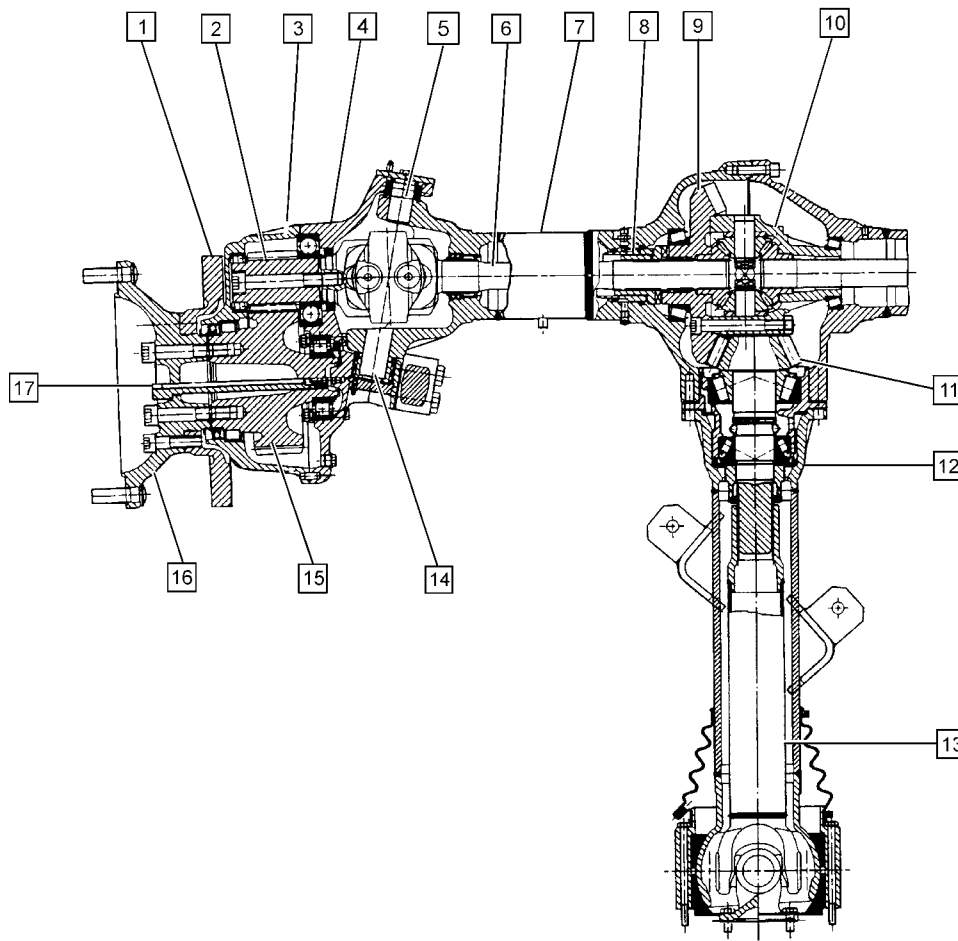


GROUP 7 — AXLE GROUP



- | | | | |
|---------------------|--------------------------------|---------------------------|---------------------|
| 1. Brake disc | 5. Upper pivot pin | 9. Ring gear | 13. Propeller shaft |
| 2. Drive gear | 6. Drive axle | 10. Differential assembly | 14. Lower pivot pin |
| 3. Wheel hub drive | 7. Axle housing | 11. Drive pinion | 15. Output gear |
| 4. Steering knuckle | 8. Differential lock mechanism | 12. Torque tube | 16. Wheel hub |
| | | | 17. Sleeve (CTIS) |

Figure 219 - Front Axle Assembly

Front Axle Assembly

99. Removal

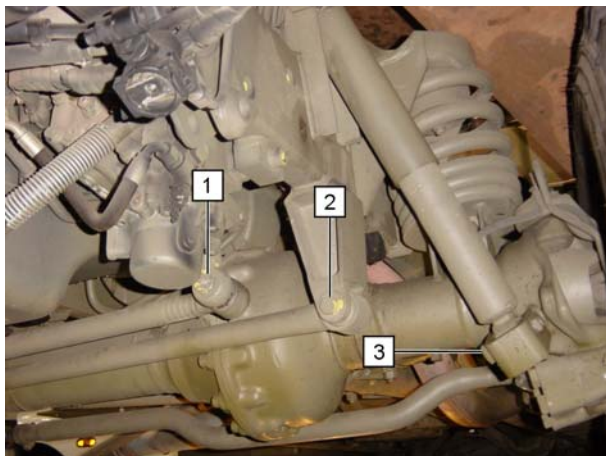
- a. Apply the hand brake and chock the wheels at the rear axles.

WARNING

DO NOT WORK ON THE VEHICLE WITHOUT SAFETY STANDS BENEATH THE CHASSIS OR BENEATH THE AXLE. PLACE THE AXLE STAND AS CLOSE TO THE RAISED WHEEL AS POSSIBLE. FAILURE TO USE SAFETY STANDS MAY RESULT IN SEVERE INJURY OR DEATH IF THE JACK SLIPS OR COLLAPSES.

- b. Place the front of the vehicle on chassis stands. Ensure there is no weight on the suspension and the wheels are still resting on the ground.
- c. Operate the battery isolation switch so that the batteries are isolated from the vehicle.
- d. Remove the drag link from the pitman arm (refer to EMEI Vehicle D 393 Group 9 - Steering).
- e. Remove the split pin and nut (or self locking nut if fitted) securing the ball joint to the pitman arm (Fig 220(1)). Discard the self locking nut (if fitted).

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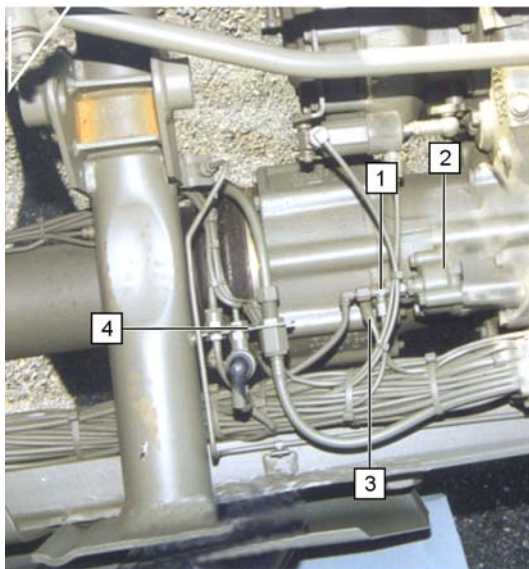


1. Pitman arm
2. Panhard rod
3. Lower shock absorber mounting

Figure 220 - Steering and Shock Absorber Mounts - Disconnecting

f. Disconnect the connections to the six-wheel drive shift cylinder as follows:

- (1) Disconnect the T-piece (Fig 221(1)) (with air lines attached) from the six-wheel drive shift cylinder (Fig 221(2)).
- (2) Disconnect the electrical lead (Fig 221(3)) from the six-wheel drive indicator switch.



1. T-piece
2. Six-wheel drive shift cylinder
3. Electrical lead
4. Mounting bracket

Figure 221 - Transmission Oil Cooler Lines - Removal

- (3) Remove the wheel hub covers on the front axle and disconnect the CTIS quick disconnect couplings at the wheel hubs (Fig 222).

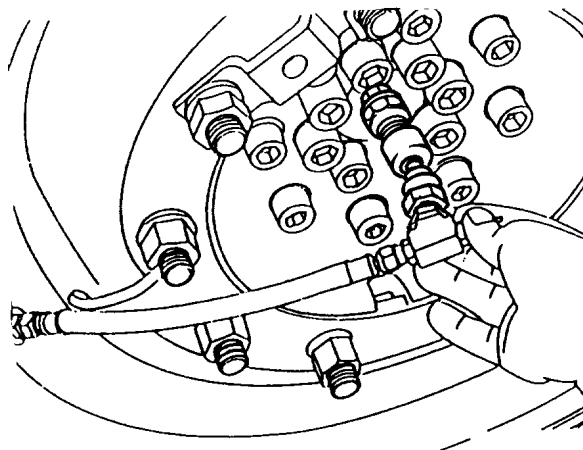


Figure 222 - CTIS Quick Disconnect Coupling - Removal

g. Disconnect the connections between the transmission and the front axle and pull back the axle as follows:

- (1) Cut the cable tie securing the front axle torque tube boot breather line to the torque tube boot connector and remove the line from the boot.
- (2) Undo the union securing the flexible brake hose to the steel brake pipe at the bracket (Fig 223(1)) on the chassis crossmember above the front axle torque ball. Remove the locking clip securing the flexible hose to the mounting bracket and disconnect the hose from the crossmember. Seal open connections.
- (3) Tag and disconnect the CTIS air line from the mounting bracket on the chassis crossmember above the front axle torque ball. Seal open connections.
- (4) Tag and undo the breather and differential lock lines at the mounting bracket on the chassis crossmember above the front axle torque ball. Remove the locking clip securing the breather and differential lock lines to the mounting bracket and disconnect the lines. Seal open connections.
- (5) Cut the cable ties securing the front axle brake wear indicator loom to the main wiring loom on the left hand chassis rail and disconnect the loom at the connector on the main loom. Do not disconnect the front axle brake wear indicator loom from the front axle torque tube.

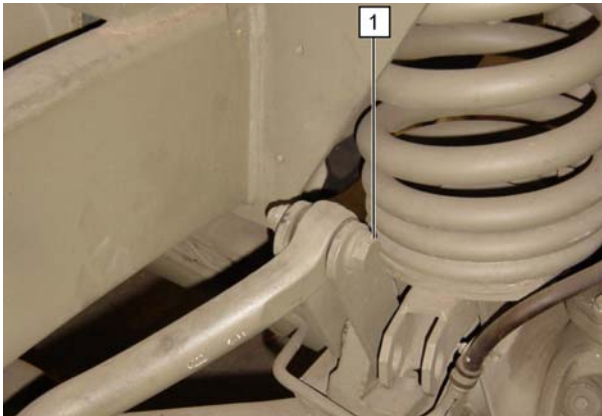
- (6) Remove the spring clamp Fig 223(2)) securing the front axle torque ball housing rubber boot and slide back the boot.



- 1. Bracket
- 2. Spring clamp

Figure 223 - Front Axle Torque Ball Housing - Removal

- h. Remove the nuts, serrated washers and bolts securing the lower end of the two shock absorbers (Fig 220(3)) to the front axle.
- i. Remove the nuts and bolts (Fig 224(1)) connecting the sway bar to the front axle housing sway bar mounts.



- 1. Bolt

Figure 224 - Sway Bar Connection

- j. Disconnect the front panhard rod (Fig 220(2)) from the mounting bracket on the left hand chassis rail (refer to Group 19 Frame/Chassis Group, para 345). Remove the panhard rod out of the chassis mounting bracket and tie up the loose panhard rod and the drag link (Fig 225).

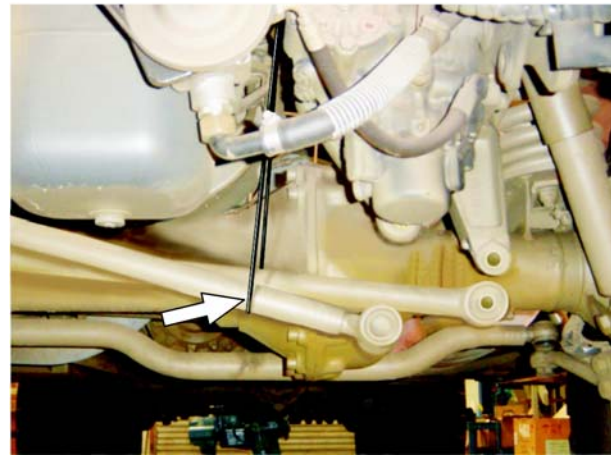


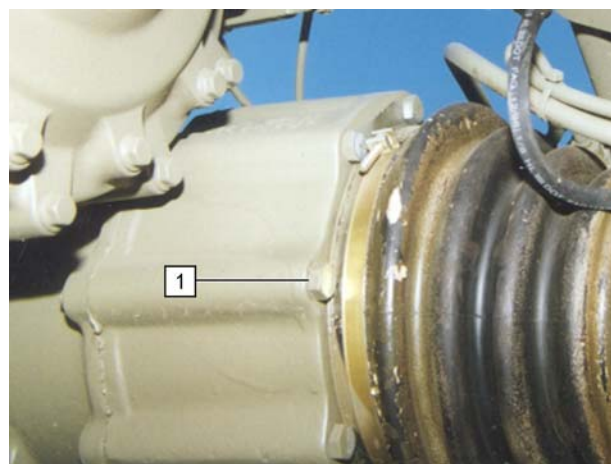
Figure 225 - Panhard Rod and Drag Link - Secured

- k. Remove the lock nuts and bolts (if fitted) securing the lower end of the two coil springs to the front axle. Discard the lock nuts.



SUPPORT THE FRONT AXLE TORQUE TUBE BEFORE REMOVING THE TORQUE BALL HOUSING MOUNTING BOLTS TO PREVENT DAMAGE TO THE TORQUE BALL HOUSING.

- (1) Support the front axle torque tube with a floor jack and a suitable extension piece.
- (2) Remove the M10 X 150 (Grade 10.9) bolts (Fig 226(1)) securing the front axle torque ball housing to the transfer case front axle output housing.



- 1. M10 (Grade 10.9) bolt

Figure 226 - Front Axle Torque Ball Housing - Removal

WARNING

THE FRONT AXLE TORQUE TUBE WILL ACT LIKE A GUILLOTINE IF IT INADVERTANTLY SLIDES TOWARDS THE TRANSFER CASE WHILST THE MAIN TRANSMISSION IS BEING REMOVED OR REPLACED AND LOSS OF FINGERS CAN OCCUR. ENSURE THE FRONT AXLE TORQUE TUBE IS SECURED AT ALL TIMES DURING THE REMOVAL/INSTALLATION PROCEDURE OF THE MAIN TRANSMISSION AND BEFORE ATTEMPTING THE REMOVAL AND INSTALLATION OF THE FRONT AXLE TORQUE TUBE.

- (3) Attach a block and tackle between the front axle torque tube struts and a suitable anchor point on the front of the vehicle (Fig 227).

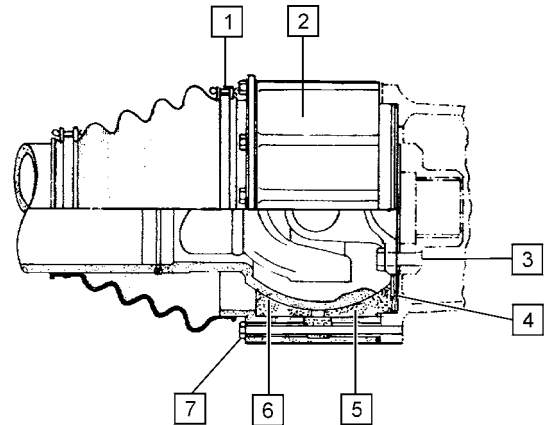


Figure 227 - Front Axle - Securing

CAUTION

AVOID DAMAGE TO SURROUNDING COMPONENTS AND ATTACHED FITTINGS WHEN PULLING BACK THE FRONT AXLE TORQUE TUBE. CHECK THAT THE AXLE IS NOT FOULING AS IT MOVES FOWARD.

- (4) Pull back the front axle torque tube with the block and tackle until there is sufficient space to access the front propeller shaft mounting bolts (Fig 228(3)).
- (5) Remove the rear torque ball shell halves (Fig 228(5)) from the front axle torque ball assembly.



- | | |
|----------------------------------|--------------------------------------|
| 1. Spring clamp | 5. Rear torque ball shell half |
| 2. Torque ball housing | 6. Front torque ball shell half |
| 3. Propeller shaft mounting bolt | 7. Torque ball housing mounting bolt |
| 4. Shims | |

Figure 228 - Torque Ball Assembly - Front Axle

- (6) Remove the four M10 x 30 (Grade 10.9) propeller shaft mounting bolts (Fig 228(3)) securing the front axle propeller shaft to the transfer case front axle output flange.
 - l. Slide the front axle propeller shaft into the front axle torque tube and support the torque tube.
 - m. Support the front axle differential centre with a suitable floor jack and extension piece.
 - n. Release the block and tackle.

- o. Lift the vehicle until the front axle is clear of the coil springs while a second person supports the wheels in a straight ahead position to prevent the wheels from collapsing.
- p. Place a temporary dust cover over the front axle torque ball housing opening, and remove the axle to the front.
- q. Lower the chassis onto the chassis stands.

100. **Cleaning and Inspection**

- a. Seal the opening at the front axle torque ball housing.

WARNING

ENSURE THE SAFETY REQUIREMENTS FOR USE OF COMPRESSED AIR ARE STRICTLY ADHERED TO. INADVERTANT USE OF COMPRESSED AIR EQUIPMENT MAY RESULT IN INJURY TO PERSONNEL.

- b. Clean the parts in an appropriate cleaning agent and blow dry with compressed air. Inspect all parts for wear or damage, replace as required.
- c. Carefully deburr the front axle torque ball housings and the torque ball shell halves (Fig 229).

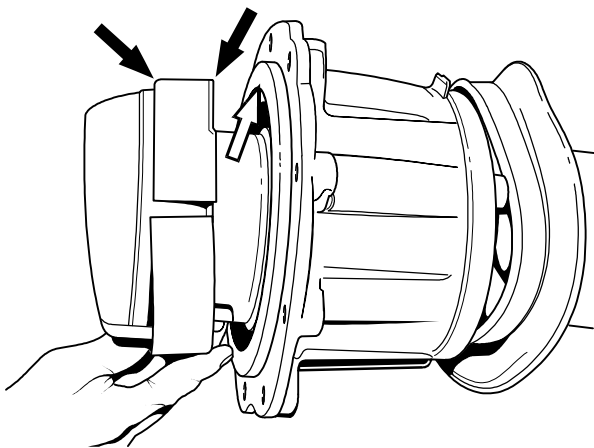


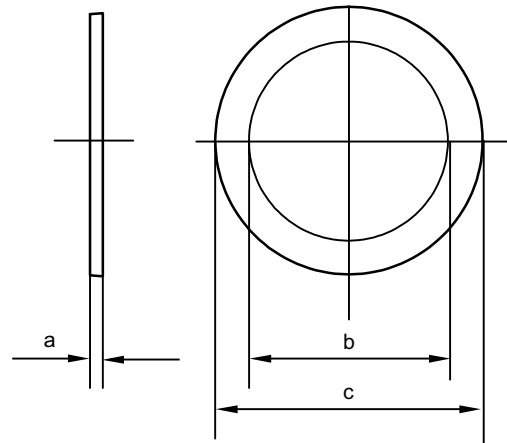
Figure 229 - Torque Ball Housing and Torque Ball Shell Halves

- d. Clean the tooth profile and slip joint spline cavity of the front axle propeller shaft and pack the cavity behind each tooth profile with a molybdenum disulphide based grease (XG-276).
- e. Lubricate the front axle propeller shaft grease nipple with grease (XG-274).

101. **Adjustment**

NOTE

To maintain the torque setting on the torque ball, shims (Fig 228(4)) are fitted between the front axle torque ball housing and the transfer case front axle output housing. Shims are supplied in 0.2 mm, 0.5 mm and 1.0 mm sizes (Fig 230). A retaining plate (Table 2, Item 21), a 750 mm extension bar (Table 2, Item 22), and a spring balance are used to measure the torque setting.



- a. 0.2 mm, 0.5 mm, 1.0 mm
- b. \varnothing 148 mm
- c. \varnothing 194 mm

Figure 230 - Torque Ball Adjusting Shims

NOTE

The torque ball adjustment must be carried out prior to attaching the front axle torque tube to the transfer case. The dimension difference between the transfer case front axle output housing flange and the torque ball housing flange must be determined.

- a. Coat the rear (Fig 232(1)) and front (Fig 232(2)) torque ball shell halves with a molybdenum disulphide based grease (XG-276) and fit them into the front axle torque ball housing (Fig 231).

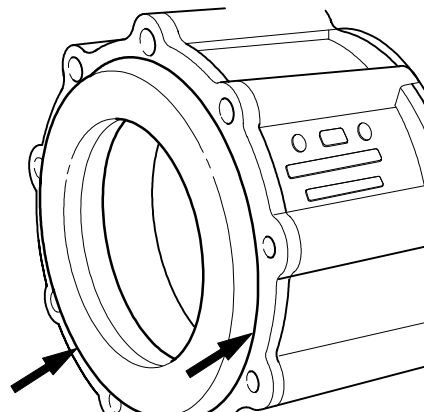
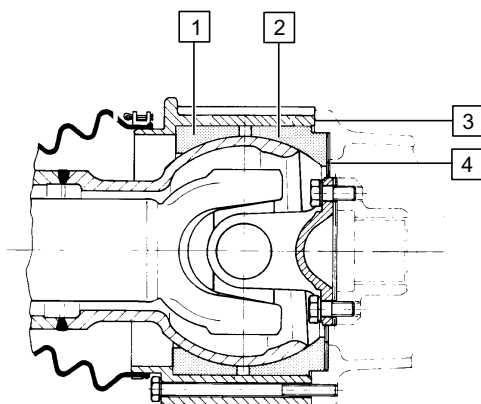


Figure 231 - Torque Ball Housing and Torque Ball Shell Halves - Installation

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b. Check the front axle torque ball adjustment as follows:

- (1) Install the shim stack (Fig 232(4)) on the torque ball housing.



1. Rear torque ball shell half
2. Front torque ball shell half
3. Sealing surface
4. Shims

Figure 232 - Torque Ball Shim Positions

- (2) Fit the retaining plate (Table 2, Item 21) to the front axle torque ball housing and tighten the securing bolts uniformly to 60 Nm.
- (3) Insert the 750 mm extension bar (Table 2, Item 22) into the retaining plate and measure the force on the extension bar with a spring balance (Fig 233).

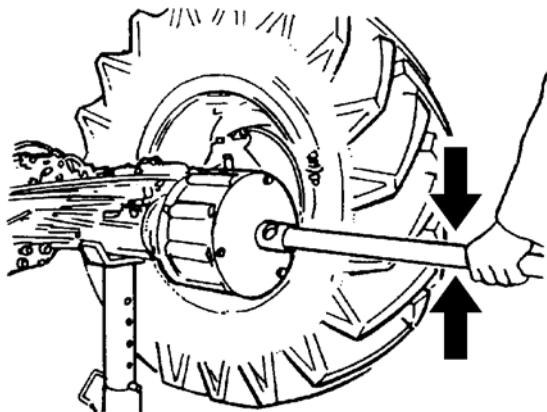


Figure 233 - Front Axle Torque Ball - Adjustment Check

NOTE

With an extension bar measuring 750 mm, a manual force of 200 - 300 N should be attained.

- (4) If the force on the extension bar is below 200 N, insert shims; if the force is above 300 N, remove shims. Repeat the procedure until the force on the extension tube is between 200 N and 300 N.

c. Remove the extension bar and the retaining plate (Table 2, Items 21 and 22) from the front axle torque ball housing. Retain the shims for fitment to the torque ball housing.

d. Cover the front axle torque ball housing opening to prevent the ingress of dirt.

102. Installation

WARNING

DO NOT WORK ON THE VEHICLE WITHOUT SAFETY STANDS BENEATH THE CHASSIS OR BENEATH THE AXLE. PLACE THE AXLE STAND AS CLOSE TO THE RAISED WHEEL AS POSSIBLE. FAILURE TO USE SAFETY STANDS MAY RESULT IN SEVERE INJURY OR DEATH IF THE JACK SLIPS OR COLLAPSES.

CAUTION

SUPPORT THE FRONT AXLE TORQUE TUBE WHEN INSTALLING THE AXLE TO PREVENT DAMAGE TO THE TORQUE BALL HOUSING.

- a. Lift the front of the vehicle in preparation for installing the front axle assembly.
- b. Support the front axle at the differential centre with a floor jack and extension piece and the torque tube at the transmission end. With a second person supporting the wheels in the upright position move the axle into position under the vehicle.
- c. Align the coil springs with the front axle mounts.

CAUTION

THE PANHARD ROD BUSHES AND SWAY BAR BUSHES WILL BE SUBJECT TO EXTREME TORSIONAL STRESS CAUSING ACCELERATED WEAR AND PREMATURE FAILURE IF THEIR CONNECTING BOLTS ARE TORQUED WHILST THE VEHICLE IS ON CHASSIS STANDS. DO NOT TORQUE THE CONNECTING BOLTS UNTIL THE WEIGHT OF THE VEHICLE IS ON THE SUSPENSION.

- d. Align the sway bar with its mounts on the front axle housing and connect the sway bar to the front axle with the nuts and bolts. Do not tighten the bolts at this stage.

- e. Connect the front panhard rod to the mounting bracket on the left hand chassis rail and fit the connecting bolt and lock nut (Fig 234). Do not tighten the bolt at this stage.

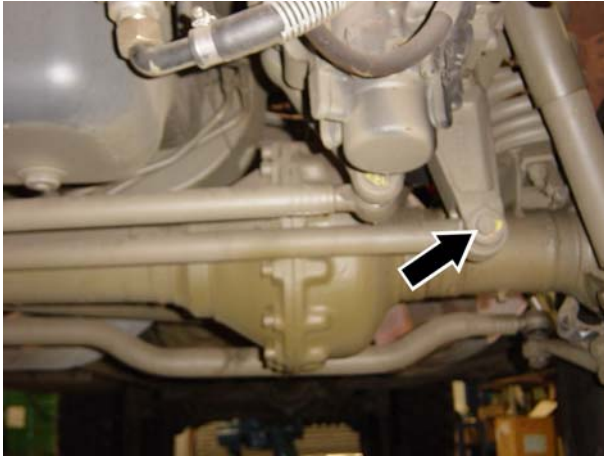


Figure 234 - Panhard Rod - Installation

- f. Lower the vehicle chassis onto chassis stands.
- g. Connect the front axle and connections to the transmission as follows:
 - (1) Remove the temporary cover from the front axle torque tube opening.
 - (2) With a trolley jack and a suitable extension piece raise the front axle torque tube until the front axle propeller shaft flange is aligned with the transfer case front output flange.
 - (3) Install the torque ball shell front halves and the torque ball shim pack (previously calculated, see para 101) to the transfer case front output housing. Temporarily secure the shims with grease.
 - (4) Attach a block and tackle between the front axle torque tube strut bracket and a suitable anchor point on the front of the vehicle (Fig 235).



Figure 235 - Front Axle - Securing

- (5) Adjust the block and tackle so that there is sufficient space between the torque ball housing and the transfer case front axle output housing to fit the front axle propeller shaft mounting bolts, then secure the block and tackle so the front axle torque tube cannot move towards the transfer case.

WARNING

THE FRONT AXLE TORQUE TUBE WILL ACT LIKE A GUILLOTINE IF IT INADVERTANTLY SLIDES TOWARD THE TRANSFER CASE WHILST THE PROPELLER SHAFT BOLTS ARE BEING INSTALLED, AND LOSS OF FINGERS CAN OCCUR. CHAIN BACK THE TORQUE BALL HOUSING SO THAT IT WILL NOT MOVE BEFORE ATTEMPTING TO INSTALL THE PROPELLER SHAFT BOLTS.

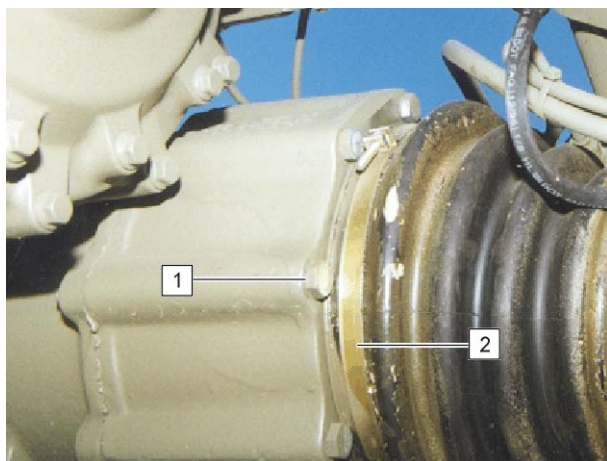
CAUTION

TO PREVENT DAMAGE TO THE FRONT AXLE TORQUE BALL HOUSING, SUPPORT THE TORQUE TUBE WITH A TROLLEY JACK AND A SUITABLE EXTENSION PIECE WHILE INSTALLING THE TORQUE BALL HOUSING BOLTS.

NOTE

Later version transfer case front axle output flanges may have been retrofitted to accept M12 bolts to secure the front propeller shaft. Torque the M12 bolts to 100 Nm and use a thread locking agent (Loctite 243) on the threads.

- (6) Connect the front axle propeller shaft to the transfer case front axle output flange with the four M10 (Grade 10.9) bolts. Coat the threads of the bolts with a thread locking agent (Loctite 243) prior to assembly and torque the M10 bolts to 75 Nm and the M12 bolts (if fitted) to 100 Nm.
- (7) Install the rear torque ball halves in the front axle torque ball housing and slowly release the axle ensuring the front axle torque tube mounting flange and the transfer case front axle output housing mounting flange is aligned.
- (8) Coat the mating surface of the front axle torque ball housing with a sealant (Omnifit FD 10, Part No. 002 989 00 20 10, or equivalent) and connect the torque ball housing to the transfer case front axle output housing with the M10 x 150 (Grade 10.9) bolts (Fig 236(1)). Torque the bolts to 65 Nm.

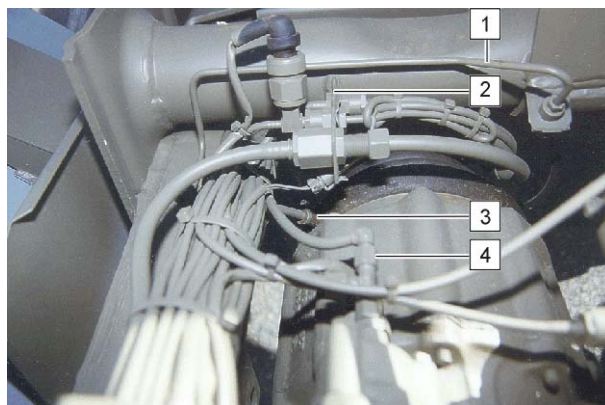


- 1. M10 (Grade 10.9) bolt
- 2. Spring clamp

Figure 236 - Front Axle Drive Torque Ball Housing - Installation

- (9) Slide the rubber boot over the front axle torque ball housing and secure with the spring clamp (Fig 236(2)).
- (10) Remove the temporary dust caps and secure the flexible brake hose to the bracket on the crossmember above the front axle torque ball with the locking clip and connect the hose to the steel brake pipe (Fig 237(1)).

- (11) Connect the front torque tube boot breather line to the torque tube boot breather connector (Fig 237(3)) and secure the line with a cable tie.



- 1. Steel brake pipe
- 2. Mounting bracket
- 3. Torque tube boot breather connector
- 4. T-piece

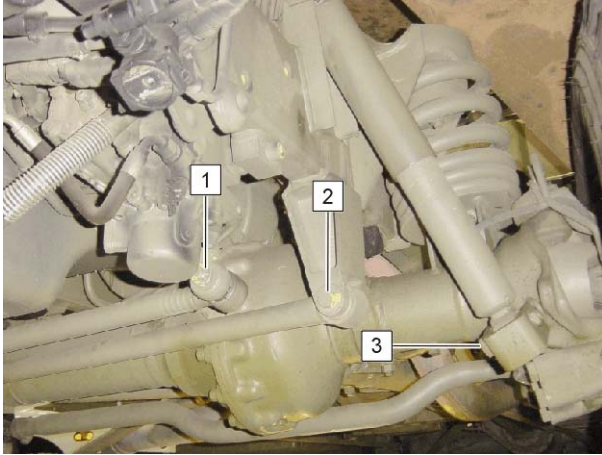
Figure 237 - Front Axle Torque Ball Connections

- (12) Connect the front axle CTIS air line to the CTIS air line at the mounting bracket (Fig 237(2)) above the front axle torque ball housing.
- (13) Connect the front differential lock air line (tagged on removal) and the front differential breather line (tagged on removal) at the mounting bracket (Fig 237(2)) above the front axle torque ball housing. Secure the front differential lock air line and the front differential breather line to the mounting bracket with locking clips.
- (14) Connect the front axle brake pad wear sensor cable to the connector on the left hand chassis rail and secure with cable ties.

NOTE

There are two types of nuts in service that are used to fasten the drag link to the pitman arm, a castellated nut (with split pin) or a self locking nut. When fitting a self locking nut always use a new nut, coat the threads of the nut with a thread locking agent (Loctite 243) and torque the new self locking nut to 220 Nm.

- h. Attach the drag link to the pitman arm (Fig 238(1)) with the castellated nut. Torque the castellated nut to 190 Nm and secure with a split pin. If necessary, align the castellations by tightening the nut to the next available hole.



- 1. Pitman arm
- 2. Panhard rod
- 3. Lower shock absorber mounting

Figure 238 - Steering and Shock Absorber Mounts - Disconnecting

- i. Install the coil spring retainers (if fitted) and secure the springs to the axle with the M18 mounting bolts and new lock nuts. Torque the M18 mounting bolts to 160 Nm.
- j. Install the shock absorbers on the lower shock absorber mountings (Fig 238(3)) on the front axle. Torque the M20 (Grade 8.8) mounting bolts to 240 Nm.
- k. Remove the chassis stands and lower the vehicle to the ground.
- l. Torque the panhard rod connecting bolt to 315 Nm.
- m. Torque the sway bar connecting bolt to 125 Nm.
- n. Connect the CTIS quick disconnect couplings at the front wheel hubs (Fig 222).
- o. Check the front differential and wheel hub oil levels (refer to the Operator Handbook). Top up if required.
- p. Bleed the brake system (refer to EMEI Vehicle D393 Group 8 - Brake System) and check for leaks.

NOTE

Check the torque of the road wheel nuts after 50 km of operation.

- q. Torque the front road wheel nuts to 400 Nm.
- r. Fit the front wheel hub covers.

- s. Check the toe-in/out of the front wheels (refer to EMEI Veh D 393 Group 9 - Steering).
- t. Check the steering stop adjustment, rectify if required (refer to Group 9 - Steering, para 153).
- u. Road test the vehicle, inspect for leaks and check the performance of the front axle, steering and brakes.

Front Axle Half-Shaft

103. Removal

- a. Apply the hand brake and chock the wheels at the intermediate and rear axles.

WARNING

DO NOT WORK ON THE VEHICLE WITHOUT SAFETY STANDS BENEATH THE CHASSIS OR BENEATH THE AXLE. PLACE THE AXLE STAND AS CLOSE TO THE RAISED WHEEL AS POSSIBLE. FAILURE TO USE SAFETY STANDS MAY RESULT IN SEVERE INJURY OR DEATH IF THE JACK SLIPS OR COLLAPSES.

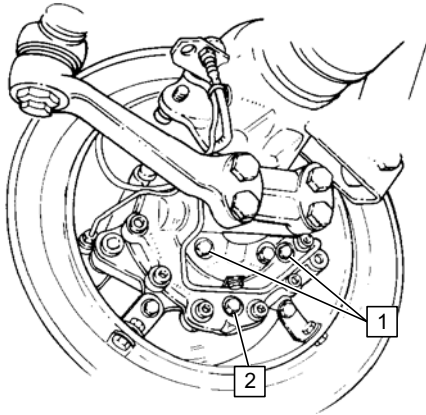
- b. Jack up the front axle until the wheels are clear of the ground and support both wheels on axle stands.
- c. Remove the front wheel from the faulty hub (refer to the Operator Handbook).

WARNING

THE CTIS QUICK DISCONNECT COUPLING ON THE OPPOSING WHEEL MUST BE DISCONNECTED IF THE OPPOSING WHEEL IS NOT SUPPORTED BY A SAFETY STAND. IF THIS ACTION IS NOT DONE WHEN THE CTIS LINE OR WHEEL HUB ON THE FAULTY HUB IS DISCONNECTED THE OPPOSING TYRE WILL DEFLATE AND ALLOW THE VEHICLE TO SLIP OFF THE AXLE STAND AND INJURE PERSONNEL AND DAMAGE EQUIPMENT.

- d. Remove the wheel hub cover off the opposing wheel on the front axle and disconnect the CTIS quick disconnect coupling (Fig 222).
- e. Remove the brake protection ring (refer to EMEI Veh D 393 Group 8 - Brake System).
- f. Disconnect the tie rod (refer to EMEI Veh D 393 Group 9 - Steering).

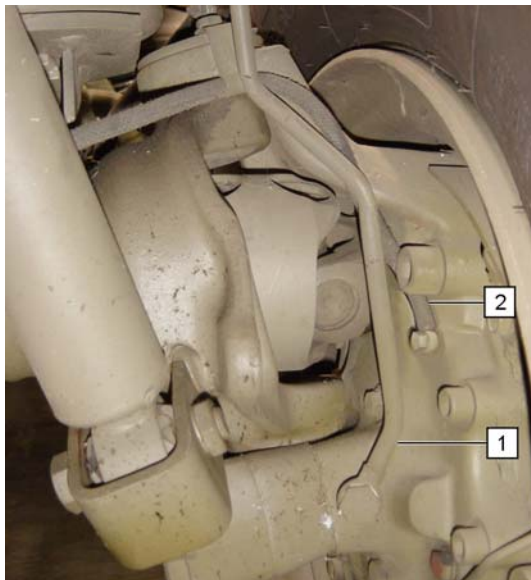
- g. Remove the drag link (if removing the right hand front half-shaft) (refer to EMEI Veh D 393 Group 9 - Steering).
- h. Clean the area around the axle hub drain plug (Fig 239(2)) and drain the oil from the wheel hub drive. Refit the drain plug with a new sealing washer and tighten securely.



- 1. Bolt
- 2. Drain plug

Figure 239 - Wheel Hub Drain Plug

- i. Remove the brake caliper (refer to EMEI Veh D 393 Group 8 - Brake System).
- j. Disconnect the hub breather line (Fig 240(1)) and the supply line for the central tyre control system (CTIS) (Fig 240(2)). Discard the banjo bolt sealing washers and retain the spacer at the CTIS connection.

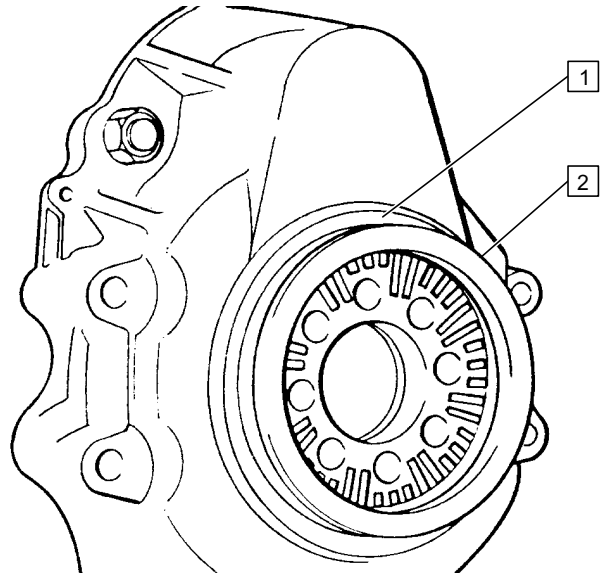


- 1. Hub breather line
- 2. Central tyre control system (CTIS) supply line

Figure 240 - Wheel Hub Connections - Disconnecting

- k. Remove the wheel hub with brake disc and CTIS sleeve (refer to EMEI Veh D 393 Group 8 - Brake System).

- l. Remove the wheel hub seal (Fig 241(1)) and wear ring (Fig 241(2)).



- 1. Wheel hub seal
- 2. Wear ring

Figure 241 - Wear Ring - Removal

- m. Install the retainer (Table 2, Item 23) in the hub (Fig 242).

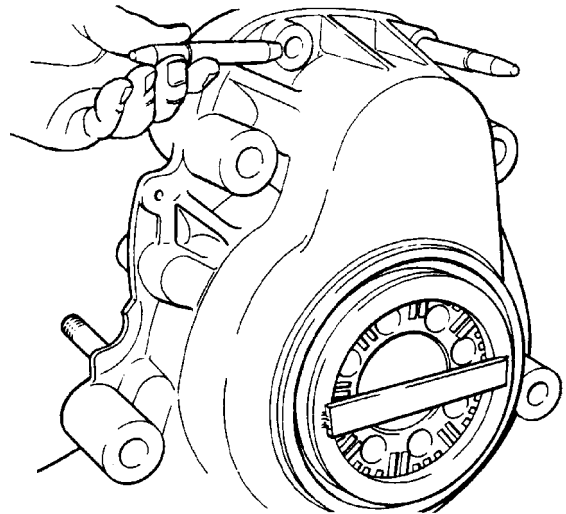


Figure 242 - Guide Pins - Installation

- n. Remove the ten M14 (Grade 12.9) hub drive housing retaining bolts and screw in the three guide pins (Table 2, Item 24) into the mounting holes (two upper and one lower) (Fig 242).
- o. Remove the hub drive housing and at the same time push the retainer completely into the roller bearing to prevent the bearing rollers from dropping out.

NOTE

The O-ring fitted on the retainer (Table 2, Item 23) will prevent the retainer from falling out of the bearing.

- p. Lock up the final drive by inserting a soft (copper) drift between the gear teeth of the half-shaft gear and the hub gear, and then remove the half-shaft gear centre bolt (Fig 243).

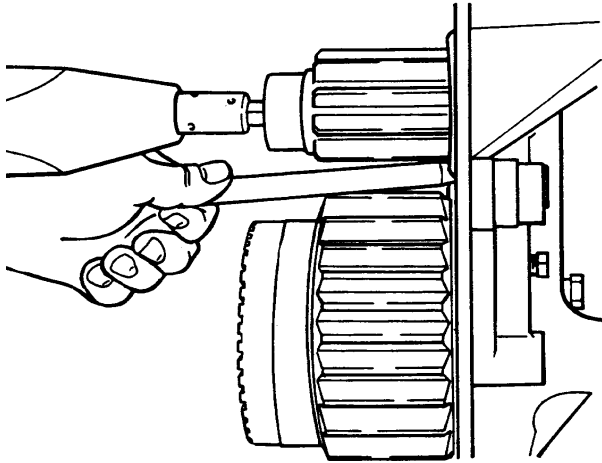


Figure 243 - Half-Shaft Gear Centre Bolt - Removal

- q. Remove the four bolts (Fig 239(1)) securing the hub gear bearing retaining ring in the hub casing.



SUPPORT THE PULLER BRIDGE WITH A CRANE TO PREVENT THE HUB GEAR FROM FALLING DURING REMOVAL (FIG 240).

- r. Remove the hub gear with the assistance of the puller and plate (Table 2, Items 25 and 26) (Fig 244).

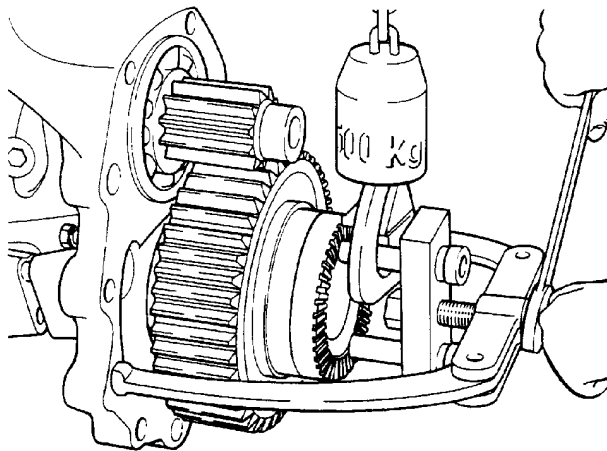


Figure 244 - Hub Gear - Removal

- s. Remove the circlip, shim, spacer ring and bearing from the hub gear shaft.

- t. Remove the half-shaft gear with the puller and extractor (Table 2, Items 25 and 43) (Fig 245).

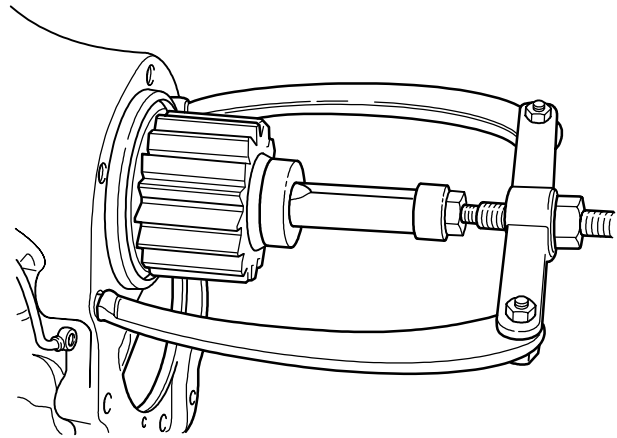


Figure 245 - Half-Shaft Gear - Removal

- u. Press the half-shaft gear bearing off the half-shaft gear. Remove the half-shaft bearing with the assistance of the puller and extractor (Table 2, Items 25 and 43).
- v. Remove all the bearings and bearing races from the outer casing. A hammer and soft drift can be used to remove the hub gear bearing race and seal.
- w. Remove the two upper pivot pin bearing cap retaining bolts, then detach the end plate, sealing ring, shims and spacer ring.
- x. Remove the upper pivot pin bearing from the upper pivot pin with the remover (Table 2, Item 27) (Fig 246).

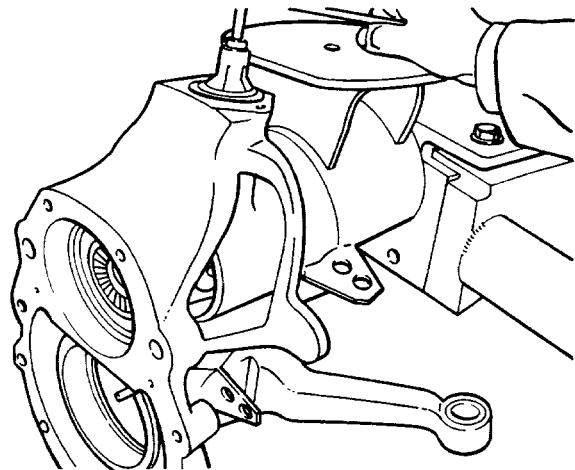
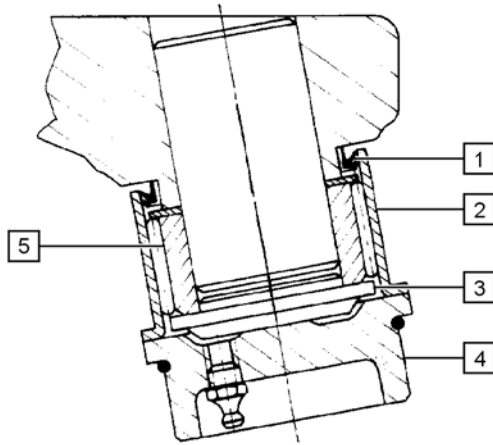


Figure 246 - Upper Pivot Pin Bearing - Removal

- y. Remove the four bolts securing the steering arm to the lower steering knuckle.
- z. Remove the steering arm, half bearing shell, thrust washer end cap (Fig 247(4)) and thrust washer (Fig 247(3)).



1. Seal
2. Needle bearing assembly
3. Thrust washer
4. Thrust washer end cap
5. Inner sleeve

Figure 247 - Lower Pivot Pin Bearing

- aa. Remove the O-ring from the thrust washer end cap and discard.
- ab. Remove the needle bearing assembly (Fig (Fig 247(2))) from the lower pivot pin.

NOTE

Replace the needle bearing inner sleeve (Fig 248) if worn.

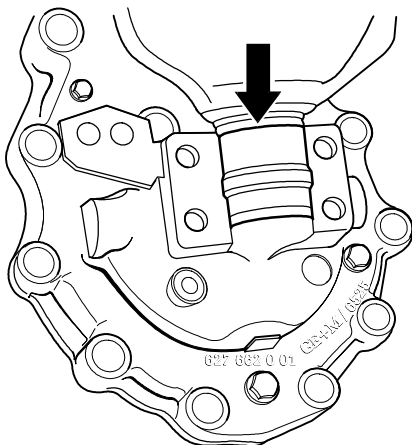


Figure 248 - Lower Pivot Pin Needle Bearing Inner Sleeve - Removal

- ac. Remove the O-ring from the pivot arm of the steering knuckle.
- ad. Remove the steering knuckle (Fig 249).

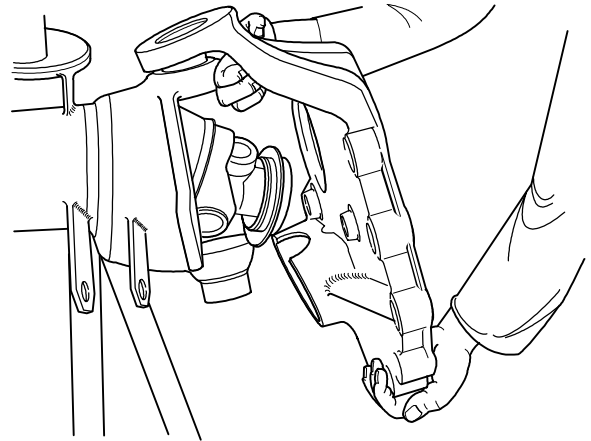


Figure 249 - Steering Knuckle - Removal

- ae. Remove the half-shaft gear seal from the steering knuckle using a hammer and drift.
- af. Remove the upper pivot pin seal.
- ag. Remove the constant velocity joint shaft.



DO NOT DAMAGE THE CIRCLIP BEHIND THE NEEDLE BEARING IN THE AXLE HOUSING WHEN REMOVING THE BEARING.

- ah. Check the condition of the needle bearing in the axle housing. Remove the outer shaft seal, circlip and needle bearing (Fig 250) if required. Remove the needle bearing with the assistance of the puller and extractor (Table 2, Items 25 and 44).

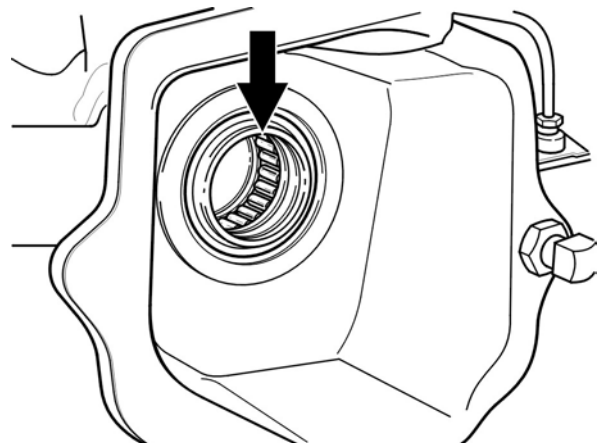


Figure 250 - Needle Bearing - Location

104. Cleaning and Inspection

- a. Clean and inspect all components. Replace any worn or damaged components.
- b. If the integrity of components is in doubt, crack test all components using an appropriate method. De-magnetise components that are induction tested before assembly and/or installation.

- c. Inspect the bearing retaining ring threads for damage, repair/ replace as required.
- d. Inspect the outer wear ring for wear, replace if required. Coat the wear ring seat on the C.V. joint with a locking agent (Loctite 241) and heat the wear ring to about 90°C prior to installation.
- e. Install the outer wear ring with the handle and replacer (Table 2, Items 6 and 28) (Fig 251).

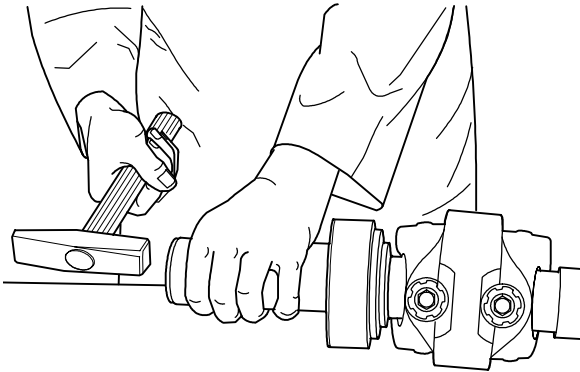


Figure 251 - Wear Ring - Installation

- f. Inspect the inner wear ring for wear, replace if required. Coat the wear ring seat on the constant velocity joint with a locking agent (Loctite 241) and heat the wear ring to about 90°C prior to installation.

105. **Installation**

- a. Install the inner circlip into the axle housing.
- b. Coat the needle bearing with a lubricant (Molycote or equivalent) and install the needle bearing into the axle housing with the handle and replacer (Table 2, Items 6 and 29). Press the bearing in until it abuts against the inner circlip (Fig 252).

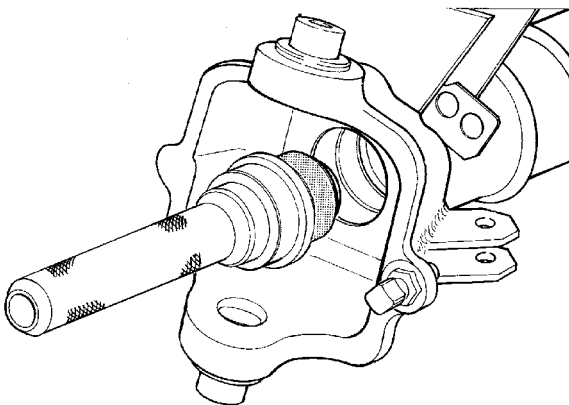


Figure 252 - Needle Bearing - Installation

- c. Install the outer circlip securing the needle roller bearing.

- d. Coat the half-shaft gear shaft seal with a locking agent (Loctite 241). Reverse the replacer (Table 2, Item 29) on the handle (Table 2, Item 6) and install the seal. Coat the lip of the seal with a lubricant (Molycote or equivalent) prior to assembly.
- e. Screw two support bolts (Fig 254(1)) of a suitable length into the lower mounting bolt holes of the saddle bearing caps on the steering knuckle to support the assembly during installation procedures.
- f. Coat the half-shaft gear seal with a lubricant (Molycote) and install the seal using the handle and replacer (Table 2, Items 6 and 30) (Fig 253).

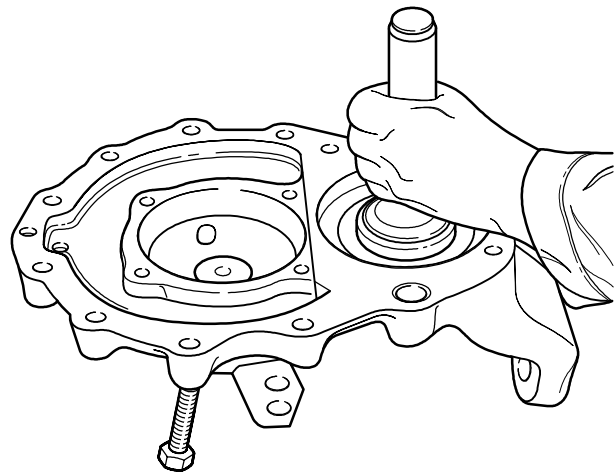
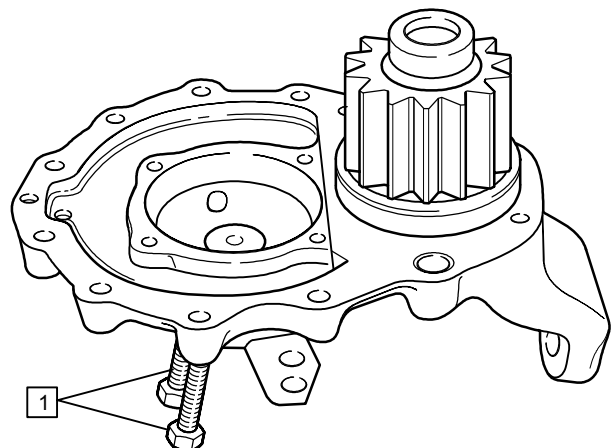


Figure 253 - Half-Shaft Gear Seal - Installation

NOTE

Install the bearing on the half-shaft gear shaft with the open face towards the half-shaft gear.

- g. Press the half-shaft gear bearing onto the half-shaft gear and install the gear with bearing in the steering knuckle (Fig 254).



- 1. Support bolt

Figure 254 - Half-Shaft Gear - Installation

- h. Install the bearing retaining ring on the hub gear. The machined face of the bearing retaining ring must face the bearing. Fit the bearing, spacer ring, shim and circlip to the shaft of the hub gear.

NOTE

There must be zero end float of the bearing on the shaft of the hub gear. Eliminate end float by inserting a shim of appropriate thickness between the bearing and the spacer ring (Fig 255).

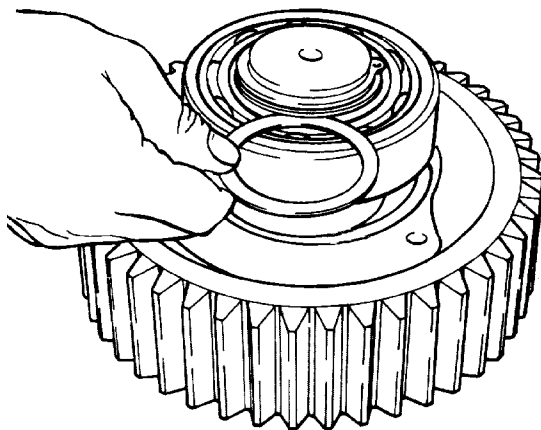
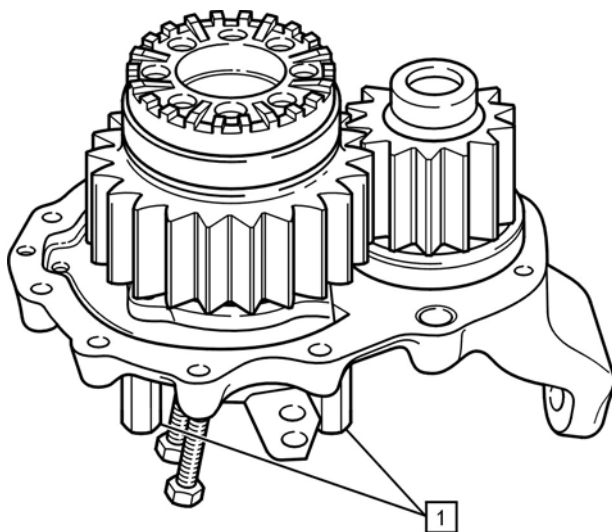


Figure 255 - Bearing End Float Adjustment

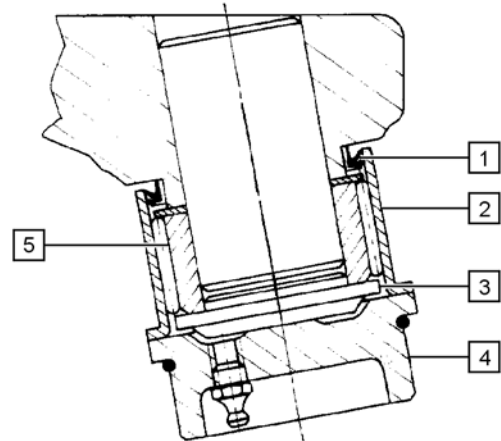
- i. Screw the puller studs (Table 2, Item 31) into the bearing retaining ring in the hub gear and fit the hub gear with puller studs to the steering knuckle.
- j. Pull the hub gear uniformly into the bearing seat with the puller nuts (Table 2, Item 31) (Fig 256).



- 1. Puller nut

Figure 256 - Hub Gear - Installation

- k. Remove the puller nuts and studs. Coat the threads of the four hub gear retaining bolts with a sealing compound (Terostat 56, Part No. 001 989 58 20 or equivalent) and install the bolts. Torque the bolts to 40 Nm.
- l. Coat the splined section of the half-shaft with a molybdenum disulphide based grease (XG-276) and install the constant velocity joint shaft in the axle housing.
- m. Fit the O-ring to the thrust washer end cap (Fig 257(4)).



- 1. Seal
- 2. Needle bearing assembly
- 3. Thrust washer
- 4. Thrust washer end cap
- 5. Inner sleeve

Figure 257 - Lower Pivot Pin Bearing

NOTE

The extractor groove in the upper swivel pin bearing must face upwards to facilitate removal.

- n. Coat the upper pivot pin shaft seal with a lubricant (Molycote or equivalent).
- o. Install the upper pivot pin shaft seal and the upper pivot pin bush.
- p. Install the steering knuckle and suspend the steering knuckle on the upper pivot pin.
- q. Coat the half bearing shell and retaining bolts of the lower pivot pin with a sealing agent (Terostat 56, Part No. 001 989 58 20 or equivalent).
- r. Install the seal (Fig 257(1)), needle bearing (Fig 257(2)), thrust washer (Fig 257(3)), half bearing shell and thrust washer end cap (Fig 257(4)) on the lower pivot pin.
- s. Coat the sealing faces of the steering arm and steering knuckle with a sealing agent (Terostat 56, Part No. 001 989 58 20 or equivalent).