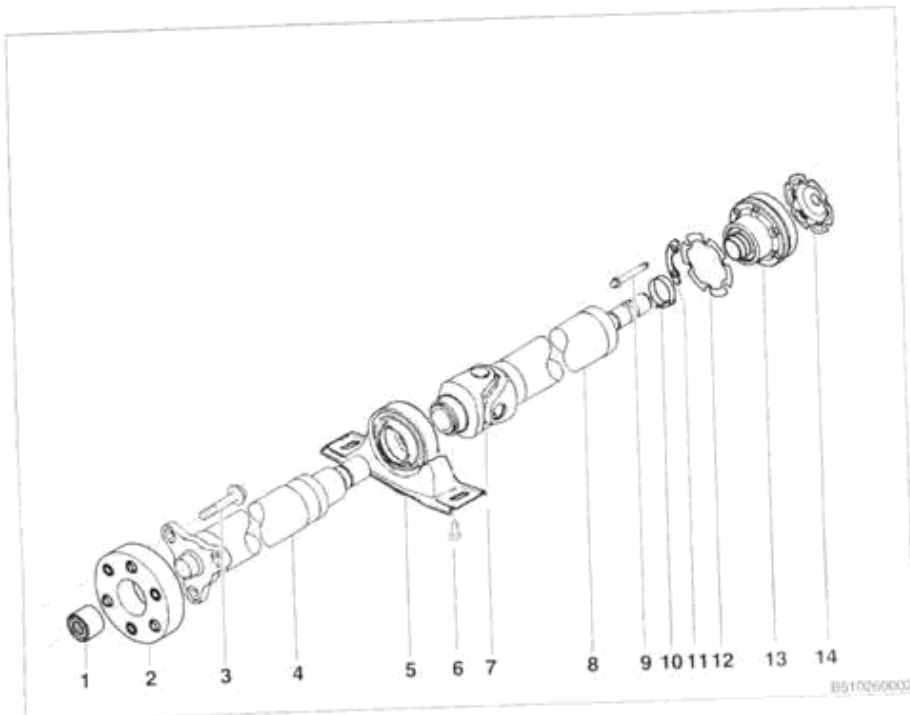
- Observe marks made previously (if applicable).
- Replace ZNS fasteners with new.

Tightening torque

Front driveshaft to transfer case or differential (use new M8 ZNS bolts)	20 Nm (15 ft-lb) + additional 45°
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REAR DRIVESHAFT SERVICE

Rear driveshaft components



1. Centering sleeve
2. Flex-disc
3. ZNS bolt
 - Replace with new
 - Bolt size and torque values vary. See torque table.
4. Front section
5. Bearing mount
6. M8 center bearing mounting bolt
 - Tighten to 21 Nm (16 ft-lb)
7. Universal joint
8. Rear section
9. M10 x 52 mm ZNS bolt
 - Replace with new
 - Torque to 20 Nm (15 ft-lb) + add'l 90°
10. Hose clamp
11. Reinforcement
12. Metal gasket
13. CV joint
14. End cover

260-6 Driveshafts

Rear driveshaft, removing

Rear driveshaft, removing

- Raise vehicle and support safely.

WARNING—

- Make sure the vehicle is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.

- Remove exhaust system and exhaust heat shields. See **180 Exhaust System**.

WARNING—

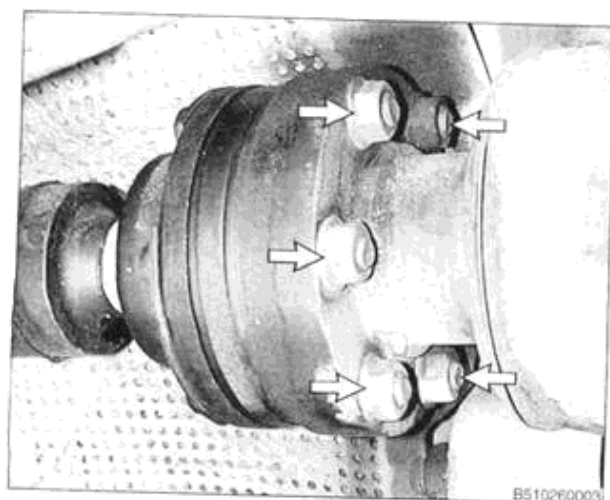
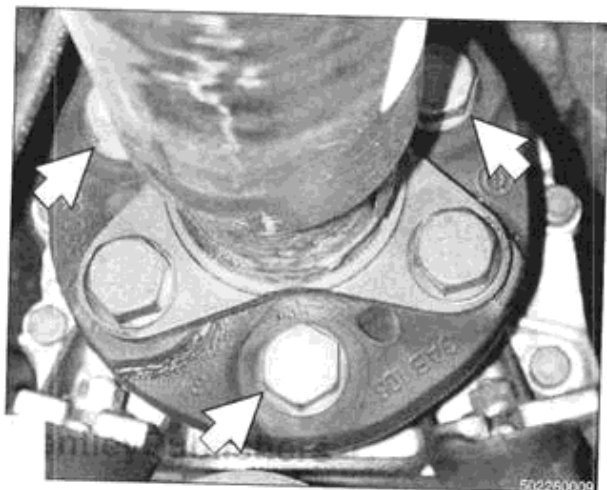
- Make sure exhaust system is fully cooled off before removing.

- N54 engine: Support transmission with transmission jack, then remove transmission rear support.
- Match mark driveshaft mounting flanges and sections with paint to preserve original orientation.
- Working at driveshaft front flex-disc, counterhold bolt heads (arrows) and remove nuts at transmission or transfer case output flange. Discard old fasteners.

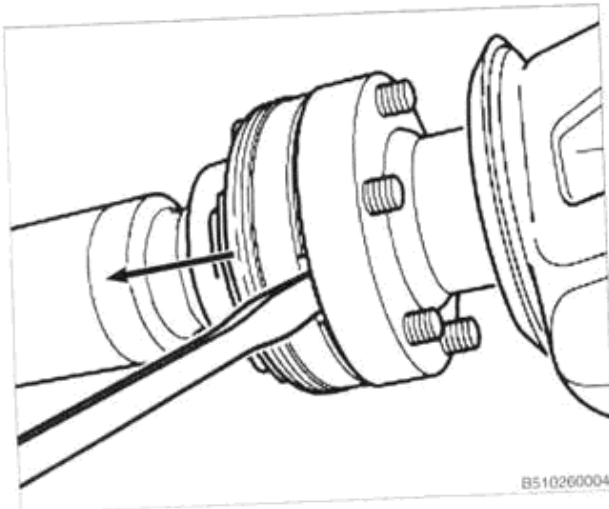
CAUTION—

- To avoid damaging flex-disc rubber, be sure to hold bolts stationary while loosening nuts.

- Hang driveshaft front section from body using stiff wire.



- Working at rear differential flange, loosen and remove rear driveshaft CV joint fasteners (arrows).



- Use screwdriver to pry CV joint off differential flange. Discard old fasteners.

- Hang driveshaft rear section from body using stiff wire.



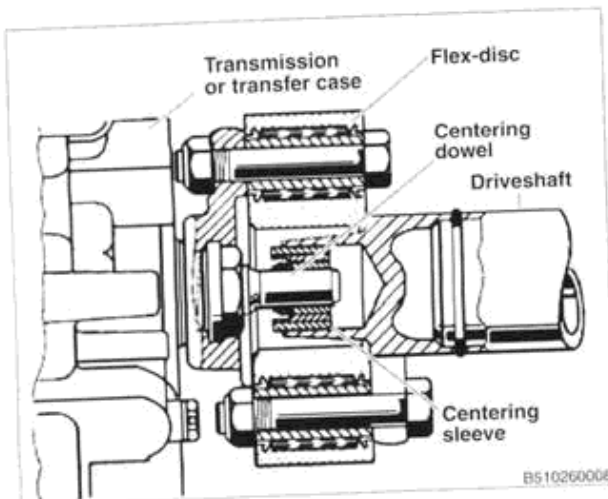
- Remove driveshaft center bearing support mounting nuts (arrows).

- Lower driveshaft, releasing front and rear sections from stiff wire.

Rear driveshaft, inspecting

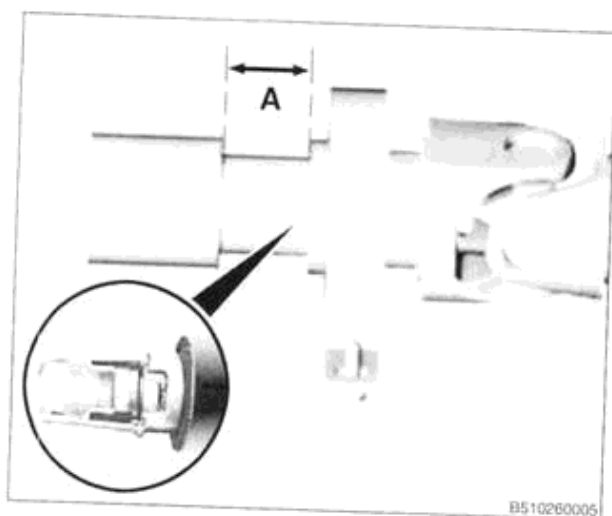
- Check driveshaft universal joint, center bearing, CV joint and flex-disc for defects. See **Troubleshooting** in this repair group. Replace components as needed.

- Check driveshaft front centering sleeve for damage. Replace if necessary. See **Front centering sleeve, replacing** in this repair group.



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Rear driveshaft, installing



- ⚠ Aluminum driveshaft: Check dimension of crash element ahead of center bearing carrier. Replace driveshaft if crash element is deformed shorter than specification.

Driveshaft crash element specification

Dimension A minimum	approx. 100 mm (4 in)
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Rear driveshaft, installing

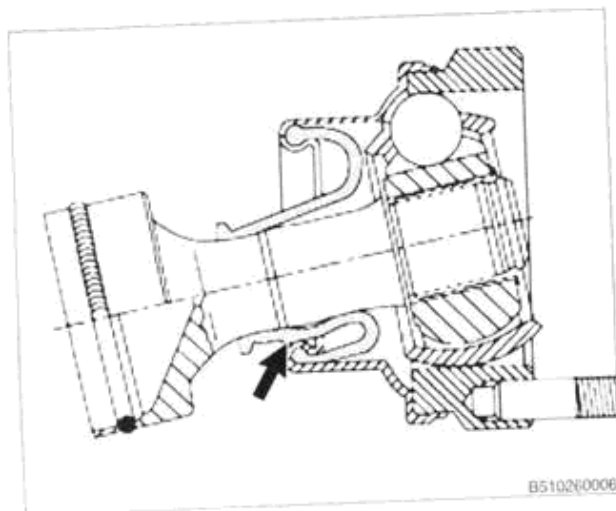
- Apply thin coat of molybdenum disulfide grease (Molykote Longterm 2 Plus[®] or equivalent) to centering sleeve.
- Bend driveshaft slightly at center universal joint to install.
- Align matchmarks on driveshaft to matchmarks on front and rear flanges.
 - Rear CV joint: Using new ZNS fasteners, alternately tighten two opposite nuts to draw joint evenly into flange. Once seated, tighten down remaining nuts.
 - Front flex-disc: Attach to transmission or transfer case output flange using new fasteners.

CAUTION—

- To avoid damaging flex-disc rubber, be sure to hold bolts stationary while tightening nuts.

Tightening torques

Rear driveshaft CV joint to differential: Replace M10 x 52 mm 10.9 grade ZNS fasteners with new	20 Nm (15 ft-lb) + additional 90°
Rear driveshaft flex-disc to transfer case: Replace M10 x 47 mm 10.9 grade ZNS fasteners with new	20 Nm (15 ft-lb) + additional 90°
Rear driveshaft flex-disc to transmission: Replace M12 10.9 grade ZNS fasteners with new	55 Nm (41 ft-lb) + additional 90°



- ⚠ Do not allow rear driveshaft to hang from flex-joint or rear CV joint. Driveshaft weight may damage rubber joints or boots (**arrow**).

- Reinstall center bearing support fasteners.

Tightening torque

Driveshaft center bearing support to body	21 Nm (15 ft-lb)
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- Install heat shields. Install exhaust system. See **180 Exhaust System**.
- Road test vehicle to check for noise or vibration.

Flex-disc, replacing

- Raise vehicle and support safely.

WARNING—

- Make sure the vehicle is stable and well supported at all times. Use a professional automotive lift or jack stands designed for the purpose. A floor jack is not adequate support.

- Remove exhaust system and exhaust heat shields. See **180 Exhaust System**.

WARNING—

- Make sure exhaust system is fully cooled off before removing.

- Support transmission with transmission jack, then remove transmission rear support.
- Check flex-disc for cracks, tears, missing pieces or distortion. Check for worn bolt holes in flange.
- Mark driveshaft mounting flanges and sections with paint to preserve original orientation.

- ⚠ Counterhold flex-disc bolt heads (**arrows**) and remove nuts at transmission or transfer case output flange. Discard old fasteners.

CAUTION—

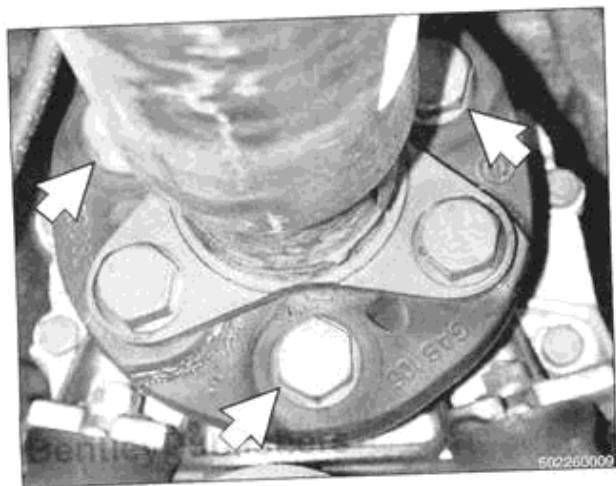
- To avoid damaging flex-disc rubber, be sure to hold bolts stationary while loosening nuts.

- Remove driveshaft center bearing support fasteners. Support center of driveshaft.

CAUTION—

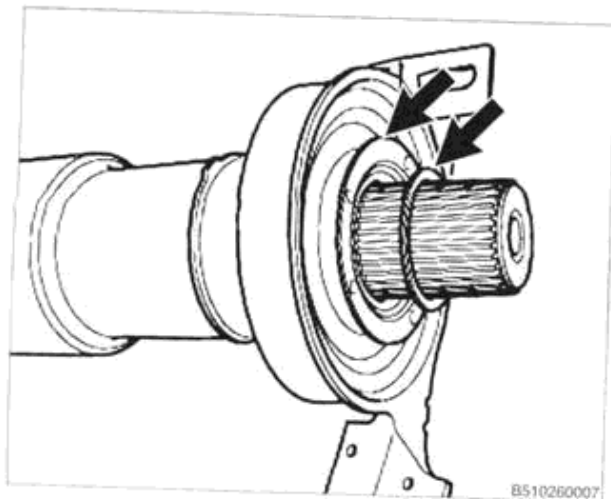
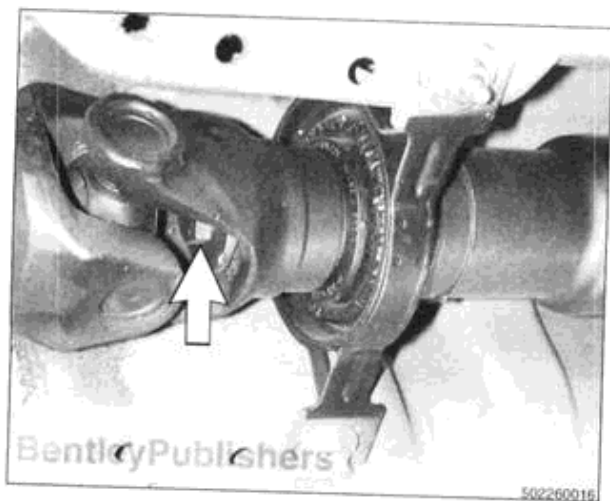
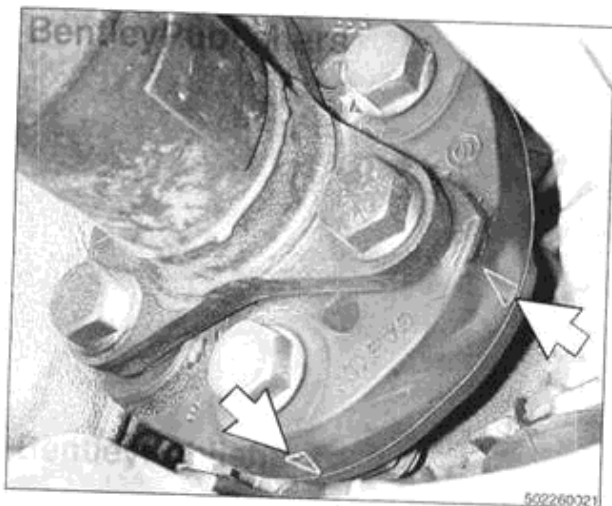
- To avoid damaging rear driveshaft CV joint, do not allow driveshaft to hang down unsupported.

- Lower center of driveshaft sufficiently to disengage flex-disc from transmission or transfer case flange. Tie driveshaft to side.



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Center bearing assembly, replacing



- Remove fasteners and detach flex-disc from driveshaft.
- Before reinstalling flex-disc, check driveshaft front centering sleeve for damage. Replace if necessary. See **Front centering sleeve, replacing** in this repair group.
- Apply thin coat of molybdenum disulfide grease (Molykote Longterm 2 Plus[®] or equivalent) to centering sleeve.
- Reinstall flex-disc using new ZNS fasteners.
 - Molded arrows (**arrows**) on coupling point toward flange arms.
 - Counterhold bolts while tightening nuts.

Tightening torques

Rear driveshaft flex-disc to transfer case: Replace M10 x 47 mm 10.9 grade ZNS fasteners with new	20 Nm (15 ft-lb) + additional 90°
Rear driveshaft flex-disc to transmission: Replace M12 10.9 grade ZNS fasteners with new	55 Nm (41 ft-lb) + additional 90°

Center bearing assembly, replacing

The rear driveshaft center bearing assembly consists of a grooved ball bearing in a rubber mount. The bearing assembly is pressed on the driveshaft.

- Remove driveshaft. See **Rear driveshaft, removing** in this repair group.
- Use paint to matchmark front and rear driveshaft sections before separating.

CAUTION—

- Do not scratch or punch marks in driveshaft metal.

- Remove bolt (**arrow**) securing front and rear halves of driveshaft and pull driveshaft apart.

- Remove shim and dust shield (**arrows**), where fitted.

- Use puller to remove center bearing assembly from driveshaft.
- On installation, drive new center bearing firmly to stop. Reassemble driveshaft using matchmarks made prior to disassembly.
- Clean threads and install bolt securing driveshaft halves. Use thread locking compound Loctite[®] or equivalent.

Tightening torque

Driveshaft front half to rear half (use thread locking compound)	97 Nm (72 ft-lb)
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- Reinstall driveshaft. See **Rear driveshaft, installing** in this repair group.

Front centering sleeve, replacing

- The front centering sleeve centers the rear driveshaft in relation to transmission or transfer case flange. The guide is press-fit into a cavity in the flex-disc and slides on a dowel on the output flange.

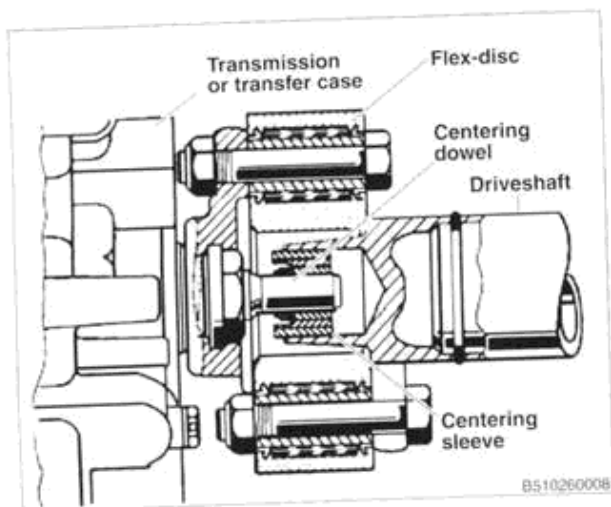
No specifications are given for wear of the guide. Check to make sure that the sleeve fits snugly over the dowel.

- Remove rear driveshaft. See **Rear driveshaft, removing** in this repair group.
- Pack cavity behind centering guide with heavy grease until grease is flush with bottom edge of guide.
- Insert 14 mm (approximately $\frac{1}{2}$ in) diameter mandrel (metal rod) into guide. Strike mandrel with hammer to force centering guide out. Make sure mandrel fits snugly in centering guide so that grease cannot escape around sides of mandrel.
- Remove old grease from driveshaft, lubricate new centering guide with molybdenum disulfide grease (Molykote Longterm 2 Plus® or equivalent) and drive through center of flex-disc into driveshaft.
- When installing new driveshaft centering guide, be sure sealing lip of guide faces outward. Drive guide into driveshaft to a protrusion depth of 4 - 6 mm (0.16 - 0.24 in).
- Apply thin coat of molybdenum disulfide grease (Molykote Longterm 2 Plus® or equivalent) to centering sleeve.
- Install driveshaft. See **Rear driveshaft, installing** in this repair group.

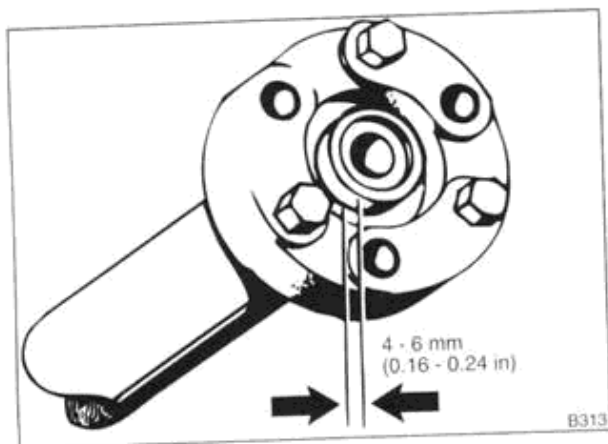
Constant velocity (CV) joint, replacing

The CV joint at the rear of the rear driveshaft is available from BMW as a separate part.

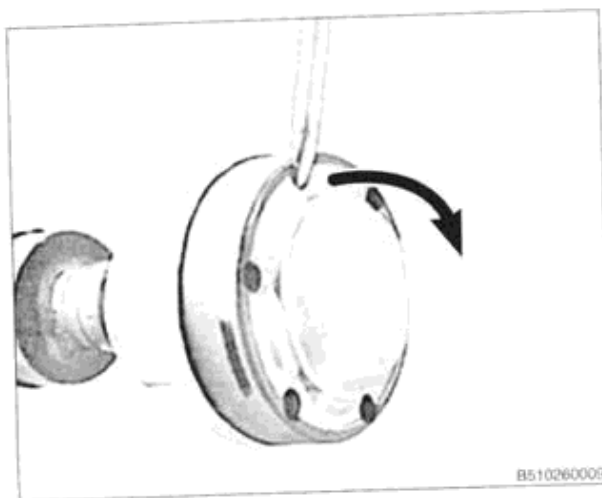
- Remove rear driveshaft. See **Rear driveshaft, removing** in this repair group.
- Use screwdriver to pry end cover off CV joint. Discard cover.



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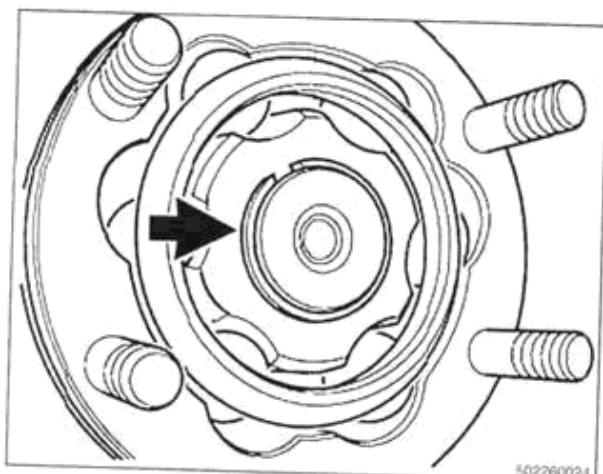
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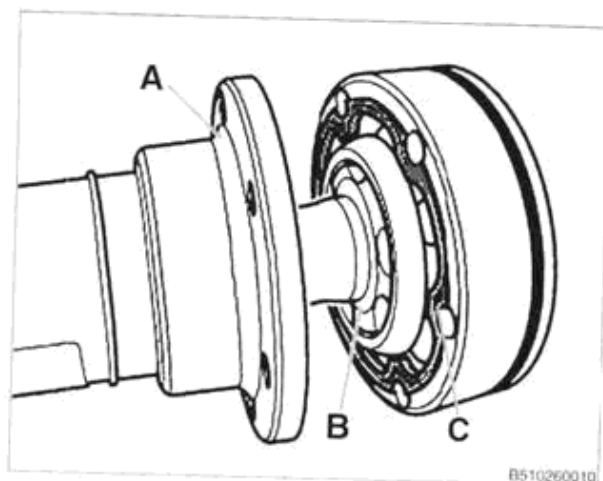
260-12 Driveshafts

Constant velocity (CV) joint, replacing



◀ Clean grease off CV joint. Remove retaining circlip (**arrow**) from CV joint end of driveshaft. Discard clip

— Drive out bolts from CV joint.



◀ Remove CV joint from driveshaft:

- Pry back protective boot (**A**).
- Using BMW special tool 26 1 070 or 26 1 110 on inner race (**B**), press or pull joint off shaft.

— Check protective boot for damage. Replace if necessary.

— Install new CV joint:

- Working from both sides of joint, inject approximately 80 grams of CV joint grease into joint.
- Install new sealing gasket (**C**) on joint face that mates with protective boot. Seal fits in groove on outer race of joint.
- Clean grease off driveshaft and mating splines on joint.
- Apply Loctite® 648 to driveshaft splines.
- Press new CV joint on shaft as far as it will go.

CAUTION—

- Only press on inner CV joint race.

— Install new retaining circlip to end of driveshaft. Install new end cover with new sealing gasket.

— Insert new CV joint mounting bolts. Be sure to reuse reinforcing washers.

— Install driveshaft. See **Rear driveshaft, installing** in this repair group.

