

## Specifications

Description	Nm	lb-ft
Power steering pump bolts	23	17
Power steering fluid reservoir nuts	4	3
Power steering high-pressure pipe union	20	15

# Power Steering

No Data Available

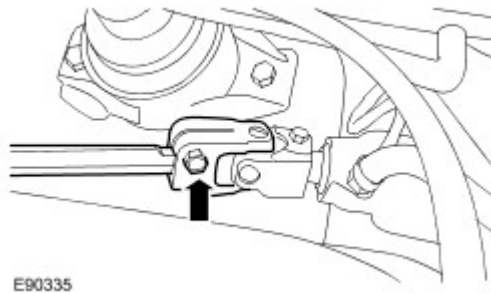
## Steering Gear (57.10.01)

### Removal

- 1 . Center the steering wheel.

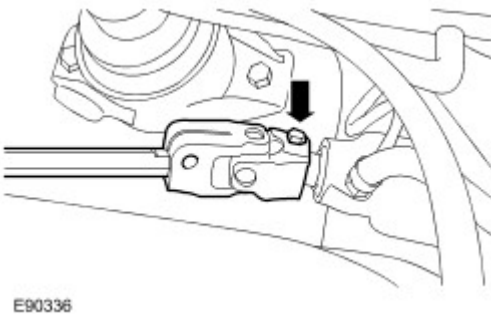
➤ Lock in position, remove the ignition key.

- 2 . Loosen the steering column lower shaft upper bolt.



- 3 . Release the steering column lower shaft from the steering gear.

➤ Remove the steering column lower shaft lower bolt.



- 4 .



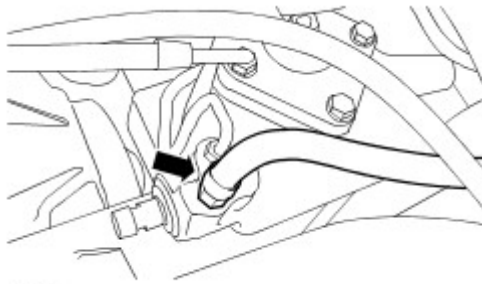
**CAUTION:** If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.




**CAUTION:** Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.


Disconnect the power assisted steering (PAS) return hose from the steering gear.

➤ Position a suitable container to collect any power steering fluid spillage.



E90337


5.  **CAUTION:** If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.

 **CAUTION:** Before disconnecting or removing the components, make sure the area around the joint faces and connections are clean. Plug open connections to prevent contamination.



Disconnect the PAS feed pipe from the steering gear.

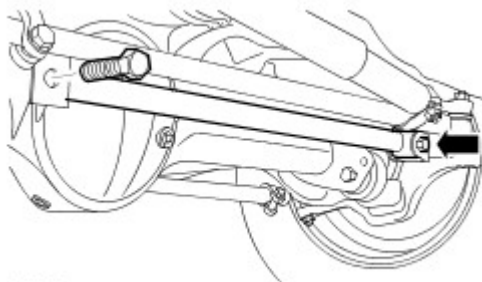


E90338


6.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

7. Remove the panhard rod.
-  Remove the 2 panhard rod nuts and bolts.
  -  Discard the 2 panhard rod nuts.



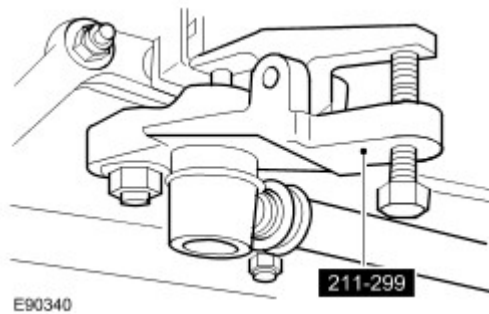
E90339

8.  **CAUTION:** Make sure the ball joint seal is not damaged. A damaged seal will lead to the

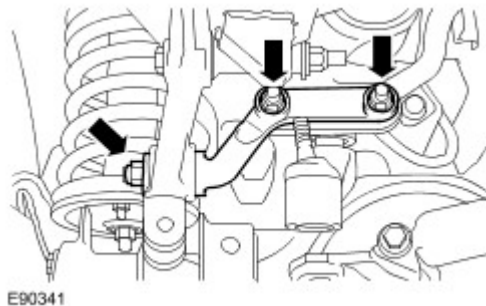
**premature failure of the joint.**

Using the special tool, release the drag link from the drop arm.

- Remove the split pin.
- Remove the drag link to drop arm nut.

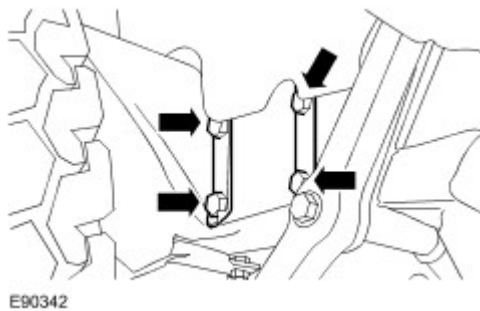


9 . Remove the tie bar.



10 . With assistance, remove the steering gear.

- Release the 2 tab washers.
- Remove and discard the 4 steering gear bolts.
- Remove and discard the 2 tab washers.



11 . **NOTE:**

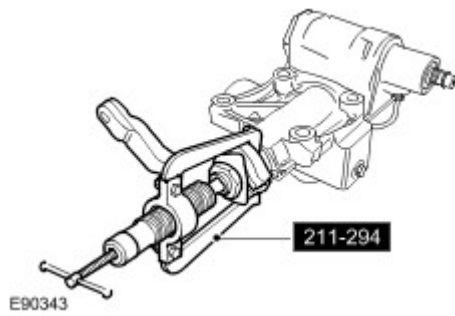
When installing a reconditioned steering gear, complete steps 12, 13 and 14.

Release the drop arm nut lock washer.

12 . Remove and discard the drop arm nut.

- Discard the drop arm nut lock washer.

13 . Using the special tool, remove the drop arm from the steering gear.



## Installation

1 . Clean the drop arm and steering gear mating faces.

2 . **NOTE:**

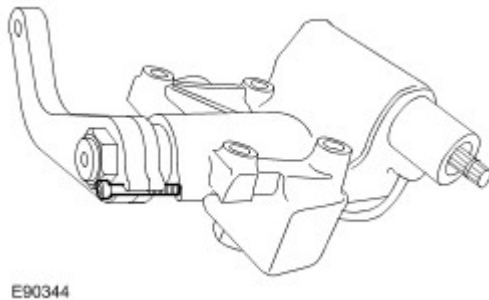
Install a new nut and lock washer.

Install the drop arm to the steering gear.

➤ Install the lock washer.

➤ Install but do not fully tighten the drop arm nut.

3 . Install the centralizing bolt to the steering gear.



4 . Secure the drop arm in a suitable vice.

5 . Tighten the drop arm nut to 176 Nm (130 lb.ft).

6 . Secure the drop arm nut using the lock washer.

7 . Remove the steering gear assembly from the vice.

8 . **NOTE:**

Install new bolts and tab washers.

With assistance, install the steering gear.

➤ Install the tab washers.

➤ Install the steering gear bolts and tighten to 65 Nm (48 lb.ft).

9 . Secure the steering gear bolts using the tab washers.

10 . Install the tie bar to the steering gear.

➤ Loosely install the nuts and bolts.

11 . Tighten the tie bar to panhard rod mount bracket nut to 83 Nm (61 lb.ft).

12 . Tighten the tie bar to steering gear nuts and bolts to 85 Nm (63 lb.ft).

13 . Secure the drag link to the drop arm.

➤ Install the nut and tighten to 40 Nm (30 lb.ft).

➤ Install the split pin.

14 . **NOTE:**

Install new nuts.

Install the panhard rod.

➤ Tighten the nuts and bolts to 230 Nm (178 lb.ft).

15 .



**CAUTION: If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.**

**NOTE:**

Inspect the O-ring seal, if there is any indication of damage install a new seal.

Connect the PAS feed pipe to the steering gear.

➤ Tighten to 20 Nm (15 lb.ft).

16 .



**CAUTION: If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.**

**NOTE:**

Inspect the O-ring seal, if there is any indication of damage install a new seal.

Connect the PAS return hose to the steering gear.

➤ Tighten to 15 Nm (11 lb.ft).

17 . Check the alignment and install the steering column lower shaft to the steering gear.

➤ Install the steering column lower shaft lower bolt and tighten to 22 Nm (16 lb.ft).

18 . Tighten the steering column lower shaft upper bolt to 22 Nm (16 lb.ft).

19 . Remove the centralizing bolt from the steering gear.


20 . Refill and bleed the PAS system.

For additional information, refer to [Power Steering System Filling and Bleeding](#)

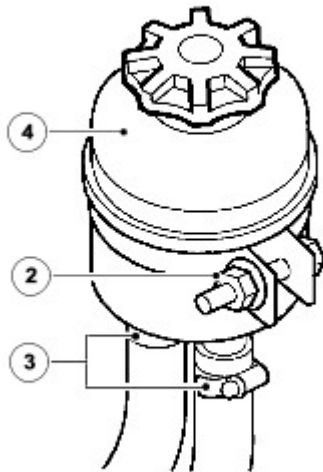
## Power Steering Fluid Reservoir (57.15.08)

### Removal

- 1 . Position drain tin beneath reservoir.
- 2 . Slacken mounting bracket clamp bolt and raise reservoir to gain access to feed and return hose retaining clips.
- 3 . Slacken clips, disconnect hoses from reservoir, allow fluid to drain.

- 4 .  **CAUTION: Plug connections to prevent ingress of dirt. Discard fluid drained from system. Do not allow fluid to contact paintwork, if spilled, remove fluid and clean area with warm water.**

Remove reservoir.



J6308

### Installation

- 1 . Position reservoir, connect feed and return hoses and tighten clips to 3 Nm (2 lbf/ft).
- 2 . Fit reservoir in clamp, tighten clamp bolt.
- 3 . Fill reservoir between upper mark and end of dipstick with power steering fluid.

For additional information, refer to

- 4 . Bleed power steering system.  
For additional information, refer to [Power Steering System Filling and Bleeding](#)




## Power Steering Pump (57.20.14)

### Removal

1. Disconnect the battery ground cable.  
For additional information, refer to [Battery Disconnect and Connect](#).
2. Remove the cooling fan.  
For additional information, refer to [Cooling Fan \(26.25.19\)](#).
3. Release the tension from the accessory drive belt.  
▶ Rotate the accessory drive belt tensioner clockwise.



4.  **WARNING:** Do not work on or under a vehicle supported only by a jack. Always support the vehicle on safety stands.

Raise and support the vehicle.

5.  **CAUTION:** Make sure that the area around the component is clean and free of foreign material.



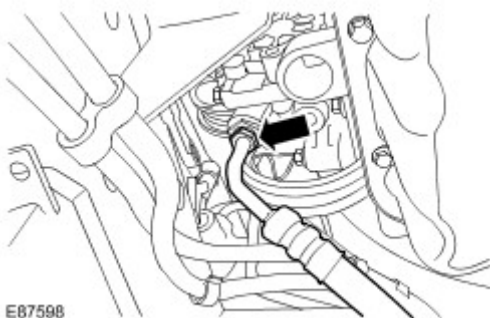
**CAUTION:** Make sure that all openings are sealed. Use new blanking caps.



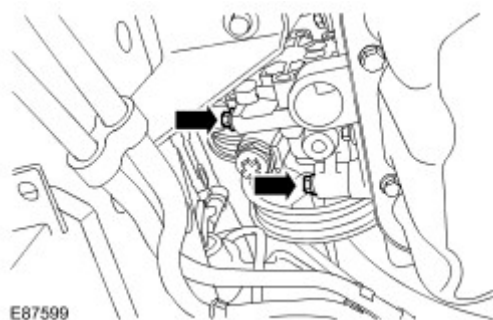
**CAUTION:** If power steering fluid comes into contact with the paintwork, the affected area must be immediately washed down with cold water.

Disconnect the power steering high-pressure pipe union.

- ▶ Remove and discard the O-ring seal.



- 6 . Remove the 2 bolts from the power steering pump.



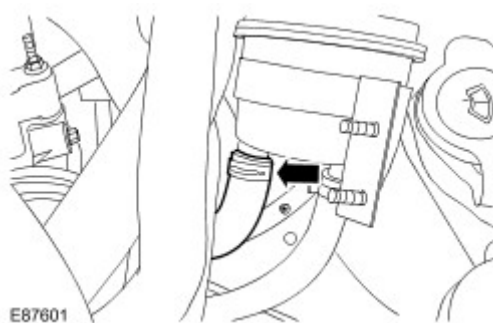
- 7 . Release the power steering fluid reservoir.

➤ Remove the 2 nuts.



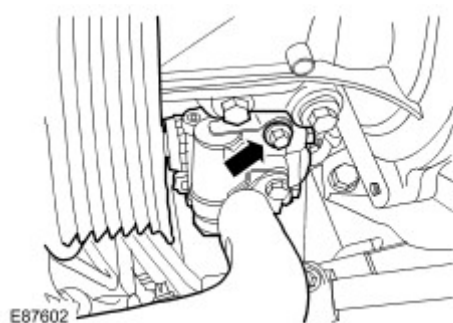
- 8 . Disconnect the power steering fluid reservoir supply hose.

➤ Release the clip.



- 9 . Remove the power steering pump.

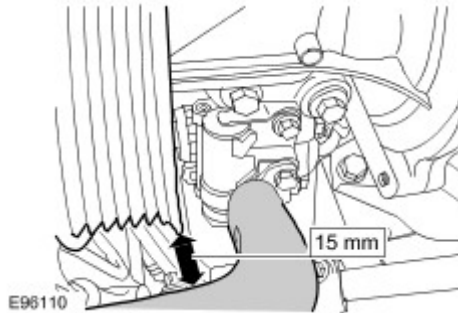
➤ Remove the bolt.



## Installation

- 1 . Install the power steering pump.

➤ Tighten to 23 Nm (17 lb.ft).



- 2 .



**CAUTION:** A 15 mm gap, or greater, must exist between the power steering pump pulley and the hose, at the rearmost edge of the pulley. Adjust the hose if required.

Connect the power steering fluid reservoir supply hose.

➤ Secure the clip.

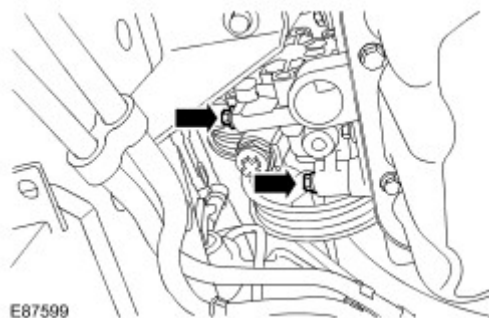
➤ Check that the correct gap exists between the power steering pump pulley and the hose.

- 3 . Secure the power steering fluid reservoir.

➤ Tighten to 4 Nm (3 lb.ft).



- 4 . Tighten to 23 Nm (17 lb.ft).



- 5 . **NOTE:**

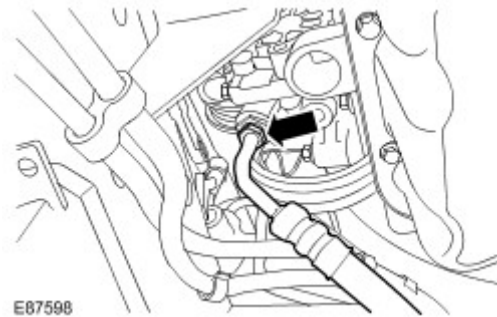
Remove and discard the blanking caps.

**NOTE:**

Install a new O-ring seal.

Connect the power steering high-pressure pipe union.

▶ Tighten to 20 Nm (15 lb.ft).



6 . Secure the accessory drive belt.

▶ Rotate the accessory drive belt tensioner clockwise.

7 . Install the cooling fan.

For additional information, refer to [Cooling Fan \(26.25.19\)](#)

8 . Connect the battery ground cable.

For additional information, refer to [Battery Connect](#)

9 . Fill and bleed the power steering system.

For additional information, refer to [Power Steering System Filling and Bleeding](#)

## Steering Gear

### Disassembly



**WARNING:** Wear safety glasses while removing and refitting circlips and retaining ring.



**CAUTION:** Absolute cleanliness is essential when overhauling steering gear.

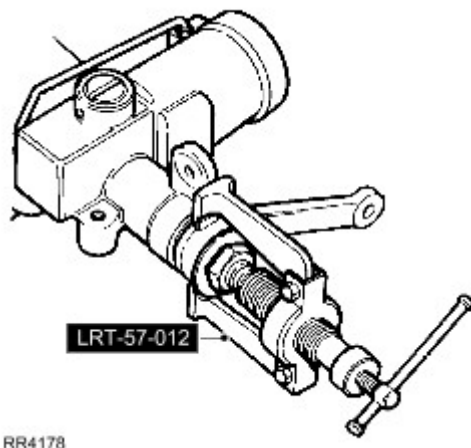
**NOTE:**

Overhaul of steering gear should not be carried out during the warranty period.

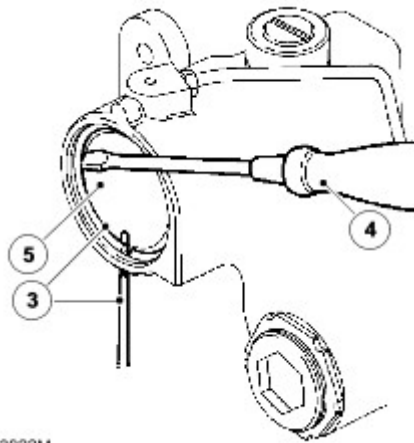
**NOTE:**

This procedure is for Adwest steering gear only.

- 1 . Remove steering gear from vehicle.  
For additional information, refer to [Steering Gear \(57.10.01\)](#). Mark drop arm and steering gear for realignment on assembly. Remove drop arm using extractor LRT-57-012. Loosen drop arm securing nut, but do not remove before using extractor. Remove dirt excluder from output shaft.

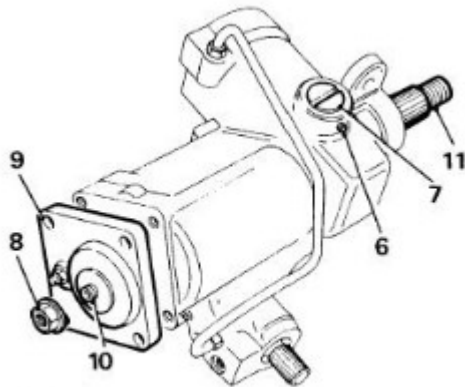


- 2 . Drain oil, remove blanking plugs and bleed screw. Hold steering gear over suitable container, turn input shaft from lock to lock, until oil is drained. Refit bleed screw.
- 3 . Rotate retainer ring until one end is 12 mm from extractor hole. Using a drift through hole in cylinder, lift retaining ring from groove in cylinder bore.
- 4 . Remove retainer ring, using a screwdriver.
- 5 . Turn input shaft (left lock on left hand drive vehicles, right lock on right hand drive vehicles) until piston pushes out cover. Turn input shaft fully in opposite direction, applying pressure to piston.



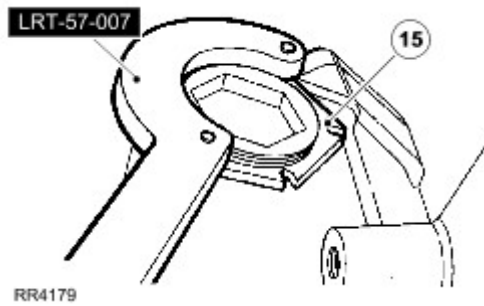
RR3922M

- 6 . Remove set screw retaining rack pad adjuster.
- 7 . Remove rack adjuster and pad.
- 8 . Remove sector shaft adjuster locknut.
- 9 . Remove four bolts from sector shaft cover.
- 10 . Screw in sector shaft adjuster until cover is removed.
- 11 . Slide out sector shaft.



RR924N

- 12 . Remove piston, a bolt screwed into piston will assist removal.
- 13 . Remove input shaft dirt excluder.
- 14 . Remove worm adjuster locknut using 'C' wrench LRT-57-007.
- 15 . Remove worm adjuster using wrench LRT-57-006.



16 . Tap splined end of shaft to free bearing.

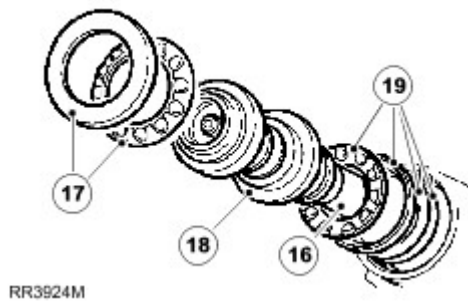
17 . Remove bearing cup and caged ball bearing assembly.

18 . Remove valve and worm assembly.

19 . **NOTE:**

If difficulty is experienced warm the casing and bearing assembly. Cool bearing cup using a mandrel and tap steering gear on a bench.

Remove inner bearing cage, cup and shim washers. Retain shims for reassembly.



20 .



**CAUTION:** Do not remove sector shaft bearings from casing. Replacement parts are not available. If sector shaft bearings are worn fit a new steering gear.

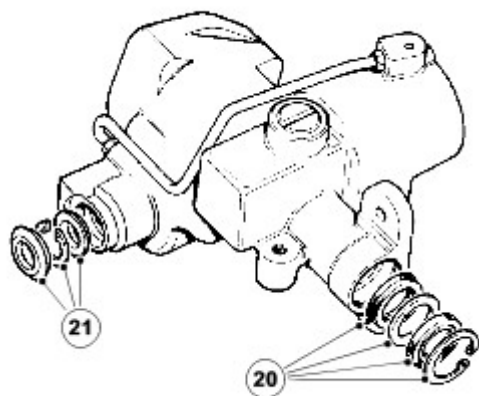
Remove circlip and seal from sector shaft housing bore.

21 .



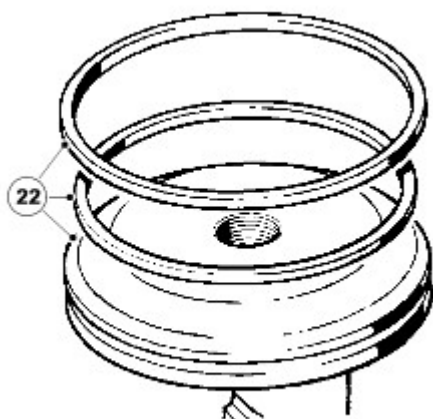
**CAUTION:** The use of a seal puller is recommended to prevent damage to casing, resulting in possible oil leaks.

Remove dirt excluder, circlip and seal from input shaft housing bore.



RR4180

22 . Discard all rubber seals and obtain replacements.



RR2350E

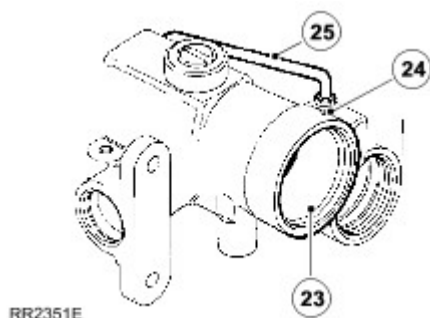
**NOTE:**

A rubber seal is fitted behind plastic ring on rack piston. Discard seal and plastic ring.

23 . Examine piston bore for scoring and wear.

24 . Examine feed tube.

25 . Fit a new feed tube if damaged. Tighten union to 22 Nm (16 lbf/ft).



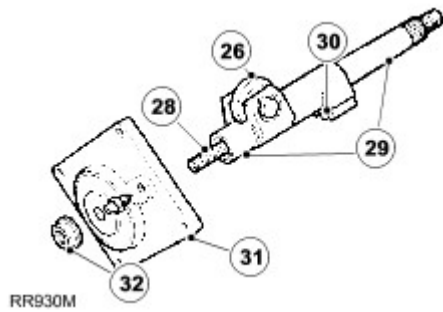
RR2351E

26 . Check there is no side play on roller.

27 . If side play on roller exists fit a new sector shaft.

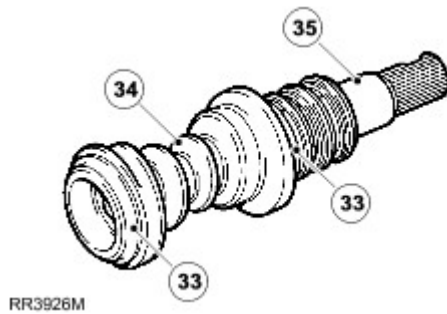


- 28 . Check condition of adjuster screw threads. Check adjuster end float. Fit new adjuster if end float exceeds 0.15 mm.
- 29 . Examine bearing areas on shaft for excessive wear.
- 30 . Examine gear teeth for uneven or excessive wear.
- 31 . Inspect cover and bearing. If worn or damaged, fit a new steering gear.
- 32 . The locknut is also a fluid seal. Fit new nut during assembly.

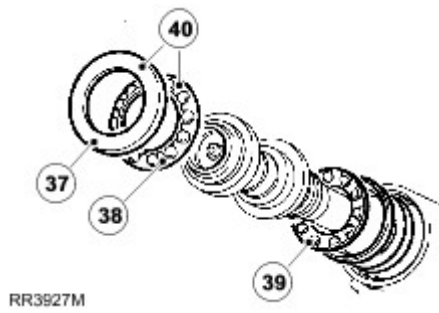


- 33 . Examine bearing areas for wear. The areas must be smooth and not indented.
- 34 . Examine worm track which must be smooth and not indented.
- 35 . **NOTE:**  
Any sign of wear makes it essential to fit new valve and worm assembly.

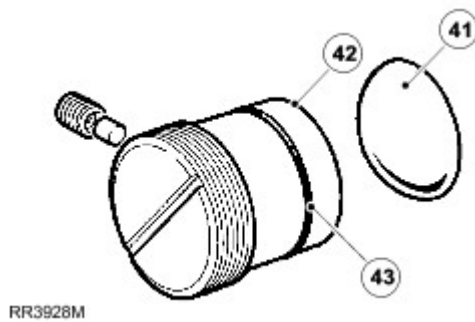
Check for wear on torsion bar assembly pin. No free movement should exist between input shaft and torsion bar or between torsion bar and worm.



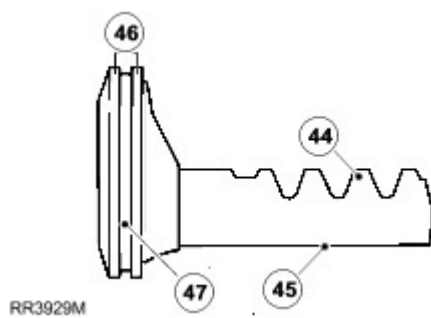
- 36 . Examine valve rings for cuts , scratches and grooves. The valve rings should be free to rotate in grooves. Renew the valve and worm assembly if any faults are found.
- 37 . Examine ball races and cups for wear and general condition.
- 38 . If ball cage has worn against bearing cup, fit replacements.
- 39 . Bearing balls must be retained by cage.
- 40 . Bearing and cage repair is carried out by complete replacement of assembly.



- 41 . Examine thrust pad for scores.
- 42 . Examine adjuster for wear in pad seat.
- 43 . Fit new sealing ring to rack adjuster.



- 44 . Examine for excessive wear on rack teeth.
- 45 . Ensure thrust pad bearing surface is free from scores and wear.
- 46 . Ensure piston outer diameters are free from burrs and damage.
- 47 . Examine seal and ring groove for scores and damage.



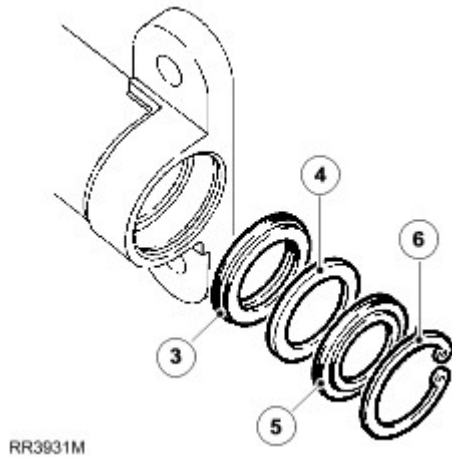
## Assembly

- 1 . Fit new ring to piston. Warm nylon seal and fit to piston.
- 2 . Slide piston assembly into cylinder with rack tube outwards.

### NOTE:

When fitting replacement oil seals lubricate with recommended fluid and ensure absolute cleanliness.

- 3 . Fit oil seal, lip side first.
- 4 . Fit extrusion washer.
- 5 . Fit dust seal, lipped side last.
- 6 . Fit circlip.

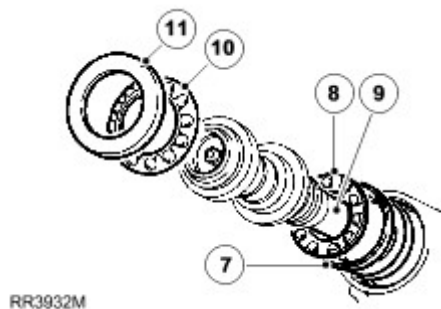


- 7 . Refit original shims and inner bearing cup. Use Petroleum Jelly to aid assembly.

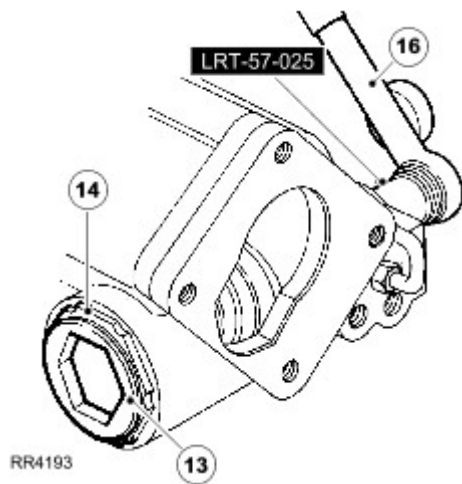
**NOTE:**

If original shims are not used, fit shims of 0.76 mm thickness.

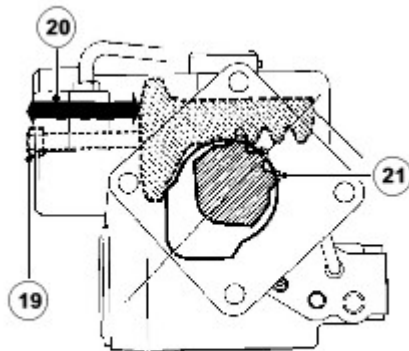
- 8 . Fit inner cage and bearings assembly.
- 9 . Fit valve and worm assembly.
- 10 . Fit outer cage and bearings assembly.
- 11 . Fit outer bearing cup.



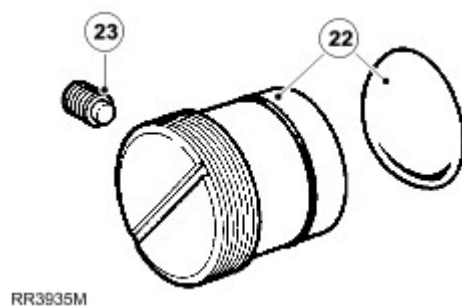
- 12 . Fit new worm adjuster sealing ring.
- 13 . Loosely screw adjuster into casing.
- 14 . Fit locknut, do not tighten.
- 15 . Turn in worm adjuster until end float is almost eliminated. Ensure bearing cages are seated correctly.
- 16 . Measure maximum rolling torque of valve and worm assembly, using a torque wrench and spline socket LRT-57-025.



- 17 . Turn in worm adjuster while rotating shaft to increase figure measured to 0.56 Nm.
- 18 . Back off worm adjuster ¼ turn. Turn in worm adjuster to increase reading by 0.21 - 0.34 Nm with locknut tight, 100 Nm (74 lbf/ft). Use worm adjusting wrench LRT-57-006 and locknut wrench LRT-57-028.
- 19 . Screw slave bolt into piston to aid assembly.
- 20 . Fit piston and rack so piston is 70 mm (2.75 in) from outer end of bore.
- 21 . Fit sector shaft using seal saver LRT-57-021. Align roller with cut out in casing as shown. Push in sector shaft while rotating input shaft to allow sector roller to engage worm.



- 22 . Fit rack adjuster and thrust pad to engage rack. Back off half turn on adjuster.
- 23 . Loosely fit new nylon pad and adjuster set screw assembly.

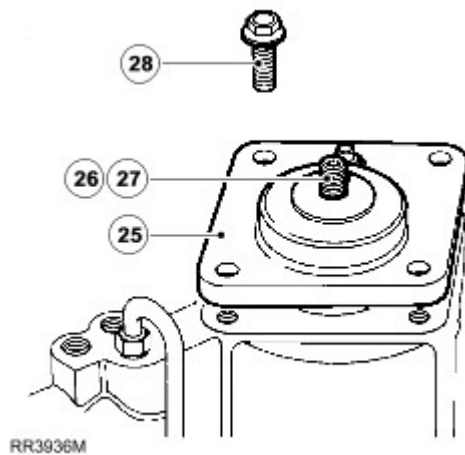


- 24 . Fit new sealing ring to cover.
- 25 . Align cover with casing.
- 26 . Screw cover assembly fully on to sector shaft adjuster screw.
- 27 . If necessary back off sector shaft adjuster screw. Tap cover in place to allow cover to joint fully with casing.

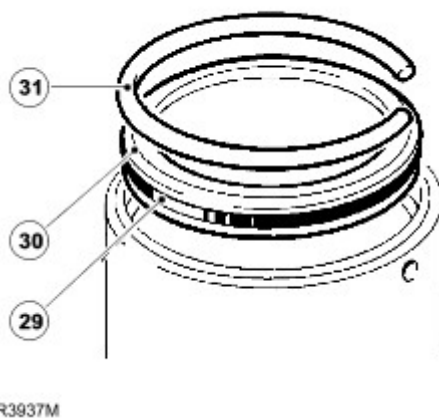
**NOTE:**

Before tightening fixings, rotate input shaft to ensure sector shaft roller is free to move in valve worm. If initial resistance is left, turn adjuster screw approximately two turns in a clockwise direction.

- 28 . Fit cover bolts. Tighten to 75 Nm (55 lbf/ft).



- 29 . Fit new square section seal to cover.
- 30 . Remove slave bolt from piston. Press cover into cylinder just to clear retainer ring groove.
- 31 . Fit retaining ring to groove with one end of ring positioned 12 mm from extractor hole.



- 32 . Refit drop arm and tighten nut sufficiently to ensure that no backlash exists between drop arm and sector shaft.
- 33 . To set worm on centre, rotate input shaft to full inner-lock (full right lock for a left hand drive vehicles, full left lock for a right hand drive vehicles). Rotate input shaft back towards centre two full turns.

34 . The box is now on centre and can be adjusted.

35 . Hold input shaft and rock the drop arm to establish backlash is present. Continue rocking and slowly turn sector shaft adjusting screw clockwise. Continue turning adjuster screw until backlash has almost been eliminated.

36 . Refit locknut and tighten.

**NOTE:**

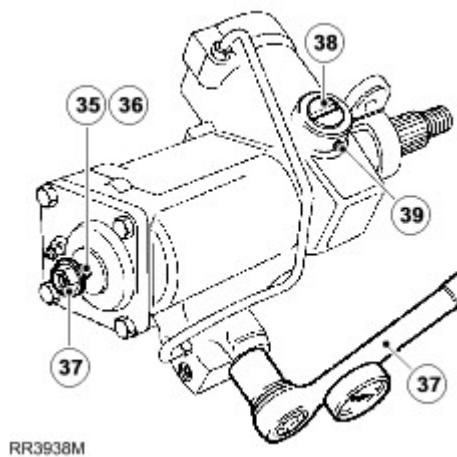
It is important steering gear is centralised before any adjustments are made.

37 . Check maximum rolling torque one and a quarter turns either side of centre position, using a torque wrench and spline socket LRT-57-025. Rotate adjuster screw to obtain across centre torque of 0.34 Nm plus torque figure at one and a quarter turns. Tighten adjuster locknut to 60 Nm (44 lbf/ft).

38 . Turn in rack adjuster to increase figure measured in previous instruction by 0.23 - 0.34 Nm. The final figure may be less, but must not exceed 1.35 Nm.

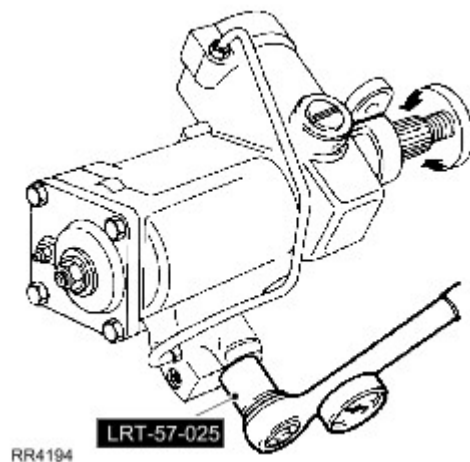
39 . Lock rack adjuster in position with grub screw. Tighten to 5 Nm (4 lbf/ft).

- With input shaft rotated from lock to lock, rolling torque figures should be greatest across centre position and equally disposed about centre position.
- The condition depends on the value of the shimming fitted between the valve and worm assembly inner bearing cup and casing. The original shim value will give correct torque peak position unless major components have been replaced.



40 . With input coupling shaft toward the operator, turn shaft fully anti-clockwise.

41 . Check torque figures obtained from lock to lock using torque wrench and spline socket LRT-57-025.



42 . Check also for equal engagement either side of centre.

43 . Note where greatest figures are recorded relative to steering position. If greatest figures are not recorded across centre of travel (steering straight-ahead), adjust as follows:

- If torque peak occurs before centre position, add to shim washer value.
- If torque peak occurs after centre position, subtract from shim washer value.
- Shims are available in the following thicknesses; 0.03 mm, 0.07 mm, 0.12 mm and 0.24 mm.



**CAUTION:** When reshimming valve and worm, extreme caution must be exercised to prevent seal damage during reassembly.

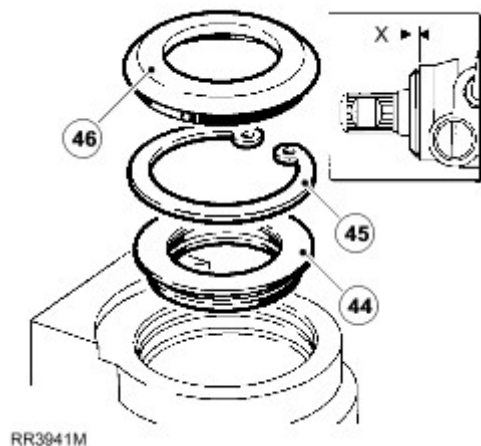
**NOTE:**

Adjustment of 0.07mm to shim value will move torque peak area by ¼ turn on the shaft.

44 . Fit seal, lip side first, into housing. Use seal saver LRT-57-016 and seal installer LRT-57-026. Note that seal is fitted to a depth of 4.75 - 5.00 mm from face of box.

45 . Secure seal with circlip.

46 . Smear inner lip of dirt excluder with PTFE grease. Fit dirt excluder using LRT-57-027. When fitted correctly outer shoulder of excluder is 4.00 - 4.50 mm from face of box, dimension X.



47 . Remove drop arm. Smear inner lip of dirt excluder with PTFE grease and refit, ensuring outer lip is flush with casing.

48 . With input shaft on centre, align assembly marks on drop arm and steering gear. Fit drop arm to steering gear using a new tab washer. Tighten to 176 Nm (130 lbf/ft), bend over tab.

49 . Fit steering gear.

For additional information, refer to [Steering Gear \(57.10.01\)](#)