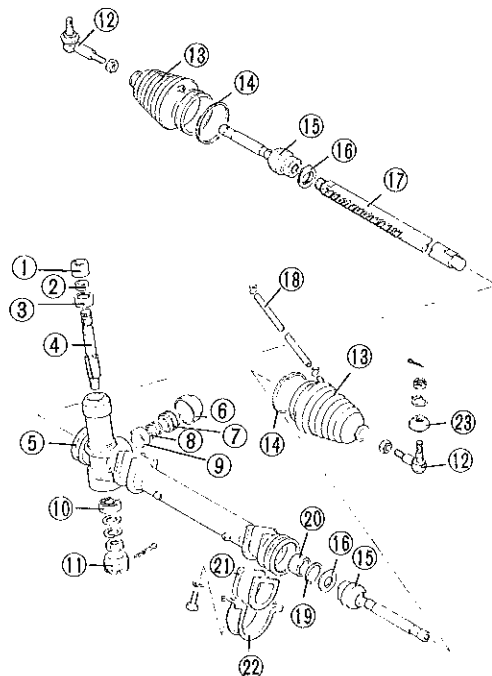


17. STEERING SYSTEM

17-1.	Description	17-2
17-2.	Specifications and Data	17-2
17-3.	Removal	17-3
17-4.	Maintenance Services	17-5
17-5.	Important Steps in Reassembly	17-6
17-6.	Tightening Torque.	17-10
17-7.	Tire	17-12
17-8.	Wheel Alignment.	17-13
17-9.	Steering Angle.	17-14

17-1. Description

The steering system is of the rack-and-pinion type with a simple structure as illustrated below, which provides dynamic maneuverability. And two joints installed in the steering shaft offer a large leg space. Steering power is transmitted to the front wheel via the steering wheel, steering shaft, shaft joint, steering pinion shaft, steering rack, steering tie rod pipe, steering tie rod end, and steering knuckle.



- | | | |
|------------------------------|-----------------------|-------------------------------|
| ① Steering pinion bush | ② Needle bearing | ③ Pinion bearing inner spacer |
| ④ Steering pinion | ⑤ Steering gear case | ⑥ Rubber cap |
| ⑦ Rack damper screw | ⑧ Plunger spring | ⑨ Steering rack plunger |
| ⑩ Bearing | ⑪ Pinion bearing plug | ⑫ Tie rod end |
| ⑬ Rack boot | ⑭ Rack boot wire | ⑮ Tie rod |
| ⑯ Lock washer | ⑰ Steering rack | ⑱ Tube |
| ⑲ C ring | ⑳ Rack bush | ㉑ Steering gear case mounting |
| ㉒ Steering gear case bracket | ㉓ Dust seal | |

Fig. 17-1

17-2. Specifications and Data

Steering gear box	Rack and pinion type
Gear ratio	17.5 : 1
Steering angle, inside	38° (degrees)
Steering angle, outside	32° (degrees)
Minimum turning radius	4.4 m (14.4 ft.)

17-3. Removal

Steering handwheel (One horn button type)

Depress the horn button, turn it counterclockwise and take out the button.

NOTE:

As to two-horn button type, remove the steering wheel pad by loosening the two screws.

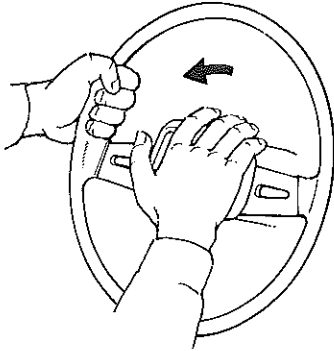


Fig. 17-2

Remove the steering shaft nut and pull off the steering wheel from the steering shaft.

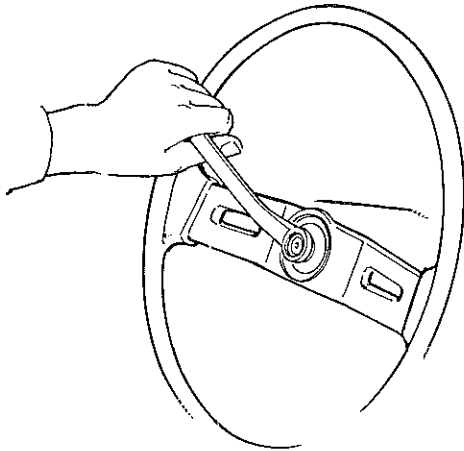


Fig. 17-3

When removing the steering gear case, follow the procedure described below.

Steering gear case

Remove the steering joint cover.

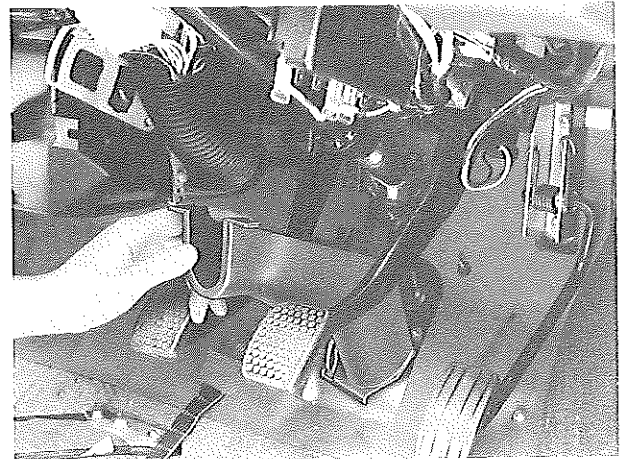


Fig. 17-4

Loosen the joint bolt securing the pinion shaft.

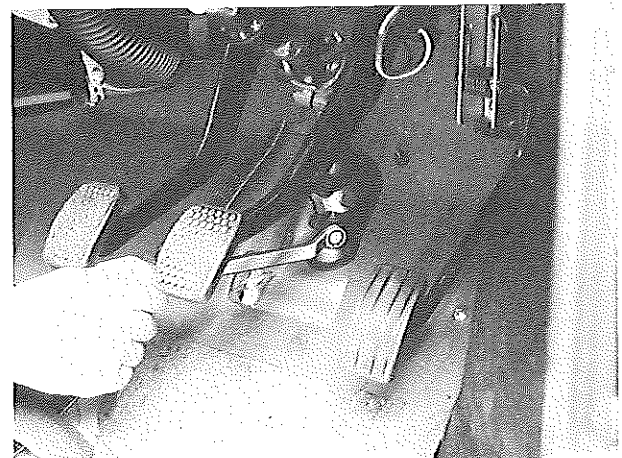


Fig. 17-5

Remove the nuts fastening the tie rod ends to the steering knuckle and remove the tie rod ends (left & right) from the steering knuckle using special tool **A** (09913 - 65210).

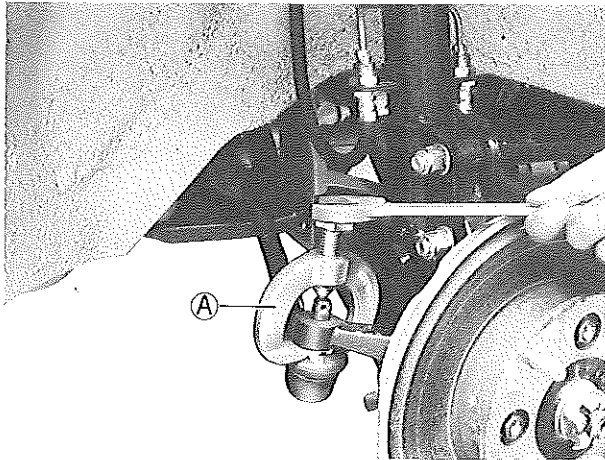


Fig. 17-6

Remove a part **1** of the engine suspension frame.

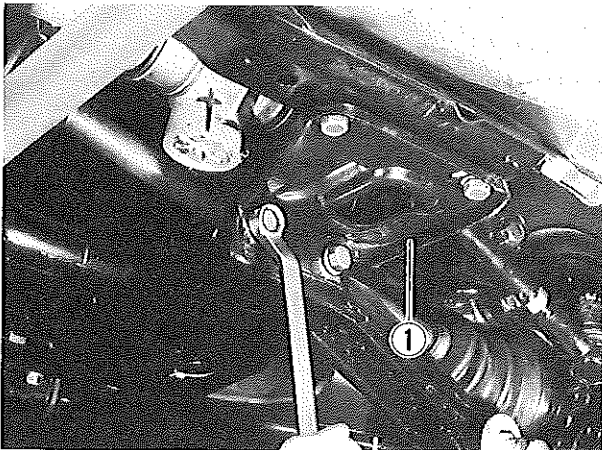


Fig. 17-7

Remove the steering gear case tightening bolts and take off the gear case with the tie rods and tie rod ends from the car body.

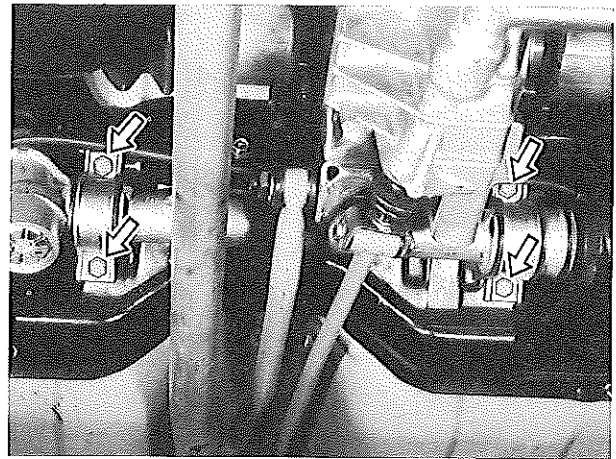


Fig. 17-8

Remove the wires binding the steering rack boots, and disconnect the steering rack breather hose.

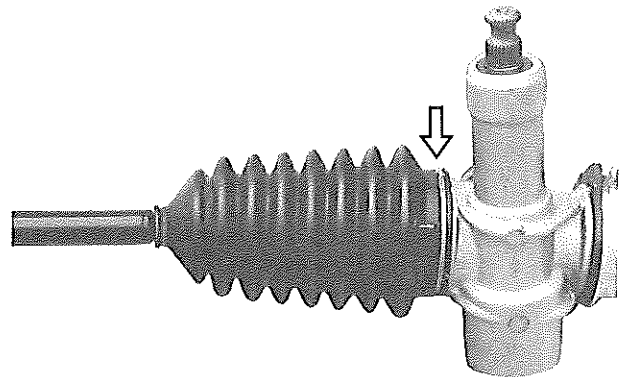


Fig. 17-9

Straighten the bent lock washer, loosen the tie rod ball stud case **1** till it is removed from the steering rack.

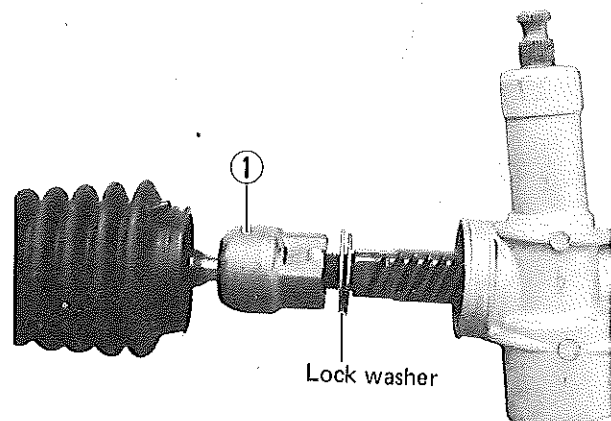


Fig. 17-10

Remove steering rack damper screw ② and remove spring ③ and plunger ④ .

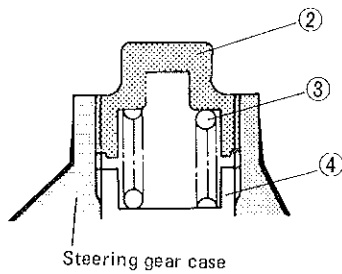


Fig. 17-11

Draw out cotter pin ⑤ from the steering pinion case, remove the pinion bush plug ⑥ and nut ⑦ fixing the pinion shaft.

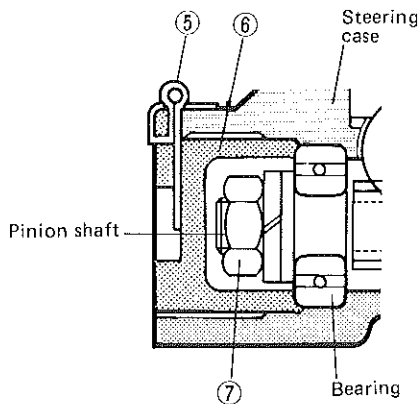


Fig. 17-12

Remove the pinion shaft, and then steering pinion bearing and pinion bush.

17-4. Maintenance Services

Steering wheel play

The wheel play is proper if it is anywhere between 0 and 15 mm (0 and 0.59 in.) as measured at the rim. An unusually large play means that the ball-and-socket joints are loose or that wear in the steering gear box is excessively large.

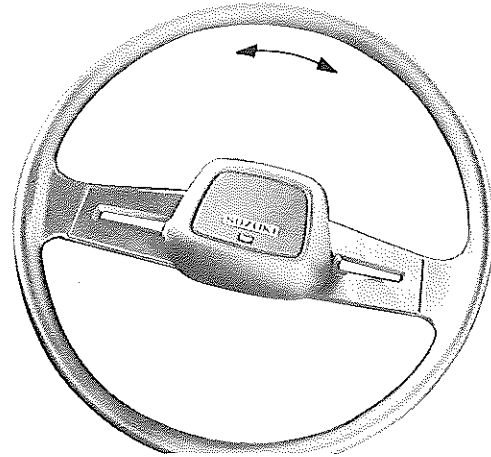


Fig. 17-13

Steering shaft joint

Check the shaft joint for wear, breakage and other damage and replace if any defect exists.

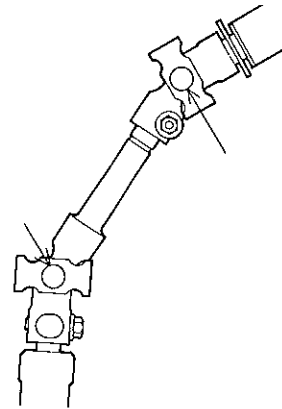


Fig. 17-14

Steering rack boot

Check the steering rack boot for deterioration, cracks and other damage and replace if defective.

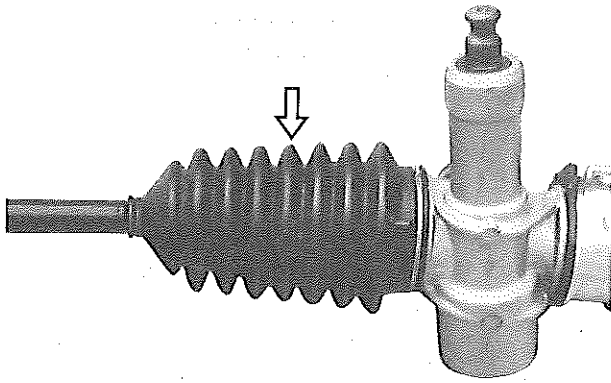


Fig. 17-15

Steering rack & pinion

Check the rack & pinion tooth surface for wear, breakage and other damage and replace if any defect exists.

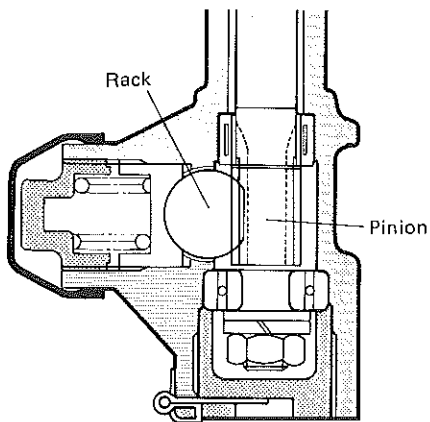


Fig. 17-16

Steering rack plunger and pinion bush

Check the steering rack plunger and pinion bush for wear, breakage and other damage and replace if defective.

17-5. Important Steps in Reassembly

Reassemble parts in the reverse order to disassembly, paying attention to the following points.

Bearing and bush

Be sure to apply SUZUKI SUPER GREASE E (99000 - 25050) to bearings and bushes before fitting them.

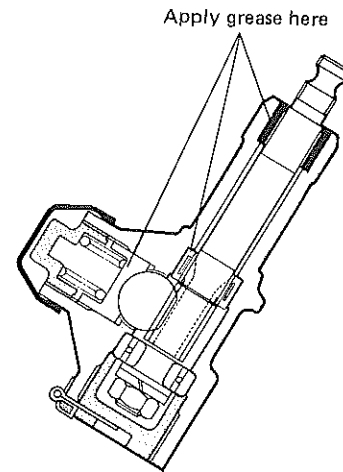


Fig. 17-17

Steering pinion bush and rack bush

Press in the bush in the direction given below.

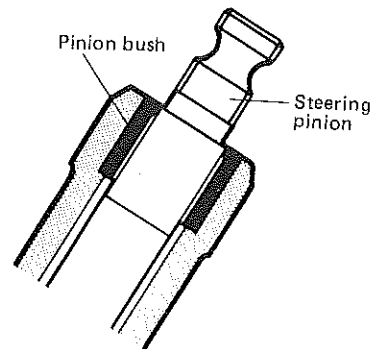


Fig. 17-18

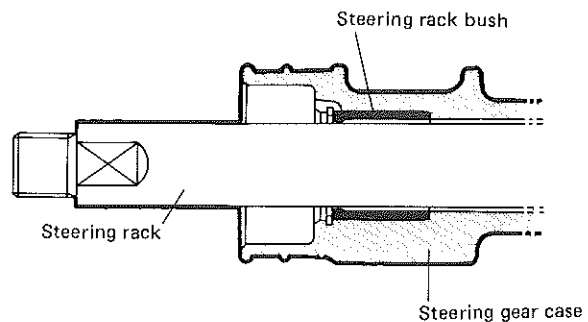


Fig. 17-19

Steering gear case

Remove the bolt ② and, through its hole, inject SUZUKI Super Grease E (99000-25050) into the steering gear case enough to fill up inside of it.

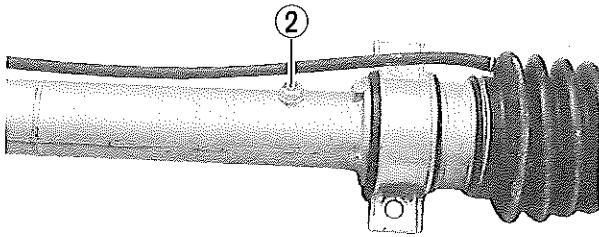


Fig. 17-20

Steering tie rod

Install the steering tie rod on the steering rack and tighten it to the torque specified below. At this time, place the washer in such a way that its larger side faces the tie rod side and bend it over the tie rod to lock it.

Tie rod tightening torque	70 - 100 N·m (7.0 - 10.0 kg·m) 51.0 - 72.0 lb·ft
---------------------------	--

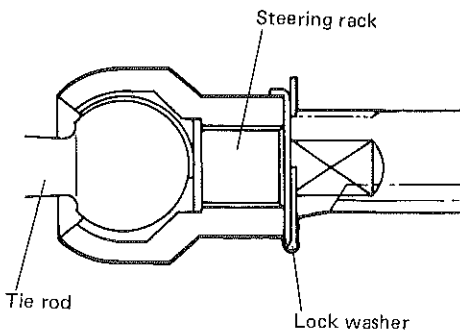


Fig. 17-21

Pinion bearing bush plug

The pinion bearing bush plug prevents the bearing from coming out. After tightening it to the specified tightening torque, be sure to fit a cotter pin ③.

Tightening torque specifications	
Pinion bearing bush plug ④	45 - 80 N·m (4.5 - 8.0 kg·m) 32.5 - 57.5 lb·ft
Steering pinion securing nut ⑤	55 - 80 N·m (5.5 - 8.0 kg·m) 40.0 - 57.5 lb·ft

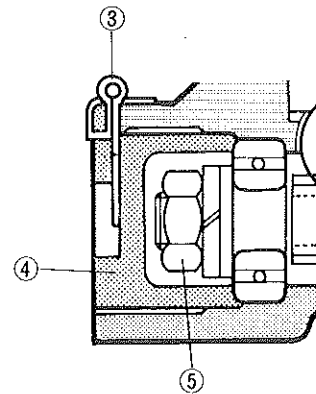


Fig. 17-22

Steering rack damper screw

The steering rack damper screw should be adjusted after being tightened. Tighten the damper screw so that the average working torque of the pinion shaft is 0.8 - 1.3 N.m (8 - 13 kg-cm, 0.58 - 0.94 lb-ft) when the steering pinion shaft is turned through 0 - 180° with the steering rack positioned at the same distance to the right and left of the gear case.

NOTE:

Height \textcircled{H} as illustrated below after the damper screw is tightened should be less than 0 - 1 mm (0 - 0.04 in.) from the gear case face.

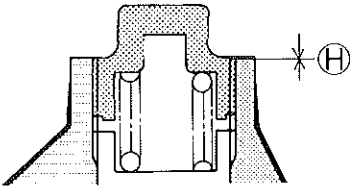


Fig. 17-23

Steering rack boots

Fit the boots on the steering rack in such a way that the plug of the boots is in the position as shown below.

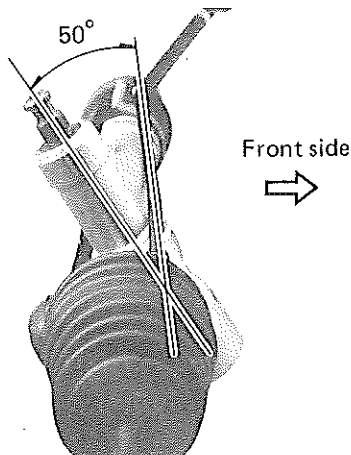


Fig. 17-24

Steering shaft joint

Connecting the steering shaft with the pinion shaft presupposes the following conditions.

- Right and left tie rods are installed in such a way that length "A" of both rod ends is equal.

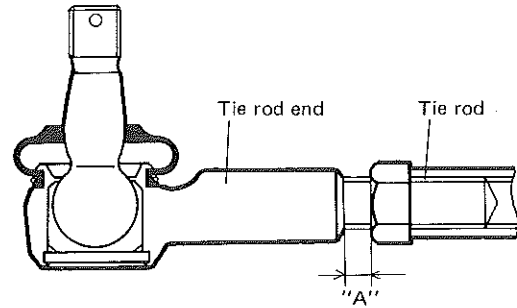


Fig. 17-25

- Right and left tie rod ends are installed in the steering knuckles.
- Right and left front wheels (tires) are kept in the straight forward position.

After making sure of the above items, install the steering shaft joint on the pinion shaft.

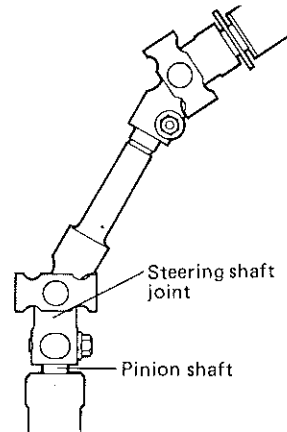


Fig. 17-26

Tighten the joint bolt on the pinion shaft side, column bolts and then joint bolt ① .

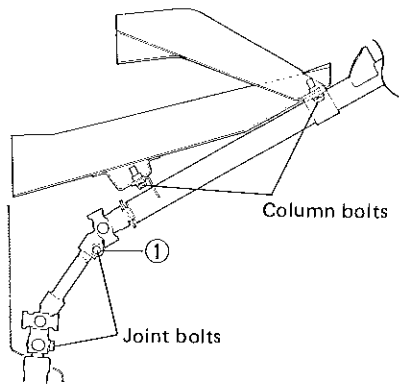


Fig. 17-27

Steering wheel

Align the front wheels for straight ahead and fit the steering wheel on the steering shaft so that the steering wheel spoke is horizontal or makes an angle of not more than 6° to the horizontal.

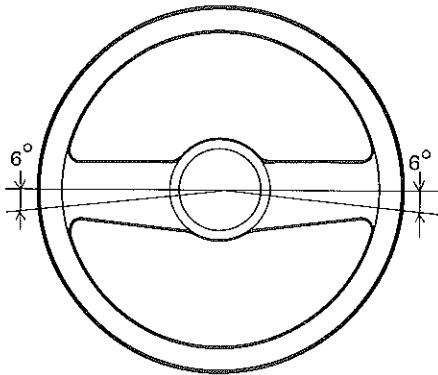


Fig. 17-28

WARNING:

After installing all parts, be sure to inspect and readjust wheel alignment. At the same time, confirm that the steering angle is correct.

Steering rack boots tube

When installing the tube, check to be sure that no grease is in it. Also be careful not to dent the tube when clamping it.

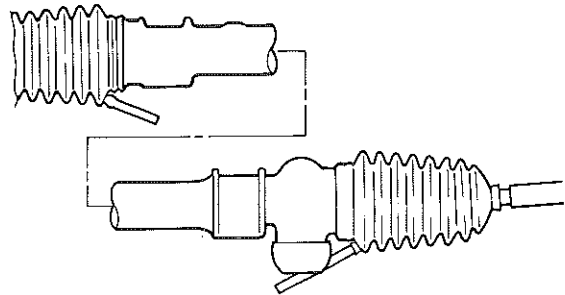


Fig. 17-29

Steering shaft bushes and washer (vehicle with horn of one horn button type.)

Apply SUZUKI SUPER GREASE A (99000-25010) to the inner groove of the bush ① and the upper and lower surfaces of the steering shaft washers ② before fitting them.

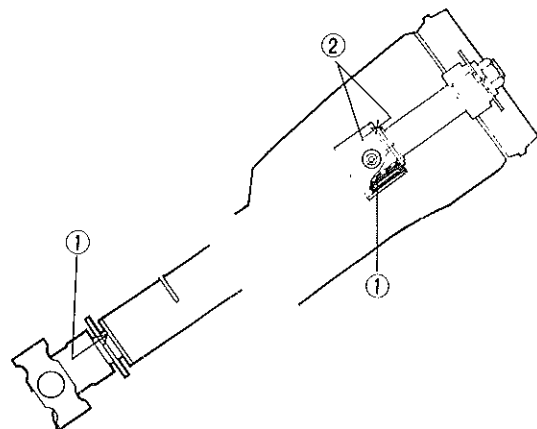


Fig. 17-30

17-6. Tightening Torque

	Fastening parts	N·m	kg-m (lb-ft)
①	Steering shaft nut	25 - 40	2.5 - 4.0 (18.0 - 28.5)
②	Steering shaft joint bolt	20 - 30	2.0 - 3.0 (14.5 - 21.5)
③	Steering column bolt	11 - 17	1.1 - 1.7 (8.0 - 12.0)
④	Tie rod ball stud case nut	70 - 100	7.0 - 10.0 (51.0 - 72.0)
⑤	Steering pinion securing nut	55 - 80	5.5 - 8.0 (40.0 - 57.5)
⑥	Pinion bearing bush plug	45 - 80	4.5 - 8.0 (32.5 - 57.5)
⑦	Tie rod end castle nut	40 - 70	4.0 - 7.0 (28.5 - 51.0)
⑧	Steering gear case bolt	20 - 30	2.0 - 3.0 (14.5 - 21.5)
⑨	Tie rod end lock nut	35 - 55	3.5 - 5.5 (25.5 - 39.5)
⑩	Wheel nuts	50 - 70	5.0 - 7.0 (36.5 - 50.5)

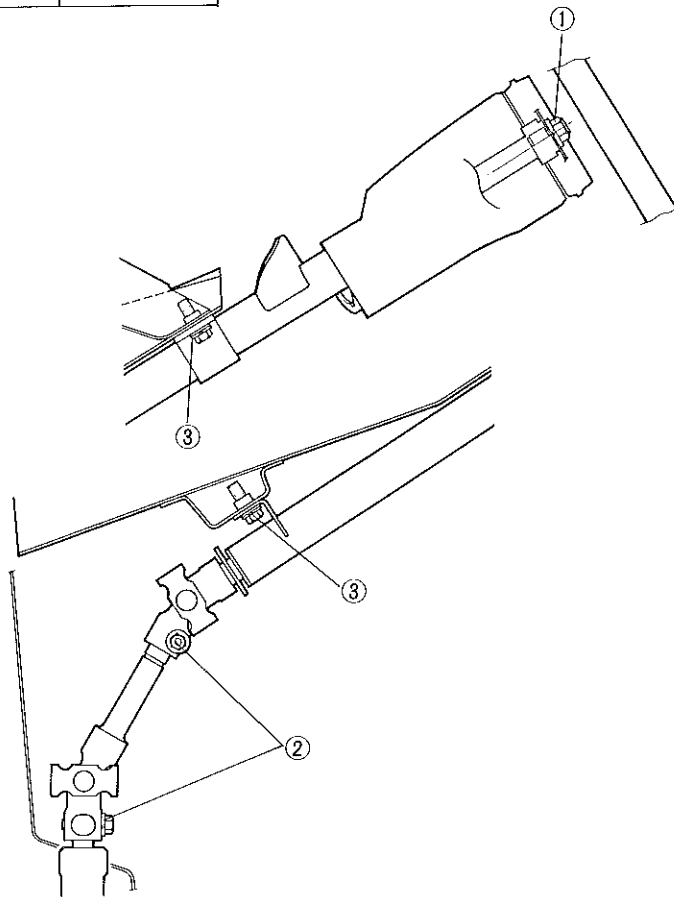


Fig. 17-31

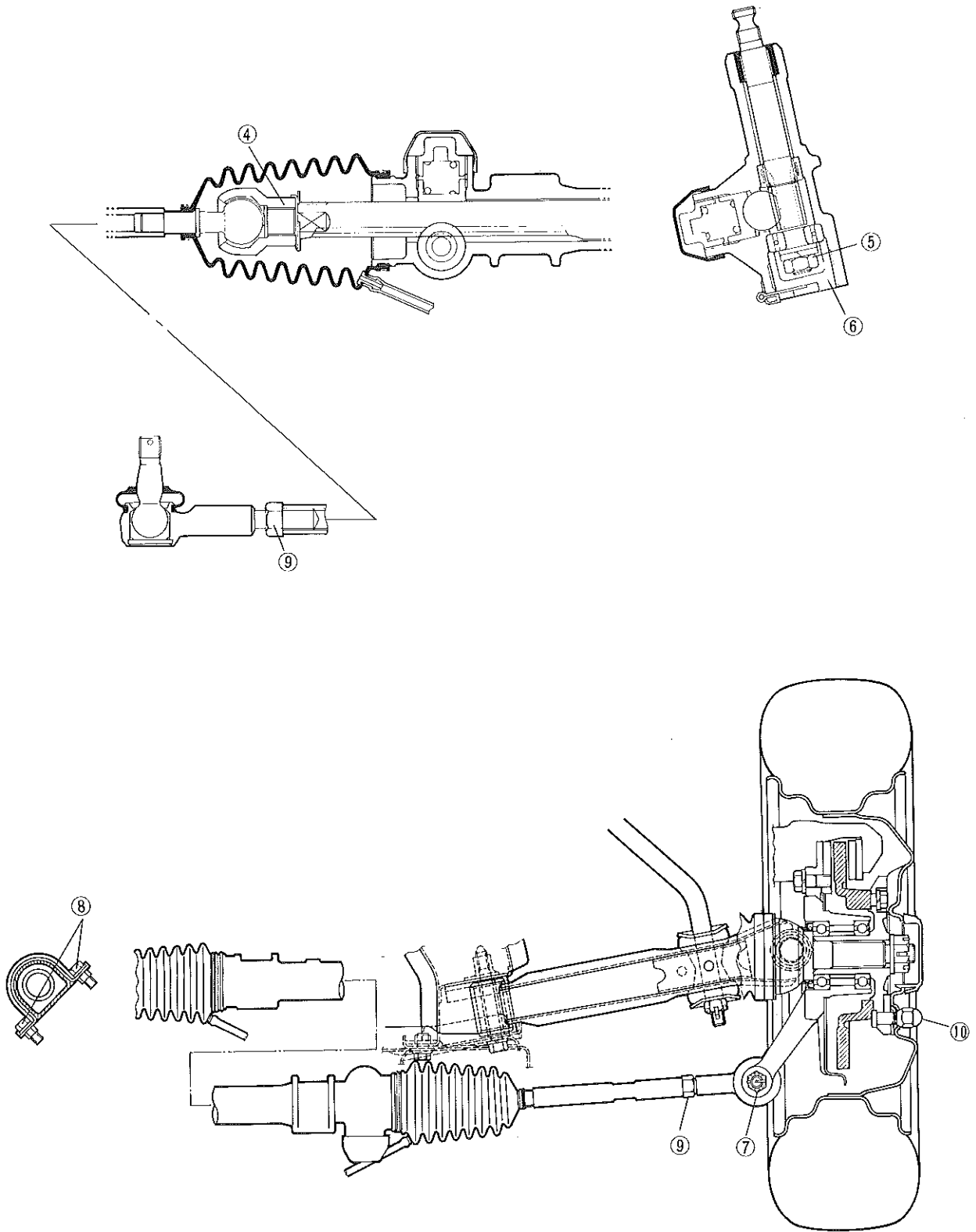


Fig. 17-32

17-7. Tires

Tire pressure specification

Front wheel tires	190 kPa (1.9 kg/cm ² , 27 psi)
Rear wheel tires	190 kPa (1.9 kg/cm ² , 27 psi)
	*220 kPa (2.2 kg/cm ² , 31 psi)

*For vehicle with rear leaf spring of three leaf type

Wheel balance inspection

The four road wheels are required to be balanced, that is, there should be no difference between right wheels and left wheels in terms of inflated pressure, tire size and also the extent of wear. Balance tends to be lost when wheel alignment is poor, the car is mis managed with the tires inflated improperly.

An unbalanced condition shows up in fast cruising as "high-speed shimmy."

To check and correct wheel balance, the four wheels must be taken off the car and tested on the off-the-car balancer; after making necessary corrections, the wheels must be put back on and the car driven for a road test to see if any other part of the car is contributing to loss of balance. On-the-car type balancers are available on the market: with this type of balancer, the wheel balance can be checked without removal of the wheels.

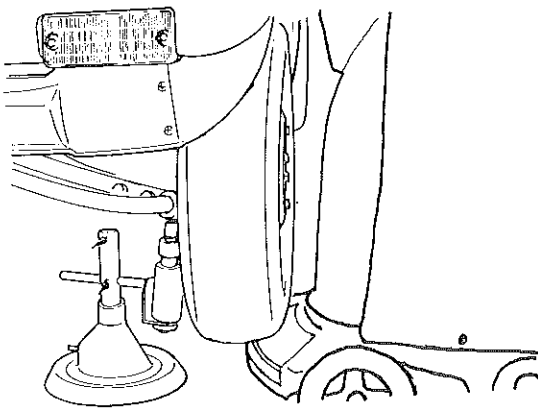


Fig. 17-33

Inspection of the tires for wear and damage

Unevenly worn or abnormally worn tires are often responsible for uneven braking, particularly when the brake is applied suddenly, and are liable to bring about a "tramping" or "shimmy" condition in high-speed cruising. Such a condition is extremely dangerous and must be absolutely avoided. For the service limit on tires, it is recommended that the depth of the tread of each tire be checked at two places on the tread. If the depth is found to be less than 1.6 mm (0.063 in.), the tire should be replaced with a new one.

Tire service limit	<i>Less than 1.6 mm (0.063 in.) depth of tread at two places.</i>
--------------------	---

NOTE:

Markings so-called "wear indicator" being attached to the tires, the tires must be replaced when these marks become visible.

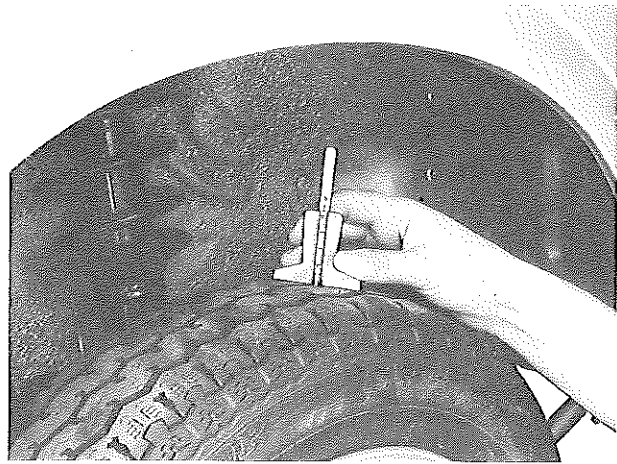


Fig. 17-34

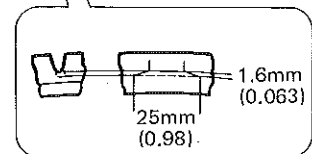
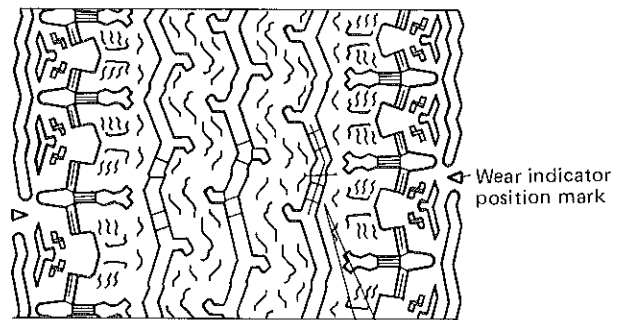


Fig. 17-35

At regular intervals, preferably at the time of carrying out the periodical inspection, the tires should be "rotated" in order to equalize wear. The pattern of rotation is shown below.

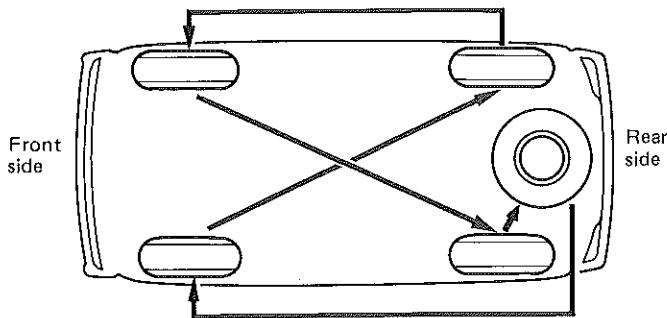


Fig. 17-36

Key information on tire pressure

1. As the tire becomes hot, its internal (inflated) pressure rises. Thus, the tires should be at normal temperature when you check inflated pressure of each tire.
2. It is good practice to have the spare tire inflated to a pressure value slightly above that specified.

17-8. Wheel Alignment

Alignment service data

Toe-in	2 - 4 mm (0.079 - 0.157 in.)
Camber	1° 20'
Trail	13 mm (0.51 in.)
Kingpin inclination	12° 50'
Caster	3° 15'

Adjustment

The only item of adjustment is toe-in. Camber and caster are given and fixed. Before checking and adjusting toe-in, let the car stand on flat level ground without any load placed aboard, and make sure that—

- (1) All tires are inflated to the following pressures:

Unloaded

Front wheel tires	190 kPa (1.9 kg/cm ² , 27 psi)
Rear wheel tires	190 kPa (1.9 kg/cm ² , 27 psi)
	*220 kPa (2.2 kg/cm ² , 31 psi)

*For vehicle with rear leaf spring of three leaf type

- (2) The car is level. (Check by using a carpenter's level gauge.)
- (3) The front wheels are set in straightahead driving position.

Using the toe-in gauge, read the toe-in and compare the reading against the specification (indicated above).

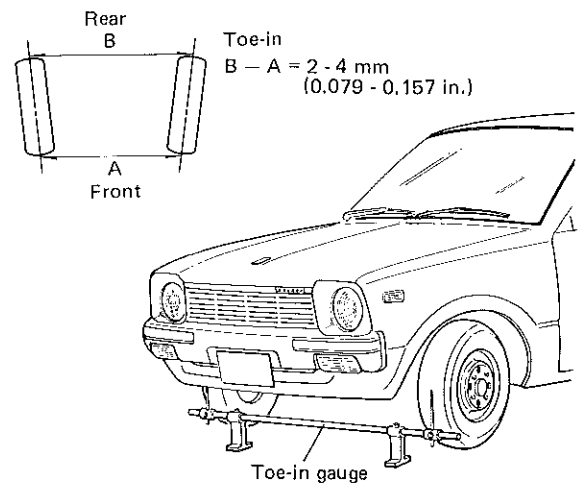


Fig. 17-37

To increase or decrease the toe-in, adjust the length of tie rods. This is accomplished by loosening the two lock nuts ① on the ends of each tie rod and by turning the rod ②.

NOTE:
Turn the tie rod pipes by the same number of turns.

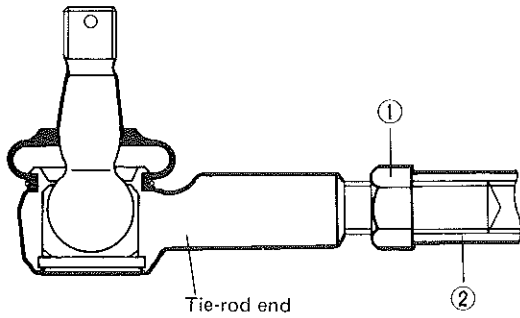


Fig. 17-38

17-9. Steering Angle

Steering angle	inside	38°
	outside	32°

Use the turning radius gauge when measuring the steering angle.

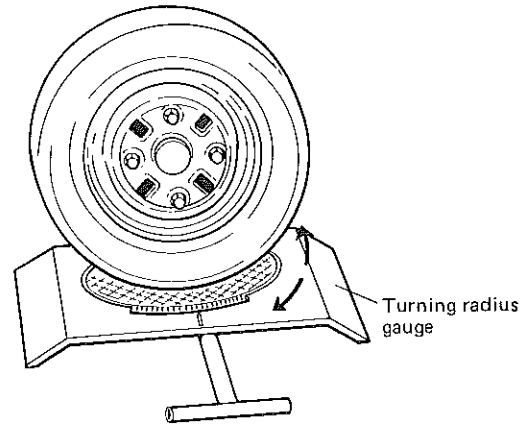


Fig. 17-39