

2004 Volkswagen Passat GL

SUSPENSION - FRONT

1998-2004 SUSPENSION

Front - Passat

IDENTIFICATION

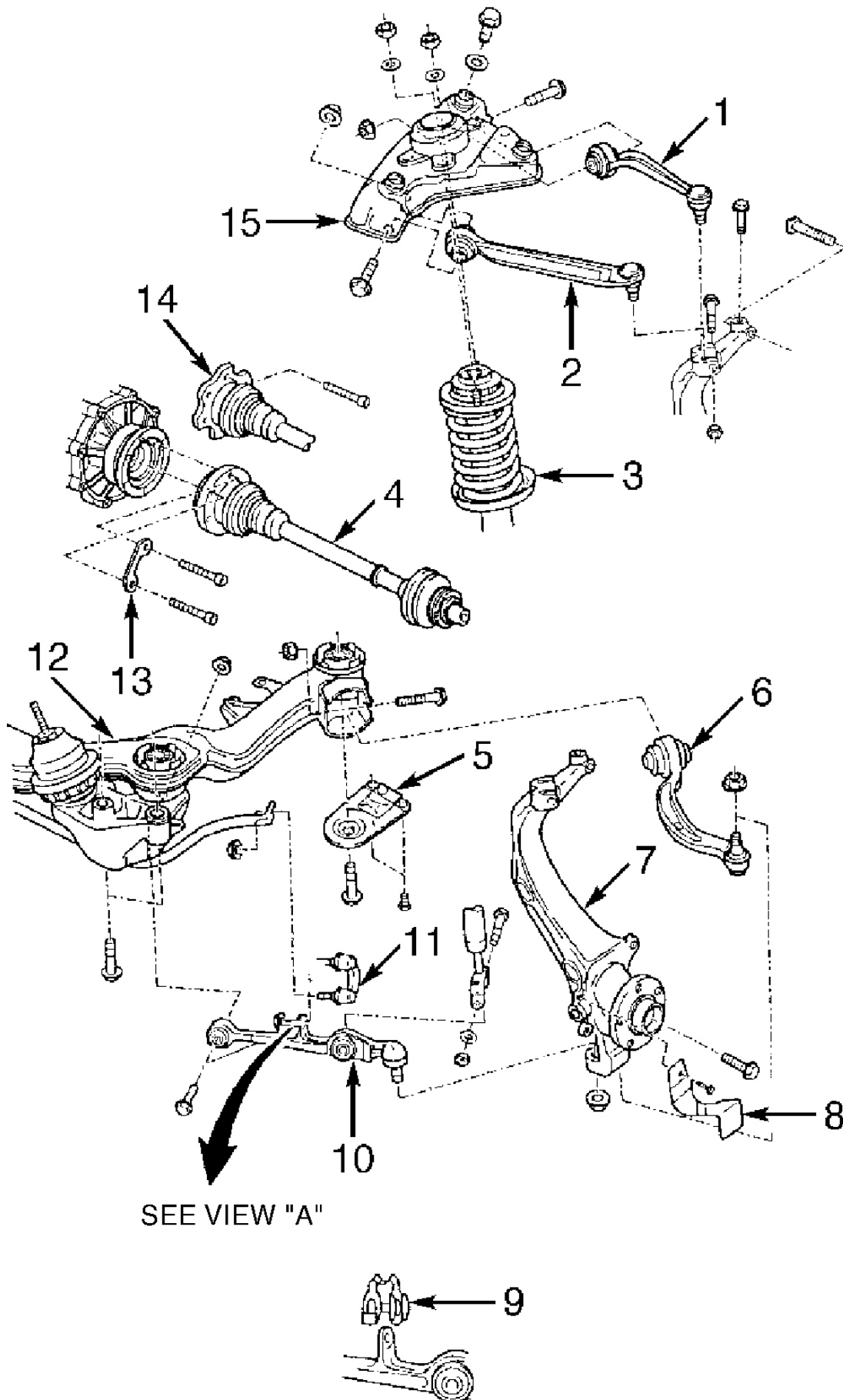
IDENTIFYING VEHICLE SUSPENSION

The front suspension is a MacPherson strut independent type suspension, with multiple links that connect strut to body and wheel bearing housing. See [Fig. 1](#) . This article covers vehicles equipped with conventional gas charged struts.

Various suspensions options are available on Passat. Running gear version installed in vehicle is indicated by the factory weight code on the vehicle data plate. See [Fig. 2](#) . Vehicle data plate is located in spare tire well and in service book. Use the following table to aid in identifying suspension versions. Identifying proper suspension version is critical for when parts replacement is required. See **IDENTIFYING SUSPENSION VARIATIONS** table.

IDENTIFYING SUSPENSION VARIATIONS

Suspension Identification Code	Suspension Variation
1BA/1BC	Standard Suspension
1BE	Sport Suspension
1BP	Rough Terrain Suspension 1
1BB	Rough Terrain Suspension 2
1BF	⁽¹⁾ Special Suspension
(1) Vehicles with constant load less than or equal to 100 kg.	



Courtesy of AUDI OF AMERICA, INC.

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CONTROL ARM MODIFICATION (AS OF 2002)

In a running change from model year 2002, the wheel bearing housings are equipped with bushings for optimizing seals of the lower control arm bearings (control arm and guide control arm). This also leads to modifications at the control arm as well as the mounting components for control arm and guide control arm. Please note the following installation precautions.

- When installing wheel bearing housings without bushings, old version control arms and flange nuts for control arm and guide control arm must be installed.
- When installing wheel bearing housings with bushings, new version control arms and combination

nuts for control arms and guide control arms must be installed.

- If only the control arm is replaced, a control arm of the old version must be replaced again by a control arm of the old version and a new version control arm is to be treated accordingly.

The following are to be used for control arm and guide control arm mounting parts:

- Old version control arm use flange nut
- New version control arm use combination nut

CONNECTING LINK FOR STABILIZER BAR MODIFICATION

The ball joint in the connecting has been changed to a rubber mounting. The lower control arm was also slightly modified. Connecting with ball joint (1) is no longer installed on vehicles beginning with vehicle identification No. 3-B-X P-213 727. See **Fig. 20** . Lower control arm (2) to stabilizer bar (6) was modified.

Only modified lower control arm is still supplied as a spare part. This lower control arm can also be installed in vehicles produced prior to vehicle identification No. 3-B-X P-213 727. In this case, the clamp (4) must also be used. Clamp is not installed in vehicles beginning with vehicle identification No. 3-B-X P-213 727. See **Fig. 21** .

WHEEL BEARING HOUSING MODIFICATIONS (AS OF 2002)

In a running change from model year 2002, the wheel bearing housings are equipped with bushings for optimizing seals of the lower control arm bearings and guide control arm. Mixed installation of wheel bearing housings with and without bushings is permissible. Please note the following precautions:

- When installing wheel bearing housings with bushings, the respective control arms (new version) and mounting components of the control arm as well as guide control arm must be used or replaced.
- The flange nuts must be replaced with combination nuts on mounting components. Guide control arms must not be replaced.
- Conventional flange nuts should be installed on vehicles with wheel bearing housings without bushings and control arms of old design.
- Replacement of bushings is not permitted. Replace wheel bearing housing in case of damage.

DESCRIPTION

VEHICLES WITH GAS DISCHARGE HEADLIGHTS

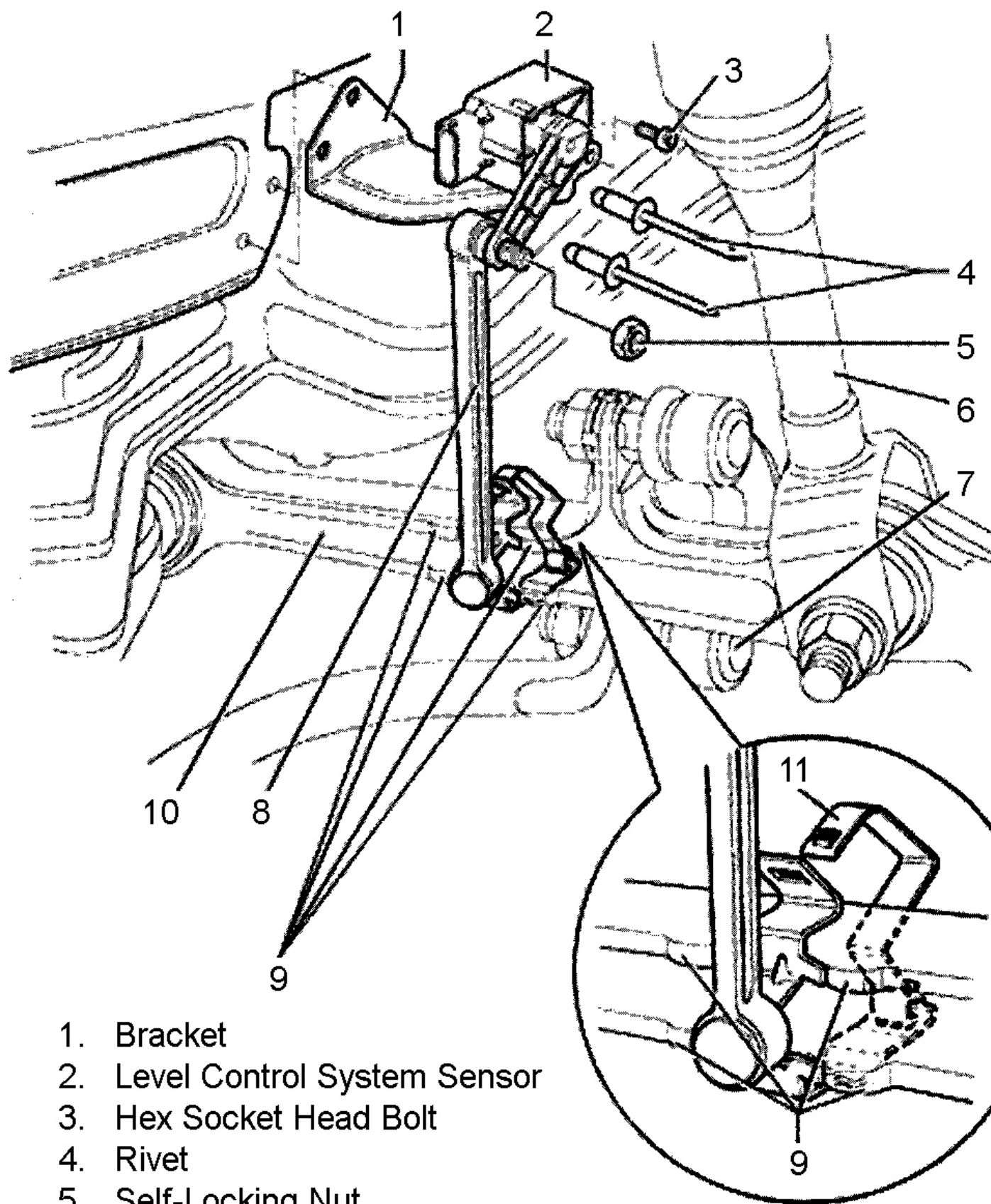
Vehicles with gas discharge headlights with automatic headlight range control comes standard. For its operation, the automatic headlight range control requires information about spring compression and rebound at the front and rear axles. For this, the position of the left lower control arm in relation to the structure is transferred over a connecting link to the left front level control system sensor. See **Fig. 3** .

This transmits electrical signals to headlight range control module. These signals are transmitted to the control module from the left rear level control system sensor at the rear axle. These signals are required to determine vehicle level. The automatic headlight range control reacts independently to changes in vehicle level. The vehicle level can change in the following situations:

- Towing a trailer

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SUSPENSION - FRONT

- Different load conditions (vehicle empty, vehicle partially or fully loaded)
- Slow or fast driving habit



1. Bracket
2. Level Control System Sensor
3. Hex Socket Head Bolt
4. Rivet
5. Self-Locking Nut
6. Suspension Strut
7. Stabilizer Bar Connecting Link

Fig. 3: Identifying Front Height Sensor & Link

Courtesy of AUDI OF AMERICA, INC.

ADJUSTMENTS**WHEEL ALIGNMENT SPECIFICATIONS & PROCEDURES**

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

WHEEL BEARING

NOTE: Wheel bearing is pressed into bearing housing. No adjustment is required.

INSPECTION**BALL JOINT CHECKING**

Raise and support vehicle. Inspect ball joints for damaged rubber boots and vertical ball joint play. Procedure and wear tolerance are not available from manufacturer. When servicing ball joints, mark ball joint mounting position before removing to avoid changing camber setting.

REMOVAL & INSTALLATION

NOTE: When drive axle is removed vehicle must not be moved. Moving vehicle without driveshaft will damage wheel bearing. If vehicle must be moved, temporarily install outer constant velocity joint in place of drive axle.

NOTE: Bonded rubber bushings can only be turned to a limited extent. Bolted connections should only be torqued to specification once vehicle is resting on its own weight.

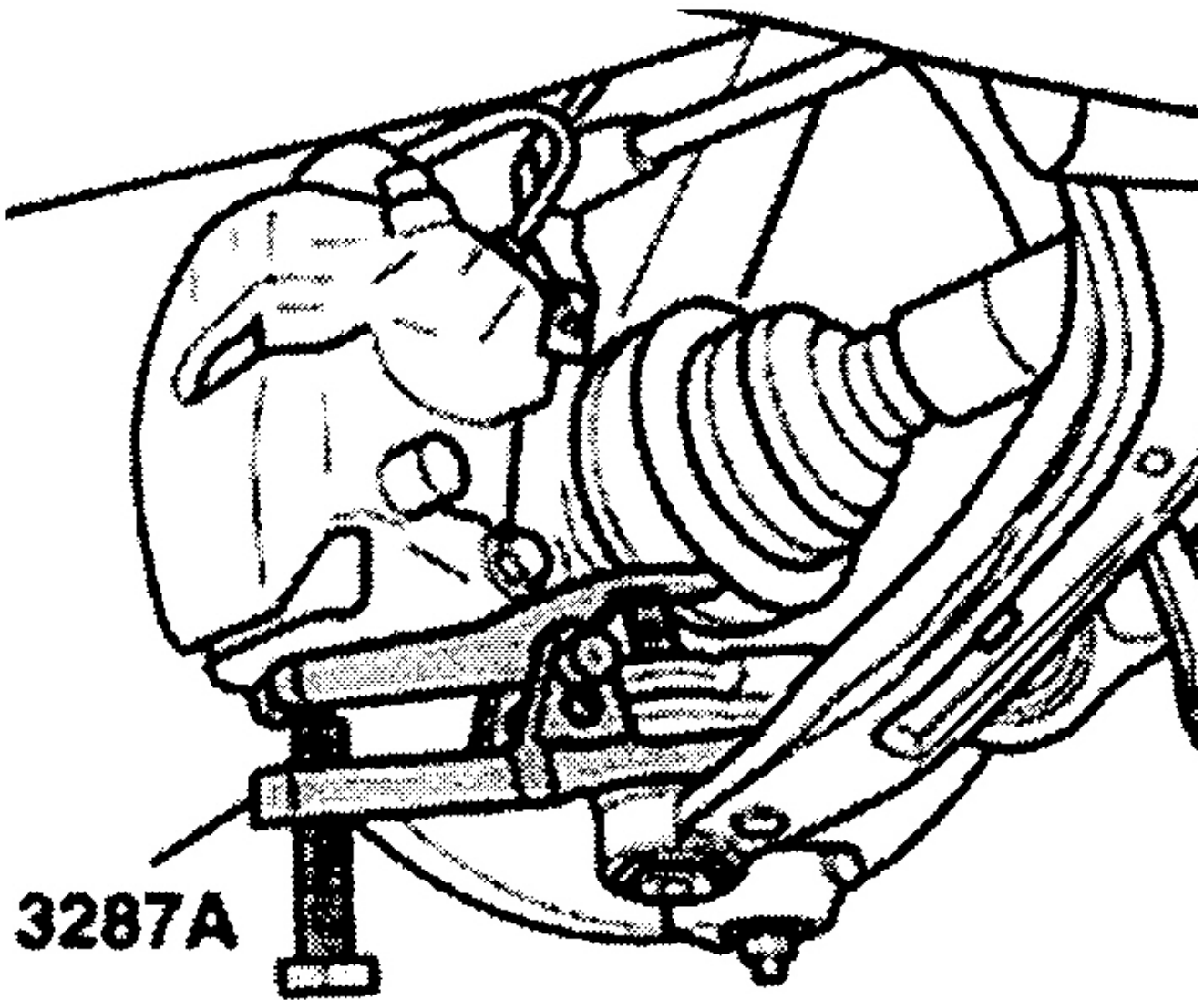
NOTE: Special tools as needed, are identified in illustrations under **SPECIAL TOOLS**.

GUIDE CONTROL ARM (FWD)**Removal**

1. Raise and support vehicle. Remove wheel assembly. See **Fig. 1**.
- 2.

NOTE: Manufacturer recommends using **NEW** guide control arm ball joint nut and inner mounting bolt and nut during installation.

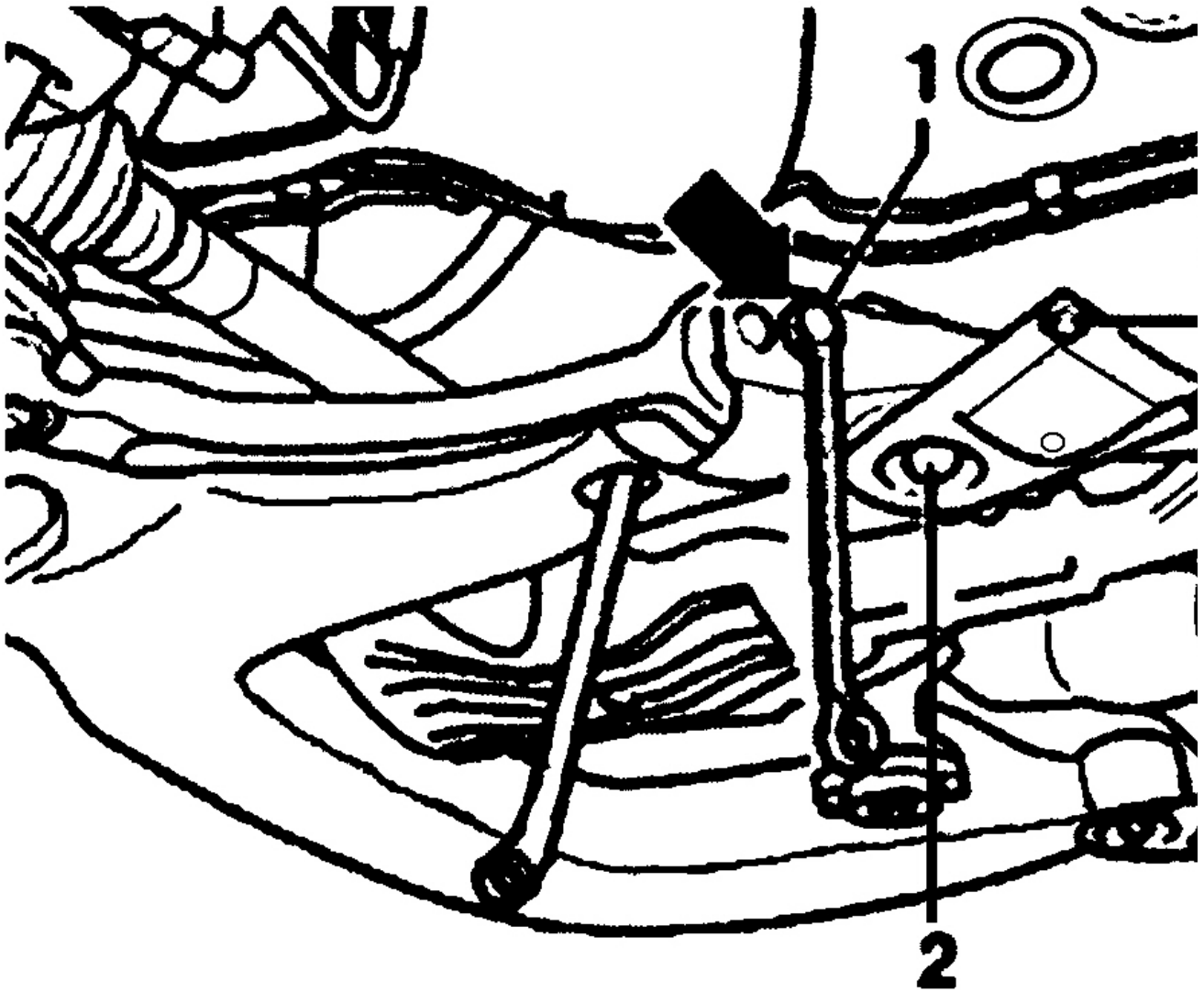
Remove guide control arm ball joint nut. Using Press Tool (3287A) or equivalent, press guide control arm from wheel bearing housing. Be careful not to damage CV boot. See **Fig. 4**.



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Fig. 4: Removing Guide Control Arm From Wheel Bearing Housing
Courtesy of AUDI OF AMERICA, INC.

3. Place engine and transmission jack (VAG1383 A with V.A.G 1359/2) under the subframe with block of wood (A), and apply slight counter pressure. See **Fig. 31** . Unscrew bolts (1 and 2) at rear of subframe on both sides of vehicle. Lower subframe slightly with engine and transmission jack.
4. Remove hex bolt (1) from guide control arm. See **Fig. 5** . Remove guide link.



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Fig. 5: Removing Guide Control Arm Inner Bolt
Courtesy of AUDI OF AMERICA, INC.

Installation

1. Lift subframe slightly using engine and transmission jack. Tighten subframe support bracket bolts (1 and 2) at rear of subframe on both sides of vehicle. See **Fig. 31** . See **TORQUE SPECIFICATIONS** . Install and tighten NEW nut on guide control arm ball joint.
2. Install NEW hex bolt (1) and NEW hex nut into inner holes (arrow). See **Fig. 5** . Push guide control arm inward while tightening. Guide control arm inner bolt and nut should be final tightened only when vehicle is standing on ground (at normal ride height). See **TORQUE SPECIFICATIONS** .
3. Install wheels. Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

GUIDE CONTROL ARM (AWD)

Removal

1. Raise and support vehicle. Remove wheel assembly. See **Fig. 1** .

2.

CAUTION: Manufacturer recommends replacing driveshaft flange self-locking bolts.

Placing mating marks on driveshaft flange and transmission mating flange. Remove self-locking bolts. Separate driveshaft from transmission.

3.

NOTE: Manufacturer recommends using **NEW** guide control arm ball joint nut and inner mounting bolt and nut during installation.

Remove guide control arm ball joint nut. Using Press Tool (3287A) or equivalent, press guide control arm from wheel bearing housing. Be careful not to damage CV boot. See **Fig. 4**.

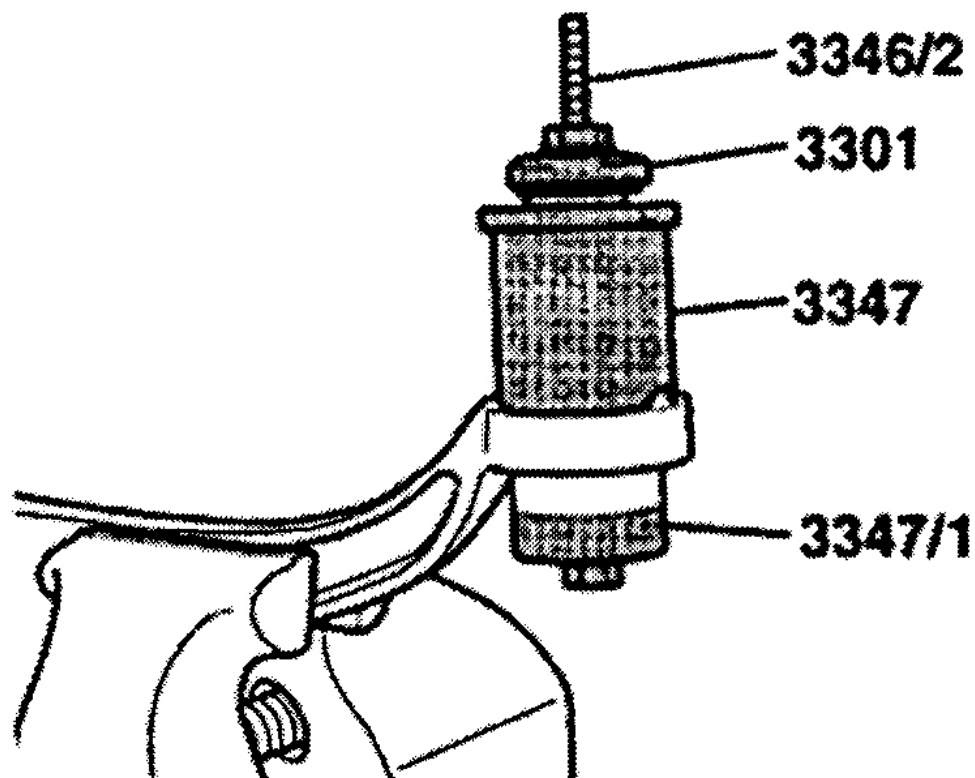
4. Place engine and transmission jack (VAG1383 A with V.A.G 1359/2) under the subframe with block of wood (A), and apply slight counter pressure. See **Fig. 31**. Unscrew bolts (1 and 2) at rear of subframe on both sides of vehicle. Lower subframe slightly with engine and transmission jack.
5. Remove hex bolt (1) from guide control arm. See **Fig. 5**. Remove guide control arm.

Installation

1. Lift subframe slightly using engine and transmission jack. Tighten subframe support bracket bolts (1 and 2) at rear of subframe on both sides of vehicle. See **Fig. 31**. See **TORQUE SPECIFICATIONS**. Install and tighten NEW nut on guide control arm ball joint.
2. Install NEW hex bolt (1) and NEW hex nut into inner holes (arrow). See **Fig. 5**. Push guide control arm inward while tightening. Guide control arm inner bolt and nut should be final tightened only when vehicle is standing on ground (at normal ride height). See **TORQUE SPECIFICATIONS**.
3. Clean transmission flange holes. Install driveshaft to transmission aligning mating marks. Install and tighten NEW self-locking bolts.
4. Install wheels. Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

GUIDE CONTROL ARM BUSHINGS

1. Remove guide control arm from vehicle.
2. Mount guide control arm in soft jawed vise. Using Bushing Remover/Installer Kit (3346, 3347 & 3301) or equivalent, remove and install bushings as shown in illustrations. See **Fig. 6** and **Fig. 7**.



Remove hydro-bushing at control arm

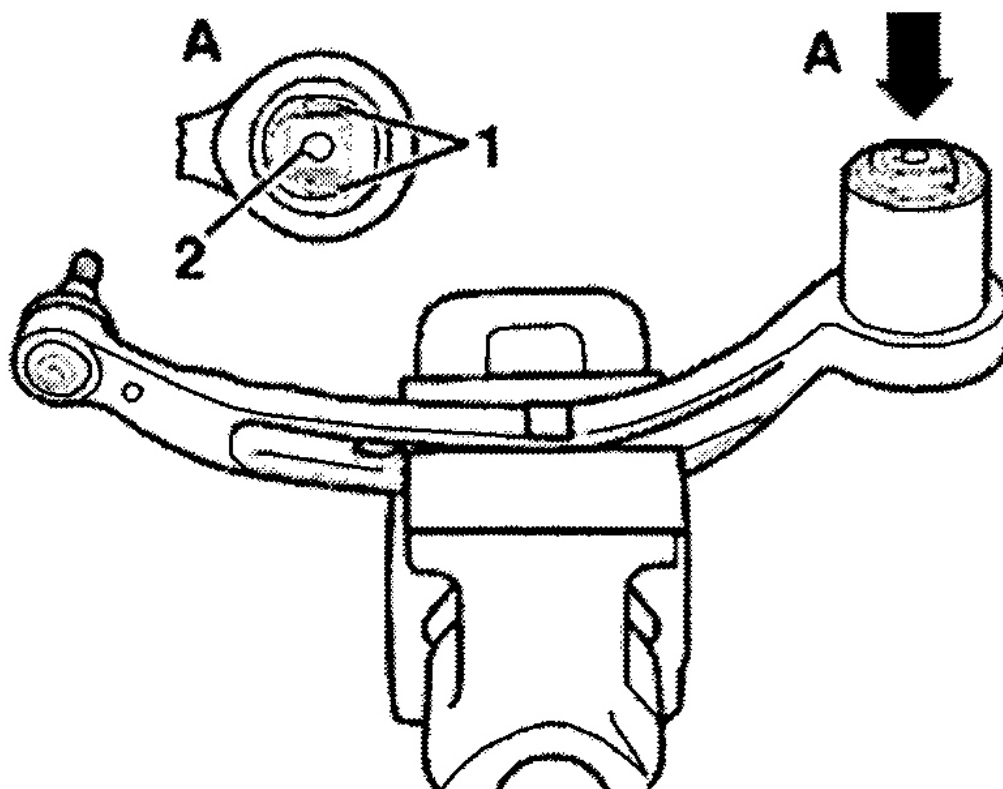
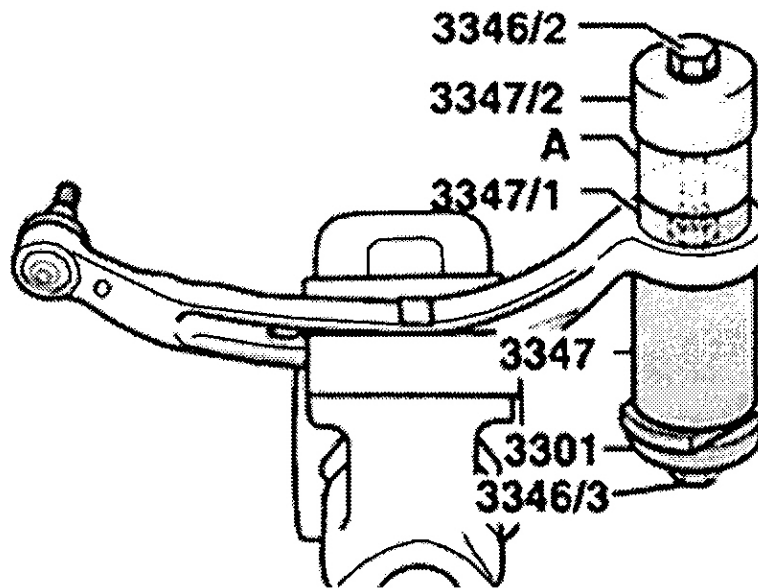


Fig. 6: Removing & Installing Guide Control Arm Bushings (1 Of 2)
 Courtesy of AUDI OF AMERICA, INC.



Pull in anti-vibration mount

- Insert anti-vibration mount -A- into special tool (3347/2).
- Clamp together with sleeve (3347/1), spindle (3346/2) and hex I
- Pull in anti-vibration mount -A- until it stops.

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Fig. 7: Removing & Installing Guide Control Arm Bushings (2 Of 2)
 Courtesy of AUDI OF AMERICA, INC.

LOWER CONTROL ARM

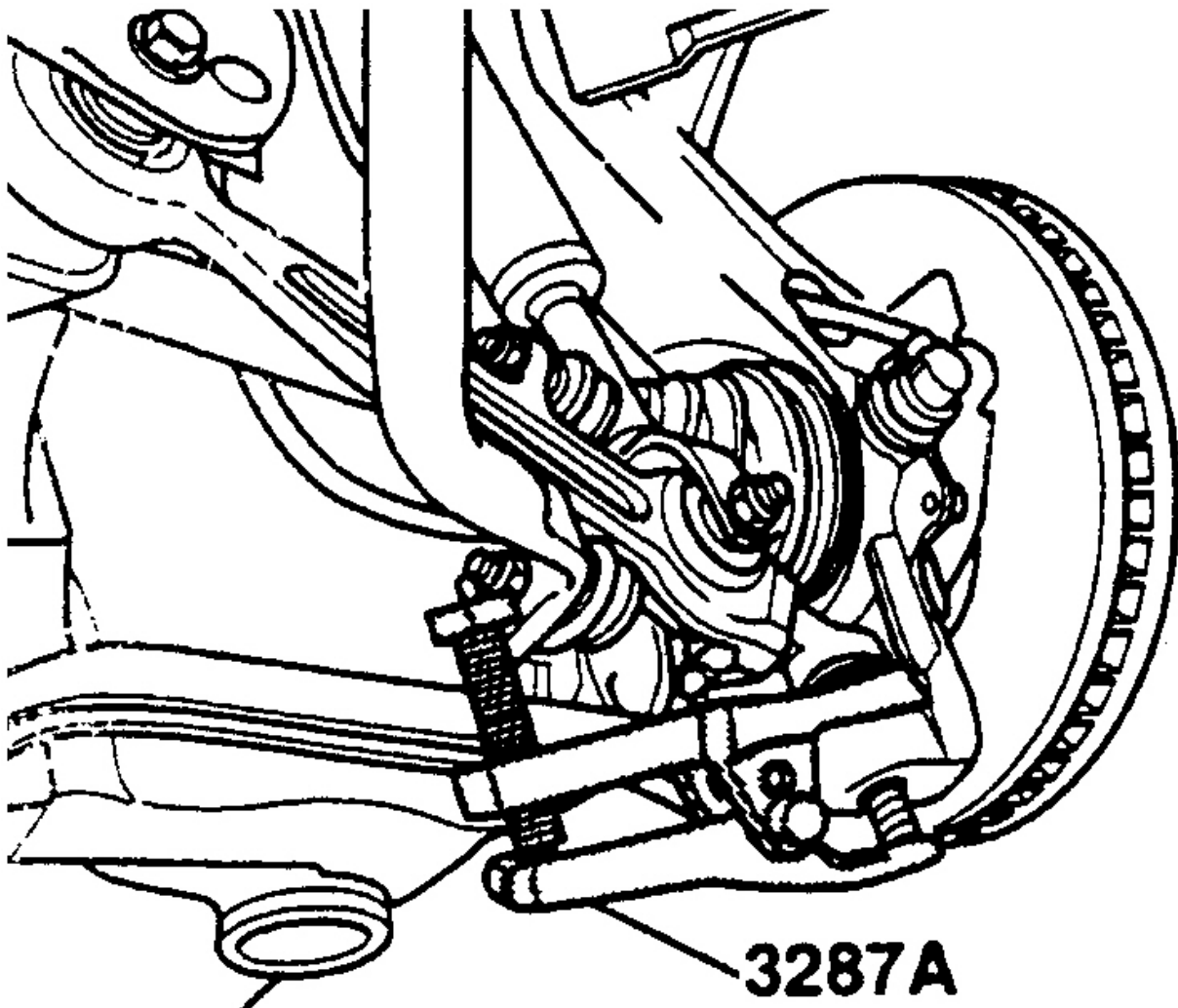
Fastener Replacement Precautions

Manufacturer recommends replacing the following fasteners, if they are removed:

- Lower control arm ball joint nut
- Lower control arm inner mounting bolt and nut
- Lower strut mount self-locking nut
- Stabilizer bar link self-locking nuts

Removal

1. Raise and support vehicle. Remove wheel. Remove nut from lower control arm joint pin. Press joint pin out of tapered seat. See **Fig. 8** . Do not damage joint protective boot when doing this.



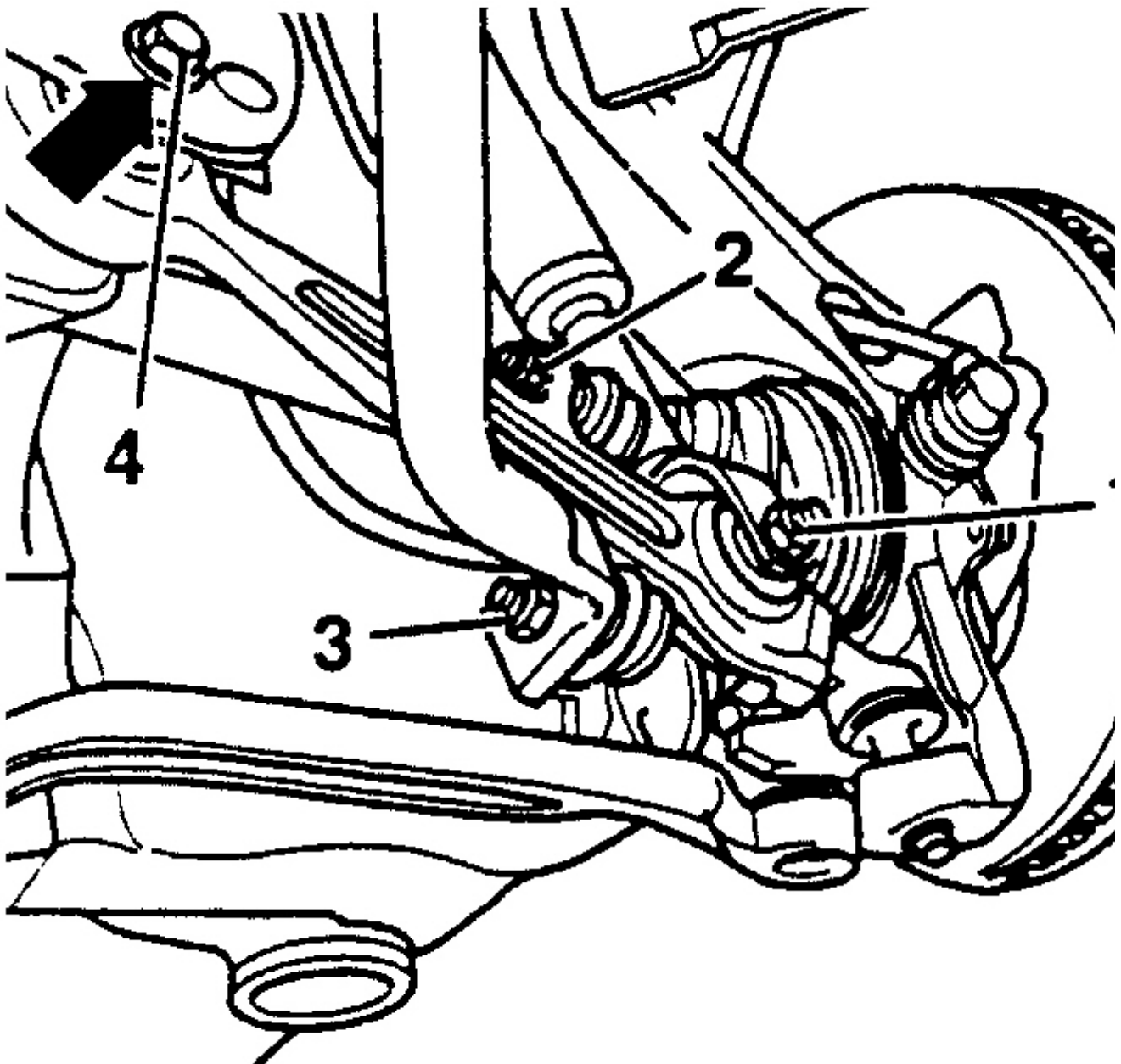
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Fig. 8: Separating Lower Control Arm Ball Joint From Wheel Bearing Housing
Courtesy of AUDI OF AMERICA, INC.

2. On vehicles equipped with headlight vertical aim control, disconnect coupling rod from vehicle level sensor. Remove ABS wheel speed sensor from wheel bearing housing. See **Fig. 1**.
- 3.

NOTE: To prevent the upper control arm joints from being damaged, support with upper control arms to prevent spring extending too much.

Remove hex bolt (1). See **Fig. 9**. Remove ribbed nuts (2 and 3) and take out connecting rod. Remove hex bolt (4). Remove lower control arm.



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Fig. 9: Identifying Lower Control Arm Mounting Bolts

Courtesy of AUDI OF AMERICA, INC.

NOTE: DO NOT loosen or remove bolt from tie-rod end, or toe constant "S" adjustment will be required.

Installation

1. Insert control arm in vehicle. Arrow on control arm points forward. See **FASTENER REPLACEMENT PRECAUTIONS**. Tighten fasteners in the following order:
 - Lower control arm ball joint nut
 - Strut lower mount self-locking nut, finger tighten only
 - Stabilizer bar link self-locking nuts

- Lower control arm inner mounting nut/bolt, finger tighten only

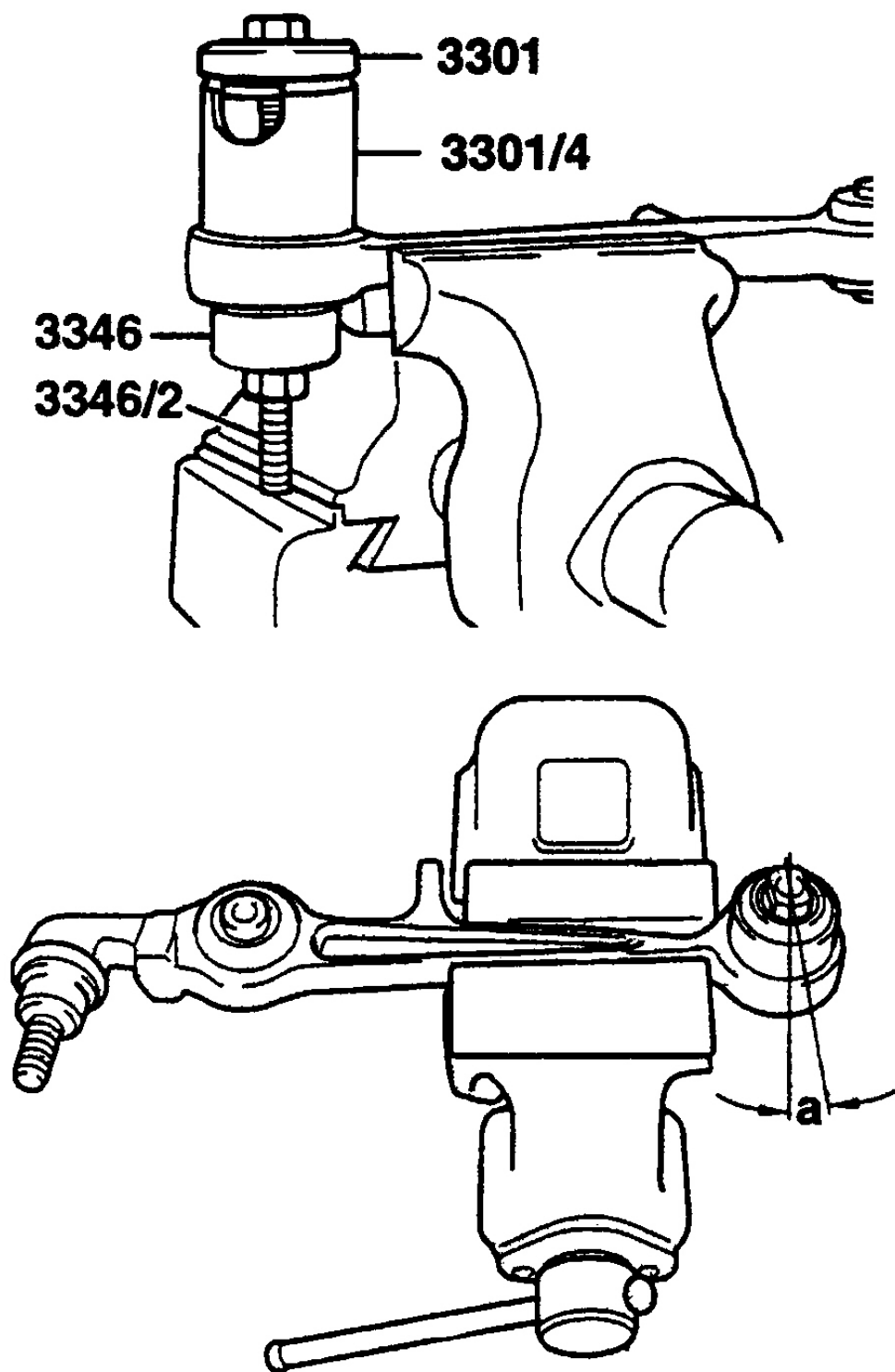
Push control arm inward while tightening. Wheel mounting .

NOTE: **Final tighten strut lower mount self-locking nut and lower control arm inner mounting nut/bolt with full weight of vehicle on ground (curb height).**

2. On vehicles with automatic headlight range control, install clamp for connecting rod for left front level control system sensor to control arm. During installation, observe installing position of clamp on control arm.
3. On all models, install wheels.
4. Parts that have bonded rubber bushing should be torqued only when vehicle is standing on ground. See **TORQUE SPECIFICATIONS** .
5. Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

LOWER CONTROL ARM BUSHINGS

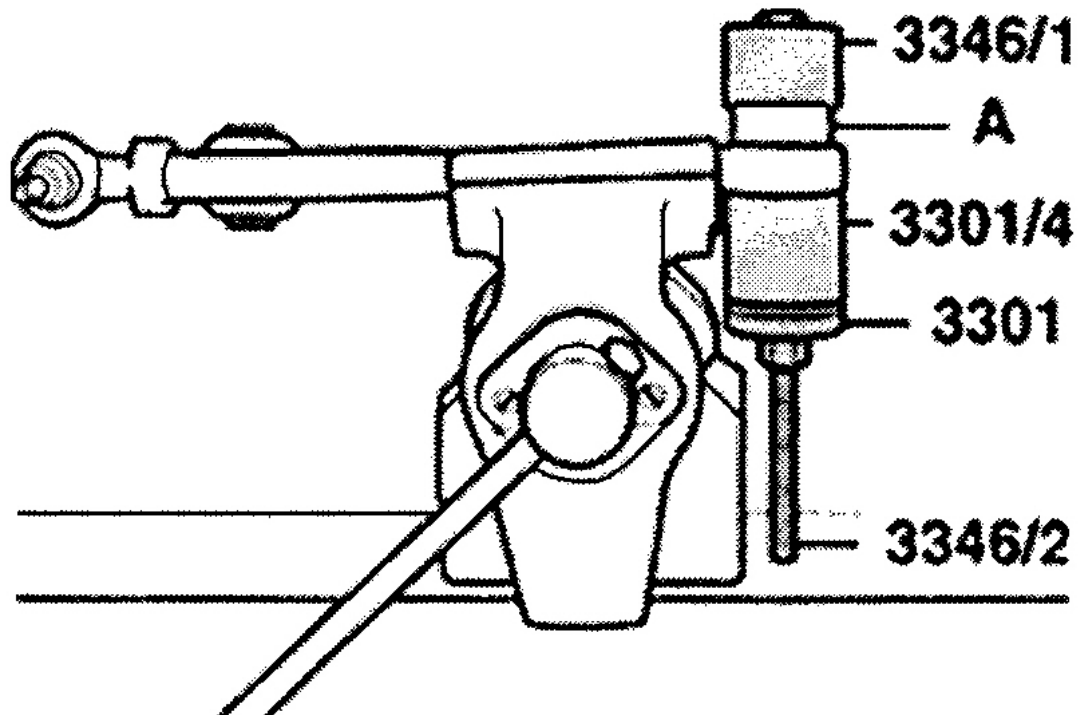
1. Mount lower control arm in soft jawed vise. Using Bushing Remover/Installer Kit (3346 & 3301) or equivalent, remove and install bushings as shown in illustrations. See **Fig. 10 -Fig. 12** .



Dimension A: $6^{\circ} \pm 3^{\circ}$

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Fig. 10: Removing & Installing Lower Control Arm Bushings (1 Of 3)
Courtesy of AUDI OF AMERICA, INC.



Pull in inside bushings

- Insert bushing -A- with thrust piece (3346/2) to a depth of .125" (3.2 mm).
- Pull in bushing until it stops.

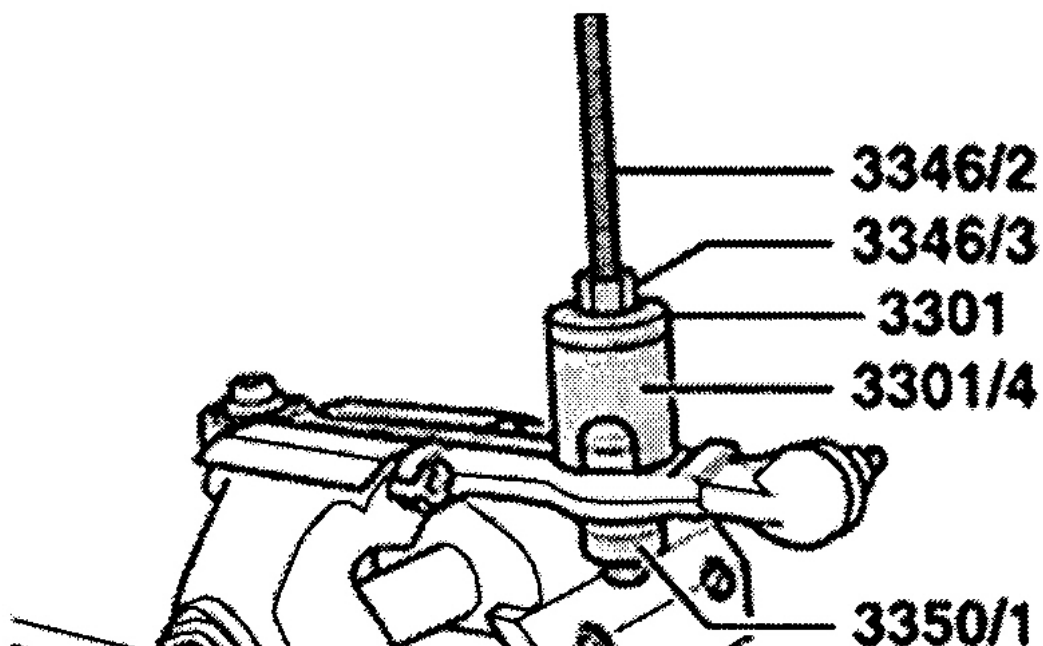
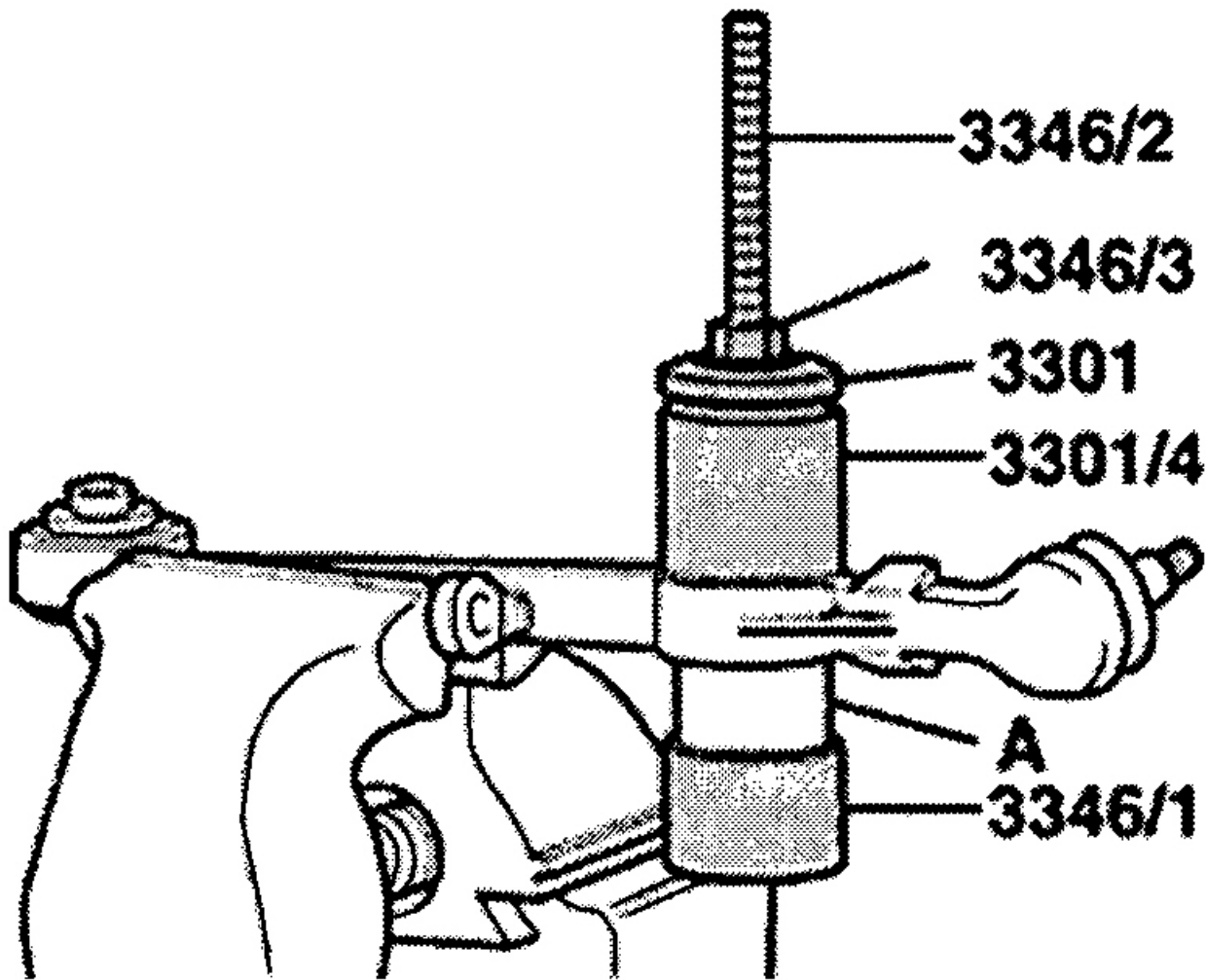


Fig. 11: Removing & Installing Lower Control Arm Bushings (2 Of 3)
Courtesy of AUDI OF AMERICA, INC.



Pull in outside bushing

- Insert bushing -A- with 3346/1 thru piece to a depth of .315" (8 mm).
- Pull in bushing until it stops.

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Fig. 12: Removing & Installing Lower Control Arm Bushings (3 Of 3)
Courtesy of AUDI OF AMERICA, INC.

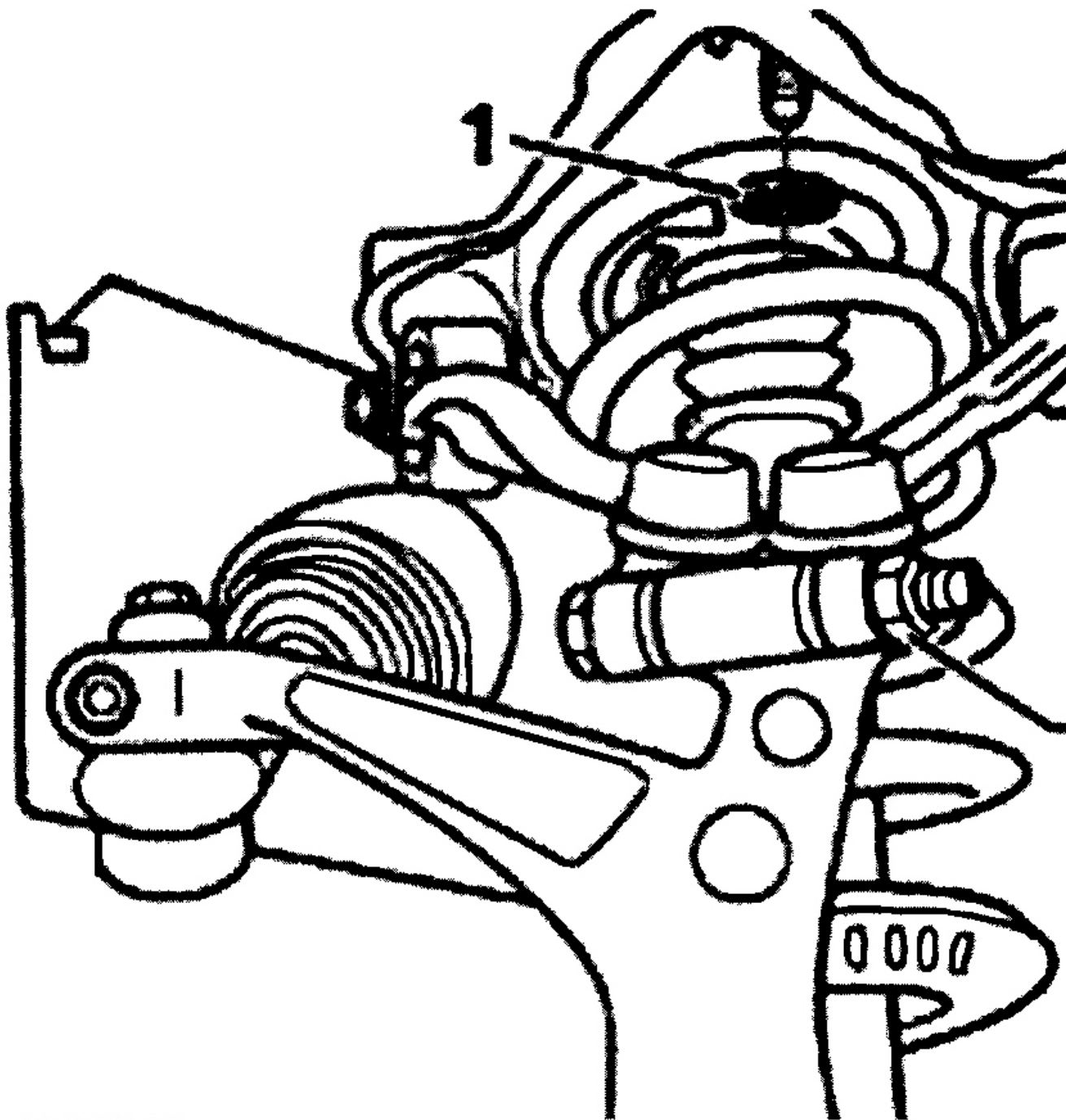
MOUNTING BRACKET

Removal

1. Raise and support vehicle. Remove wheels.
- 2.

CAUTION: The slits in the wheel bearing housing must NOT be widened using a chisel or similar tool.

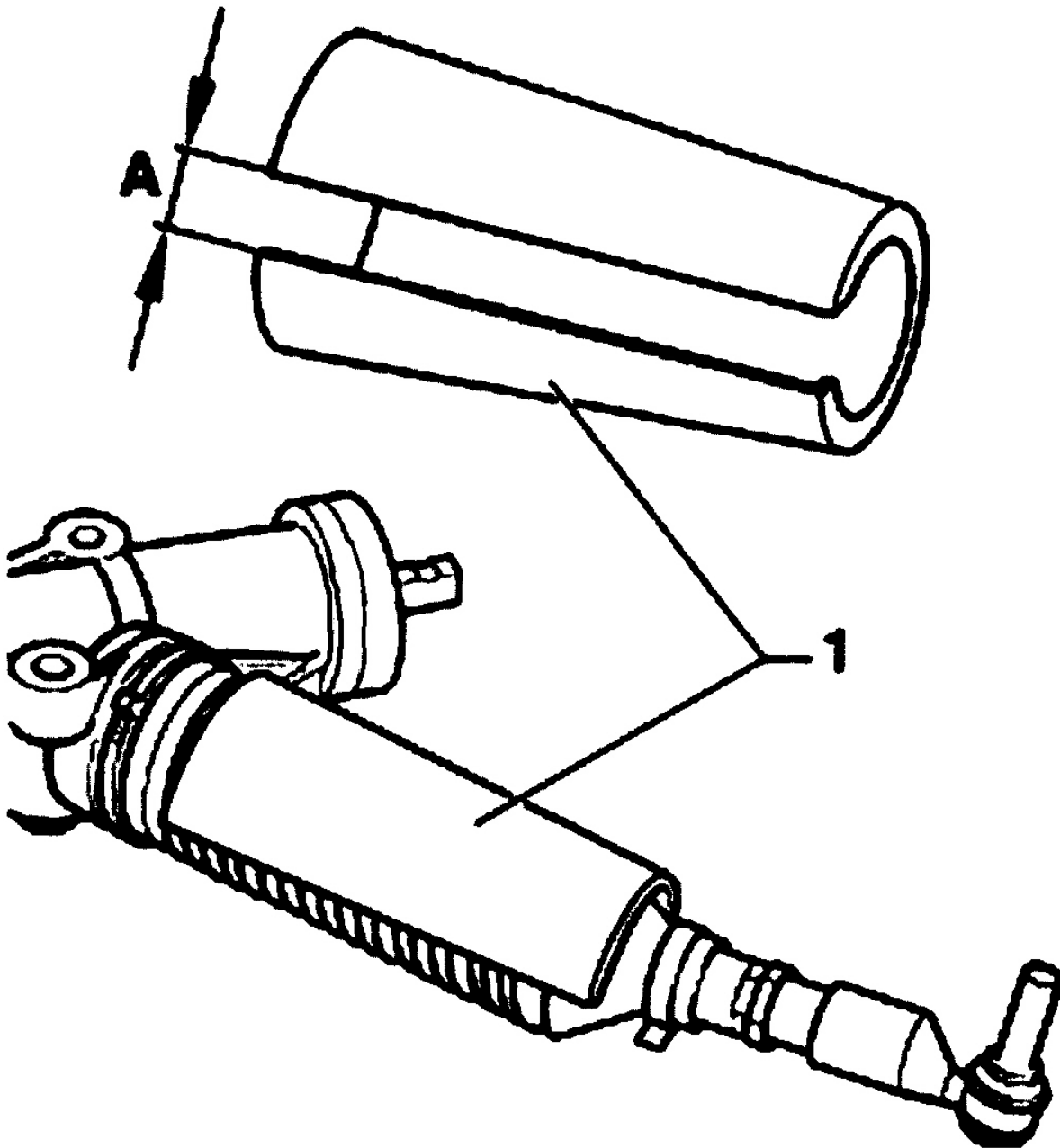
Remove and discard clip (1) with a pair of pliers. See **Fig. 13** . Remove nut (2). Take out hex bolt and pull both control arms out upward. If the hex bolt cannot be removed from the wheel bearing housing, then the hex bolt and the control arms must be pressed out of the wheel bearing housing. See **SEPARATING CONNECTIONS BETWEEN UPPER CONTROL ARMS & WHEEL BEARING HOUSING** .



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Fig. 13: Identifying Upper Control Arm Bolts
Courtesy of AUDI OF AMERICA, INC.

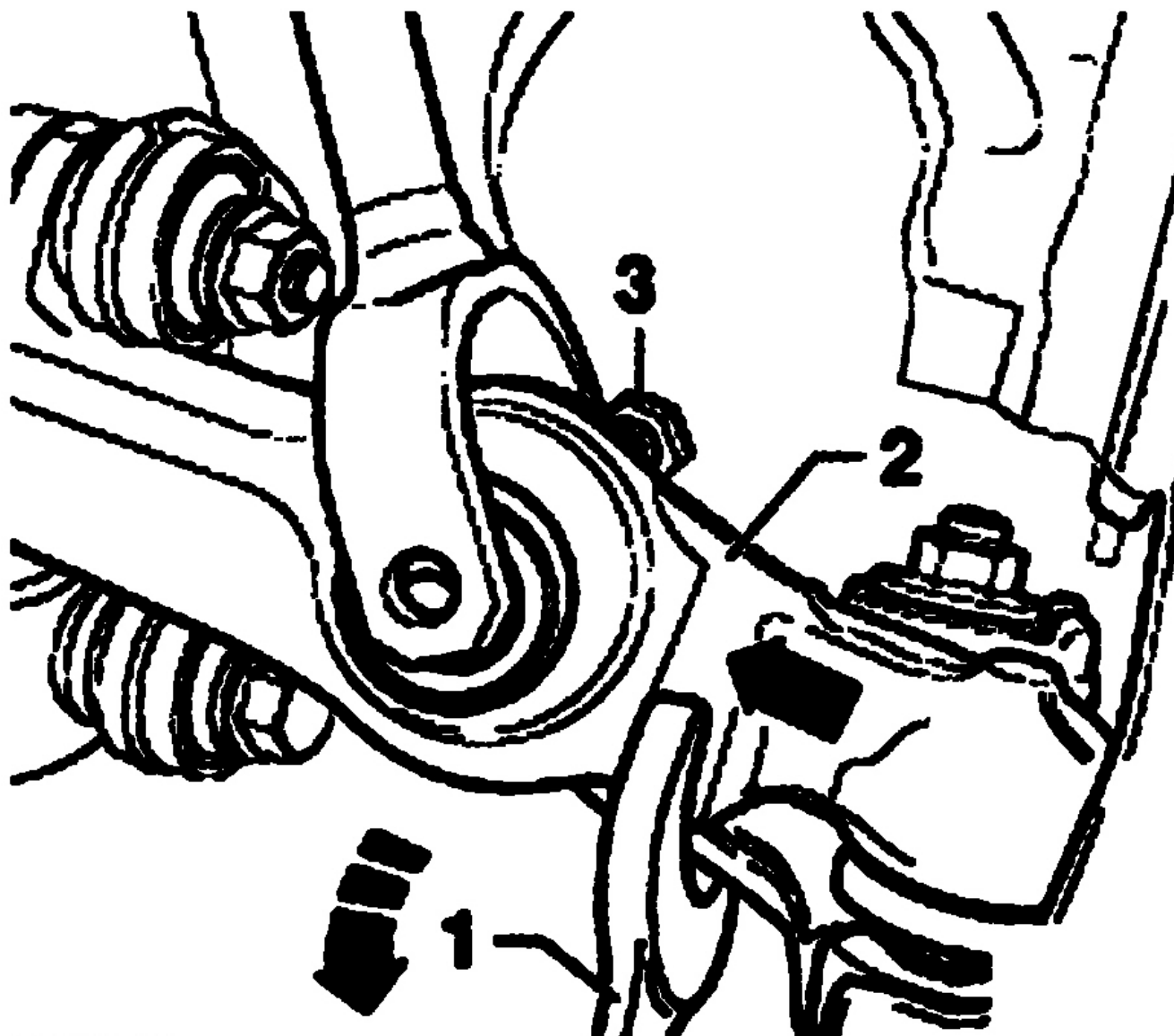
3. Protect steering gear boot from being damaged. The protective sleeve (1) can be ordered with No. 893 512 137. See **Fig. 14** . Slide protective sleeve over the steering gear boot. The open side of the sleeve must point downward. Disconnect ABS speed sensor wiring out from retainer on brake caliper.



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Fig. 14: Installing Protective Sleeve On Steering Gear
Courtesy of AUDI OF AMERICA, INC.

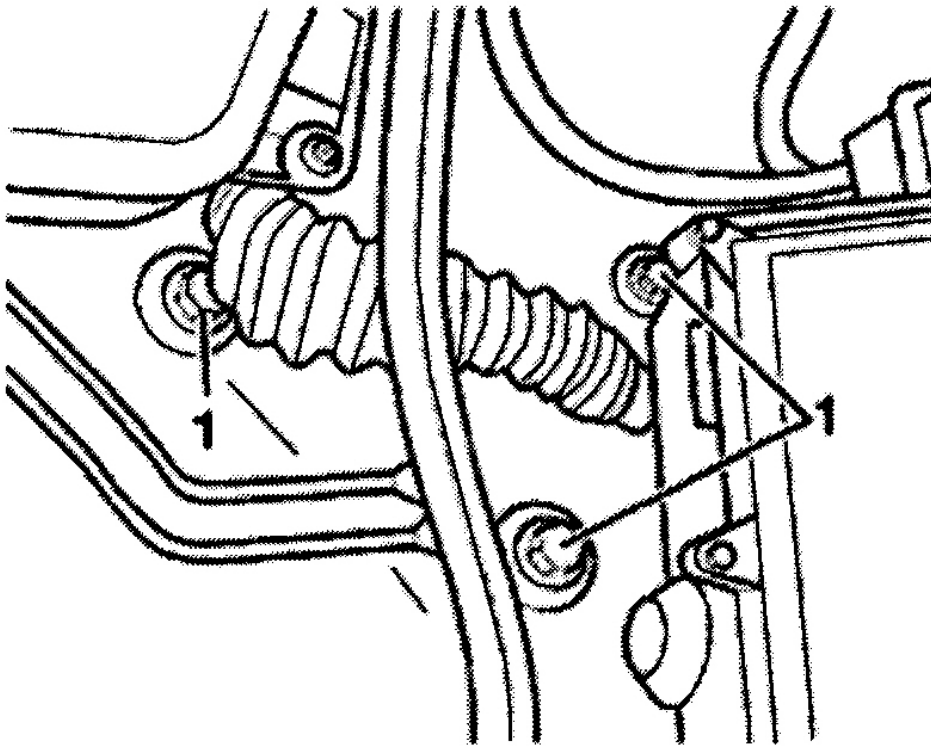
4. Remove nut from suspension strut lower mounting bolt at support link. See **Fig. 1**.
5. To facilitate removal of suspension strut, apply an open-end wrench (1) to wrench surfaces (arrow) of lower control arm. See **Fig. 15**. Turn wrench in direction of arrow (direction of travel) and remove bolt (3). Swing wheel bearing housing to side.



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Fig. 15: Removing Suspension Strut From Lower Control Arm
Courtesy of AUDI OF AMERICA, INC.

6. Unscrew hex bolts (1). Take out suspension strut with mounting bracket. Do not damage joint protective boot when doing this. See **Fig. 16** .



1. Mounting Bracket Bolts

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Fig. 16: Locating Mounting Bracket Bolts
Courtesy of AUDI OF AMERICA, INC.

7.

NOTE: Manufacturer recommends using NEW mounting bracket nuts during installation.

Tighten suspension strut in a vice (use protective clamps). See **Fig. 38** . Unscrew both control arms (arrows). Unscrew nuts and take off mounting bracket.

Installation

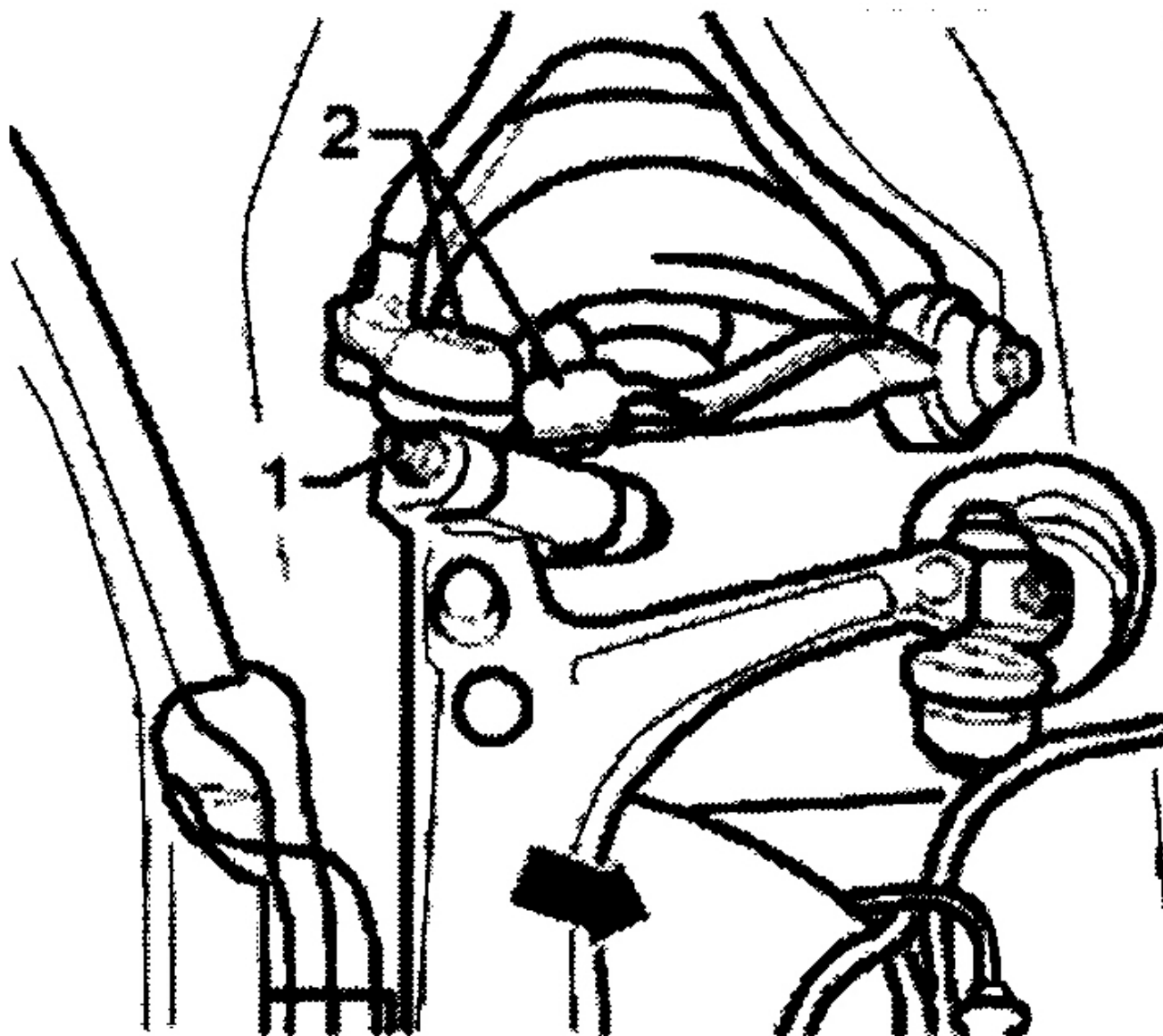
1. Install strut assembly so that hole in lower spring seat faces inside of vehicle. See **Fig. 42** .
2. Align upper links to mounting bracket. See **Fig. 42** . Tighten hex bolts finger tight. Final tighten hex bolt and NEW nut with vehicle on ground at curb height.
3. Install lower strut assembly-to-lower control arm nut and bolt. Finger tighten fasteners only. Final tightening will be performed with vehicle at normal curb height.
4. Insert upper links into wheel bearing housing, insert NEW bolt and tighten NEW nut. See **Fig. 13** . Push the upper links down as far as possible while tightening bolts. See **TORQUE SPECIFICATIONS** .
5. To finish installation, reverse remaining installation procedure. Tighten all other bolts and nuts to specification. Parts that have bonded rubber bushing should be torqued only when vehicle is standing on ground. See **TORQUE SPECIFICATIONS** .
6. Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

SEPARATING CONNECTIONS BETWEEN UPPER CONTROL ARMS & WHEEL BEARING HOUSING

NOTE: This procedure is only necessary if the hex bolt for the connections between the upper control arms and the wheel bearing housing cannot be removed.

CAUTION: The slits in the wheel bearing housing must NOT be widened using a chisel or similar tool.

1. Raise and support vehicle. Remove wheel.
2. Disconnect ABS speed sensor wiring from retainer on brake caliper. Remove nut from upper control arm retaining bolt in wheel bearing housing (1). See **Fig. 17** . Do not loosen other bolts in upper portion of wheel bearing housing.

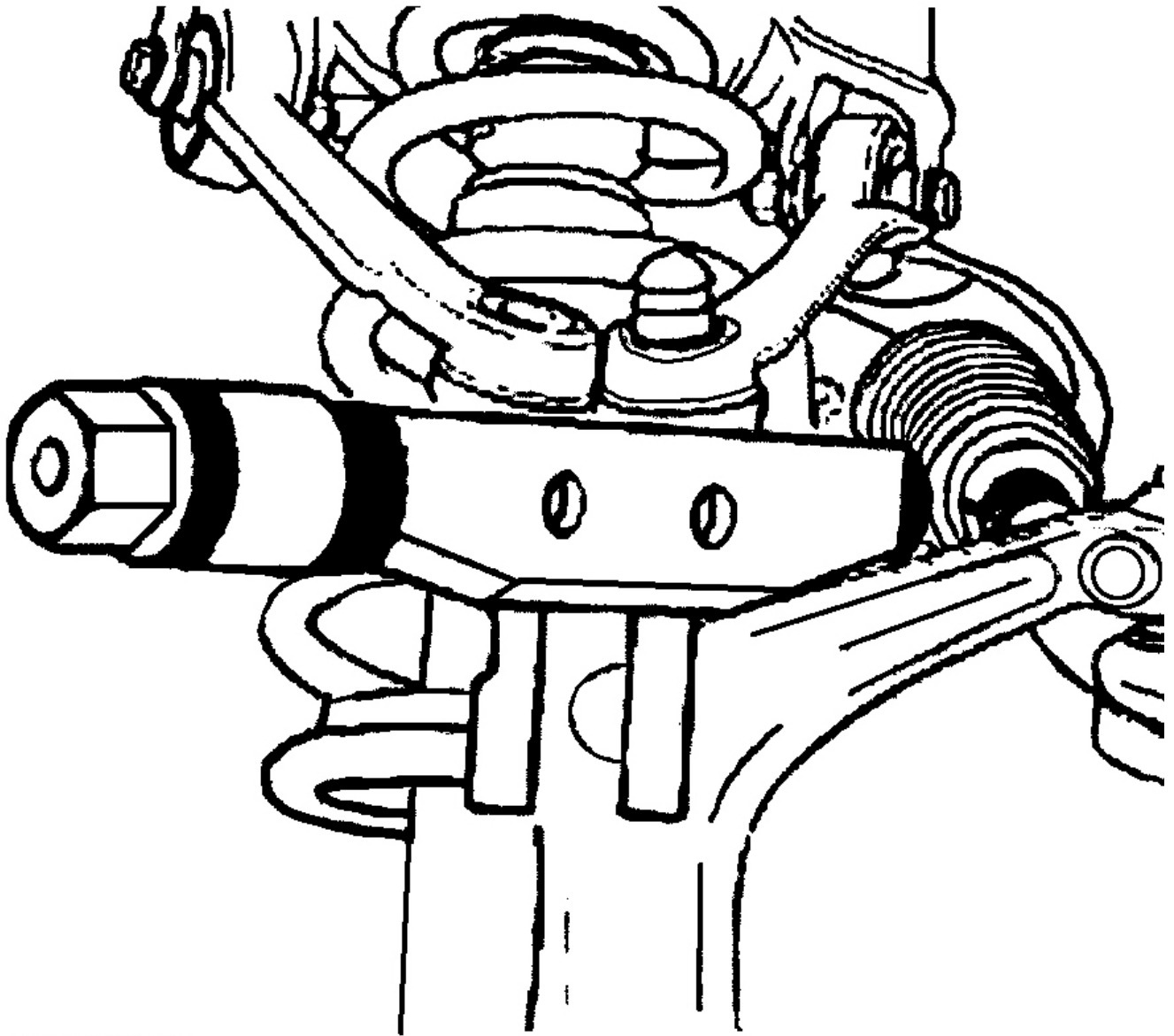


1. Upper Control Arm Bolt
2. Upper Control Arms

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Fig. 17: Removing Upper Control Arm From Wheel Bearing Housing
Courtesy of AUDI OF AMERICA, INC.

3. Spread wheel bearing housing using Press Tool (VAS 6085), or equivalent. See **Fig. 18**.



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Fig. 18: Removing Upper Control Arms From Wheel Bearing Housing
Courtesy of AUDI OF AMERICA, INC.

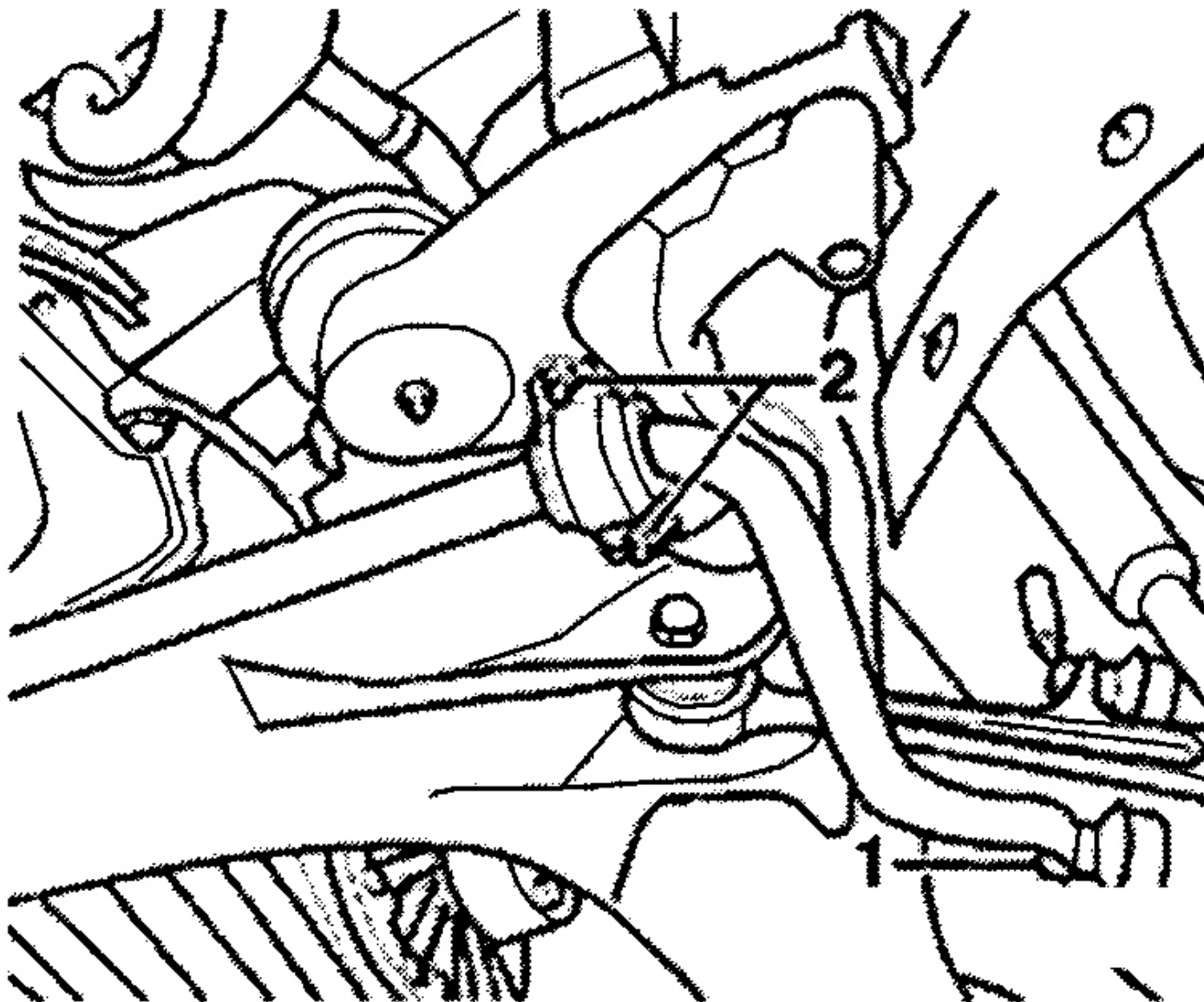
STABILIZER BAR & BUSHINGS

Removal & Installation

NOTE: See **CONNECTING LINK FOR STABILIZER BAR MODIFICATION** in **IDENTIFICATION** for information on stabilizer link modifications.

1. Raise and support vehicle. Remove engine sound proofing panel. Remove and discard nut from coupling link (1) at left and right sides of stabilizer bar. See **Fig. 19** .
2. Remove stabilizer bar bracket nuts. Remove stabilizer bar.
3. When installing, note that arrow on coupling link points to front of vehicle. Ensure that clip (4) is installed in proper position on stabilizer bar (if equipped). See **Fig. 20** .
4. To finish installation, reverse remaining installation procedure. Tighten all other bolts and nuts to

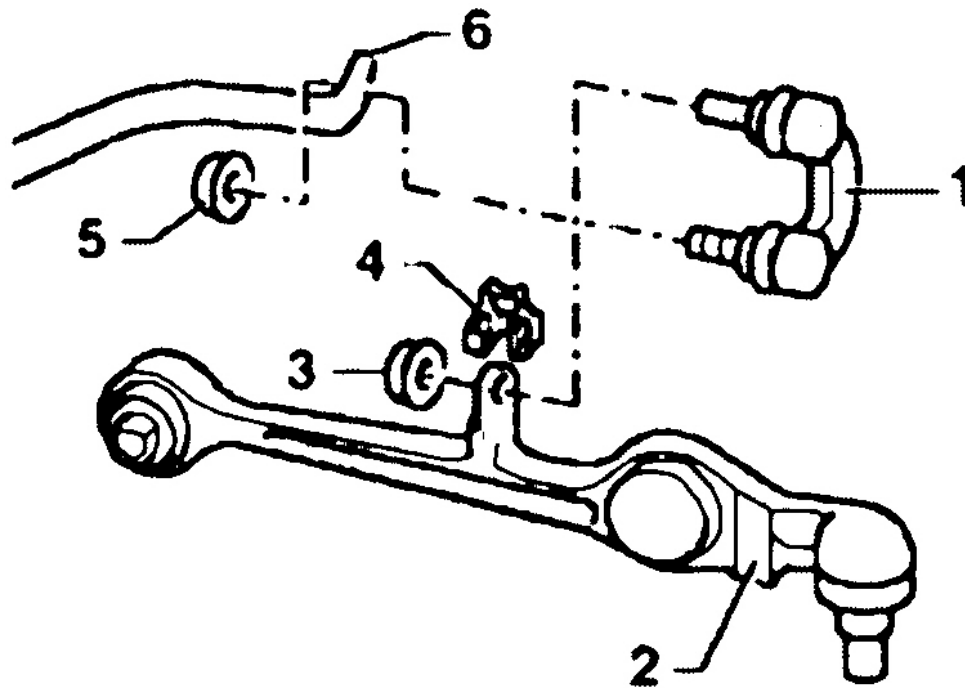
specification. Parts that have bonded rubber bushing should be torqued only when vehicle is standing on ground. See **TORQUE SPECIFICATIONS**.



1. Coupling Link Bolt
2. Stabilizer Bar Bracket Bolts

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Fig. 19: Removing & Installing Stabilizer Bar
Courtesy of AUDI OF AMERICA, INC.



1 - coupling with ball joint

2 - lower control arm

3 - self-locking hex nut, 40 Nm plus additional 90° (1/4 -tu

4 - clip

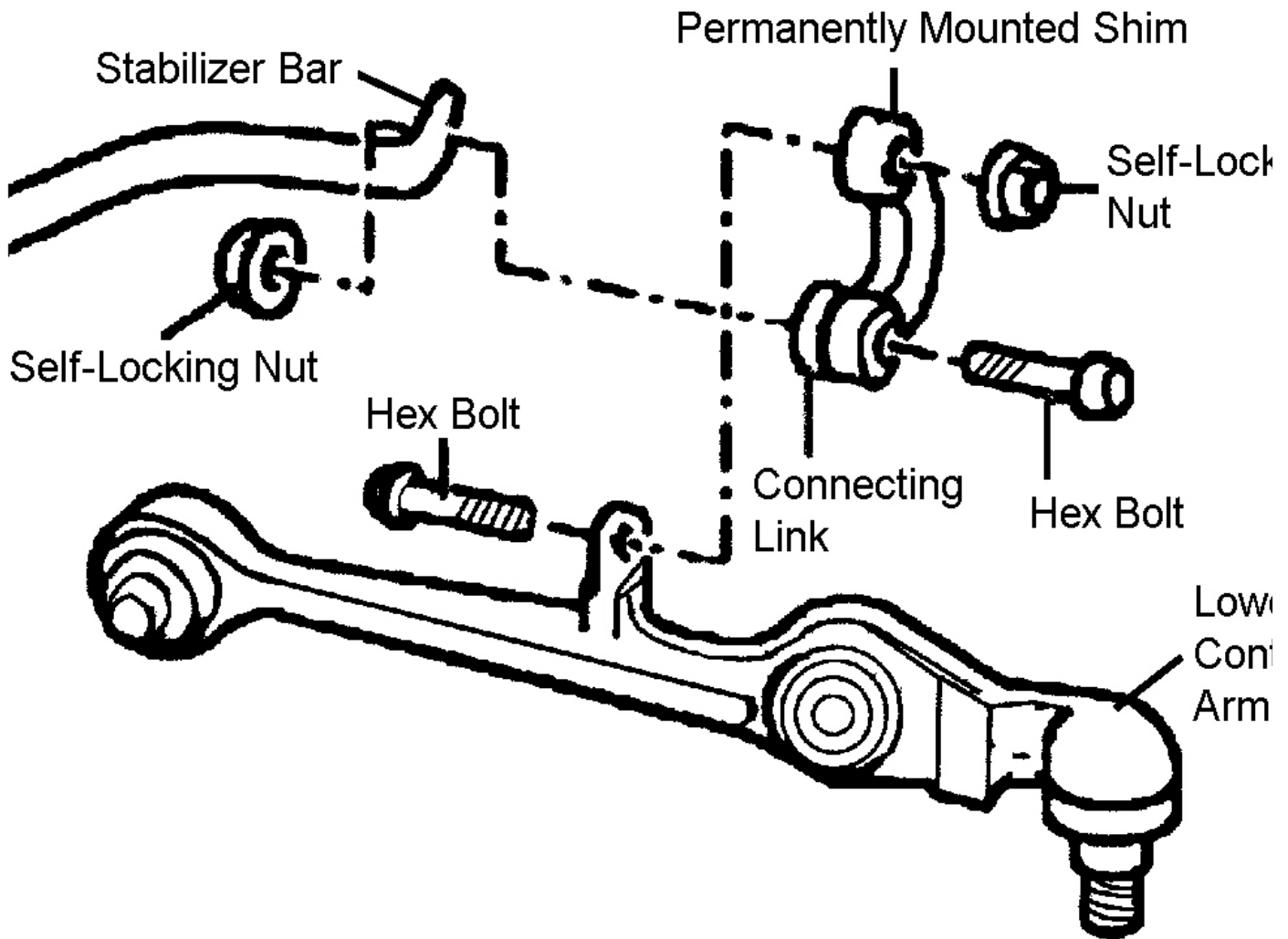
5 - self-locking hex nut, 100 Nm

6 - stabilizer

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Fig. 20: Stabilizer Bar Coupling Link (With Ball Joint)

Courtesy of AUDI OF AMERICA, INC.



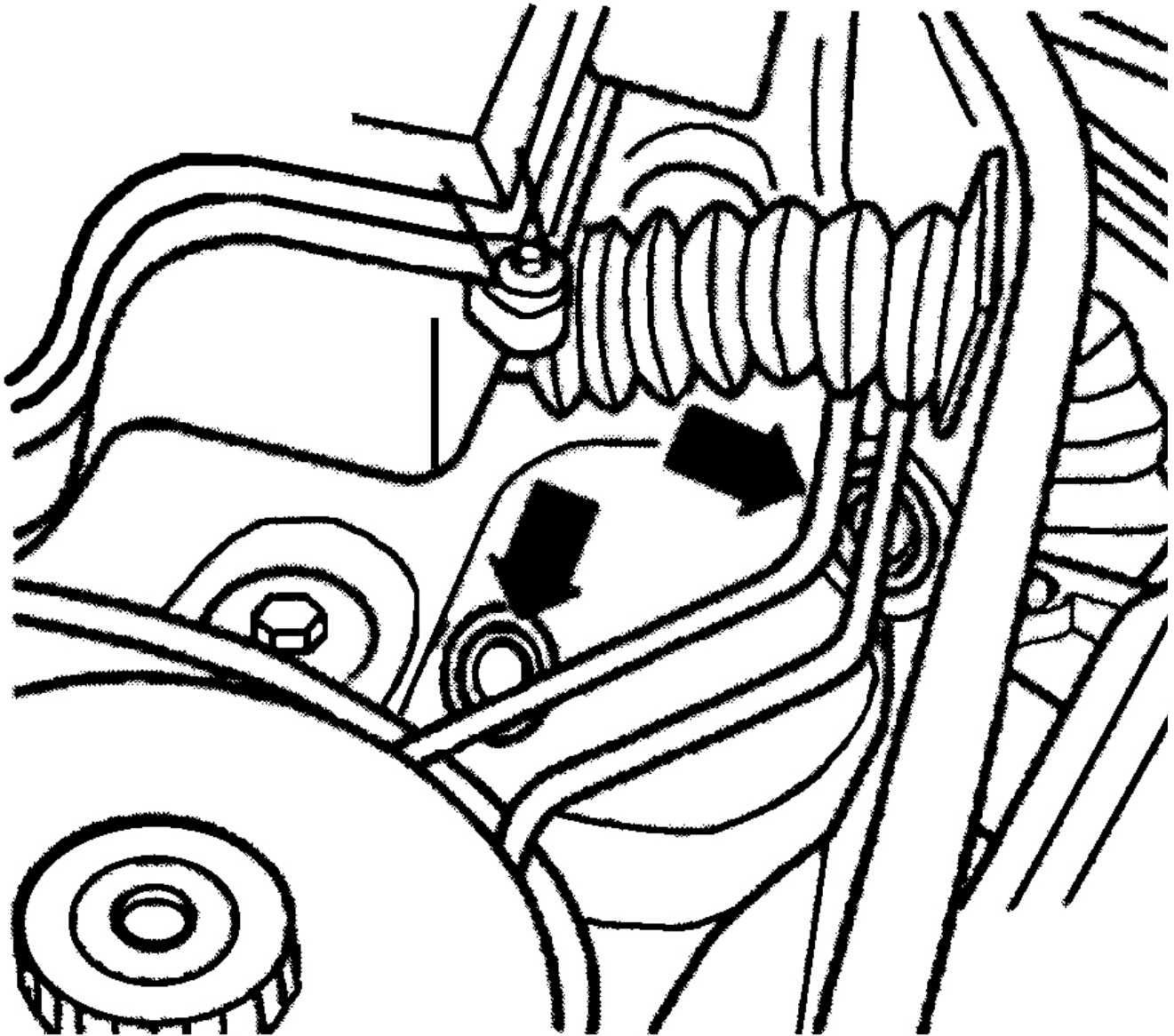
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Fig. 21: Stabilizer Bar Coupling Link (With Bonded Rubber Bushing)

Courtesy of AUDI OF AMERICA, INC.

STRUT ASSEMBLY**Removal**

1. Working under hood, remove plenum chamber/battery cover. Take out rubber grommets in plenum chamber. See **Fig. 22**.



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Fig. 22: Locating Rubber Grommets In Plenum Chamber
Courtesy of AUDI OF AMERICA, INC.

2. Raise and support vehicle. Remove wheel assembly. On vehicles equipped with headlight vertical aim control, disconnect coupling rod from vehicle level sensor. Remove ABS wheel speed sensor from wheel bearing housing.
3. Working through holes in plenum chamber, unbolt suspension strut at body.
4. Raise and support vehicle. Remove wheel. Disconnect ABS speed sensor wiring out from retainer on brake caliper.
- 5.

NOTE: DO NOT loosen or remove bolt from tie-rod end, or toe constant "S" adjustment will be required.

CAUTION: The slits in the wheel bearing housing must not be widened using a chisel or similar tool. If control arms cannot easily be removed from

wheel bearing housing, see SEPARATING CONNECTIONS BETWEEN UPPER CONTROL ARMS & WHEEL BEARING HOUSING .

Remove upper control arm-to-wheel bearing housing nut. See **Fig. 17** . Remove hex bolt and lift out control arm. Swing wheel bearing housing towards rear of vehicle.

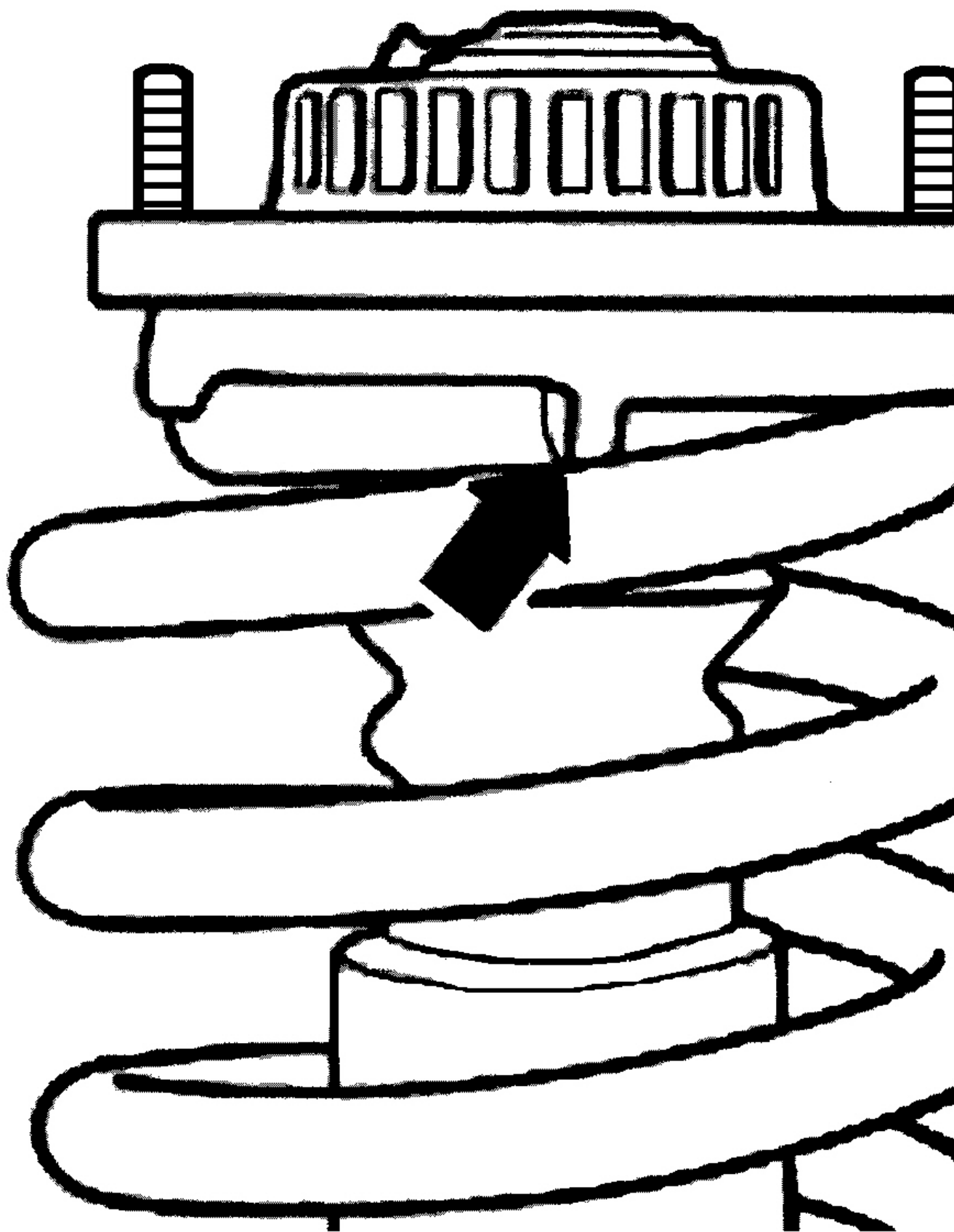
6. Remove and discard lower strut assembly-to-lower control arm nut and bolt. To facilitate removal of strut, apply an open-jaw wrench to wrench surfaces of lower control arm. Pull wrench towards front of vehicle and remove bolt. See **Fig. 15** . Being careful not to damage CV boot, remove strut assembly from vehicle.
- 7.

Spring Replacement Precautions

Surface of the spring must not be damaged Observe spring color coding The coil spring allocation for vehicles from vehicle identification No. 3B-WE 113 562 is performed suspension identification numbers. See **IDENTIFYING VEHICLE SUSPENSION** under IDENTIFICATION.

Disassembly & Reassembly

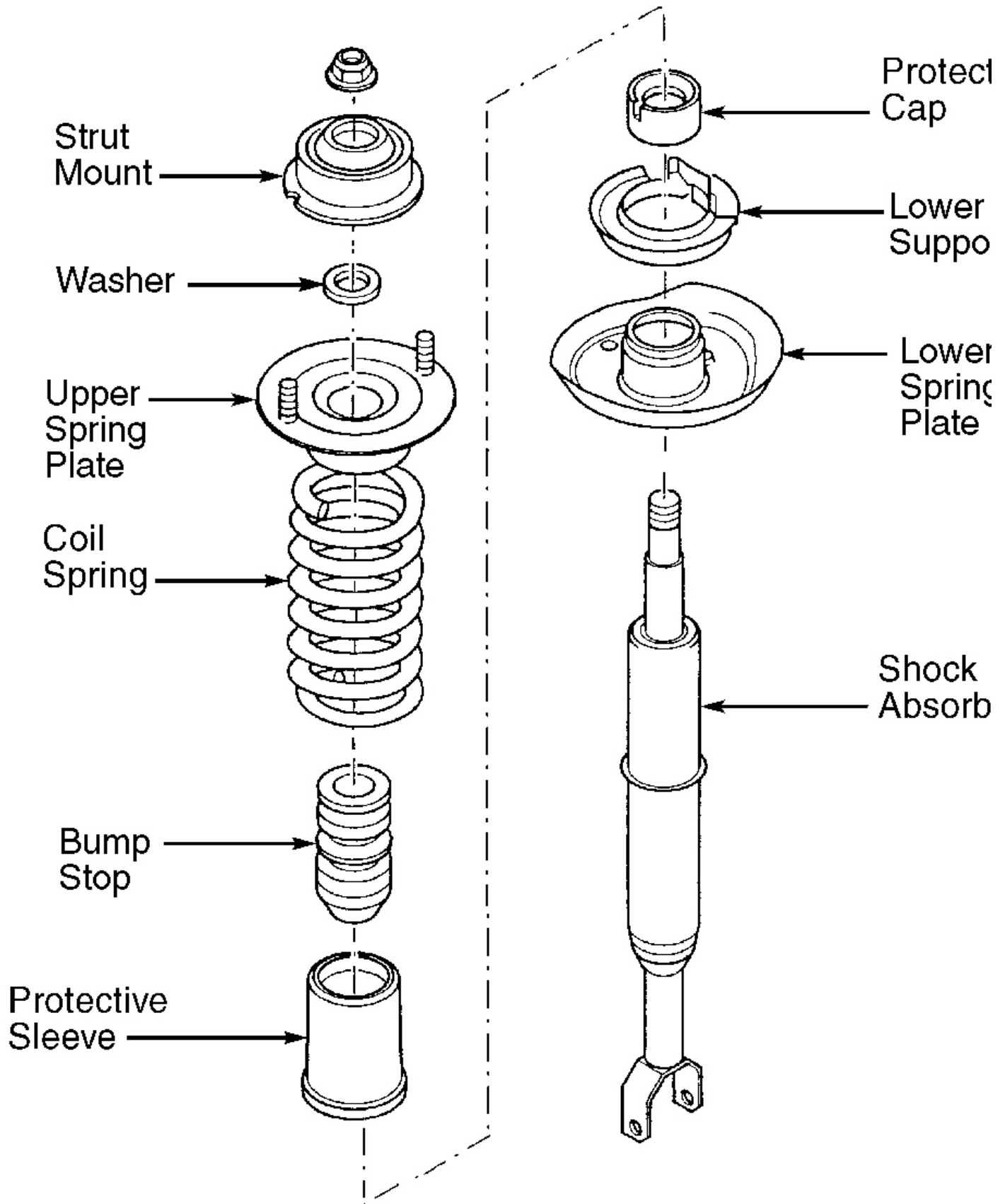
1. Clamp Suspension Strut Mount (VAG 1752/2) into vise. Clamp suspension strut into suspension strut mount at clevis.
2. Compress coil spring with Spring Compressor (VAG 1752/1) and appropriate adapters until upper spring plate is free. Remove piston rod nut. Counter-hold piston rod as necessary. See **Fig. 26** .
3. Slowly release tension on spring and remove upper strut mount, mounting bracket and coil spring. Remove bump stop, protective cap, lower spring support. See **Fig. 24** . Mark installation position of lower spring plate in relation to strut. Use a plastic hammer to loosen and remove lower spring plate.
4. Install lower spring plate. Ensure spring plate is aligned correctly. See **Fig. 25** .
5. Install lower spring support, protective cap, bump stop, protective sleeve and coil spring. Verify that coil spring rests against stop.
6. Set angle scale (arrow) of spring mounting tool V.A.G 1752/2 to 0 degrees. See **Fig. 26** .
7. Install upper spring plate, washer and suspension strut mount. Adjust angle scale of Clamping Device (1752/2) to zero. Bring upper spring seat into 11° position using Adjusting Gauge (1752/8). See **Fig. 26** . On adjusting gauge, the 11° setting has "left front" or "right front" markings, ensure that left and right side 11° positions of spring plate (seat) are symmetrical. See **Fig. 27** .
8. Top end of coil spring must rest against stop of upper spring plate. See **Fig. 23** .



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Fig. 23: Installed Position Of Top Of Coil Spring
Courtesy of AUDI OF AMERICA, INC.

9. Tighten piston rod nut to specification. See **TORQUE SPECIFICATIONS** . Remove strut assembly from strut mount.



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Fig. 24: Exploded View Of Strut Assembly

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SUSPENSION - FRONT

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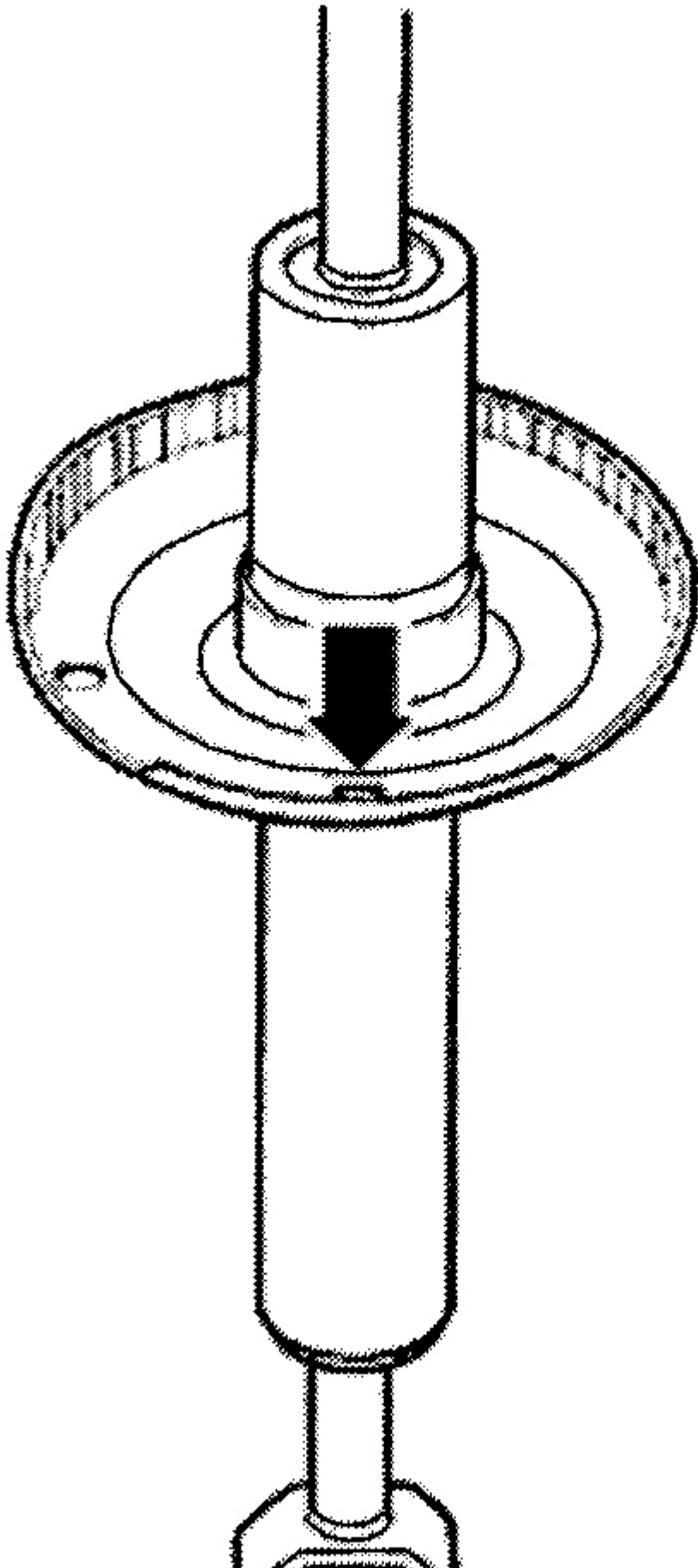


Fig. 25: Checking Lower Spring Plate Installation Position
Courtesy of AUDI OF AMERICA, INC.

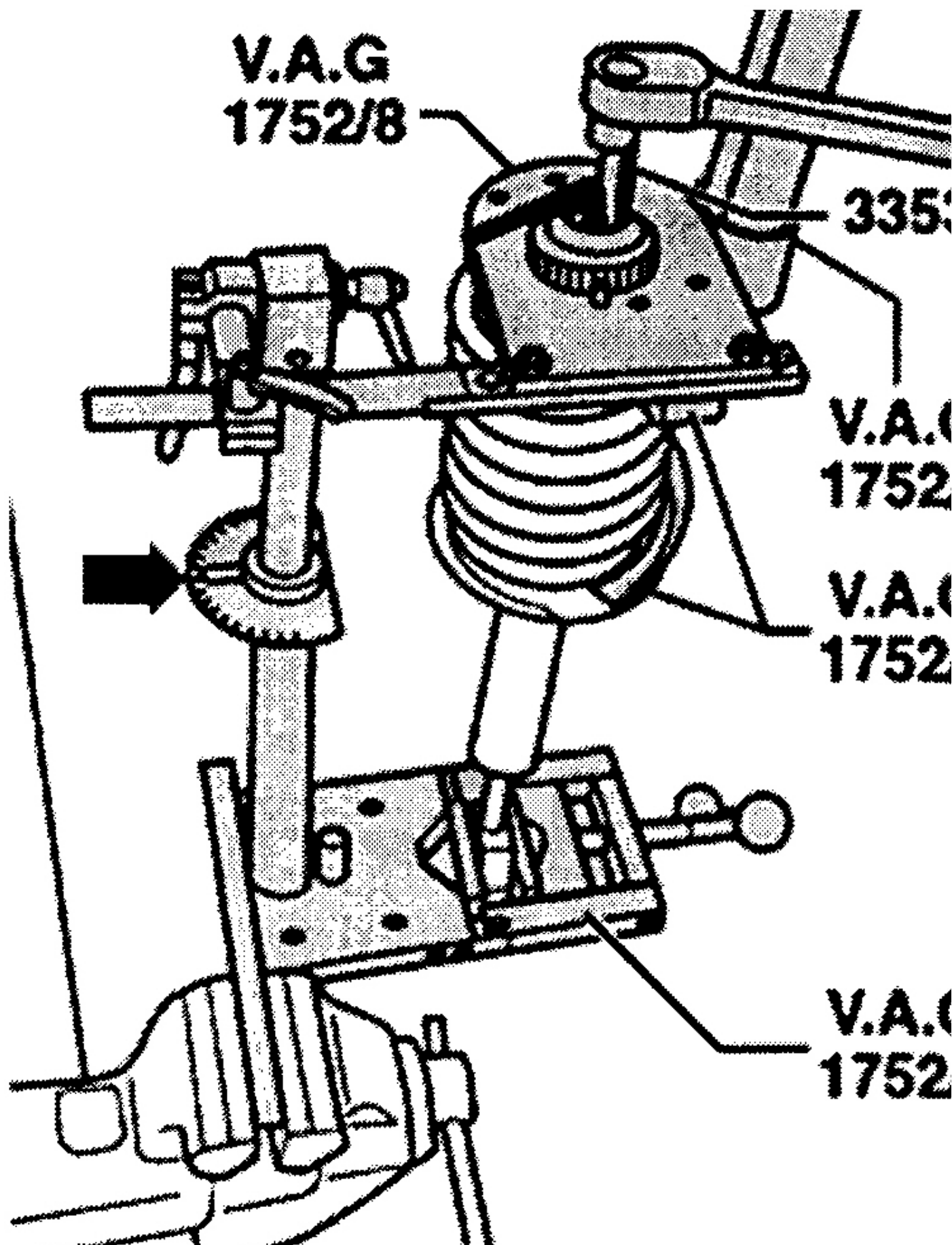
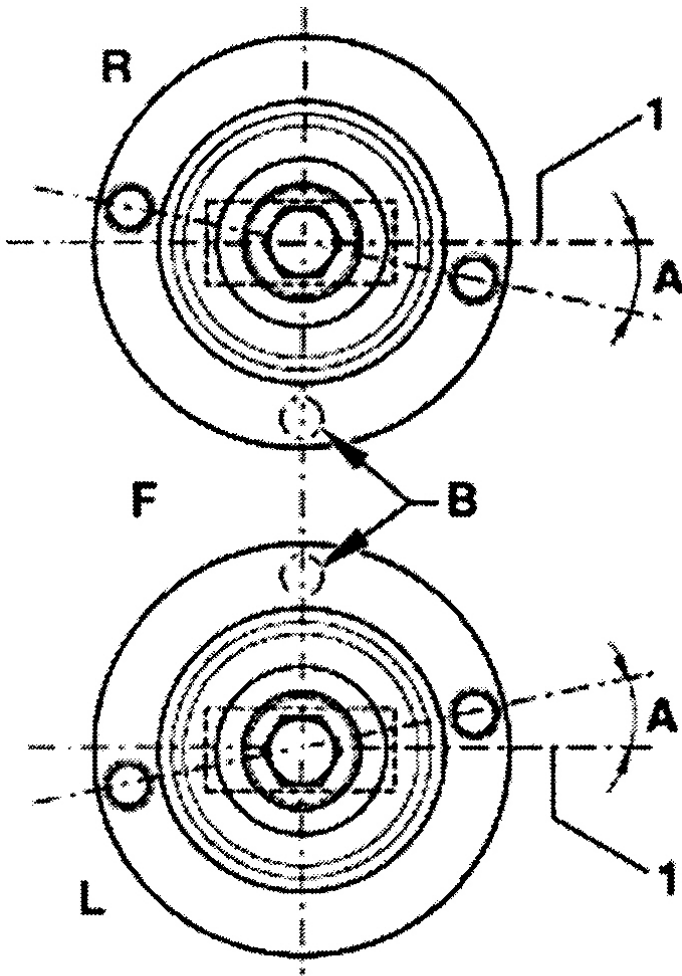


Fig. 26: Removing/Installing Upper Spring Seat
 Courtesy of AUDI OF AMERICA, INC.



F = direction of travel

R = right side spring seat

L = left side spring seat

A = $11^{\circ} \pm 2^{\circ}$

B = holes of bottom spring seat
 face middle of vehicle

G00191474

Fig. 27: Checking Installation Position Of Upper Spring Plate
 Courtesy of AUDI OF AMERICA, INC.

Installation

1. Install strut assembly so that hole in lower spring seat faces inside of vehicle.

2. Install lower strut assembly-to-lower control arm bolt. Install a NEW nut. Finger tighten fasteners only
3. Install upper control arms into wheel bearing housing. Install bolt with NEW nut. Push upper control arms down as far as possible while tightening bolt. Tighten bolt to specification. See **TORQUE SPECIFICATIONS**.
4. To finish installation, reverse remaining installation procedure. Tighten all other bolts and nuts to specification. Parts that have bonded rubber bushing should be torqued only when vehicle is standing on ground. See **TORQUE SPECIFICATIONS**.

Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

STRUT CARTRIDGE

Removal & Installation

Remove strut assembly and disassemble. See **STRUT ASSEMBLY**.

SUBFRAME & SUBFRAME BUSHINGS

NOTE: See **SUBFRAME BOLT VERSIONS** under **TORQUE SPECIFICATIONS** for information on subframe retaining bolts.

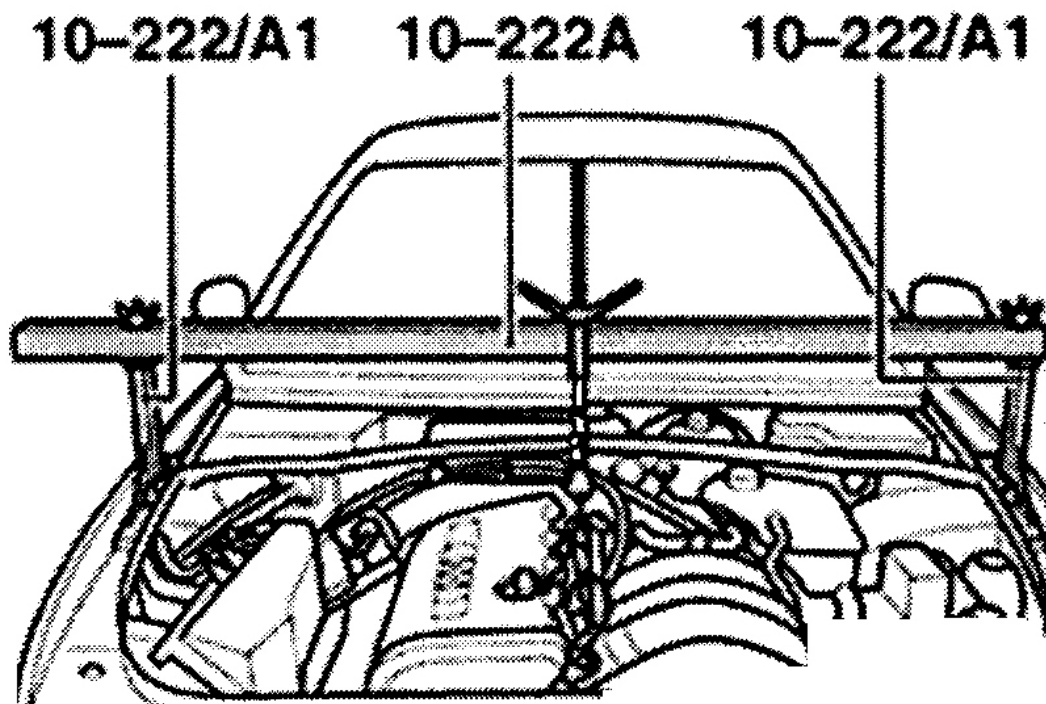
Removal

1. Install Support Bar (10-222A) along with appropriate support to engine. See **Fig. 28**. On vehicles equipped with V8, remove oil filler pipe from engine. Take weight of engine/transmission assembly off the spindles.
2. Raise and support vehicle. Remove wheels. Remove sound insulation tray. On vehicles equipped with self-leveling headlights, unclip coupling rod from lower control arm. See **Fig. 3**.
3. Before loosening subframe, verify subframe alignment with Alignment Tool (3393). See **Fig. 29**. If this is not the case, perform axle alignment measurements after installing the subframe.
4. Remove lower strut mount bolts. Remove stabilizer bar coupling links. Remove lower control arm-to-subframe nut and bolt. Remove guide control arm-to-subframe nut and bolt. Remove transmission mount bolts (1). See **Fig. 30**.
- 5.

CAUTION: Manufacturer recommends replacing driveshaft flange self-locking bolts.

On vehicles with all-wheel drive, placing mating marks on driveshaft flange and transmission mating flange. Remove self-locking bolts. Separate driveshaft from transmission.

6. Place transmission jack with a wood block under subframe and lift subframe slightly. Unscrew bolts (1) and (2) at rear of subframe. See **Fig. 31**. Lower subframe slightly.
7. Remove and discard hex bolts and nuts for track control arm and guide control arm arm. Clear ABS vehicle speed sensor wiring. Pull both track control arm and guide control arm arms out of subframe.
8. Remove subframe bolts "A" and "B". See **Fig. 32**. Remove subframe.



4-CYL & V6

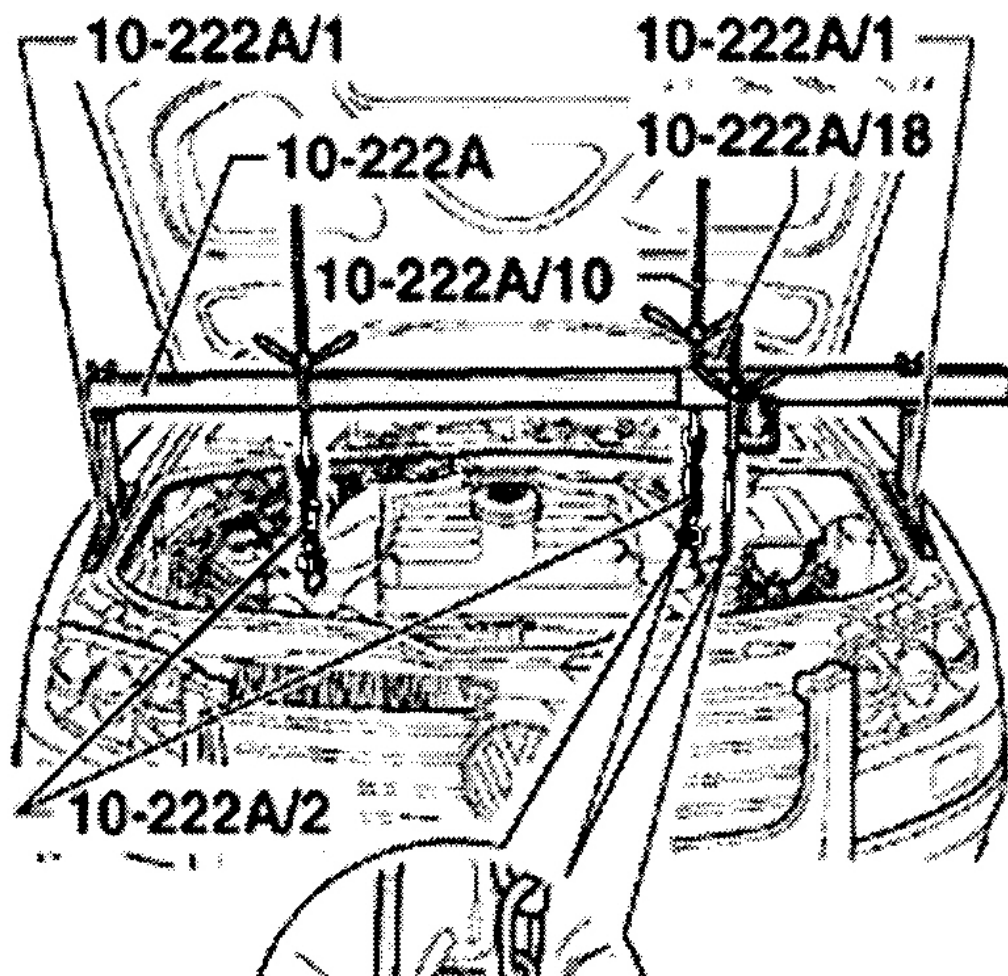
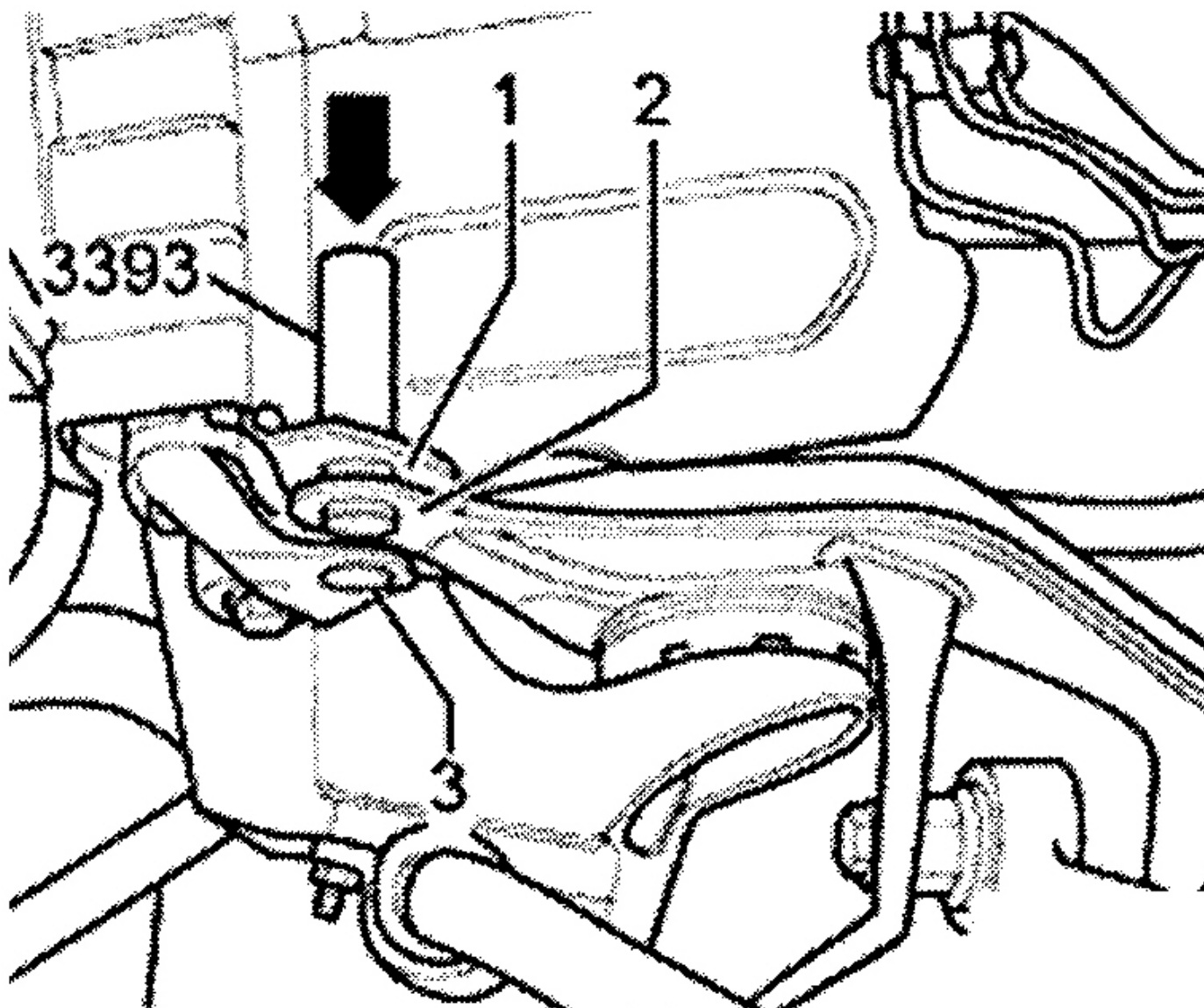
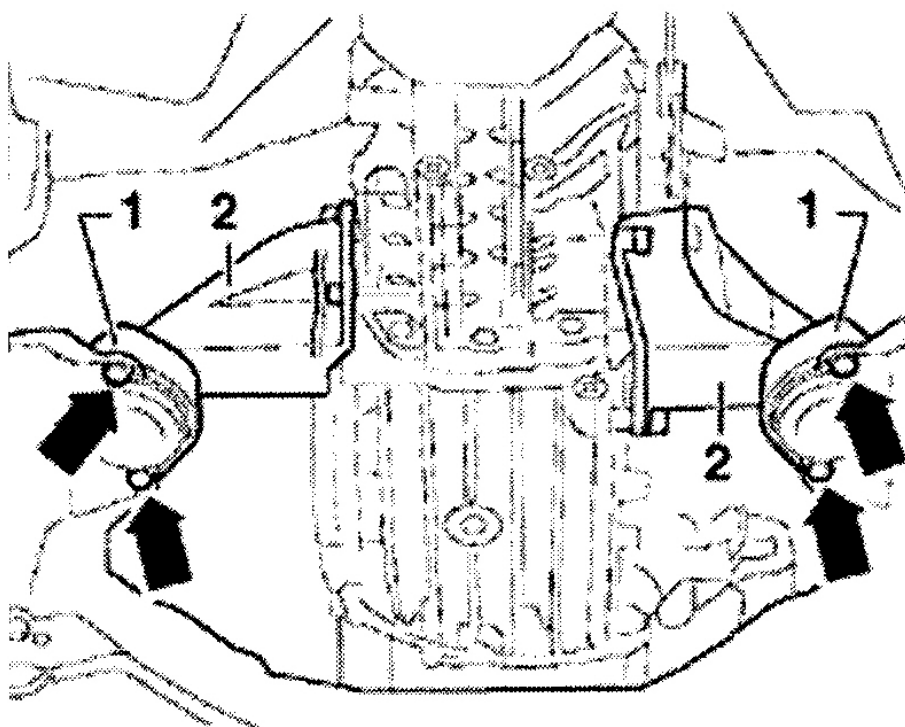
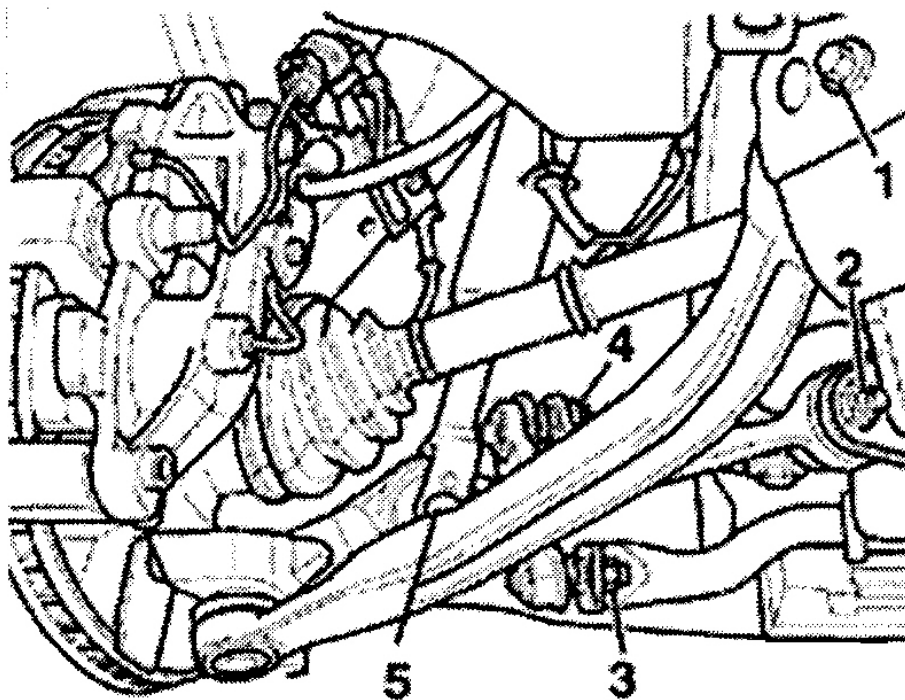


Fig. 28: Supporting Engine Using Support Bar (10-222A)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



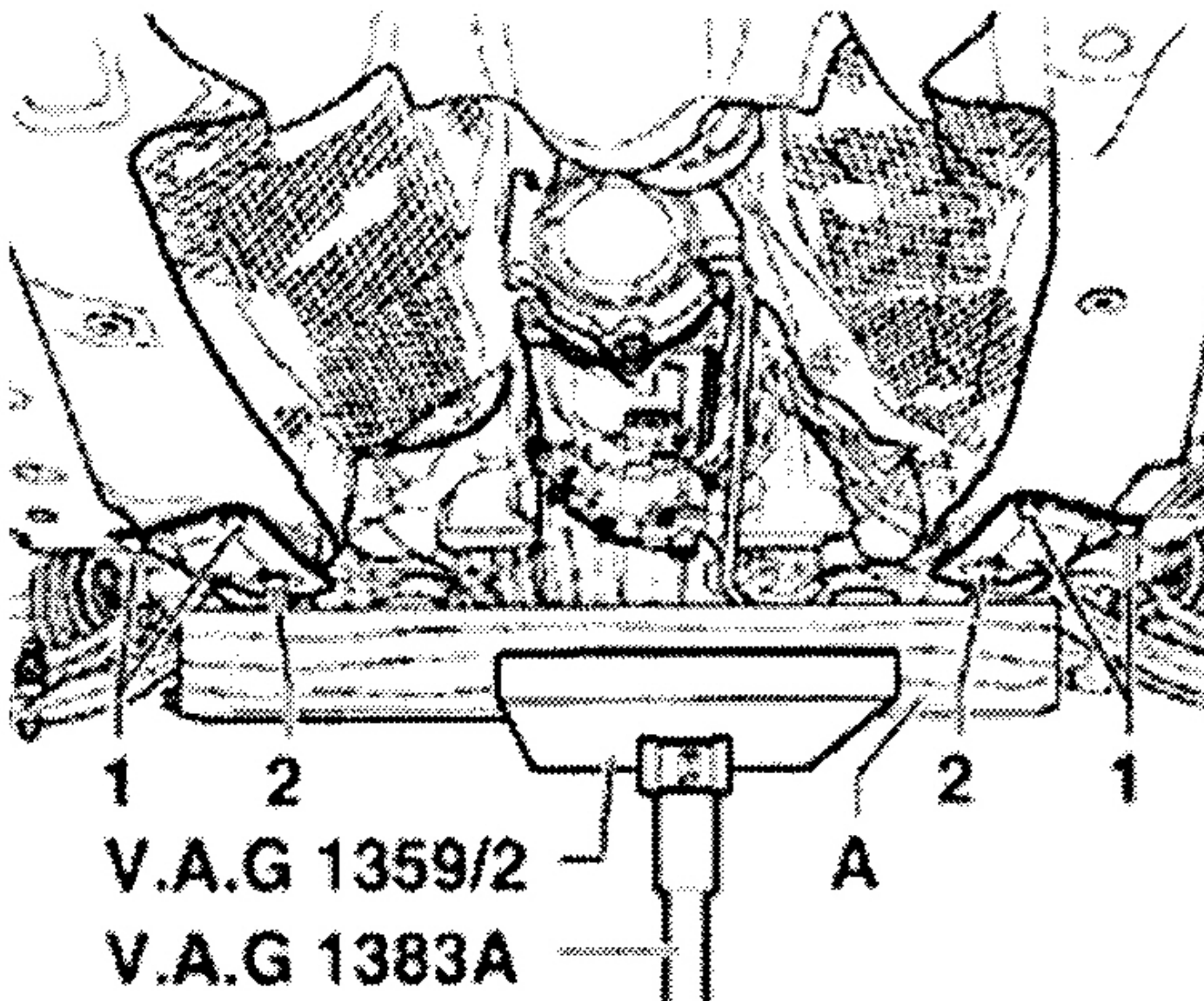
G00222146

Fig. 29: Checking Subframe Alignment
Courtesy of VOLKSWAGEN UNITED STATES, INC.



G00222147

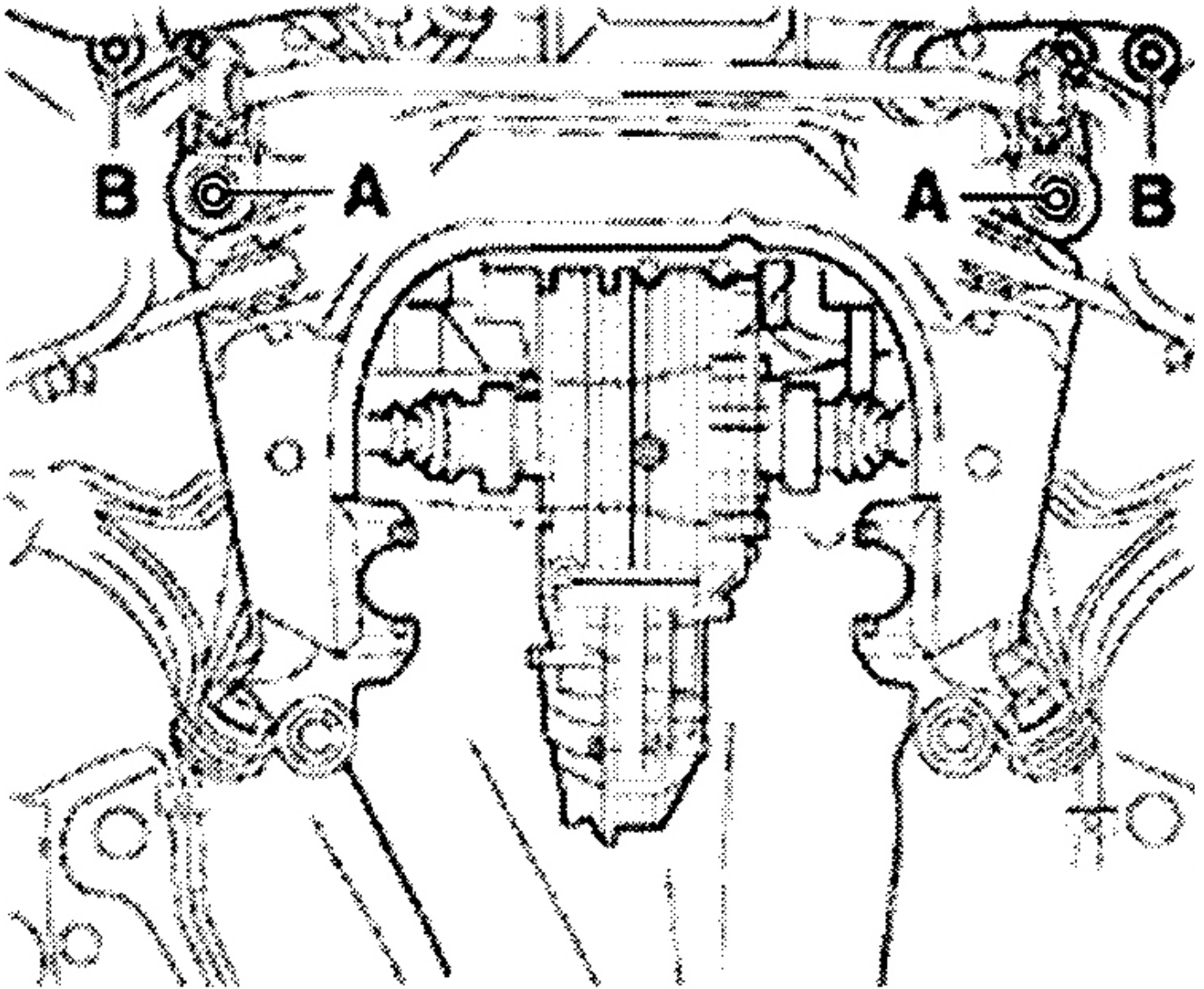
Fig. 30: Removing Transmission Mounting Bolts
Courtesy of VOLKSWAGEN UNITED STATES, INC.



G00222148

Fig. 31: Removing Subframe

Courtesy of VOLKSWAGEN UNITED STATES, INC.



G00222149

Fig. 32: Removing & Installing Subframe Bolts "A" & "B"

Courtesy of VOLKSWAGEN UNITED STATES, INC.

Installation

1. Loosely install subframe bolts "A" and "B". See **Fig. 32** . Guide both track control arms and guide control arm arms into subframe. Install bolts into the inner holes. Using transmission jack (VAG 1383A), raise back of subframe slightly.
2. Using Alignment Tool (3393) check alignment of subframe to body. See **Fig. 29** . Install bolts (1) and (2) and tighten to specification. See **TORQUE SPECIFICATIONS** .
3. Tighten subframe bolts "A" and "B". Install and tighten transmission mount bolts to specification. See **TORQUE SPECIFICATIONS** .
4. For all-wheel drive vehicles, align mating marks and install driveshaft to transmission. Clean bolt holes. Install and tighten NEW self-locking bolts. See **TORQUE SPECIFICATIONS** .
- 5.

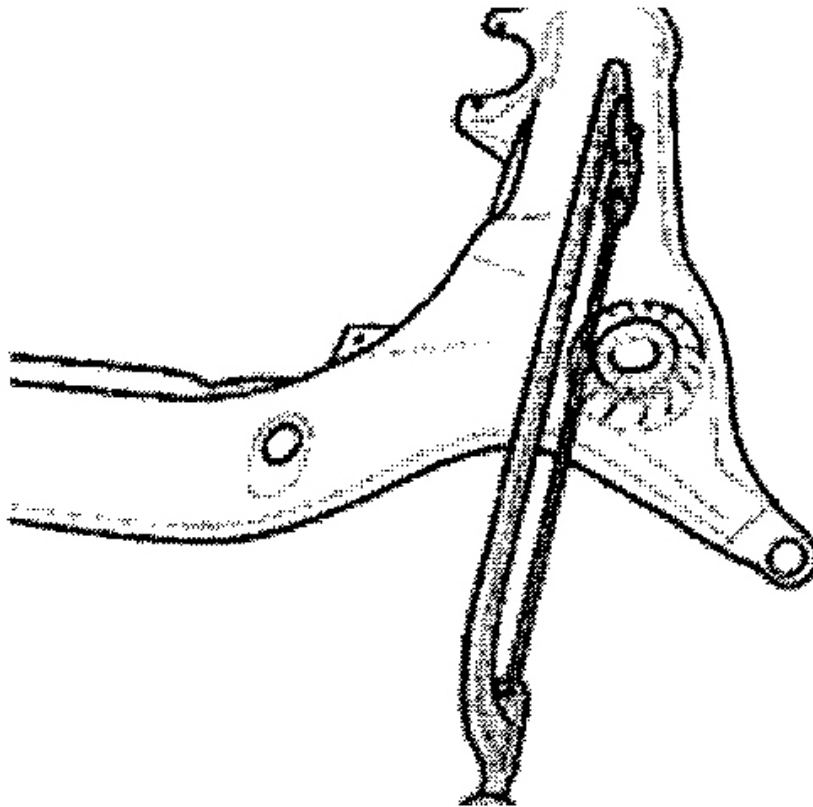
NOTE: **Manufacturer recommends replacing guide control arm-to-subframe bolt and nut, and lower control arm-to-subframe bolt and nut during installation.**

To finish installation, reverse remaining removal procedure. Tighten all other bolts and nuts to specification. Parts that have bonded rubber bushing (guide control arm and lower control arm) should be final torqued only when vehicle is standing on ground (curb height). See **TORQUE SPECIFICATIONS**.

6. Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

Subframe Bushings

Subframe must be removed from vehicle to replace bushings. Cut or saw off rubber shoulder on bushing, cut rubber up to outer bearing bushing. If rubber shoulder is not removed completely, removal tool cannot seat correctly and will fall off. If painted surface on subframe is damaged, recoat with corrosion protection. Use illustrations to remove and install subframe bushings. See **Fig. 33 -Fig. 37**.



Pulling out bonded rubber mounting

- Saw off/cut-off rubber shoulder on sub-frame mounting up to outer bearing bushing

If paint surface on sub-frame is damaged, protect surface against corrosion.

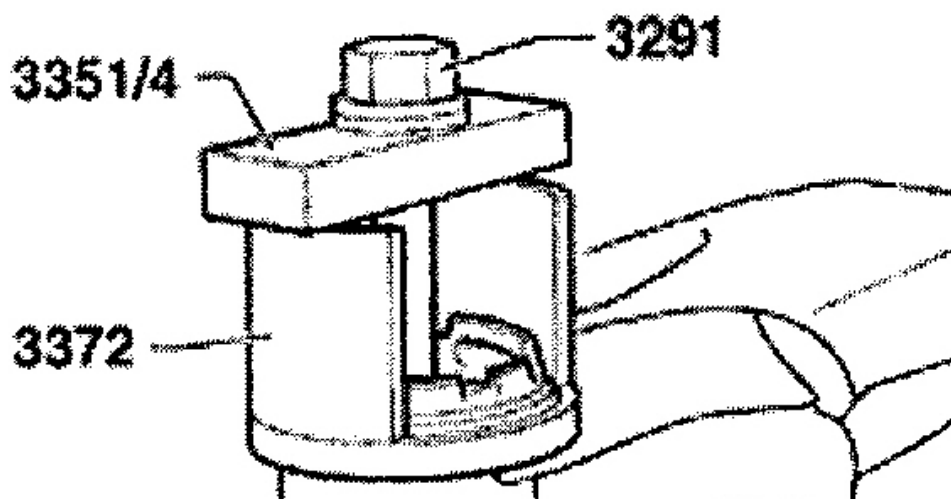
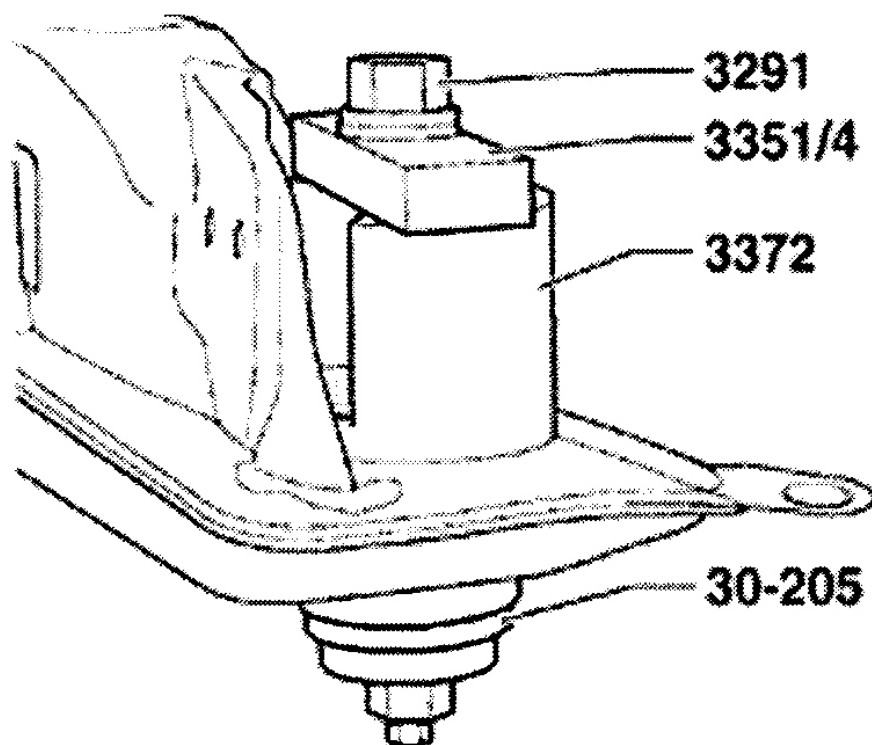


Fig. 33: Removing & Installing Subframe Mounting Bushings (1 Of 5)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



Pulling out bonded rubber mounting

All bonded rubber mountings on sub-frame are pulled out with the same tool.

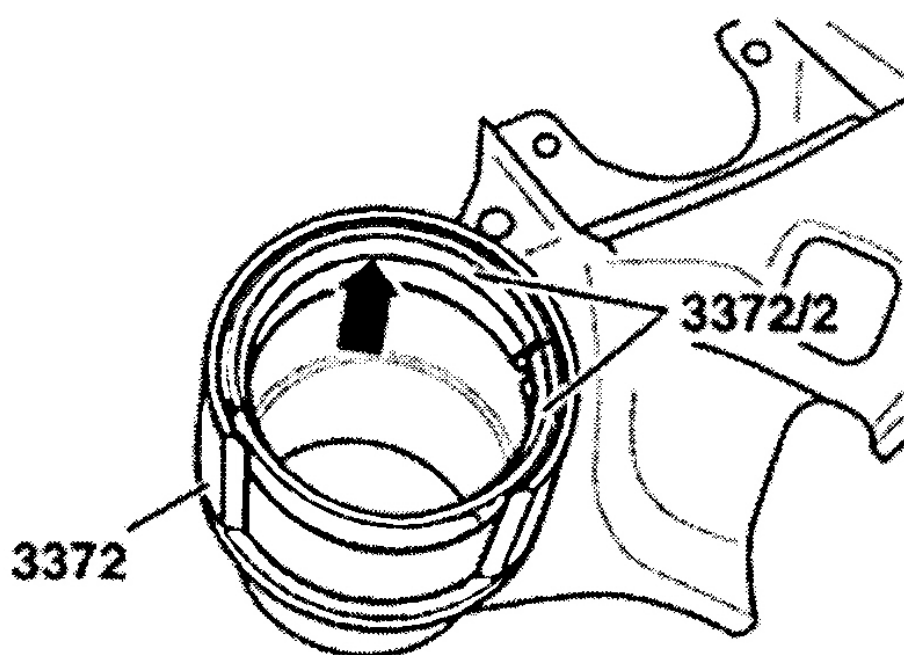
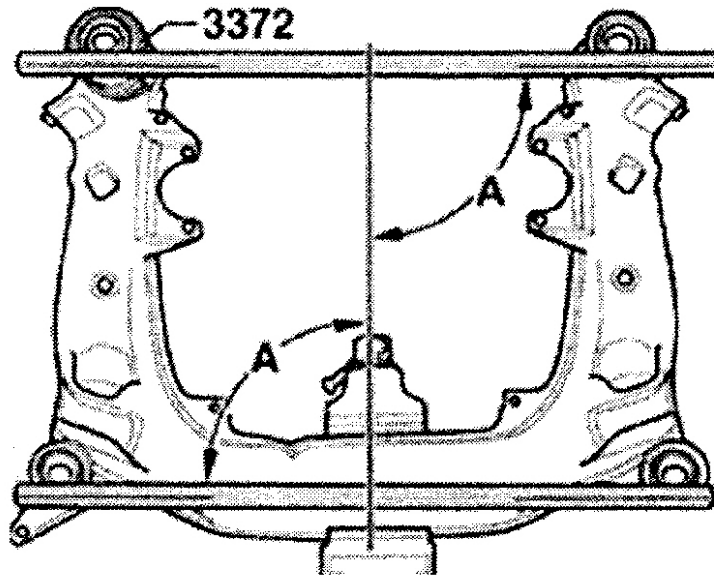


Fig. 34: Removing & Installing Subframe Mounting Bushings (2 Of 5)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

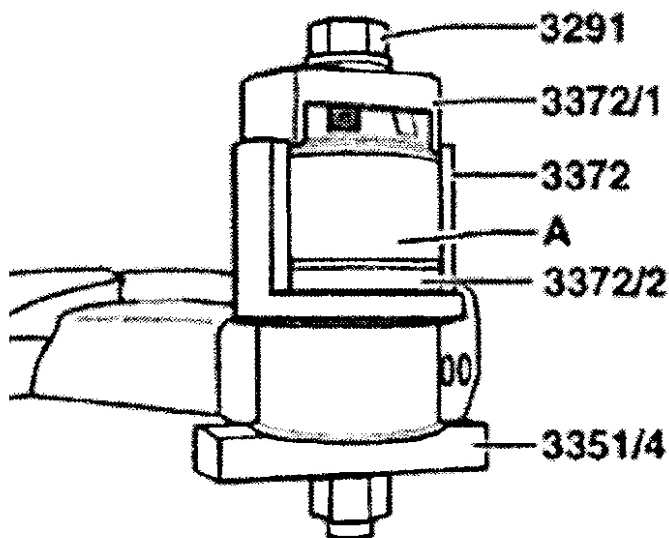


Aligning bonded rubber mounting

The bonded rubber mountings must be aligned with a long square tube or a straight-edge.

$$A = 90^{\circ} \pm 5^{\circ}$$

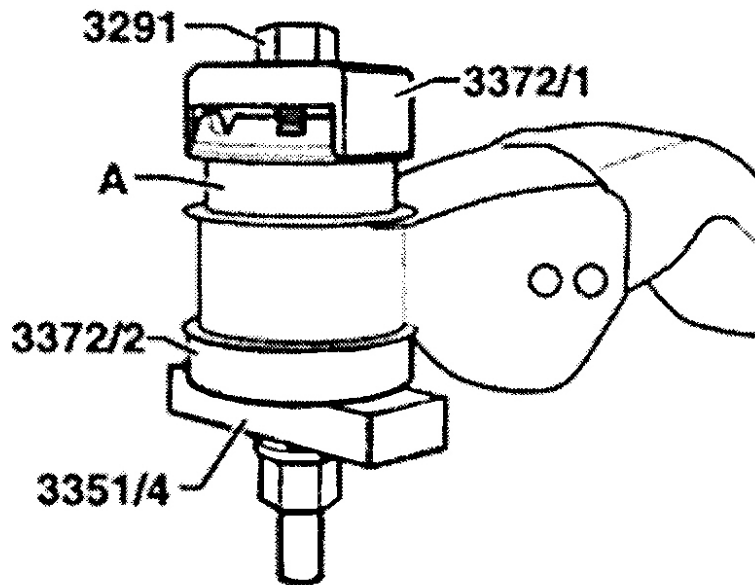
Only tension sub-frame in a vice using protective clamps!



Pulling in rear bonded rubber mounting

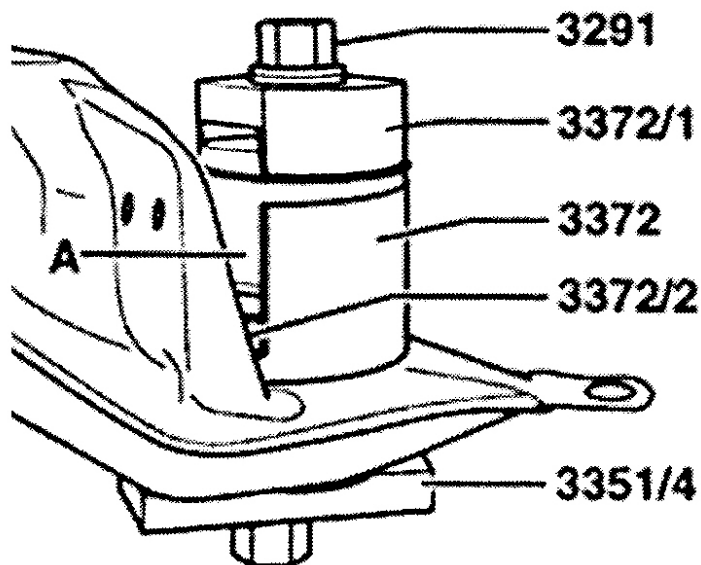
- Coat bonded rubber mounting with e.g. tire

Fig. 35: Removing & Installing Subframe Mounting Bushings (3 Of 5)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



Pulling in rear bonded rubber mounting

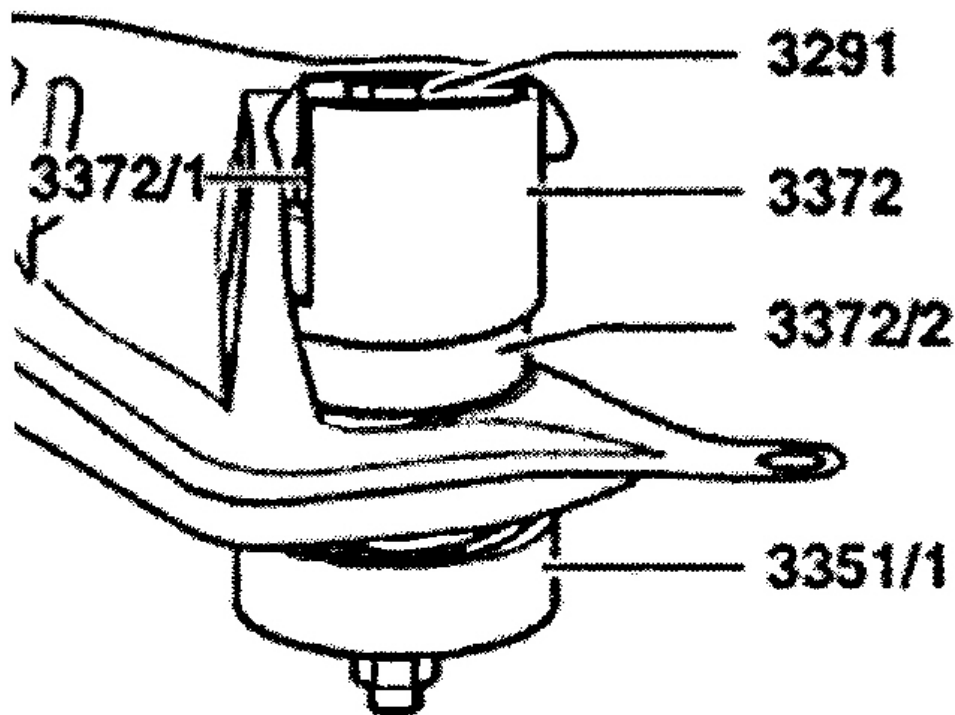
- Insert segments -3372/2- between bridge -3351/4- and sub-frame.
- Pull mounting -A- in onto stop.



Pulling in front bonded rubber mounting

- Coat bonded rubber mounting with e.a.

Fig. 36: Removing & Installing Subframe Mounting Bushings (4 Of 5)
Courtesy of VOLKSWAGEN UNITED STATES, INC.



- Lift tube -3372- and remove segments -3372/2.
- Replace bridge -3351/4- with thrust piece -3351/1 and then push mounting in onto stop.

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Fig. 37: Removing & Installing Subframe Mounting Bushings (5 Of 5)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

UPPER CONTROL ARMS & BUSHINGS

1. Remove mounting bracket. See **MOUNTING BRACKET**.
2. Mount strut assembly in vise. Remove control arms from mounting bracket. See **Fig. 38**.

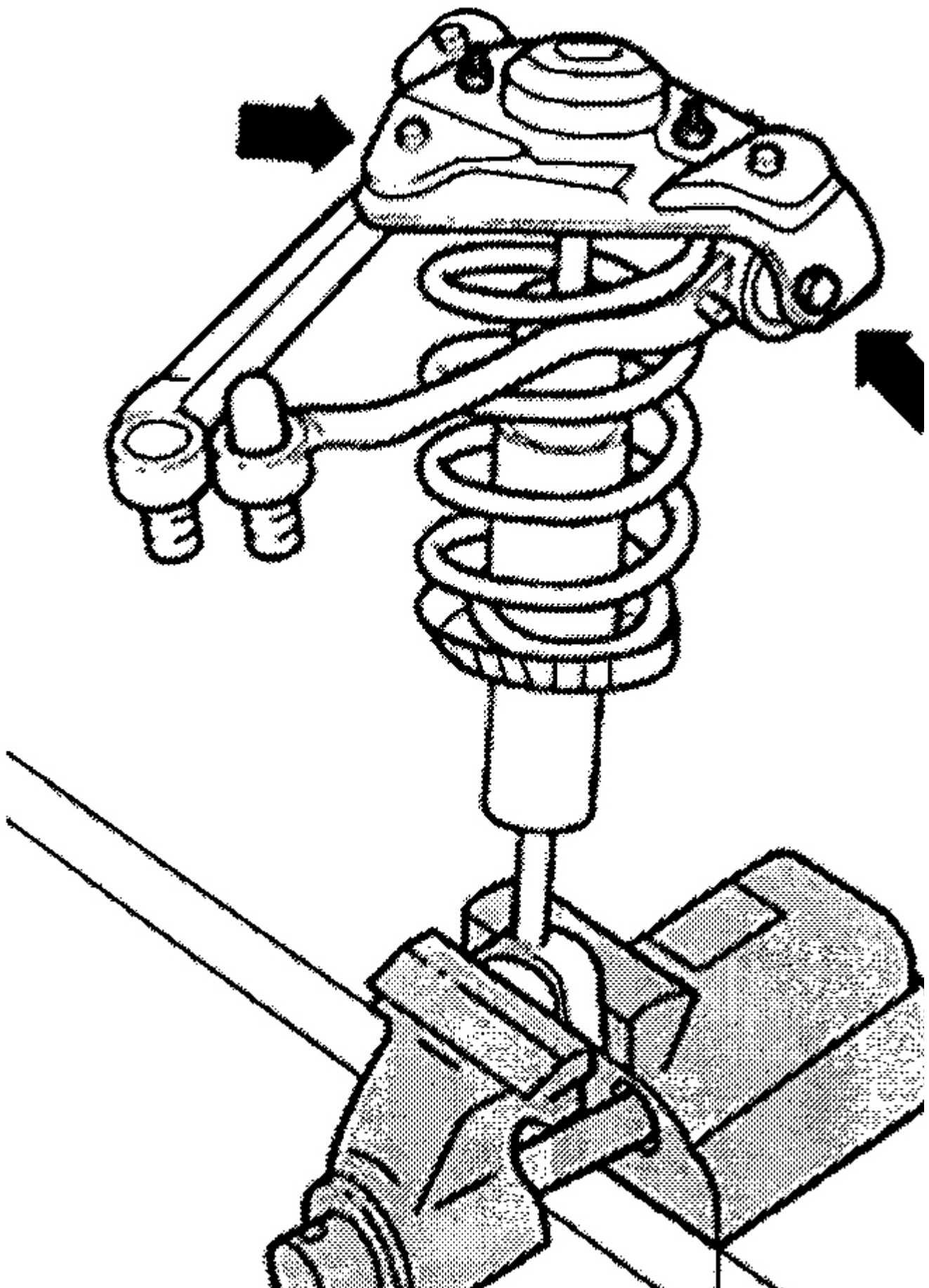
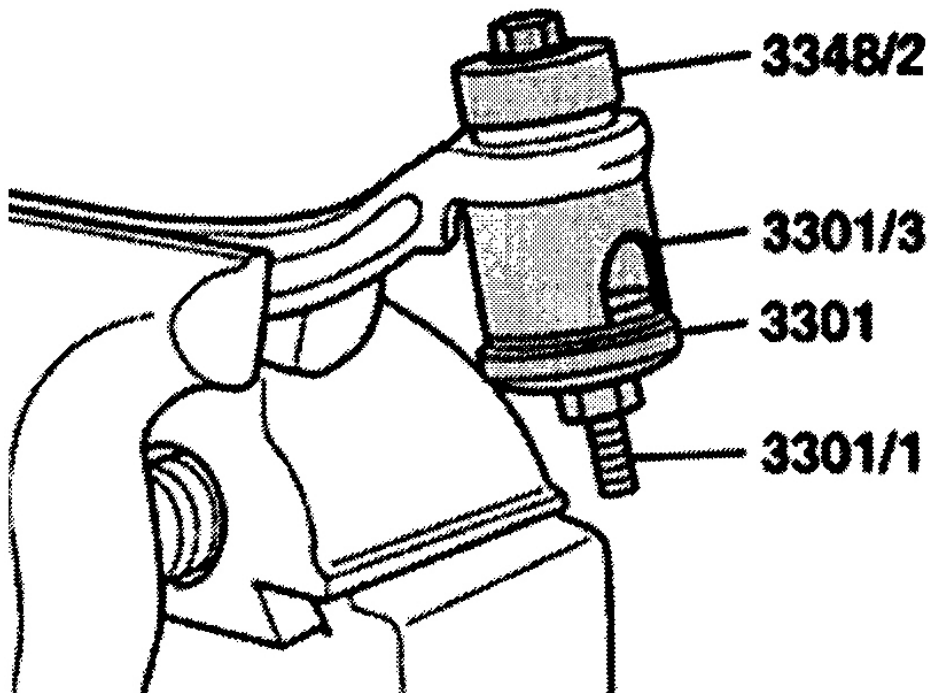


Fig. 38: Removing Upper Control Arms From Mounting Bracket
Courtesy of AUDI OF AMERICA, INC.

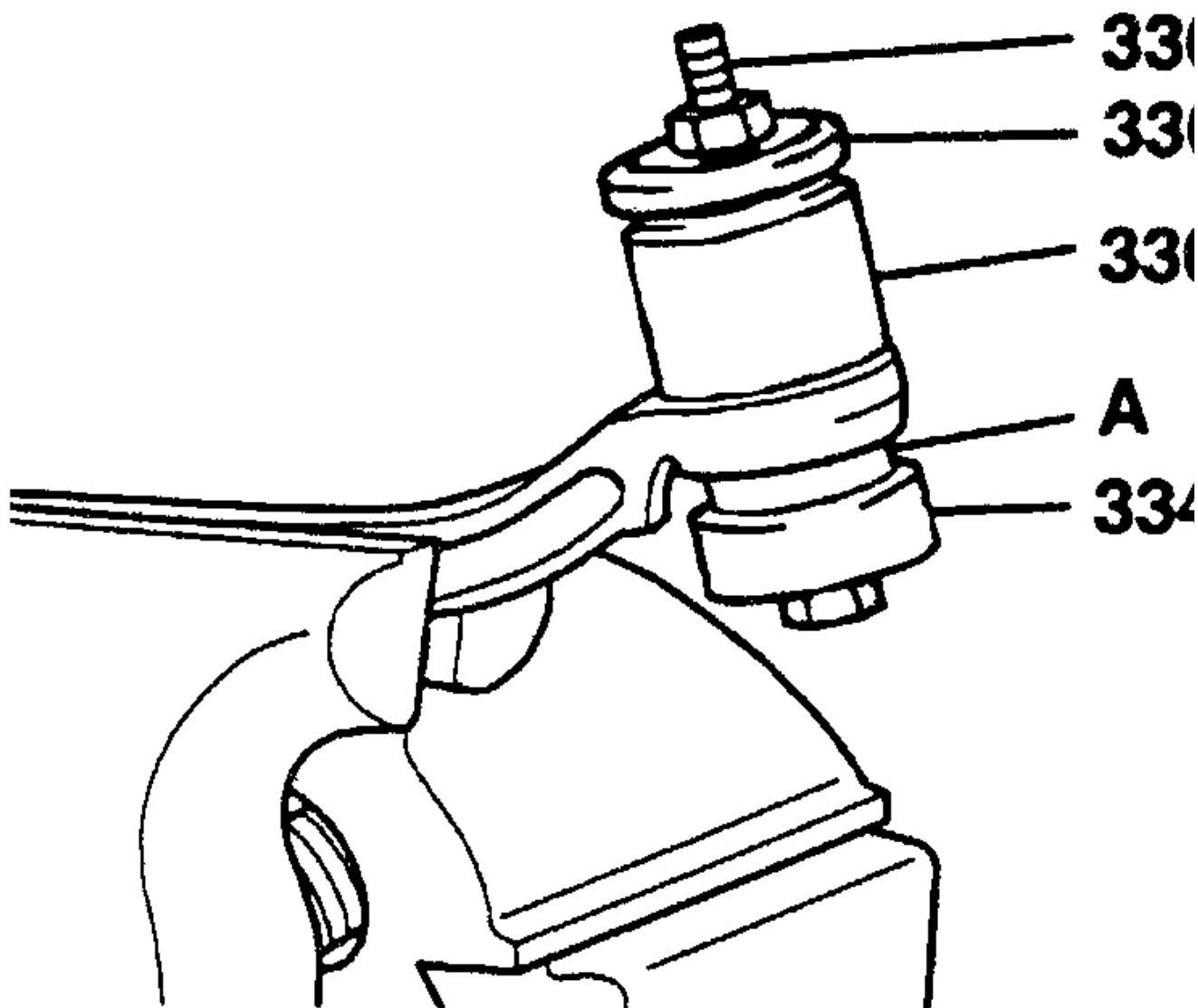
3. Mount upper control arm in soft jawed vise. Using Bushing Remover/Installer Kit (3348 & 3301) or equivalent, pull bushing from control arm. See **Fig. 39** .



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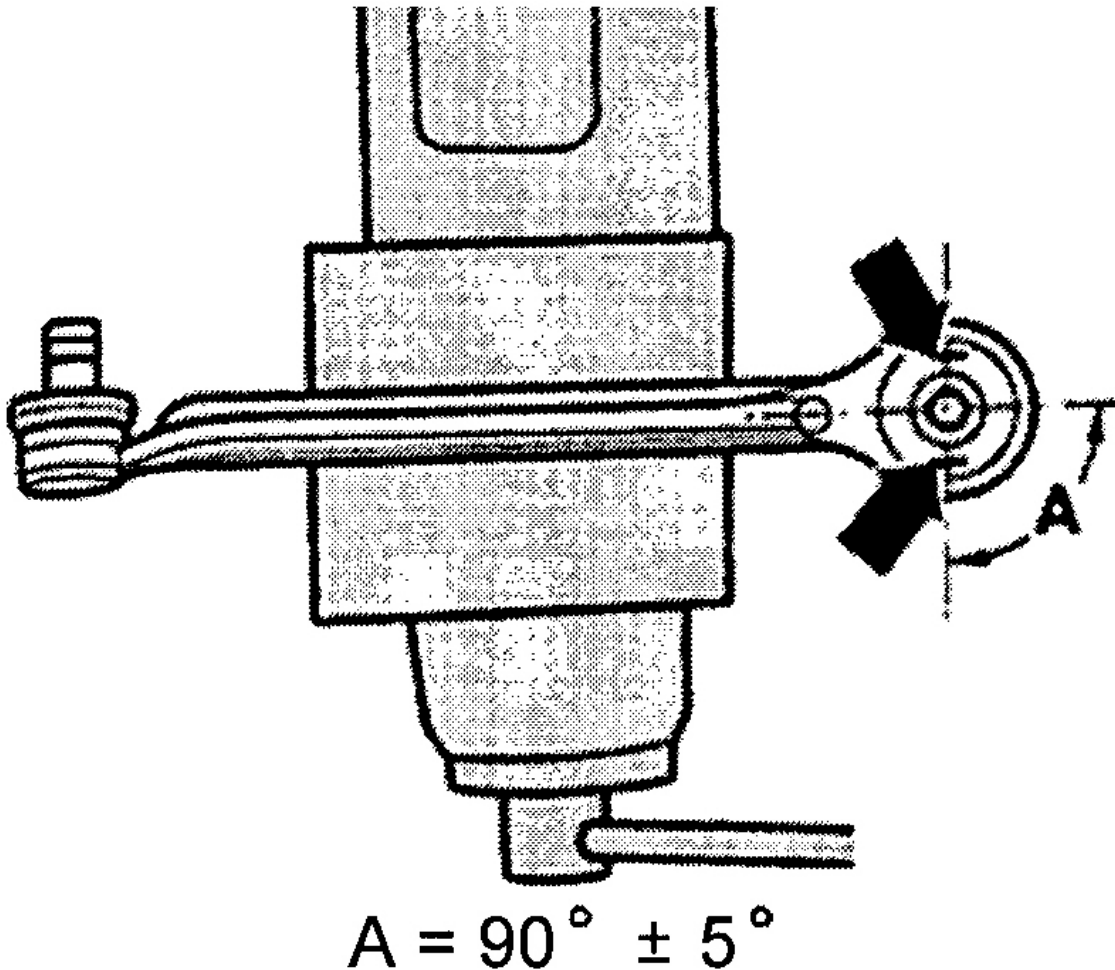
Fig. 39: Removing Upper Control Arm Bushings
Courtesy of AUDI OF AMERICA, INC.

4. Install bushing to control arm. See **Fig. 40** . Check bushing installation position. See **Fig. 41** .



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Fig. 40: Installing Upper Control Arm Bushings
Courtesy of AUDI OF AMERICA, INC.



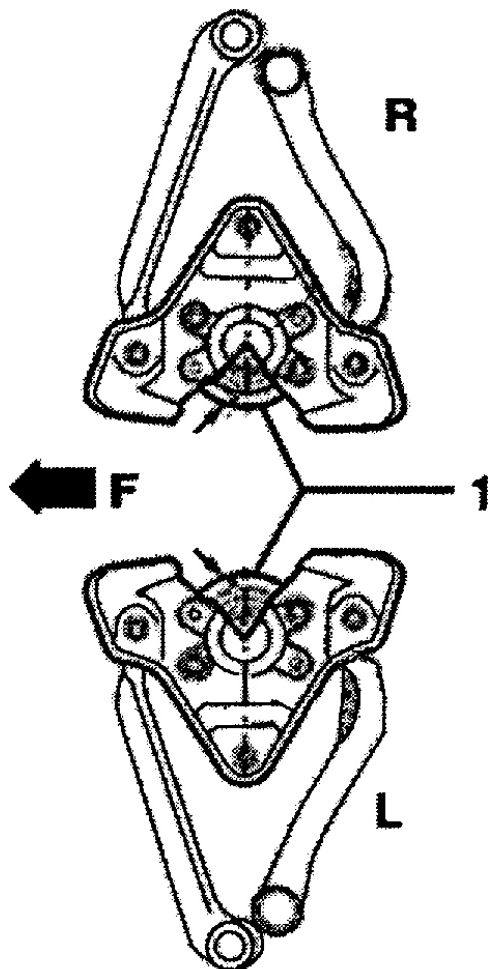
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Fig. 41: Identifying Control Arm Bushing Installation Position
Courtesy of AUDI OF AMERICA, INC.

5.

NOTE: Final tighten upper control arm-to-mounting bracket bolts/nuts with full weight of vehicle on ground (curb height).

Install upper control arms to mounting bracket. Install mounting bolts and nuts finger tight. Ensure control arms are mounted in specified position. See **Fig. 42** . Reinstall mounting bracket. Tighten all bolts and nuts to specification. See **TORQUE SPECIFICATIONS** .



1 = Suspension Strut Spring Seat

F = Direction Of Travel

L = Left Mounting Bracket

R = Right Mounting Bracket

NOTE: Holes in suspension strut spring seat must face middle of vehicle.

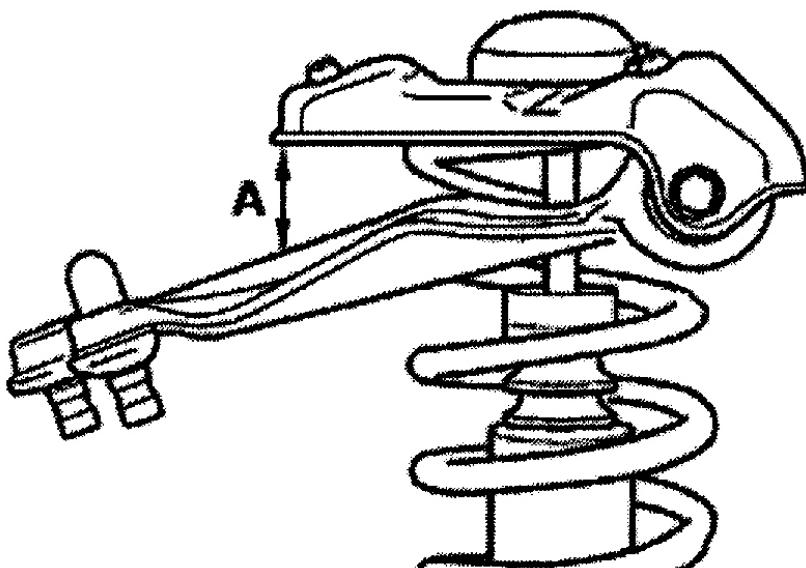


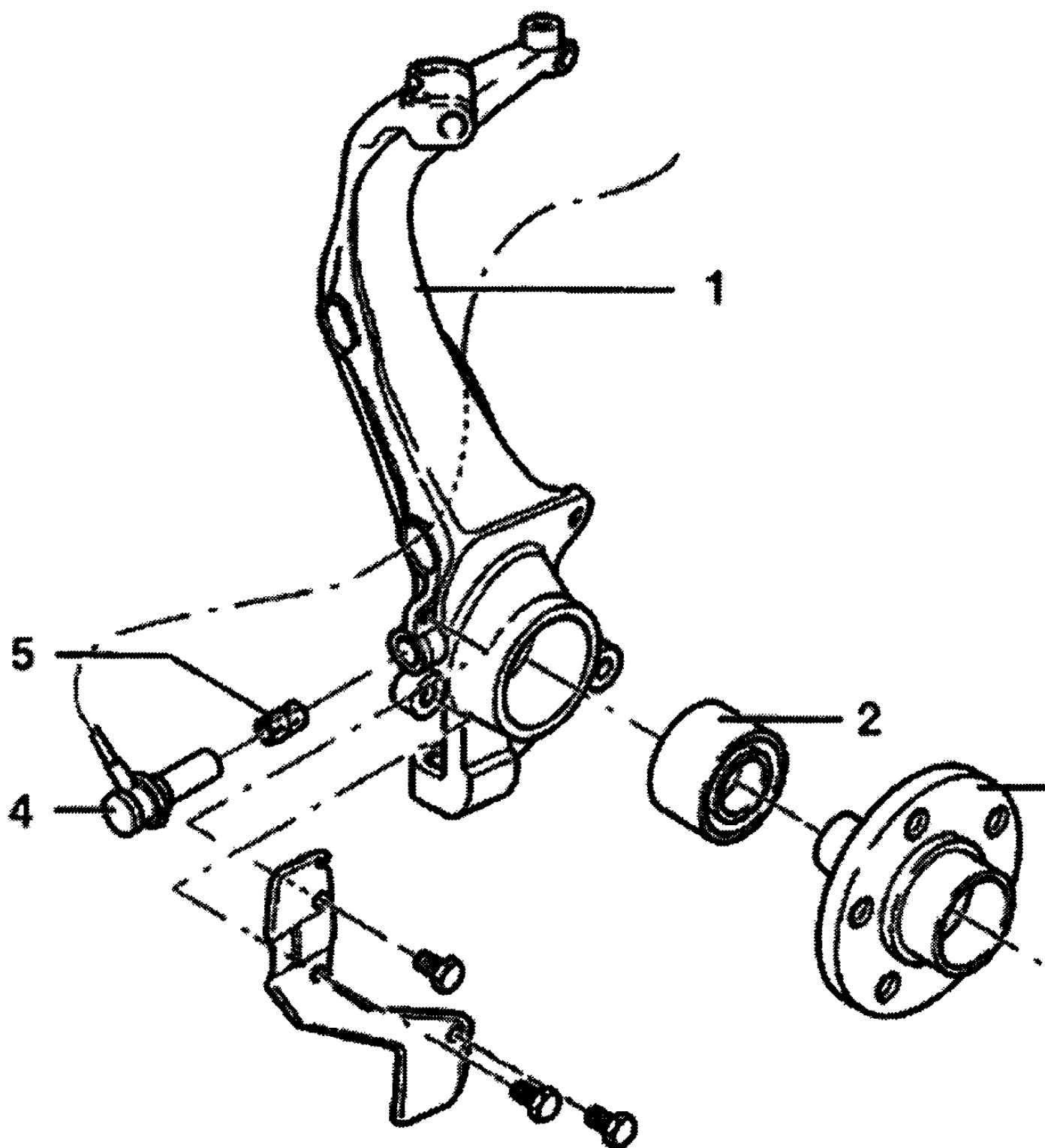
Fig. 42: Installed Position Of Upper Control Arms
Courtesy of VOLKSWAGEN UNITED STATES, INC.

WHEEL BEARINGS (WHEEL BEARING HOUSING REMOVED FROM VEHICLE)

NOTE: Wheel bearing **MUST** be replaced if removed, as removal will damage bearing. During any removal and installation procedure, if axle nut/bolt is removed or installed, do so with vehicle resting on floor at full curb weight. Always replace axle shaft self-locking nut/bolt with **NEW** parts when removed.

Removal & Installation

Remove wheel bearing housing. See **WHEEL BEARING HOUSING**. To replace wheel bearing with wheel bearing housing removed from vehicle, use following illustrations. See **Fig. 43 -Fig. 48**.



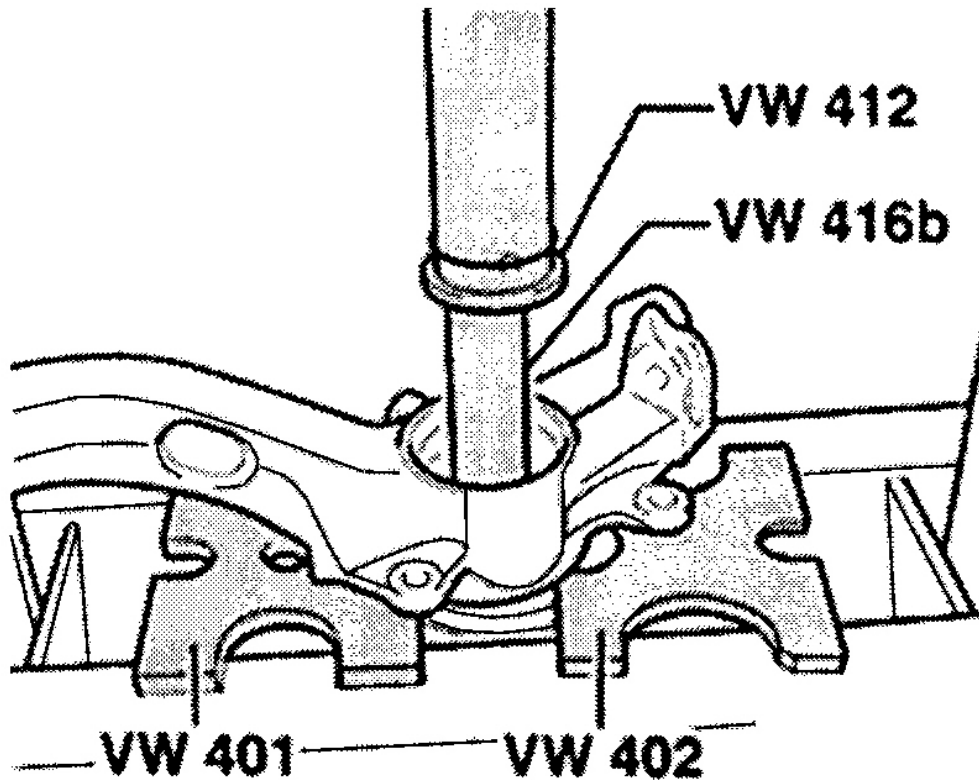
1. Wheel Bearing Housing
2. Wheel Bearing
3. Wheel Hub
4. Wheel Speed Sensor
5. Clamping Sleeve (Always Replace)

G00191477

Fig. 43: Exploded View Of Hub & Bearing Assembly (Steel Housing)

2004 Volkswagen Passat GL
SUSPENSION - FRONT

Courtesy of AUDI OF AMERICA, INC.



**Pressing wheel hub out of wheel bearing housi
with 75 mm diameter**

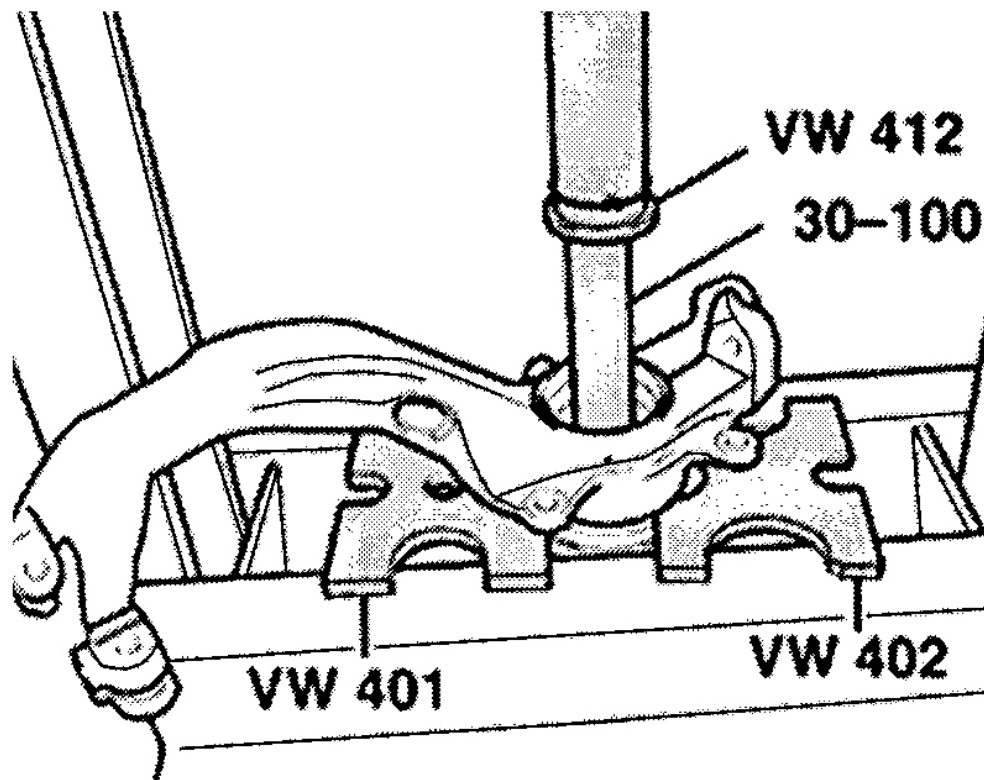
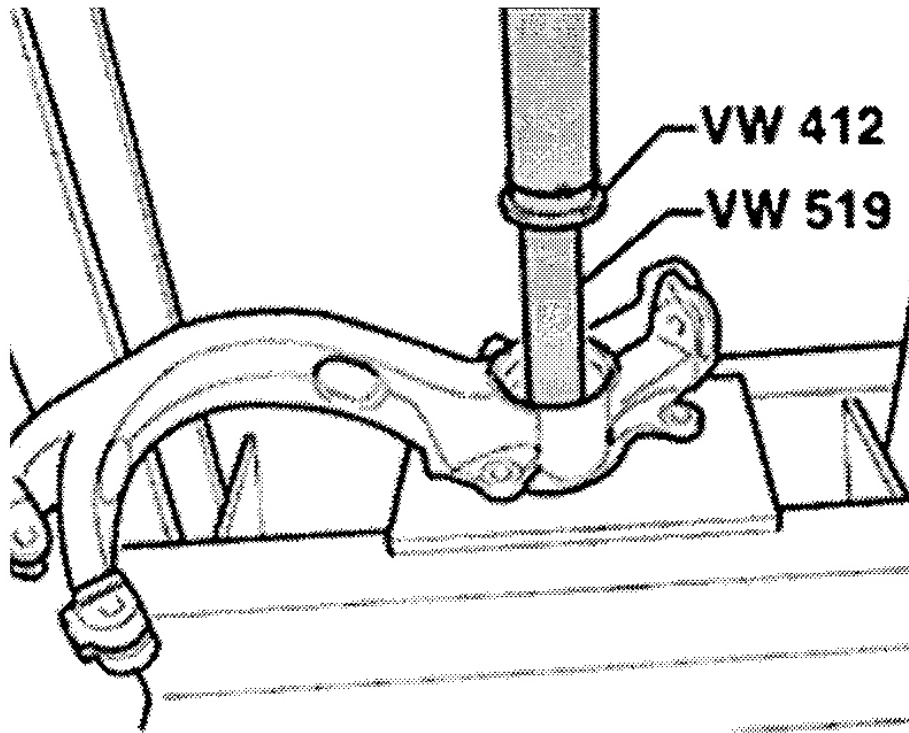
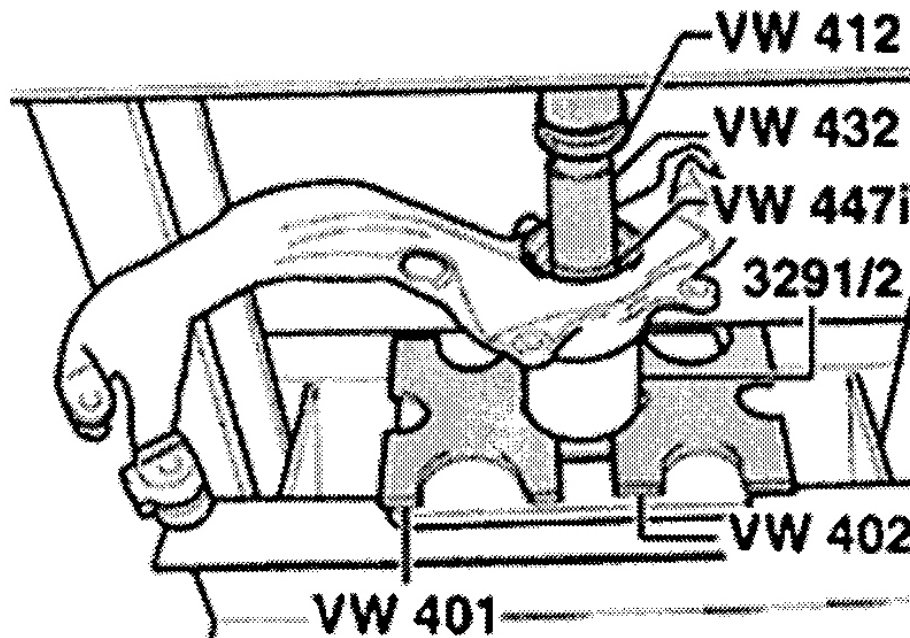


Fig. 44: Pressing Wheel Hub From Wheel Bearing
Courtesy of AUDI OF AMERICA, INC.

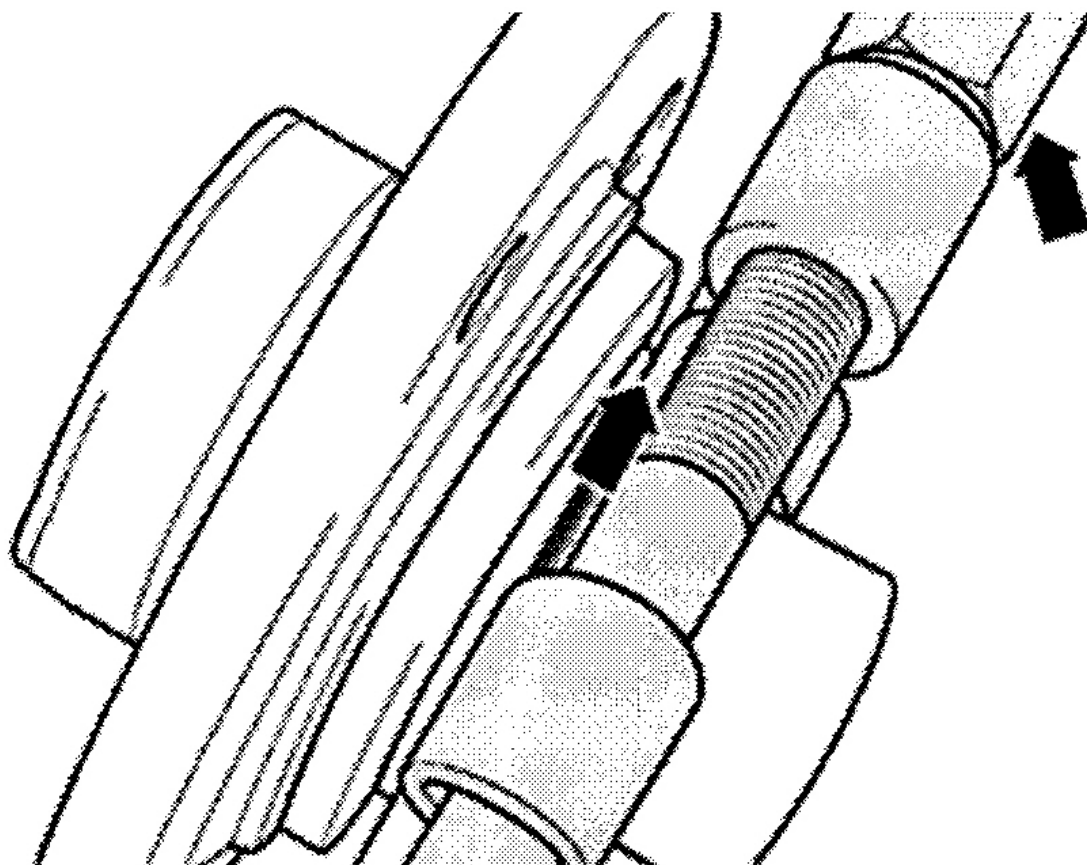


**Pressing wheel bearing out of wheel bearing housi
with 75 mm diameter**



**Pressing wheel bearing out of wheel bearing housi
with 82 mm diameter**

Fig. 45: Pressing Wheel Bearing From Wheel Bearing Housing
Courtesy of AUDI OF AMERICA, INC.



- Insert separator into ring groove of bearing inner race (arrow), and pretension with spindle.

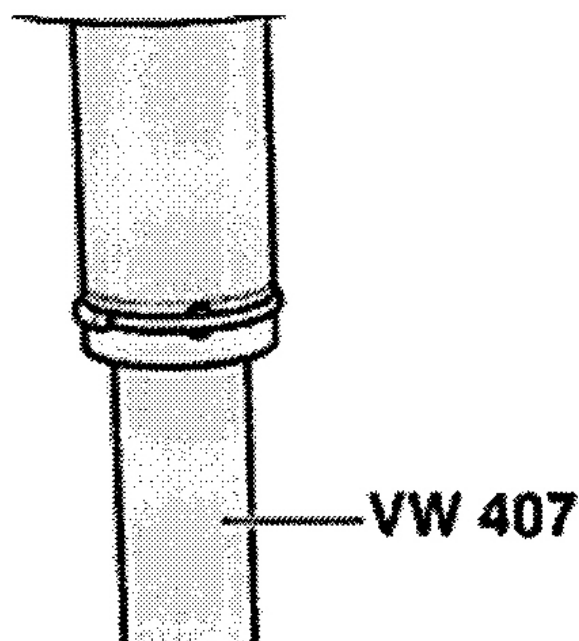
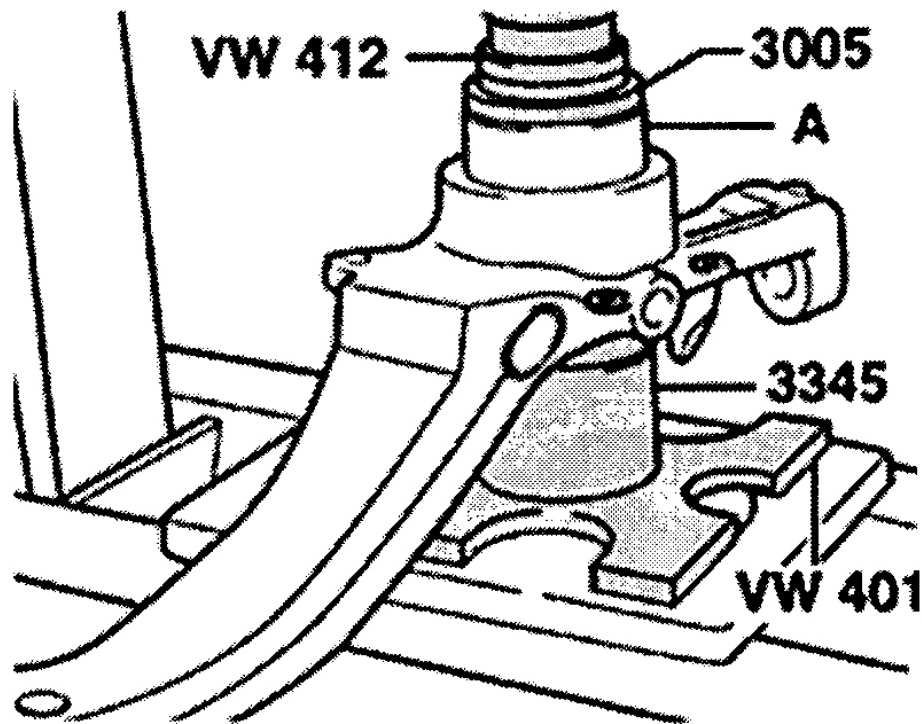


Fig. 46: Pressing Wheel Bearing Inner Race From Wheel Hub
Courtesy of AUDI OF AMERICA, INC.



Pressing wheel bearing into wheel bearing housing with 75 mm diameter

Note:

Larger inside diameter of wheel bearing faces wheel h

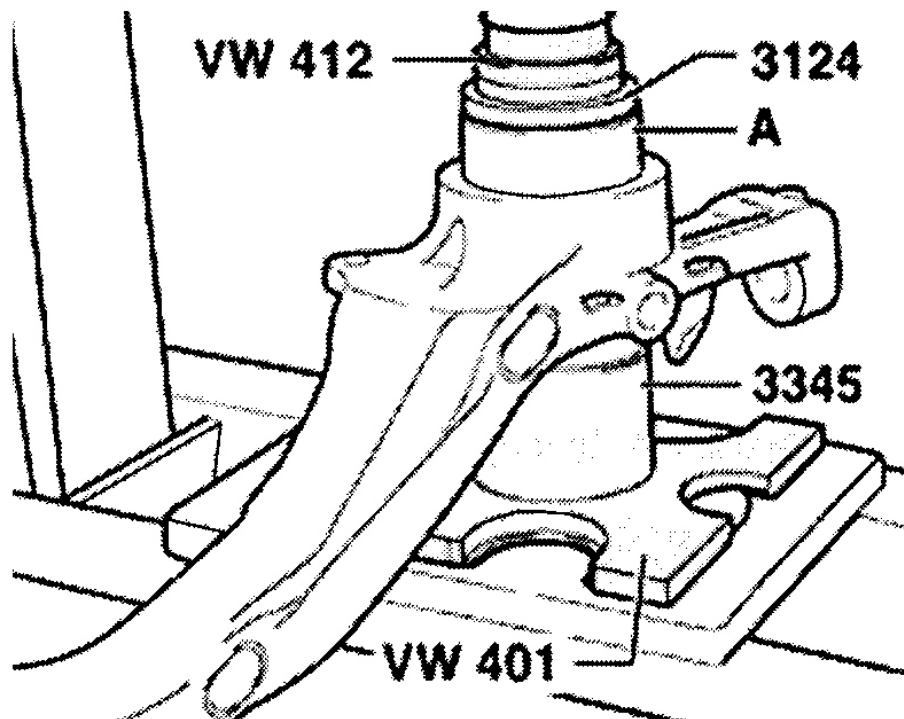
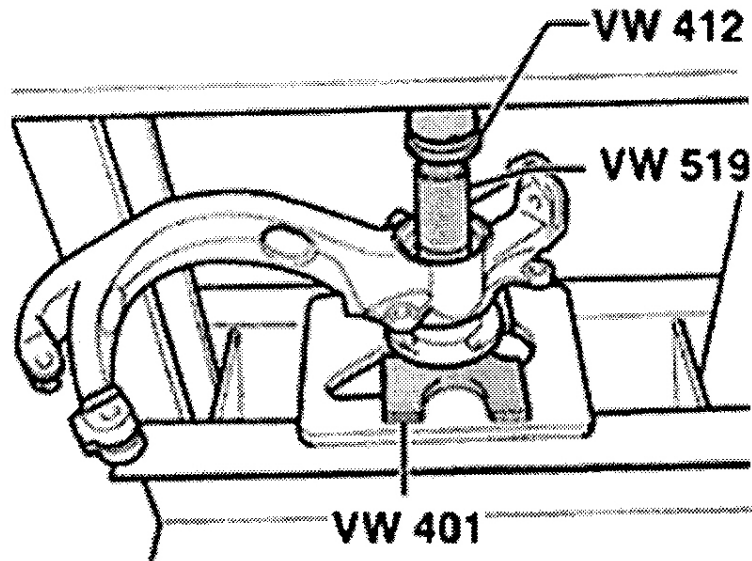
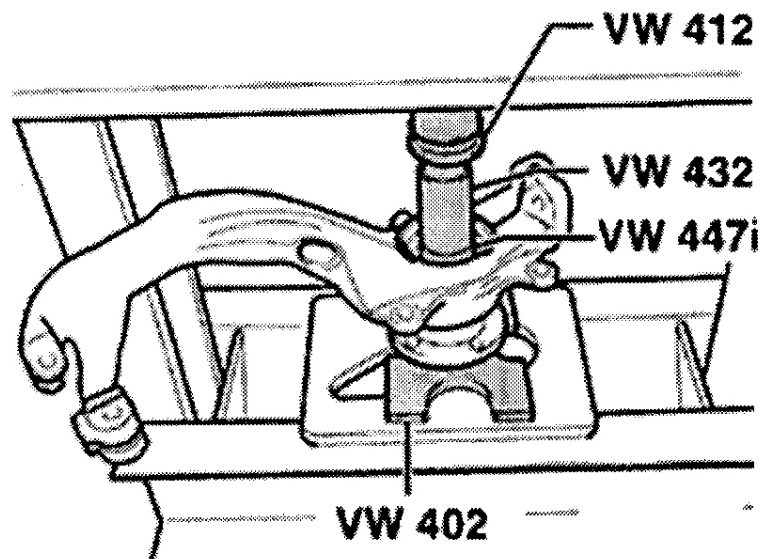


Fig. 47: Pressing Wheel Bearing Into Housing
Courtesy of AUDI OF AMERICA, INC.



Pressing wheel hub into wheel bearing with 75 mm diameter



Pressing wheel hub into wheel bearing with 82 mm diameter

Note:

Make sure that dead weight of wheel bearing housing does not pre on wheel hub. This can damage wheel bearing.

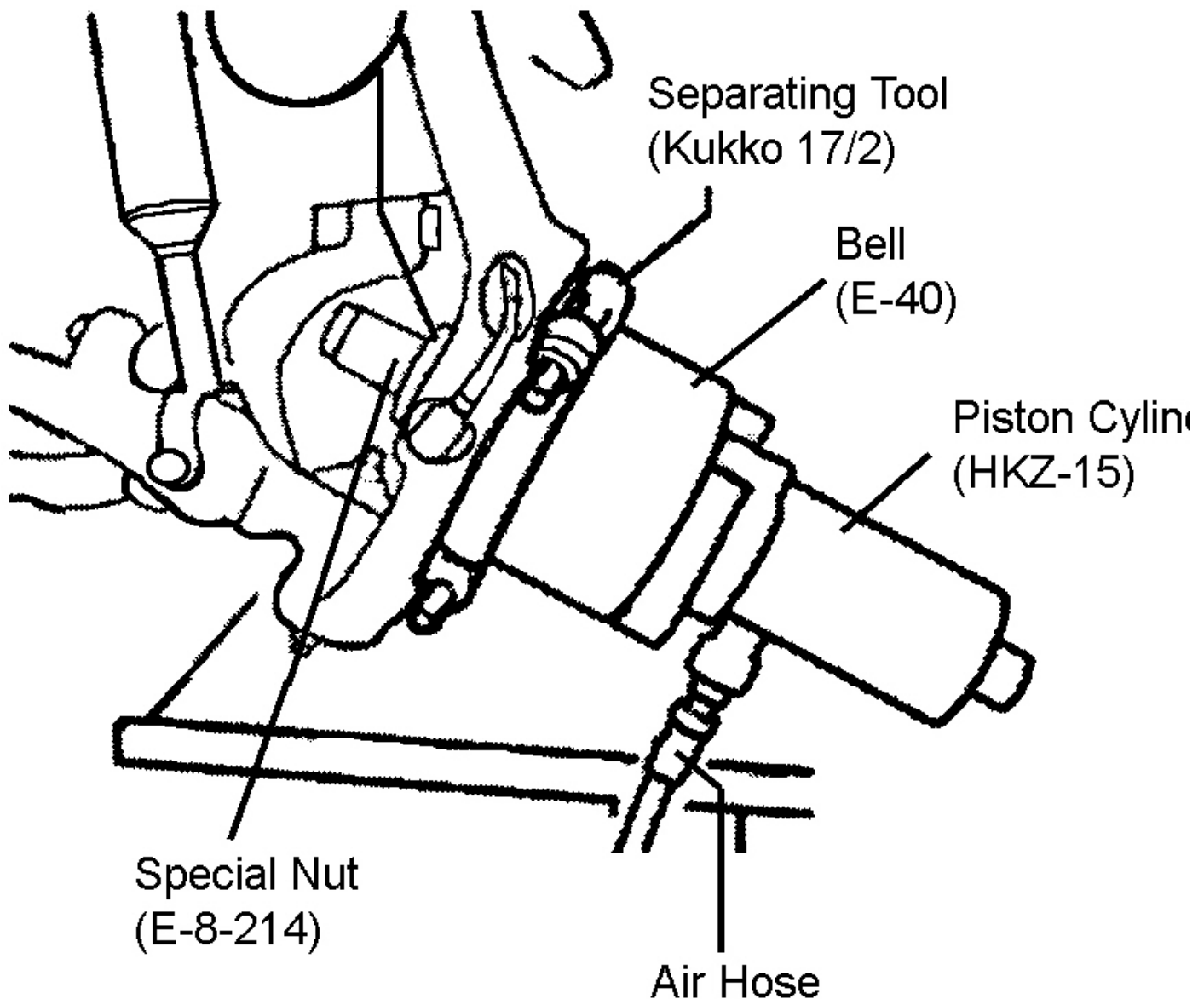
- When pressing in, pressure piece (VW519 or VW447i) may only lie against bearing inner race.

Fig. 48: Pressing Wheel Hub Into Wheel Bearing
Courtesy of AUDI OF AMERICA, INC.

WHEEL BEARINGS (WHEEL BEARING HOUSING ON VEHICLE)

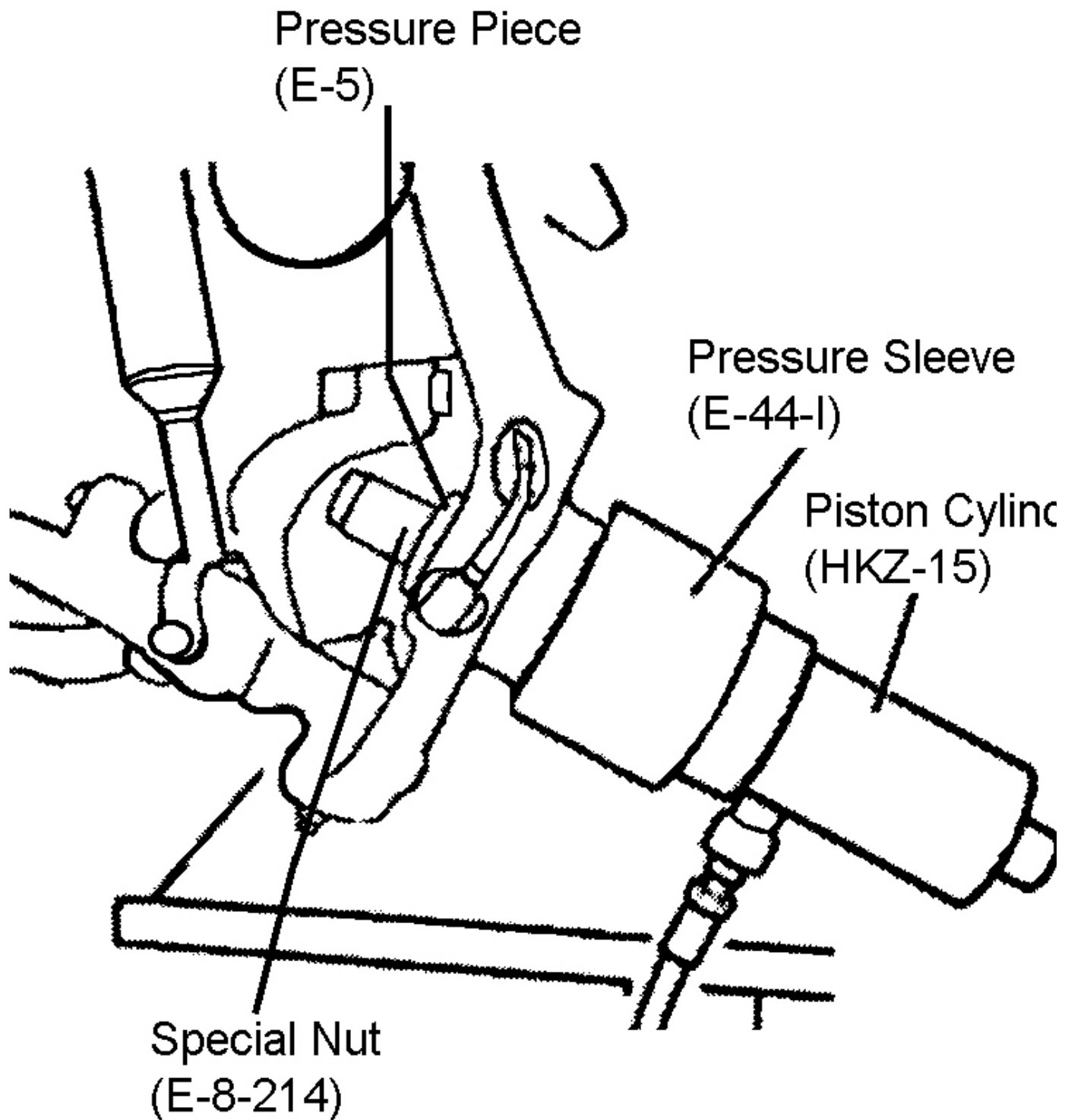
NOTE: Wheel bearing **MUST** be replaced if removed, as removal will damage it. During any removal and installation procedure, if axle nut/bolt is removed or installed, do so with vehicle resting on floor at full curb weight. Always replace axle shaft self-locking nut/bolt with **NEW** parts when removed.

Wheel bearing can be replaced without removing wheel bearing housing from vehicle. Using or equivalent, follow manufactures instructions to remove and install wheel bearing. See **Fig. 49 -Fig. 52** .



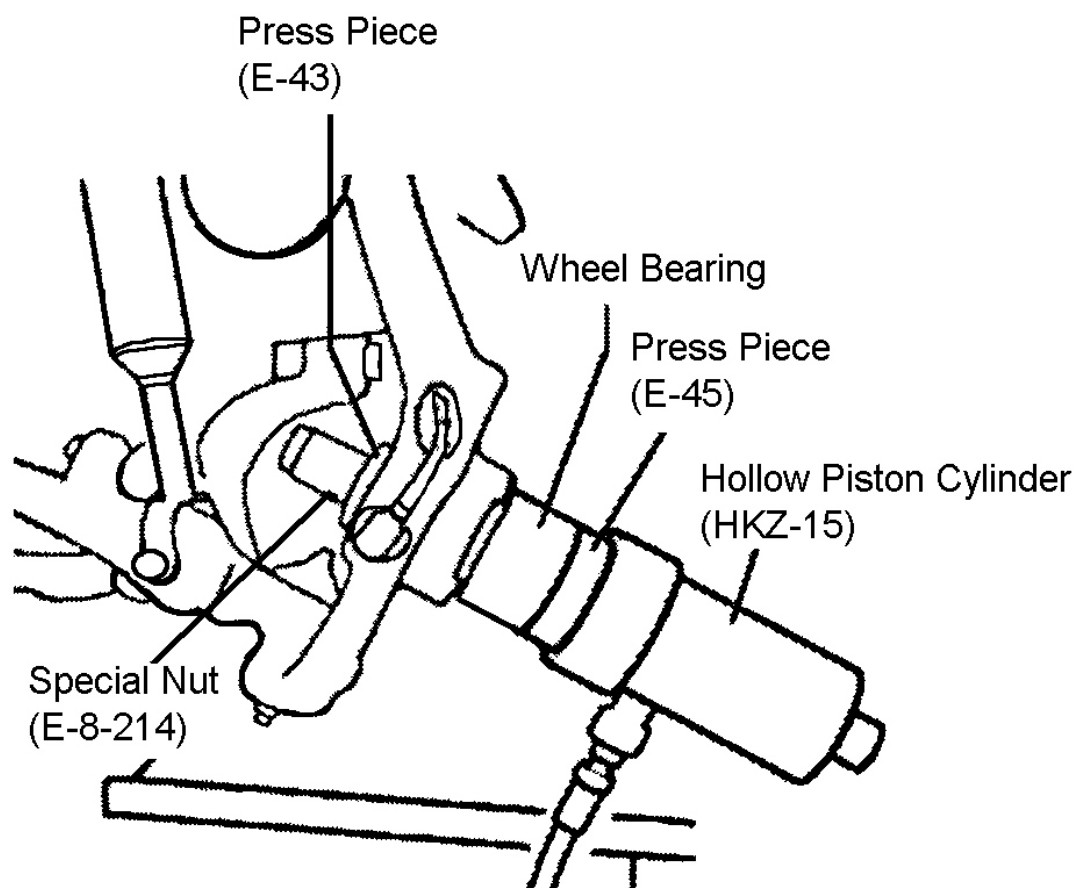
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Fig. 49: Removing Hub From Wheel Bearing Housing (On-Vehicle)
Courtesy of AUDI OF AMERICA, INC.



G00283751

Fig. 50: Removing Wheel Bearing From Housing (On-Vehicle)
 Courtesy of AUDI OF AMERICA, INC.

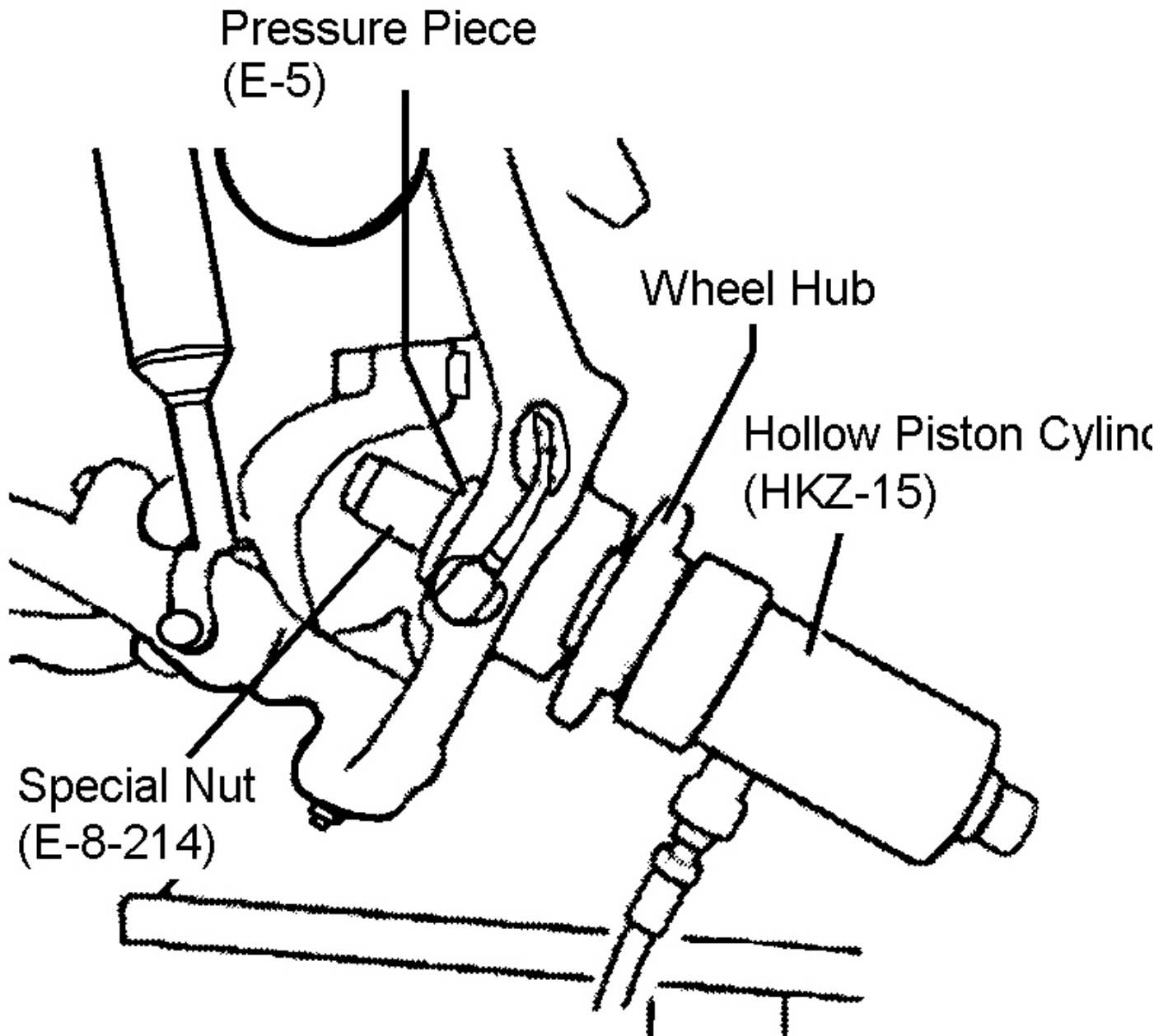


G00283752

Fig. 51: Installing Wheel Bearing In Housing (On-Vehicle)

Courtesy of AUDI OF AMERICA, INC.

NOTE: Use press to replace wheel bearing inner race on hub.



G00283753

Fig. 52: Installing Hub In Housing (On-Vehicle)

Courtesy of AUDI OF AMERICA, INC.

WHEEL BEARING HOUSING

NOTE: During any removal and installation procedure, if axle nut/bolt is removed or installed, do so with vehicle resting on floor at full curb weight. Always replace axle shaft self-locking nut/bolt with NEW parts when removed.

Fastener Replacement Precautions

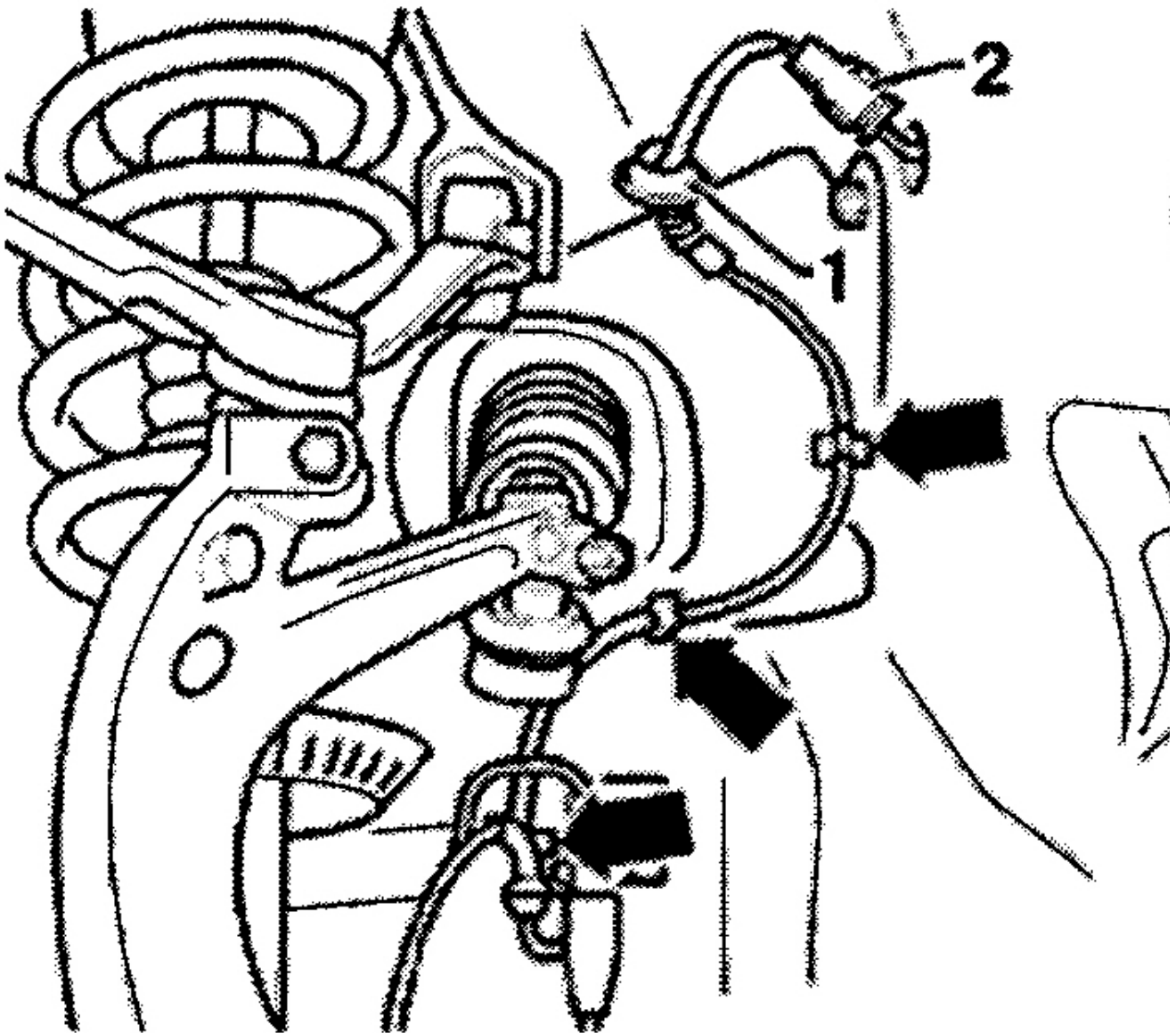
Manufacturer recommends replacing the following fasteners, if they are removed:

- Lower control arm ball joint nut

- Guide control arm ball joint nut
- Tie rod end self-locking nut
- Upper control arm pinch bolt and nut in wheel bearing housing

Removal

1. With vehicle resting on ground, remove hubcap. Loosen drive axle bolt, but do not remove. Raise and support vehicle. Remove wheel(s). Loosely install wheel lugs.
2. Remove ABS wheel speed sensor from wheel bearing housing. Remove brake caliper, brake pads and brake pad carrier. Support brake caliper with mechanics wire. DO NOT allow caliper hang by brake hose. Remove lug bolts and slide rotor from hub.
3. Remove bolts from backing plate, and remove backing plate. Remove rubber grommet and disconnect ABS speed sensor harness connector. See **Fig. 53** . Remove speed sensor cable from guides, and guide cable through openings in wheel bearing housing and remove speed sensor.

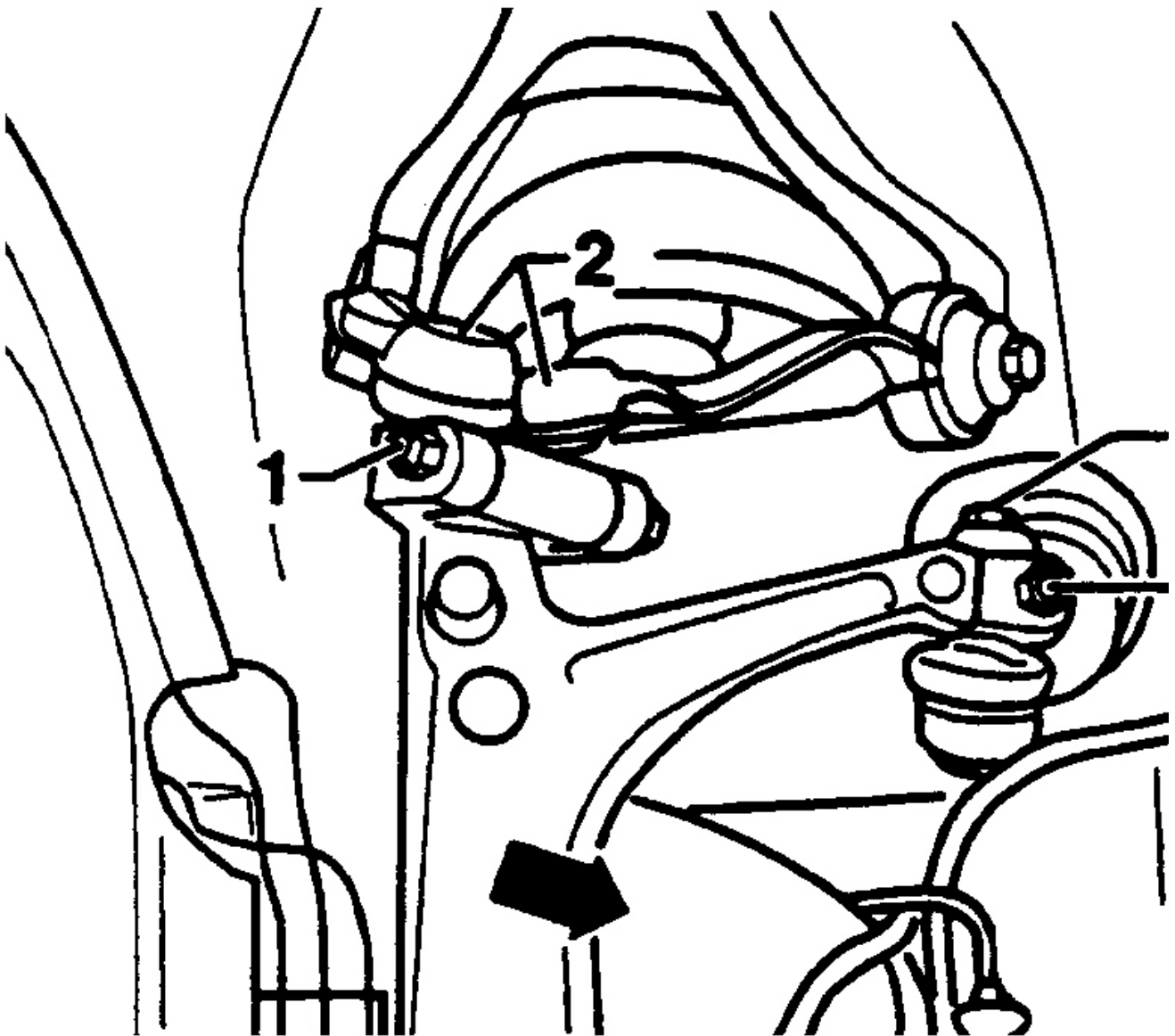


G00191475

Fig. 53: Removing ABS Wheel Speed Sensor Harness

Courtesy of AUDI OF AMERICA, INC.

4. On vehicles equipped with headlight vertical aim control, disconnect coupling rod from vehicle level sensor. See **Fig. 3**.
5. Remove hex bolt (3) and nut (4) from tie rod end. See **Fig. 54**. Pull out tie rod end. Remove nut from joint pin (1).

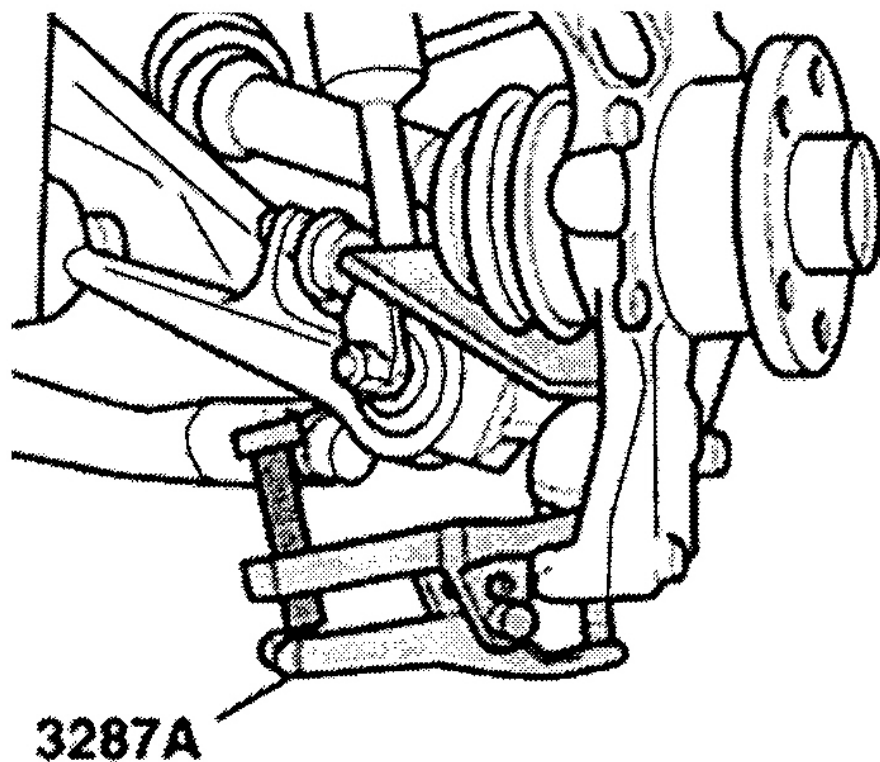
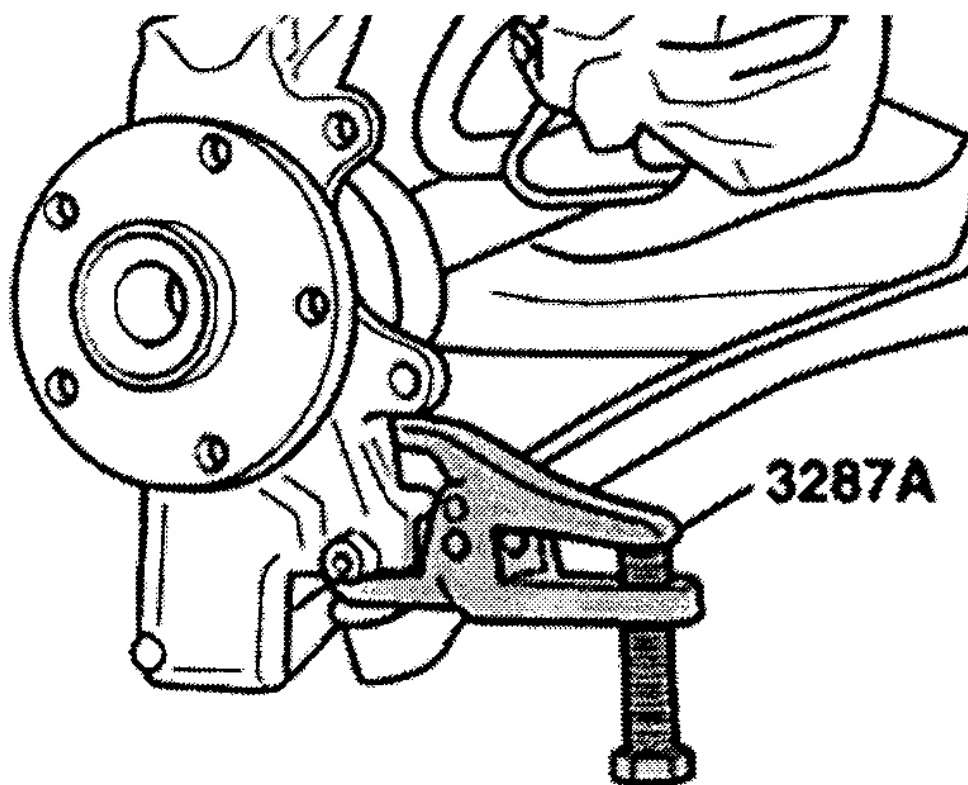


G00283750

Fig. 54: Identifying Tie Rod End & Upper Control Arm Nut

Courtesy of AUDI OF AMERICA, INC.

6. Remove guide control arm ball joint nut. Separate ball joint from wheel bearing housing using Press Tool (3287A). See **Fig. 55**. Loosen, but do not remove lower control arm ball joint nut. Being careful not to damage CV boot, use Press Tool (3287A) to press lower control arm joint from wheel bearing housing. See **Fig. 55**. Remove lower control arm ball joint nut. Separate lower control arm from wheel bearing housing.



G00191476

Fig. 55: Separating Lower Control Arm & Guide Control Arm From Wheel Bearing Housing
Courtesy of AUDI OF AMERICA, INC.

7.

CAUTION: The slits in the wheel bearing housing must not be widened using a chisel or similar tool! If the hex bolt cannot be removed from the wheel bearing housing, then the hex bolt and control arms must be pressed out of wheel bearing housing. See **SEPARATING CONNECTIONS BETWEEN UPPER CONTROL ARMS & WHEEL BEARING HOUSING** .

Remove upper control arm nut and bolt. Pull both upper control arm upward from wheel bearing housing. Swing wheel bearing housing away to side; when doing this remove drive axle pin from wheel hub. Take off wheel bearing housing.

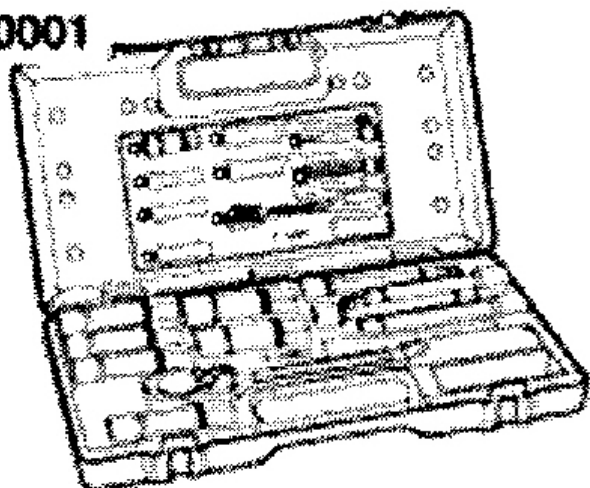
Installation

1. Install wheel bearing housing. Install lower control arm and control arm ball joints into wheel bearing housing.
2. Screw on NEW self-locking nut on lower control arm and guide control arm ball joints. Tighten to specification. See **TORQUE SPECIFICATIONS** . Counter hold joint pin with 4 mm hex key, if necessary.
3. Install outer drive axle joint into hub. HAND tighten with a new hex bolt. Bolt will be final tightened with vehicle on ground.
4. Insert upper control arms into wheel bearing housing. Insert NEW bolt and tighten NEW nut. See **TORQUE SPECIFICATIONS** . Push upper control arms down as far as possible while tightening bolts.
5. Install tie rod end into wheel bearing housing. Tighten hex bolt. See **TORQUE SPECIFICATIONS** . Screw on NEW self-locking nut and tighten.
6. Install ABS speed sensor. Install brake backing plate.
7. Install disc and brake caliper. See **TORQUE SPECIFICATIONS** .
8. Install wheel and tighten wheel bolts. See **TORQUE SPECIFICATIONS** .
9. Lower vehicle to ground. Final tighten NEW drive axle collar bolt.
10. Check wheel alignment. See **SPECIFICATIONS & PROCEDURES - PASSAT** article in WHEEL ALIGNMENT.

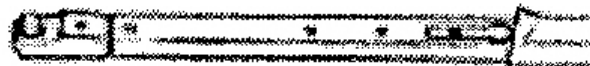
SPECIAL TOOLS

Use following illustrations in identifying special tools used during servicing. See **Fig. 56 -Fig. 63** .

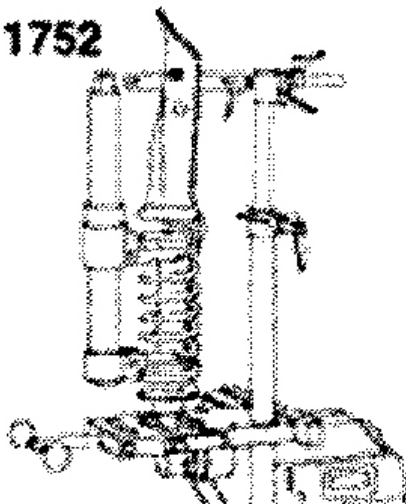
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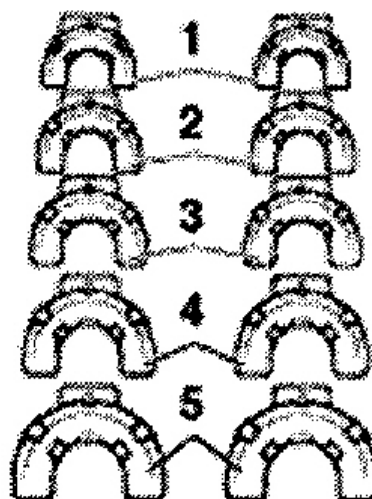
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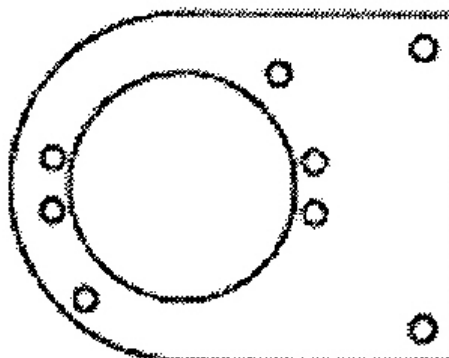
V.A.G 1752



V.A.G 1752/3-7



V.A.G 1752/8

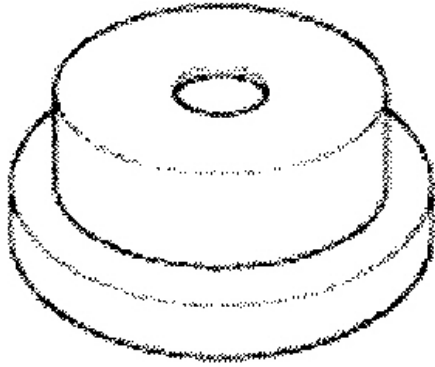


Coil Spring

G00222155

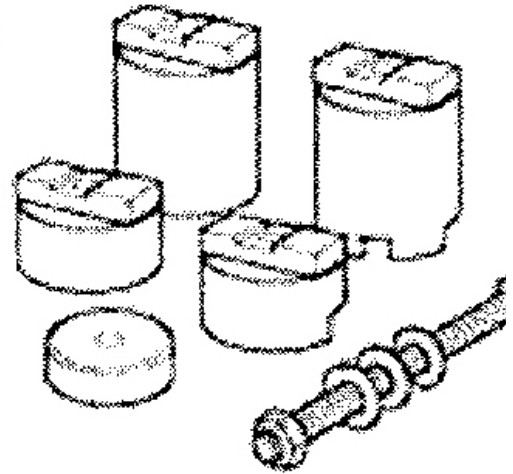
Fig. 56: Identifying Special Tools For Replacing Strut Components
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

30-205



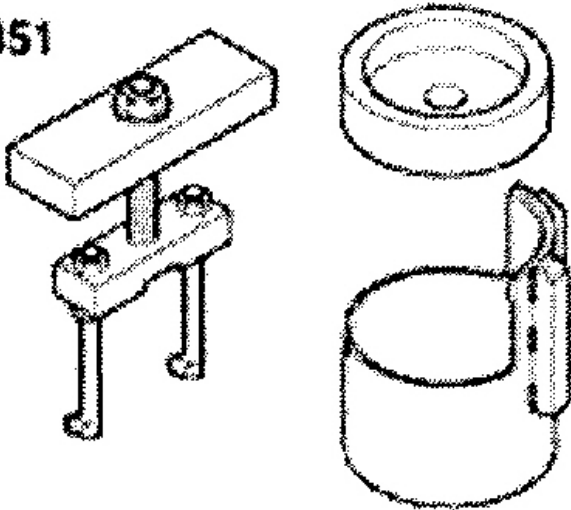
Thrust plate

3291



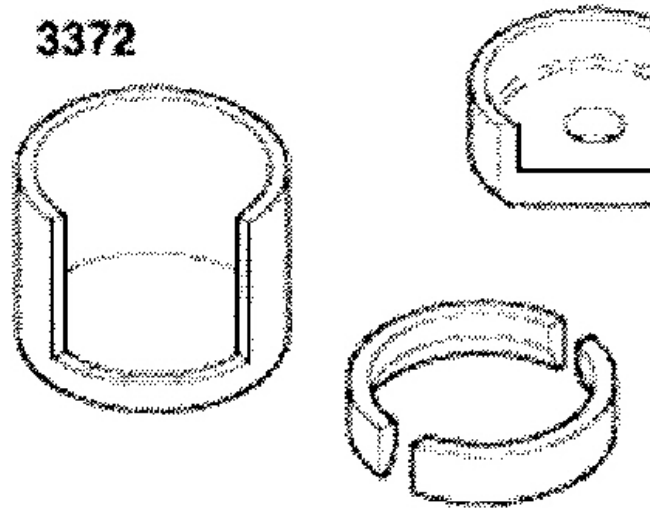
Assembly tool

3351



Puller

3372



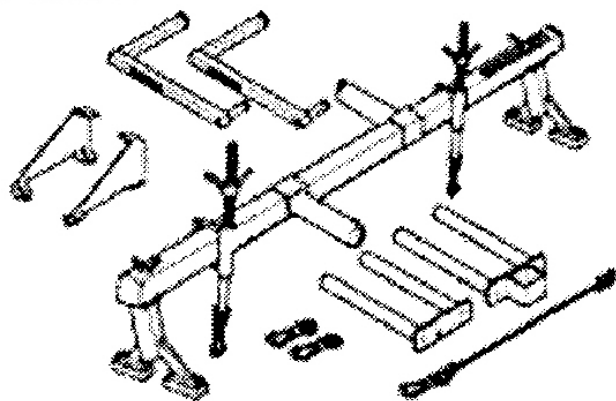
Removal tool

Subframe Mountings

G00222156

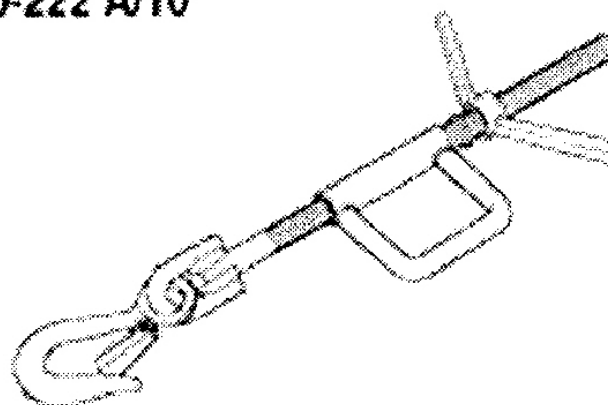
Fig. 57: Identifying Special Tools For Replacing Subframe Bushings
 Courtesy of VOLKSWAGEN UNITED STATES, INC.

10-222 A



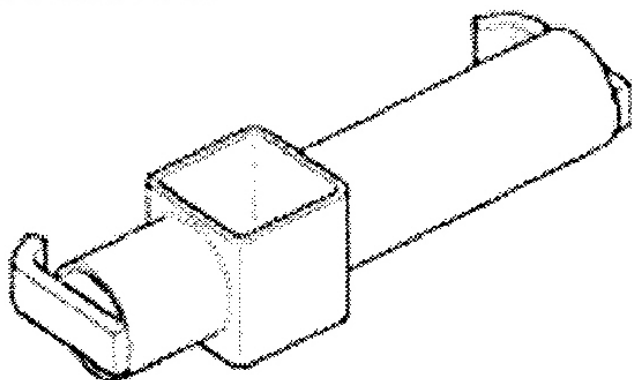
Support

10-222 A/10



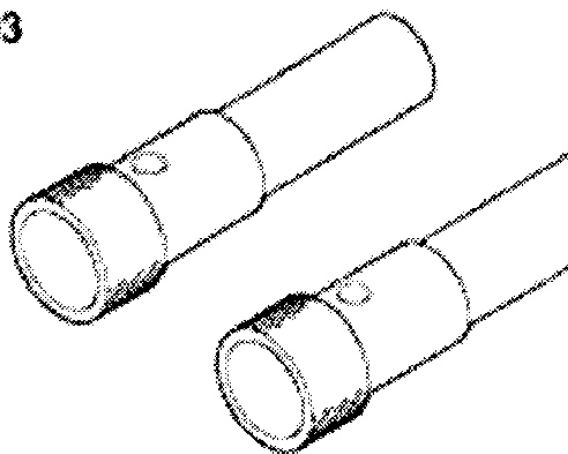
Additional spindle

10-222 A/18



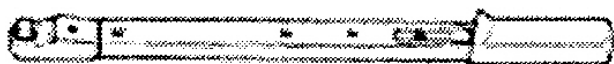
Adapter

3393



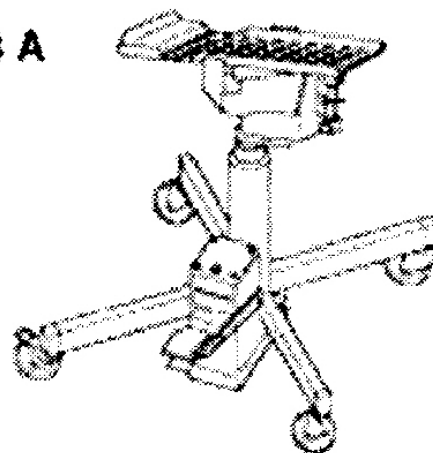
Test mandrel

V.A.G 1332



Torque wrench

V.A.G 1383 A

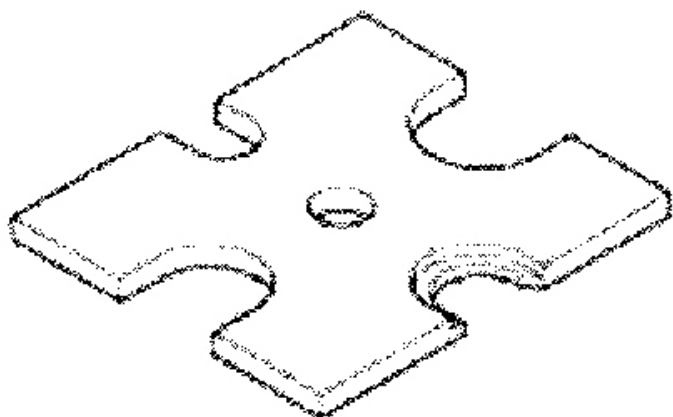


Engine/transmission jack

2004 Volkswagen Passat GL
SUSPENSION - FRONT

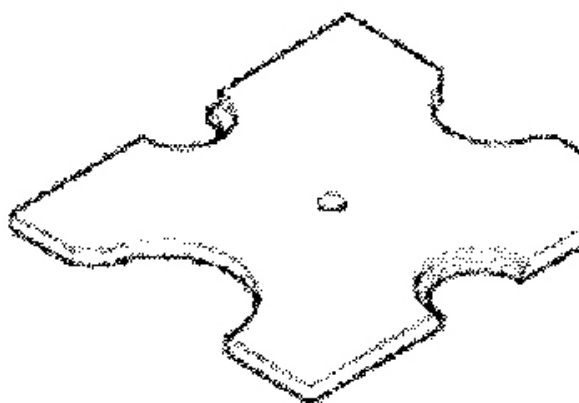
Fig. 58: Identifying Special Tools For Removing/Installing Subframe
Courtesy of VOLKSWAGEN UNITED STATES, INC.

VW 401



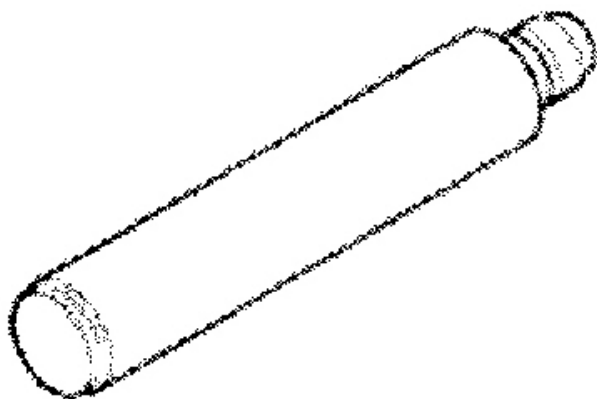
Thrust plate

VW 402



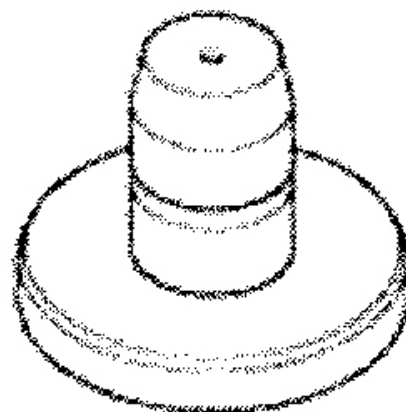
Thrust plate

VW 407



Press tool

VW 412



Press tool

VW 416 B



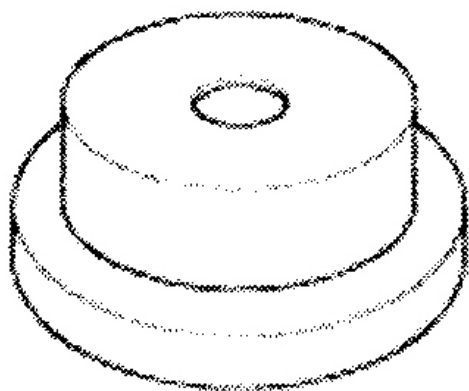
VW 432



2004 Volkswagen Passat GL
SUSPENSION - FRONT

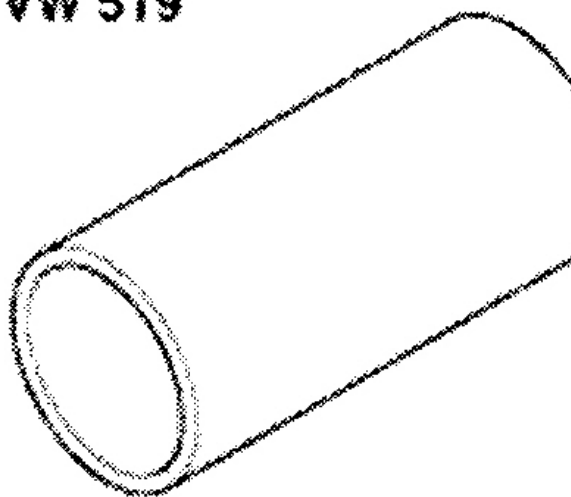
Fig. 59: Identifying Special Tools For Replacing Wheel Bearing (1 Of 3)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

VW 447 i



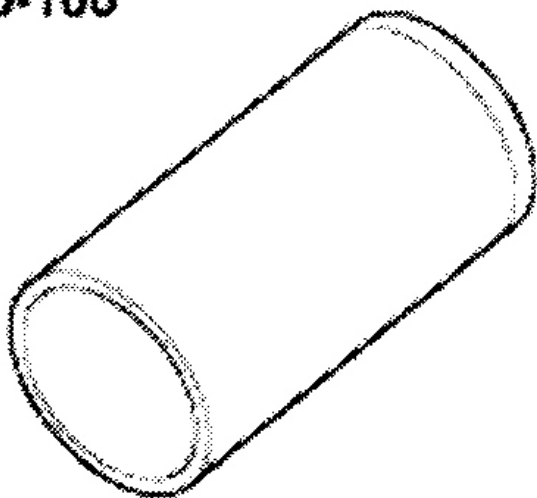
Thrust plate

VW 519



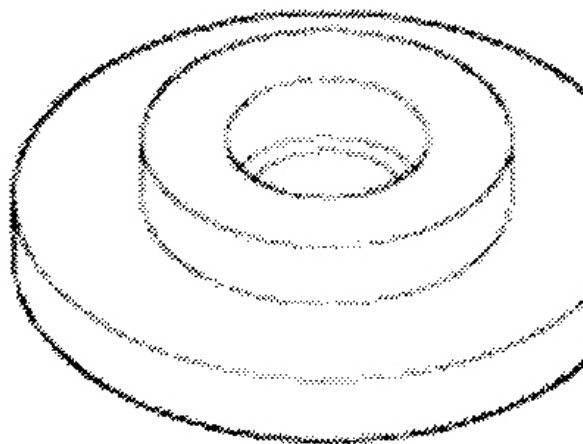
Tube

30-100



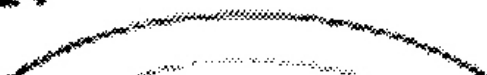
Drift sleeve

3005



Press disk

3124



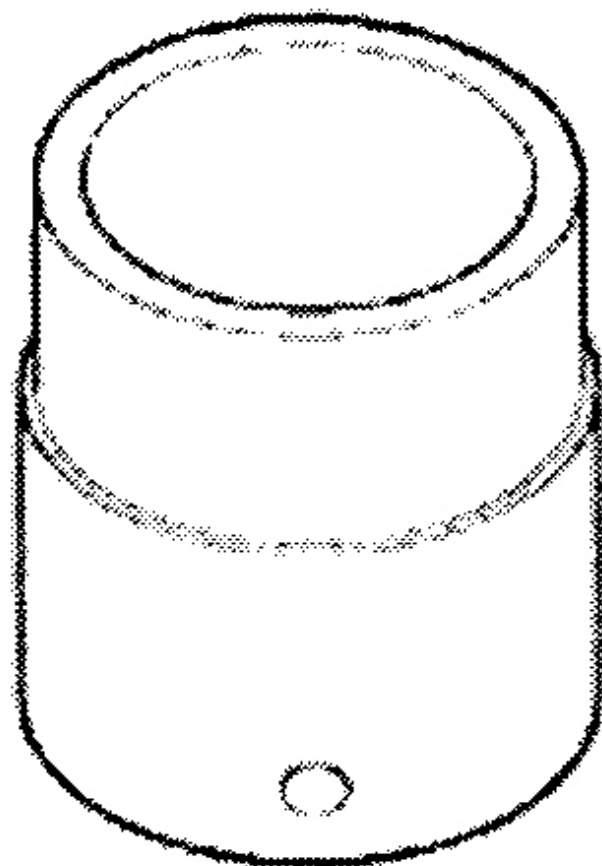
3291



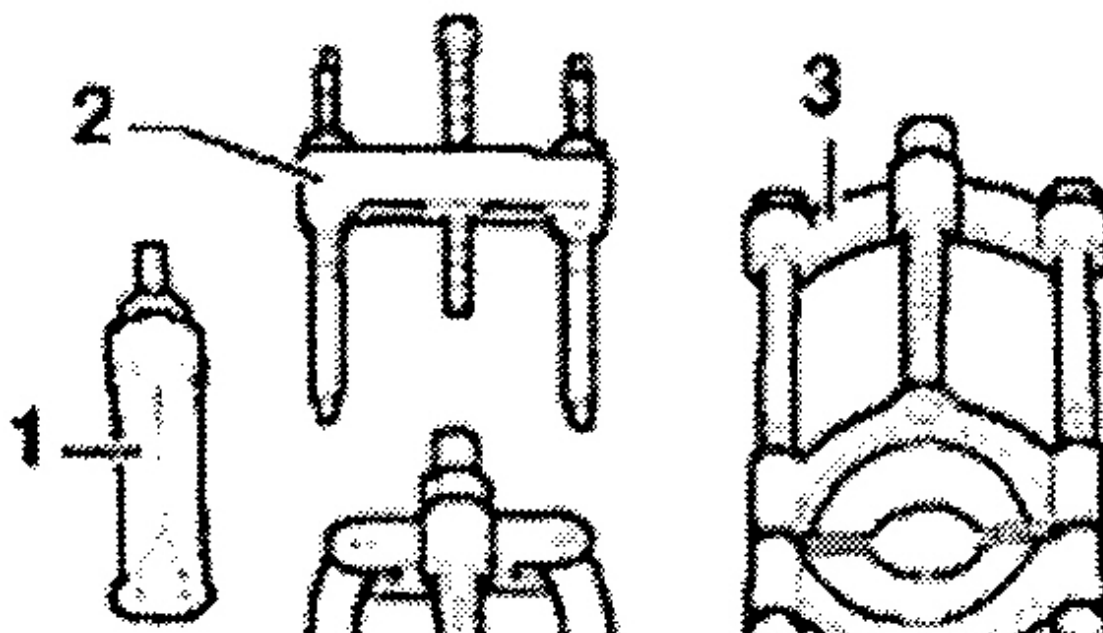
2004 Volkswagen Passat GL
SUSPENSION - FRONT

Fig. 60: Identifying Special Tools For Replacing Wheel Bearing (2 Of 3)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

3345



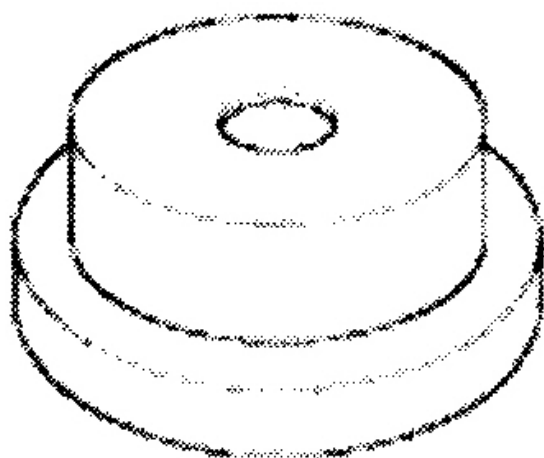
Wheel bearing tube



2004 Volkswagen Passat GL
SUSPENSION - FRONT

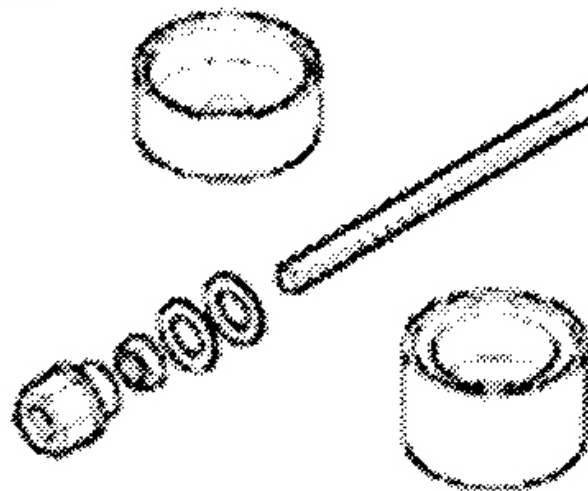
Fig. 61: Identifying Special Tools For Replacing Wheel Bearing (3 Of 3)
Courtesy of VOLKSWAGEN UNITED STATES, INC.

30-205



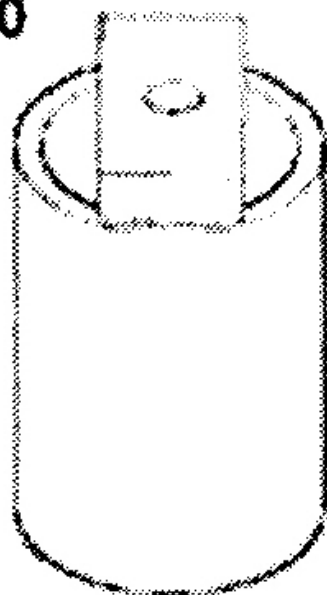
Thrust Plate

3346



Assembly tool

3350



Tube

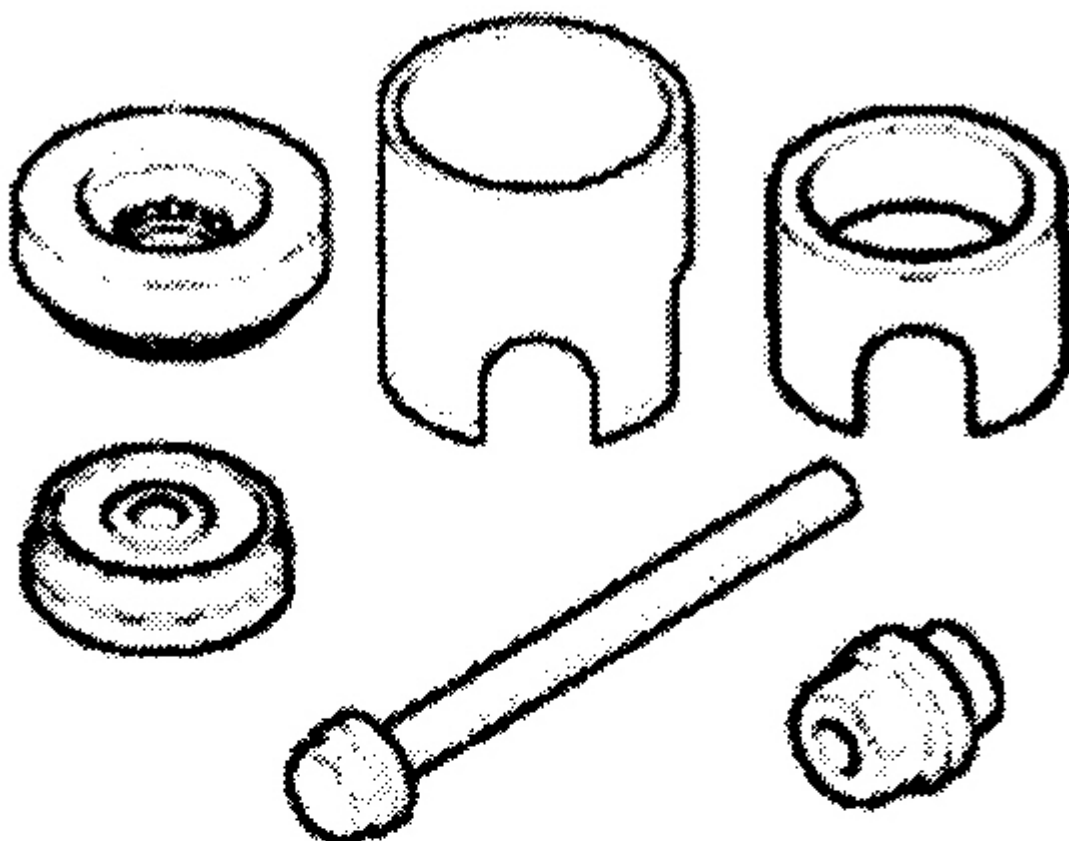


Control arm mountings

2004 Volkswagen Passat GL
SUSPENSION - FRONT

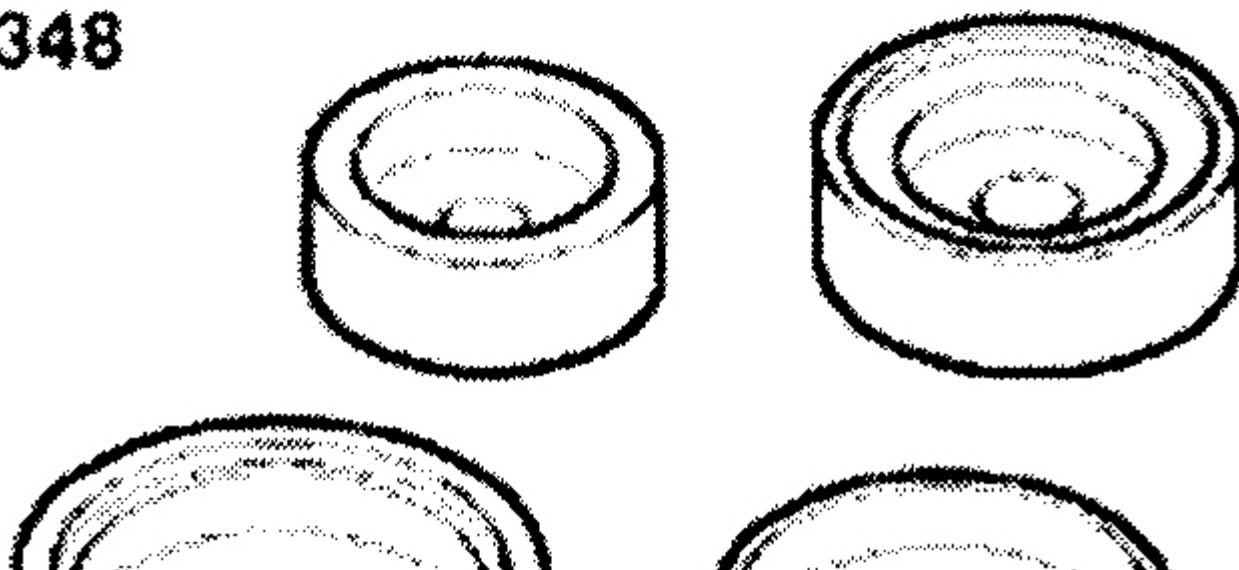
Fig. 62: Identifying Special Tools For Replacing Lower Control Arm Bushings
Courtesy of VOLKSWAGEN UNITED STATES, INC.

3301



Assembly tool

3348



2004 Volkswagen Passat GL

SUSPENSION - FRONT

Fig. 63: Identifying Special Tools For Replacing Upper Control Arm Bushings

Courtesy of VOLKSWAGEN UNITED STATES, INC.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Brake Caliper	
Guide Pin-To-Caliper Carrier (Single Piston Caliper)	18 (25)
Guide Pin-To-Caliper Carrier (2-Piston Caliper)	18 (25)
Caliper-To-Wheel Bearing Housing (2-Piston Fixed Caliper)	140 (190)
Drive Axle Collar Bolt M14 (Tighten With Wheels On Ground) ⁽¹⁾	
Step 1	85 (115)
Step 2	Plus 180° (1/2) Turn
Drive Axle Collar Bolt M16 (Tighten With Wheels On Ground) ⁽¹⁾	
Step 1	140 (190)
Step 2	Plus 180° (1/2) Turn
Driveshaft Flange-To-Transmission Flange Self-Locking Bolt ⁽¹⁾	
AWD Vehicles	41 (55)
Guide Control Arm-To-Subframe Nut & Bolt ⁽¹⁾⁽²⁾	
Step 1	60 (80)
Step 2	Plus 180° (1/2) Turn
Guide Control Arm Ball Joint Self-Locking Nut ⁽¹⁾	
Flange Nut	74 (100)
Combination Nut	92 (125)
Lower Control Arm Ball Joint Nut ⁽¹⁾	
Flange Nut	74 (100)
Combination Nut	92 (125)
Lower Control Arm-To-Subframe Nut ⁽¹⁾ , ⁽²⁾	
Step 1	60 (80)
Step 2	Plus 90° (1/4) Turn
Mounting Bracket-To-Body Bolt	55 (75)
Stabilizer Bar Lower Coupling Link Self-Locking Nut ⁽¹⁾	
Step 1	30 (40)
Step 2	Plus 90° (1/4) Turn
Stabilizer Bar-To-Subframe Bracket Nut	18 (25)
Strut Piston Rod Nut	37 (50)
Strut-To-Mounting Bracket Nuts ⁽¹⁾	16 (22)
Strut-To-Lower Control Arm Nut ⁽¹⁾ , ⁽²⁾	66 (90)
Subframe Bolt (Front, M10 x 70) ⁽¹⁾	55 (75)
Subframe Bolt (Front, M12 x 110) ⁽¹⁾	

2004 Volkswagen Passat GL

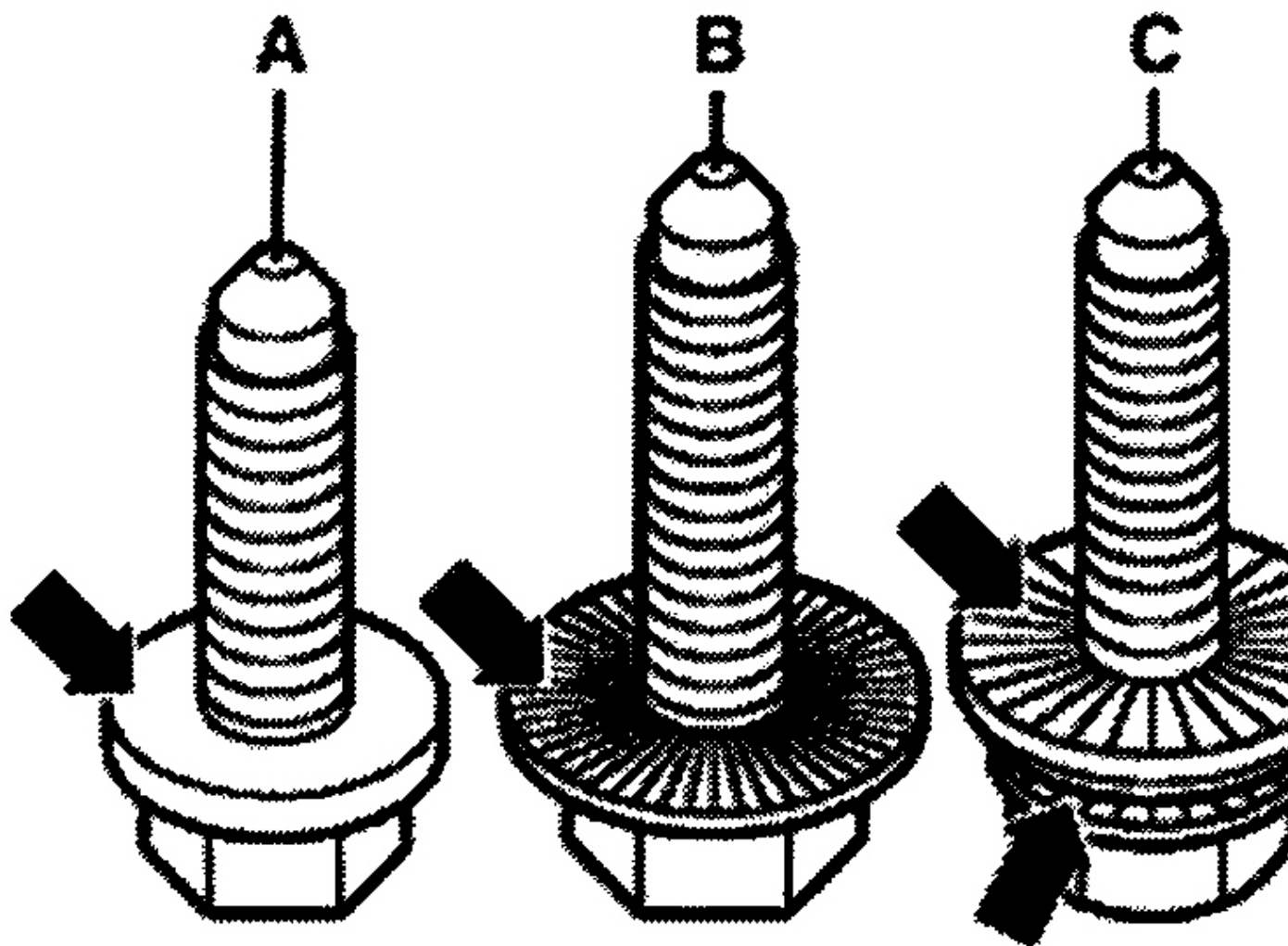
SUSPENSION - FRONT

Step 1	81 (110)
Step 2	Plus 90° (1/4) Turn
Subframe Bolt (Rear, M12 x 110) ⁽¹⁾	
Step 1	81 (110)
Step 2	Plus 90° (1/4) Turn
Subframe Support Bracket Bolt	
Rear, M 8 x 25	(3)
Tie Rod End Nut ⁽¹⁾	⁽⁴⁾ 33 (45)
Upper Control Arm-To-Mounting Bracket Nut ⁽²⁾ , ⁽¹⁾	
Step 1	37 (50)
Step 2	Plus 90° (1/4) Turn
Upper Control Arm-To-Wheel Bearing Housing Nut ⁽¹⁾	30 (40)
Wheel Lug Bolts	89 (120)
INCH Lbs. (N.m)	
Brake Backing Plate Bolt	89 (10)
(1) Always replace with NEW parts. (2) Since bonded rubber bushings can only be turned to a limited extent, tighten all bolts and nuts to specification. Parts that have bonded rubber bushing should be torqued only when vehicle is standing on ground at curb height. (3) Torque depends on type of bolt installed. See BOLT VERSIONS for proper torque specification. (4) When tie rod end fastener is loosed or removed, toe constant "S" must be checked and adjusted. See SPECIFICATIONS & PROCEDURES - PASSAT article in WHEEL ALIGNMENT.	

SUBFRAME BOLT VERSIONS

Three different subframe support bracket 8 mm bolt versions are used on suspensions. See **Fig. 64** . All bolts should only be used once. Bolts are as follows:

1. Bolt "A" without ribbing. Tightening torque 18 ft. lbs. (25 N.m).
2. Bolt "B" with ribbing. Tightening torque 55 ft. lbs. (75 N.m).
3. Bolt "C" with screwhead and washer ribbing. Tightening torque 22 ft. lbs. (30 N.m), plus an additional 90° turn.



G00191467

Fig. 64: Identifying Subframe Support Bracket Bolt Type
Courtesy of AUDI OF AMERICA, INC.