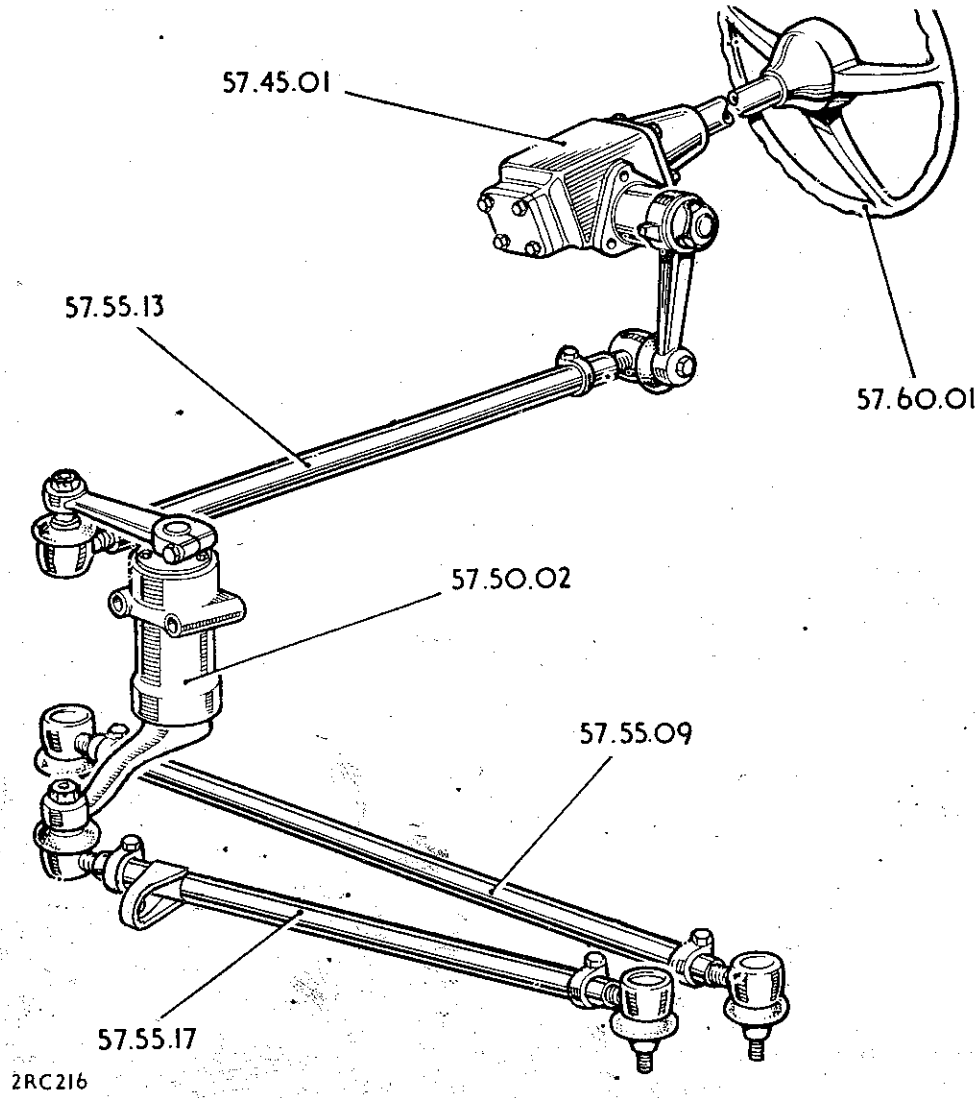
STEERING OPERATIONS

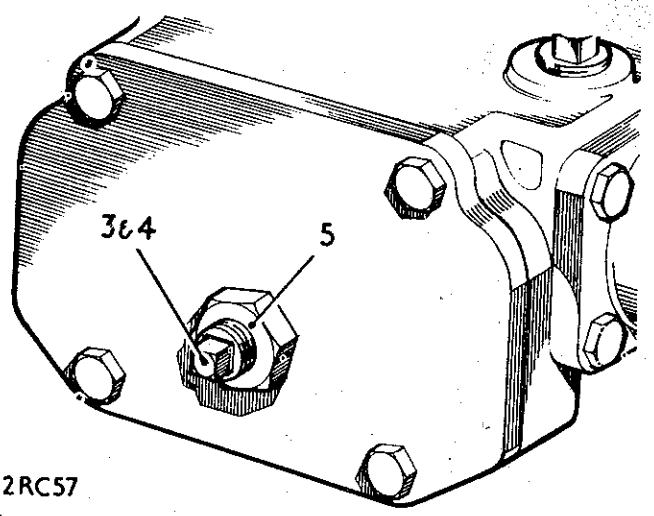

57.45.01
57.55.13
57.60.01
57.50.02
57.55.09
57.55.17
2RC216

STEERING BOX

—Adjust 57.35.01

Procedure

1. Set the steering in the straight ahead position.
2. Slacken the locknut and adjuster.
3. Screw in the adjuster until steering wheel backlash is taken up.
4. Screw in a further one-half flat maximum to allow for locknut tightening.
5. Tighten the locknut without disturbing the adjuster.



2RC57

STEERING COLUMN TOP BEARING

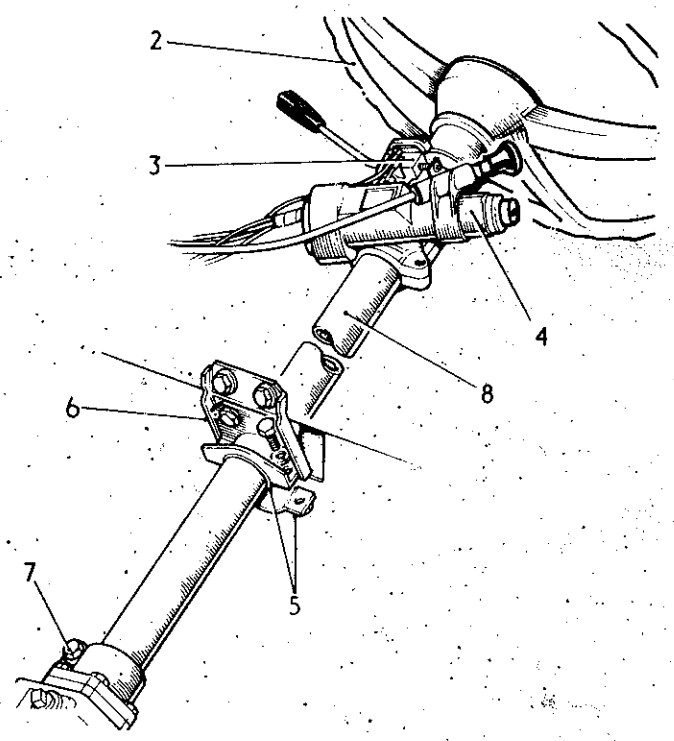
—Remove and refit 57.40.19

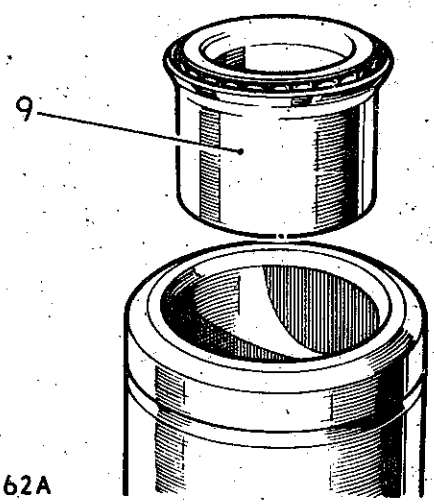
Removing

1. Disconnect the battery earth lead.
2. Remove the steering wheel. 57.60.01.
3. Release the combined switch from the steering column. 86.65.55.
4. Unscrew the lock ring and move aside the ignition-/starter switch from the mounting bracket.
5. Remove the column clamp bracket and seal.
6. Remove the column support bracket.
7. Slacken the pinch bolt, outer column to steering box.
8. Withdraw the outer column from the inner column and steering box.
9. Remove the column top bearing.

Refitting

10. Reverse 1 to 9.





2RC62A

STEERING COLUMN AND BOX ASSEMBLY

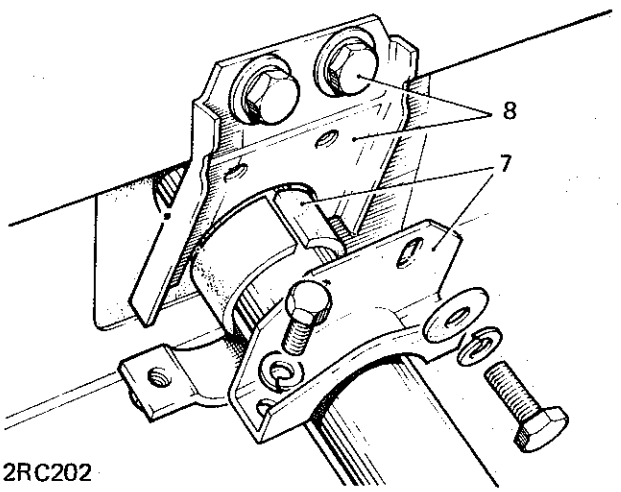
–Remove and refit **57.45.01**

Service tool **600000 Drop arm remover**
601763 Ball joint extractor

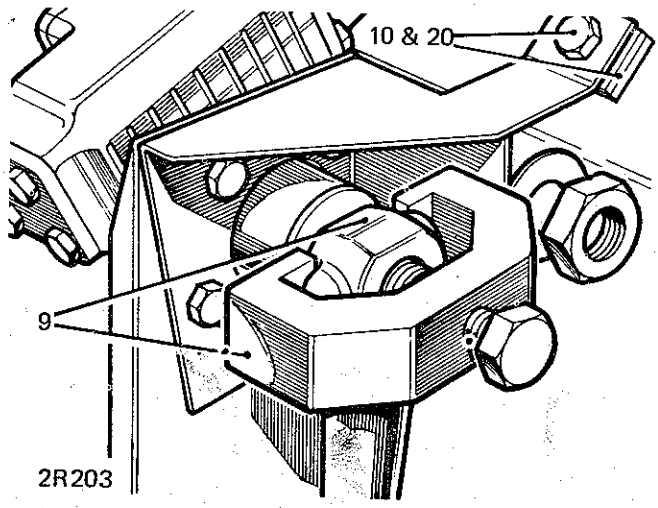
Removing

1. Fully open or remove the bonnet panel.
2. Disconnect the battery earth lead.
3. Remove the air cleaner.
4. Remove the steering wheel. 57.60.01.
5. Remove the combined switch from the steering column. 86.65.55.
6. Unscrew the lock ring and move aside the ignition-/starter switch from the mounting bracket.
7. Remove the lower clamp bracket and rubber sleeve from the outer column.
8. Remove the upper clamp bracket and support bracket from the bulkhead.
9. Disconnect the steering drop arm and the attached longitudinal steering tube from the steering box, using 600000.
11. Remove the fixings, steering box stiffener bracket to toe box.
    Raise the front of the vehicle and support on stands.
12. Remove the driver's side front road wheel.

Continued



2RC202



2R203

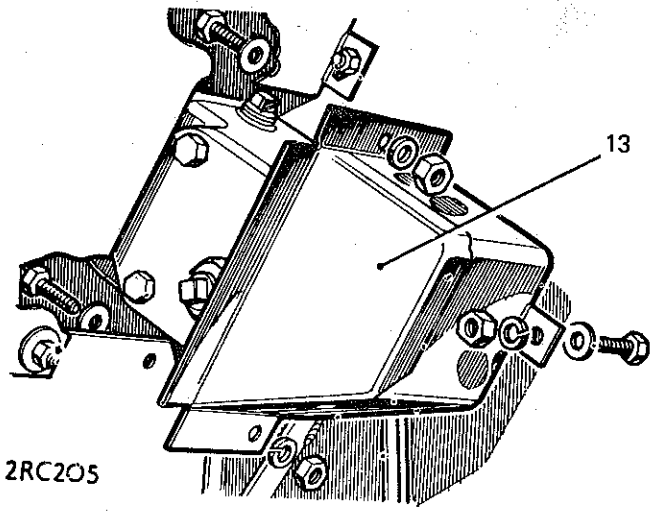
13. Remove the steering unit cover box from the wheel arch.
14. Remove the fixings, steering box support bracket to toe box, wing valance and chassis.
15. Withdraw the steering column and box assembly complete with attached brackets from beneath the front wing.
16. If required, remove the stiffener bracket and support bracket from the steering box.

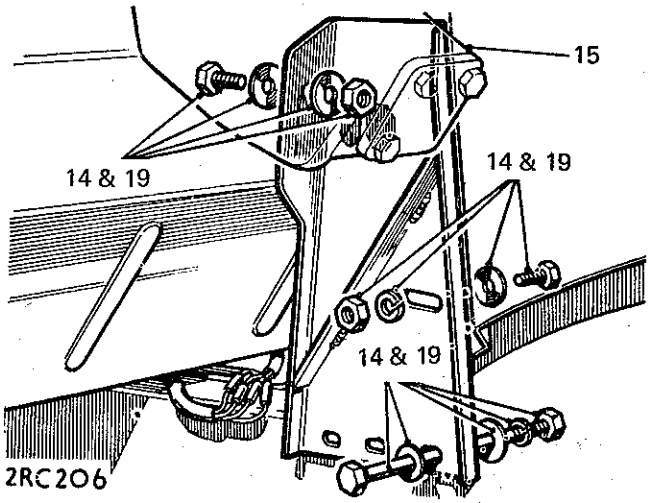
NOTE: The steering box can be overhauled without removing the brackets.

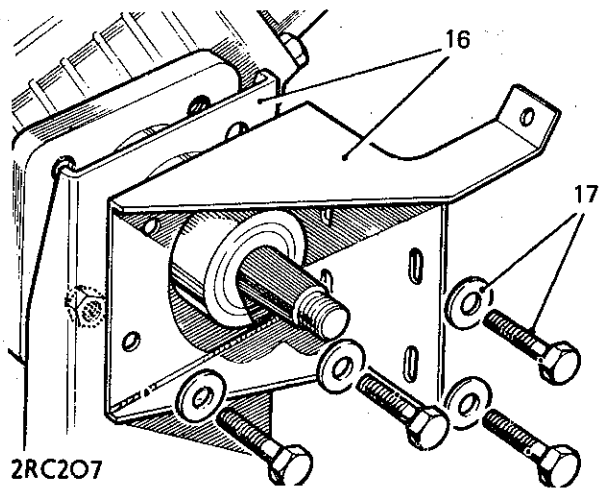
Refitting

17. If removed, fit the support bracket and stiffener brackets to the steering box. Torque 7,0 to 8,5 kgf.m (50 to 60 lbf.ft.).

Continued







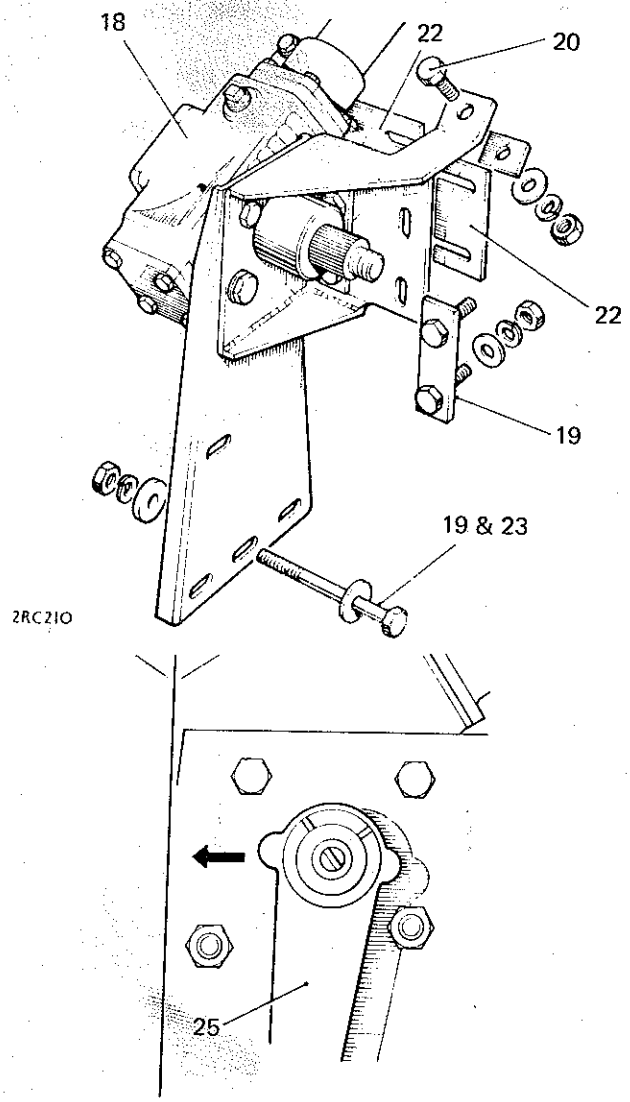
18. Locate the steering box and bracket assembly, less drop arm, in position on the vehicle.
19. Retain the support bracket to the chassis, wing valance and toe box, but do not fully tighten the fixings at this stage.
20. Retain the steering box stiffener bracket to the toe box, but do not fully tighten the fixings at this stage. If necessary, fit shim washers between the stiffener bracket and the toe box to prevent distorting the toe box or bracket.

CAUTION: During the next item, DO NOT strain the steering column. If necessary, adjust the steering box position, using the slotted fixing holes in the support and stiffener brackets, to obtain a snug fit between the clamp upper half and the steering column, before securing the clamp halves.

21. Reverse 7 and 8.
22. Insert slotted packing pieces, as required, to take up clearance between the support bracket and stiffener bracket and the toe box.
23. Secure the support bracket and stiffener bracket fixings. Torque load for support bracket to chassis fixings is 2,0 kgf.m (15 lbf. ft.).
24. Reverse 5 to 11.
25. Fit the drop arm to the steering box, aligning the mark on the steering rocker arm with the forward mark of the two on the drop arm.

NOTE: Where a replacement steering box and drop arm complete is being fitted, remove and discard the original drop arm from the longitudinal steering tube, using 601763, and fit the new drop arm. Torque load for ball joint fixings is 4,0 kgf.m (30 lbf. ft.).

26. Tighten the drop arm fixings to 8,5 to 11,0 kgf.m (60 to 80 lbf. ft.).
27. Reverse 1 to 6.



DATA

Drop arm alignment with steering box

Align the mark on the steering rocker arm with the forward mark of the two on the drop arm.

STEERING COLUMN AND BOX ASSEMBLY

—Overhaul **57.45.07**

Dismantling

1. Remove the steering column and box assembly. 57.45.01.
2. Remove the side cover and drain the oil from the steering box.
3. Lift out the roller for the main nut, and withdraw the rocker shaft.
4. Hold the outer column in a vice and remove the fixings securing the steering box.
5. Using a mallet, tap the inner column at the steering wheel end to partially remove the box.
6. Withdraw the box and inner column complete. Take care not to loose any of the steel balls from the steering box bearings.
7. Rotate the inner column to locate the main nut in the mid-way position on the worm shaft.
8. Using a mallet, gently tap the box away from the inner column sufficient to remove the upper ball race. Take care not to loose the steel balls which will be released from the bearings.
9. Wind the worm shaft through the main nut and remove the shaft, main nut and any loose steel balls.
10. Remove the end cover, shims and lower ball race.
11. Dislodge and remove the twelve 9,52mm (0.375 in.) diameter ball bearings from the main nut and re-circulating tube.

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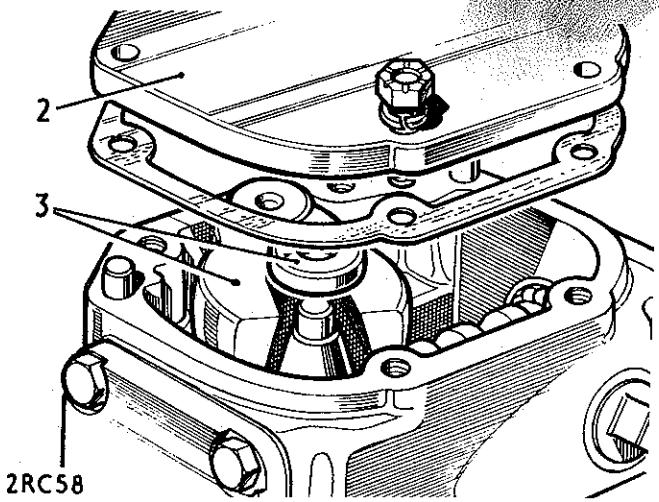

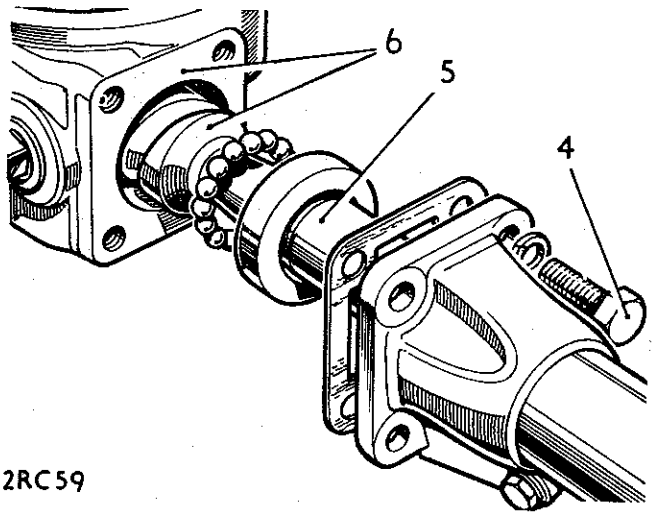

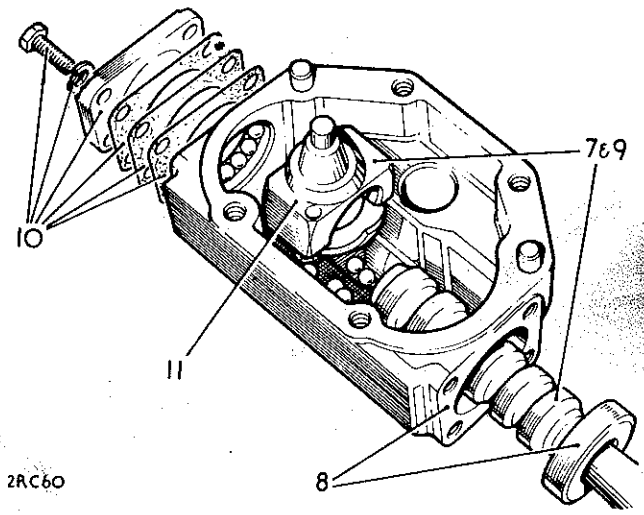

12. Remove the retaining washer and oil seal.
13. If required, press out the rocker shaft bush.
14. If required, remove the outer column top bearing.

Inspecting

15. Examine all components for obvious signs of wear or damage.

NOTE: Some early models may be fitted with a short outer column identified with a spot of yellow paint on the column upper end and used in conjunction with a 2,8 mm (0.155 in.) thick spacer fitted between the column lower end and the steering box face.
Later columns are 2,8mm (0.155 in.) longer and measure 587,73 ± 0,38mm (23.139 ± 0.015 in.) from the column lower end face to the top face of the sleeve attached to the column.
The early column and spacer may be replaced with the later column, if required, and the spacer discarded.

16. Examine the main nut ball bearing track for evidence of indentations or scaling.
17. Examine the worm shaft for similar markings. Slight indentations at the extreme end of the shaft can be disregarded as this is a normal wear condition, but if indentations have spread to the middle of the shaft, a replacement must be fitted.

Re-assembling (refer also to 'NOTE', item 15)

18. Reverse 12 to 14, using a press as required.
19. Reverse 2 to 11, using general purpose grease to retain the ball bearings and to coat the joint washers. Coat all cover plate fixing bolt threads with 'Wellseal' or a suitable equivalent sealing compound and tighten to 2,3 to 2,8 kgf.m (17 to 20 lbf.ft.).
20. Check for end float on the inner steering column. Adjust the shim washer thickness between the end cover and the steering box to obtain a 'free-to-rotate-but-no-end-float' condition on the inner column.

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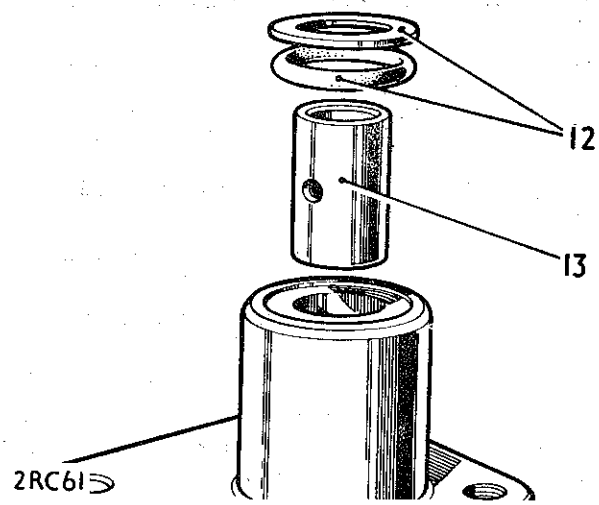
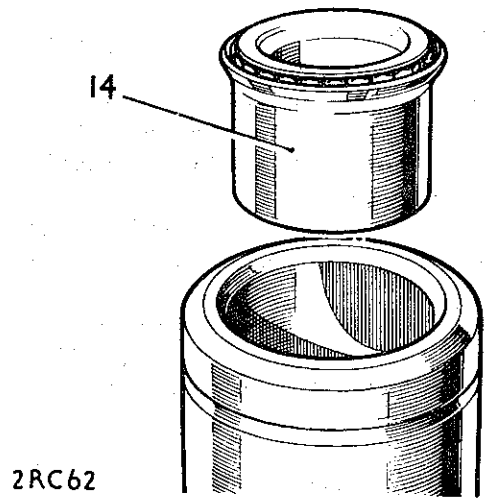
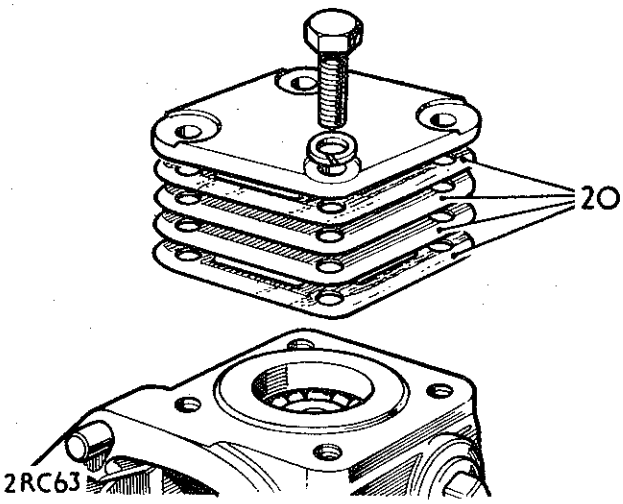






21. Set the steering in the straight ahead position (mid-way lock-to-lock).
22. Screw the steering box adjuster by hand until there is just no end-float between the adjuster and the rocker shaft.
23. Tighten the adjuster locknut ensuring that the adjuster does not move.
24. Fill the steering box with the correct grade of lubricating oil. Division 09 refers.
25. Reverse 1.

DATA

Inner column end-float.	Column to be free to rotate with no end-float.
Outer column overall dimension.	Early, shorter column measuring 584,9 ± 0,38mm (22.99 ± 0.015 in.) used with 2,8mm (0.155 in.) thick spacer. Later, longer column measuring 587,73 ± 0,38mm (23.139 ± 0.015 in.) no spacer required.

STEERING RELAY

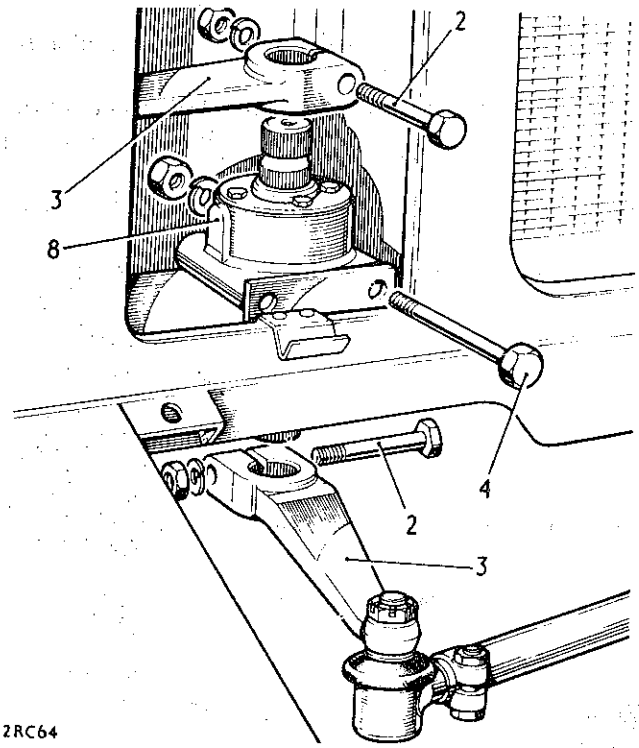
–Remove and refit 57.50.02

Removing

1. Remove the name plate and withdraw the radiator grille.
2. Remove the fixings securing the upper and lower relay levers to the relay unit.
3. Prise the levers clear, avoiding damage to the oil seals.
4. Remove the fixings between the relay housing and the chassis top face.
5. Remove the relay mounting flange plate from the underside of the chassis.

NOTE: Before attempting to remove the relay unit, remove any equipment that is mounted directly above and would obstruct relay unit removal.

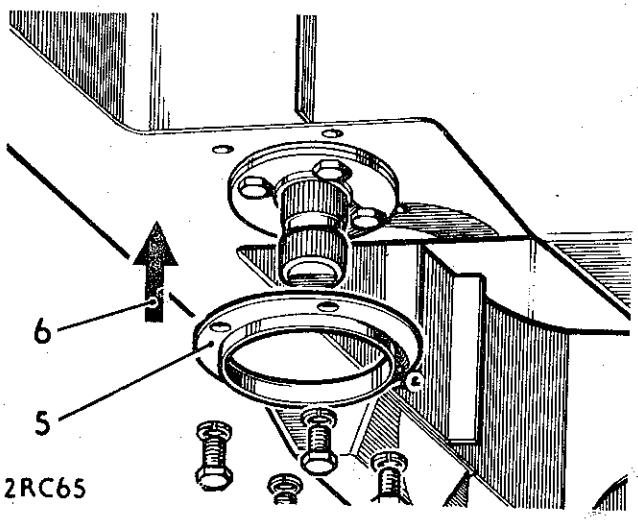
6. Using a brass drift and mallet, drive the relay unit upward to free it from the chassis. If necessary, use penetrating oil between the unit and the chassis.



2RC64

Refitting

7. Before fitting the relay unit, ensure that it is filled with the correct lubricant.
8. Reverse 4 to 6, fitting the relay unit to the chassis with the filler plug boss towards the driver's side of the vehicle. The relay unit must be a drive fit in the chassis.
9. Reverse 2 and 3, tighten the relay levers pinch bolts to 7,6 kgf.m (55 lbf.ft.). The angular relationship between the upper and lower relay levers must be within 81° to 90° when fitted.
10. Reverse 1.



2RC65

DATA

Angular relationship between relay levers	81° to 90° when fitted

STEERING RELAY

—Overhaul 57.50.08

Service tool: **600536 Spring Compressor**

Dismantling

1. Remove the steering relay. 57.50.02.
2. Remove two of the fixing bolts from the relay top cover, invert the relay and allow the lubricant to drain.
3. Remove the bottom oil seal retainer complete with seal and joint washer.

WARNING: **During the following procedure use extreme care, the relay housing contains a large compressed spring which is automatically released during dismantling.**

4. Cover the bottom end of the shaft, using a suitable cover, secured as illustrated.
5. Using a mallet, tap out the shaft, thrust washer, spring, fibre bush and plain washer into the cover.
6. Remove the cover and lift out the relay shaft and fittings.
7. Remove the top oil seal retainer complete with seal and joint washer.

Inspecting

8. Examine all components for obvious signs of wear or damage and fit replacements as required.
9. Check the relay shaft at the diameters which form the tracks for the oil seals. Any damage or score marks would cause failure of the oil seals, and a replacement shaft must be fitted.
10. The free length of the spring should be 184mm (7.250 in.).

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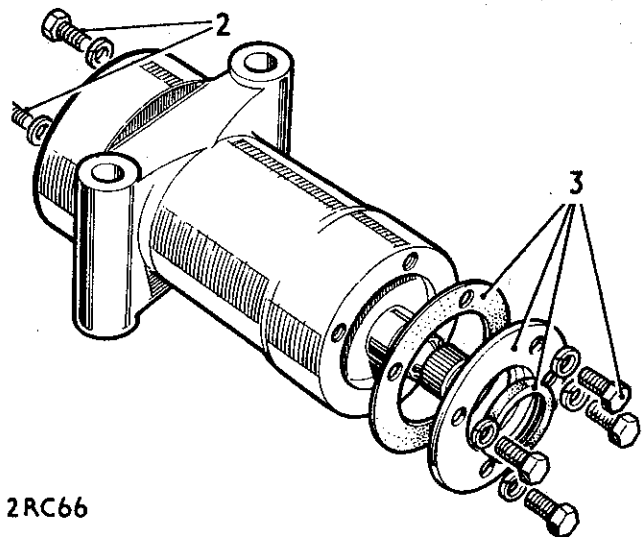

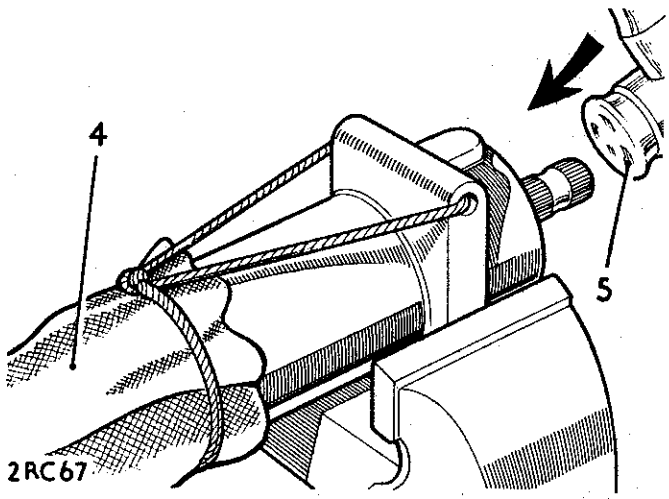

Reassembling

11. If removed, fit the oil seals, lipped side inward, to their retainers, using jointing compound on the outside diameter of the seals.
12. Locate two halves of the split bush on the top cone of the shaft.
13. Insert the assembly of shaft and bush into the housing from the bottom.
14. Secure the housing and shaft assembly, bottom end uppermost, in a vice with a 19mm (0.750 in.) support block under the bottom end of the shaft.
15. Insert washer for spring into housing and fit two of the oil seal retainer fixing bolts into the housing diametrically opposite each other.
16. Fit the spring and washer.
17. Using service tool 600536, carefully compress the spring.
18. Turn the tool to lock in position with the keyhole slots under the heads of the bolts.
19. Locate the other split bush in position on the bottom cone of the shaft and secure with a 50mm (2 in.) hose clip.
20. Remove the service tool and the seal retainer fixing bolts.
21. Remove the assembly from the vice, gently tap shaft into position until the split bush has entered the housing for at least half its length.

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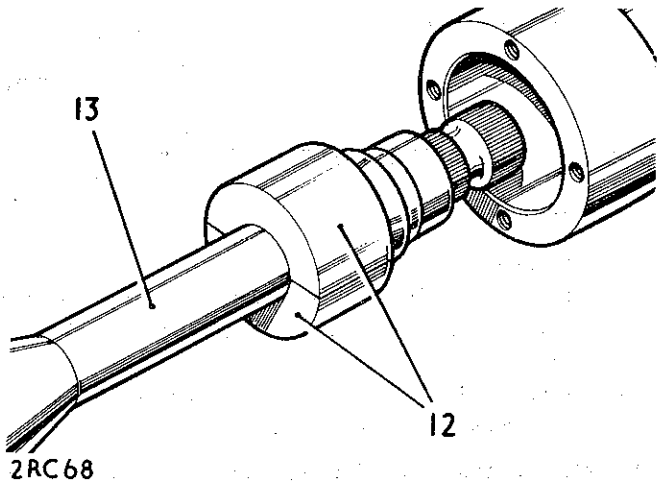
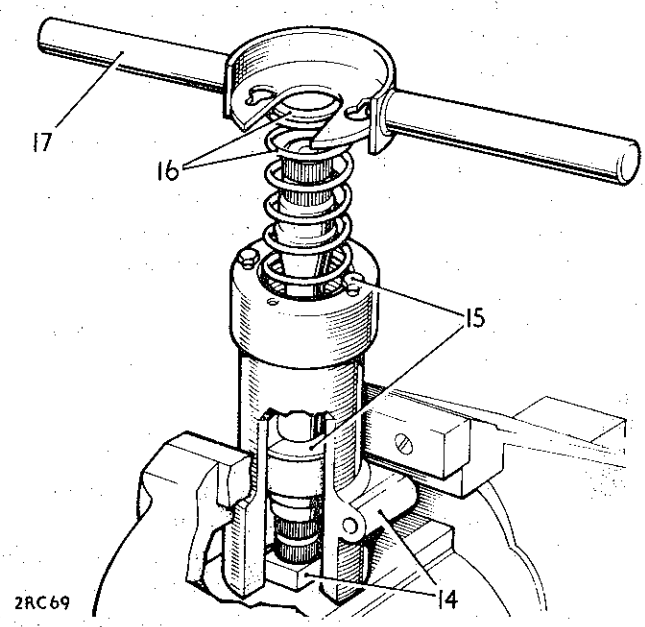
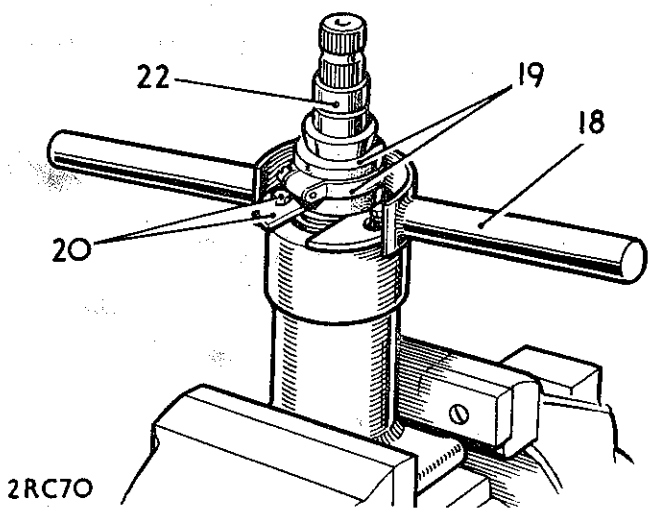


2RC68

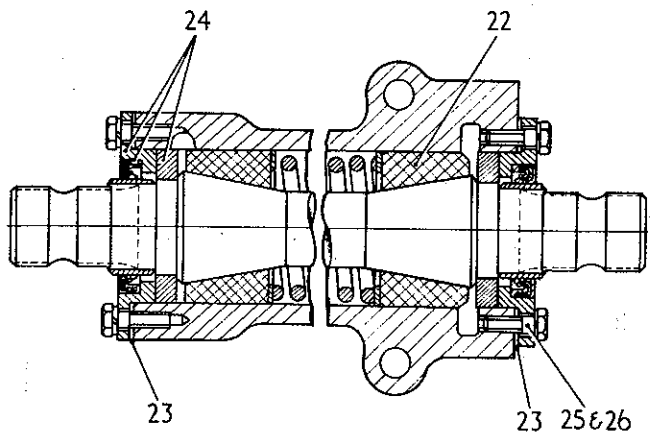


2RC69

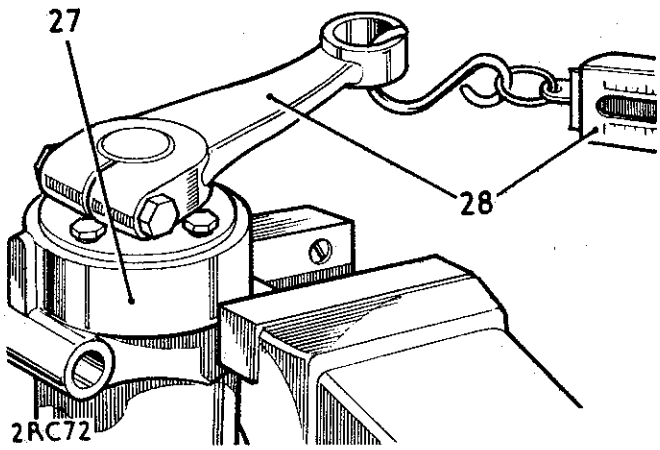


2RC70

22. Remove the hose clip and continue to tap the shaft into the housing until the bushes are correctly located in the housing.
23. Smear general purpose grease on both sides of the joint washers and fit one to each end of the housing.
24. Fit the thrust washer and oil seal retainer, complete with seal, to bottom end of the housing only. Use 'Wellseal' or suitable equivalent sealing compound on the threads of the bolt fitted to the breather hole.
25. Fill the housing with the correct grade of lubricant.
26. Fit the thrust washer and oil seal retainer, complete with seal to the top of the housing, using sealing compound on the threads of the four securing bolts.
27. Hold the relay unit in a vice.
28. Temporarily attach the **upper** relay lever and use a suitable spring balance to check resistance to rotation of the relay shaft. The resistance, measured on the spring balance, must not be less than 5,4 kg. (12 lb.) and should not exceed 7,3 kg. (16 lb.).
    If the resistance is less than 5,4 kg. (12 lb.), fit a new replacement spring.
    If the resistance is excessive, remove the oil seal retainers and thrust washers, then use a suitable piece of tube to push each split bush in turn, clear of its cone and inject lubricating oil. Re-assemble and recheck.
29. Reverse 1.



2RC71



2RC72

DATA

Relay spring free length	184mm (7.250 in.)
Resistance to rotation, relay shaft	5,4 to 7,3 kg. (12 to 16 lb.) measured using a spring balance

TRACK ROD BALL JOINTS

–Remove and refit, items 6 to 9 57.55.08

TRACK ROD

–Remove and refit, items 1 to 5 and 10 to 14 57.55.09

Service tool: 601763 Ball joint extractor

Removing, track rod

1. Jack up the vehicle front end and support on stands.
2. Remove the front road wheels.
3. Remove the fixings from both ball joints.
4. Extract the ball joints, using 601763.
5. Withdraw the track rod and ball joints.

Removing, ball joints

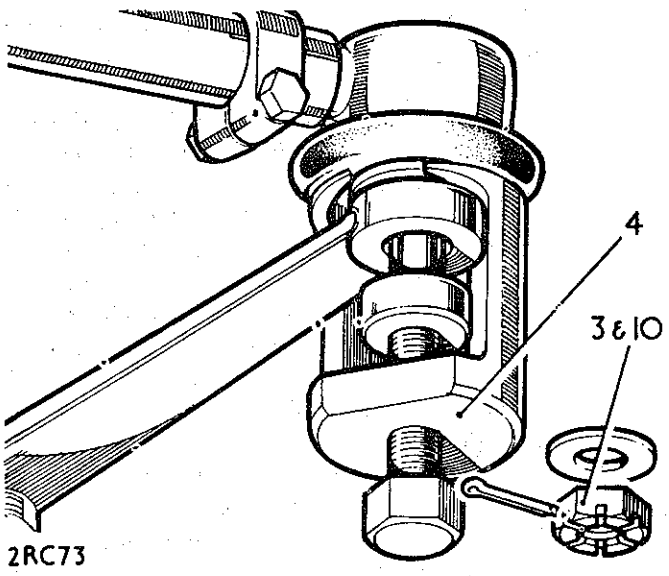
6. Slacken the ball joints clamp fixings.
7. Unscrew the ball joints, L.H. and R.H. thread.

Refitting, ball joints

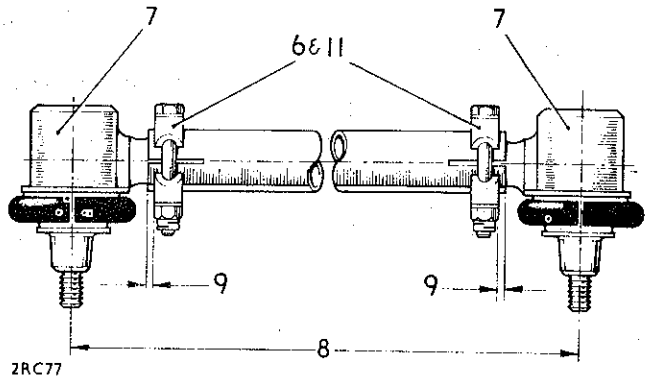
8. Screw in the ball joints equally until the overall dimension between the ball joint centres is 1030,3 to 1033,4mm (45.56 to 45.68 in.).
9. Position the ball joint clamps 1,58 to 3,17mm (0.062 to 0.125 in.) from the track rod ends with the clamp jaws situated over the slot in the tube; do not tighten the fixings at this stage.

Refitting, track rod

10. Reverse 3 to 5. Torque for ball joint fixings 4,0 kgf.m (30 lbf.ft.).
11. Check and if necessary adjust the wheel alignment, 57.65.01, leaving the clamp fixings slackened.
12. Lightly tap the ball joint cups in the directions illustrated to the maximum of their travel to ensure full, unrestricted movement of the track rod.
13. Tighten the ball joint clamps. Torque load 1,1 to 1,5 kgf.m. (8.5 to 10.5 lbf.ft.).
14. Reverse 1 and 2.



2RC73



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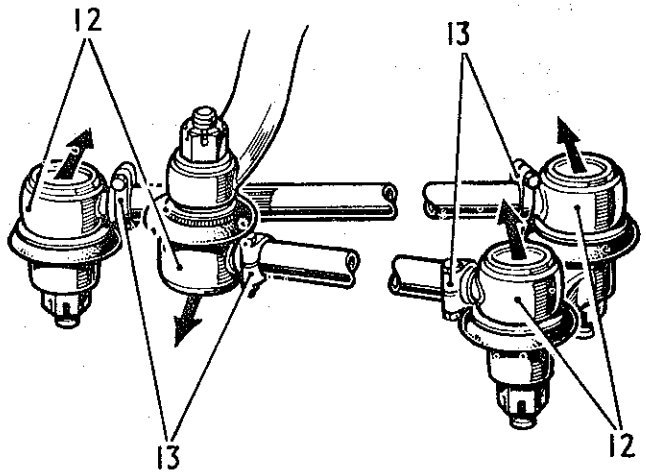

2RC75B

DATA

Initial setting dimension for track rod and ball joints	1030,3 to 1033,4mm (45.56 to 45.68 in.) measured between ball joint centres.
Position of ball joint clamps	1,58 to 3,17mm (0.062 to 0.125 in.) from track rod ends

LONGITUDINAL STEERING TUBE BALL JOINTS

– Remove and refit, items 9 to 12 57.55.12

LONGITUDINAL STEERING TUBE

–Remove and refit, items 1 to 8 and 13 to 19 57.55.13

Service tool: 601763 Ball joint extractor

Removing

1. Remove the bonnet panel.
2. If required for access, remove the air cleaner.
3. Remove the name plate and withdraw the radiator grille.
4. Remove the fixings securing the upper relay lever to the relay unit and prise the lever clear.
5. Remove the fixings from the ball joint connecting the longitudinal arm to the steering box drop arm.
6. Using service tool 601763 extract the ball joint from the steering box drop arm.
7. Manoeuvre the end of the upper relay lever through the aperture in the grille panel, then moving the steering box drop arm fully forward, carefully withdraw the upper relay lever and longitudinal arm assembly.
8. Remove the fixings and extract the ball joint from the upper relay lever, using 601763.

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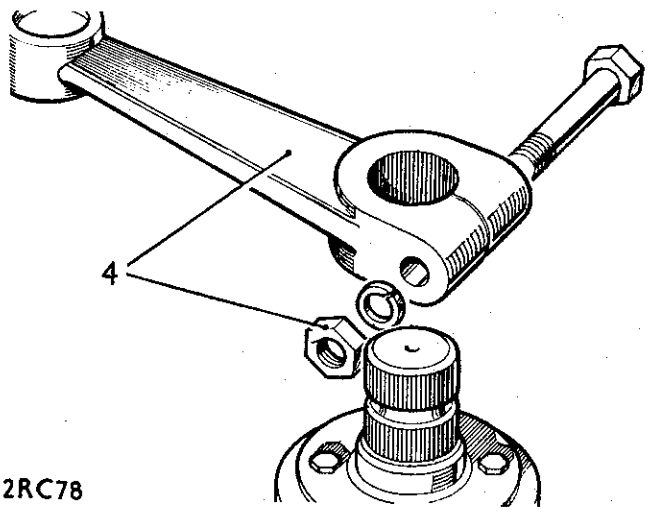

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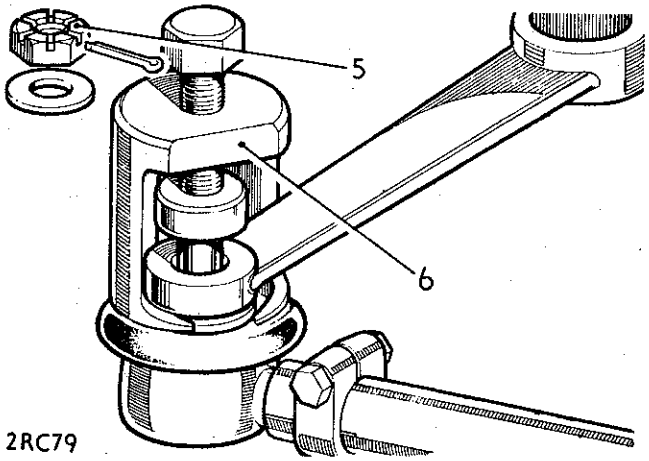

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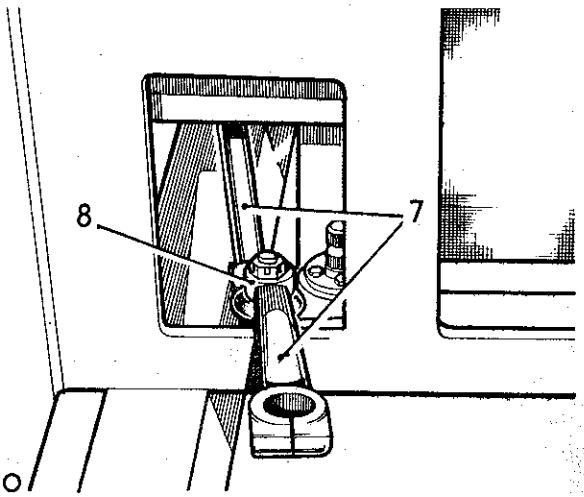


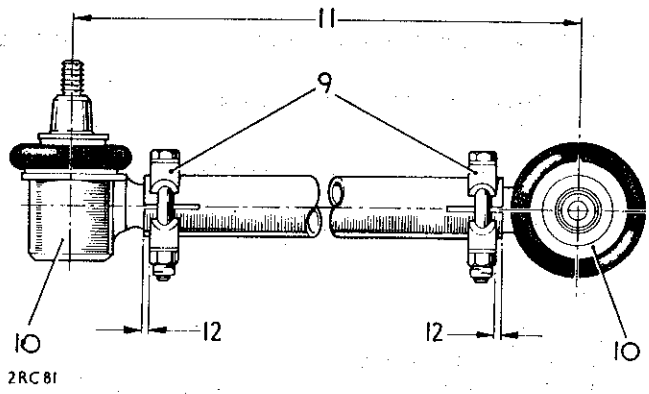
2RC80

Removing ball joints

9. Slacken the ball joint clamp fixings.
10. Unscrew the ball joints, LH and RH thread.

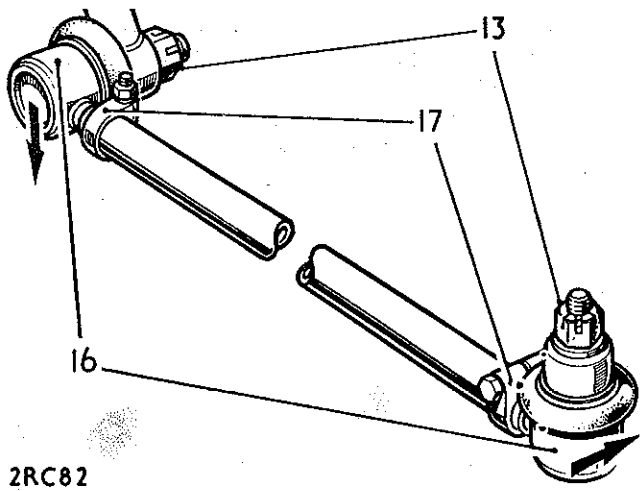
Refitting ball joints

11. Screw in the ball joints equally until the overall dimension between ball joint centres is 621,4 to 624,6mm (24.46 to 24.59 in.).
12. Position the clamps 1,58 to 3,17mm (0.062 to 0.125 in.) from the longitudinal tube ends with the clamp jaws situated over the slot in the tube; do not tighten the clamp fixings at this stage.



Refitting the longitudinal tube

13. Reverse 5 to 8. Torque load for ball joint fixings is 4,0 kgf.m (30 lbf.ft.).
14. Place the front wheels in the straight ahead position and the steering wheel in the intermediate position, then connect the upper relay lever to the relay unit, the longitudinal arm may require adjusting slightly to align the splines of the relay lever and unit.
15. Tighten the lever pinch bolt. Torque 7,6 kgf.m (55 lbf.ft.).
16. Using a mallet, lightly tap the ball joint cups in the direction indicated to the maximum of their travel, to ensure full unrestricted movement of the longitudinal arm.
17. Secure both ball joint clamps. Torque load 1,1 to 1,5 kgf.m (8.5 to 10.5 lbf.ft.).
18. Check the steering lock stops setting. 57.65.03.
19. Check the steering, lock-to-lock, for correct functioning. If necessary, adjust the overall length of the longitudinal arm by slackening the ball joint clamps and screwing the arm in or out, as required, then re-secure the clamps.



DATA

Initial setting dimension for longitudinal tube and ball joints	621,4 to 624,6mm (24.46 to 24.59 in.) measured between ball joint centres.
Position of ball joint clamps	1,58 to 3,17 mm (0.062 to 0.125 in.) from tube ends.

DRAG LINK BALL JOINTS

—Remove and refit, items 6 to 9 57.55.16

DRAG LINK

—Remove and refit, items 1 to 5 and 10 to 13 57.55.17

Service tool 601763, Ball joint extractor

Removing, drag link

1. Jack up the vehicle front end.
2. Remove the front road wheel from the side where the drag link is connected to the swivel pin steering lever.
3. Remove both of the ball joints fixings.
4. Extract the ball joints, using 601763.
5. Withdraw the drag link and ball joints.

Ball joints, removing

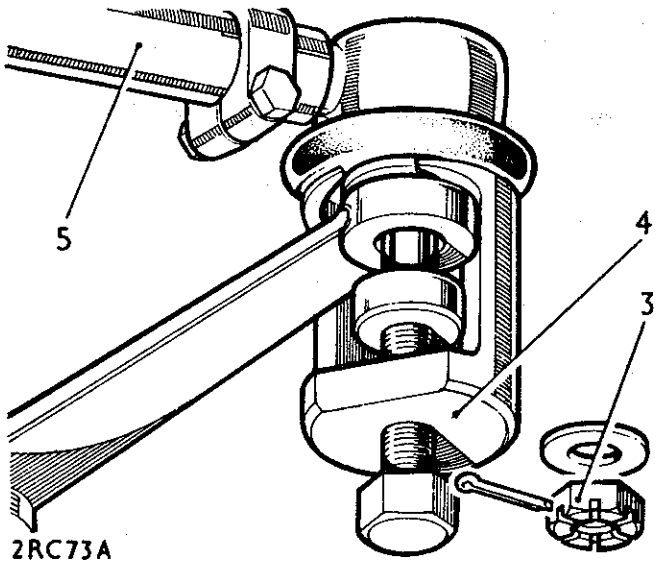
6. Slacken the clamp fixings.
7. Unscrew the ball joints, LH and RH thread.

Ball joints, refitting

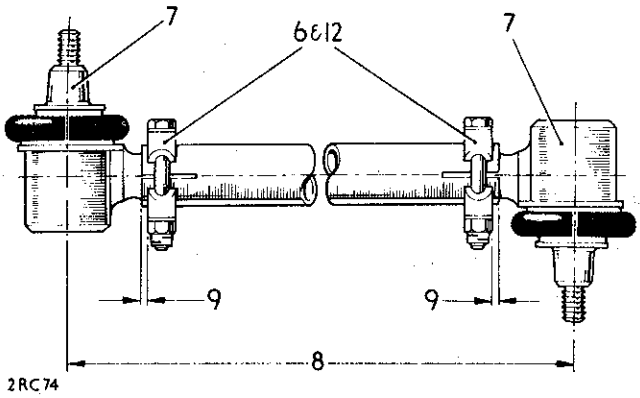
8. Screw in the ball joints equally until the overall dimension between ball joint centres is 782,62 to 785,79mm (30.812 to 30.937 in.).
9. Position the clamps 1,58 to 3,17mm (0.062 to 0.125 in.) from the drag link ends with the clamp jaws situated over the slot in the tube; the relay lever ball joint is in the pendant position when fitted. Do not tighten the clamp fixings at this stage.

Refitting, drag link

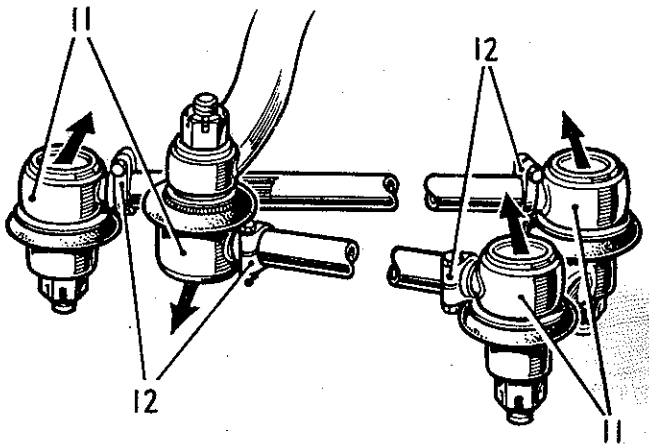
10. Reverse 3 to 5. Torque for ball joint fixings 4,0 kgf.m (30 lbf.ft.).
11. If the clamps were previously slackened, lightly tap the ball joint cups in the direction indicated to the maximum of their travel, to ensure full unrestricted movement of the drag link using a mallet.
12. Tighten the ball joint clamps. Torque load 1,1 to 1,5 kgf.m (8.5 to 10.5 lbf.ft.).
13. Reverse 1 and 2.



2RC73A



2RC74



2RC75

DATA

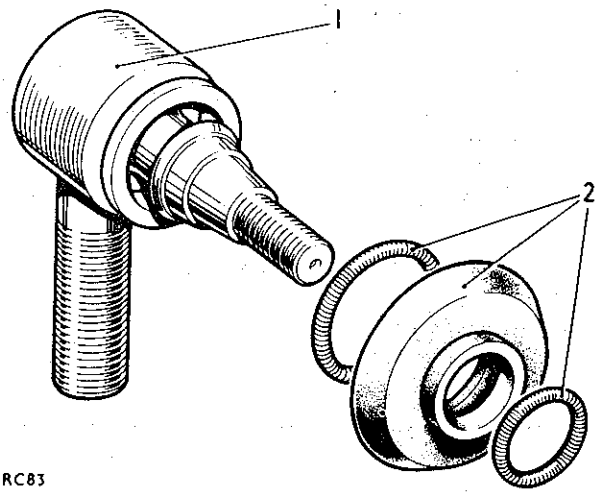
Initial setting dimension for drag link and ball joints	782,62 to 785,79mm (30.812 to 30.937 in.) measured between ball joint centres.
Position of ball joint clamps	1,58 to 3,17mm (0.062 to 0.125 in.) from drag link ends

STEERING BALL JOINTS

–Clean, inspect and regrease 57.55.24

General

The steering ball joints have been designed in such a way as to retain the initial filling of grease for the normal life of the ball joint; however, this applies only if the rubber boot remains in position on the joint. The rubber boots should be checked at the maintenance intervals specified in Division 10 to ensure that they have not become dislodged or the joint damaged. Should any of the rubber boots be dislodged, proceed as follows:



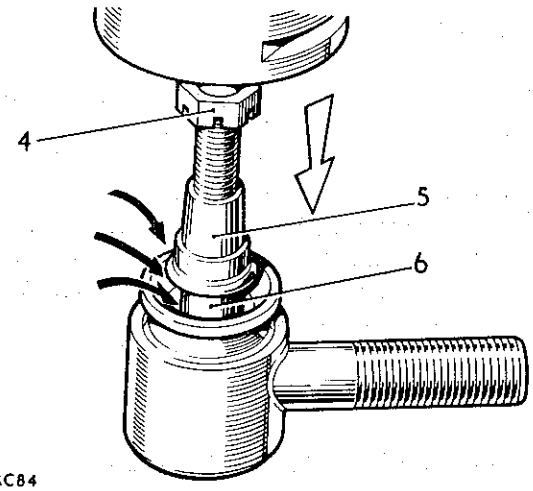
2RC83

Procedure

1. Remove the ball joints from the longitudinal arm, track rod and drag link, as required. 57.55.12, 57.55.08, 57.55.16.

NOTE: If only one ball joint requires attention, it is only necessary to disconnect the applicable end of the steering arm.

2. Remove the rubber cover and spring rings.
3. Thoroughly clean all parts.
4. Place the castle nut upside down on the pin and screw on a few threads.
5. Place the ball joint under a press or between the jaws of a vice and carefully force the pin and ball down against the spring. In this position the interior of the ball joint can be cleaned and lubricated.
6. Apply grease around the taper, and fill the replacement rubber boot.
7. Reassemble, using replacement spring rings.
8. Reverse 1.
9. If necessary, check and adjust the wheel alignment. 57.65.01.



2RC84

STEERING WHEEL

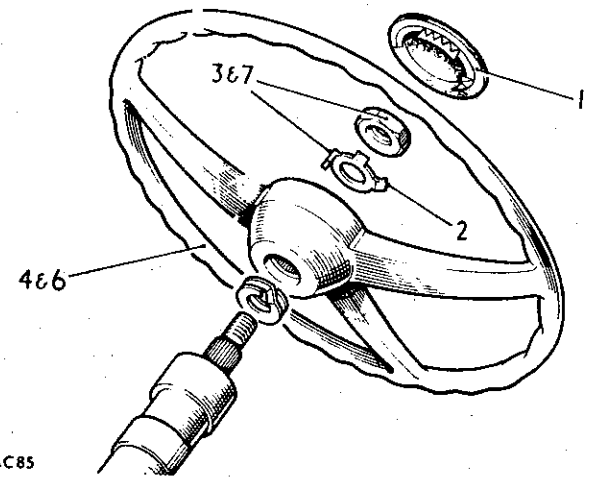
—Remove and refit **57.60.01**

Removing

1. Prise off the wheel centre cover.
2. Release the locking tab.
3. Remove the tab washer and fixing nut.
4. Withdraw the steering wheel.

Refitting

5. Position the road wheels in the straight ahead position.
6. Fit the steering wheel with the centre spoke pointing downwards.
7. Reverse 1 to 3. Torque load for steering wheel securing nut is 5,4 kgf.m (40 lbf.ft.).



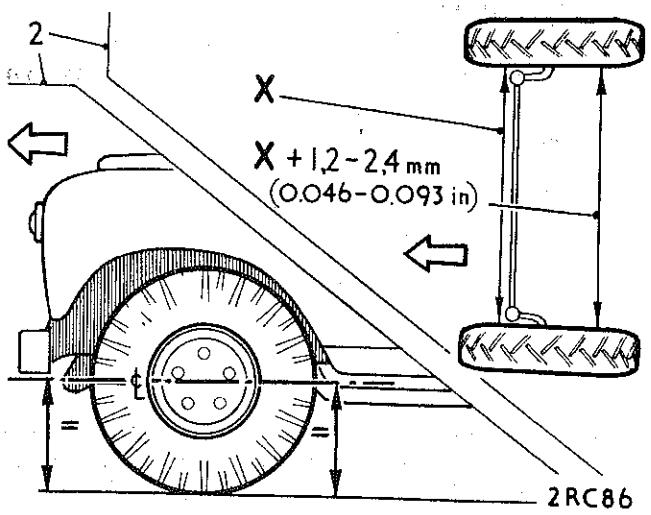
2RC85

FRONT WHEEL ALIGNMENT

–Check and adjust 57.65.01

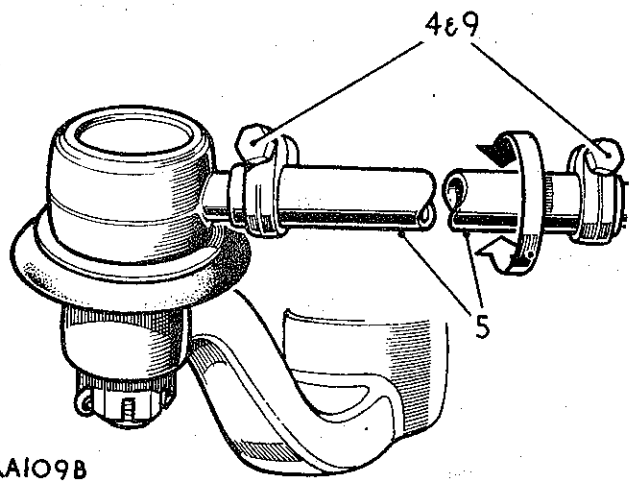
Checking

1. Set the vehicle on level ground with the road wheels in the straight ahead position, and push it forward a short distance.
2. Measure the toe-in with the aid of a tracking stick or suitable proprietary equipment; it should be 1,2mm to 2,4mm (0.046 to 0.093 in.) measured at the horizontal centre-line of the road wheels.
3. If necessary, adjust the toe in as follows:



Adjusting

4. Slacken the clamps securing the ball joints at each end of the track rod.
5. Turn the track rod to decrease or increase its effective length as necessary, until the toe in is correct.
6. Push the vehicle rearwards turning the steering wheel from side to side to settle the ball joints. Then, with the road wheels in the straight ahead position, push the vehicle forward a short distance.
7. Recheck the toe in. If necessary carry out further adjustment.
8. When the toe in is correct, lightly tap the track rod ball joints in the direction indicated to the maximum of their travel, to ensure full unrestricted movement of the track rod.
9. Secure the ball joint clamps. Torque load 1,1 to 1,5 kgf.m (8.5 to 10.5 lbf.ft.).



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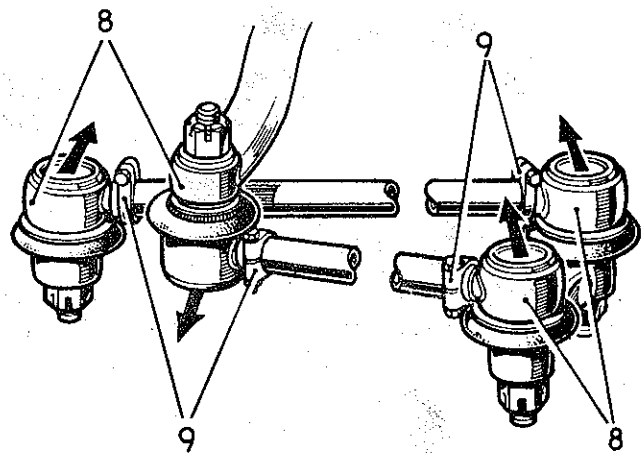


2RC75A

DATA

Front wheel toe-in	1,2 to 2,4mm (0.046 to 0.093 in.) measured at the horizontal centre line of the road wheels.

STEERING GEOMETRY

—Check **57.65.02**

General

No adjustment is provided for castor, camber or swivel pin inclination; 57.65.01 refers for wheel alignment setting.

DATA – vehicle in static unladen condition with coolant, oils and 22,7 litres (5 gallons UK) of fuel; tyres at recommended pressures.

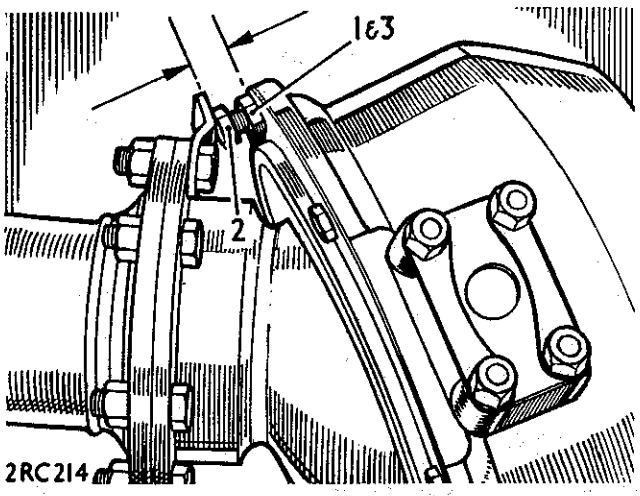
Wheel castor angle	3°
Wheel camber angle	1°30'
Swivel pin inclination	7°
Front wheel toe-in	1,2 to 2,4mm (0.046 to 0.093 in.)

LOCK STOPS

—Check and adjust **57.65.03**

Procedure

1. Slacken the locknuts.
2. Adjust the stop bolts to obtain 12,5mm (0.500 in.) between the bolt head top face and the oil seal retainer face.
3. Tighten the locknuts.
4. Check the steering at full lock and ensure clearance between the tyres and chassis components.



DATA

Lock stop setting	12,5mm (0.500 in.) from bolt top face to oil seal retainer.