SECTION K

STEERING

SERIES BN4

Section No. K.1  Description
Section No. K.2  Maintenance
Section No. K.3  Adjustments in the vehicle
Section No. K.4  Steering gear assembly
Section No. K.5  Steering idler
Section No. K.6  Side rods
Section No. K.7  Cross tube
Section K.1

DESCRIPTION

The steering gear is a unit of extreme simplicity. The steering tube revolves a cam, which, in turn, engages with a taper peg fitted to a rocker shaft. This assembly is enclosed in an oil tight casing which carries two ball bearings at either end of the cam. These bearings are designed to carry radial and thrust loads.

When the steering wheel is turned the tube revolves the cam, which, in turn, causes the taper peg to move over a predetermined arc, thus giving the rocker shaft its desired motion. Attached to the rocker shaft is a steering side and cross tube lever, which links up with the steering linkage.

The steering is of the “three cross tube” type, having a centre cross tube connecting the steering side and cross tube lever to the arm on the idler shaft. Two shorter side tubes, one on either side, connect the steering arms to the steering gear and idler levers respectively.

Section K.2

MAINTENANCE

Lubrication of the grease nipples on the steering connections and swivel bearings is most important to maintain accurate steering.

At the recommended mileage use the grease gun filled to Ref. C (page Q.1) to charge the following points with lubricant:

(a) Steering rods and cross tube—6 nipples.
(b) Lower wishbone arm outer bearing—2 nipples.
(c) Swivel pin bushes—4 nipples.

The steering box and steering idler should be topped up with recommended oil to the top of the filler plug opening.

Austin-Healey 100-6/3000. Issue 4. (53761)

Section K.3

ADJUSTMENTS IN THE VEHICLE

The following adjustments maintain the performance of the steering at its maximum and consist of aligning the front wheels and taking up backlash in the steering gear. Proceed as detailed below.

1. Front wheel alignment is governed by four factors—camber, caster, swivel pin inclination and wheel toe-in. The correct camber and swivel pin angles are built into the front suspension and will change only if the suspension is distorted by accidental damage. It is most important that the front wheels should toe-in \( \frac{1}{2} \) in. (1-6mm) to \( \frac{1}{4} \) in. (3 mm.), and this is governed by the angle of the track-rod arms and the length of the track-rod. An adjustment is provided so that the track-rod may be lengthened or shortened to maintain the correct alignment. The track-rod should not be adjusted to correct a bent track-rod arm.

Fig. K.1. Showing the front suspension, steering layout and lubrication points.

1. Cross tube connections.
2. Side rod inner connections.
3. Lower link.
4. Side rod outer connections.
5. Swivel pin.
6. Shock absorber.
7. Steering idler.
8. Anti-roll bar (no lubrication required).

The track is best adjusted by means of a Dunlop Optical Alignment Gauge, particulars of which can be obtained from the Dunlop Rubber Co. Ltd., Fort Dunlop, Erdington, Birmingham, England.

The cross tube is threaded right-hand at one end and left-hand at the other, so that the track adjustment can be made by simply rotating the tube in the required direction after releasing the locknuts. Always re-tighten the locknuts at each end of the cross tube after an adjustment has been made.

The side-rose are non-adjustable.

When adjusting the track the following precautions should be observed:

(a) The car should have come to rest from a forward movement. This ensures as far as possible that the wheels are in their natural running position.
(b) It is preferable for alignment to be checked with car laden.

K.1
K

STEERING

(a) With the side rod still disconnected from the steering lever, slacken the adjusting screw locknut and screw in the adjusting screw.

(b) Check for backlash by exerting a light pressure on the lower end of the steering lever alternatively in both directions, while an assistant turns the steering wheel slowly from lock to lock. It will be noticed that the amount of slackness is not constant, there being less slackness in the centre than in the full lock position. If slackness appears at all positions of the drop arm, the adjusting screw should be screwed in further. After further adjustment, test again in the same manner. The correct adjustment is such that a "tight spot" will barely be apparent as the steering wheel is removed past the centre position, with no backlash at the steering drop arm. At this position tighten the adjusting screw locknut.

(c) Refill the steering box with the correct grade of oil.

(d) Reconnect the side rod.

Section K.4

STEERING GEAR ASSEMBLY

To Remove

(1) Remove the horn quadrant as described in Section N.31.

(2) Remove the nut from the centre of the steering wheel hub, and pull off the steering wheel.

(3) Prize off the circlip, exposed to view, and then release the locking ring behind the steering wheel hub. (Adjustable type column only.)

Fig. K.3. Showing the steering column being manoeuvred out through the radiator grille aperture.

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(4) Pull the steering wheel clear of the column, followed by the telescopic spring and locating collar. (Adjustable type columns only.)

(5) From behind the fascia release the two-piece clamping bracket supporting the top end of the column.

(6) Remove the radiator as described in Section C.

(7) Remove the radiator grille as described in Section P.

(8) There are two sealing plates, one on each side of the scuttle, through which the steering column passes, release each plate by undoing the four metal thread screws.

(9) Jack up the front of the car and remove the front wheels.

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Fig. K.A. Components of the steering box

1. Top cover.
2. Setpin and washer.
3. Adjusting screw.
4. Locknut.
5. Filler plug.
7. Joint washer.
8. Adjusting screw stop.
10. Follower peg.
11. Steering box.
12. Inner column.
13. Steering box bracket.
14. Oil seal.
15. Dust excluder.
16. Steering lever.
17. Washer.
18. Castellated nut and washer.
19. Inner races.
20. Outer races.
22. Adjusting shims.
23. End cover.
25. Stator tube nut.
26. Setpin and washer.
STEERING

(9) Extract the ball race at the top of the outer casing of the column by pulling it upwards by hand, or if it is tight, ease it from the column with a screwdriver behind the protruding lip. Replacing the ball race merely entails pushing it into place.

(10) Clean all components in paraffin and blow them dry with compressed air.

(11) Examine the rocker shaft, rocker shaft bush and splines for wear.

(12) Examine the steering column shaft cam for excessive wear in the grooves.

(13) Carefully examine the steering lever for cracks and accidental damage.

To Dismantle

(1) Extract the split pin and unscrew the castellated nut at the base of the steering lever. Pull the steering lever off the splines by using a suitable extractor.

(2) Unscrew the four setscrews securing the steering box top cover plate, and remove the plate.

(3) Turn the steering gear over and suitably support the top face when the rocker shaft can be lightly tapped out using a soft metal drift.

NOTE.—The follower peg, situated in the rocker, is a pressed fit. The peg is peened over at the top to ensure complete security and should only be removed if showing an appreciable amount of wear.

(4) Release the nut and olive at the steering box end of the column allowing the oil to drain into a suitable receptacle and withdraw the long stator tube.

(5) Remove the four setscrews holding the end cover plate in position and release the end cover.

(6) Up end the complete unit so that the steering box is uppermost.

(7) Displace the worm and its two ball bearings by bumping the end of the inner shaft on a piece of wood placed on the floor.

(8) Withdraw the complete inner column from the casing via the open end of the steering box.

To Reassemble

Reassembly is a reversal of the removal procedure giving particular attention to adjustments as described in Section K.3. Before refitting the top cover plate, screw back the adjuster.
To Replace

The replacement of the steering gear is a reversal of the procedure "To Remove", but observe the following precautions:—

1. Carefully align the steering column so that no bending stress is imposed upon it before tightening the support brackets.
2. Make sure that the steering wheel is in the centre of travel and the front wheels are in the straight ahead position when installing the side rod.
3. Tighten the steering wheel securing nut to the recommended torque tightness (see General Data).

Section K.5
STEERING IDLER

To Remove

2. Disconnect the side and cross tubes from their connections at the idler lever.
3. Lift the idler and its lever clear of the body.

To Dismantle

1. Unscrew the three set screws securing the idler cap to the idler body.
2. Remove the split pin, castellated nut, idler lever and dust excluder from the base of the idler body.
3. Pull the idler shaft upwards through the idler body taking care not to damage the oil seal.
4. Tap out the oil seal.
5. Check the two bush bearings for wear and renew if necessary.

To Assemble and Replace

The assembling and replacement is a reversal of the procedure to dismantle and remove. Ensure that an oil tight seal is maintained at the base of the idler body.

Idler shaft end float is adjustable by means of joint washers fitted beneath the top cap. Fit sufficient joint washers to enable the idler shaft to turn freely without end float when the top cap set screws are fully tightened.

Section K.6
SIDE RODS

To Remove

1. Withdraw the split pins and remove the nuts from the ball pins at the steering lever end and the swivel arm end of the side rod.
2. Loosen the ball pins from the steering lever and swivel arm by using Service Tool 18G 1063; see Fig. K.8.

To Dismantle

1. Remove the dust covers from the ball pins and sockets by releasing the clips and levering the covers off. Further dismantling of the socket assemblies is not permissible.
2. Check the ball pins for wear. They must be tight enough to prevent end play, yet loose enough to allow free movement. Renew as complete assemblies if necessary.
3. Renew the dust covers if damaged.
4. Examine the side rod for damage. Renew if it is bent or damaged.
Section K.7

CROSS TUBE

To Remove
The removal of the cross tube from the steering lever and the idler lever is similar to that of the side rods.

To Dismantle
(1) Slacken the socket locknuts at each end of the cross tube and unscrew the socket assemblies which are screwed left-hand and right-hand respectively.
(2) Follow the procedure described in “To Dismantle” Section K.6.

NOTE.—The procedures to assemble and replace the side rods and cross tube is the reverse of the procedures for removing and dismantling them, with the precaution that after replacing the cross tube the “toe-in” should be checked as described in Section K.3.
SECTION KK

STEERING

SERIES BN6

NOTE
For details of the steering mechanism
fitted to BN6 cars refer to Section K.
SECTION KKK

STEERING

Mk. I and II (SERIES BN7 and BT7)
AND Mk. II and Mk. III (SERIES BJ7 and BJ8)

Section No. KKK.1. Nylon-seated ball joints
Section No. KKK.2. Steering-column lock and ignition starter switch

NOTE
This section should be used in conjunction with Section K.
Section KKK.1

NYLON-SEATED BALL JOINTS

Nylon-seated ball joints, which are sealed in manufacture and therefore require no further lubrication, were introduced on 3000 Mk. II cars from Car No. BT7 19191.

It is essential that no dirt or abrasive matter enters the nylon ball joint; in the event of a rubber boot being torn or damaged in service it is probable that the ball joint will have been left exposed, and it is therefore imperative that both the ball joint and the boot are renewed.

If damage to the boot occurs whilst the steering side- or cross-rod is being removed in the workshop, only a new rubber boot need be fitted, provided the ball joint is clean. Smear the area adjacent to the joint with a little Dextragrease Super G.P. before assembling the boot.

Section KKK.2

STEERING-COLUMN LOCK AND IGNITION/STARTER SWITCH

Cars exported to Germany and Sweden are fitted with a combined ignition/starter switch and steering-column lock mounted on the steering-column.

On cars fitted with the lock a sleeve integral with the inner column is slotted to permit engagement of the lock tongue: the outer column is also slotted to allow the lock tongue to pass through. A hole drilled in the upper surface of the outer column locates the steering lock bracket. The bracket is secured by two bolts each waisted below the head to permit removal of the heads by shear action during assembly.

To remove the lock, disconnect the battery and the ignition/starter switch connections and turn the key to the ‘GARAGE’ position to unlock the steering. Free the steering-column assembly as described in Section K.4 and remove the lock securing bolts with an ‘easy-out’ extractor.