

## STEERING

	Page
STEERING .....	12- 1
TROUBLE SHOOTING .....	12- 2
STEERING WHEEL .....	12- 3
Removal .....	12- 3
Inspection .....	12- 3
Installation .....	12- 4
STEERING MAIN SHAFT .....	12- 4
Removal .....	12- 4
Disassembly .....	12- 5
Inspection .....	12- 6
Assembly .....	12- 6
Installation .....	12- 7
STEERING INTERMEDIATE SHAFT .....	12- 7
Removal .....	12- 7
Disassembly .....	12- 7
Inspection .....	12- 8
Assembly .....	12- 8
Installation .....	12- 9
STEERING LINK .....	12- 9
Removal .....	12- 9
Disassembly .....	12-10
Inspection .....	12-10
Assembly .....	12-11
Installation .....	12-12



STEERING

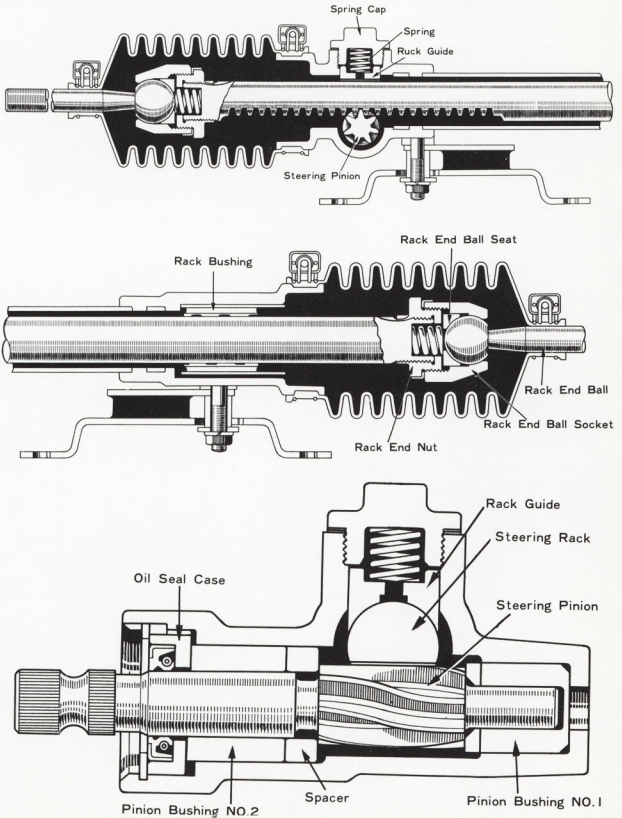


Fig. 12-1 Steering Cross Sectional View

Y5287, Y5288, X6195

## 12-2 STEERING

The steering gear is of the high efficiency rack and pinion type in which the motion is transmitted from the steering shaft through the steering pinion to the steering rack.

When the pinion is turned it forces the rack to move, either to the right or left. The ends of the rack are connected to the steering knuckle arms by a rack end ball, and a tie-rod end. All gear rack movement is then transferred directly to the knuckle arms.

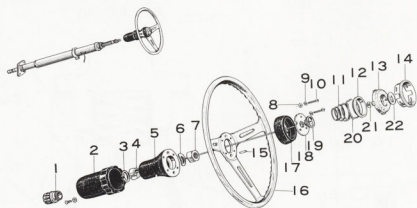
The steering shafts are provided with an universal joint, and a sliding joint, and these dampen the steering shock and vibration transfer to the steering wheel. In addition, the steering wheel adjusting mechanism is provided on the steering shaft, and the steering wheel may be slided into the desired position.

### Specification:

Type of steering main shaft	Slide type
Type of steering gear	Rack and pinion
Material of steering wheel	Mahogany
Gear ratio	14.7
Turning angle: Inner wheel	35°
Outer wheel	30.5°
Steering wheel diameter	384 mm (14.98")
Main shaft adjustable length	60 mm ( 2.36")

### TROUBLE SHOOTING

Since the trouble shooting of the steering has a close relation with the front end alignment, it should be referred to the trouble shooting in the SUSPENSION.



1. Split collet
2. Steering adjusting sleeve
3. Shaft snap ring
4. Split cone
5. Steering wheel hub
6. Washer
7. Nut
8. Washer
9. Lock washer
10. Screw
11. Compression spring
12. Horn button contact plate
13. Horn button base
14. Horn button stopper ring
15. Straight pin
16. Steering wheel
17. Steering wheel ring
18. Contact spring set plate
19. Horn button contact seat
20. Hole snap ring
21. Spring nut
22. Horn button

Fig.12-2 Steering Wheel Components

## STEERING WHEEL

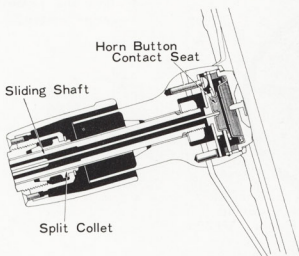


Fig.12-3 Steering Wheel Cross Sectional View

G0403

Removal

1. Remove the horn button stopper ring assembly, and compression spring.

To remove the stopper ring, tap out the cut portion of the stopper ring with a screwdriver.



Fig.12-4 Removing Horn Button Stopper Ring V1297

2. Remove the screws retaining the steering wheel to the steering wheel hub, then remove the horn contact spring set plate with the horn button contact seat, steering wheel ring, straight pins, and the steering wheel.
3. Remove the steering wheel hub

retaining nut and washer, then pull out the hub. Remove the split cones.

4. Remove the snap ring with the Snap Ring Expander No.1 09905-00020, then screw out the steering adjusting sleeve, and remove it from the steering main shaft.

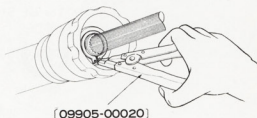


Fig.12-5 Removing Shaft Snap Ring G0404

5. Remove the split collet.

Inspection

1. Inspect the steering wheel for cracks, and peel.
2. Inspect the horn button contact plate surface for wear, and scores.

3. Inspect the horn button base for scores and damage.

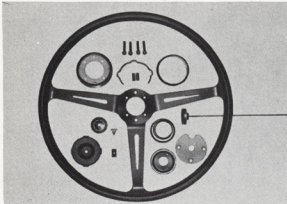


Fig.12-6 Inspection of Steering Wheel Related Parts V1298

Installation

Follow the removal procedures in reverse order.

STEERING MAIN SHAFT

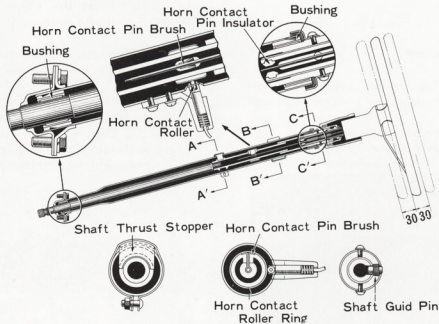


Fig.12-7 Steering Main Shaft Cross Sectional View

Y5289

Removal

1. Remove the steering wheel. Refer to Removal of Steering Wheel.
2. Disconnect the wiring from the horn contact roller holder, then remove the horn contact roller housing.
3. Remove the clamp bolt on the main shaft joint housing.
4. Remove the bolts attaching the steering column tube to the toe-board.
5. Disconnect the throttle rod from the accelerator pedal rod, then remove the throttle rod assembly.
6. Remove the steering column clamp lower, and the grommet.
7. Remove the steering column clamp upper.

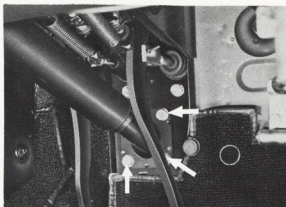


Fig.12-8 Steering Column Tube Attaching Bolts V1299

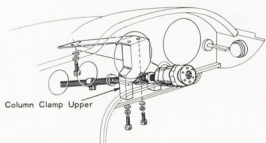


Fig.12-9 Steering Column Clamp Removal G0405

8. Pull out and remove the steering main shaft assembly towards the interior.

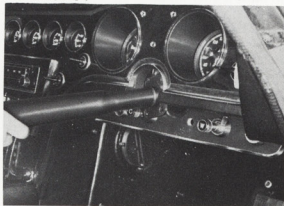


Fig.12-10 Removing Steering Main Shaft V1300

Disassembly

1. Remove the steering wheel hub, adjusting sleeve and the split collet.

To remove, refer to Removal of Steering Wheel.

2. Remove the clamp, and the steering shaft thrust stopper from the steering column tube.
3. Remove the dust cover, then remove the steering shaft guide pin from the steering column tube. Remove the steering sliding shaft.
4. Straighten the locking tabs of the steering column tube, then slide out the main shaft together with the steering shaft bushing No.2 socket and bushing from the steering column tube.

As the horn contact roller ring is mounted on the main shaft within the column tube, do not damage the horn contact roller ring with the steering shaft bushing No.2 socket.

5. Straighten the tabs of the horn contact roller ring, and remove it (1). Remove the horn contact roller ring insulators (2), and the horn contact pin brushes (3) from the shaft.

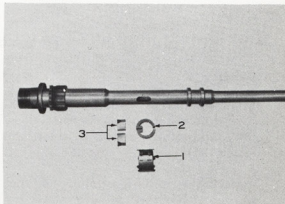
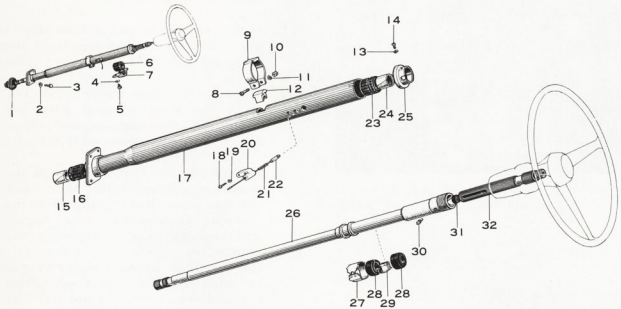


Fig.12-11 Horn Contact Pin V1301 Brushes Removal

6. Remove the steering shaft bushing No.1 socket, and bushing from the steering column tube.
7. Remove the horn contact pin insulator from the sliding shaft.



- |                                  |                                 |                              |
|----------------------------------|---------------------------------|------------------------------|
| 1. Dust cover                    | 12. Thrust stopper              | 23. Bushing No.1 socket      |
| 2. Lock washer                   | 13. Lock washer                 | 24. Bushing                  |
| 3. Bolt                          | 14. Screw                       | 25. Dust cover               |
| 4. Lock washer                   | 15. Bushing                     | 26. Steering main shaft      |
| 5. Bolt                          | 16. Bushing No.2 socket         | 27. Horn contact roller ring |
| 6. Steering column clamp grommet | 17. Steering column tube        | 28. Roller ring insulator    |
| 7. Steering column clamp         | 18. Screw                       | 29. Horn contact pin brush   |
| 8. Screw                         | 19. Lock washer                 | 30. Shaft guide pin          |
| 9. Clamp                         | 20. Horn contact roller housing | 31. Contact pin insulator    |
| 10. Nut                          | 21. Spring                      | 32. Steering sliding shaft   |
| 11. Lock washer                  | 22. Horn contact roller holder  |                              |

Fig.12-12 Steering Main Shaft Components

Y5291

Inspection

Wash all the parts with cleaning solvent, and inspect the parts for wear, scores, and other damage. Replace as necessary.

1. Inspect the sliding portion (sliding groove) on the sliding shaft for excessive wear and scores.
2. Inspect the steering shaft guide pin for wear and bend.
3. Inspect the bushing contact portions for wear and scores.
4. Check the steering shaft thrust stopper for excessive wear, scores or cracks.

5. Check the bushings and bushing sockets for wear or other defects.

Assembly

Follow the disassembly procedures in the reverse order.

1. It is recommended that the bushings, shaft thrust stopper, and the shaft guide pin should be replaced upon assembly.
2. Apply a light coat of multipurpose grease onto the bushings, shaft stopper, sliding portion of the sliding shaft, and the threads of the steering adjusting sleeve.



Installation

Follow the removal procedures in the reverse order.

STEERING INTERMEDIATE SHAFT

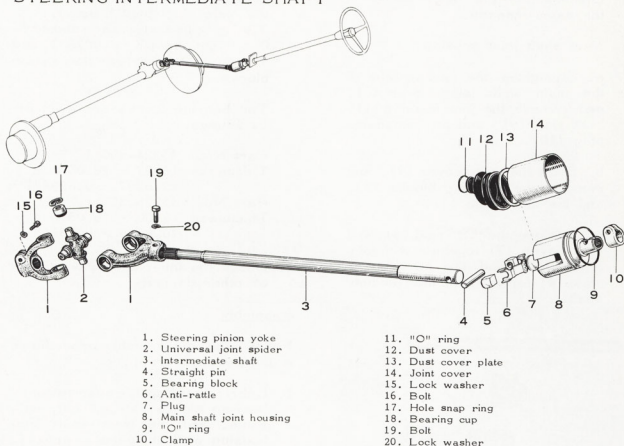


Fig.12-13 Intermediate Shaft Components

Y5295

Removal

1. Remove the clamp bolts on the steering pinion yokes, then slide the joint yoke towards the intermediate shaft, and disconnect it from the steering pinion.
2. Remove the bolt clamping the main shaft joint housing to the main shaft, then dismount the intermediate shaft assembly from the car.

Disassembly

1. Universal joint.

a. Punch mating marks on both pinion yokes.

b. Remove the hole snap ring from the bearing holes in the yoke.

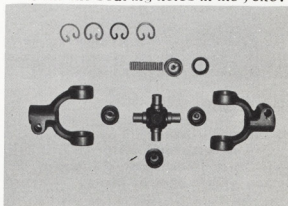


Fig.12-14 Disassembly of V1303 Universal Joint

c. Tap one end of the spider

bearing cup lightly, and remove the opposite bearing cup, and disconnect the yoke from the joint spider.

Disassemble the other spider in the same manner.

2. Main shaft joint housing.

a. Straighten the locking tabs of the main shaft joint cover (6), and remove the joint housing (1), "O" ring (9), and the expansion plug (10).

b. Slide the joint cover (6), and remove the bearing blocks (2), and the anti-rattle (3).

c. Remove the "O" ring (8), and dust cover (7) together with joint cover (6), and the dust cover plate (4) forward the intermediate shaft.

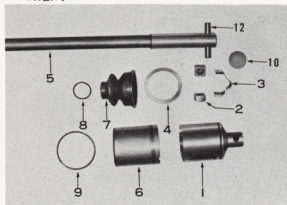


Fig.12-15 Disassembly of V1302 Joint Housing

d. Remove the straight pin from the shaft only for replacement with a press, and a suitable rod.

Inspection

Wash all disassembled parts thoroughly, and inspect for damage, wear, and rusty condition. Repair or replace part/s if necessary.

1. Inspect the spider journals for rust and wear.

3. Inspect the bearing blocks, and main shaft joint housing slots for wear.

Check the clearance between the bearing blocks, and the slots of the main shaft joint housing.

The specified clearance should be 0 ~ 0.06 mm (0 ~ 0.0023"), and if necessary, replace the bearing blocks.

The bearing blocks are available as follows.

Part No. 45224-30011  
 Thickness 15.97 ~ 16.00 mm  
 (0.6287 ~ 0.6299")

Part No. 45225-30011  
 Thickness 16.00 ~ 16.03 mm  
 (0.6299 ~ 0.6311")

4. Check the anti-rattle for weakness or other damage.

Assembly

Follow the disassembly procedures in the reverse order.

1. Lubricate the spider bearing cups, bearing blocks, straight pin, anti-rattle, and the main shaft joint housing with multipurpose grease.
2. Align the mating marks on both yokes when assembling the universal joint spider.
3. After assembling the spider bearing cups, check and adjust the spider thrust play. Select and install new hole snap ring so that the spider thrust play will be less than 0.05 mm or 0.002". Use the same size snap ring for both sides.

Hole Snap Ring Thickness:

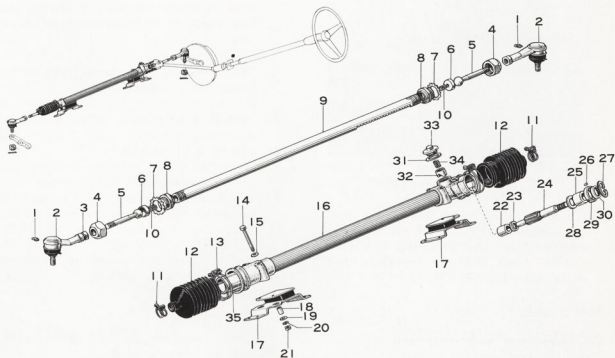
Part No. 90521-22011  
 Thickness 1.20 mm (0.047")  
 Part No. 90521-22012  
 Thickness 1.25 mm (0.049")

Part No. 90521-22013  
 Thickness 1.30 mm (0.051")

### Installation

Follow the removal procedures in the reverse order.

### STEERING LINK



- |                         |                                  |                                  |
|-------------------------|----------------------------------|----------------------------------|
| 1. Grease fitting       | 13. Clamp                        | 25. Steering pinion bushing No.2 |
| 2. Tie-rod end          | 14. Bolt                         | 26. Straight pin                 |
| 3. Nut                  | 15. Washer                       | 27. Hole snap ring               |
| 4. Rack end ball socket | 16. Rack housing                 | 28. Spacer                       |
| 5. Rack end ball        | 17. Rack housing bracket         | 29. Oil seal case                |
| 6. Ball seat            | 18. Spacer                       | 30. Oil seal                     |
| 7. Lock washer          | 19. Washer                       | 31. Adjusting shim               |
| 8. Rack end nut         | 20. Lock washer                  | 32. Rack guide                   |
| 9. Steering rack        | 21. Nut                          | 33. Spring cap                   |
| 10. Spring              | 22. Steering pinion bushing No.1 | 34. Spring                       |
| 11. Clamp               | 23. Spacer                       | 35. Rack bushing                 |
| 12. Boot                | 24. Steering pinion              |                                  |

Fig.12-16 Steering Link Components

Y5292

### Removal

1. Remove the radiator lower shroud and disconnect the oil cooler flexible hose clamp from the steering gear box support.
2. Remove the steering pinion yoke clamping bolts, and disconnect the yoke from the steering pinion.
3. Disconnect both tie-rod ends from

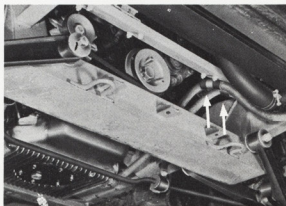


Fig.12-17 Flexible Hose Clamp V1304

the knuckle arms with the Tie-rod End Puller 09611-20011.

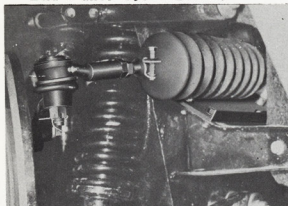


Fig.12-18 Steering Link V1305 Removal

4. Remove the bolts mounting the rack housing bracket to the frame, then remove the steering link assembly from the car towards the right side for RHD.

Disassembly

1. Loosen the lock nut, and remove the tie-rod end. Remove the lock nut, and loosen the clamp screws. Pull out the steering rack boot from the rack housing.
2. Straighten the locking tabs of the lock washer, and loosen the rack end ball socket.

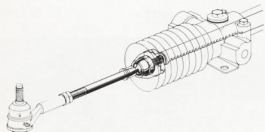


Fig.12-19 Rack End Ball Y5293 Disassembly

3. Remove the rack end ball, ball seat, spring and lock washer.

Unscrew the rack end nut. Disassemble the other side in the same manner.

4. Loosen the rack guide spring cap, and remove the shim, spring and the rack guide from the gear housing.
5. Remove the hole snap ring with a snap ring expander.
6. Install the pinion yoke onto the steering pinion, and tighten the clamp bolt securely. Tap the yoke lightly, and pull out the steering pinion together with the spacer bushing No.2, and the oil seal case from the gear housing.

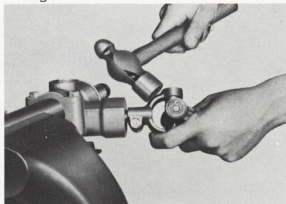


Fig.12-20 Removing Steering Pinion V1307

7. Slide the steering rack from the rack housing.
8. Tap the end of the pinion bushing No.1 with a hammer, and a suitable tool, and remove the bushing No.1 towards the steering pinion only for replacement.

Inspection

Wash all disassembled parts thoroughly, and inspect for wear, score and other defects.

Repair or replace as necessary.

1. Inspect the rack end ball for wear, scores, and cracks.

2. Inspect the end ball socket for wear, scores, and cracks.
3. Inspect the end ball seat for wear and scores.
4. Check the spring for weakness and break.
5. Check the boot for cracks, and other damage.

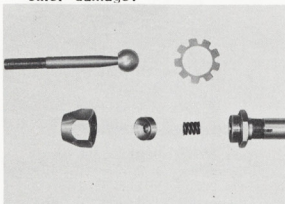


Fig.12-21 Rack End V1306  
Inspection

6. Inspect the bushings, and the rack guide for wear and scores.
7. Inspect the gear teeth, and bushing fitting portions of the steering pinion for wear, scores, and other defects.
8. Inspect the steering rack teeth for wear, and other defects.

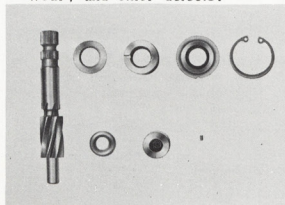


Fig.12-22 Steering Pinion V1308  
Inspection

### Assembly

1. Install new pinion bushing No.1, and the spacer into the gear housing if removed.
2. Lubricate the steering rack, and teeth with multipurpose grease, and slide in the rack housing.
3. Repack the gear housing with multi-purpose grease.
4. Assemble the steering pinion, spacer, and the bushing No.2 into the gear housing.
5. Align the indent on the oil seal case, and the straight pin, and install them.
6. Install the oil seal, then select and install the proper hole snap ring so that the steering pinion thrust play will be zero, and smooth operation.

### Hole Snap Ring Thickness:

Part No.	90521-44090
Thickness	1.5 mm (0.060")
Part No.	90521-44091
Thickness	1.8 mm (0.072")
Part No.	90521-44092
Thickness	2.0 mm (0.080")

7. Install the rack guide, and the spring into the gear housing.
8. Install the adjusting shim, and tighten the rack guide spring cap to 4 ~ 5 m-kg (29 ~ 36 ft-lb) torque.  
To select the adjusting shim, install the Steering Pinion Torque Flange 09639-62010 onto the steering pinion, next, wind a cord on the Steering Pinion Torque Flange, then hook a pull-scale to the other end of the cord. Pull the scale slowly, then read the pull-scale applying a steady pull on it.

The reading of the pull-scale should be 2 ~ 4 kg (4.4 ~ 8.8 lb), and if it is not within this specification, select the adjusting shim to obtain the specified reading of the pull-scale.

The adjusting shims are available in two thickness.

Part No. 90564-28107  
Thickness 0.1 mm (0.004")

Part No. 90564-28108  
Thickness 0.2 mm (0.008")

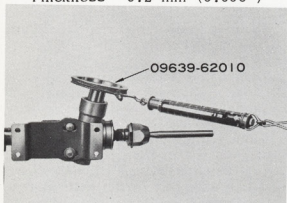


Fig.12-23 Steering Pinion V2536 Adjustment

9. Install the rack end nut onto the steering rack.  
Tighten the nut to 11 ~ 12.5 m·kg (80 ~ 90 ft·lb) torque.
10. Check and adjust the rack end ball end play.  
To check the end play, assemble the ball seat, rack end ball, and the end ball socket onto the steering rack.  
Tighten the rack end ball socket to 11 ~ 12.5 m·kg (80 ~ 90 ft·lb) torque. Check the clearance "A" between the end nut and the end ball socket with a feeler gauge as shown in figure 12-23.  
The required thickness of the lock washer is "A" + 0.4 ~ 0.6 mm for selection.  
The lock washers are available in the following thickness.

Lock Washer Thickness:

Part No. 90215-35008  
Thickness 0.8 mm (0.032")

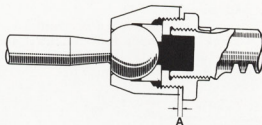


Fig.12-24 Rack End Ball End Play Measurement G0406

Part No. 90215-35009  
Thickness 1.0 mm (0.040")  
Part No. 90215-35010  
Thickness 1.2 mm (0.048")

11. Lubricate the rack end with multi-purpose grease, and reassemble the spring, ball seat, and the rack end ball onto the steering rack. Install the selected lock washer, and tighten the rack end ball socket.  
Bend the tabs of the lock washer, and secure the rack end ball socket, and the rack end nut.
12. Install the steering rack boot, and the clamps.  
Tighten the clamp screw securely.
13. Install the lock nut, and tie-rod end onto the rack end ball.  
Tighten the lock nut securely.

#### Installation

Follow the removal procedures in the reverse order.