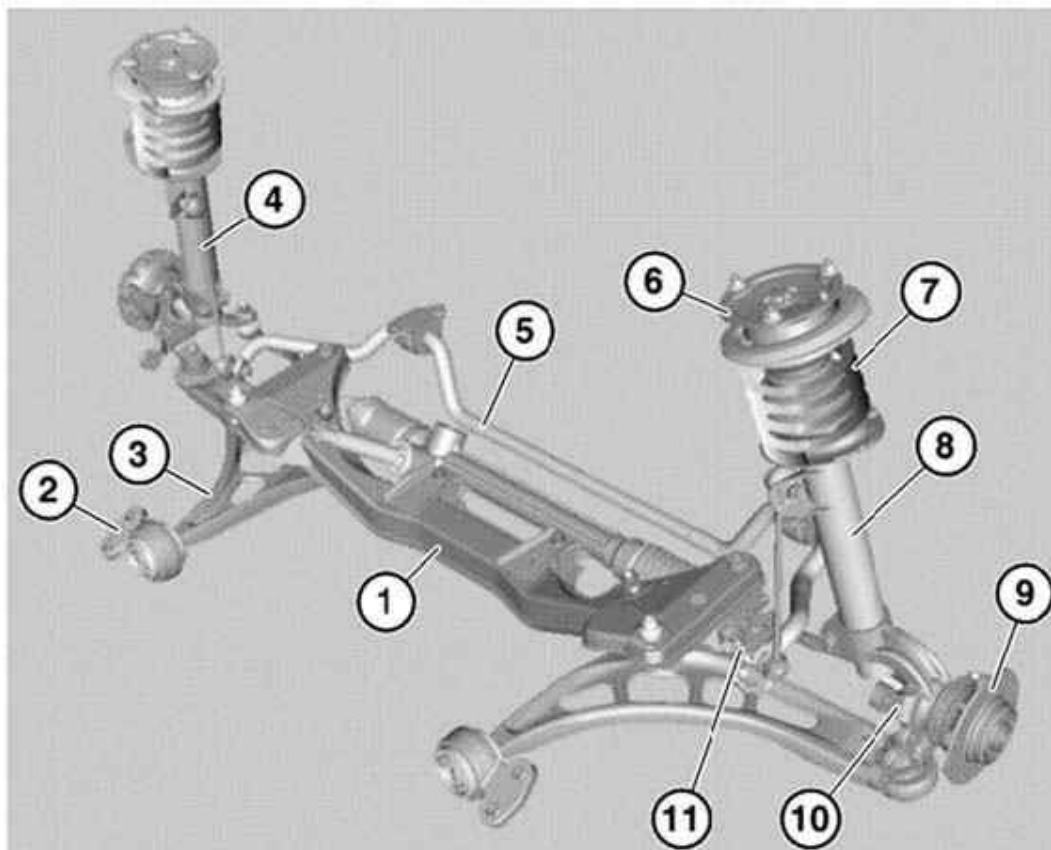


2003-2005 SUSPENSION**Front - Z4****DESCRIPTION**

All BMW models use MacPherson strut front suspension systems, which consist of vertically mounted strut assemblies directly attached to steering knuckles. Steering knuckles are connected to the axle carriers (crossmembers) through lower control arms. A stabilizer bar is attached to either the strut assembly or the lower control arm. See **Fig. 1**.



- 1 Front Axle Support
- 2 Bracket, Control Arm
- 3 Control Arm
- 4 Stabilizer Link
- 5 Stabilizer/Stabilizer Suspension
- 6 Thrust Bearing

- 7 Coil Spring
- 8 Spring Strut Shock Absorber
- 9 Wheel Bearing/Drive Flange
- 10 Steering Knuckle
- 11 Ride Level Sensor

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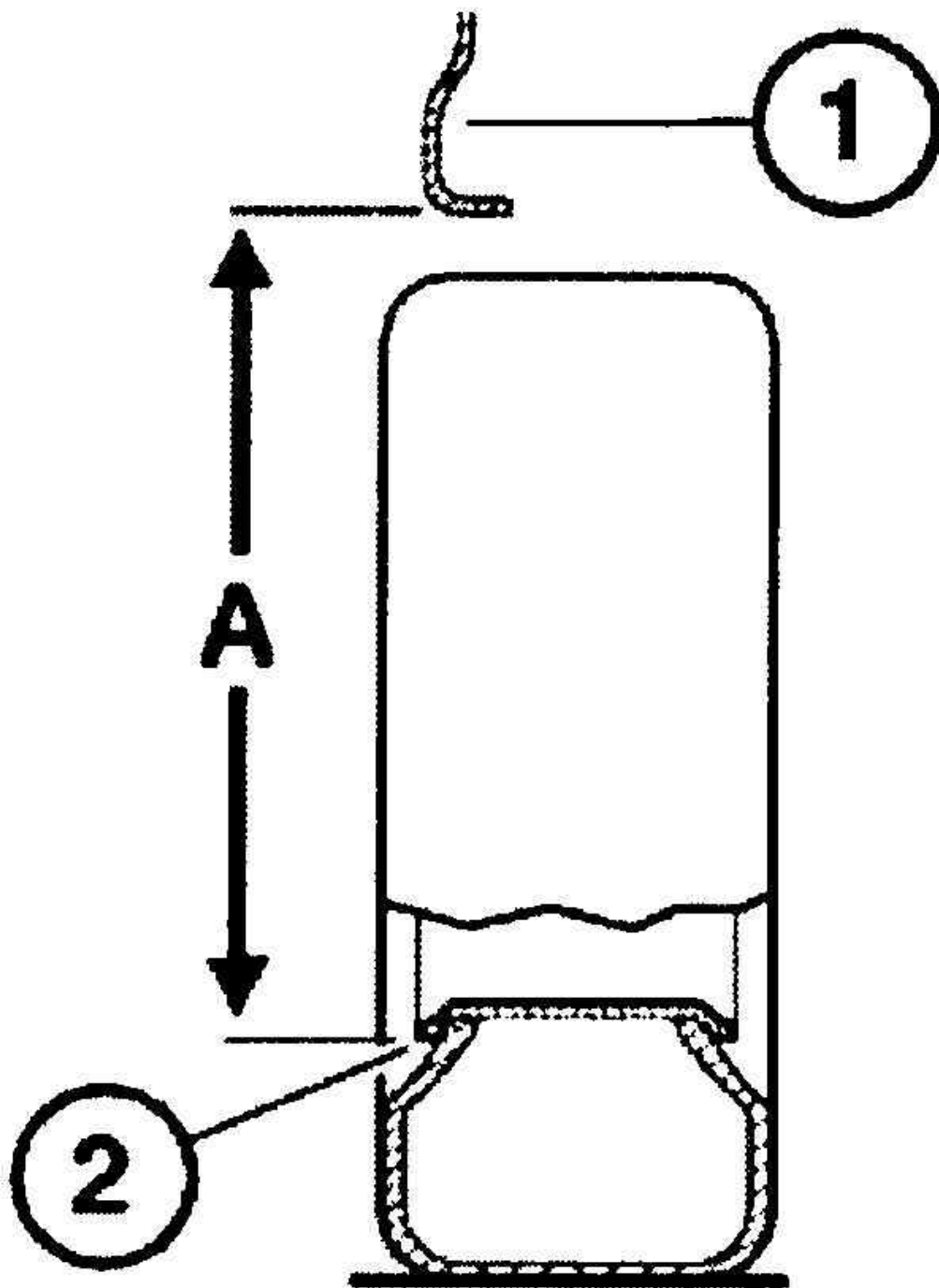
Fig. 1: Identifying Front Suspension Components
Courtesy of BMW OF NORTH AMERICA, INC.

ADJUSTMENTS & INSPECTION

RIDING HEIGHT

NOTE: **Numbers and letters in text refer to numbers and letters in figures.**

1. Ensure vehicle is on ground and in normal loaded position with 150 lbs. (68 kg) in each front seat. Place seats in central position. Load 31 lbs. (14 kg) in the trunk and ensure a full tank of fuel.
2. Determine actual ride-level height (A) by measuring from wheel arch lower edge (1) to rim flange (2) at wheel center height. See **Fig. 2** . Determine average value for each wheel by pushing vehicle body down at each wheel, and establish average value for axle. Ride height measurement must be within .04" (10 mm) of specification. See **RIDE HEIGHT SPECIFICATIONS** .
3. To identify installed spring, refer to parts microfiche, contact parts supplier, or remove spring and find BMW number on end of spring. Springs are allocated by vehicle type and, where applicable, by special equipment such as air conditioning, sports suspension, etc. and by date of production launch.
4. Replace both coil springs to bring ride height back to specification, even though only one may be defective. See **COIL SPRING & SHOCK ABSORBER** under REMOVAL & INSTALLATION.



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2005 BMW Z4

2003-2005 SUSPENSION Front - Z4

Fig. 2: Measuring Ride Level Height

Courtesy of BMW OF NORTH AMERICA, INC.

RIDE HEIGHT SPECIFICATIONS

Application	(1) In. (mm)
Standard Suspension	
16" Rim	23.2 (589)
17" Rim	23.8 (605)
18" Rim	24.3 (618)
Low-Slung Sport Suspension	
17" Rim	23.2 (590)
18" Rim	23.7 (603)
(1) Ride height measurement must be within .04" (10 mm) of specification.	

SPRING STRUT SHOCK ABSORBER

Spring strut shock absorber can be tested while installed with a shock tester. While removed, use a shock absorber testing machine.

WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES

NOTE: See **SPECIFICATIONS & PROCEDURES** article in **WHEEL ALIGNMENT**.

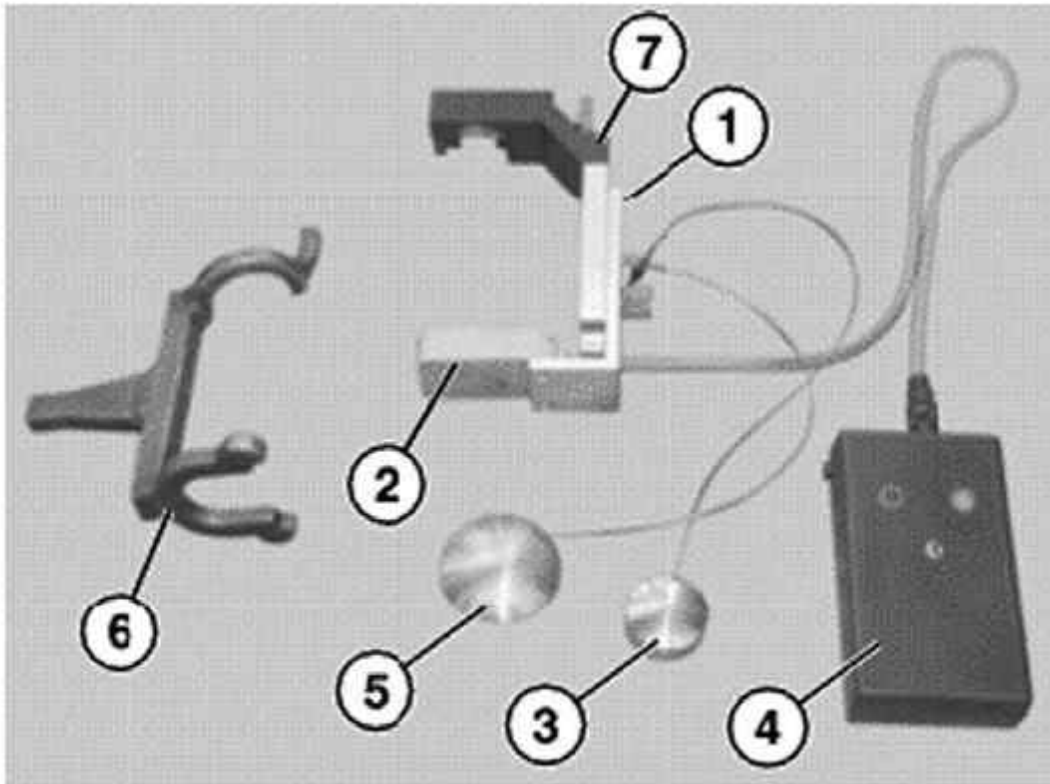
WHEEL CONTROL JOINT PLAY

NOTE: Numbers and letters in text refer to numbers and letters in figures.

NOTE: For special tools needed, see **Fig. 3** .

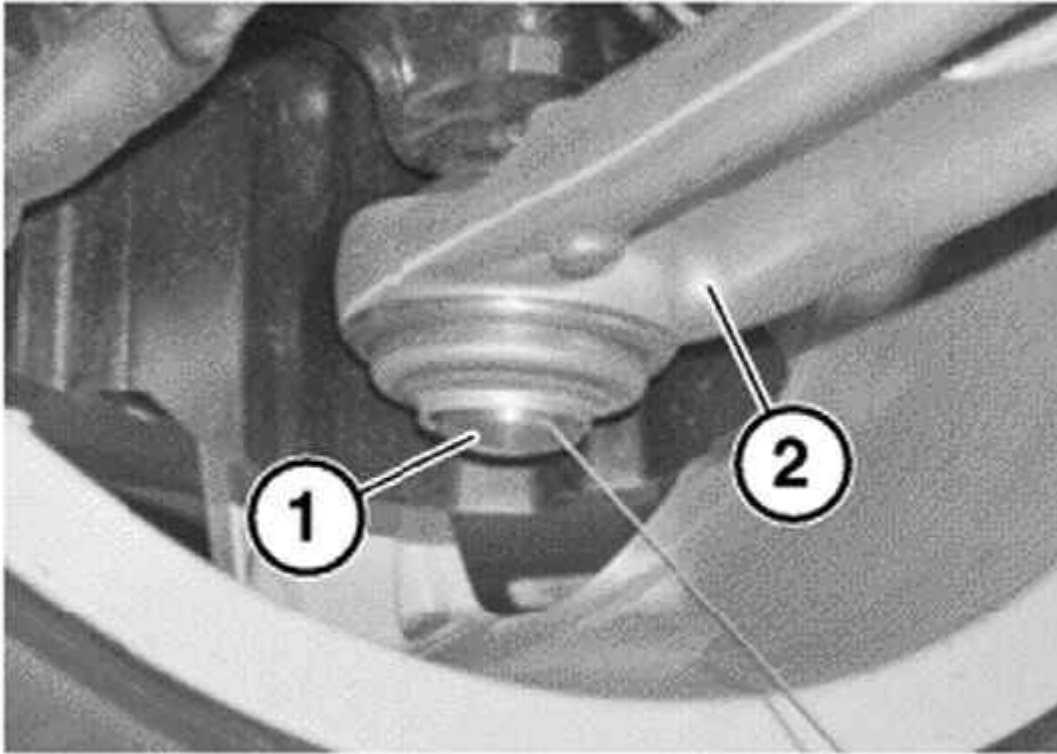
Preparation

1. Position magnetic retainers (1) on housing cover of control arm (2). See **Fig. 4** . Make sure magnetic retainers are correctly seated in control arm.
2. Fit measuring clip (1) on threaded stem (2) of joint and screw down with locating screw (3). See **Fig. 5** . Measuring clip must not contact control arm.
3. Press evaluation electronics button. Device will perform a self-test. LEDs flash. Red LED illuminates permanently.
4. Move sensor with slide upward until green LED illuminates. Gap (A) between sensor and magnetic retainer should be 5-7 mm. See **Fig. 6** . Secure slide with clamping screw (1).
5. Press evaluation electronics button for about 2 seconds until green LED flashes. Device is now calibrated and ready for measuring. Go to **FIRST CHECK** .



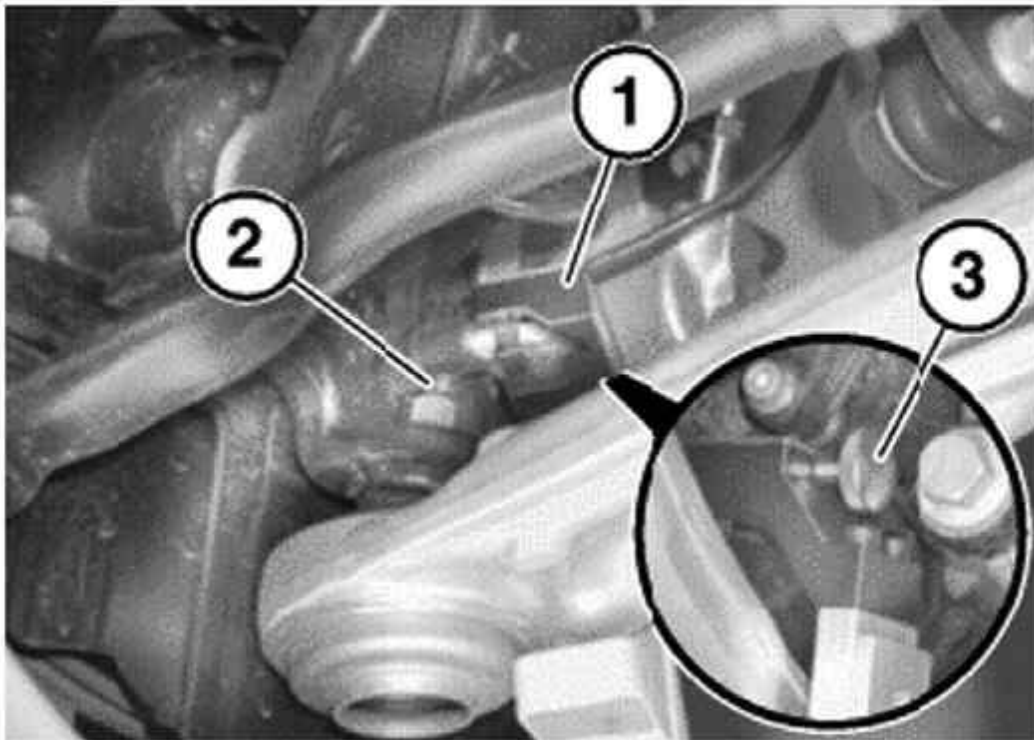
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Fig. 3: Identifying Special Tools For Measuring Play Of Wheel Control Joints
Courtesy of BMW OF NORTH AMERICA, INC.



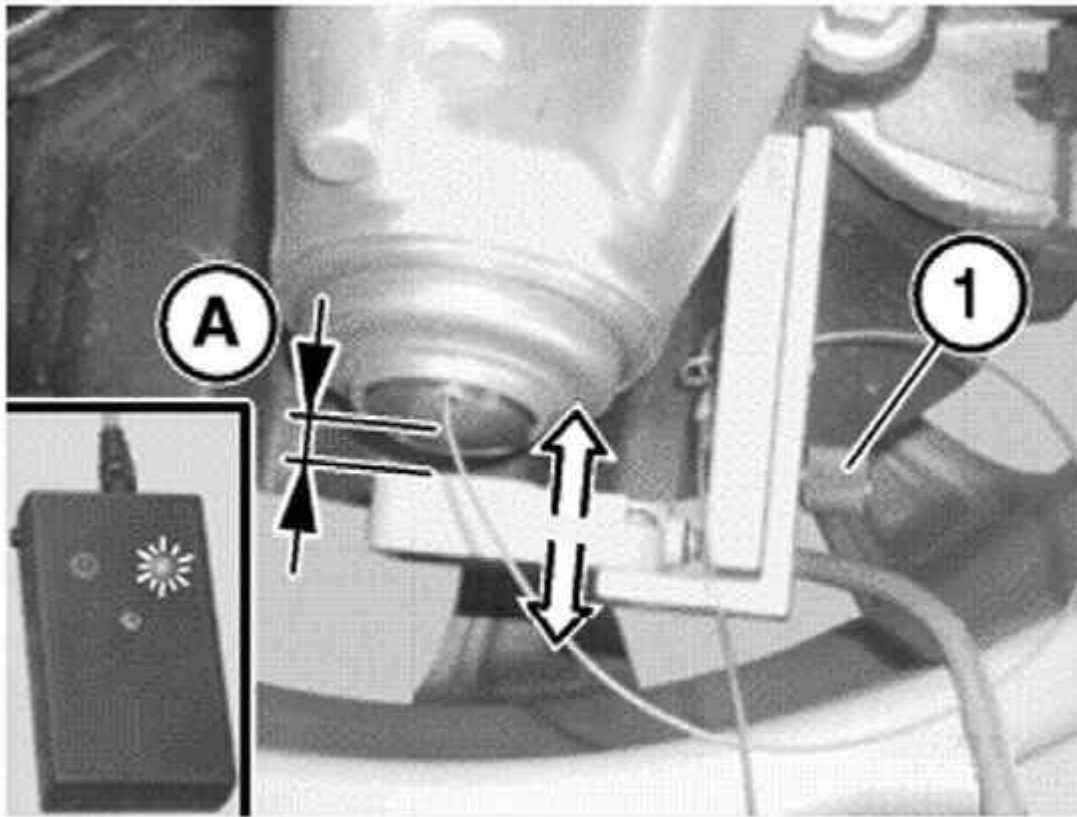
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Fig. 4: Positioning Magnetic Retainers
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 5: Fitting Measuring Clip
Courtesy of BMW OF NORTH AMERICA, INC.

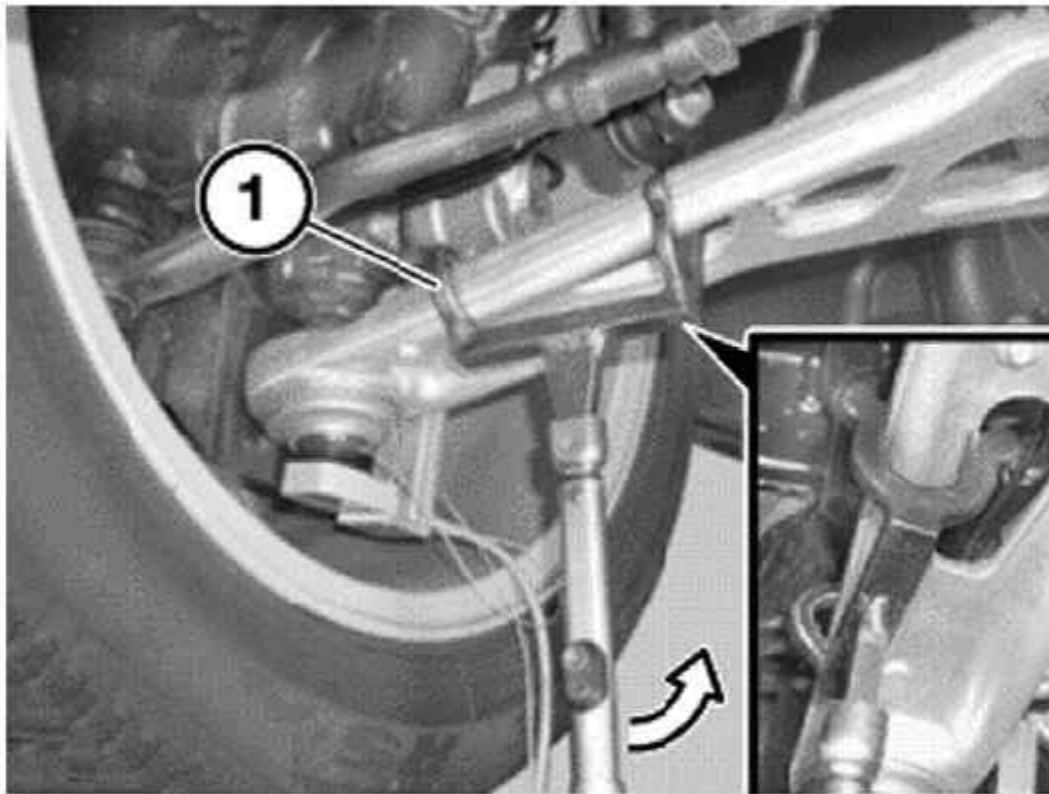


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Fig. 6: Securing Slide With Clamping Screw
Courtesy of BMW OF NORTH AMERICA, INC.

First Check

1. Set torque wrench to 44 ft. lbs. (60 Nm).
2. Introduce a force with hook wrench (1) in direction shown until torque is obtained. See **Fig. 7** . If red LED flashes, joint must be replaced. If green LED flashes, go to **SECOND CHECK** .



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Fig. 7: First Check Of Wheel Control Joint Play
Courtesy of BMW OF NORTH AMERICA, INC.

Second Check

1. Reposition hook wrench. Introduce a force with hook wrench (1) in direction shown until torque is obtained. See **Fig. 8** .
2. If red LED flashes, joint must be replaced. If green LED flashes, joint must not be replaced.

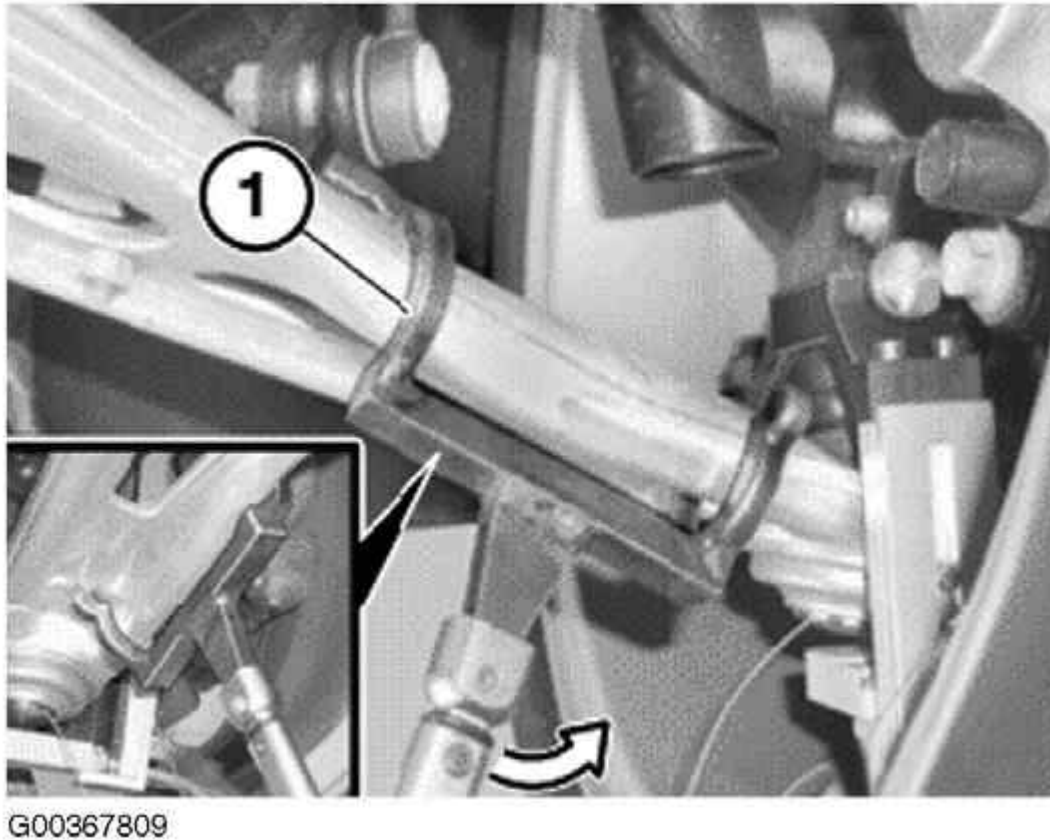


Fig. 8: Second Check Of Wheel Control Joint Play
 Courtesy of BMW OF NORTH AMERICA, INC.

TROUBLE SHOOTING

To trouble shoot most symptoms, see **TROUBLE SHOOTING** .

Whether a spring strut has to be replaced can only be ascertained by checking while it is installed with a shock tester or while it is removed with a shock absorber test machine.

TROUBLE SHOOTING

Fault	Cause	Remedy
Body Swinging Long After Driving Over Rough Road	Shock Absorber Effect Insufficient	Replace Shock Absorbers
Excessive Tire Wear	Wheel Alignment Not OK	Measure Wheel Alignment, Adjust & Replace Faulty Parts
Grinding Noise (Louder When Cornering)	Wheel Bearings Faulty	Replace Wheel Bearings
Flattened Areas On Tire Profile	Shock Absorber Faulty	Replace Shock Absorbers
Poor Handling	Shock Absorber Effect Weak	Replace Shock Absorbers

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2003-2005 SUSPENSION Front - Z4

Rattling Noise	Ball Joints Of Control Arms Worn	Replace Control Arm Or Ball Joint
Rattling Noise	Stabilizer Rubber Mounts Worn	Replace Rubber Mount
Rattling Noise	Ball Joints Of Push Rod Worn	Replace Push Rod
Rattling Noise	Steering Knuckle To Spring-Strut Bolts Loose	Tighten Bolts (Check Threads)
Rising Of Body When Accelerating	Shock Absorber Effect Insufficient	Replace Shock Absorbers
Shock Absorbers Bottoming	Rubber Damper Faulty	Check/Replace Rubber Damper
Shock Absorbers Bottoming	Shock Absorber Effect Insufficient	Replace Shock Absorbers
Shock Absorber Noise	Shock Absorber Faulty	Replace Shock Absorbers
Skidding In Bends Due To Poor Track Holding	Shock Absorber Effect Insufficient	Replace Shock Absorbers
Steering Wheel Shake	Wheels Out Of Balance	Balance Wheels
Steering Wheel Shake	Rims Have Lateral/Radial Runout	Replace Rims If Necessary
Steering Wheel Shake	Shock Absorber Effect Insufficient	Replace Shock Absorbers
Steering Wheel Shake	Control-Arm Rubber Mounts Faulty	Replace Control-Arm Rubber Mounts
Vehicle Skidding When Braking	Shock Absorber Effect Insufficient	Replace Shock Absorbers
Vibration	Wheels Out Of Balance	Balance Wheels
Vibration	Rims Have Lateral/Radial Runout	Replace Rims If Necessary
Vibration	Tires Have Radial Runout	Match Or Replace Tires
Whipping Of Body When Driving Over Successive Rough Road Surfaces	Shock Absorber Effect Insufficient	Replace Shock Absorbers

REMOVAL & INSTALLATION

COIL SPRING & SHOCK ABSORBER

NOTE: Numbers and letters in text refer to numbers and letters in figures.

When a spring strut shock absorber is replaced, a spring strut shock absorber with the same identification marking (K) must be installed. See **Fig. 9** . It is permitted to replace a shock absorber on one side only as long as they have not run for more than 31,000 miles (50,000 km) unless vehicle was built by M-GmbH. In this case, replace both shock absorbers. It is permitted to fit shock absorbers on left and right made by different manufacturers.

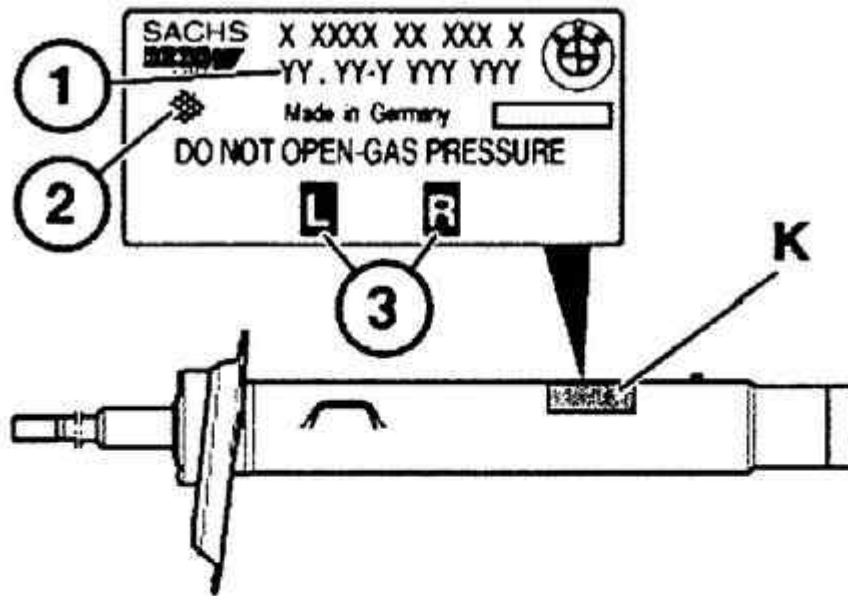
Removal

1. Raise and support vehicle. Remove front wheel.
2. Remove brake caliper and tie back to body. It is not necessary to disconnect brake line. See **DISC** in BRAKES article.

2005 BMW Z4

2003-2005 SUSPENSION Front - Z4

3. Detach cable and brake line from mounting. See **Fig. 10** .
4. On vehicle with headlight range adjustment, remove retaining bracket (1) of angle joint from control arm (2). See **Fig. 11** .
5. On all vehicles, detach stabilizer link by releasing nut with open-end wrench. See **Fig. 12** .
6. Release nut and press steering tie rod off steering knuckle with special tool (32 3 090). See **Fig. 13** .
7. Release nut, force control arm off steering knuckle with special tool (32 3 090) and detach. See **Fig. 14** .
8. Secure steering knuckle against falling off. Unscrew multipurpose bolt a few turns. If necessary, spread out steering knuckle with special tool (31 2 200) and remove towards bottom. See **Fig. 15** .
9. If there is no centering pin (1) or bore (2), only one nut may be released. Position of the threaded pin to wheel arch must be precisely marked. This ensures that the original camber is retained during installation. See **Fig. 16** . Remove support bearing from wheel arch.



1 = BMW number

2 = Suspension design:

4Z Serie = 4-cylinder Series

6Z Serie = 6-cylinder Series

4Z Sport = 4-cylinder sports suspension, low-slung

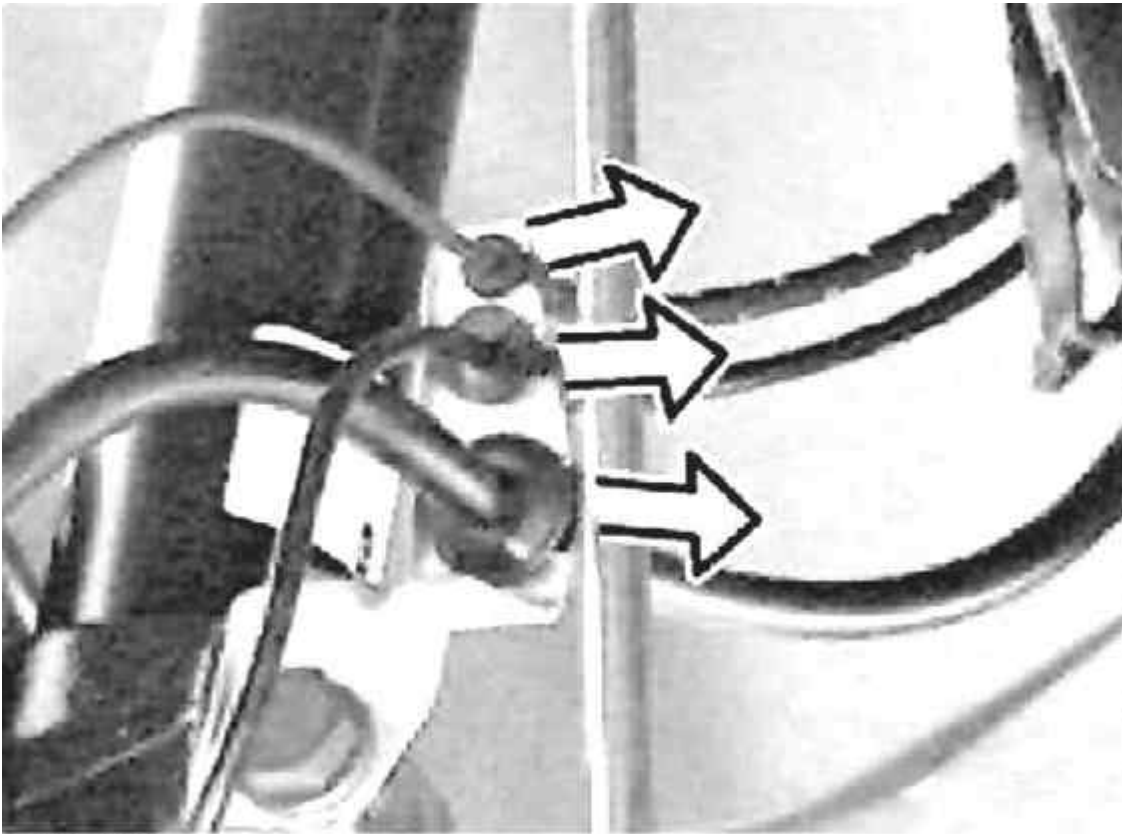
6Z Sport = 6-cylinder sports suspension, low-slung

3 = Side designation:

L = left / R = right

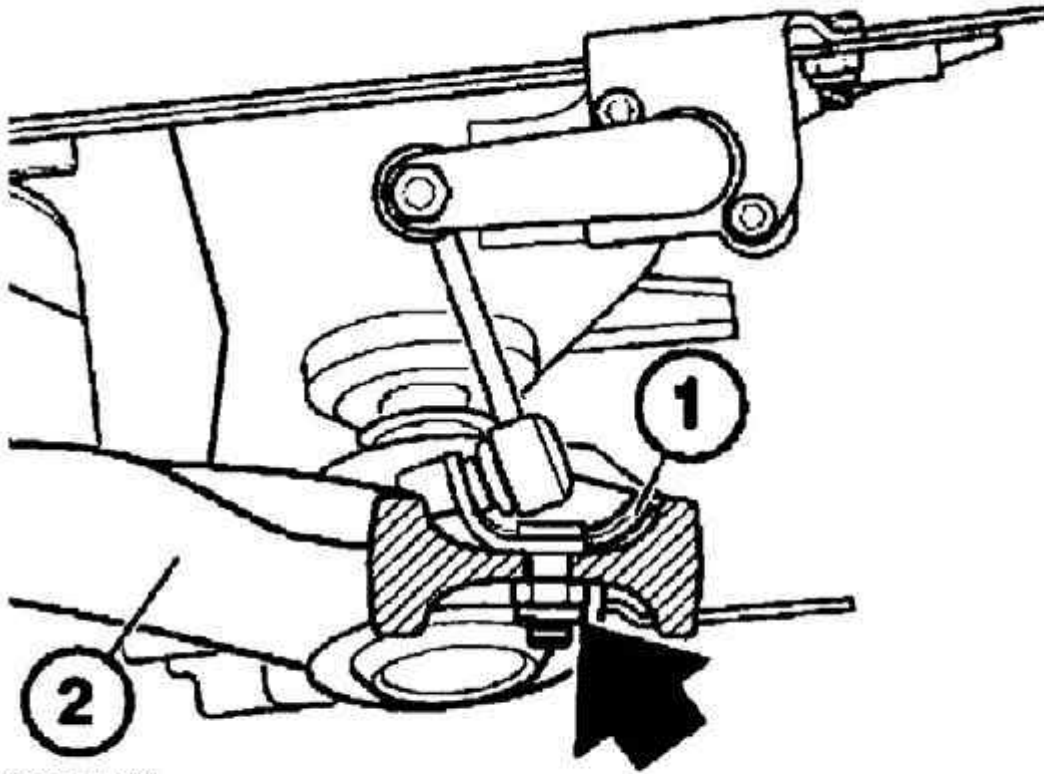
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Fig. 9: Identifying Spring Strut Shock Absorber
 Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 10: Detaching Cable & Brake Line
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 11: Removing Retaining Bracket
Courtesy of BMW OF NORTH AMERICA, INC.

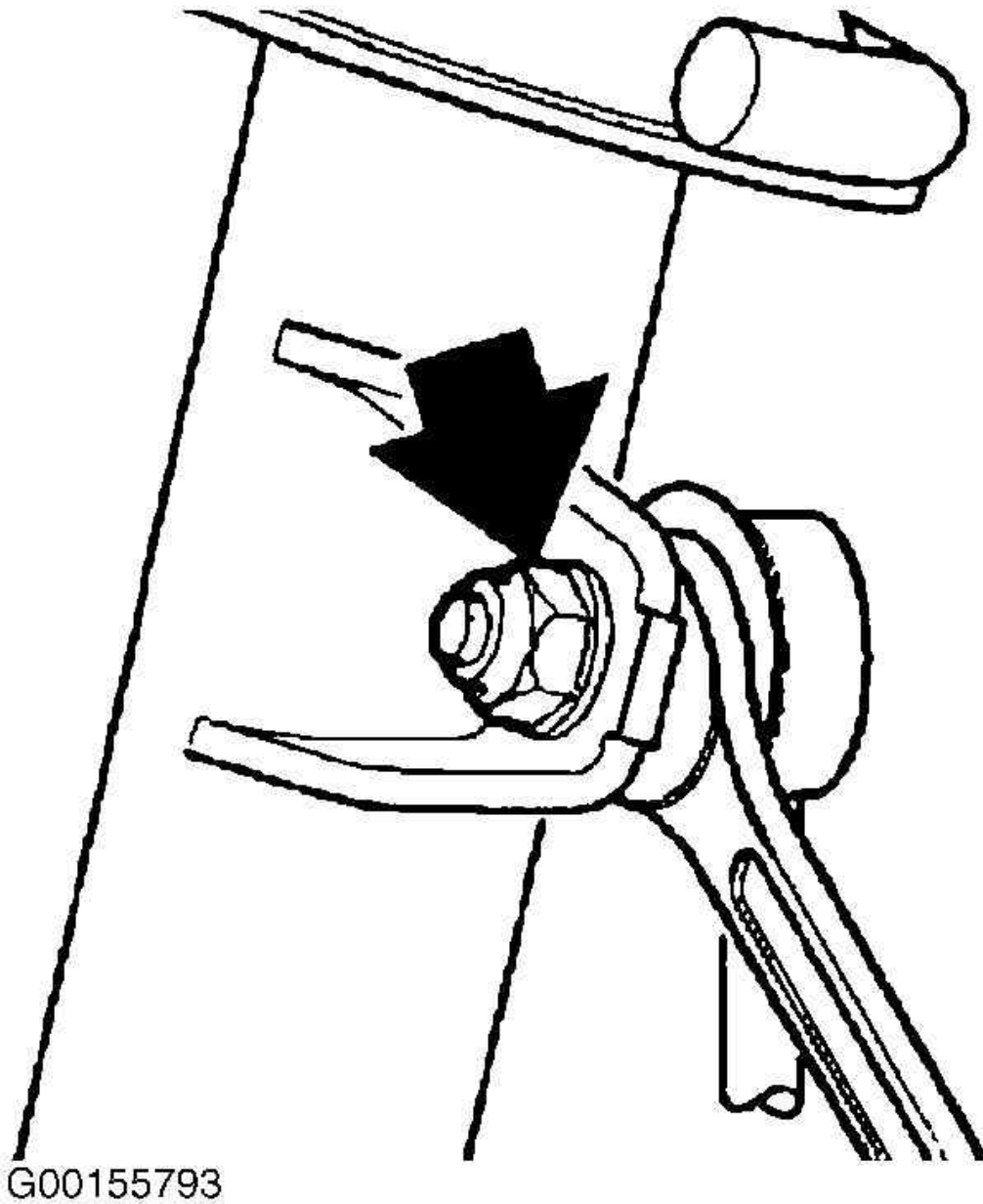
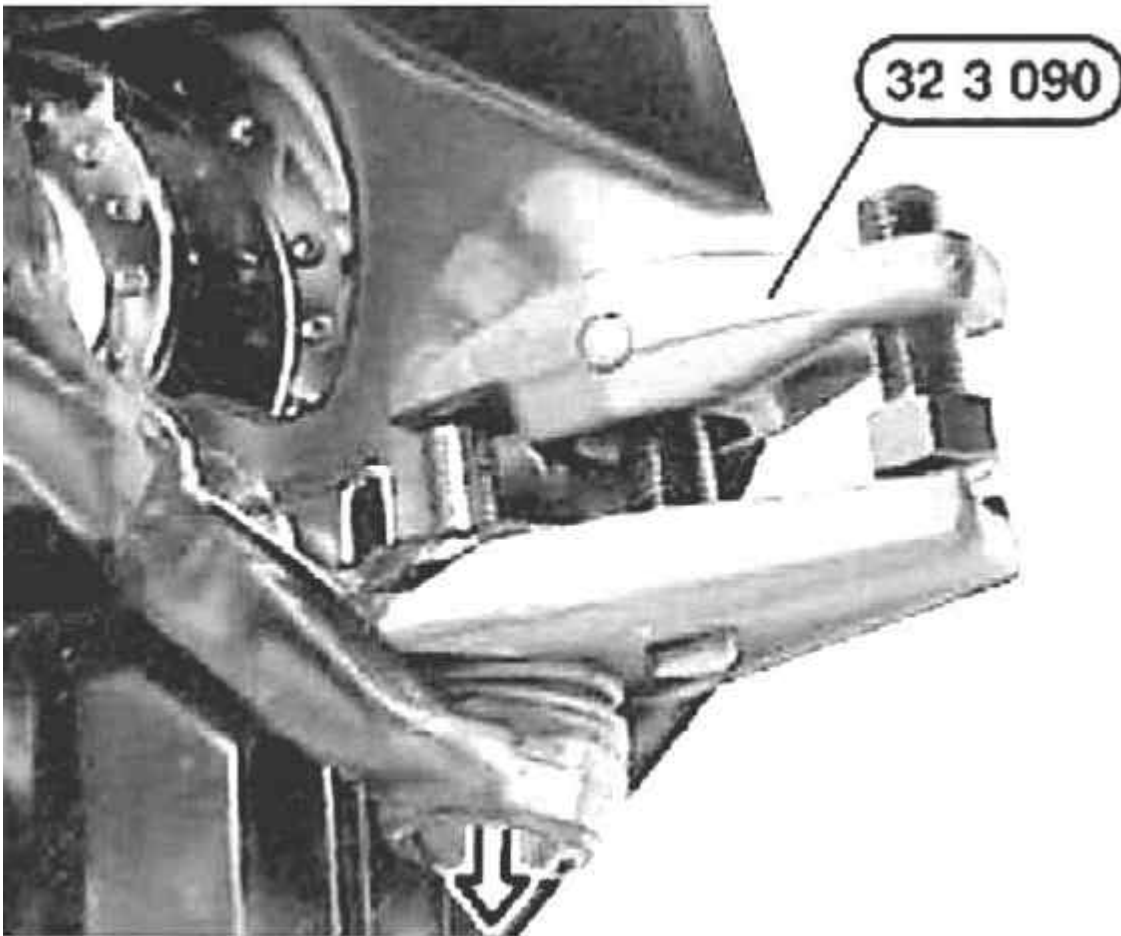
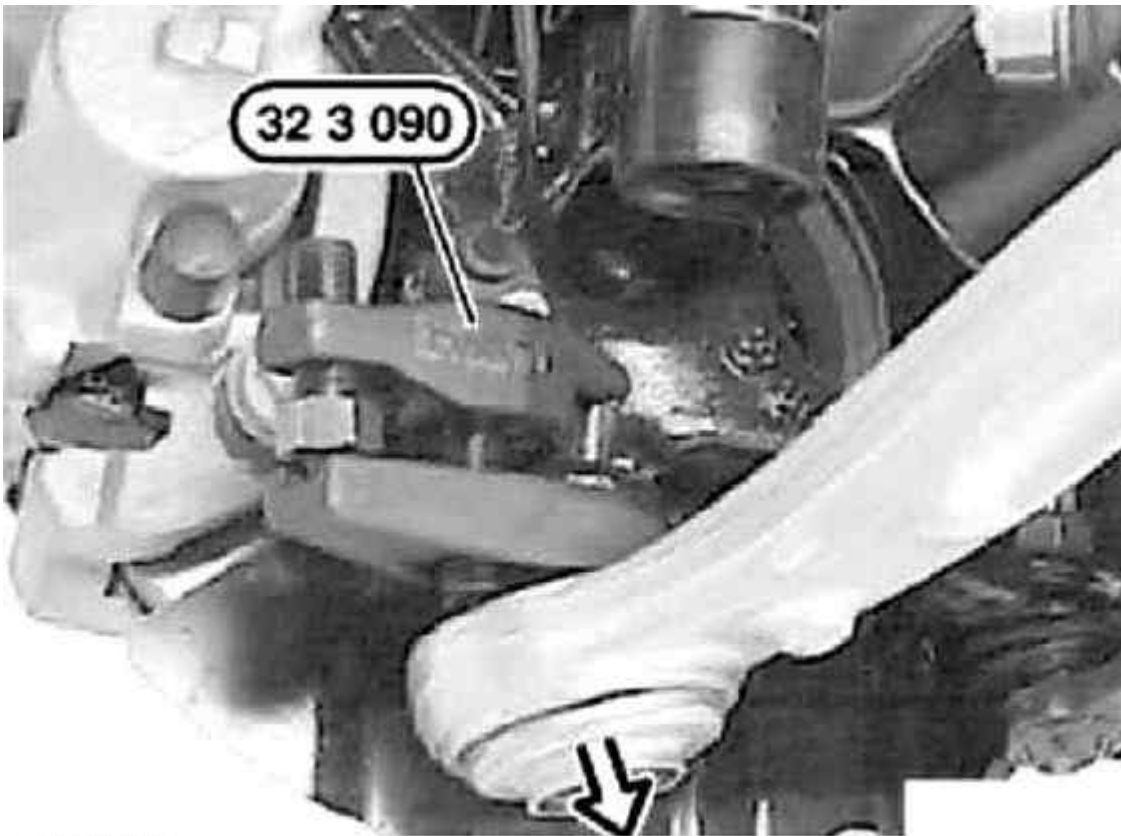


Fig. 12: Releasing Stabilizer Link Nut
Courtesy of BMW OF NORTH AMERICA, INC.



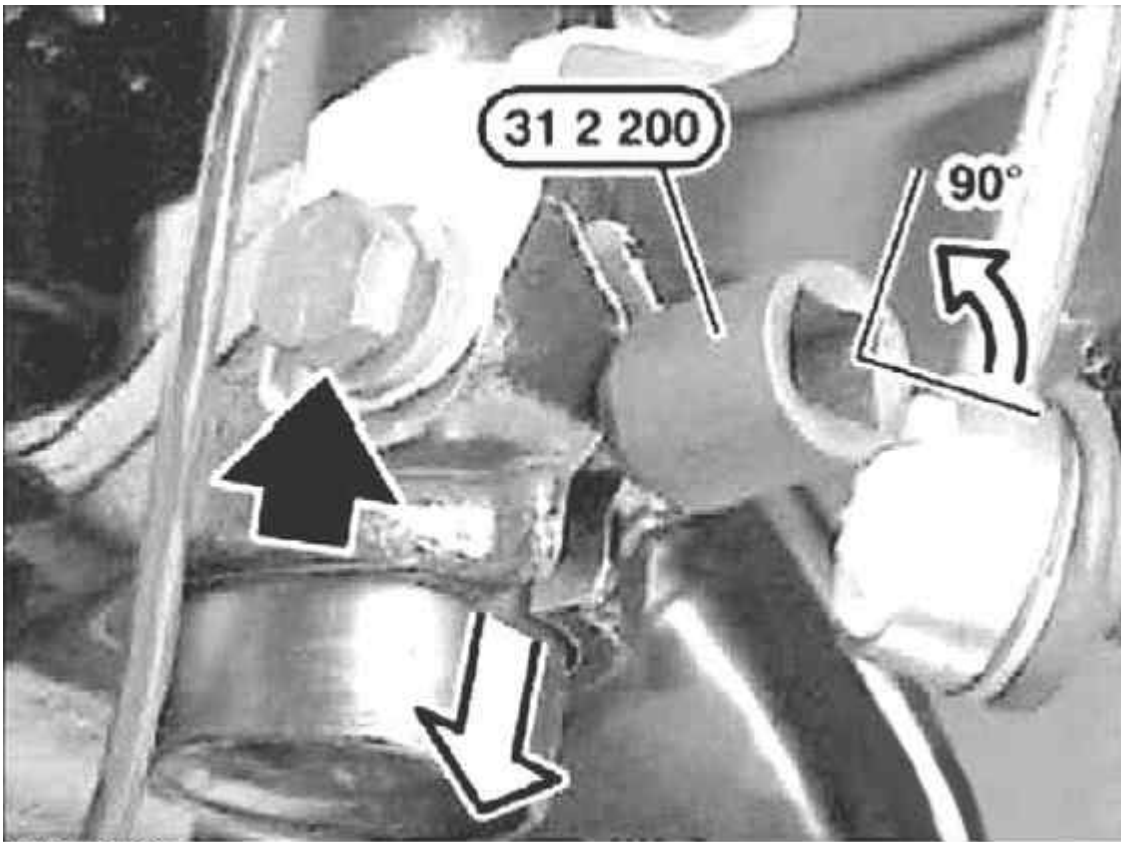
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Fig. 13: Using Special Tool (32 3 090)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 14: Forcing Control Arm Off Steering Knuckle
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 15: Removing Steering Knuckle
Courtesy of BMW OF NORTH AMERICA, INC.

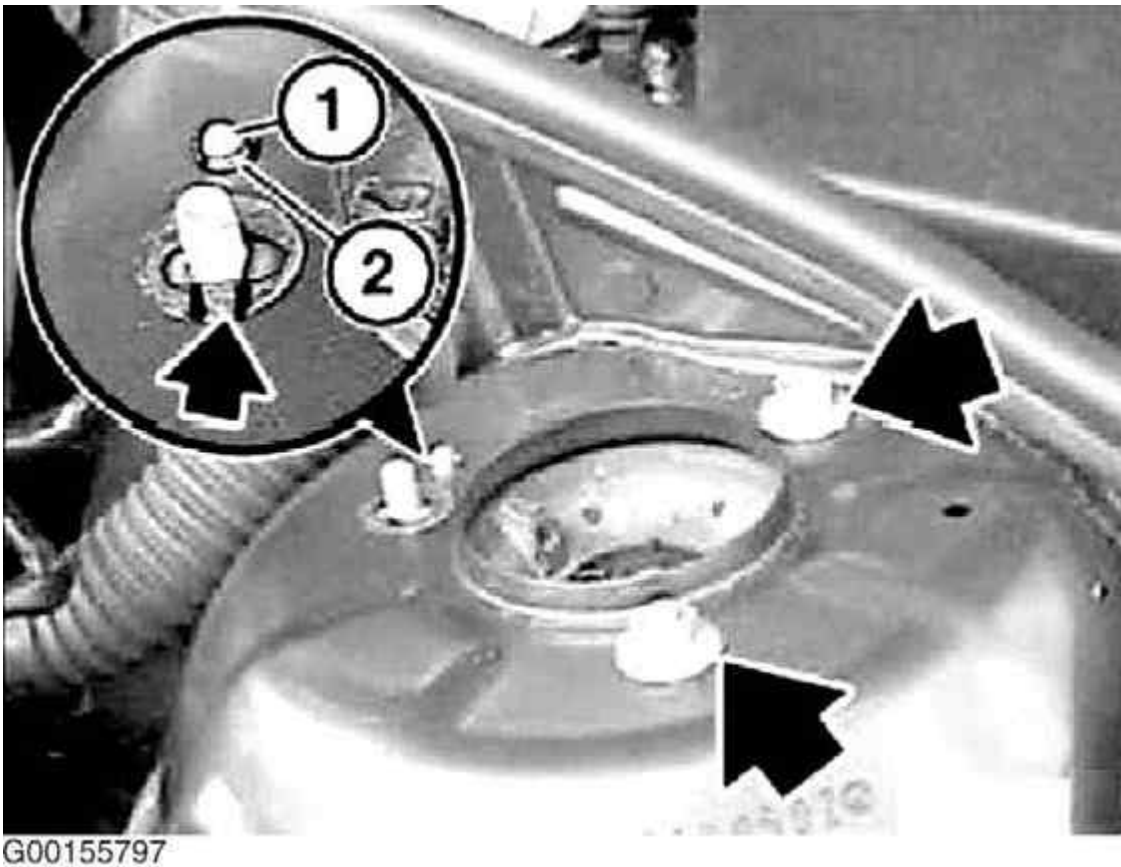


Fig. 16: Locating Wheel Arch Nuts
Courtesy of BMW OF NORTH AMERICA, INC.

Disassembly

WARNING: Before they are used, always check that special tools work properly. DO NOT use damaged tools. DO NOT make any modifications to special tools. Use only suitable spring retainers. Never use an impact wrench for tensioning/releasing purposes. Keep protective inserts clean and free from oil and grease.

1. Clamp Special Tool (31 3 341) at guide (1) in vise. See **Fig. 17** . Slide in Special Tools (31 3 354) without protective insert and (31 3 355) in each case from chamfer of special tool (31 3 34). Locking pins (2) must be felt and heard snapping into place. Spring retainers must be pushed in from chamfer side (1) of Special Tool (31 3 341). See **Fig. 18** . Locking pins must be felt and heard snapping into place. Check seating of spring retainers again.
2. Position coil spring between spring holders. End of spring (1) must be flush with end of spring holder (2). See **Fig. 19** . When tensioned in the spring holder, the spring coil must rest completely in the recess.
3. Tighten down coil springs until stress on the thrust bearing is just relieved.
4. Release nut with special tool (31 2 210). DO NOT use an impact screwdriver. Grip piston rod firmly, if necessary, and remove spring strut shock absorber. See **Fig. 20** .

5. If a new coil spring is installed, release special tool (31 3 341) and remove coil spring. The special tool must not be tightened or untightened with an impact wrench. Check spring pad (1). See **Fig. 21** . Replace if necessary. Fit spring pad (1) and spring plate (2) onto new coil spring. Make sure that end of spring, spring pad (1) and spring plate (2) form a positive connection.

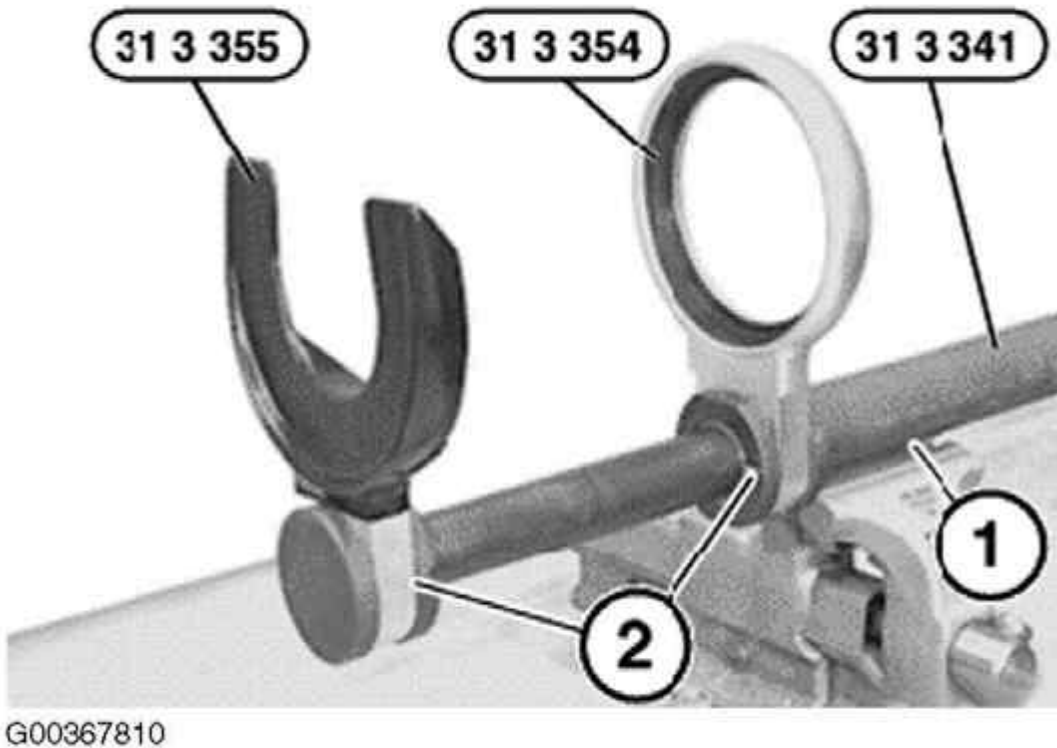
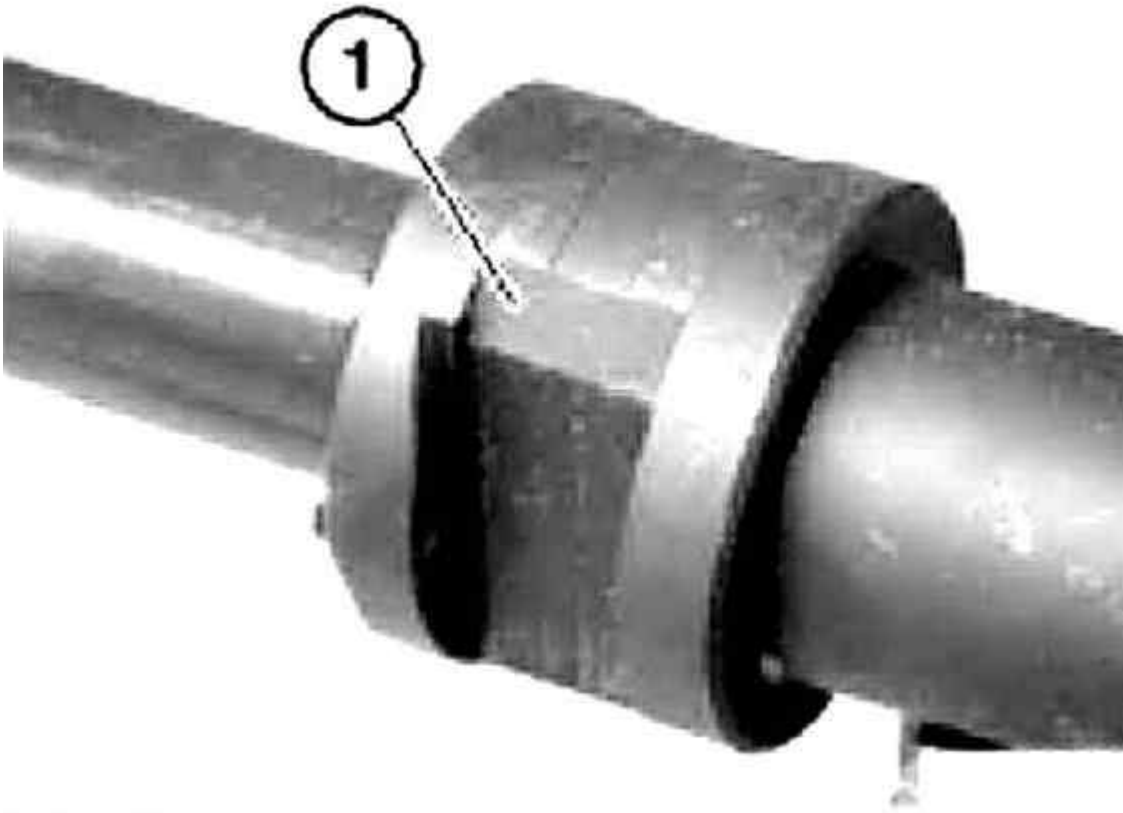


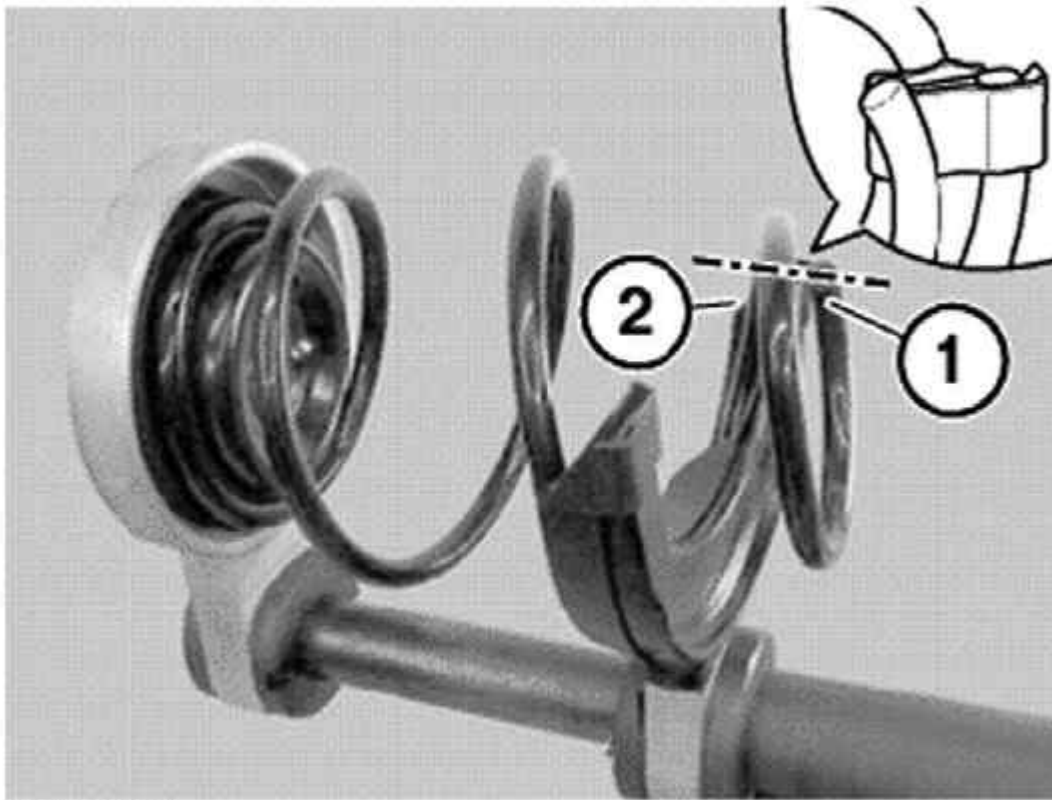
Fig. 17: Clamping Special Tool In Vise
Courtesy of BMW OF NORTH AMERICA, INC.



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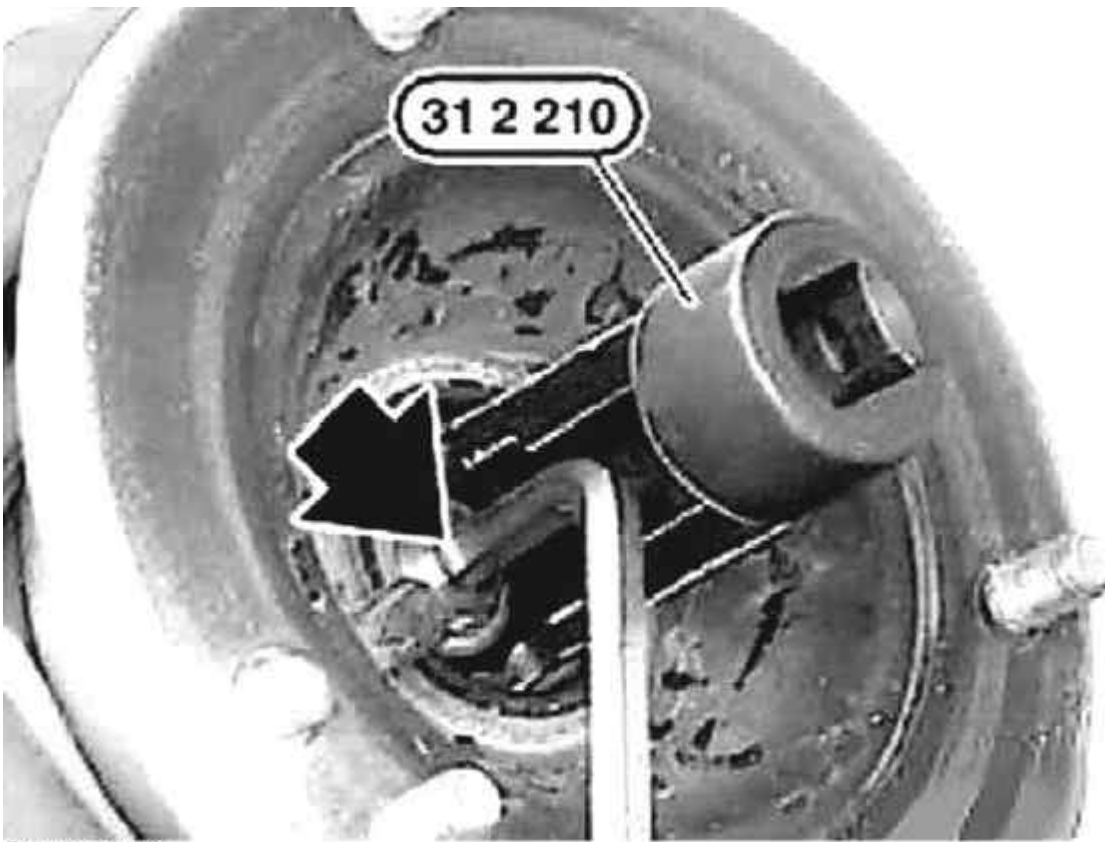
Fig. 18: Locating Chamfer

Courtesy of BMW OF NORTH AMERICA, INC.



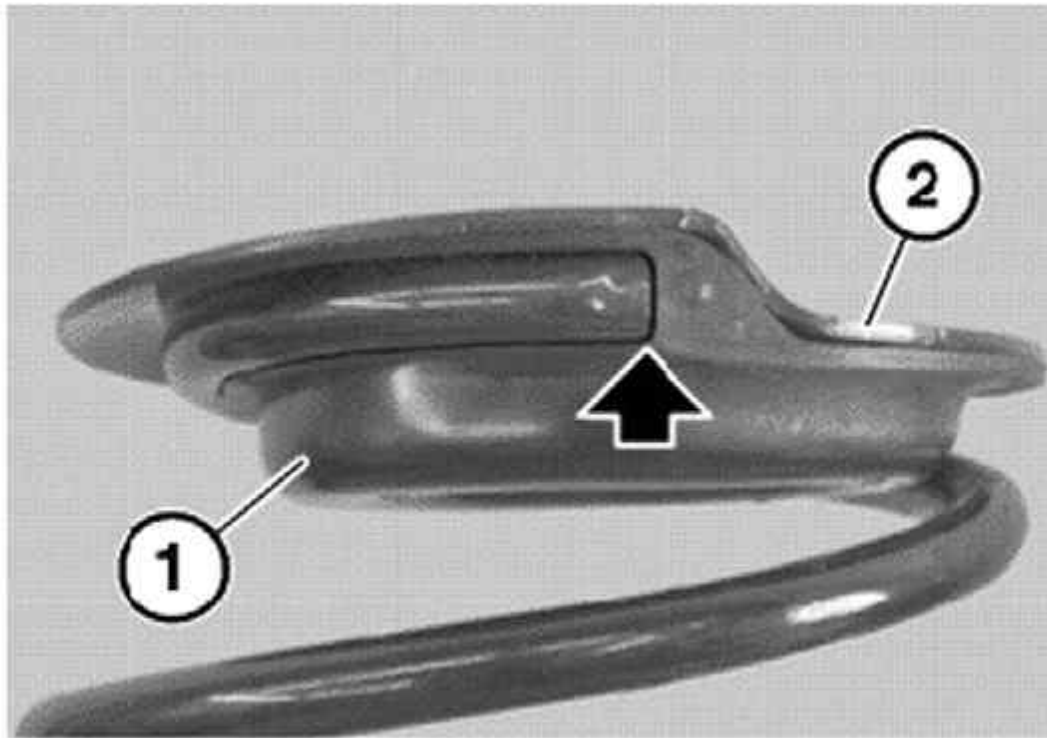
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Fig. 19: Placing Coil Spring In Spring Holder
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 20: Using Special Tool (31 2 210)
Courtesy of BMW OF NORTH AMERICA, INC.



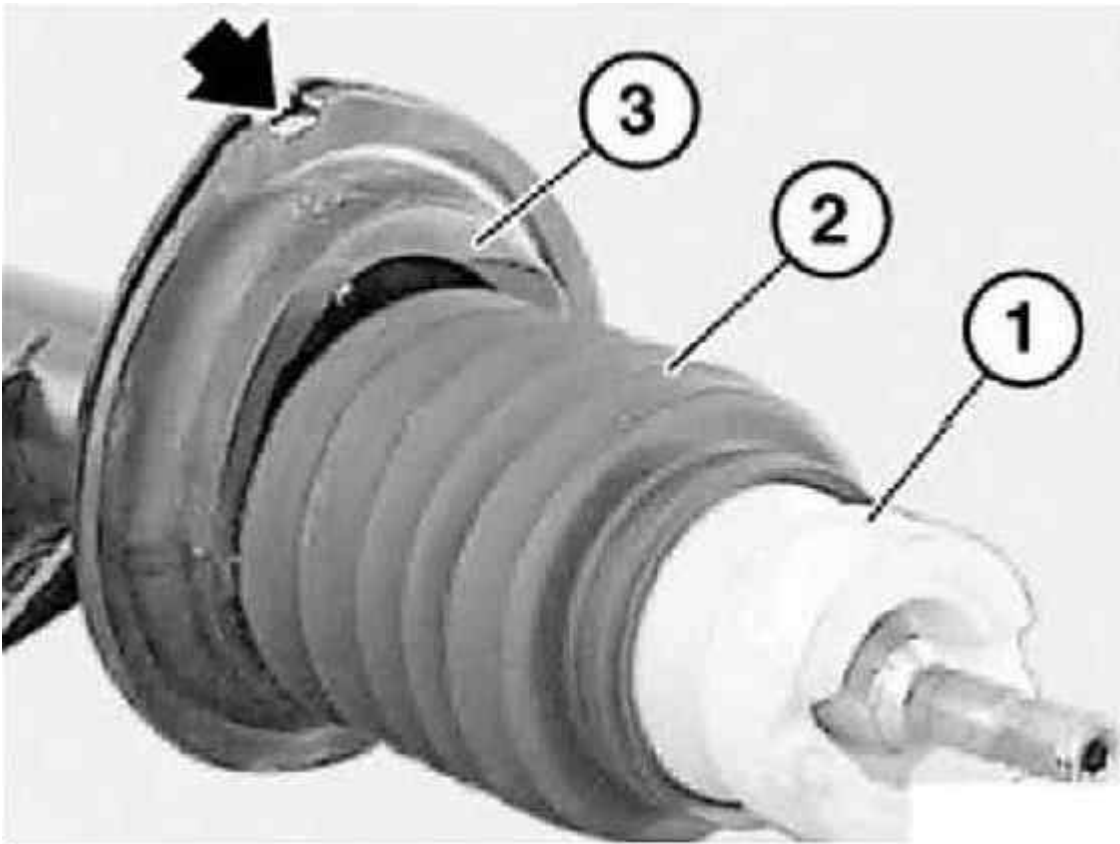
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Fig. 21: Checking Spring Pad

Courtesy of BMW OF NORTH AMERICA, INC.

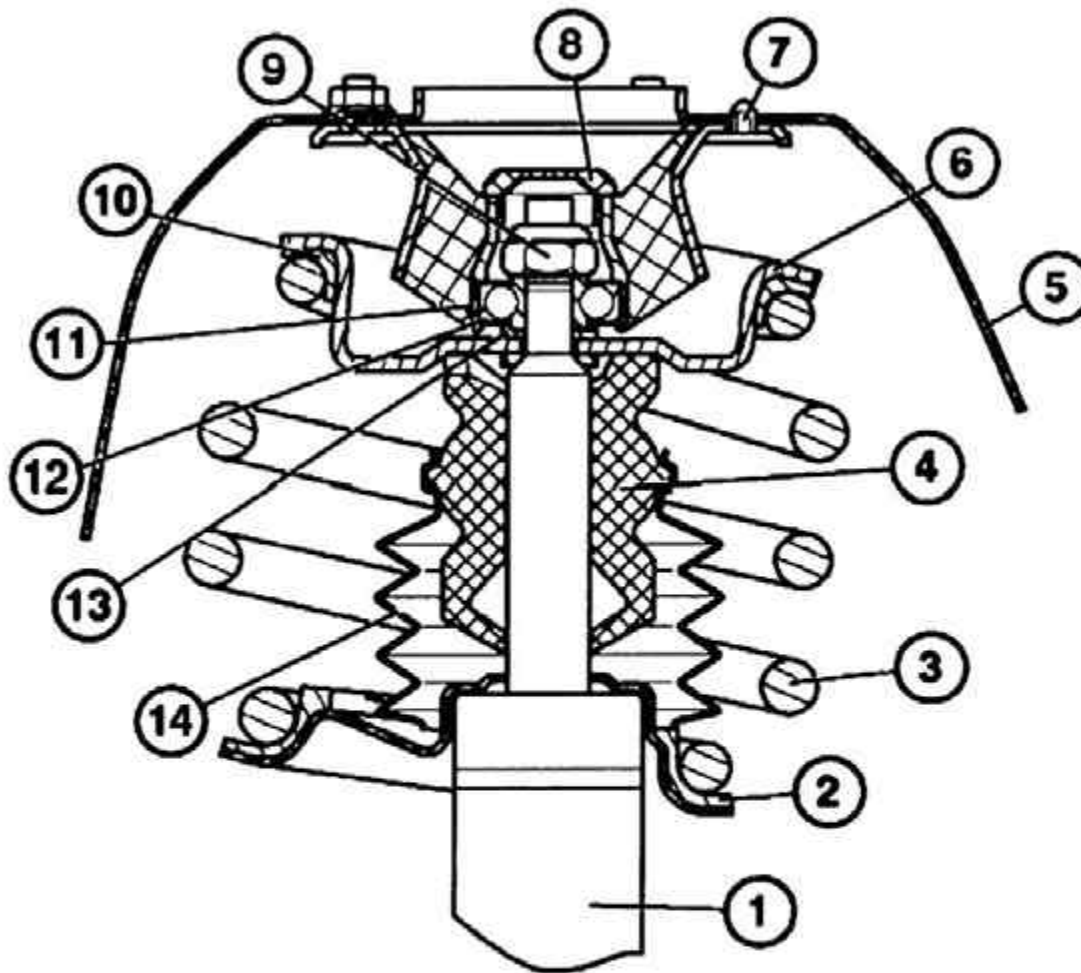
Assembly

1. Place coil spring in spring holders. End of spring must be flush with end of spring holder.
2. Replace auxiliary spring (1), if necessary. Check protective tube (2) and spring pad (3), replace if necessary. Opening on spring plate and spring pad must be flush. See **Fig. 22** .
3. Insert spring strut shock absorber into coil spring and upper spring plate. Observe installation sequence. See **Fig. 23** .
4. Replace self-locking nut (1) and screw onto piston rod so that it is flush. See **Fig. 24** . Coil spring must fit positively in lower spring plate/spring pad. Release tension on coil spring until it is fully resting in lower spring plate.
5. Tighten self-locking nut with special tool (31 2 210). If necessary, grip piston rod. See **Fig. 20** . Tighten nut to specification. See **TORQUE SPECIFICATIONS** .
6. Fully release tension on coil spring and remove.



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Fig. 22: Checking Spring Strut Components
Courtesy of BMW OF NORTH AMERICA, INC.



- | | |
|-------------------------|-----------------------|
| 1 Shock absorber | 8 Protective cap |
| 2 Bottom spring support | 9 Nut |
| 3 Bearing spring | 10 Top spring support |
| 4 Auxiliary spring | 11 Thrust bearing |
| 5 Wheel arch | 12 Sealing ring |
| 6 Top spring plate | 13 Washer |
| 7 Centering pin | 14 Folding tube |

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Fig. 23: Identifying Installation Sequence Of Spring Strut Shock Absorber
 Courtesy of BMW OF NORTH AMERICA, INC.



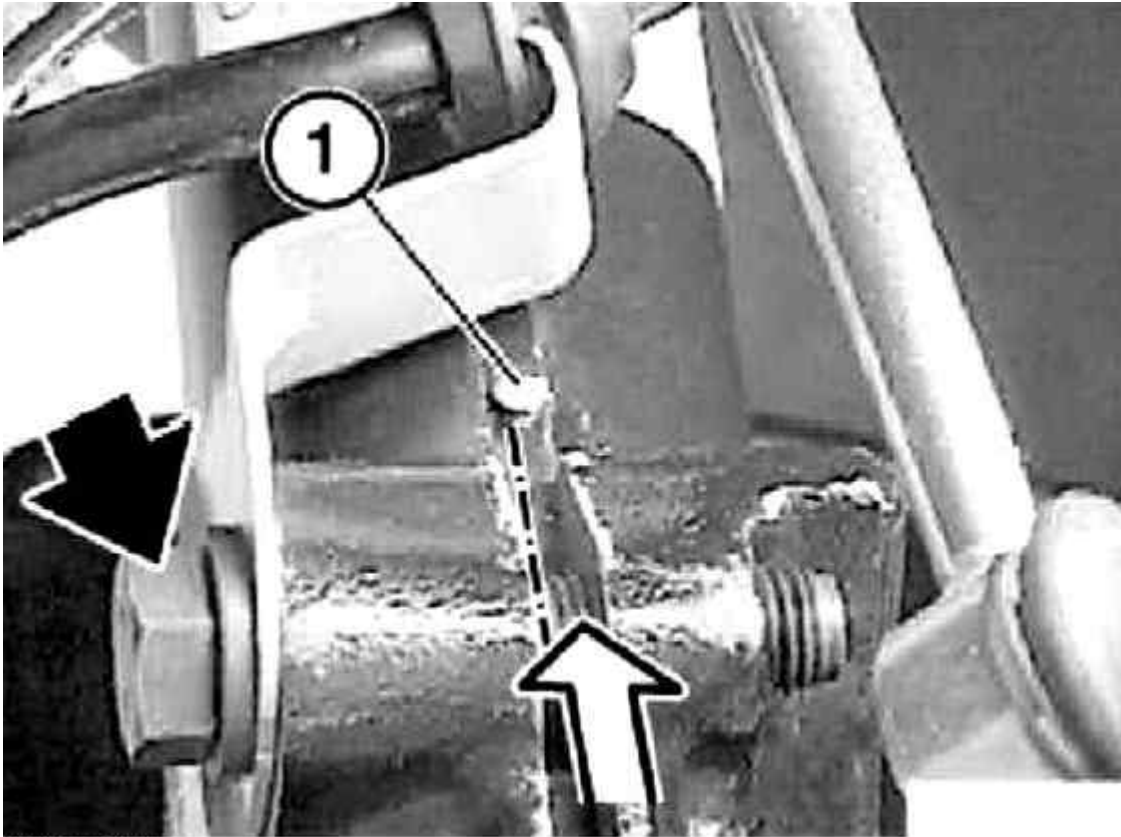
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Fig. 24: Locating Self-Locking Nut On Piston Rod
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

1. Install support bearing to wheel arch. Replace self-locking nuts. The centering pin (1) of the support bearing must lie in the bore (2) of the wheel arch, and the marking must be noted. See **Fig. 16** .
2. Tighten to specification. See **TORQUE SPECIFICATIONS** .
3. Insert positioning pin (1) into gap and press steering knuckle upwards onto stop. See **Fig. 25** .
4. Tighten steering knuckle-to-spring strut nut to specification. See **TORQUE SPECIFICATIONS** .
5. Replace self-locking nut and attach control arm to steering knuckle. Tighten to specification. See **TORQUE SPECIFICATIONS** .
6. Replace self-locking nut and attach steering tie rod to steering knuckle. Tighten to specification. See **TORQUE SPECIFICATIONS** .
7. Replace self-locking nut and attach stabilizer link. Tighten to specification. See **TORQUE SPECIFICATIONS** .
8. Attach retaining bracket of angle joint to control arm. Tighten to specification. See **TORQUE SPECIFICATIONS** .
9. Attach brake cable and brake hose to mounting.
10. Attach brake caliper. See **DISC** article in BRAKES.

11. Install front wheel and tighten wheel lug bolts to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 25: Inserting Positioning Pin
Courtesy of BMW OF NORTH AMERICA, INC.

CONTROL ARM

WARNING: If control arm or tie rod is bent, it is essential for safety reasons to check the spring strut piston rod for straightness.

NOTE: Numbers and letters in text refer to numbers and letters in figures.

Removal

1. Raise and support front of vehicle. Remove front wheel.
2. Remove retaining bracket (1) of angle joint from control arm (2). See **Fig. 11** .
3. Unfasten nut. Press control arm off steering knuckle with special tool (32 3 090). See **Fig. 14** . Reconnect ball-and-socket joint with wheel carrier and secure with nut against falling out.
4. Remove control arm bracket from engine support. See **Fig. 26** .
5. Unfasten nut. Strike off control arm ball joint with plastic hammer. Take off control arm.

6. If replacing control arms, derust the stub axle in the area of the contact face of the rubber sleeve and replace brackets. See **CONTROL ARM BRACKETS** .

Installation

1. To install, reverse removal procedure.
2. Remove grease from bores and pins.
3. Replace all self-locking nuts. Damaged threads on engine mounts can be repaired with Helicoil M12 x 1.5 threaded inserts. Tighten to specification. See **TORQUE SPECIFICATIONS** .
4. Force ball joint upwards with a transmission lifter and base. This makes it easier to tighten down the nut.

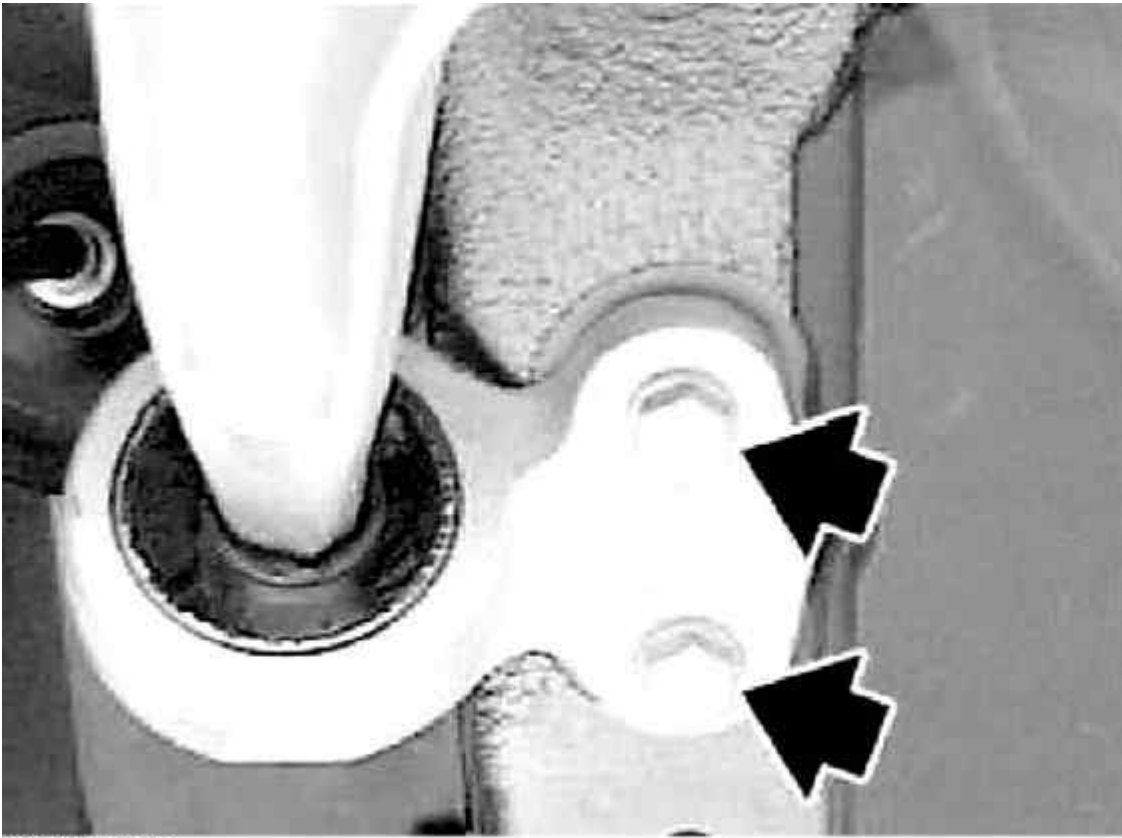
CONTROL ARM BRACKETS

CAUTION: If a bracket is replaced, a new rubber mount must also be installed on the other side.

NOTE: Numbers and letters in text refer to numbers and letters in figures.

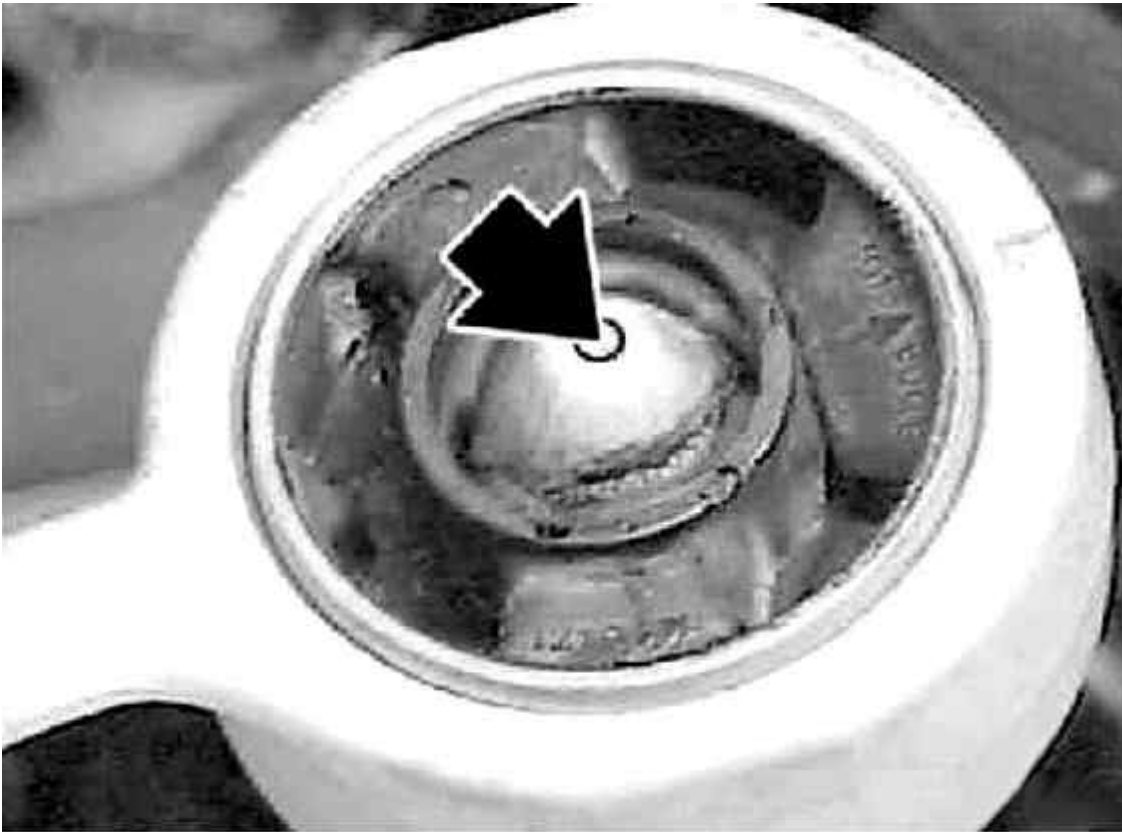
Removal

1. Remove reinforcement plate. See **REINFORCEMENT PLATE** .
2. Unfasten screws. See **Fig. 26** .
3. Punch mark center of control arm. See **Fig. 27** .
4. Assemble Special Tool (00 7 500).
5. If necessary, remachine Special Tool (31 2 151). See **Fig. 28** .
6. Detach bracket with Special Tools (00 7 500) and (31 2 151) from control arm. See **Fig. 29** .
7. Mark out measurement (A) at bottom of control arm pin. See **Fig. 30** . Measurement (A) equals 286.3-288.3 mm.



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Fig. 26: Removing Control Arm Bracket
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 27: Locating Punch Mark Of Control Arm
Courtesy of BMW OF NORTH AMERICA, INC.

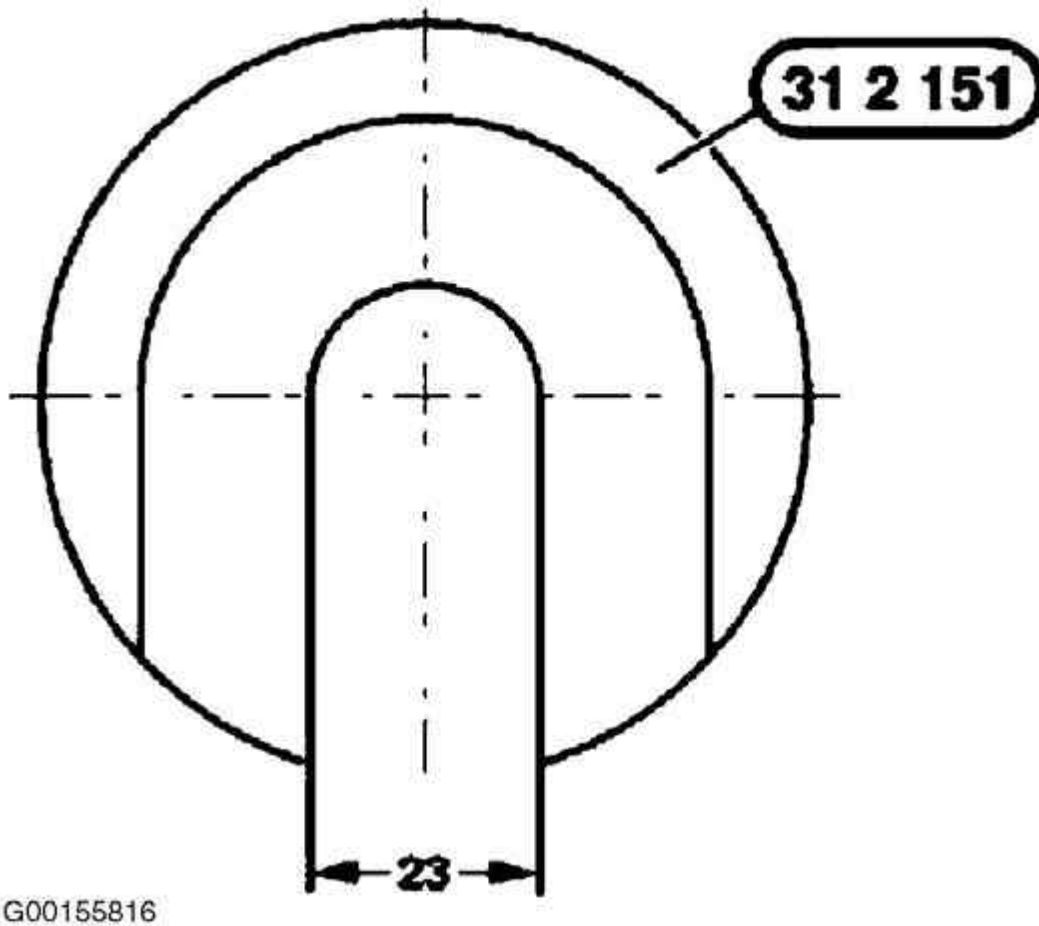
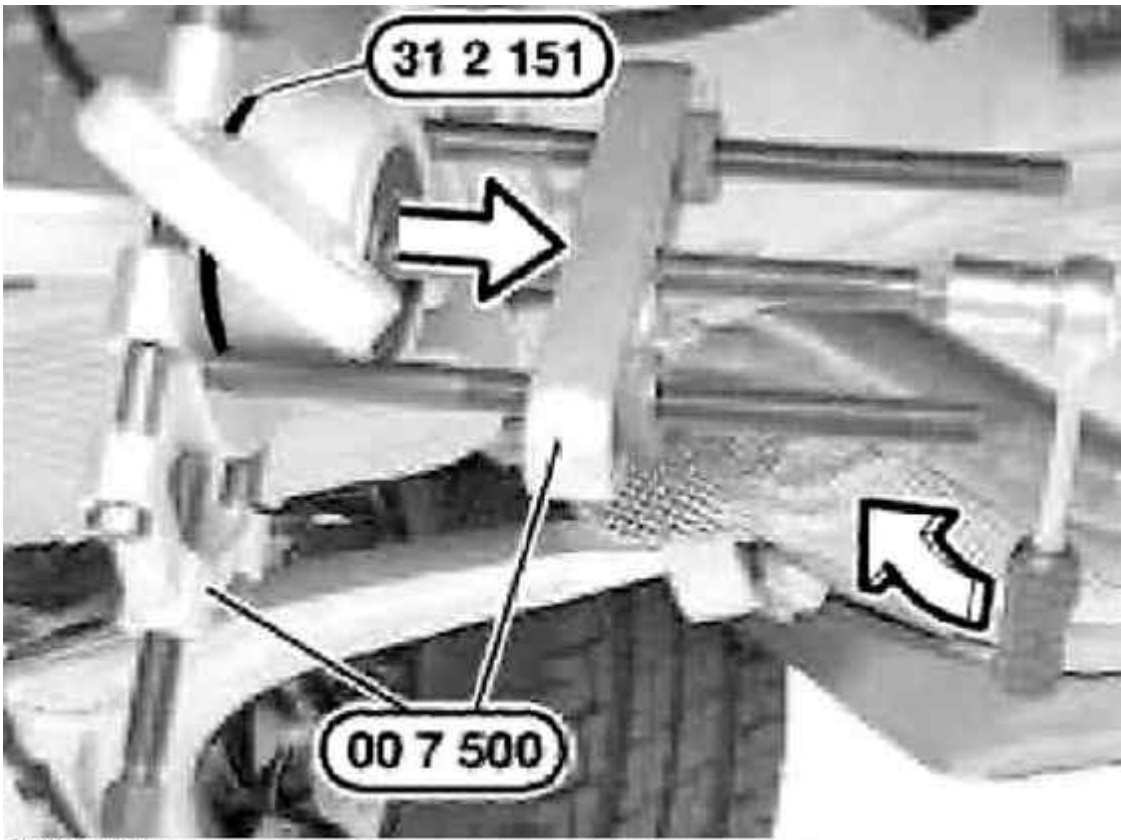
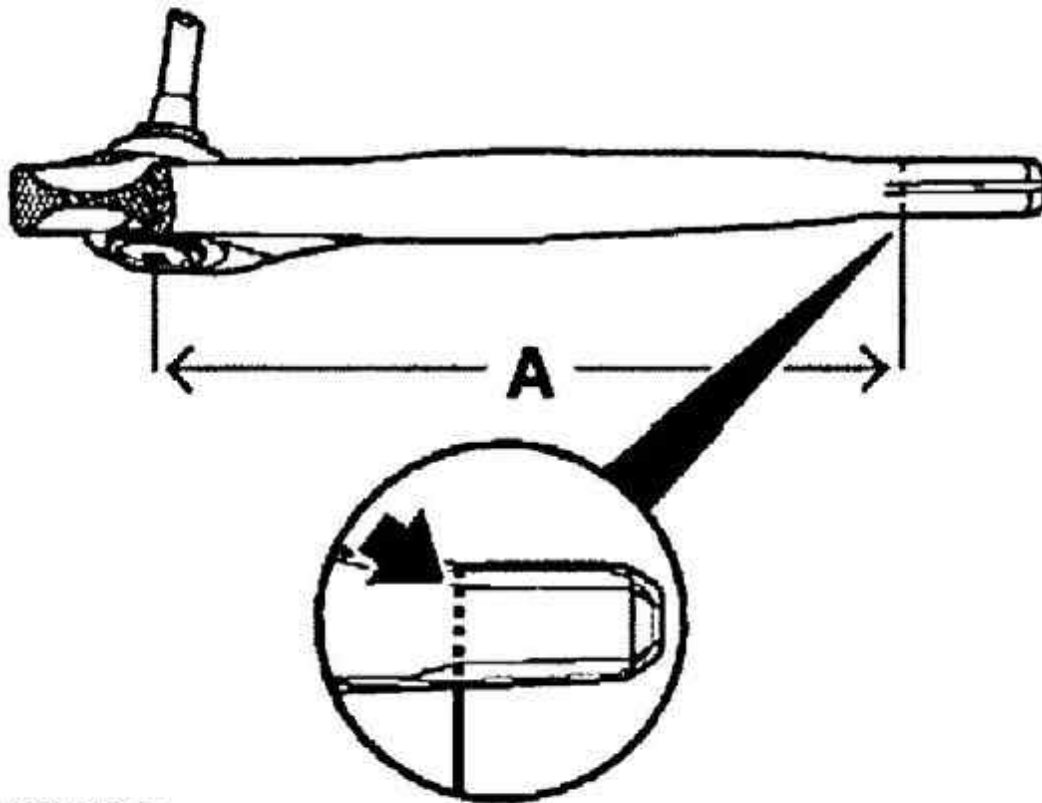


Fig. 28: Remachining Special Tool (31 2 151)
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 29: Detaching Control Arm Bracket
Courtesy of BMW OF NORTH AMERICA, INC.



G00155819

Fig. 30: Measuring Control Arm Pin
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

CAUTION: If the position of the rubber mount is not strictly adhered to, it will impair vehicle handling and cause early rubber mount wear. Outer edge (B) of rubber mount must be flush with marked measurement (A). See [Fig. 31](#) .

1. Coat control arm pin and rubber mount bushing with low-surface-tension water. Mix one part soap to 20 parts water.
2. Ensure positive locking (1) of bushing and control arm pin. See [Fig. 32](#) . Larger diameters of bores (2) point to engine support.
3. Attach Special Tool (31 2 153) with extensions (1) from puller set to control arm opening. Install new bracket on control arm up to applied marking with Special Tools (00 7 500) and (31 2 152/154/157). See [Fig. 33](#) .
4. Relieve tension on special tool. Check position of rubber mount to marking (measurement A) and correct if necessary.

5. Damaged threads on engine mounts can be repaired with Helicoil M12 x 1.5 threaded inserts. Tighten to specification. See **TORQUE SPECIFICATIONS**.
6. Install reinforcement plate. See **REINFORCEMENT PLATE**.
7. After installation, check freedom of movement of other components to control arm bracket.

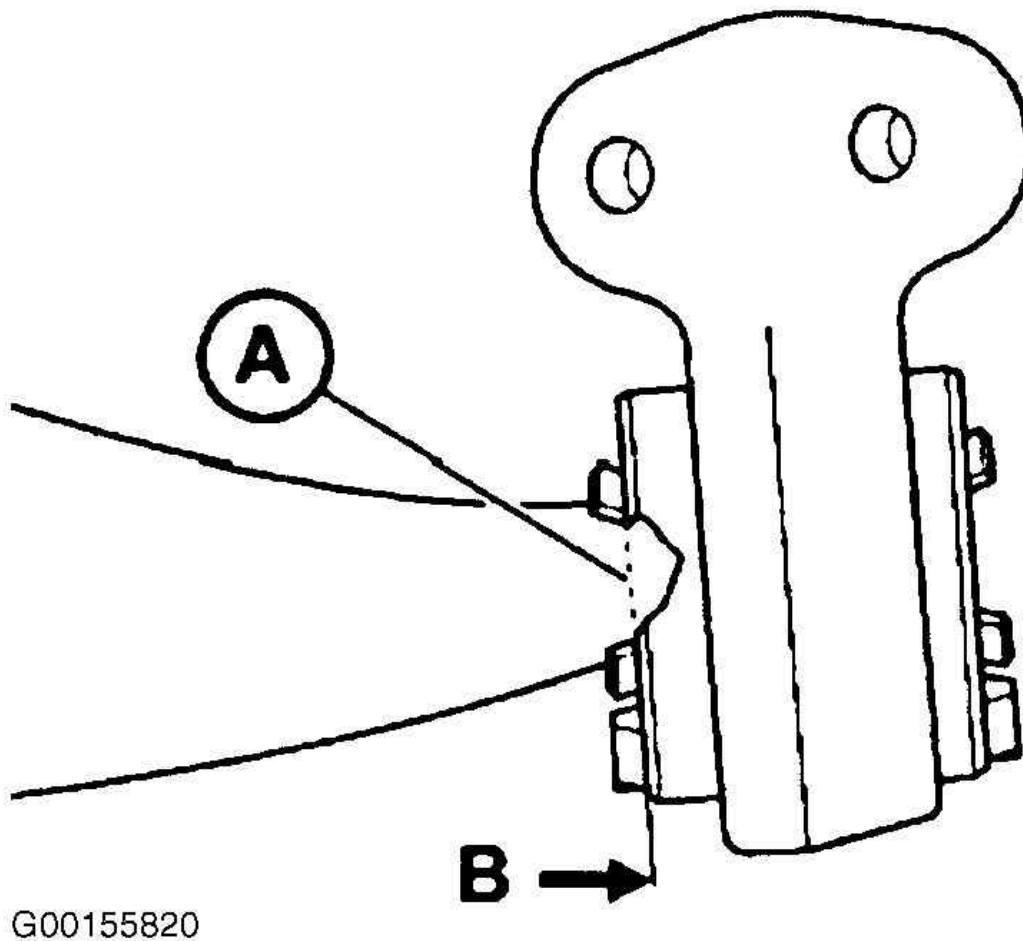
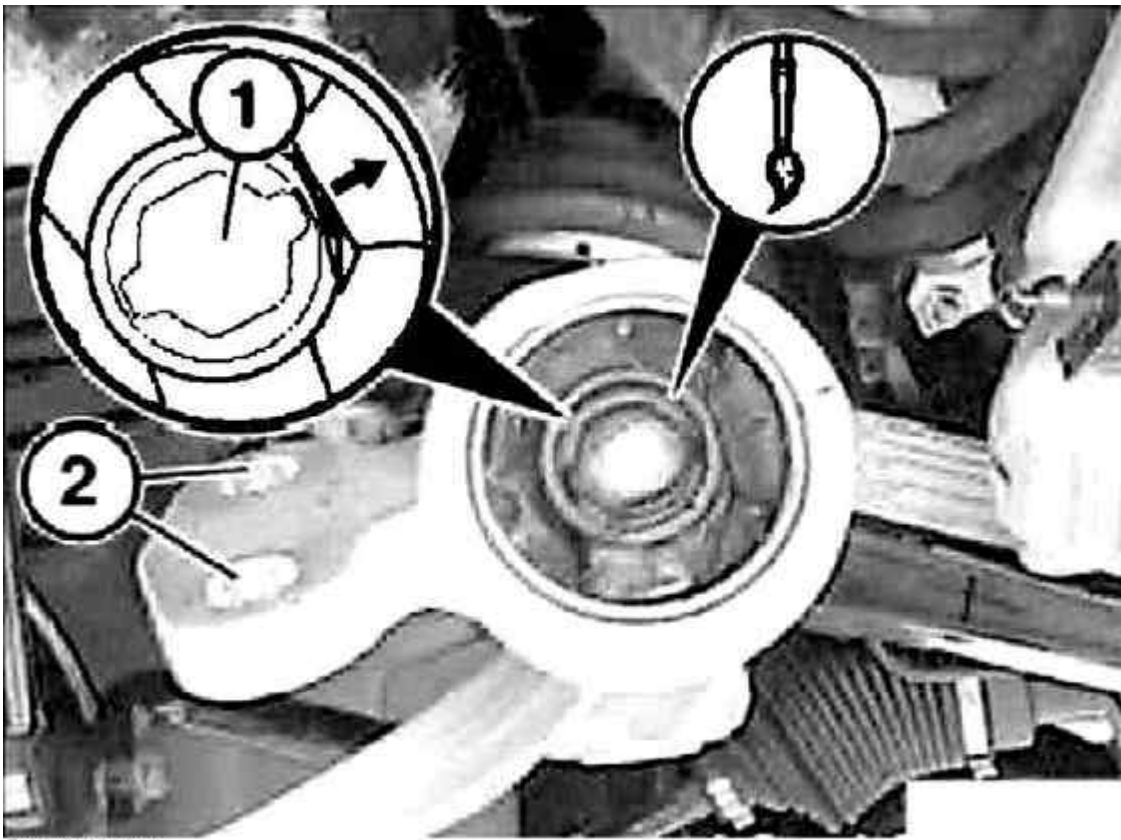


Fig. 31: Locating Position of Control Arm
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 32: Locking Bushing & Control Arm Pin
Courtesy of BMW OF NORTH AMERICA, INC.

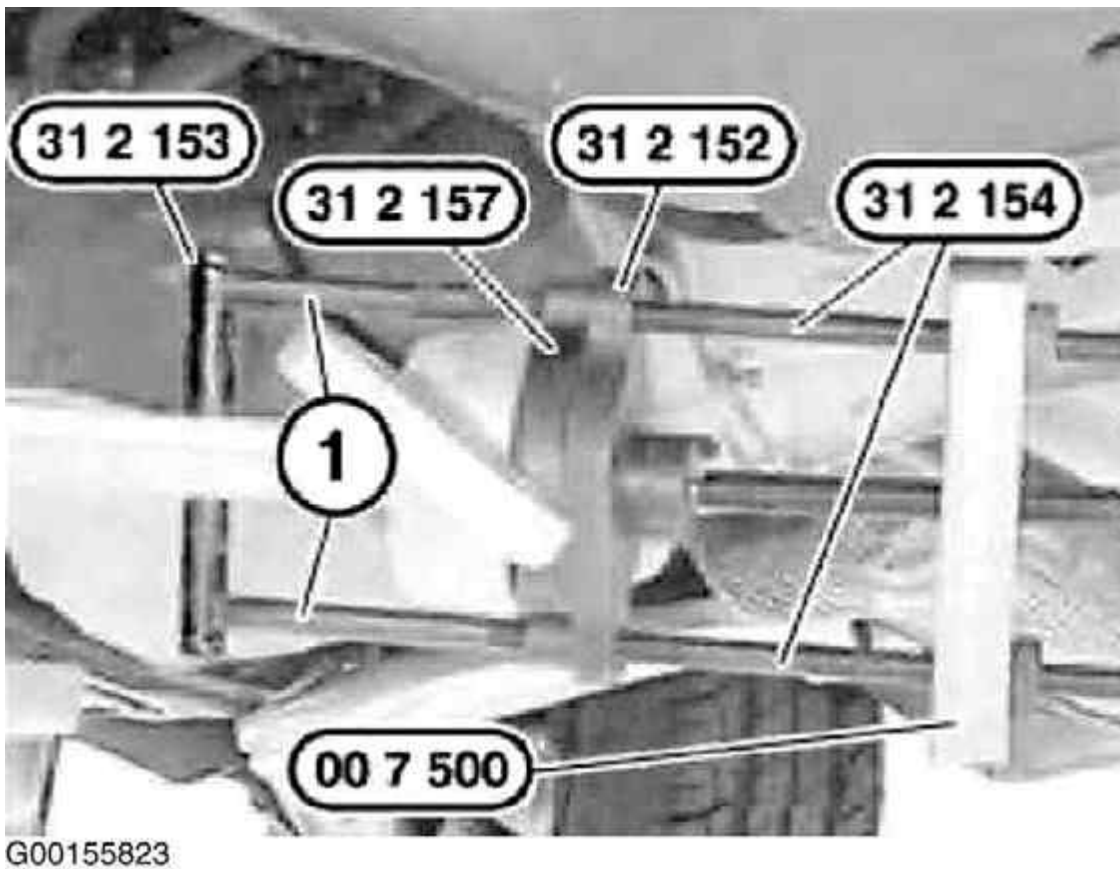


Fig. 33: Pulling On New Bracket Of Control Arm With Opening
Courtesy of BMW OF NORTH AMERICA, INC.

FRONT AXLE (WITH SPRING STRUT SHOCK ABSORBER)

WARNING: No one is permitted to stand underneath the front axle.

CAUTION: Spring struts must not tilt or hang outwards to prevent damage to ball joints and side walls.

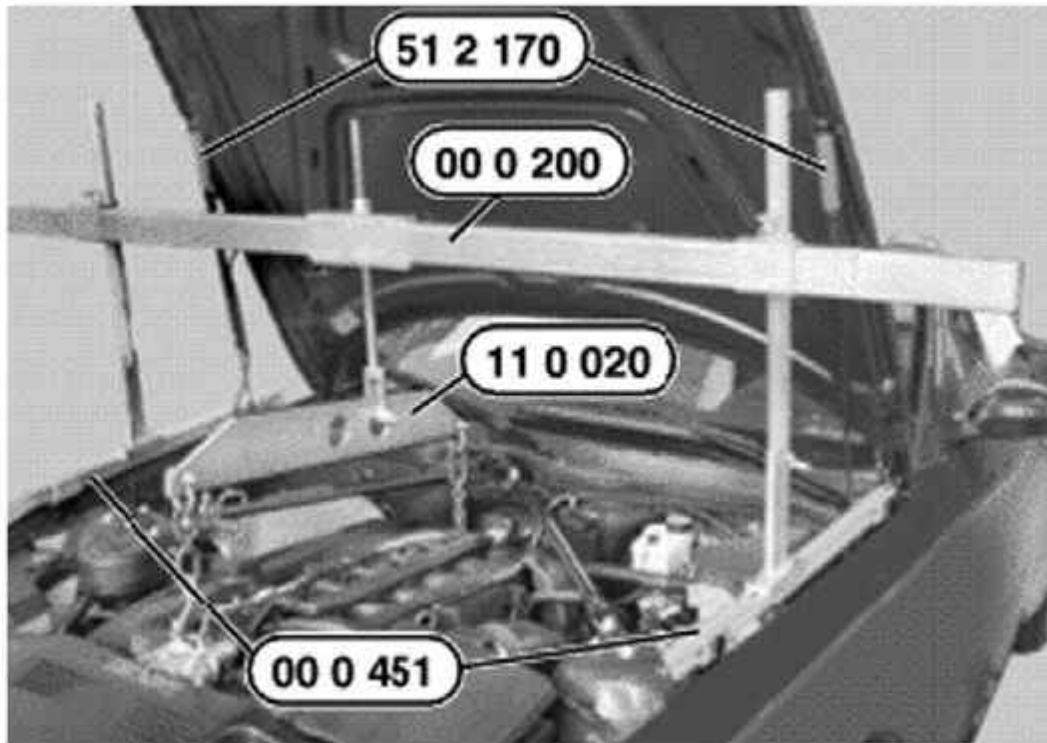
NOTE: Numbers and letters in text refer to numbers and letters in figures.

Removal

1. Remove engine cover. Lay wiring harness on rear side of cylinder head to one side. Cut through cable tie, if necessary.
2. Secure engine hood in service position with Special Tool (51 2 170). See **Fig. 34** . Assemble Special Tool (00 0 200) with Special Tool (00 0 201/202/203/204/451) and install. Supports of Special Tool (00 0 451) must rest on both rear screw connections of side walls. Secure Special Tool (11 0 020) to front and rear

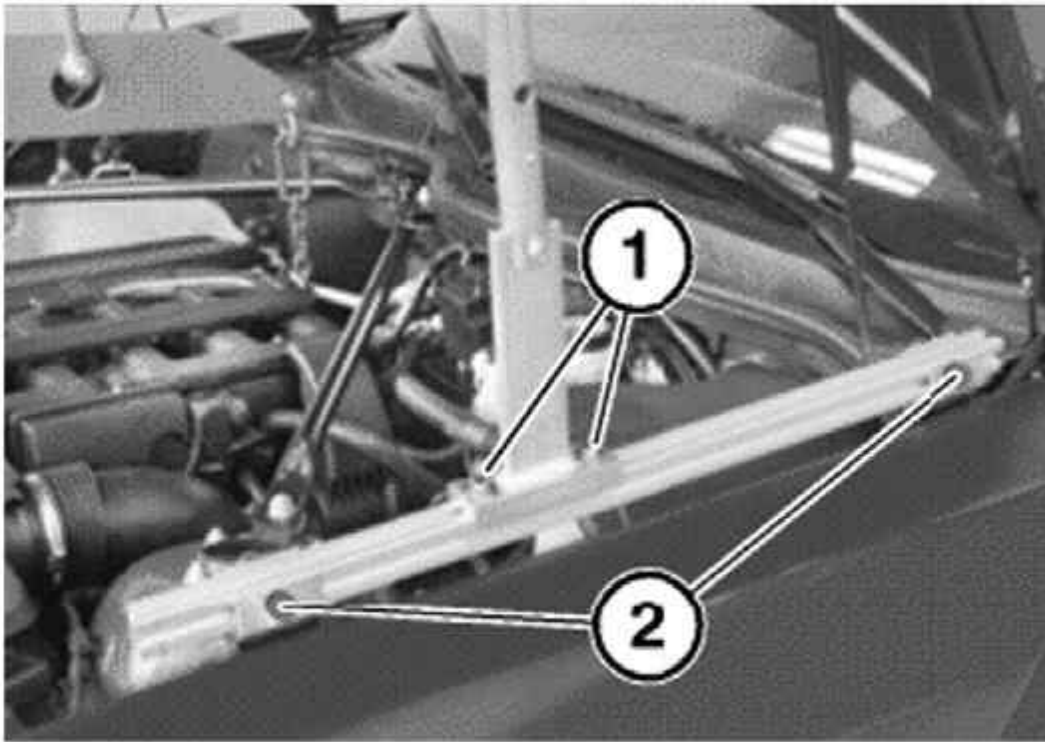
lifting eyes on engine and to Special Tool (00 0 200).

3. Tighten screws (1, 2). See **Fig. 35** . Remove engine mounts at top left and right. Raise engine with Special Tool (00 0 200) approximately 10 mm.
4. Remove brake caliper, and secure assembly to body using wire. Brake lines remain connected.
5. Remove splash guard.
6. Remove reinforcement plate. See **REINFORCEMENT PLATE** .
7. Remove lower section of steering spindle. See **STEERING SPINDLE LOWER SECTION** .
8. Remove left and right brake calipers and tie up to body. Lines remain connected. Disconnect ABS pulse sensor line.
9. Remove left and right stabilizer links (1) from stabilizer (2). See **Fig. 36** . Grip with open end wrench. Secure with adhesive tape to spring strut.
10. Remove retaining bracket (1) of angle joint from control arm (2). See **Fig. 11** .
11. Remove control arm bracket from engine support on left and right. See **Fig. 26** .
12. Remove left and right engine mounts from front axle support.
13. Release screws from side. Lower vehicle until rear wheels touch ground. Support front axle support in middle with workshop hoist. Remove front axle support from engine support on left and right.
14. Remove nuts from top of strut assemblies. Release only one nut if there is no centering pin (1). Position of threaded pin to wheel arch must be marked exactly. This ensures that original camber is retained during installation. See **Fig. 16** .
15. Remove support bearing from wheel arch on left and right.
16. Raise car. Each spring strut must be held by a person. Spring struts must not tilt or hang outwards to prevent damage to ball joints and side walls.



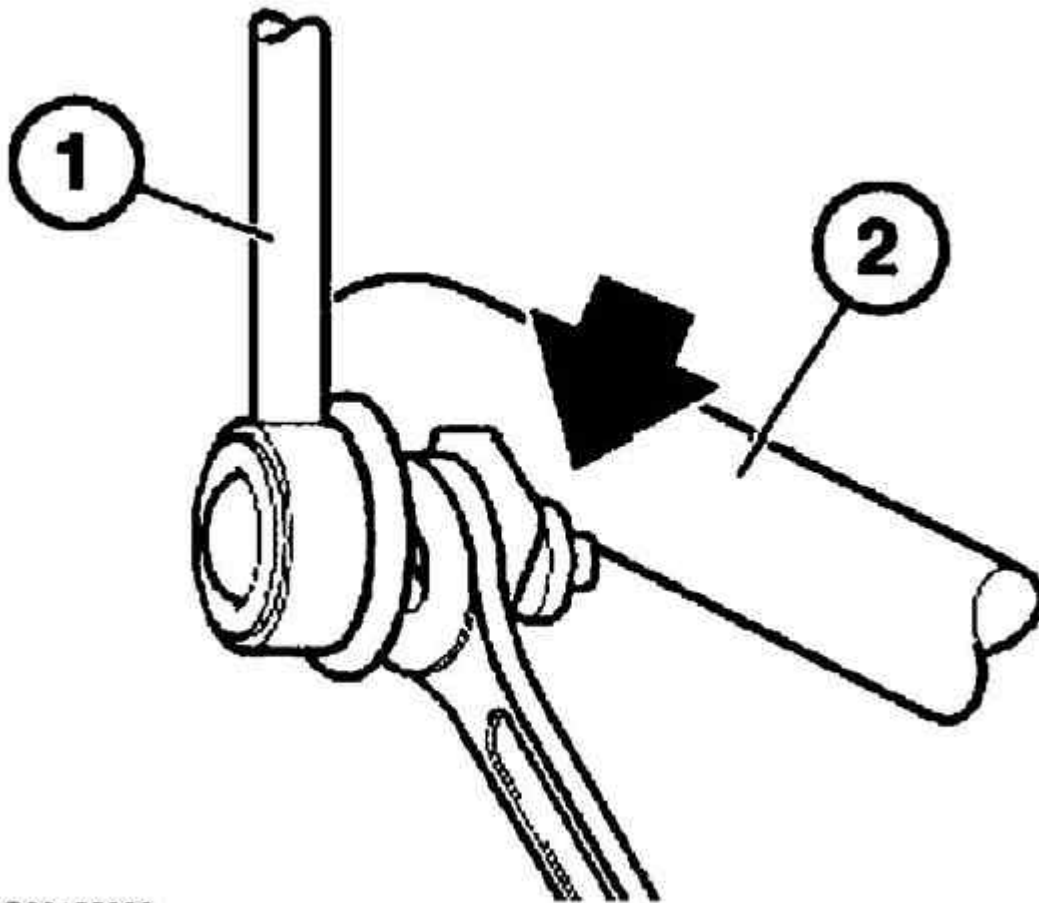
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Fig. 34: Securing Engine In Installation Position
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 35: Locating Engine Support Screws
Courtesy of BMW OF NORTH AMERICA, INC.



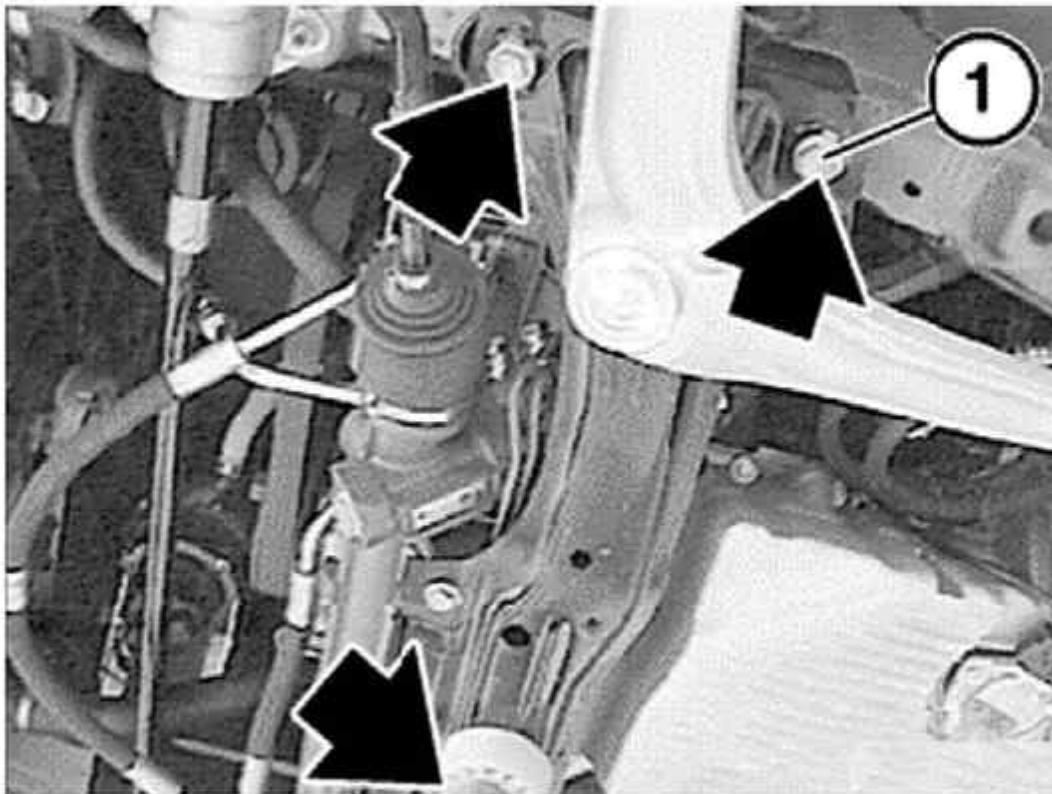
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Fig. 36: Removing Link On Stabilizer Bar
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

1. To install, reverse removal procedure. Centering pin of support bearing must lie in bore of wheel arch and marking must be noted. Replace all self-locking nuts and tighten to specification. See **TORQUE SPECIFICATIONS** .
2. When installing front axle support to engine support, tighten down rear screws (1) first. See **Fig. 37** .
3. When installing engine mounts and control arm bracket, check for damaged threads. Damaged threads can be repaired with Helicoil M12 x 1.5 threaded inserts. Tighten to specification. See **TORQUE SPECIFICATIONS** .
4. Install reinforcement plate. See **REINFORCEMENT PLATE** .
5. Install ABS pulse generator line, brake calipers and engine underguard.
6. Check and adjust front wheel alignment. See **SPECIFICATIONS & PROCEDURES** article in WHEEL

ALIGNMENT.



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Fig. 37: Installing Front Axle Support To Engine Support
Courtesy of BMW OF NORTH AMERICA, INC.

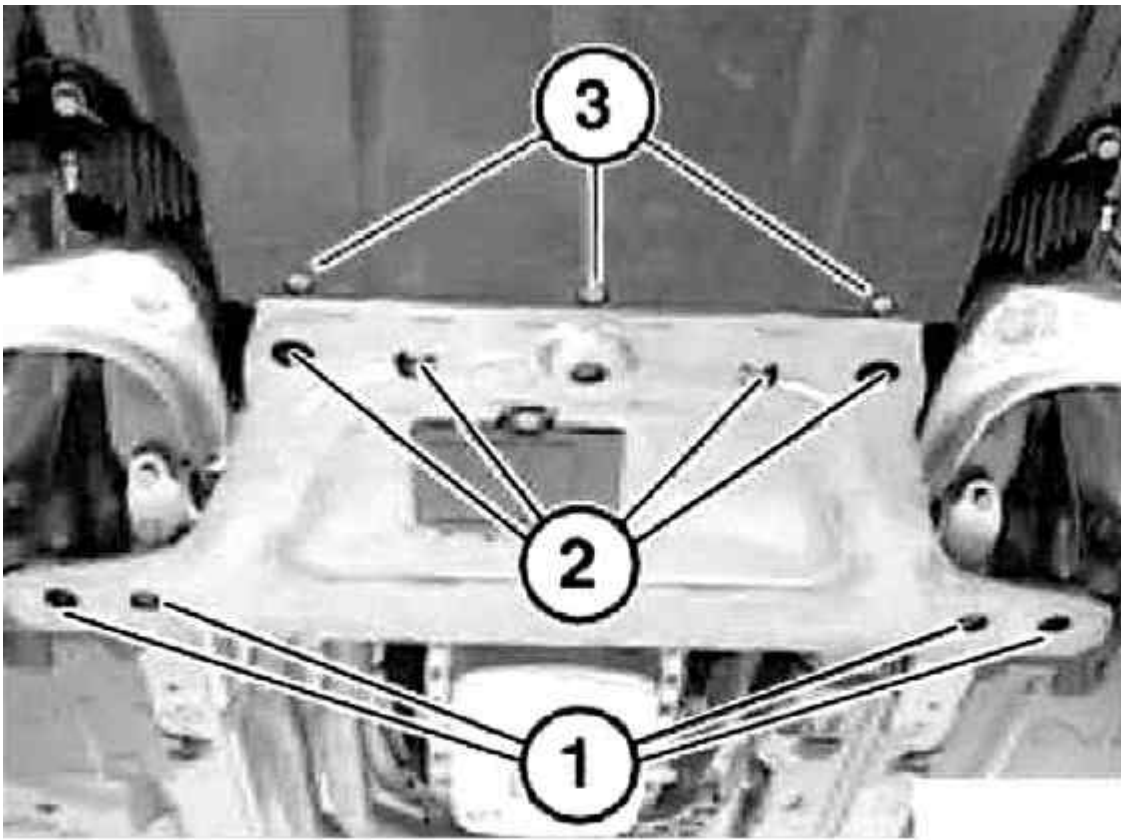
REINFORCEMENT PLATE

CAUTION: Vehicles must not be driven without reinforcement plates.

NOTE: Numbers and letters in text refer to numbers and letters in figures.

Removal & Installation

1. Remove screws (3). See **Fig. 38**.
2. Remove screws (1 and 2) and remove reinforcement plate.
3. Replace screws (1, 2). Tighten to specification and then to angle of rotation with Special Tool (00 9 120). See **TORQUE SPECIFICATIONS**.
4. Tighten down screws (3).



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Fig. 38: Removing Reinforcement Plate
Courtesy of BMW OF NORTH AMERICA, INC.

STABILIZER BAR

NOTE: Numbers and letters in text refer to numbers and letters in figures.

Removal & Installation

1. Release stabilizer link (1) on left and right of stabilizer bar (2). Grip with open-end wrench. See **Fig. 36** .
2. Release retaining bracket on left and right. Remove stabilizer. See **Fig. 39** .
3. To install, ensure rubber mount, retaining bracket and stabilizer bar are free of grease. Ensure rubber mount open end faces downward.
4. Wet retaining bracket with low-surface-tension water (mix one part soap to 20 parts water) and install. Replace self-locking nuts and tighten to specification. See **TORQUE SPECIFICATIONS** .
5. Install stabilizer links on stabilizer bar. Replace self-locking nuts and tighten to specification. See **TORQUE SPECIFICATIONS** .

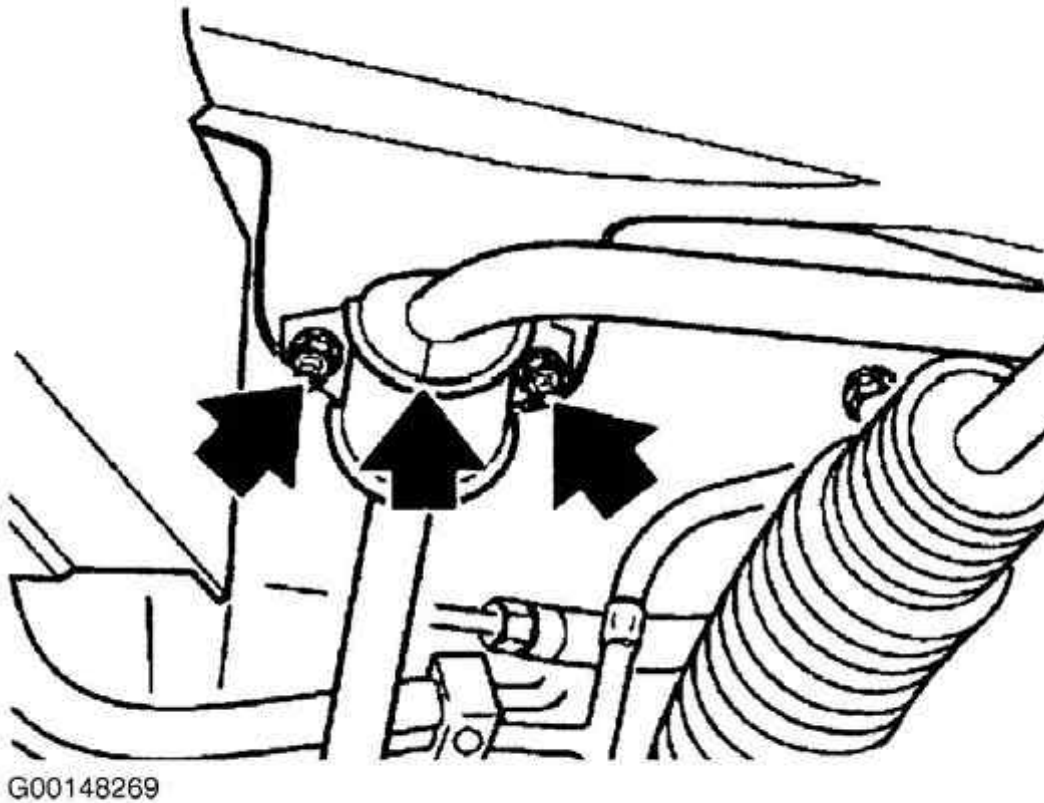


Fig. 39: Positioning Rubber Mount
Courtesy of BMW OF NORTH AMERICA, INC.

STEERING KNUCKLES

NOTE: Numbers and letters in text refer to numbers and letters in figures.

Removal & Installation

1. Remove wheel bearing. See **WHEEL BEARING** .
2. Unfasten tie rod nut. Pull off tie rod with Special Tool (32 3 090). See **Fig. 13** .
3. Unfasten control arm nut. Press control arm off steering knuckle with Special Tool (32 3 090). See **Fig. 14** .
4. Secure steering knuckle against falling off. Unscrew multi-purpose bolt. If necessary, spread out steering knuckle with Special Tool (31 2 200) and remove. See **Fig. 15** .
5. To install, remove guard plate and attach to new steering knuckle. See **Fig. 40** .
6. Insert positioning pin (1) into gap and press steering knuckle upwards onto stop. See **Fig. 25** . Tighten bolt to specification. See **TORQUE SPECIFICATIONS** .

7. Install control arm on steering knuckle and replace self-locking nut. Tighten to specification. See **TORQUE SPECIFICATIONS** .
8. Remove grease from bore and pin. Install tie rod. Replace self-locking nut. Tighten to specification. See **TORQUE SPECIFICATIONS** .
9. Install wheel bearing. See **WHEEL BEARING** .

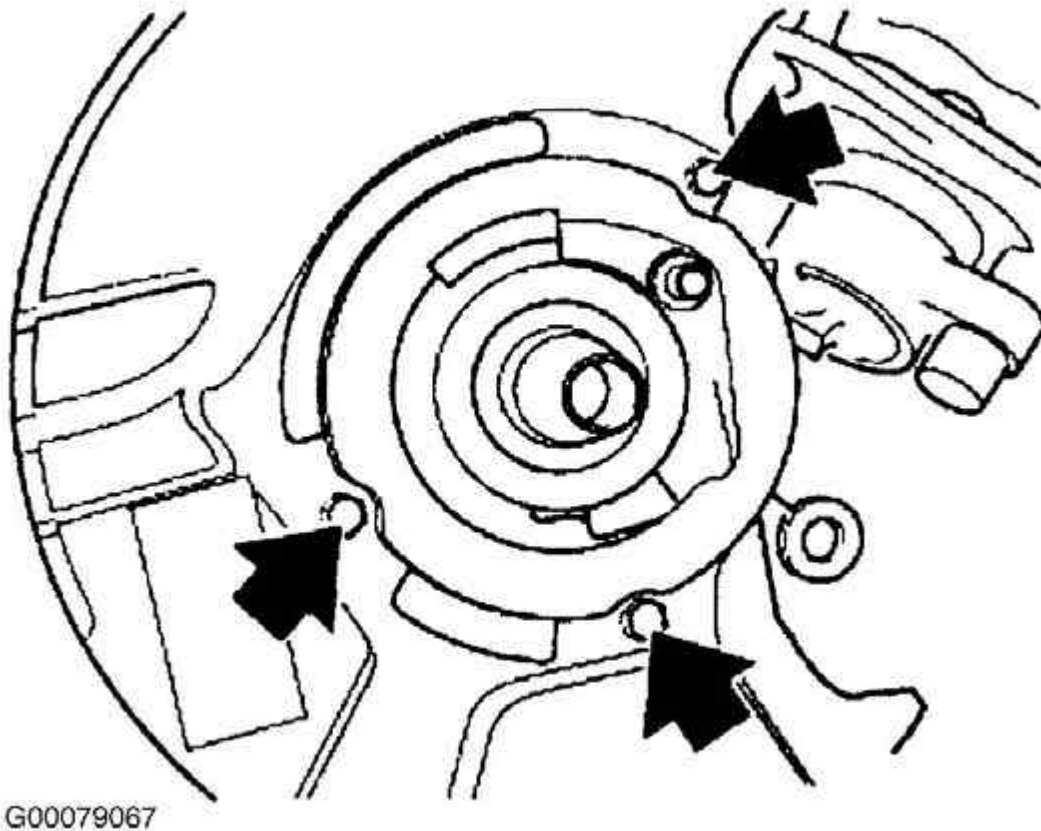


Fig. 40: Locating Dust Guard Plate Bolts
Courtesy of BMW OF NORTH AMERICA, INC.

STEERING SPINDLE LOWER SECTION

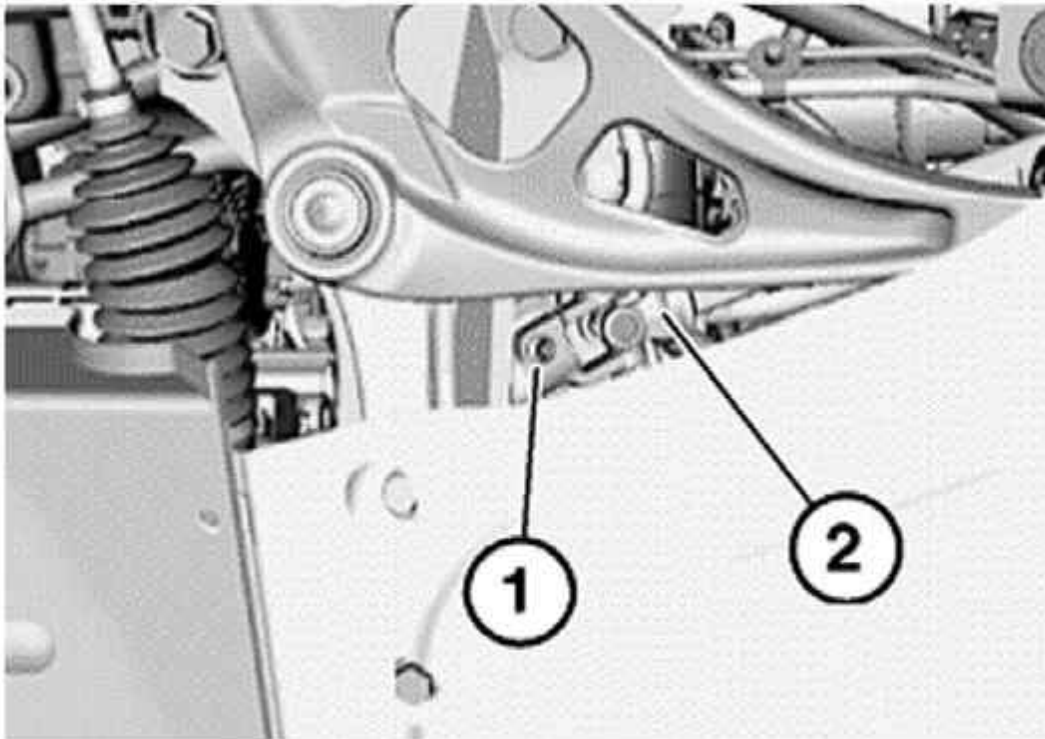
CAUTION: There is no longer an end stop if steering spindle is separated from steering gear. Steering wheel can be turned without restriction.

NOTE: If a screw connection is released on the universal joint, the clamping screw must be replaced and the thread in the universal joint recut.

NOTE: Numbers and letters in text refer to numbers and letters in figures.

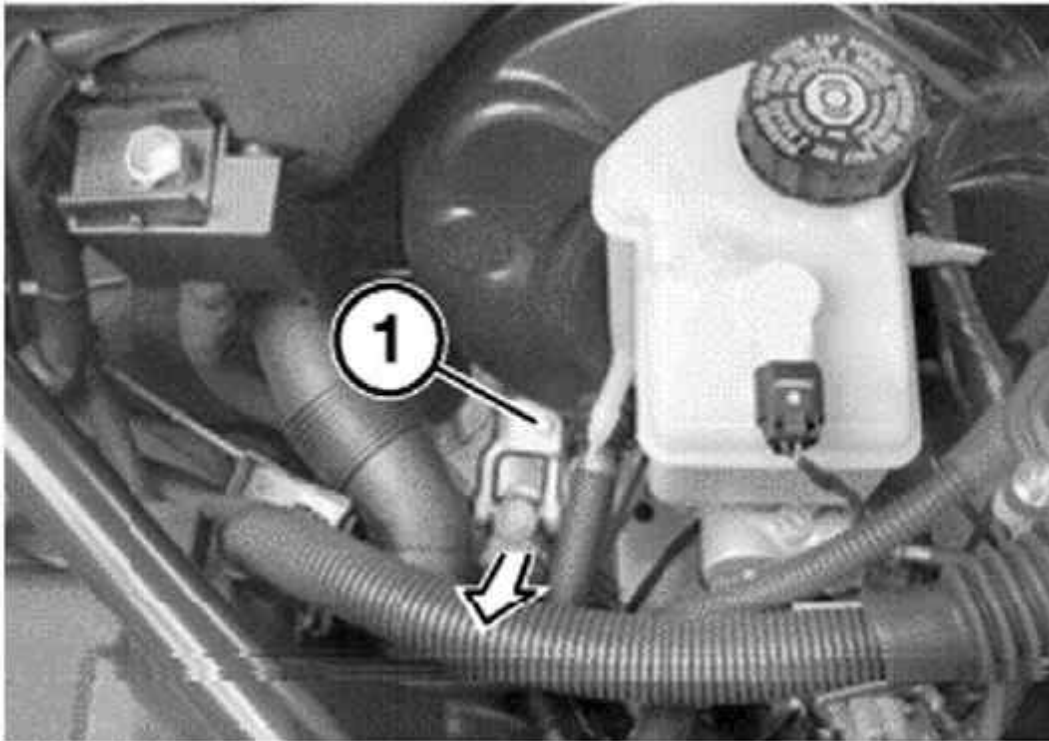
Removal & Installation

1. Move steering wheel to straight ahead position. Lock steering lock. Remove ignition key.
2. Release clamping screw (1) and detach lower section of steering spindle (2 from steering gear. See **Fig. 41** .
3. Release clamping screw (1). See **Fig. 42** . Pull lower section of steering spindle downwards and remove.
4. To install, reverse removal procedure. Ensure steering gear is in straight ahead position. Joining the lower section of steering spindle in the steering column is only possible in one position. Make sure universal joint is correctly seated. Recut threads and replace clamping screws. Tighten to specification. See **TORQUE SPECIFICATIONS** .



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Fig. 41: Locating Clamping Screw
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 42: Removing Lower Section Of Steering Gear
Courtesy of BMW OF NORTH AMERICA, INC.

SUPPORT BEARINGS ON SPRING STRUT SHOCK ABSORBERS

Removal & Installation

NOTE: If a spring strut support bearing without centering pin was fitted, the centering pin of the new spring strut support bearing must be driven out.

Procedures are identical with those of replacing spring strut shock absorber. See **COIL SPRING & SHOCK ABSORBER** .

WHEEL BEARING

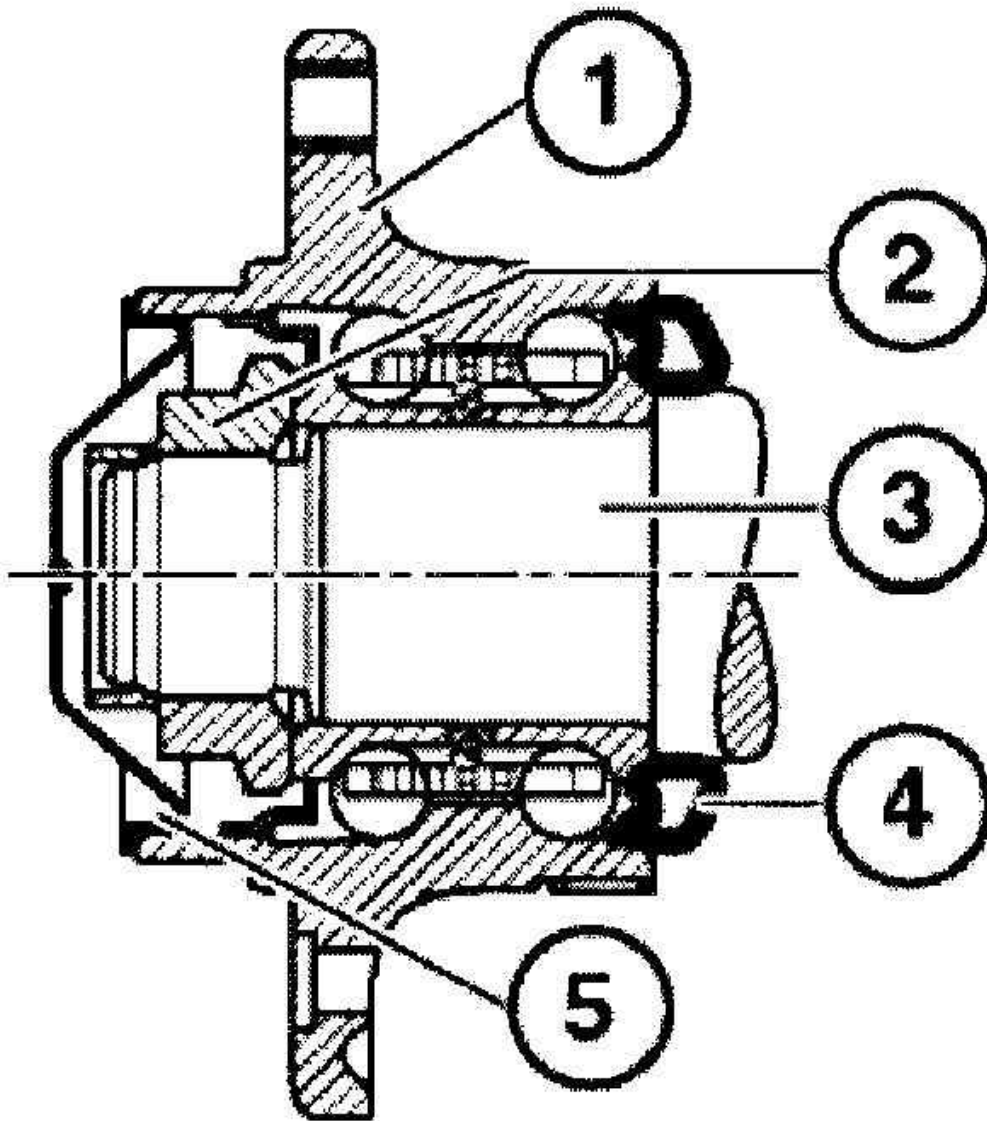
CAUTION: DO NOT use a bearing assembly again once it has been removed.

NOTE: Numbers and letters in text refer to numbers and letters in figures.

To identify components of wheel hub, see **Fig. 43** .

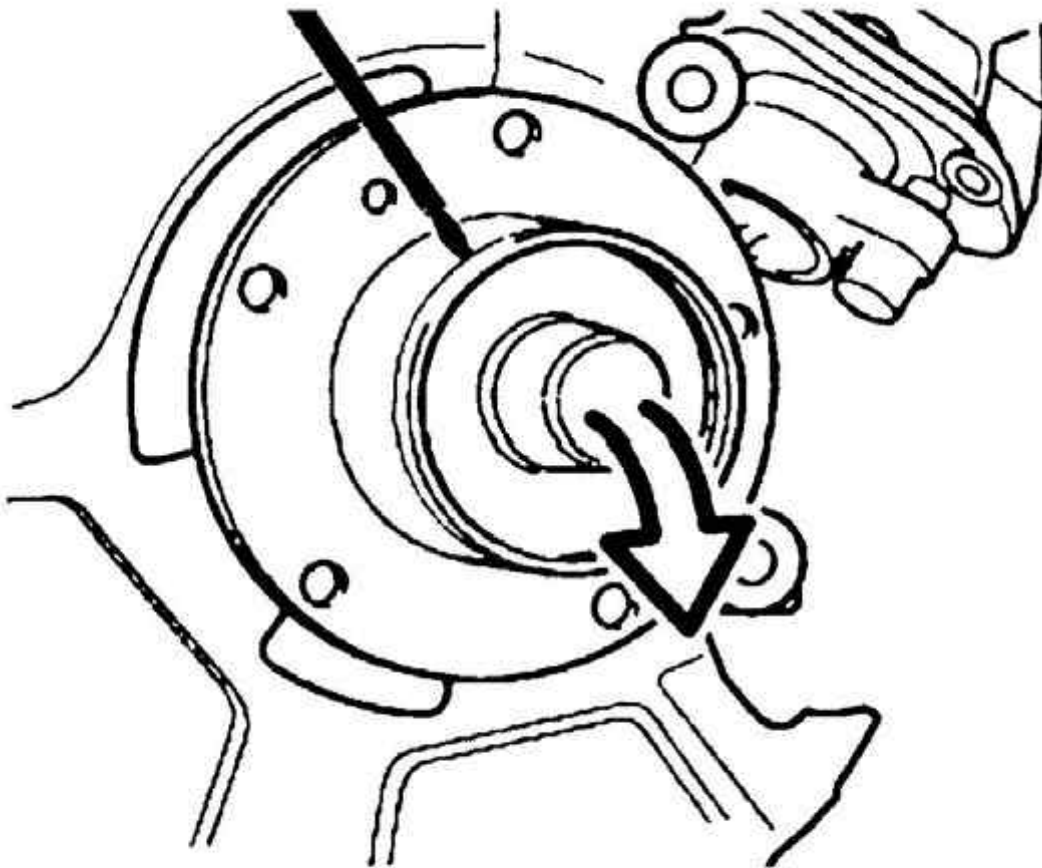
Removal

1. Remove brake disc and ABS pulse sensor. See **DISC** article in BRAKES.
2. Remove sealing cap with screwdriver or chisel. See **Fig. 44** .
3. Release collar nut with cross-cut chisel and remove with Special Tool (31 2 080). See **Fig. 45** .
4. Remove bearing assembly with Special Tool (33 2 116, 33 4 201/202/203). Hold special tool on with wheel lug bolts. See **Fig. 46** .
5. If necessary, pull inner bearing race off axle stub. Attach Special Tool (33 4 406/401) to inner bearing race and compress until special tool can still just be turned. Withdraw inner bearing race with special tool (33 4 402). See **Fig. 47** . To withdraw inner bearing race without special tool, if inside bearing inner ring remains on stub axle after pulling off wheel bearing unit, unscrew guard plate. If necessary, bend back dust guard plate so that guard plate can be removed. See **Fig. 40** .
6. Bend back dust guard plate (1). See **Fig. 48** . Fit pulling off claws of Special Tool (00 7 500) behind bearing inner race (2). Pull off bearing inner race with Special Tools (00 7 500) and (31 2 106).



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Fig. 43: Identifying Components Of Wheel Hub
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 44: Removing Grease Cap
Courtesy of BMW OF NORTH AMERICA, INC.

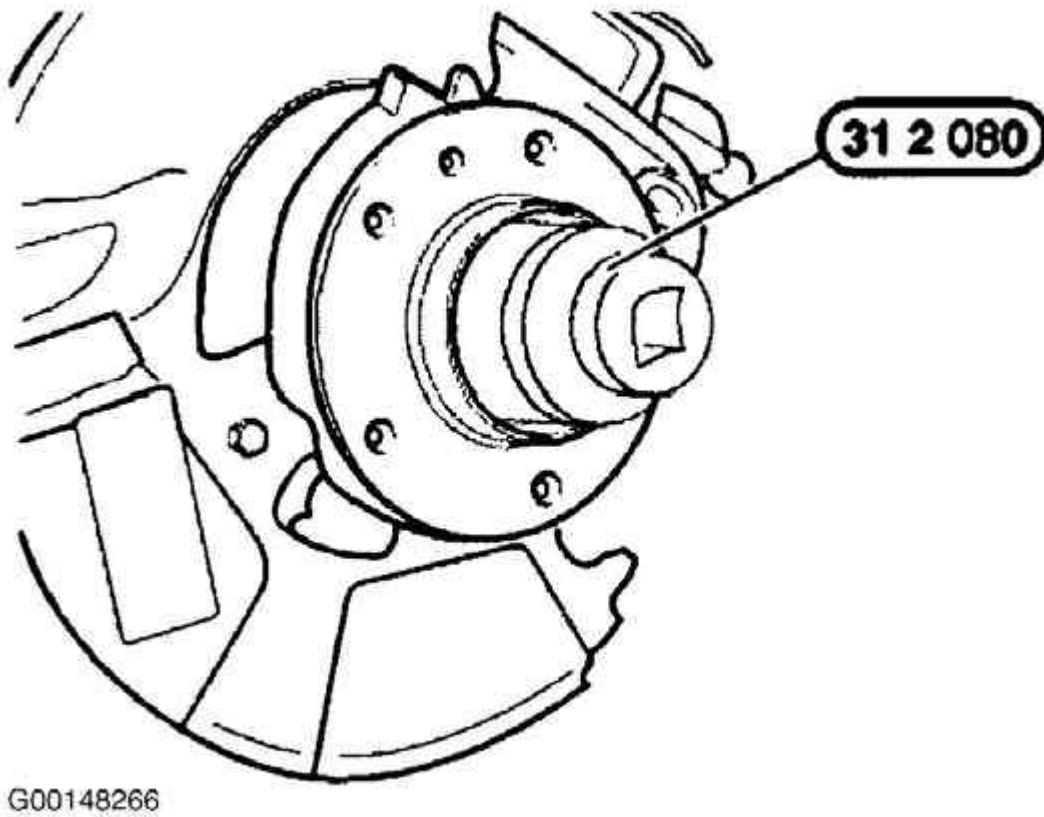


Fig. 45: Removing Collar Nut
Courtesy of BMW OF NORTH AMERICA, INC.

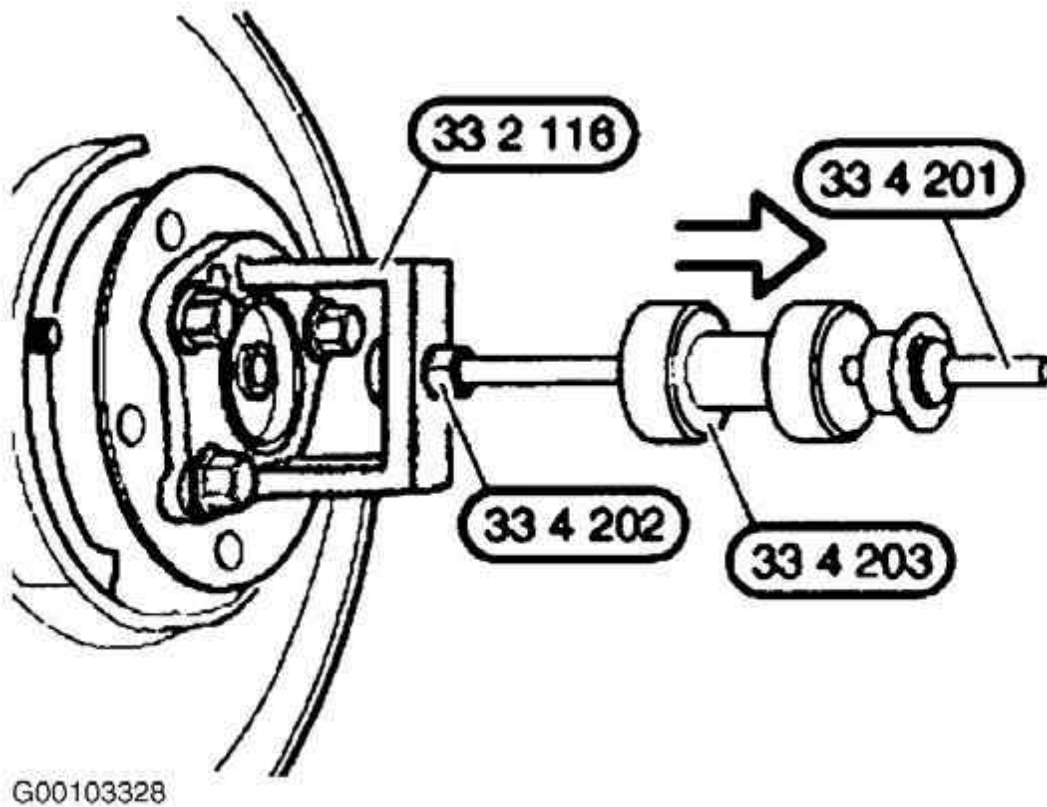
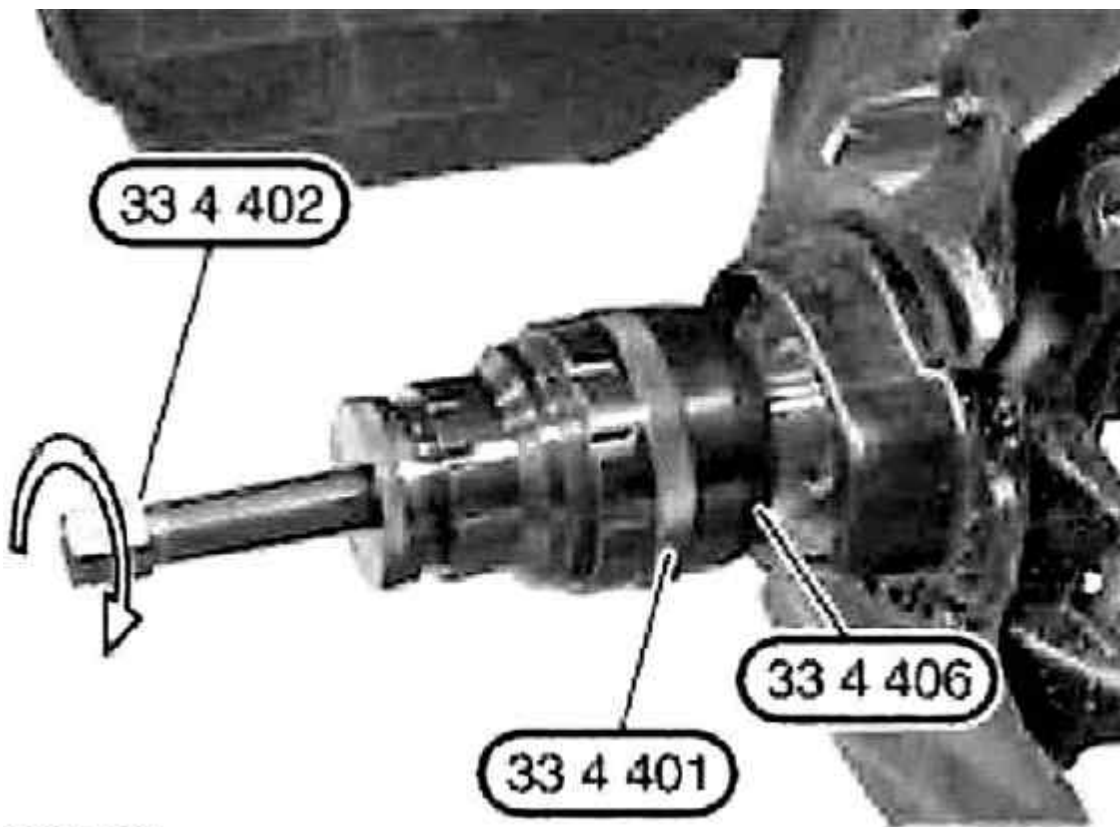


Fig. 46: Removing Bearing Assembly
Courtesy of BMW OF NORTH AMERICA, INC.



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Fig. 47: Removing Inner Bearing Race With Special Tool
Courtesy of BMW OF NORTH AMERICA, INC.

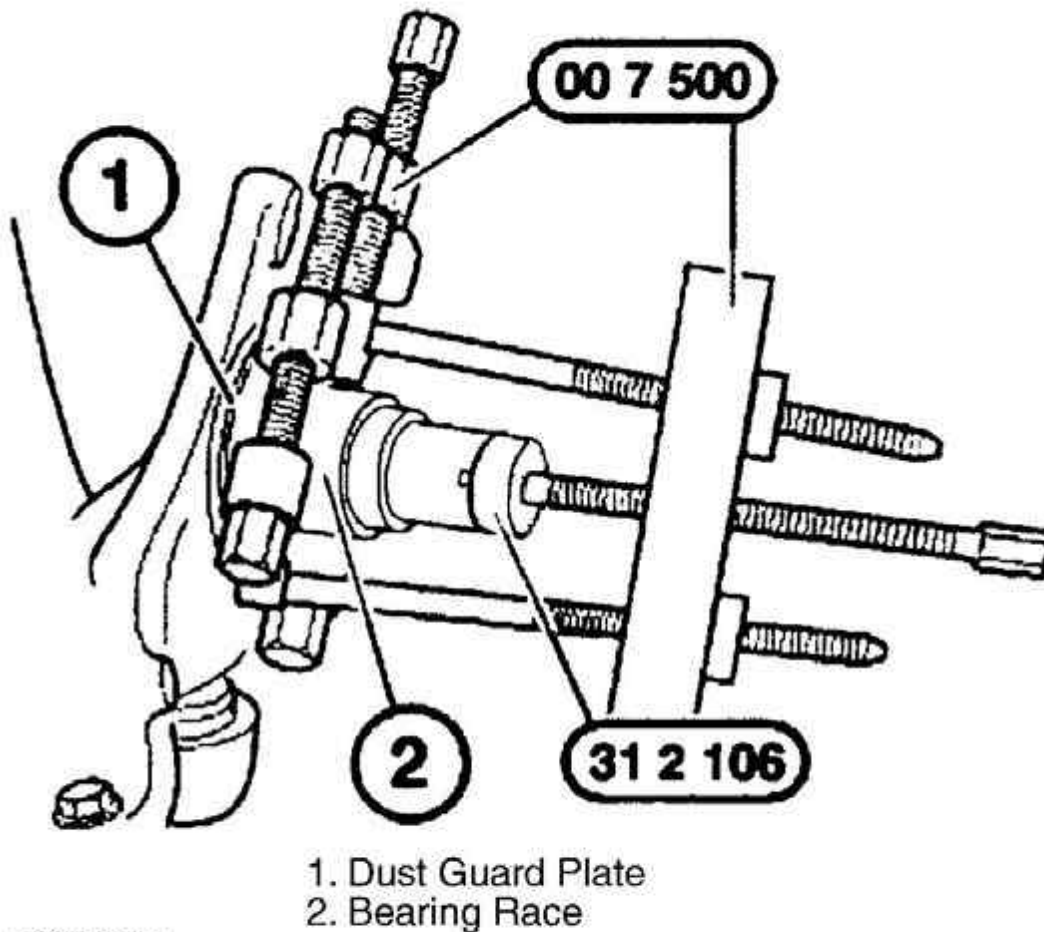


Fig. 48: Removing Inner Bearing Race
Courtesy of BMW OF NORTH AMERICA, INC.

Installation

CAUTION: After installing, lock collar nut. Calk flat area OF axle stub.

1. If applicable, install guard plate. See **Fig. 40**.
2. Fit a new dust guard plate (2). Screw in guide sleeve (1) of Special Tool (31 2 110) for entire length of threads and pull on new bearing assembly. See **Fig. 49**.
3. Replace collar nut and tighten down with Special Tool (31 2 080). See **Fig. 45**.
4. Tighten collar nut to specification. See **TORQUE SPECIFICATIONS**. Lock collar nut, Calking flat area of axle stub.

5. Replace sealing cap. Coat edge (mating surface to wheel hub) over entire circumference with sealing compound. Fit sealing cap. See **Fig. 50**.
6. Install brake disk and ABS pulse generator. See **DISC** article in BRAKES.

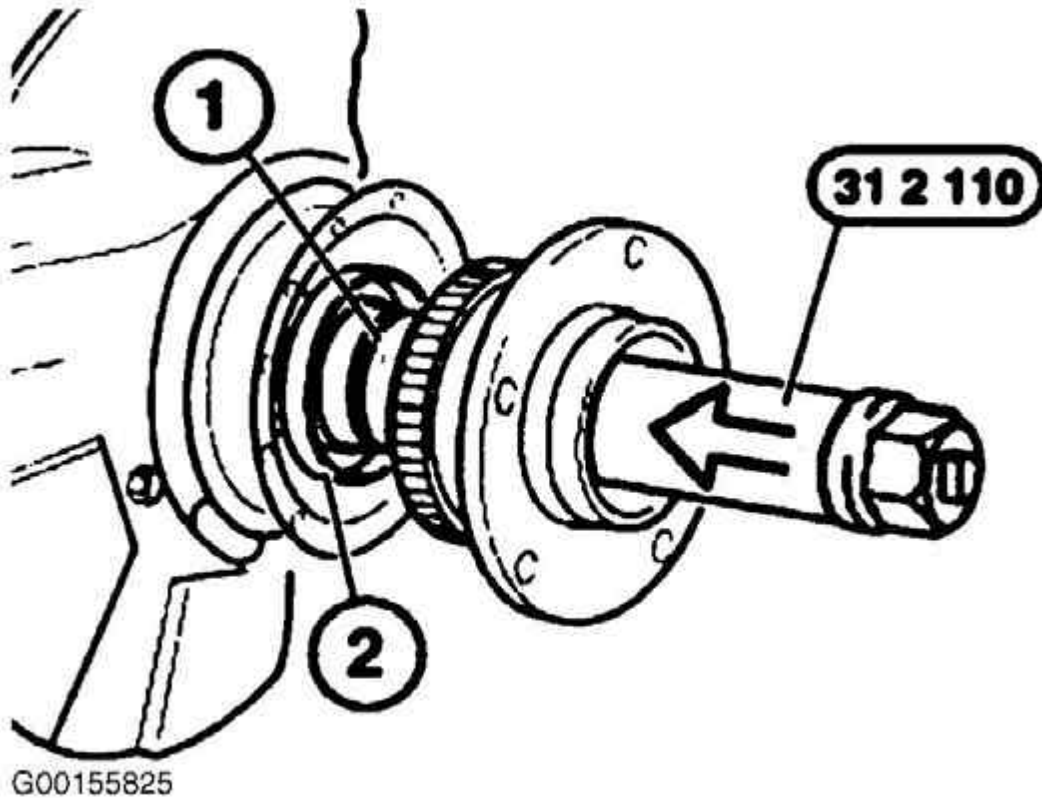


Fig. 49: Installing New Bearing Assembly
Courtesy of BMW OF NORTH AMERICA, INC.

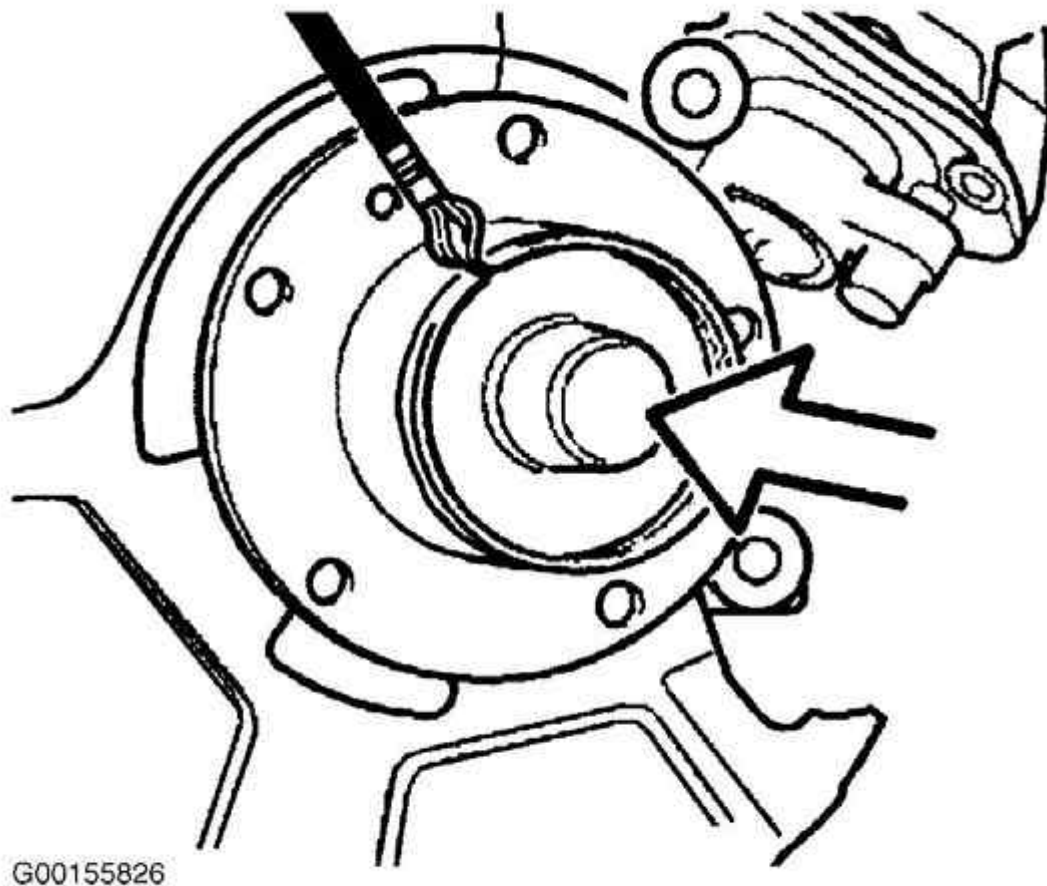


Fig. 50: Replacing Sealing Cap

Courtesy of BMW OF NORTH AMERICA, INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Collar Nut	207-229 (280-310)
Control Arm (Ball Joint) On Front Axle Support	59 (80)
Control Arm-To-Engine Carrier	41 (56)
Control Arm-To-Steering Knuckle	48 (65)
Front Axle Carrier-To-Engine Carrier	74 (100)
Reinforcement Plate-To-Front Axle Support	
Step 1	44 (59)
Step 2	Additional 90°
Retaining Bar For Stabilizer-To-Front Axle Carrier/Body	16 (22)

2005 BMW Z4

2003-2005 SUSPENSION Front - Z4

Shock Absorber Piston Rod On Thrust Bearing	47 (64)
Spring Strut Support Bearing-To-Wheel Arch	25 (34)
Stabilizer Link-To-Stabilizer	43 (58)
Steering Gear-To-Front Axle Carrier	31 (42)
Steering Knuckle-To-Spring Strut	60 (81)
Universal Joint/Coupling-To-Steering Gear/Steering Spindle	18 (25)
Tie Rod End Nut	48 (65)
Wheel Lug Bolts	81-96 (110-130)
INCH Lbs. (N.m)	
Bracket For Jointed Rod-To-Front Control Arm	71 (8)
Bracket Ride Level Sensor-To-Front Axle Carrier	71 (8)