

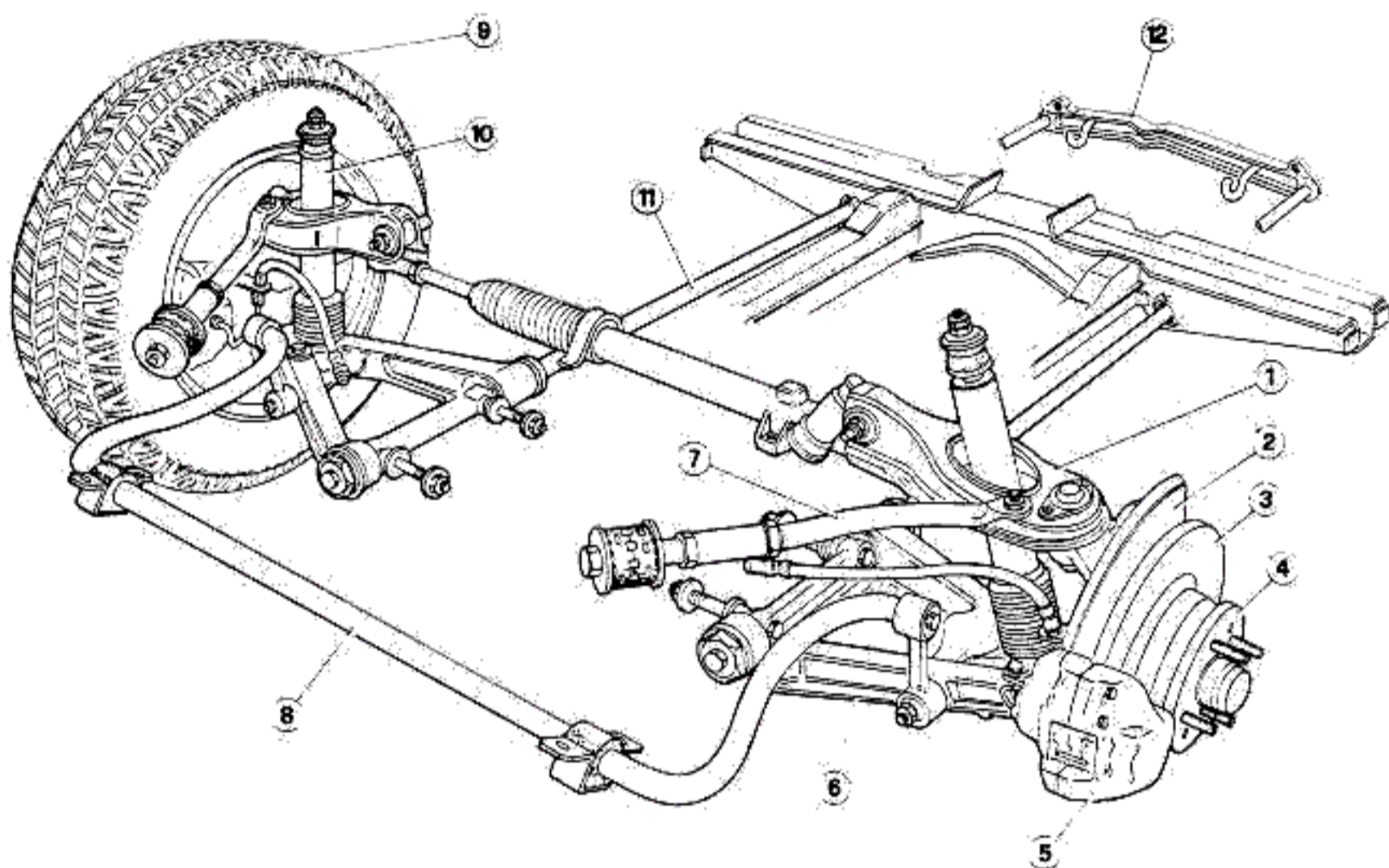
GROUP 21

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This group is structurally similar to that of the vehicle **OTV623** and consequently the disassembly and reassembly procedures remain the same. To simplify operations, the overhaul procedures complete with instructions for the ABS MARK II anti-lock braking system have been included.

DESCRIPTION



- | | | | |
|---|---------------|----|-------------------|
| 1 | Upper link | 7 | Tie rod |
| 2 | Splash guard | 8 | Anti-rot bar |
| 3 | Brake disc | 9 | Front wheel |
| 4 | Wheel hub | 10 | Shock absorber |
| 5 | Brake caliper | 11 | Torsion bar |
| 6 | Lower link | 12 | Rear cross member |

Front suspension is independent, connected to body by transverse links. Two longitudinal torsion bars are connected at the front to the links and at the rear to the

chassis

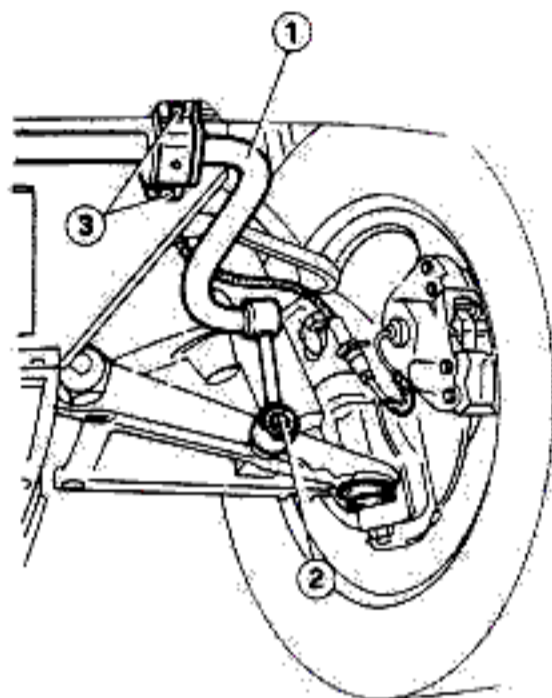
Front suspension also includes hydraulic double-acting shock absorbers connecting body and lower links

and an anti-rot bar improving stability on cornering. Link upward and downward movement is restricted by bump blocks secured to cross member.

ANTI-ROLL BAR

REMOVAL

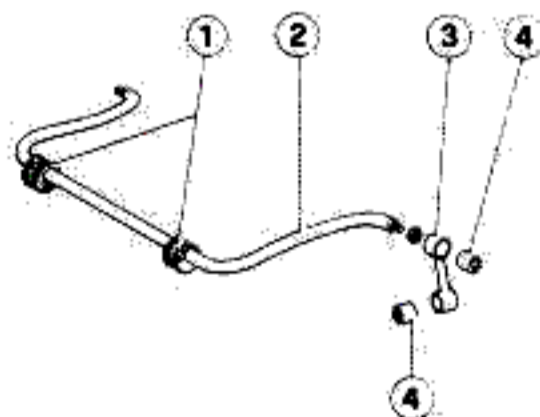
Raise car on a lift, back off nuts ② and capscrews ③ and disconnect anti-roll bar ①.



- 1 Anti-roll bar
- 2 Nut
- 3 Capscrews

DISASSEMBLY

1. Apply markings on anti-roll bar and conn. rods.
2. Using a press, remove conn. rods from anti-roll bar.
3. Take off anti-vibration bushings ④ from conn. rod ③ and rubber cushions ① from anti-roll bar ②.



- 1 Rubber cushions
- 2 Anti-roll bar
- 3 Conn. rod
- 4 Anti-vibration bushing

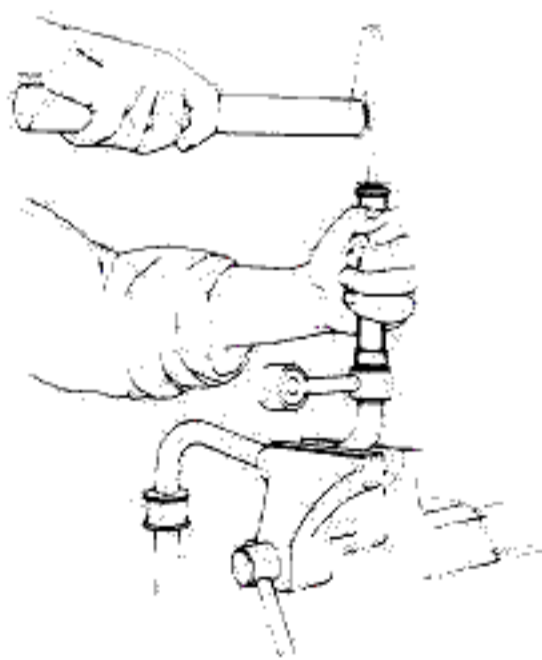
INSPECTION

Clean all parts.

1. Check that anti-roll bar and conn. rods are not damaged or bent and anti-vibration bushing seats are not worn; replace as necessary.
2. Check that rubber cushions, anti-vibration bushings and rubber components are not worn; replace damaged parts as necessary.

ASSEMBLY

1. Lubricate inner surface of anti-roll bar support rubber cushions using the recommended grease (ISECO Ergon Rubber Grease no. 3; SPCA Spagraph; REINACH Sferul B2AR) and install on anti-roll bar.
2. Install anti-vibration bushings on conn. rods.
3. Clamp anti-roll bar in a vice and insert conn. rods on anti-roll bar spigots.



INSTALLATION

Lubricate anti-roll bar supports on lower links using the recommended antiseize (R. GORI Never Seez) and install by reversing the removal sequence.

T: Tightening torques

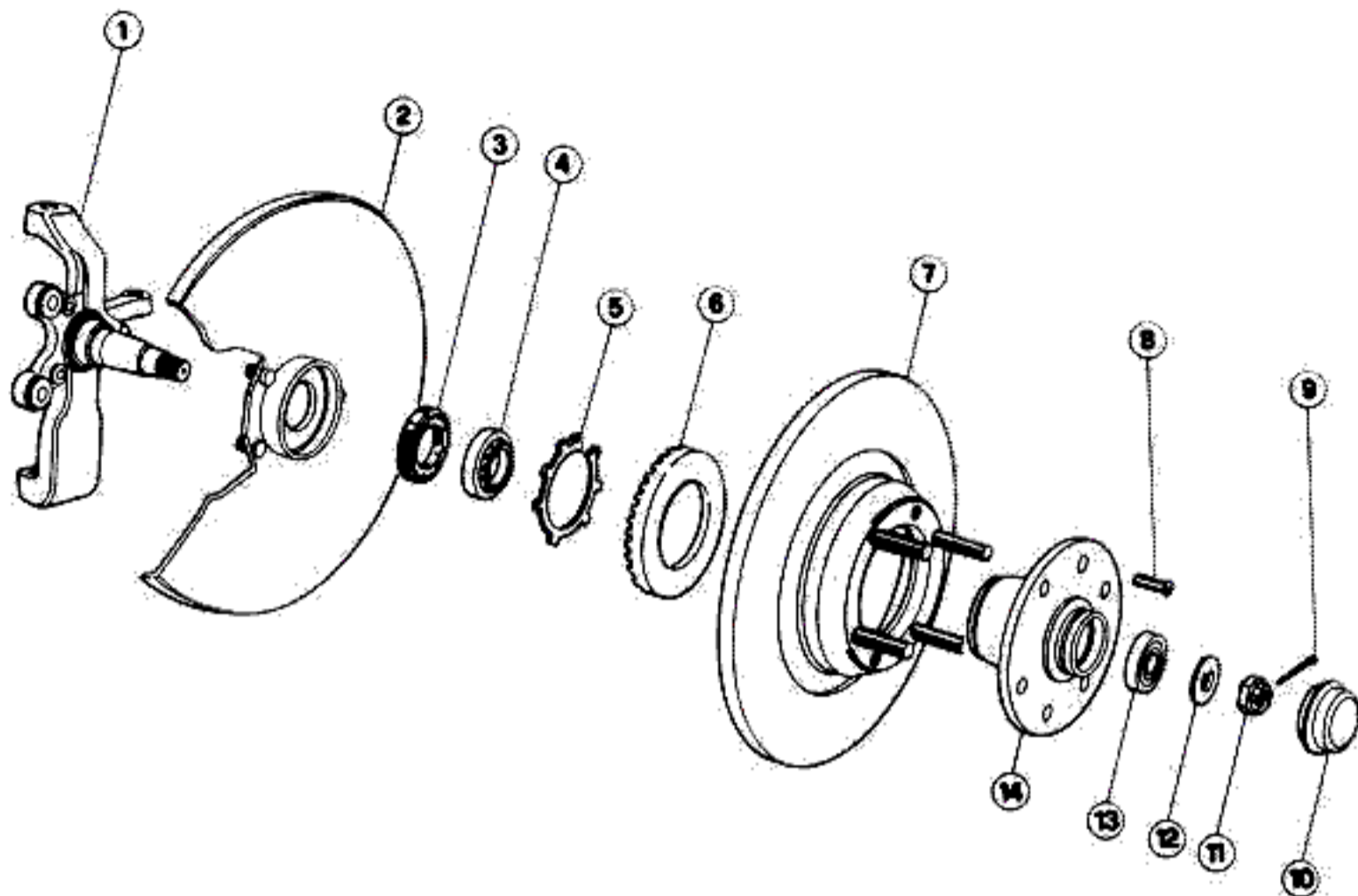
Nut securing anti-roll bar conn. rod to lower link

18 to 23 N·m
(13.3 to 17 ft·lb)
(1.8 to 2.3 kg·m)

Anti-roll bar pad support capscrews

25 to 29 N·m
(18.4 to 21.4 ft·lb)
(2.5 to 3 kg·m)

STEERING KNUCKLES AND WHEEL HUBS



- 1 Steering knuckle
- 2 Splash guard
- 3 Seal
- 4 Inner bearing
- 5 Retaining ring (*)

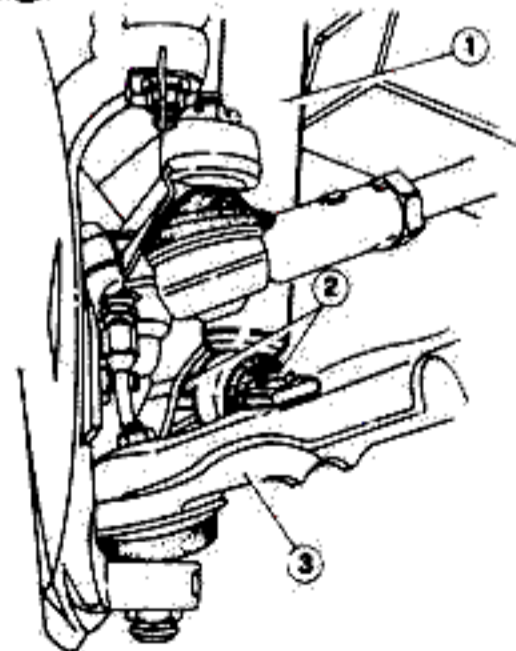
- 6 Impulse emitting wheel (*)
- 7 Brake disc
- 8 Capscrew
- 9 Cotter pin
- 10 Hub cover

- 11 Nut
- 12 Washer
- 13 Outer bearing
- 14 Wheel hub

(*) For vehicles equipped with (ABS) MARK II wheel antilock braking system only

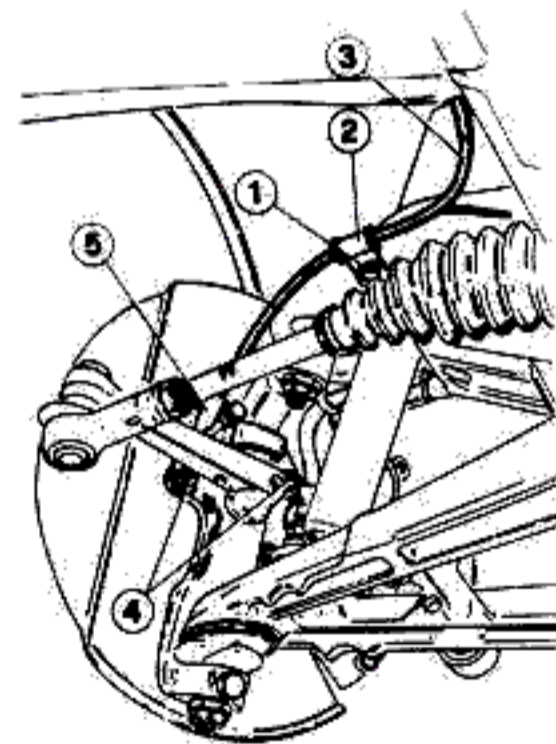
REMOVAL

1. Place car on a lift, operate parking brake, load car statically and slacken wheel nuts.
2. Back off capscrews (2) and disconnect shock absorber (1) from lower link (3).



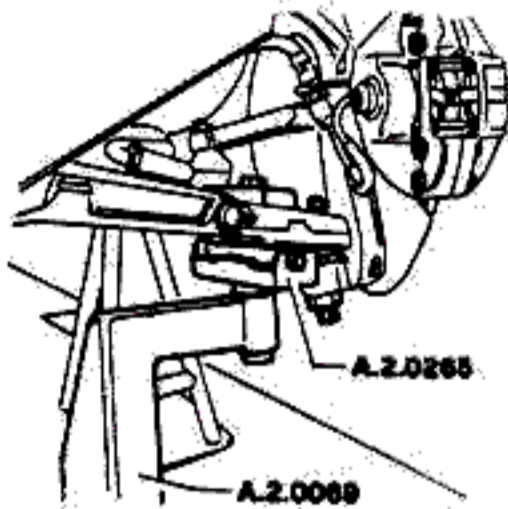
- 1 Shock absorber
- 2 Capscrews
- 3 Lower link

3. Raise car and support it at the front by means of stands and remove wheels.
4. Remove anti-roll bar (see: Anti-roll bar - Removal).
5. Vehicles equipped with (ABS) MARK II wheel antilock system only.
 - a. Back off screw (1) securing cable plate (2) to the upper link of the suspension.
 - b. Back off nuts (4) and remove the impulse pick-up (5), complete with support from the steering knuckle without disconnecting it electrically.
 - c. Put the impulse pick-up aside in a safe place, taking great care not to damage it and ensuring it does not hinder operations.

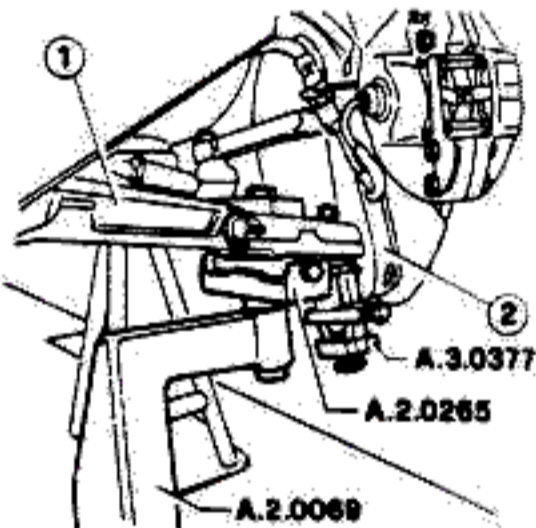


- 1 Screw
- 2 Cable plate
- 3 Impulse pick-up cable
- 4 Steering knuckle-impulse pick-up support securing nut
- 5 Front impulse pick-up

6. Position tools A.2.0265 and A.2.0069 on a column lift and insert in link seats and raise unit.



7. Remove cotter pin, back off nut and disconnect lower link ① from steering knuckle ② using tool A.3.0377.



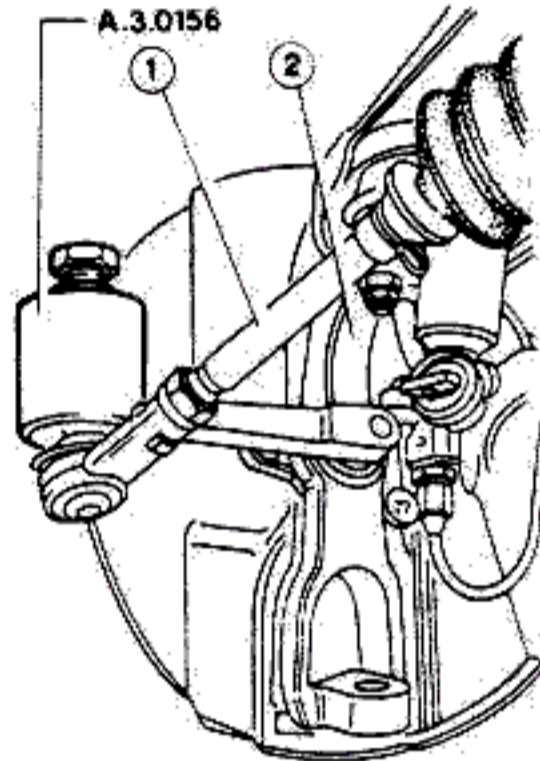
- 1 Lower link
- 2 Steering knuckle

8. Unload torsion bar by lowering lift.
9. Disconnect brake fluid pipe from front caliper after draining brake fluid reservoir.

CAUTION:

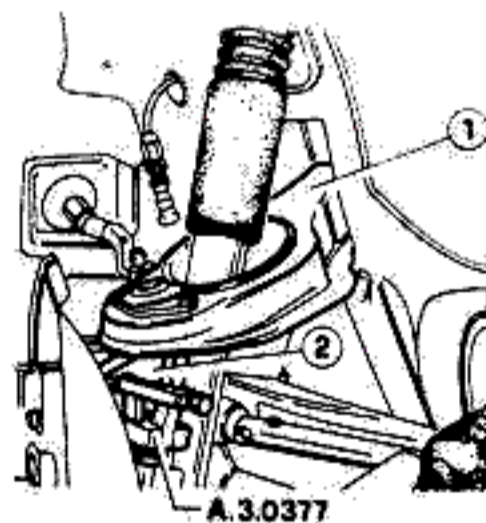
Brake caliper may be removed from steering knuckle without disconnecting from hydraulic system, thereby avoiding having to refill and bleed the system.

10. Remove cotter pin, back off nut and disconnect steering tie rod ① from steering knuckle ② using tool A.3.0156.



- 1 Steering tie rod
- 2 Steering knuckle

11. Remove cotter pin, back off nut and disconnect upper link ① from steering knuckle ② using tool A.3.0377.

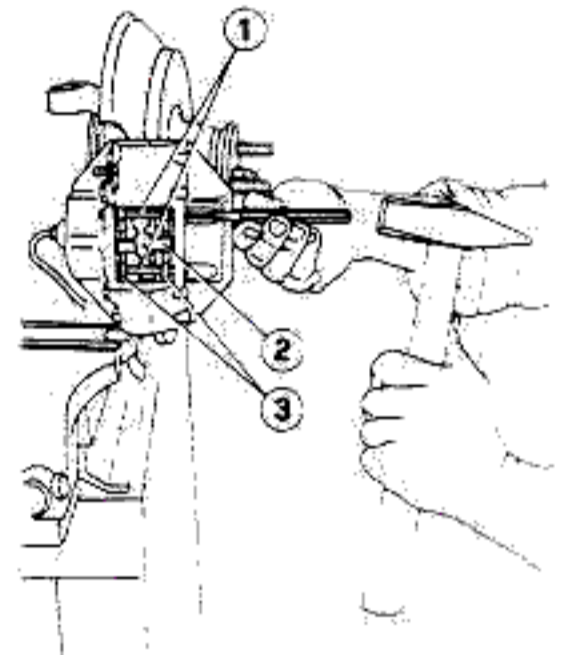


- 1 Upper link
- 2 Steering knuckle

12. Remove steering knuckle along with wheel hub.

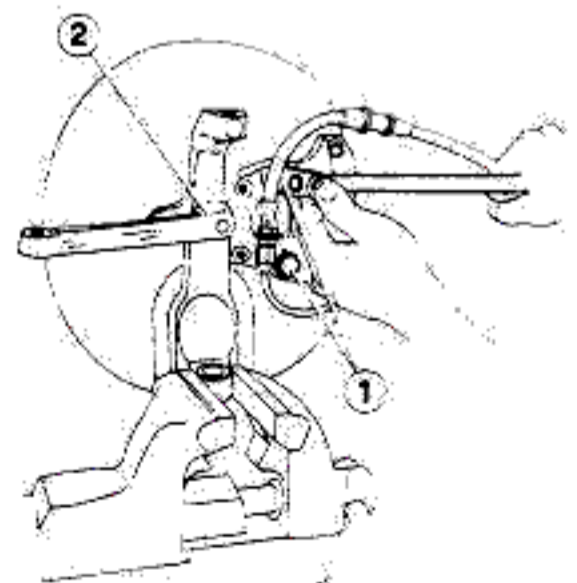
DISASSEMBLY

1. Install wheel hub unit in a vise; using a punch, push and take off brake pad pins ①, remove cross shaped spring ② and pads ③.



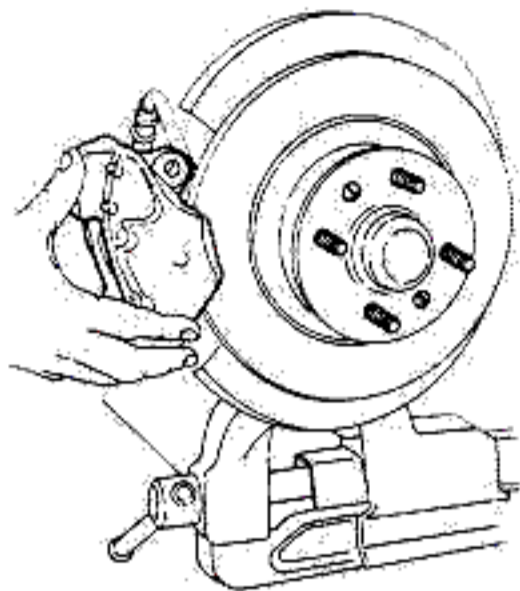
- 1 Pad pins
- 2 Cross spring
- 3 Brake pads

2. Slacken 2 capscrews ① securing brake caliper to steering knuckle ②.



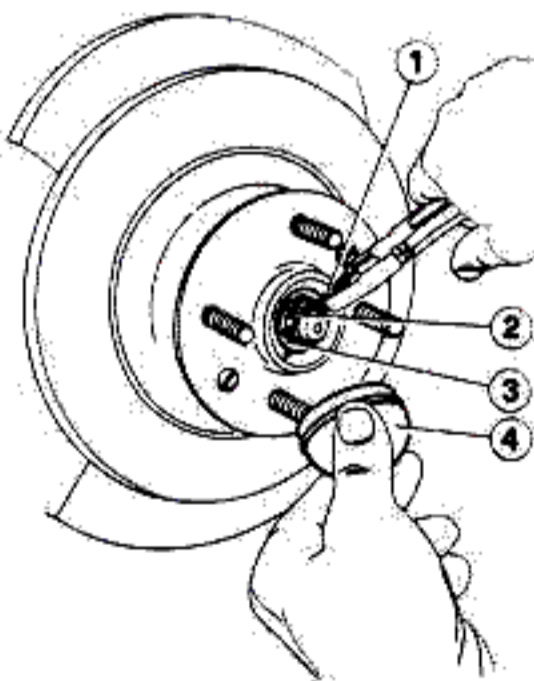
- 1 Brake caliper capscrews
- 2 Steering knuckle

3. Remove brake caliper assembly.



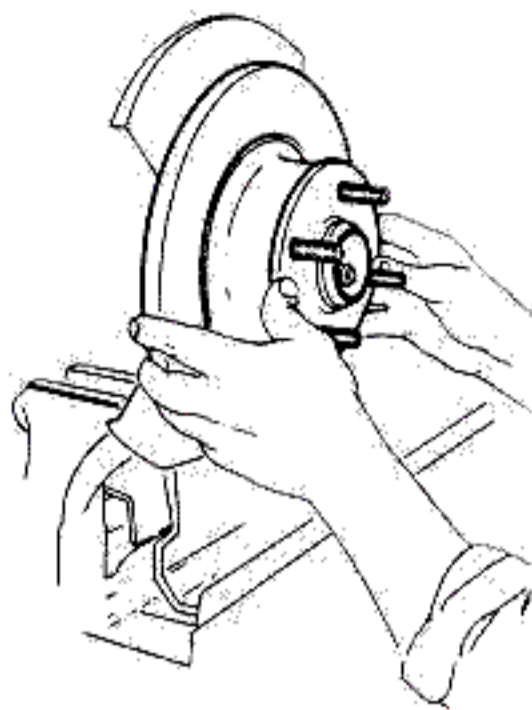
4. Take off hub cover (4) and cotter pin (1).

5. Back off nut (2) and remove together with washer (3).

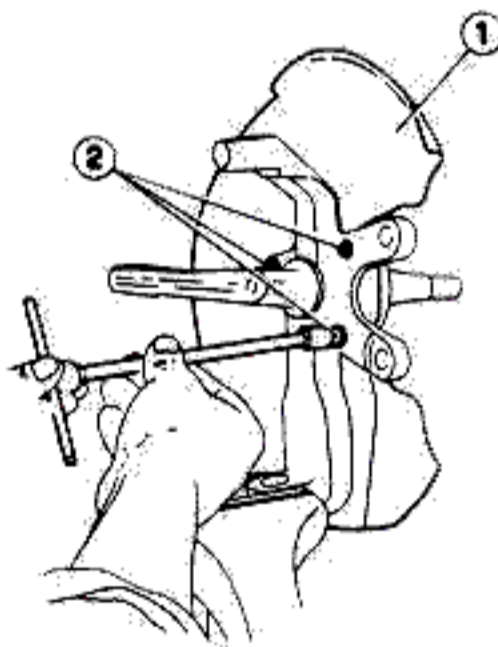


- 1 Cotter pin
- 2 Nut
- 3 Washer
- 4 Hub cover

6. Remove hub with brake disc and place on bench.



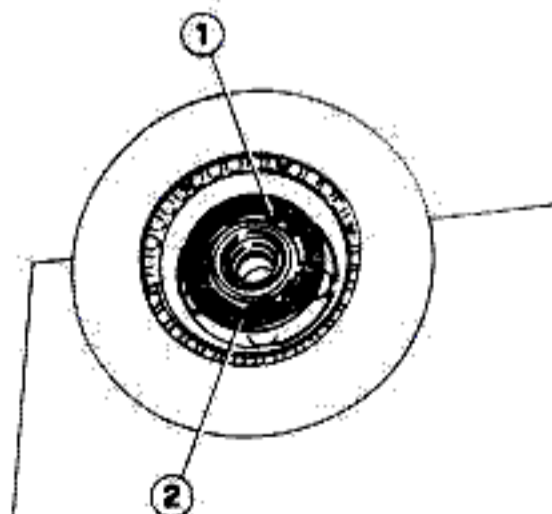
7. Remove splash guard (1) backing off 3 retaining nuts (2).



- 1 Splash guard
- 2 Retaining nuts

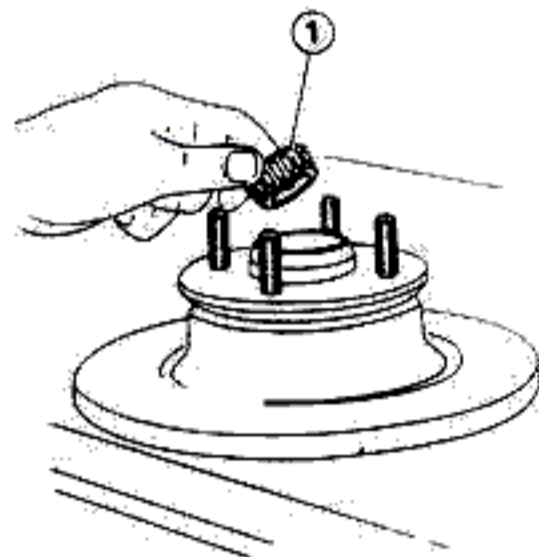
8. Vehicles equipped with (ABS) MARK II wheel antilock system only.

Using suitable pliers remove the retaining ring (1) and separate the impulse emitting wheel (2) from the wheel hub.



- 1 Retaining ring
- 2 Impulse emitting wheel

9. Remove outer bearing (1) from hub.

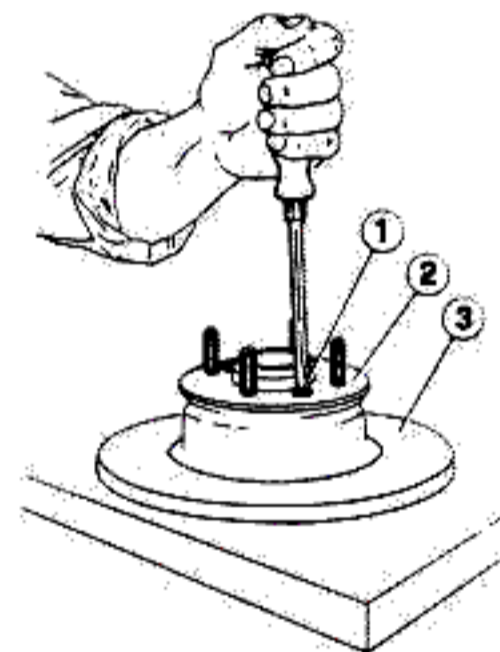


- 1 Outer bearing

CAUTION:

Prevent shocks to bearing.

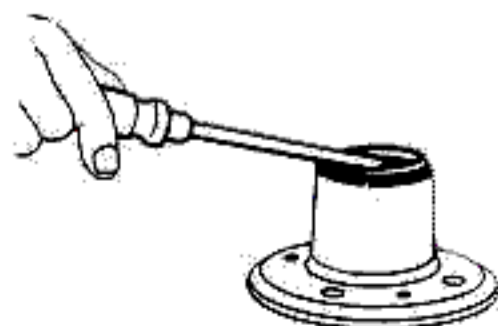
10. Back off 2 capscrews (1) securing wheel hub (2) to brake disc (3) and separate the two parts.



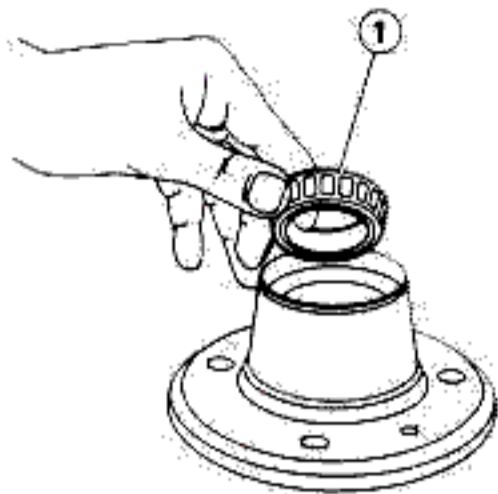
- 1 Capscrew
- 2 Wheel hub
- 3 Brake disc

11. Using a screwdriver, take off seal from hub.

When removed, the seal must be replaced.

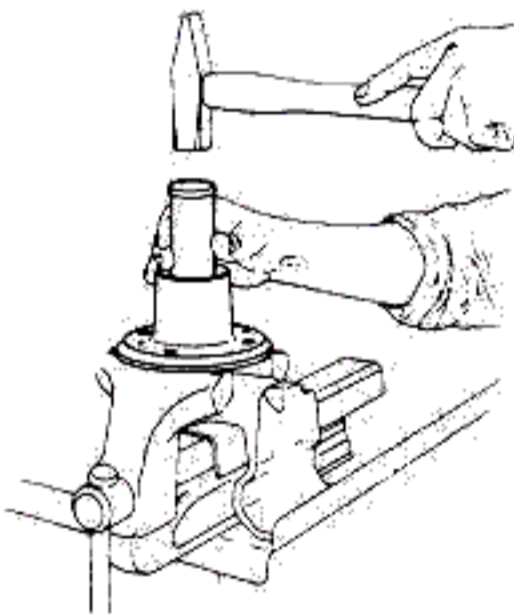


12. Take off inner bearing ① from seat.

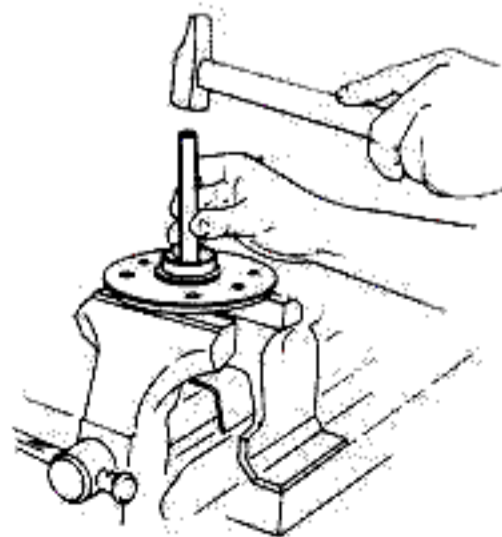


1. Inner bearing

13. Take off outer bearing cup.



14. Take off inner bearing cup.



INSPECTION

Thoroughly clean bearings and other parts and dry by blowing compressed air.

Wheel bearing

In case of pitting, roughness or ovality on race or taper roller surfaces, replace bearing.

CAUTION:

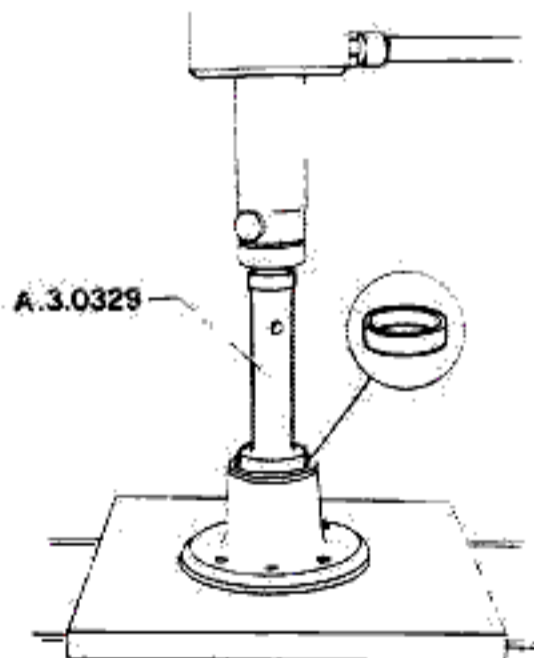
Bearings must be replaced in pairs, i.e. both inner and outer.

Steering knuckle and hub

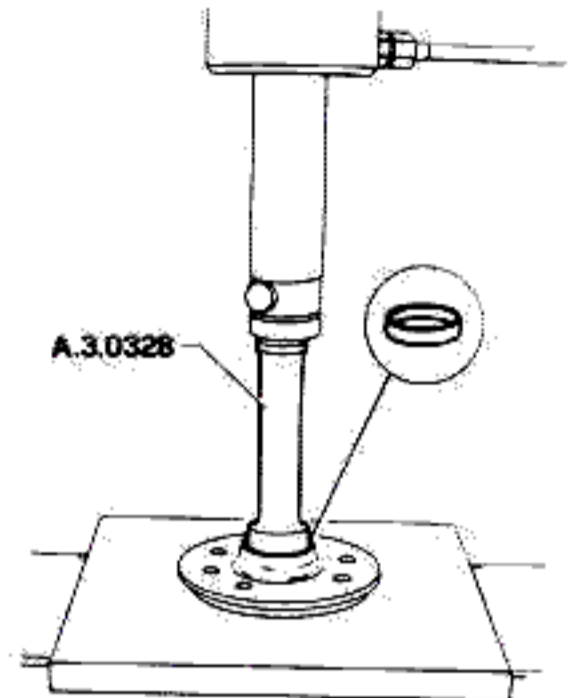
Check wheel hub and steering knuckle; replace damaged parts as necessary.

ASSEMBLY

1. Using inserter **A.3.0329** with a press, install inner bearing cup on hub; pressing fully home.



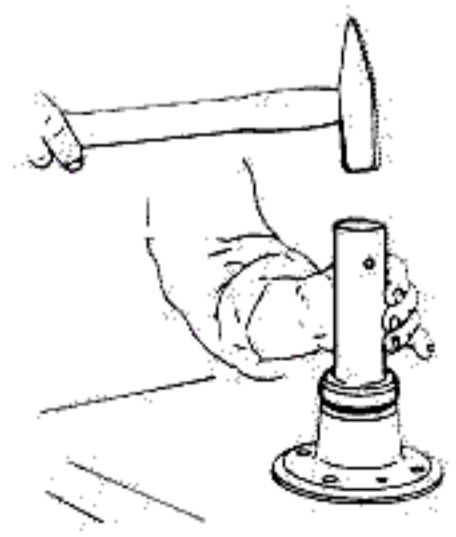
2. Using inserter **A.3.0328** with a press, install outer bearing cup, pressing fully home.



3. Lubricate bearing cups using bearing grease (**AGIP Grease 33 FD** or **IP Autogrease FD** or **SHELL Retinax AX** or **ESSO Norva 275**) and pack hub recess with **50 g (1.76 oz)** of grease. This quantity must not be exceeded otherwise bearing friction will result in overheating, grease leakage, etc.

4. Lubricate hub inner bearing using grease as per para. 3 and install.

5. Lubricate grease (**ISECO Molykote BR2**) and install on hub.



6. Install and secure splash guard through 3 nuts.

7. Secure brake disc to hub through 2 capscrews.

8. Vehicles equipped with (ABS) MARK II wheel antilock system only.

Reassemble the impulse emitting wheel on the hub (having thoroughly cleaned it and checked for good condition) then secure it with the retaining ring.

9. Apply grease (ISECO Molykote BR2) to steering knuckle, threaded end, washer and retaining nut. Wet seal outer surface using the recommended oil (AGIP Rotra MP SX SAE 75W90 or IP Pontiac HDS 75W90 or SHELL Spirax HD 80W90).

10. Install hub on steering knuckle and then install outer bearing, lubricated with grease as per para 3 washer and nut.

11. Tighten nut to the specified torque and rotate hub to settle the bearings. Slacken nut and retighten to the specified torque.

T : Tightening torques:

Wheel hub nut, first tightening stage

20 to 24 N·m

(14.8 to 17.7 ft·lb)

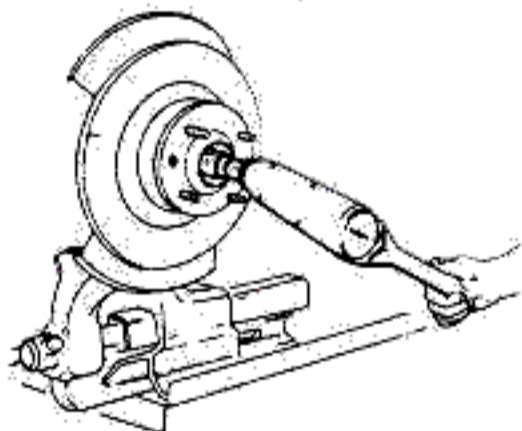
(2 to 2.5 kg·m)

Wheel hub nut, second tightening stage

5 to 10 N·m

(3.7 to 7.4 ft·lb)

(0.5 to 1 kg·m)



12. Vehicles not equipped with (ABS) MARK II wheel antilock system.

a. Back off nut through 90° and insert cotter pin. If nut slot and steering knuckle hole are not aligned, further tighten nut as necessary to permit cotter pin insertion.

b. Settle bearings by tapping steering knuckle end using a mallet and check that washer is not locked (ensure that

washer can be moved by slight pressure prising with a screwdriver between washer and hub).

If washer is locked, remove cotter pin and back off nut to insert cotter pin in a hole perpendicular to the hole previously used. Tap steering knuckle end with a mallet and recheck washer fit.

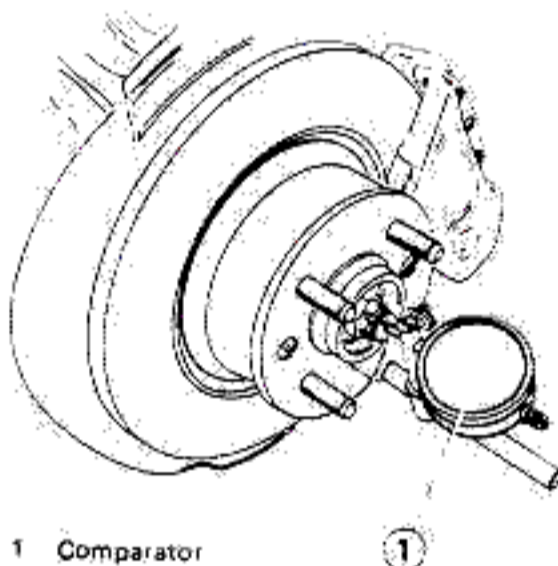
c. Bend cotter pin and install hub cover.

13. Vehicles equipped with (ABS) MARK II wheel antilock system only.

Check front hub bearing clearance.

Front hub bearing clearance check

a. Install a comparator on a magnetic base (or suitable tool) so that it touches the steering knuckle axis (preload the comparator to 1mm (0.04 in)).



1 Comparator

b. Move the wheel hub axially (back and forth) and read the clearance indicated on the comparator. This clearance should come within specified values.

Front hub bearing clearance:

$G = 0.02$ thru 0.12 mm

(0.0008 thru 0.005 in)

c. Re-position the cotter pin thus:

— If the clearance value is 0.02 thru 0.06 mm (0.0008 thru 0.002 in), back off nut until cotter pin is inserted.

— If the clearance value is 0.06 thru 0.12 mm (0.002 thru 0.005 in), screw on the nut until cotter pin is inserted.

d. Bend the cotter pin back and reassemble the hub cover.

14. Install brake caliper on steering knuckle by reversing the removal sequence and tighten two capscrews to the specified torque.

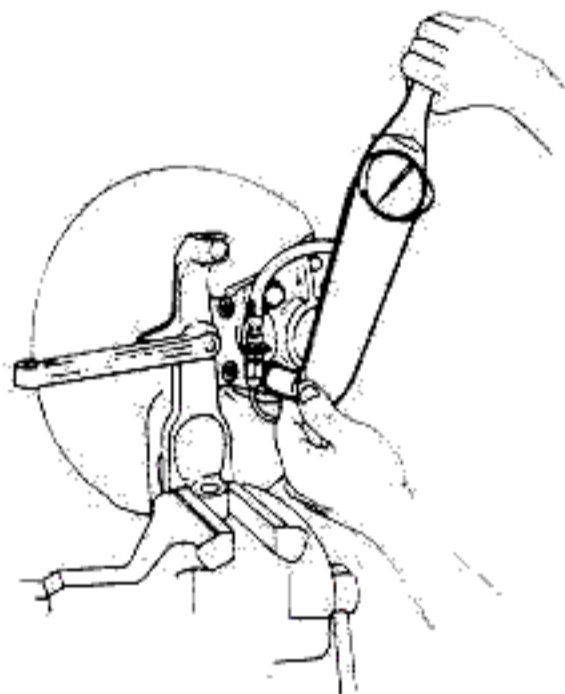
T : Tightening torque

Brake caliper/steering knuckle capscrews

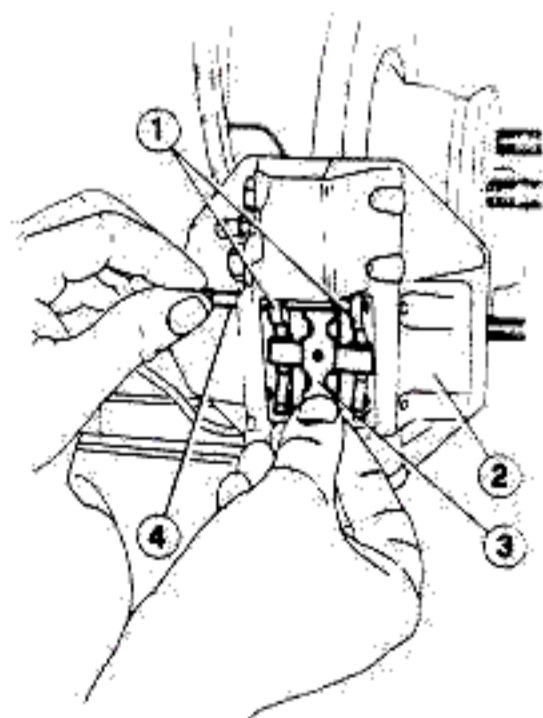
74 to 83 N·m

(54.6 to 61.2 ft·lb)

(7.5 to 8.5 kg·m)



15. Insert pads (1) in brake caliper (2) install cross spring (3) home and insert retaining pins (4).



1 Pads
2 Brake caliper
3 Cross spring
4 Retaining pin

INSTALLATION

1. Position tools **A.2.0265** and **A.2.0069** as previously specified and load torsion bar to connect steering knuckle to both lower and upper links.
2. Install by reversing the removal sequence and following the instructions detailed below.
3. Tighten nut securing upper link ball joint to steering knuckle to the specified torque (see: Service Data and Specifications - Tightening Torques).
4. Tighten the following parts to the specified torque.

- T** : Tightening torques
- Steering link ball joint/steering knuckle nut
45 to 55 N·m
(33.2 to 40.6 ft·lb)
(4.6 to 5.6 kg·m)
 - Lower link ball joint/steering knuckle nut
45 to 55 N·m
(33.2 to 40.6 ft·lb)
(4.6 to 5.6 kg·m)

5. Vehicles equipped with (ABS) MARK II wheel antilock system only.
 - a. Re-install the impulse pick-up in reverse order of removal, observing the following tightening torques.

- T** : Tightening torques
- Steering knuckle - impulse pick-up support securing nuts
9 thru 10 N·m
(6.6 thru 7.4 ft·lb)
(0.9 thru 1 kg·m)

- Suspension upper link - impulse pick-up cable plate securing screw
9 thru 10 N·m
(6.6 thru 7.4 ft·lb)
(0.9 thru 1 kg·m)

- b. Ensure that impulse pick-up cables have been well secured to their anchor points to avoid damage when vehicle is running.
 - c. Check the air gap between the impulse pick-ups removed and their respective impulse emitting wheels (see: Group 22 - Service Data and Specifications - Checks and Adjustments - Adjustment of the Air Gap between the Impulse Pick-ups and the Impulse Emitting Wheels).
6. Check vehicle trim and front wheel geometry (see: Group 00 - Maintenance of Mechanical Components and Body - Check on Vehicle Height and Wheel Alignment).

SHOCK ABSORBERS

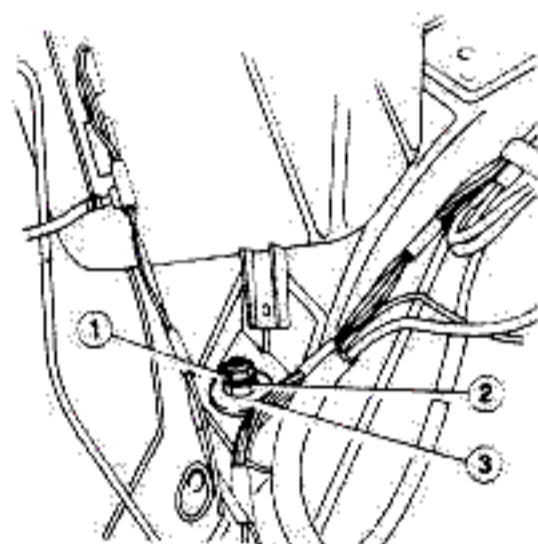
REMOVAL

1. Place the car on a platform lift.

CAUTION:

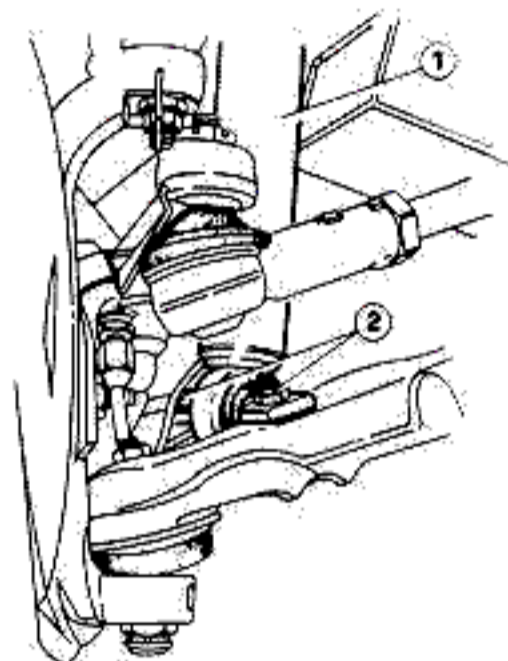
Remove underhood components as necessary to gain access to nuts securing shock absorbers to body.

2. From engine compartment, detach shock absorbers from body by removing locknuts ①, nuts ②, washers ③ and associated rubber cushions.



- 1 Locknut
- 2 Nut
- 3 Washer

3. Raise car and disconnect shock absorbers ① from lower links by backing off capscrews ②.



- 1 Shock absorbers
- 2 Capscrews

4. Remove shock absorbers

INSPECTION

1. Check shock absorbers and replace if affected by oil leakage.
2. If necessary, check shock absorber settings (see Service Data and Specifications - Checks and Adjustments). Replace as necessary.

INSTALLATION

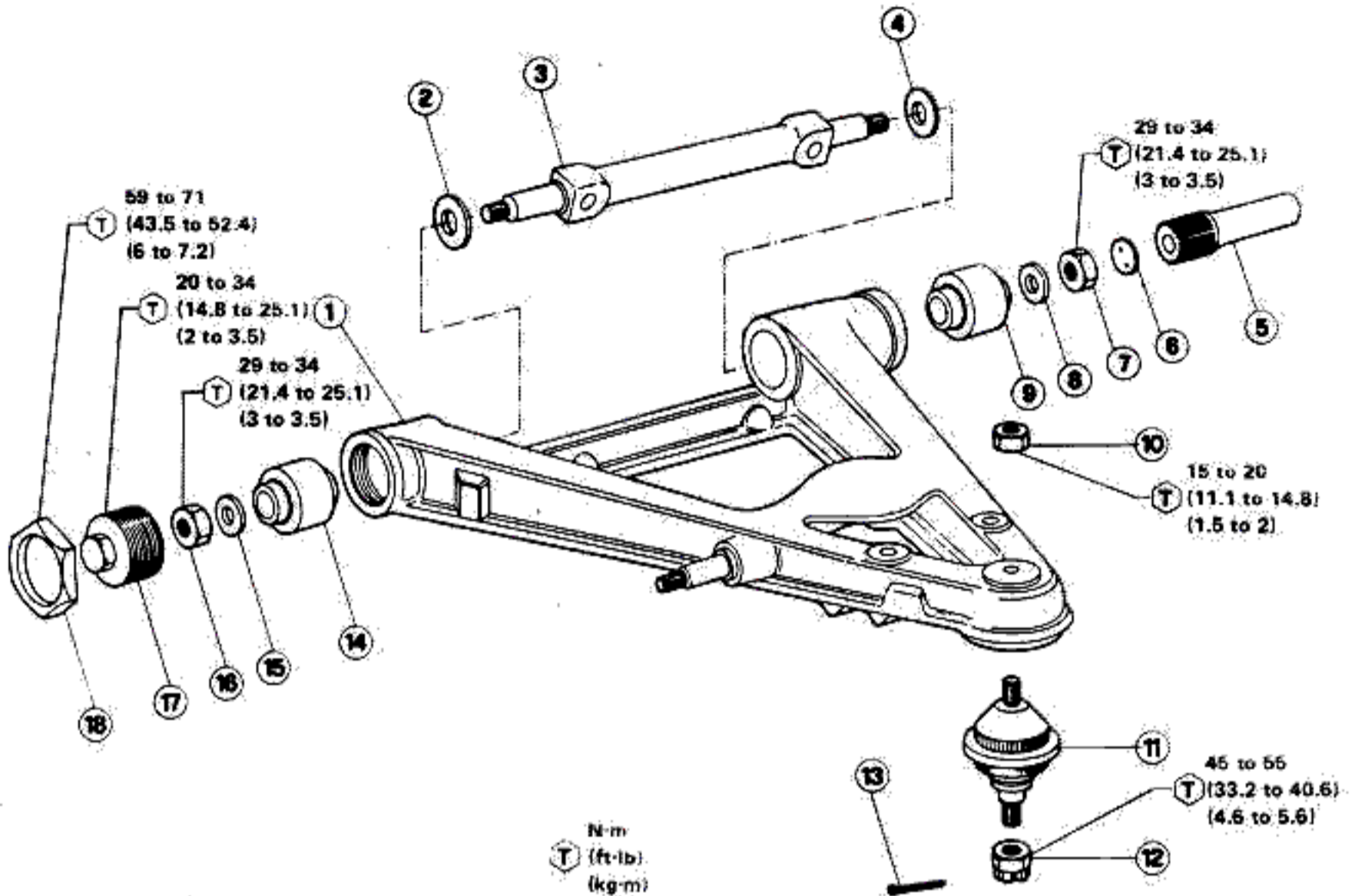
Install by reversing the removal sequence.

Ⓣ: Tightening torques

Shock absorber to body locknut
 24 to 29 N·m
 (17.7 to 21.4 ft·lb)
 (2.4 to 3 kg·m)

Shock absorber to lower link capscrews
 25 to 31 N·m
 (18.4 to 22.9 ft·lb)
 (2.5 to 3.2 kg·m)

LOWER LINKS AND TORSION BARS



- 1 Lower link
- 2 Washer
- 3 Link support
- 4 Washer
- 5 Torsion bar
- 6 Plastic cover

- 7 Nut
- 8 Washer
- 9 Rear bush
- 10 Ball joint nut
- 11 Ball joint
- 12 Steering knuckle nut

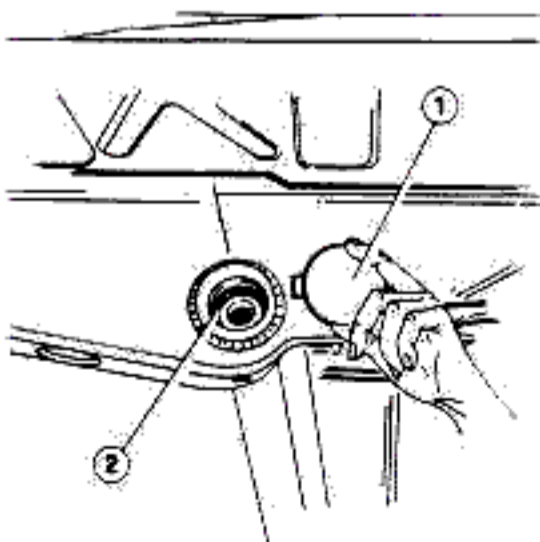
- 13 Cotter pin
- 14 Front bush
- 15 Washer
- 16 Nut
- 17 Lockring
- 18 Retaining nut

REMOVAL

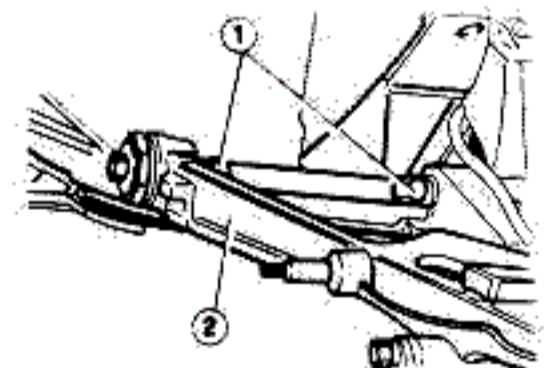
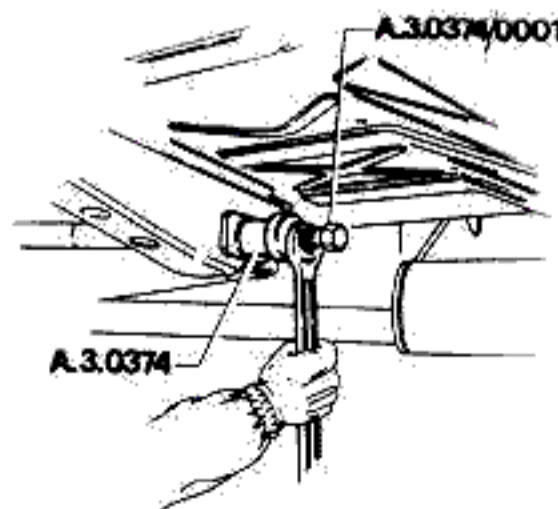
1. Proceed as specified in "Steering Knuckles and Wheel Hubs - Removal" up to para. 8 (excluding step 5).
2. Remove cover (1) from torsion bar seat (2).

3. Mark torsion bar at front and rear, install tool A.3.0374 and nut along with forcing screw A.3.0374/0001 and remove torsion bar from seat.

4. Back off bolts (1) and remove lower link (2) retrieving spacers.



- 1 Cover
- 2 Torsion bar seat



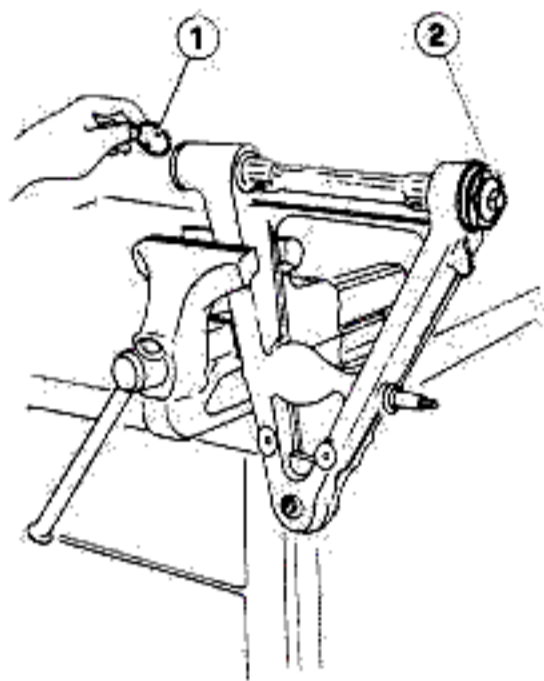
- 1 Bolts
- 2 Lower link

5. Take off torsion bar from the front.

LOWER LINK

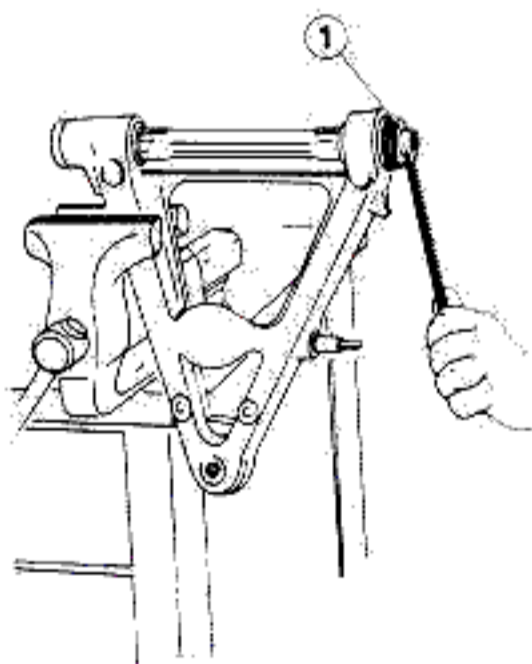
DISASSEMBLY

1. Clamp lower link in a vise, remove plastic cover ① from torsion bar seat and back off nut ②.



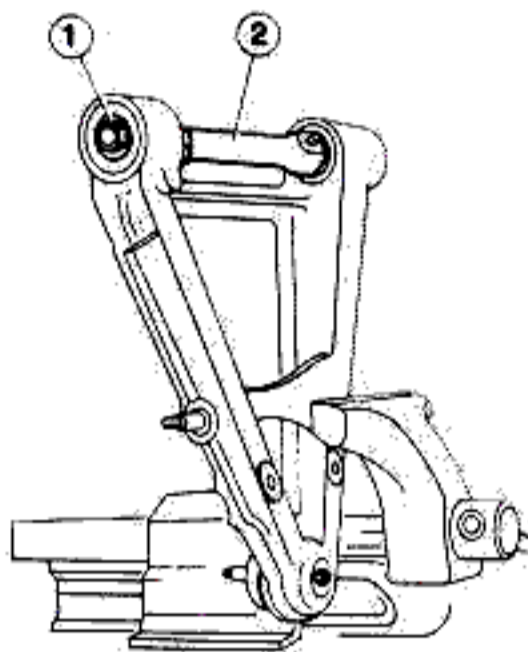
- 1 Plastic cover
- 2 Nut

2. Back off and remove locking ①.



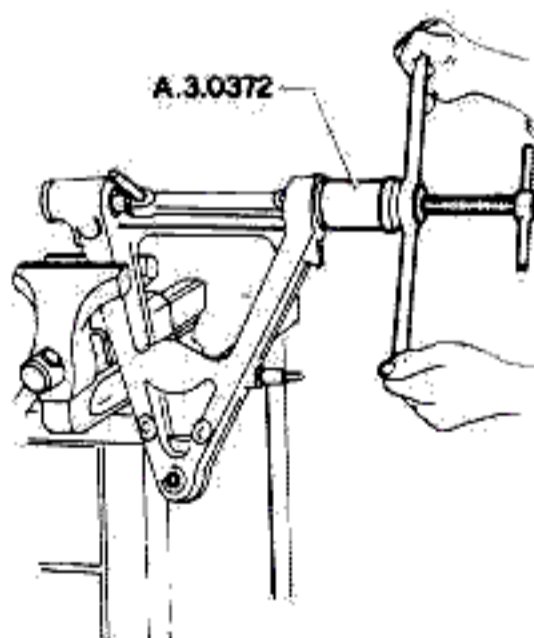
- 1 Lockring

3. Remove two nuts ① and associated washers preventing support ② rotation.



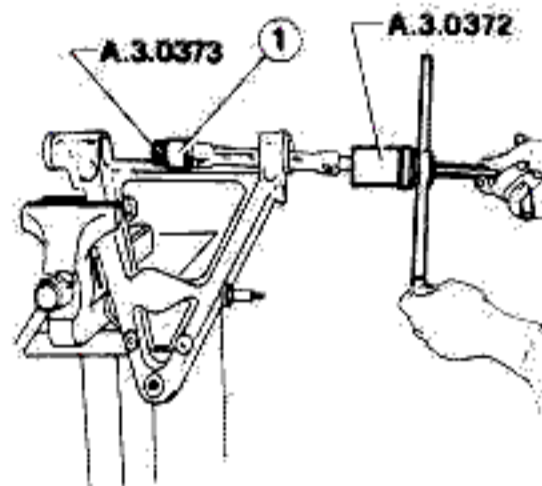
- 1 Nut
- 2 Link support

4. Install tool A.3.0372 on link support front threaded spigot, take off front bush and retrieve associated washer.



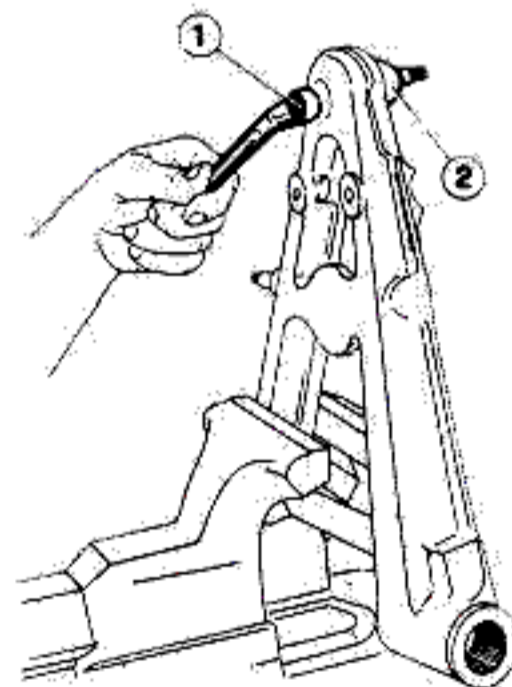
5. Position link support in seat, insert tool washer A.3.0373 in torsion bar seat and secure on link support threaded spigot through a nut.

Tighten tool A.3.0372 on link support front threaded spigot and take off rear bush ①.



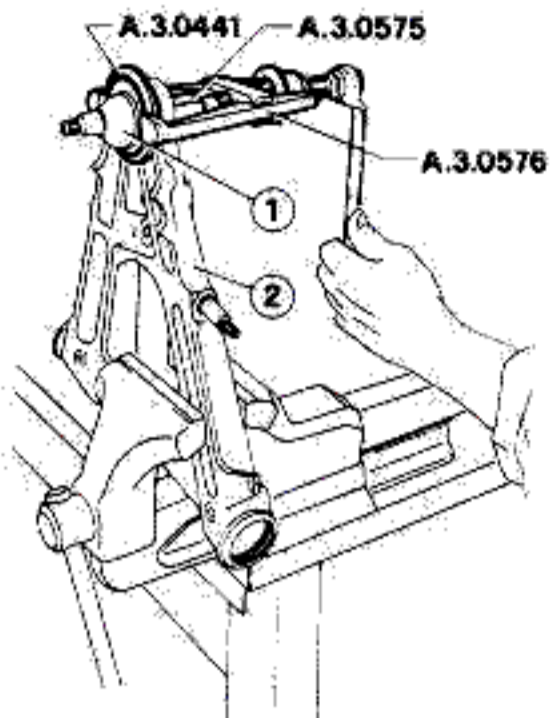
- 1 Rear bush

6. Back off ball joint ② nut ①.



- 1 Nut
- 2 Ball joint

7. Using tools A.3.0576, A.3.0575 and A.3.0441, take off ball joint ① from link ②.



- 1 Ball joint
- 2 Lower link

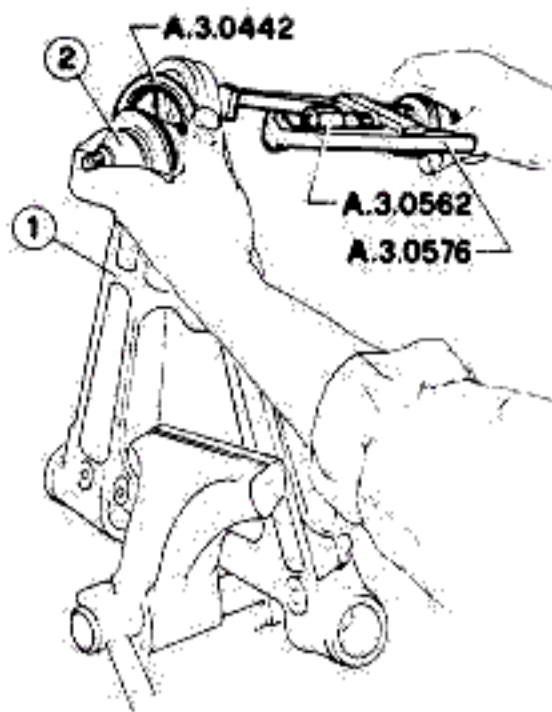
INSPECTION

Clean all parts

1. Check that link and support are not damaged or bent and that antivibration bushing seats are not worn; otherwise replace link or support.
2. Replace ball joint if roughness or excessive play is detected.
3. Check anti-vibration bushings for damage; in particular, ensure that rubber components are not worn; replace as necessary.

ASSEMBLY

1. Using tools A.3.0578, A.3.0562 and A.3.0442, insert ball joint ② into lower link ①.



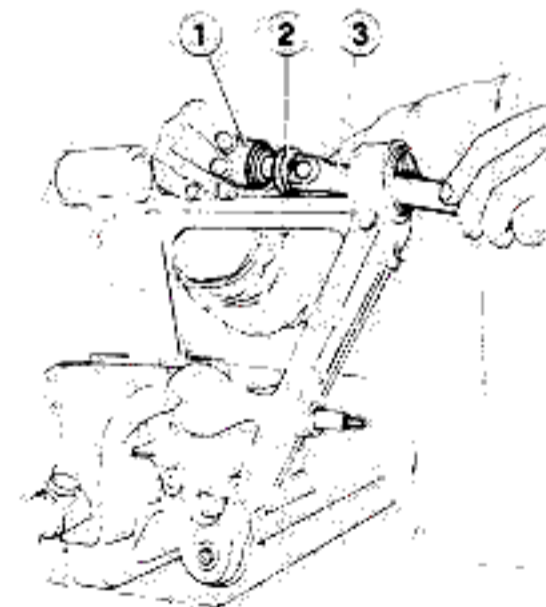
- 1 Lower link
- 2 Ball joint

2. Tighten ball joint nut to the specified torque.

T: Tightening torque

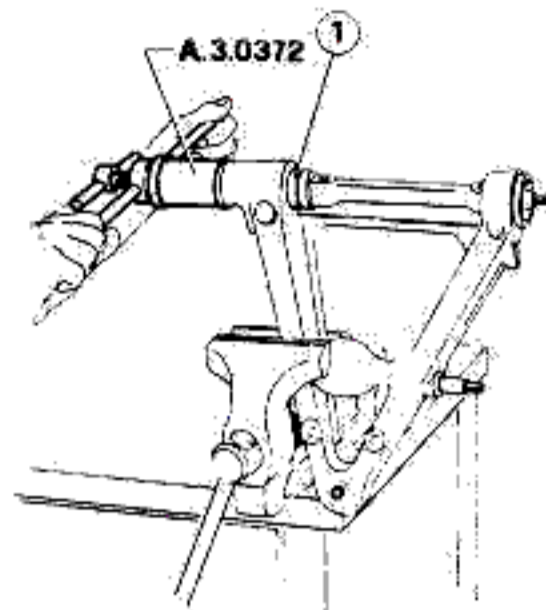
Ball joint/lower link nut:
 15 to 20 N·m
 (11.1 to 14.8 ft·lb)
 (1.5 to 2 kg·m)

3. Lubricate bush/lower link recess using 6 g (0.21 oz) of recommended grease (ISECO Molykote Longterm no. 2).
4. Insert support ③, washer ② of tool A.3.0372 and rear bush ① in link.



- 1 Rear bush
- 2 Washer
- 3 Link support

5. Tighten tool A.3.0372 on link support rear threaded spigot and insert rear bush ①.



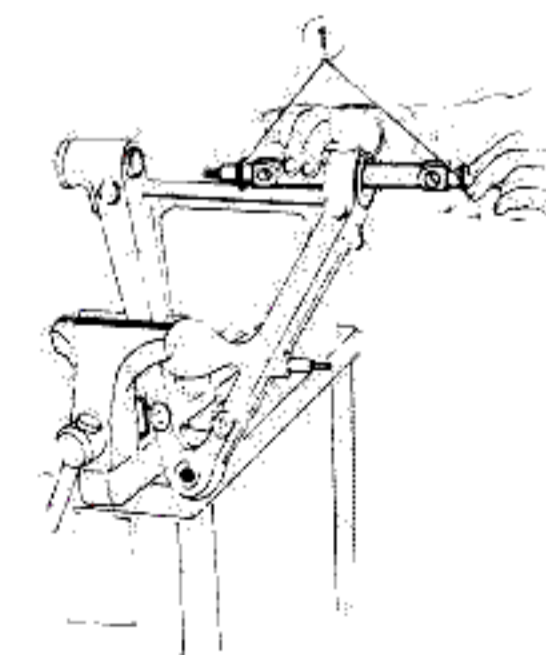
- 1 Rear bush

6. Retrieve tool A.3.0372 and take off link support.

7. Install link support in seat with washers ①.

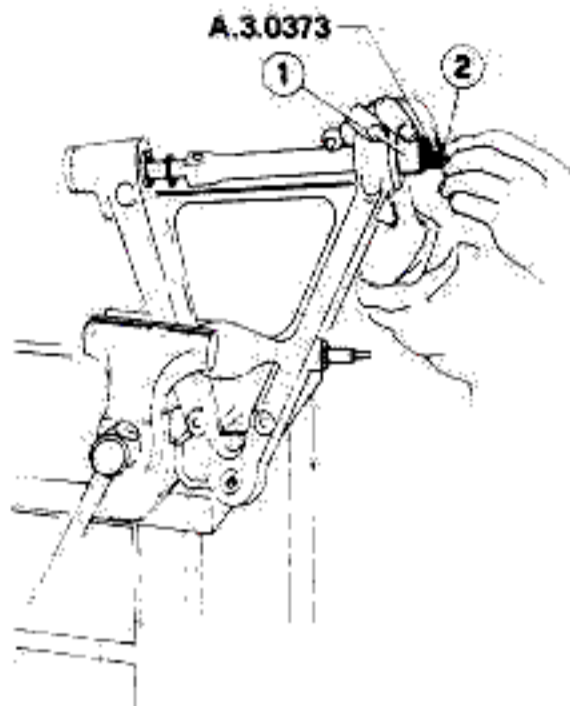
CAUTION:

Washers must be positioned with chamfer facing toward support.



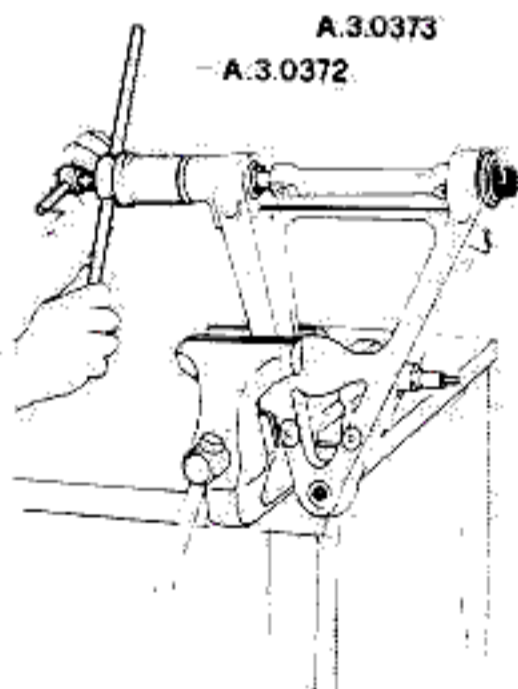
- 1 Washers

8. Move support forward, insert front bush ① in support spigot, position tool washer A.3.0373 on support spigot threaded end and secure through a nut ②.



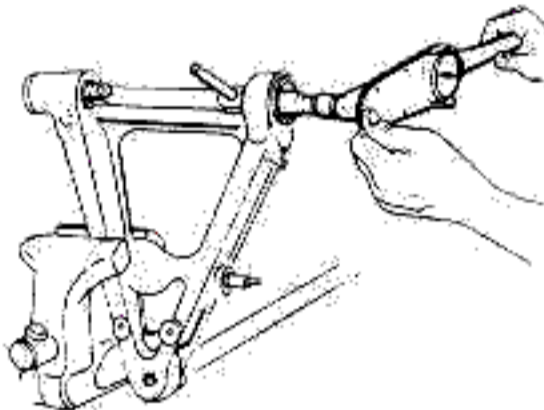
- 1 Front bush
- 2 Nut

9. Using tool A.3.0372 insert front bush in seat and remove tool.



10. Insert two washers in threaded support ends, tighten two nuts to the specified torque, simultaneously preventing support rotation.

T : Tightening torque
 Lower link support end nut
 29 to 34 N·m
 (21.4 to 25.1 ft·lb)
 (3 to 3.5 kg·m)



11. Tighten locking on link to the specified torque.

T : Tightening torque
 Lower link locking
 20 to 34 N·m
 (14.8 to 25.1 ft·lb)
 (2 to 3.5 kg·m)

12. Tighten locking nut to the specified torque.

T : Tightening torque
 Lower link locking nut
 59 to 71 N·m
 (43.5 to 52.4 ft·lb)
 (6 to 7.2 kg·m)

13. Insert plastic cover in torsion bar seat.

INSTALLATION

Install by reversing the removal sequence and following the instructions given below.

- Before inserting torsion bar in seat, apply the recommended grease (R. GORI Never Seez) on seat and torsion bar splines.

CAUTION:

Ensure that plastic cover is in position on lower link splined seat.

- On bar assembly align reference marks applied on disassembly, and match colour references.

Right bar - blue mark and letter D or R on front end.

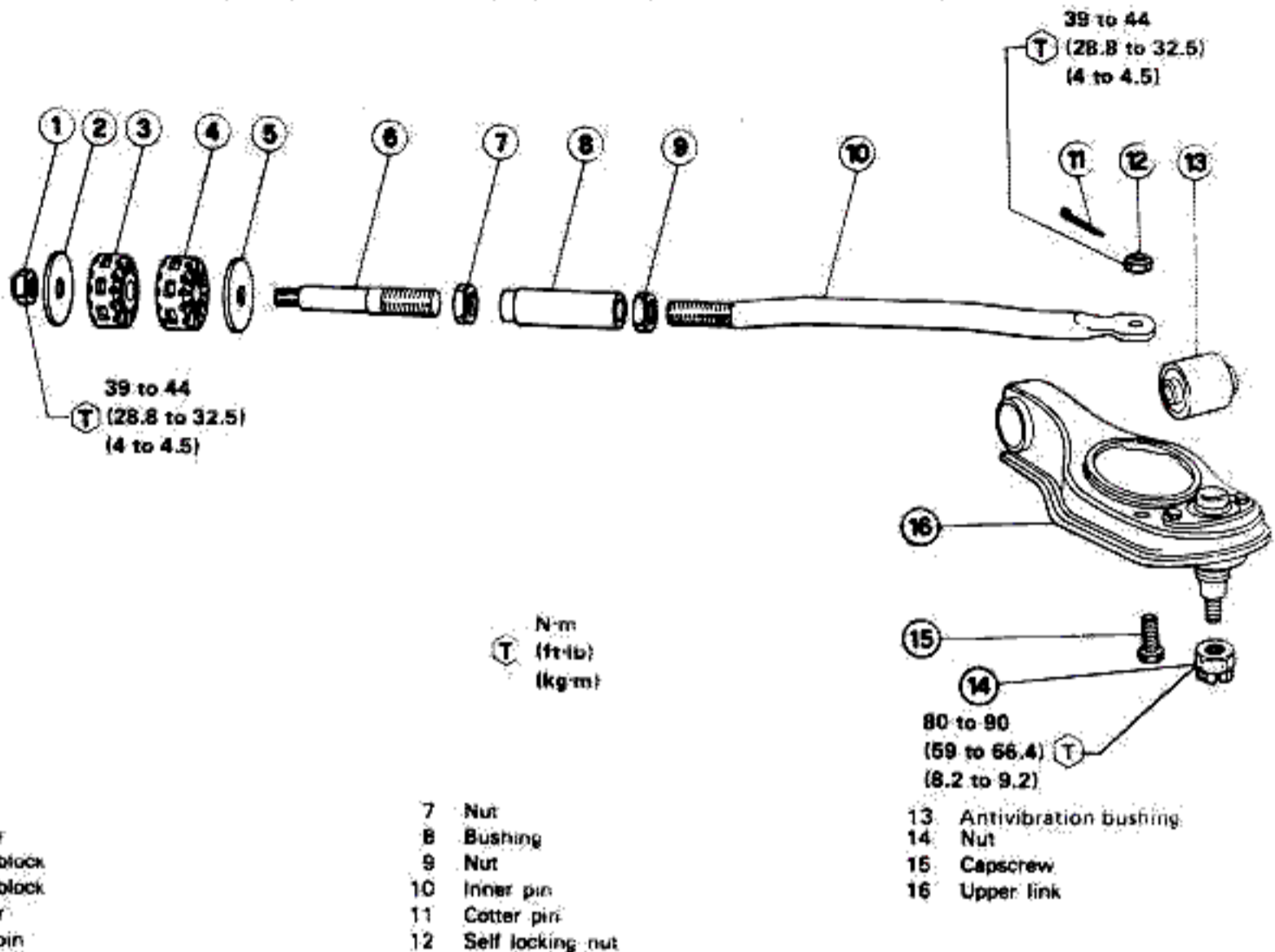
Left bar - yellow mark and letter S or L on front end.

- Tighten the following components to the specified torque.

T : Tightening torques
 Lower link/body bolts
 80 to 90 N·m
 (59 to 66.4 ft·lb)
 (8.2 to 9.2 kg·m)

Lower link ball joint/steering knuckle nut
 45 to 55 N·m
 (33.2 to 40.6 ft·lb)
 (4.6 to 5.6 kg·m)

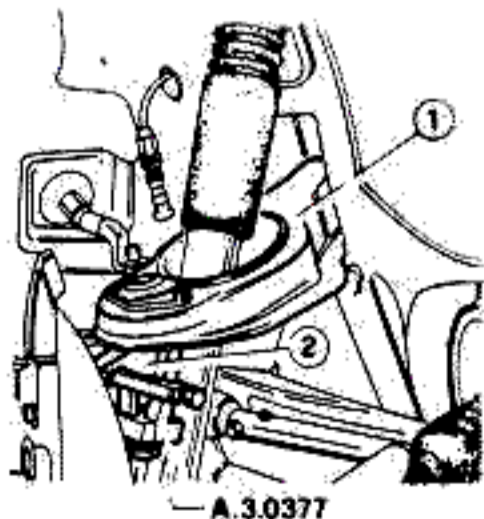
UPPER LINKS AND TIE RODS



UPPER LINKS

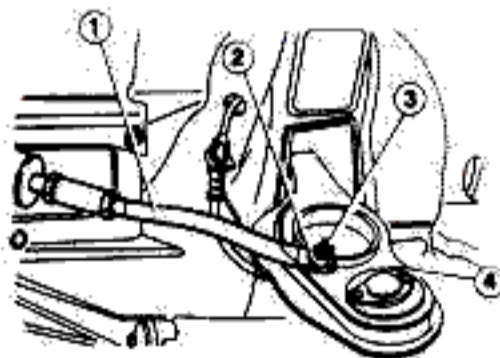
REMOVAL

1. Proceed as specified in "Steering Knuckles and Wheel Hubs - Removal" up to para. 6.
2. Remove cotter pin, back off nut and disconnect upper link ① from steering knuckle ② using tool A.3.0377.



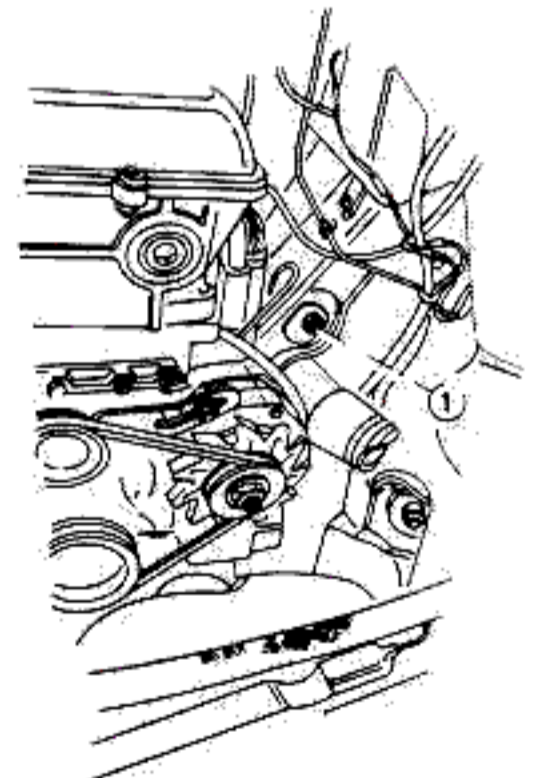
- 1 Upper link
- 2 Steering knuckle

3. Lower the column lift to unload lower link previously loaded.
4. Remove shock absorber (see Shock Absorbers - Removal).
5. Remove cotter pin ③, back off nut ② and disconnect tie rod ① from link ④.



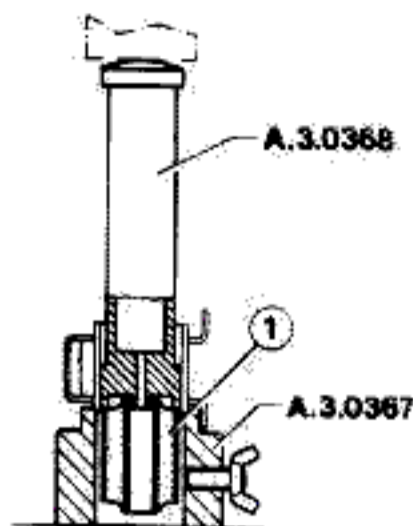
- 1 Tie rod
- 2 Nut
- 3 Cotter pin
- 4 Upper link

6. Back off bolt ① and remove upper link.



- 1 Bolt

7. If necessary, take off anti-vibration bushing ① at the press using tools A.3.0367 and A.3.0368.



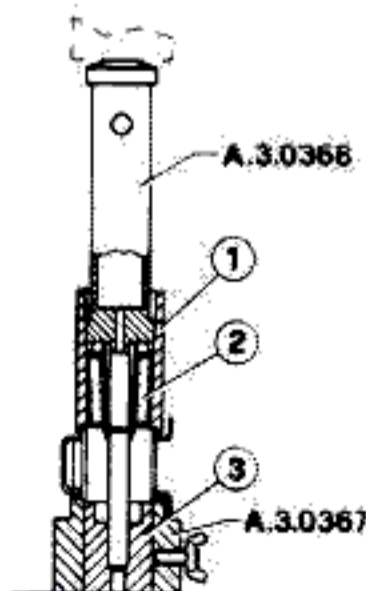
1 Antivibration bushing

INSPECTION

1. Check upper link for damage or distortion and antivibration bushing seat for wear; replace as necessary.
2. Replace ball joint if affected by roughness or excessive play.
3. Check that anti-vibration bushing is not damaged and in particular that the rubber portion is not worn; otherwise replace as necessary.

INSTALLATION

1. If previously removed, install anti-vibration bushing ② using tool A.3.0367 at the press (with adapter ③ and lead-in taper ①) and tool A.3.0368.



1 Lead-in taper
2 Anti-vibration bushing
3 Inner adapter

CAUTION:

Insert anti-vibration bushing from chamfered side.

2. Apply the recommended lubricant (R. GORI Never Seaz) on bolt securing upper link to body.
3. Connect upper link to body through securing bolt.
4. Raise upper link by 1 to 2 mm (0.04 to 0.08 in) and tighten link bolt and tie rod nut to the specified torque.

Ⓣ: Tightening torques

Upper link/body securing bolt
39 to 44 N·m
(28.8 to 32.5 ft·lb)
(4 to 4.5 kg·m)

Tie rod/upper link retaining nut
39 to 44 N·m
(28.8 to 32.5 ft·lb)
(4 to 4.5 kg·m)

5. Install by reversing the removal sequence.
6. Vehicles equipped with (ABS) MARK II wheel antilock system only.
 - a. Re-install the impulse pick-up in reverse order of removal, observing the following tightening torques.

Ⓣ: Tightening torques

Steering knuckle - impulse pick-up support securing nuts
9 thru 10 N·m
(6.6 thru 7.4 ft·lb)
(0.9 thru 1 kg·m)

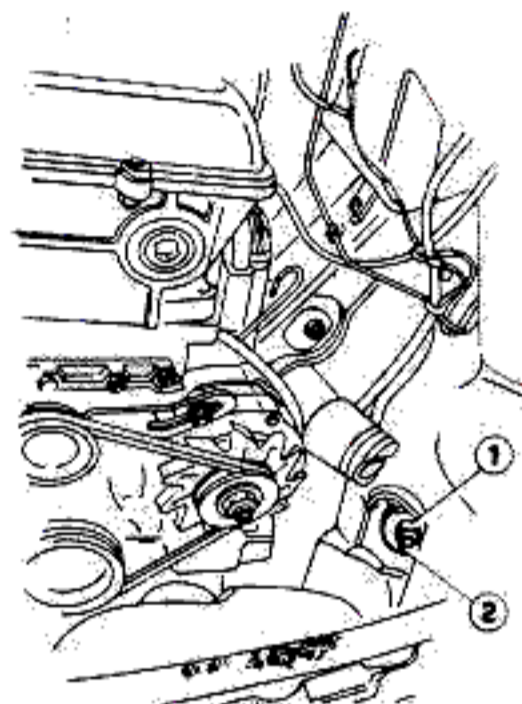
Suspension upper link - impulse pick-up cable plate securing screw
9 thru 10 N·m
(6.6 thru 7.4 ft·lb)
(0.9 thru 1 kg·m)

- b. Ensure that impulse pick-up cables have been well secured to their anchor points to avoid damage when vehicle is running.
- c. Check the air gap between the impulse pick-ups removed and their respective impulse emitting wheels (see: Group 22 - Service Data and Specifications - Checks and Adjustments - Adjustment of the Air Gap between the Impulse Pick-ups and the Impulse Emitting Wheels).

TIE RODS

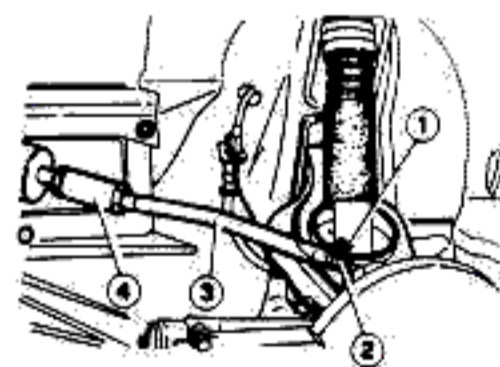
REMOVAL

1. Place car on a platform lift
2. From engine compartment, remove nut ① retrieving washer ② and rubber cushion.



1 Nut
2 Washer

3. Raise lift, remove cotter pin ① and back off nut ②. Remove tie rod ③.



1 Cotter pin
2 Nut
3 Tie rod
4 Bush

FRONT SUSPENSION

INSPECTION

Check tie rod for distortion or damage, and bump clocks for wear, replace any damaged parts as necessary.

INSTALLATION

Install by reversing the removal sequence and following the instructions given below.

- Adhere to the specified tightening torques.

T: Tightening torque
 Tie rod to body nut
 Tie rod to upper link nut
 39 to 44 N·m
 (28.8 to 32.5 ft·lb)
 (4 to 4.5 kg·m)

- Check vehicle trim and caster angle (See: Group 00 - Maintenance of Mechanical Components and Body - Check on Vehicle Height and Wheel Alignment).

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

FLUIDS AND LUBRICANTS

| Description | Type | Recommended product | Quantity |
|---|--------|---|--------------------|
| Wheel hub recess | GREASE | SHELL: Retinax AX AGIP: Grease 33 FD ESSO: Norva 275 IP: Autogrease FD Part. no. 3671-69833 | 50 g (1.76 oz.) |
| Hub sealing ring lip and steering knuckle contact surface | GREASE | ISECO: Molykote BR2 Part. no. 3671-69841 | — |
| Hub sealing ring outer surface | OIL | SHELL: Spirax HD 80W/90 AGIP: Rotra MP SX SAE 75W/90 IP: Pontiax HDS SAE 75W/90 Part. no. 3631-69412 | Wet |
| Anti-roll bar cushion pad inner surface | GREASE | ISECO: Ergon Rubber Grease no. 3 SPCA: Spagraph REINACH: Sferul B2AR Part. no. 3671-69816 | Wet |
| Torsion bar serrations Upper links to body screws Anti-roll bar supports (on lower links) | FLUID | Antiseizure compound: R. GORI: Never Seez Part. no. 3671-69850 | — |
| Bush/lower link recess | GREASE | ISECO: Molykote Longterm no. 2 Part. no. 3671-69831 | 6 g (0.21 oz.) |

BASIC BAR REPLACEMENT

Foreword

Front trim adjustment is accomplished by rotating the torsion bars with respect to reference notes on the front links and rear cross member.

The different number of serrations (35 at the front, 34 at the rear) allows small trim corrections, about 2.5 mm (0.1 in) to be made by repositioning by one tooth at both ends.

Consequently, torsion bar subdivision has been based on diameter rather than vehicle type. A mark, known as the "basic mark" has been put on both ends of the bars.

When operating on the bars, take care not to switch them over, by observing, during assembly, the following marks:

- left bar, yellow mark and letter S or L
- right bar, blue mark and letter D or R

Basic bar installation

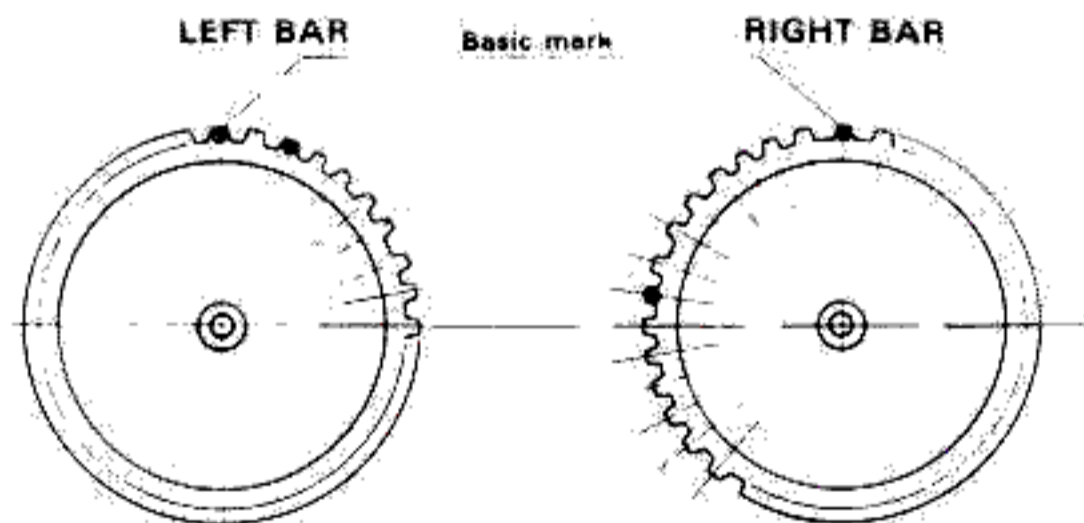
- a) Choose a basic bar having the same diameter as the one to be replaced.
- b) Trace the part no. by referring to the torsion bar table.
- c) Take a new bar from the storehouse then install it by aligning the references on the basic marks with those on the crossmember and lower link.
- d) Having completed installation, check the trim as per normal procedure.

bearing in mind that with a new torsion bar the trim value is 5 mm (0.2 in) greater than the normal one.

e) In the event of incorrect trim, adjust by rotating the bar by some teeth.

The exact number of teeth by which the bar is to be rotated is obtained by dividing the trim difference by the minimum trim correction value corresponding to the bar diameter (see torsion bar table).

f) It is emphasized that for a lower trim, by rotating the left bar CCW and the right bar CW, the trim value increases. For greater trim: by rotating the left bar CW and the right bar CCW, the trim value decreases.



Rear view (cross member side)

CHECKS AND ADJUSTMENTS

TORSION BARS

| Left bar yellow mark | Right bar blue mark | Length mm (in) | Diameter Ø mm (in) | Minimum trim correction for a tooth mm (in) |
|-------------------------|------------------------|----------------------|------------------------------|---|
| Part. no. | Part. no. | | | |
| 16218.21.X15.00 | 16218.21.X16.00 | 931 ± 2 (36.7 ± 0.1) | 22.8 (0.90) (1) 24 (0.95) | 2.5 (0.10) |

(1) Bars marked with red dot

FRONT WHEEL GEOMETRY

Refer to Group 00-Maintenance of Mechanical Components and Body - Wheel Alignment

CHECK ON VEHICLE HEIGHT

Refer to Group 00-Maintenance of Mechanical Components and Body - Check on Vehicle Height

SHOCK ABSORBER CALIBRATION AND PAIRING

On all vehicle front and rear shock absorbers must be paired as indicated in the calibration table.

Front

values in N (lb; kg)

| Part. no. | 161.18.21.072.03 |
|----------------|--|
| Low speed (1) | Compression (151.7 to 69.7; 23.4 to 31.6) |
| | Rebound (123.6 to 146.1; 56.1 to 66.3) |
| High speed (1) | Compression (130.4 to 161.9; 59.1 to 73.4) |
| | Rebound (185.0 to 205.0; 41.5.9 to 460.8; 188.4 to 209) |

Rear

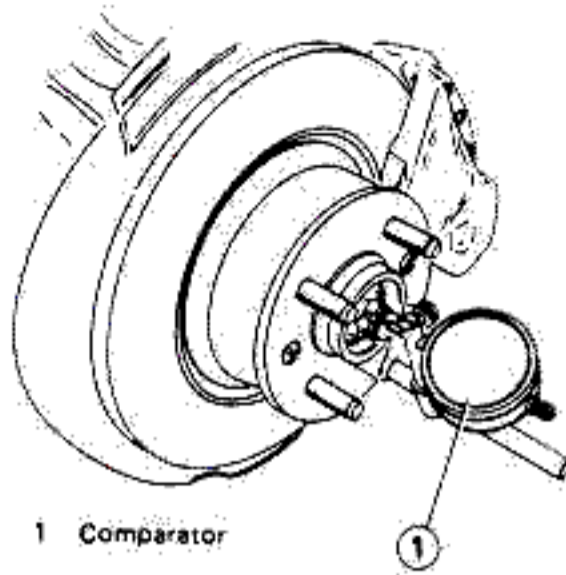
values in N (lb; kg)

| Part. no. | 117.01.25.070.02 |
|----------------|---|
| Low speed (1) | Compression (20.2 to 38.2; 9.2 to 17.3) |
| | Rebound (40.5 to 62.9; 18.3 to 28.5) |
| High speed (1) | Compression (69.7 to 101.2; 31.6 to 45.9) |
| | Rebound (106.0 to 126.0; 238.3 to 283.2; 108.1 to 128.4) |

(1) The values indicated must be considered as the limits for shock absorber use. They must be measured at a temperature of 20 ± 2°C (64.4 to 71.6°F)

FRONT WHEEL HUB BEARING CLEARANCE CHECK (*)

- a. Slacken nuts securing front wheel concerned.
- b. Raise the front of the vehicle and rest it on stands; remove the wheel.
- c. Remove hub cover.
- d. Install a comparator on a magnetic base (or suitable tool) so that it touches the steering knuckle axis (preload the comparator to 1 mm (0.04 in)).



- e. Move the wheel hub axially (back and forth) and read the clearance indicated on the comparator.
This clearance should come within specified values:

Front hub bearing clearance
G = 0.02 thru 0.12 mm
(0.0008 thru 0.005 in)

(*) Vehicles equipped with (ABS) MARK II wheel antilock braking system.

TIGHTENING TORQUES

| Description | Measurement unit N·m (ft·lb; kg·m) |
|--|---------------------------------------|
| Nut, wheel hub (stage 1) | 20 to 24 (14.8 to 17.7; 2 to 2.5) |
| Nut, wheel hub (stage 2) | 5 to 10 (3.7 to 7.4; 0.5 to 1) |
| Nut, lower link support end | 29 to 34 (21.4 to 25.1; 3 to 3.5) |
| Lockring, lower link | 20 to 34 (14.8 to 25.1; 2 to 3.5) |
| Nut, lower link lockring | 59 to 71 (43.5 to 52.4; 6 to 7.2) |
| Nut, ball joint to lower link | 15 to 20 (11.1 to 14.8; 1.5 to 2) |
| Nuts, lower link support to chassis | 80 to 90 (59 to 66.4; 8.2 to 9.2) |
| Nut, lower link ball joint to steering knuckle | 45 to 55 (33.2 to 40.6; 4.6 to 5.6) |
| Nut, upper link ball joint to steering knuckle | 80 to 90 (59 to 66.4; 8.2 to 9.2) |
| Nut, upper link to chassis | 39 to 44 (28.8 to 32.5; 4 to 4.5) |
| Nut, tie rod to chassis | 39 to 44 (28.8 to 32.5; 4 to 4.5) |
| Nut, tie rod to upper link | 39 to 44 (28.8 to 32.5; 4 to 4.5) |
| Locknut, shock absorber to chassis | 24 to 29 (17.7 to 21.4; 2.4 to 3) |
| Capscrews, shock absorber to lower link | 25 to 31 (18.4 to 22.9; 2.5 to 3.2) |
| Nut, anti-roll bar conn. rod (on lower link) | 18 to 23 (13.3 to 17; 1.8 to 2.3) |
| Capscrews, anti-roll bar cushion pads | 25 to 29 (18.4 to 21.4; 2.5 to 3) |
| Capscrews, front brake caliper to steering knuckle | 74 to 83 (54.6 to 61.2; 7.5 to 8.5) |
| Nut, steering link ball joint to steering knuckle | 45 to 55 (33.2 to 40.6; 4.6 to 5.6) |
| Steering knuckle-impulse pick-up support securing nuts (1) | 9 to 10 (6.6 to 7.4; 0.9 to 1) |
| Suspension upper link-impulse pick-up cable plate securing screw (1) | 9 to 10 (6.6 to 7.4; 0.9 to 1) |

(1) Vehicles equipped with (ABS) MARK II wheel antilock braking system

TROUBLE DIAGNOSIS AND CORRECTIONS

| Condition | Probable cause | Corrective action |
|----------------------------|---|--|
| Shock, vibration or shimmy | <ul style="list-style-type: none"> - Shocks on steering wheel from road feedback. May be caused by excessive pinion rack backlash or steering components play. - Steering wheel oscillation may be due to steering linkage play or pinion rack backlash, or front wheel vibration. - Shimmy is a high frequency oscillation transmitted to steering wheel and often occurs at particular vehicle speeds. • Incorrect tire inflation pressure • Wheel unbalance or rim distortion • Worn tires or loose wheel screws • Worn suspension ball joint • Incorrect pinion-rack backlash • Failed suspension linkage rubber bushings • Excessive steering linkage play • Loose steering box screws • Loose or defective shock absorber | <ul style="list-style-type: none"> Inflate correct tire Balance or repair Replace or tighten Replace ball joint Adjust backlash Replace bushings Check and replace as necessary Tighten screws Tighten or replace |
| Car wanders | <ul style="list-style-type: none"> - This fault is detected with the car on the move on a level road by taking hands off the steering wheel. See also: Group 25 - Trouble diagnosis and corrections • Worn or defective tires • Incorrect tire pressure and/or loose wheel screws • Different tread wear on right and left tyres • Asymmetric car trim • Incorrect wheel geometry • Brakes binding • Worn suspension rubber bushings • Damaged steering-suspension connection | <ul style="list-style-type: none"> Replace tires Inflate to correct pressure and/or tighten Replace tire with shallower tread Adjust trim Adjust Check and repair Replace worn parts Replace defective parts |

FRONT SUSPENSION

| Condition | Probable cause | Corrective action |
|-------------------------------|--|--|
| Excessive steering wheel play | <ul style="list-style-type: none"> • Incorrect pinion rack backlash • Worn steering components • Loose steering box screws | <p>Adjust</p> <p>Replace worn parts</p> <p>Tighten</p> |
| Noise | <ul style="list-style-type: none"> • Incorrect tire pressure • Damaged and worn ball joints or steering components. Insufficient lubrication • Loose steering linkage or suspension fasteners • Defective shock absorbers • Inefficient wheel bearings • Inefficient suspension bushings • Damaged torsion bars • Loose shock absorber nut | <p>Inflate to correct pressure</p> <p>Replace or lubricate</p> <p>Tighten</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Replace</p> <p>Tighten</p> |
| Tires squeal on corners | <ul style="list-style-type: none"> • Incorrect tire pressure • Incorrect wheel geometry • Incorrect driving | <p>Inflate to correct pressure</p> <p>Adjust</p> <p>Avoid incorrect driving</p> |
| Uneven tire wear | <ul style="list-style-type: none"> • See Group 00 - Wheels and Tires | |
| Steering wheel binding | <ul style="list-style-type: none"> • Incorrect tyre pressure • Worn tires • Incorrect pinion rack backlash <p>• After these preliminary operations, if fault persists check and operate as follows: Raise vehicle front end using a jack and apply stands. Detach steering linkage from steering knuckle and move steering wheel</p> <ol style="list-style-type: none"> a) If steering wheel movement is light, check steering linkage or suspension. b) If steering wheel binds, check steering box or steering column. <ul style="list-style-type: none"> • Incorrect steering box lubrication and/or contaminated lubricant | <p>Inflate to correct pressure</p> <p>Replace</p> <p>Adjust</p> <p>Lubricate or change lubricant</p> |

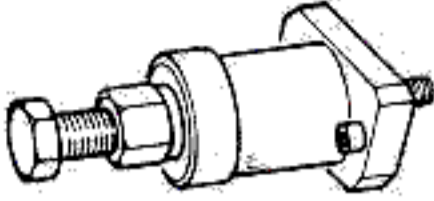

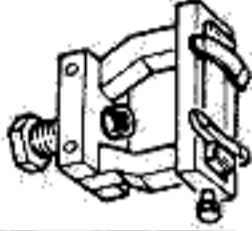


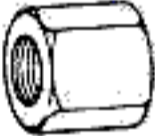

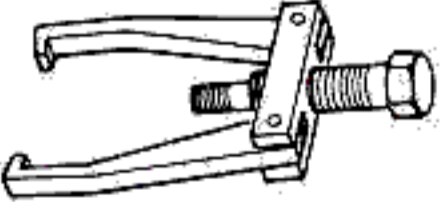
FRONT SUSPENSION

| Condition | Probable cause | Corrective action |
|-----------|---|--|
| | <ul style="list-style-type: none"><li data-bbox="691 379 1228 508">• Incorrect steering linkage lubrication, contaminated grease or abnormal steering wear<li data-bbox="691 551 1075 594">• Worn or seized ball joint<li data-bbox="691 636 1081 679">• Distorted steering linkage<li data-bbox="691 722 1081 765">• Incorrect wheel geometry | Lubricate correctly, change grease or replace worn parts Replace Replace Adjust |

SPECIAL SERVICE TOOLS

| Part. no. | Description | Page ref. |
|-----------|---|-------------------------|
| A.2.0069 | Support, torsion bar load/unload (use with A.2.0265) | 21-5 21-9 |
| A.2.0265 | Loader/unloader, torsion bars (use with A.2.0069) | 21-5 21-9 |
| A.3.0156 | Puller, steering knuckle upper pins | 21-5 |
| A.3.0328 | Installer, front hub outer bearing cup | 21-7 |
| A.3.0329 | Installer, front hub inner bearing cup | 21-7 |
| A.3.0367 | Bolster, upper link anti-vibration bushing removal/installation (use with A.3.0368) | 21-16 |
| A.3.0368 | Remover/replacer, upper link anti-vibration bushing (use with A.3.0367) | 21-16 |
| A.3.0372 | Remover/replacer, lower link (use with A.3.0373) | 21-12 21-13 21-14 |
| A.3.0373 | Toothed washer, lower link removal/installation (use with A.3.0372) | 21-12 21-14 |

FRONT SUSPENSION

| Part no. | Description | Page ref. |
|---------------|---|---------------|
| A.3.0374 | Remover, torsion bars.  | 21-11 |
| A.3.0374/0001 | Forcing screw, torsion bar removal.  | 21-11 |
| A.3.0377 | Puller, upper and lower ball joints, steering knuckle.  | 21-5 21-15 |
| A.3.0441 | Ring, lower link ball joint removal (use with A.3.0576 and A.3.0575).  | 21-13 |
| A.3.0442 | Ring, lower link ball joint installation (use with A.3.0576 and A.3.0562).  | 21-13 |
| A.3.0562 | Centralizer, front suspension link ball pin installation (use with A.3.0576 and A.3.0442).  | 21-13 |
| A.3.0575 | Centralizer, front suspension link ball pin removal (use with A.3.0576 and A.3.0441).  | 21-13 |
| A.3.0576 | Remover/replacer, front suspension link ball pin (use with A.3.0575, A.3.0441, A.3.0442, A.3.0562).  | 21-13 |