# SERVICE MANUAL

DATSUN 240Z
MODEL S30 SERIES



NISSAN

NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

## SECTION FA

# FRONT AXLE & FRONT SUSPENSION

FA


FRONT AXLE AND FRONT SUSPENSION ..... FA- 1
ADJUSTMENT ..... FA-18
SERVICE DATA AND SPECIFICATIONS ..... FA-20
TROUBLE DIAGNOSES AND CORRECTIONS ..... FA-22

# FRONT AXLE AND FRONT SUSPENSION

## CONTENTS


DESCRIPTION ..... FA- 2
FRONT AXLE AND SUSPENSION ASSEMBLY ..... FA- 2
- Removal ..... FA- 2
- Reinstallation ..... FA- 4

FRONT AXLE ..... FA- 4
- Removal ..... FA- 4
- Inspection ..... FA- 5
- Reinstallation ..... FA- 9
- Wheel bearing adjustment ..... FA-10

STRUT ASSEMBLY ..... FA-10
- Disassembly ..... FA-12
- Inspection ..... FA-13
- Reassembly ..... FA-13

TRANSVERSE LINK AND LOWER BALL JOINT ..... FA-16
- Removal ..... FA-16
- Inspection ..... FA-17
- Reinstallation ..... FA-18

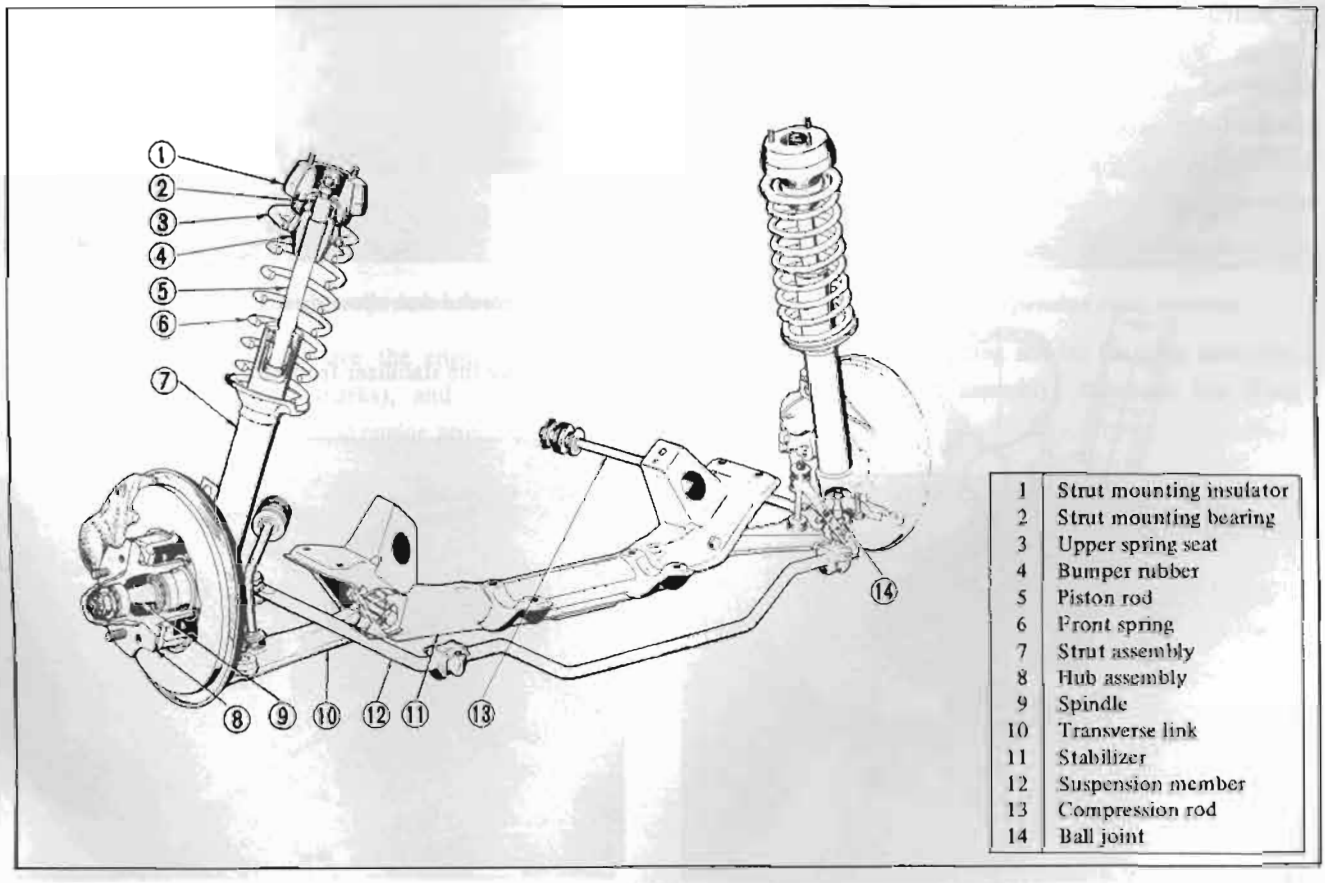




*Fig. FA-1 Front axle and suspension assembly*

## DESCRIPTION

The front suspension is of a strut type. The shock absorber and spindle are combined to a single unit which is supported by the coil spring at the upper end and by the transverse link at the lower end.

The spindle is installed on the bottom of the strut outer casing by means of welding.

A ball-joint is attached to the lower part of the spindle. The ball-joint and the transverse link (lower link) are connected and they are fitted to the suspension member through a rubber bushing. The shock absorber mechanism is built in the strut outer casing. A coil-spring is applied between the upper end of the piston rod and spring seat welded to the outer casing. These components, assembled to a single unit, are fitted to the chassis frame at their upper part through the thrust bearing. Moreover, the transverse link supports the overall forward and backward strut movements by means of the compression rod fitted to the chassis through a rubber bushing. The rubber bushing adopts a non-linear shape with which the forward and rearward rigidities are changed. The torsion-bar type stabilizer adopted in this suspension system is used so that the strut maintains connection between both side struts.

Thus, this suspension mechanism absorbs shocks toward all directions into the chassis effectively and efficiently; the compression rod absorbs forward and backward shocks, the strut absorbs vertical shock, and the transverse-link absorbs shock applied toward sideway.

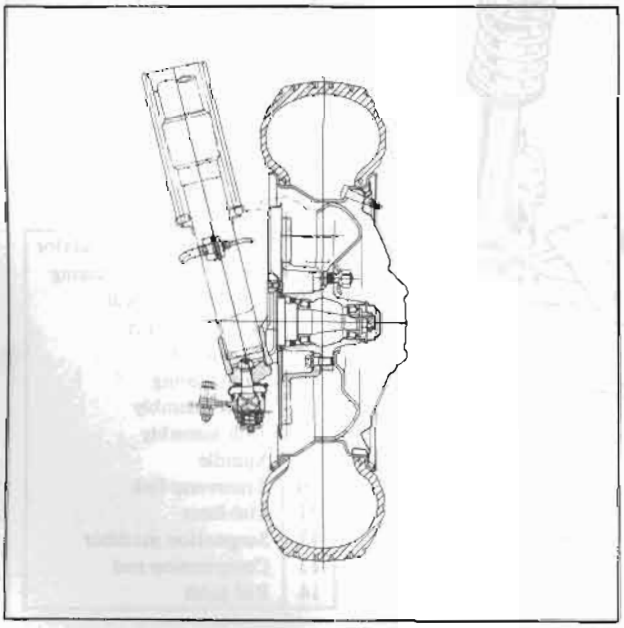


*Fig. FA-2 Cross-sectional view of front axle*

## FRONT AXLE AND SUSPENSION ASSEMBLY

### Removal

1. Jack up the vehicle, and support the vehicle with stands. (See the Section GI.)

2. Remove the hub nuts and remove the wheel.

3. Remove the splash board.

4. Loosen the brake tube, remove the brake hose locking spring, withdraw the plate, and remove the brake hose from the strut assembly bracket.

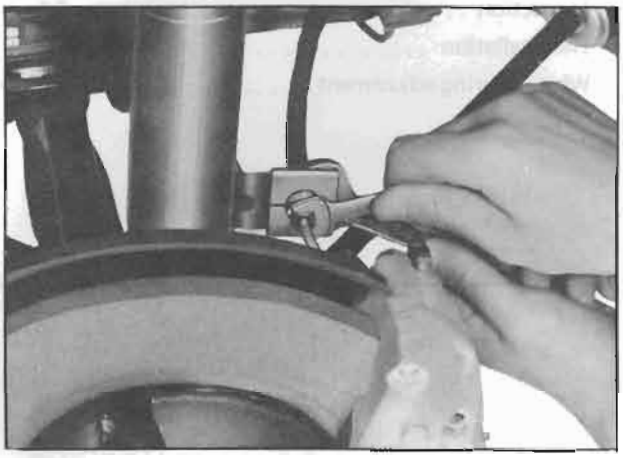


*Fig. FA-3 Detaching brake hose*

**Note:** Be careful not allow dust to enter the brake hose.

5. Remove the stabilizer from the body.

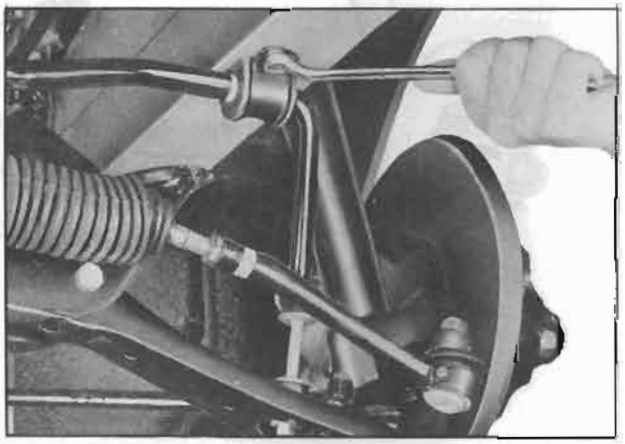


*Fig. FA-4 Removing stabilizer*

6. Remove the steering coupling bolts and remove the steering shaft at the rubber coupling unit. (See Section ST.)

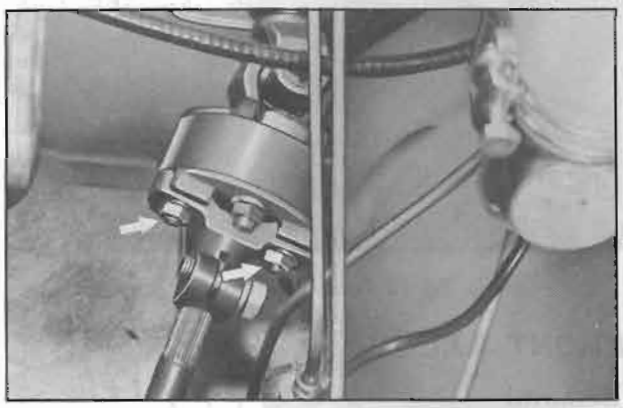


*Fig. FA-5 Removing steering coupling bolts*

7. Loosen the compression rod securing bolts and nuts, and remove the compression rod.

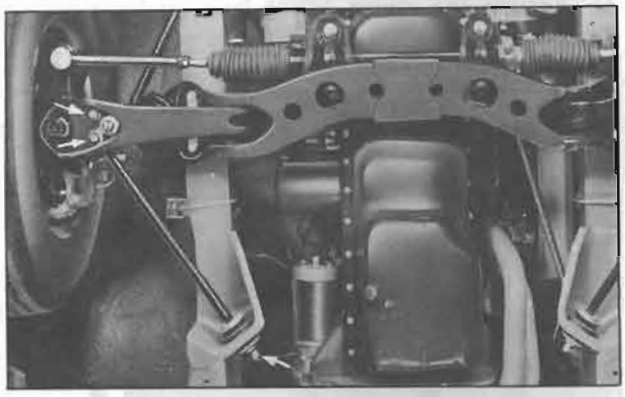


*Fig. FA-6 Removing compression rod*

8. Support the engine, remove the engine mounting bolts (indicated by arrow marks), and separate the suspension cross member from the engine assembly.

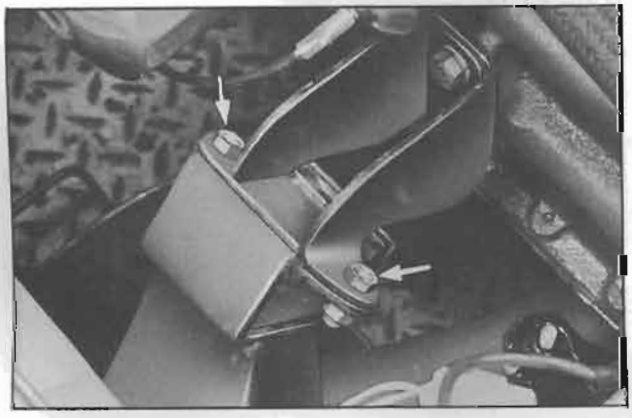


*Fig. FA-7 Removing engine mounting bolts*

9. Apply a jack to the patch unit in the center of the suspension cross member to support the member, loosen the bolts, and separate the suspension cross member from the body.

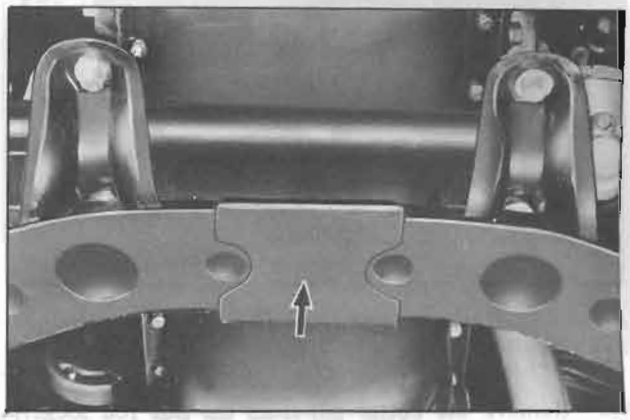


*Fig. FA-8 Jack-up point of suspension cross member*

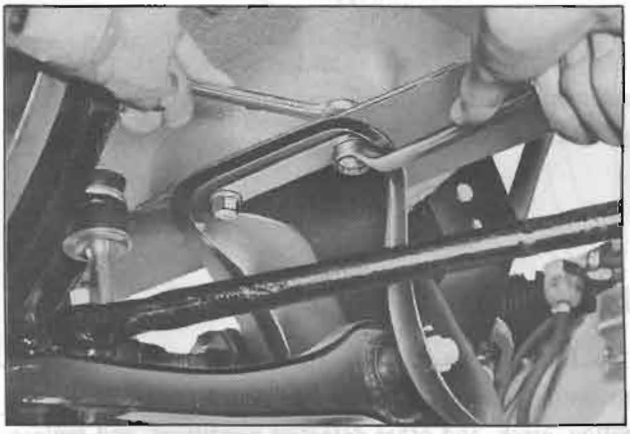


*Fig. FA-9 Removing suspension cross member*

10. Loosen the self-locking nut on the strut assembly, and holding the strut assembly, dismount the front suspension assembly.

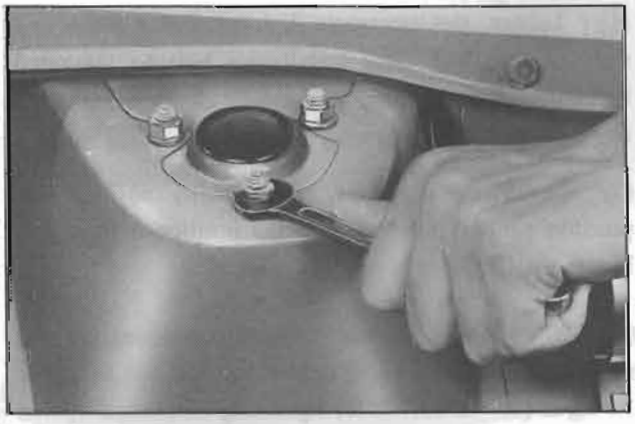


*Fig. FA-10 Removing self-locking nut*




*Fig. FA-11 Removing front axle and suspension assembly*

11. Remove the cotter pin from the side rod socket, remove the slotted nut, and separate the knuckle arm from the side rod assembly.

12. Remove the bolts from the rack mounting bracket, and separate the steering gear assembly from the suspension member.

### Reinstallation

1. First, check rubber parts such as compression rod mounting bushing, stabilizer bar bushing, etc. for deterioration, crack, and other defective conditions, and replace as required.

2. Reinstall the front axle and suspension assembly in reverse sequence of removal, noting the following matters.

(1) Tighten the transverse link mounting bolts and stabilizer bar body side installation bolt to the rated tightening torque with the vehicle loaded with the standard load (two passengers).

(2) Install the stabilizer bar correctly so that the position painted in white is in the position indicated in Figure FA-12.

(3) When assembling the stabilizer connecting rod and transverse link, be sure to tighten the first nut to 1.2 to 1.9 kg-m (8.7 to 13.7 ft-lb) tightening torque and tighten the lock nut to secure the first nut.

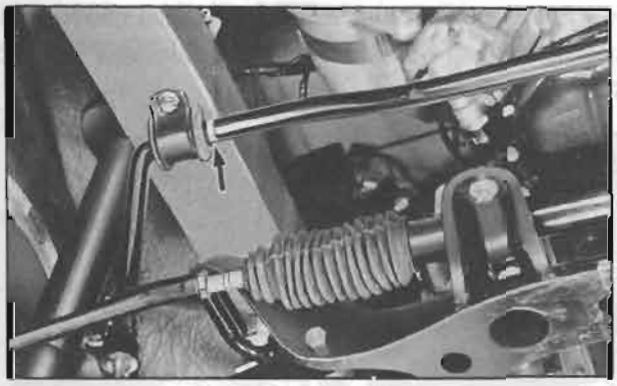


*Fig. FA-12 Installing stabilizer bar*

## FRONT AXLE

### Removal

1. Jack up the vehicle, remove the wheel, and disconnect the brake hose. (For the details, see "Removal of front axle and suspension assembly" above.)

2. Remove the caliper fitting bolts, and remove the caliper assembly.

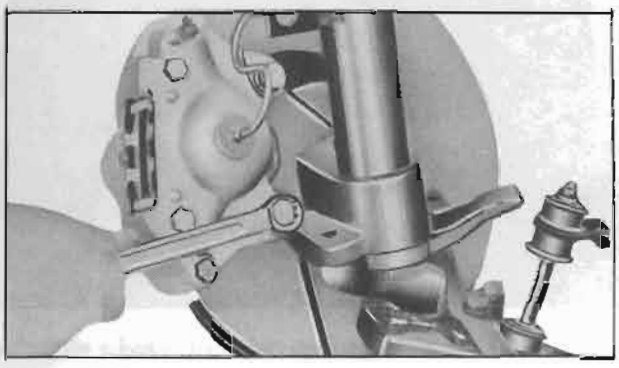


*Fig. FA-13 Removing caliper assembly*

3. Remove the hub cap with a flat-headed (-) screw driver or other proper tool and hammer as shown in Figure FA-14.



*Fig. FA-14 Removing hub cap*

4. Withdraw the cotter pin, and remove the wheel bearing lock nut.

5. Remove the wheel hub with the wheel bearing washer, wheel bearing and brake disc rotor installed on the wheel hub, from the spindle.

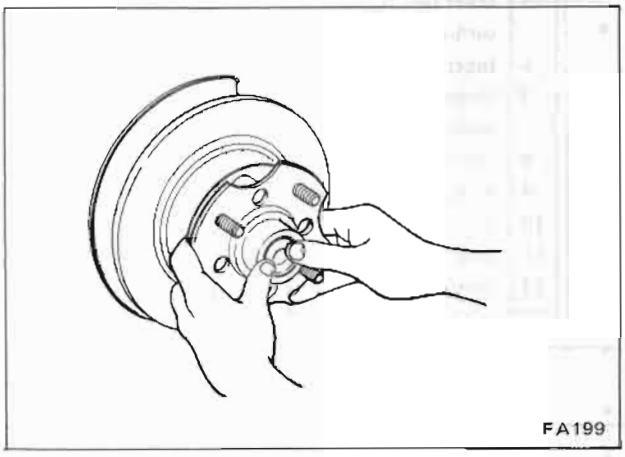



*Fig. FA-15 Removing wheel hub assembly*

6. Remove set screws and remove the baffle plate.

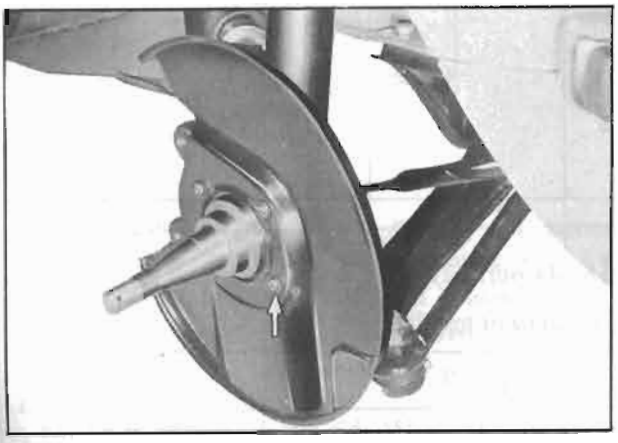


*Fig. FA-16 Removing baffle plate*

7. Utilizing two grooves inside the wheel hub, tap and remove the wheel bearing outer race from the hub.

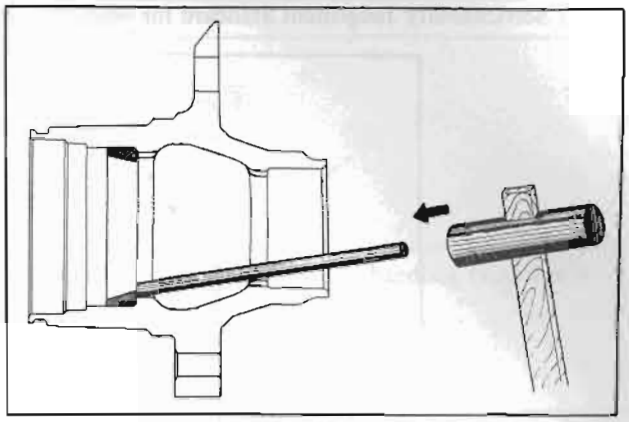


*Fig. FA-17 Removing wheel bearing outer race*

8. Remove four brake disc fitting bolts, and remove the brake disc rotor from the wheel hub assembly.

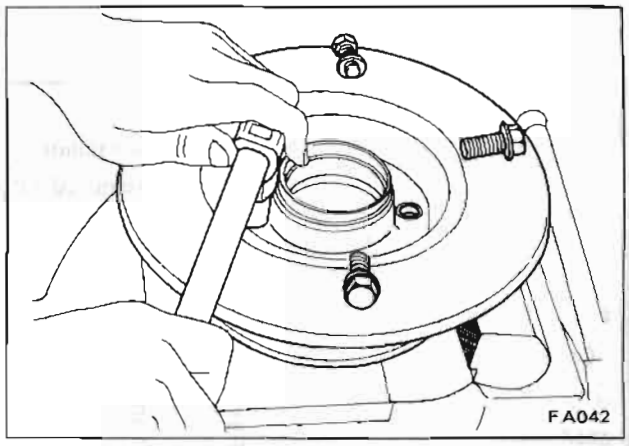



*Fig. FA-18 Removing brake disc rotor*

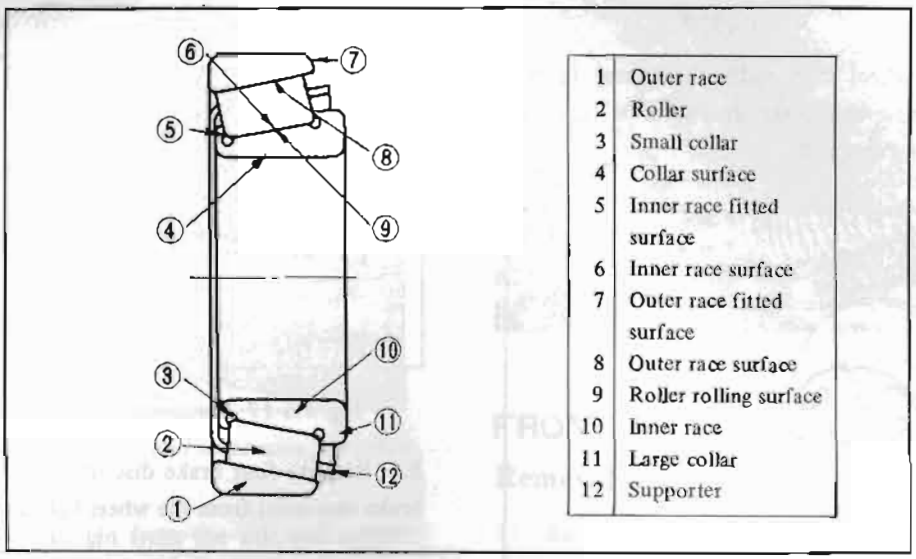
## Inspection

1. Wheel bearing

Remove used grease from the wheel bearing with solvent, and inspect the bearing for operating condition from the rotation, operating sound and appearance. The outer race may be checked for the condition of rolling surface with the race installed on the wheel hub.

Visual serviceability judgement standard for the wheel bearing is indicated in the following table.

**Visual Serviceability Judgement Standard for Wheel Bearing**




| Judgement | × : Unserviceable<br>△ : May be used when minor<br>* : Rust should be removed with # 0 emery paper | | | |
|---|---|---|---|---|
| Components | Race and roller | | Supporter | Cause |
| | Rolling surface | Fitted surface | | |
| Flaking<br><br>(Fig. a, b) | × | | | Shortened service life due to one of the following causes:<br>• Abnormal load (overload)<br>• Improper handling or installing |
| Crack<br><br>(Fig. c, d) | × | × | × | • Excessive tightening<br>• Excessive gap and a considerable shock received from the outside<br>• Rapid heat generation on the race due to creep<br>• Bitten supporter with seized rollers<br>• Abnormal thrust load<br>• Tapped with a hammer while removing |
| Seizure | × | × | × | In the most cases, seizure occurs as the result of grown discoloring or flaking |
| Scratch | △ | △ | △ | • Shock is given carelessly during installation<br>• Bit foreign matter |

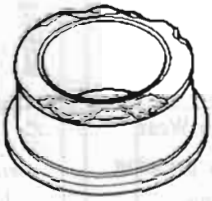
| Components | Race and roller | | | Cause |
|---|---|---|---|---|
| | Rolling surface | Fitted surface | Supporter | |
| Recess or Wear made by pressing or striking (Fig. e, f, g) | △ | △ | △ | • Careless installation, removal, or other handling (scar due to striking)<br>• Recess made by bit foreign matter |
| Wear | △ | △ | △ | • Poor lubricant quality or deteriorated lubricant<br>• Intrusion of dust. Fitted surface is worn remarkably<br>• Wear due to excessive preliminary pressure |
| Biting | △ | △ | △ | • Excessive preliminary pressure of faulty lubrication |
| Fretting | △* | △* | △* | • The fitted part is discolored to brown or black<br>• Fretting corrosion (rust on fitted part) means fine relative slip on metal contact surface |
| Rust (Fig. h) | △* | △* | △* | • Temperature increased during operation lowers when the bearing stops, moisture inside the bearing is condensed, becoming fine drips, and the grease is moistened<br>• The bearing has been placed in a highly moistened place for a long period of time<br>• Intrusion of moisture, chemicals, etc., or the bearing is touched with bare hand and no rustproof action has been taken |
| Discoloring | The wheel bearing is serviceable if discoloring can be removed with solvent or by polishing | | | • Slight discoloring may become like oxidized oil stain due to grease<br>• In the most cases, this occurs when preliminary pressure is too high |



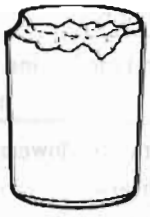
a) Inner race flaking



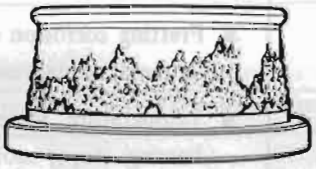
b) Roller flaking



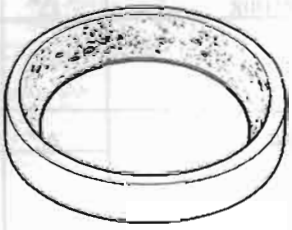
c) Cracked inner race



d) Cracked roller



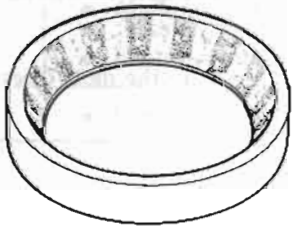
e) Recess on inner race



f) Recess on outer race



g) Recess on roller



h) Rust on outer race

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2. Grease seal

(1) When grease leakage is detected during disassembly, replace.

(2) Replace the grease seal with a new one, if worn or cracked.

## Reinstallation

1. Reinstall the wheel bearing in reverse sequence of removal.

2. Install the bearing outer race by the use of a front wheel bearing drift (special tool ST35300000).

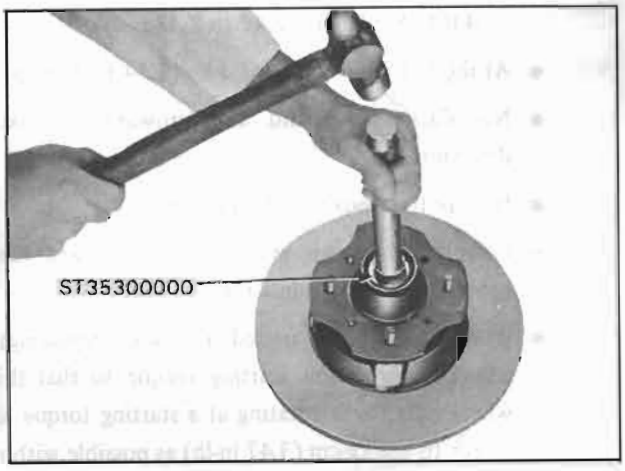



*Fig. FA-19 Installing wheel bearing outer race*

3. Fill the wheel hub and hub cap with multi-purpose grease (MIL G2108 or 10924) up to the line indicated in Figure FA-20.

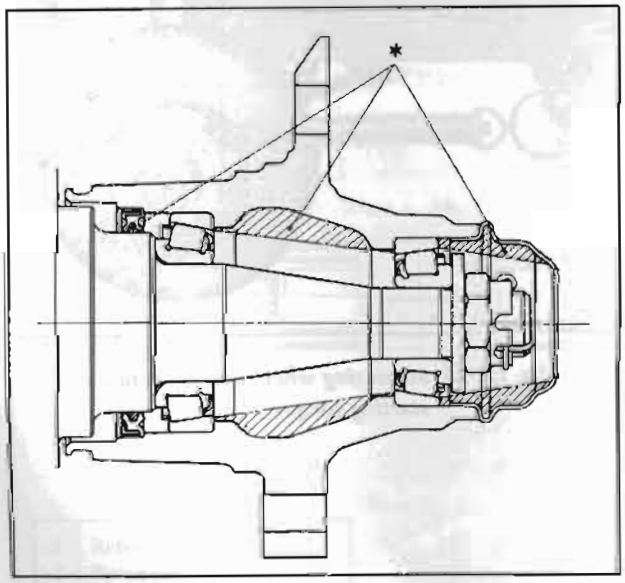



*Fig. FA-20 Greasing points of hub assembly*

4. Fill the spaces between wheel bearing rollers and grease seal lip pocket with multi-purpose grease sufficiently. (See Figures FA-21 and FA-22.)

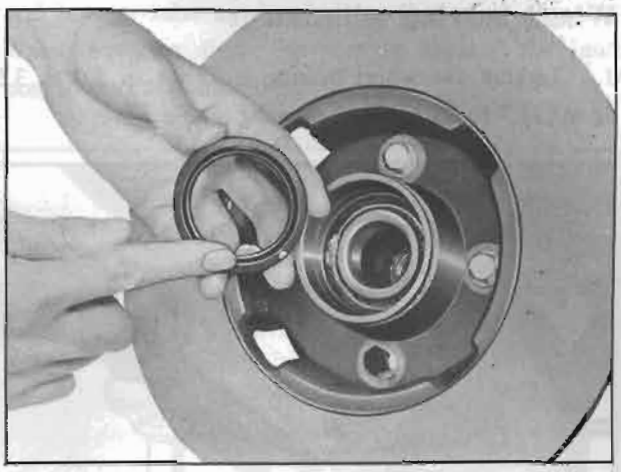


*Fig. FA-21 Filling grease seal lip pocket with grease*




*Fig. FA-22 Filling spaces between wheel bearing rollers with grease*

5. Apply multi-purpose grease to the spindle shaft and threaded portions, wheel bearing washer, and wheel bearing lock nut surfaces slightly.

6. Install the wheel bearing and grease seal on the wheel hub, and install them on the spindle.

**Note: In order to provide the bearing with a proper prepressure and to extend the bearing service life, install the wheel bearing, grease seal, washer, and lock nut carefully so that no dust and foreign matters stick on grease applied to them.**

## Wheel bearing adjustment

1. Tighten the wheel bearing lock nut to 3.0 to 3.5 kg-m (21.7 to 25.3 ft-lb) tightening torque.

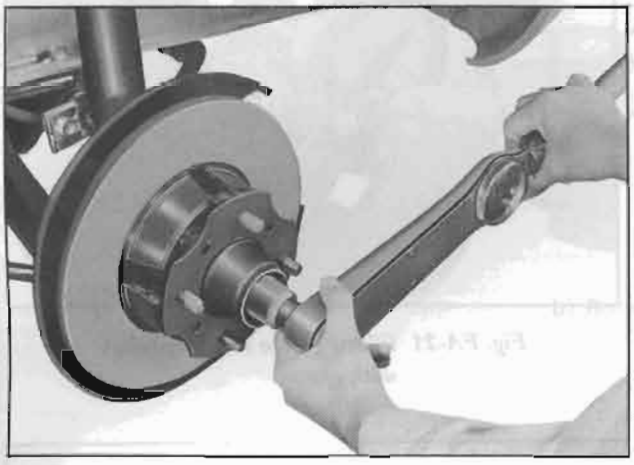


*Fig. FA-23 Tightening wheel bearing lock nut*

2. Turn the wheel hub in a few turns toward both clockwise and counterclockwise to settle down the bearing, and retighten the wheel bearing lock nut to the same tightening torque.

3. Return the wheel bearing lock nut 60° and coincide it with cotter pin hole on the spindle. When the wheel bearing lock nut is returned 60° and not coincided with the cotter pin hole, turn the nut toward loosening direction in maximum range of 15° and correctly coincide it with the cotter pin hole.

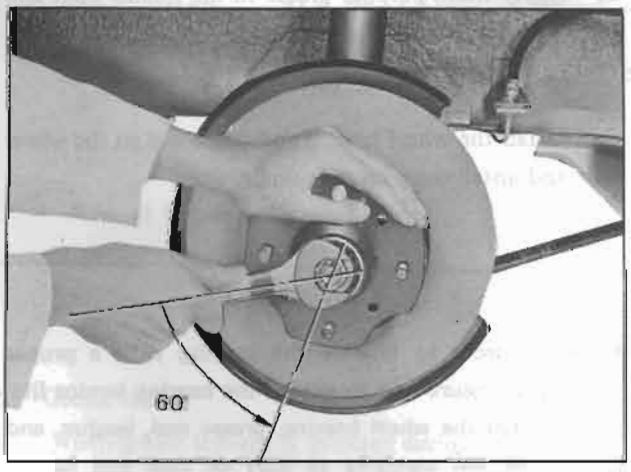



*Fig. FA-24 Returning wheel bearing lock nut 60°*

4. Turn the wheel hub in a few turns toward both clockwise and counterclockwise again to allow the bearing breaking-in, measure bearing rotation starting torque, apply a cotter pin to secure the nut (if the measured starting torque is within the rated value), and install the hub cap.

Wheel bearing rotation starting torque:
4.0 to 8.5 kg-cm (3.47 to 7.37 in-lb)

- At the hub bolt: 0.7 to 1.5 kg (1.54 to 3.30 lb)
- No slackness should exist toward the axis direction.
- Be sure to remove the brake pad.
- Correctly measure starting force toward tangential direction against the hub bolt.
- When bearing is reused (without replacing), adjust the rotation starting torque so that the wheel hub starts rotating at a starting torque as closer to 4.0 kg-cm (3.47 in-lb) as possible within the permissible rotation starting torque range 4.0 to 8.5 kg-cm (3.47 to 7.37 in-lb).

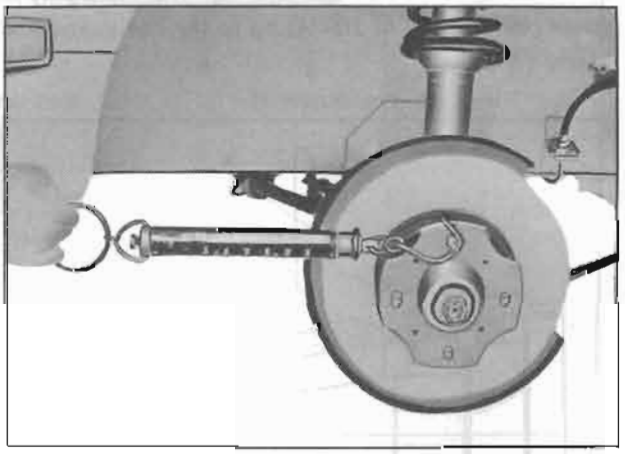


*Fig. FA-25 Measuring wheel bearing rotation starting torque*

## STRUT ASSEMBLY

The strut assembly, consisting of a strut-outer casing with spindle, forms a cylinder between the piston rod guide and bottom valve.

The inner components are precisely assembled, and no dirt and foreign matter intrusions are permitted. The components such as piston rod, piston rod guide, cylinder, and bottom valve are handled together as an assembly. When replacing them, be sure to replace the inner components as an assembly.

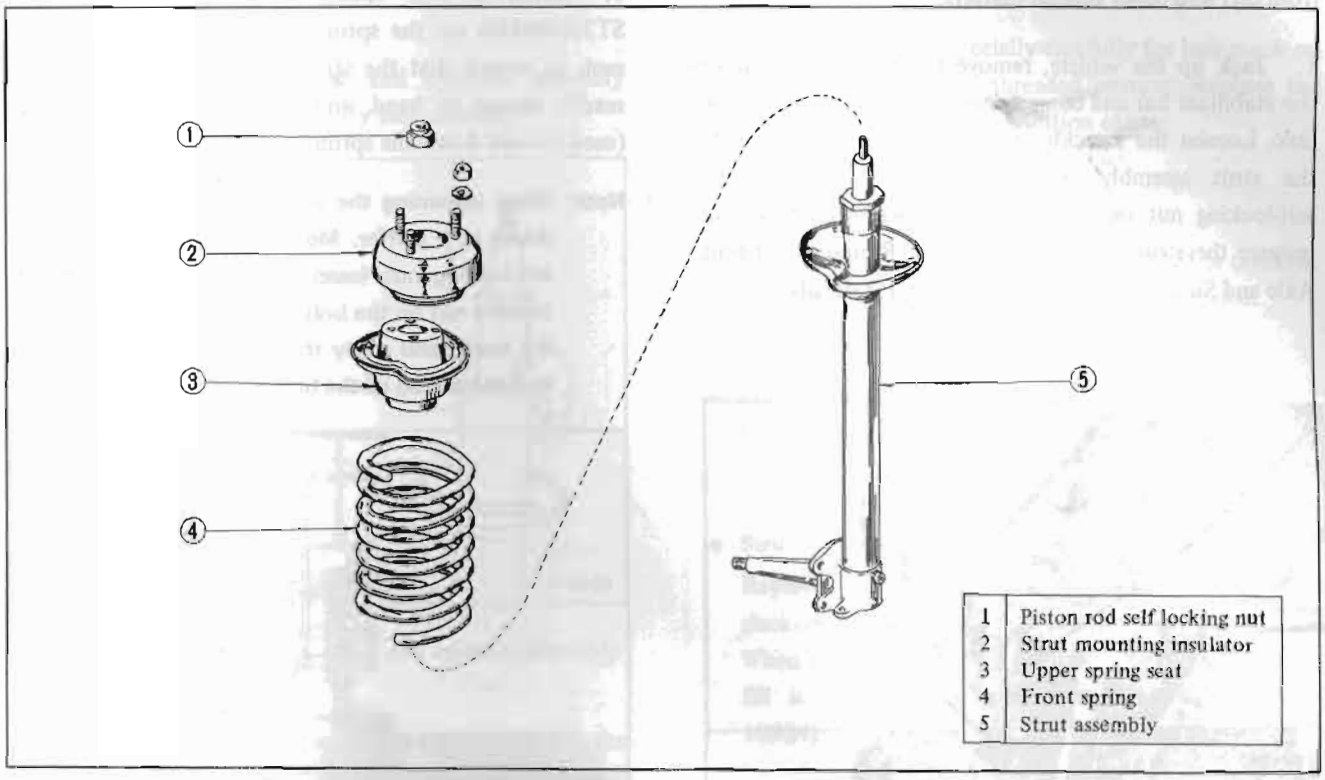



*Fig. FA-26 Exploded view of strut assembly*

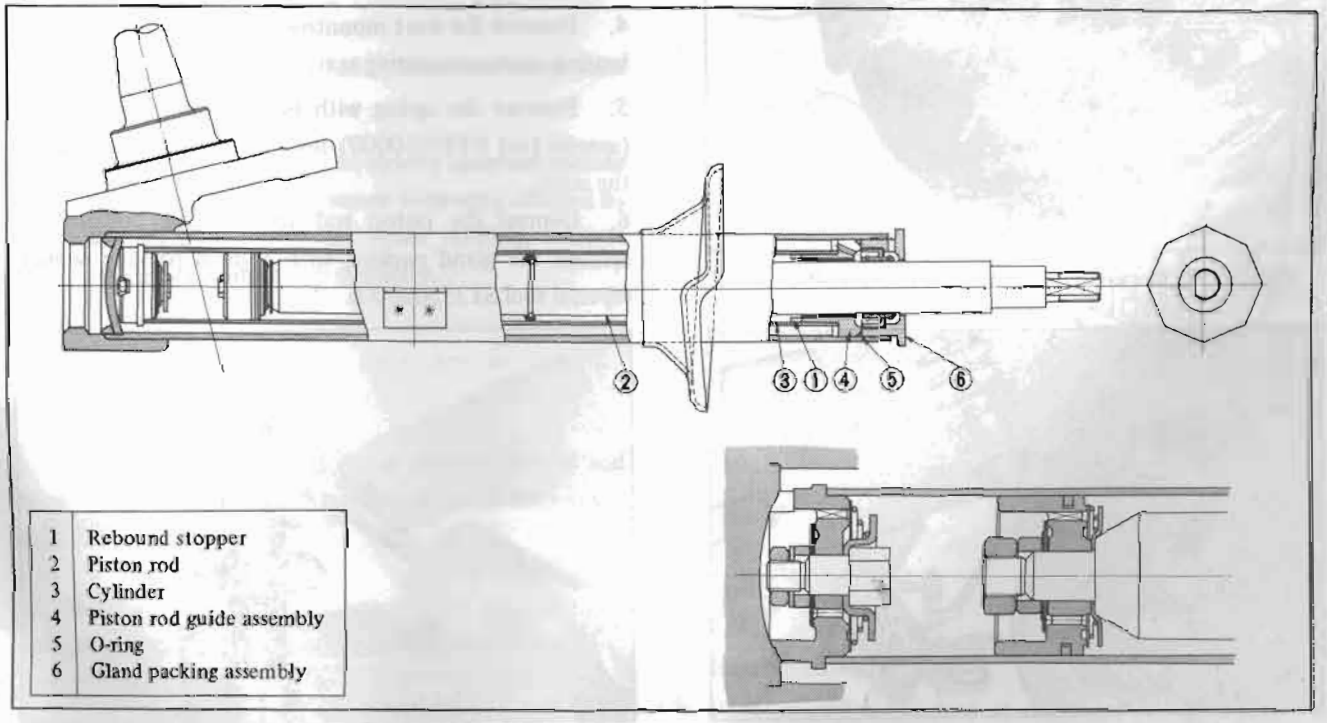



*Fig. FA-27 Sectional view of strut assembly*

## Disassembly

Disassemble and reassemble the strut assembly in a clean place so that the inner components are protected from dirt and other foreign matters.

1. Jack up the vehicle, remove the wheel, and remove the stabilizer bar and compression rod from the transverse link. Loosen the knuckle arm fixing bolts, and separate the strut assembly from the ball-joint. Loosen the self-locking nut on the upper portion of the strut, and remove the strut assembly. (See the "Removal of Front Axle and Suspension Assembly" above, for details.)

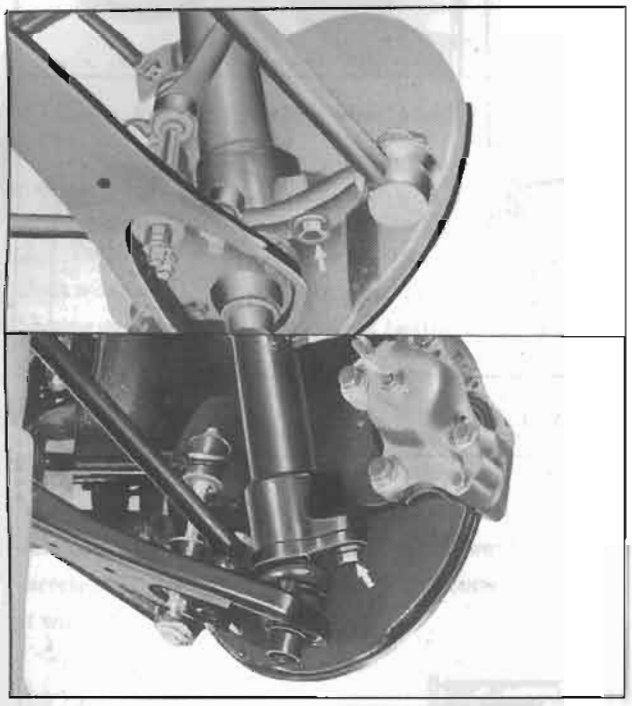


*Fig. FA-28 Removing knuckle arm fixing bolt*

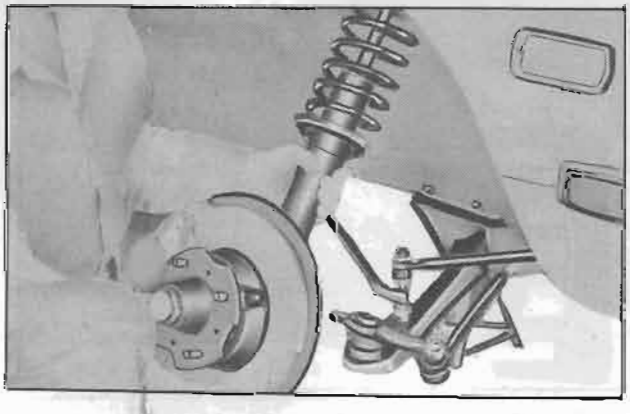


*Fig. FA-29 Removing front strut assembly*

2. Install a strut attachment (special tool ST35650000) on the strut outer casing, and secure the strut assembly in a vise.

3. Install a coil spring compressor (special tool ST35650000) on the spring, compress the spring up to such an extent that the strut mounting insulator can be readily turned by hand, and remove the self-locking nut (used to hold down the spring).

**Note: When loosening the self-locking nut, use a screwdriver as a shifter. Moreover, when loosening the self-locking nut (used to hold down the spring), install a nut on the bolt (used to install the strut on the body) and apply the screwdriver to the nut so that the thread of the bolt is not damaged.**




*Fig. FA-30 Removing self-locking nut*

4. Remove the strut mounting insulator, strut mounting bearing, and upper spring seat.

5. Remove the spring with the coil spring compressor (special tool ST35650000) installed on the spring, from the strut.

6. Depress the piston rod down to the bottom and remove the gland packing with a gland packing wrench (special tool ST35500000).

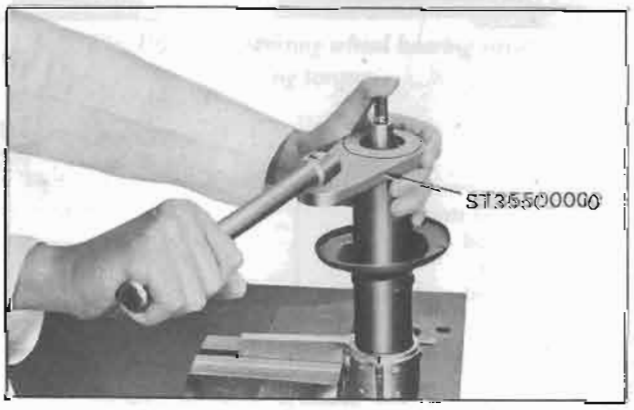



*Fig. FA-31 Removing gland packing*

**Note: Remove mud and other foreign matters from the gland packing.**

7. Remove the O-ring from the upper portion of the piston rod guide.

8. Separate the piston rod and cylinder assembly upward from the strut tube slowly and carefully.

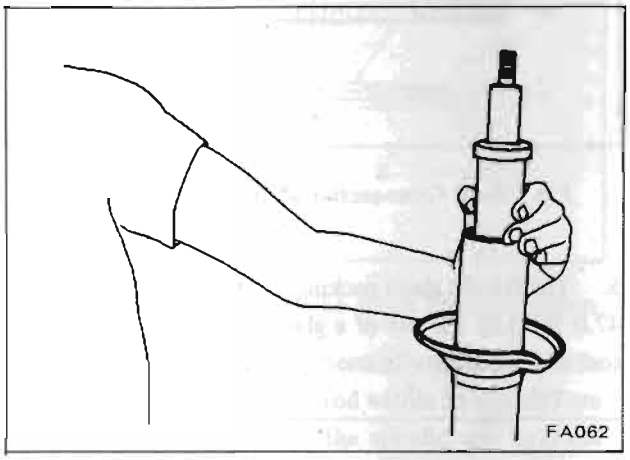



*Fig. FA-32 Removing piston rod and cylinder assembly*

**Note: Do not remove the piston rod and guide from the cylinder. They are precisely assembled and thus, should be handled as an assembly.**

9. Drain damping oil from the cylinder and strut outer casing into a clean container.

**Note: This procedure should be strictly observed because shock absorber performance is directly affected by amount of damping oil. When refilling, measure amount of damping oil correctly.**

## Inspection

1. Be sure to replace the gland packing, O-ring and damping oil with new ones whenever the strut assembly is disassembled.

2. Wash all disassembled parts, except for nonmetal parts, with gasoline or thinner, and remove dirt and other foreign matters with compressed air.

3. Clean the nonmetal parts with compressed air.

- **Strut outer casing**

  Replace, if deformed, cracked or damaged.

- **Spindle**

  Check the spindle especially carefully for hair crack on the base and damaged threaded portion. Replace the strut assembly, if faulty condition exists.

- **Strut mounting insulator**

  Replace if rubber and metal joint is melted or cracked. Replace the rubber parts, if they are deteriorated.

- **Front spring**

  Replace, if weakened or cracked.

- **Strut mounting bearing**

  Replace, if unusual sound occurs during rotation or slackness toward the axis direction is excessive.
  When installing the strut mounting bearing, be sure to fill it with multi-purpose grease (MIL G-2108 or 10924).




*Fig. FA-33 Greasing strut mounting bearing*

## Reassembly

Be careful not to drop or scratch part since all parts are precisely finished. When reassembling, thoroughly clean

all component parts, and make sure that dirt and other foreign matters are completely removed. During reassembly, do not use cloth or gloves.

1. Secure the strut outer casing in a vise.

2. Insert the piston rod and cylinder assembly into the strut outer casing.

3. Fill the strut outer casing with correct amount of oil.

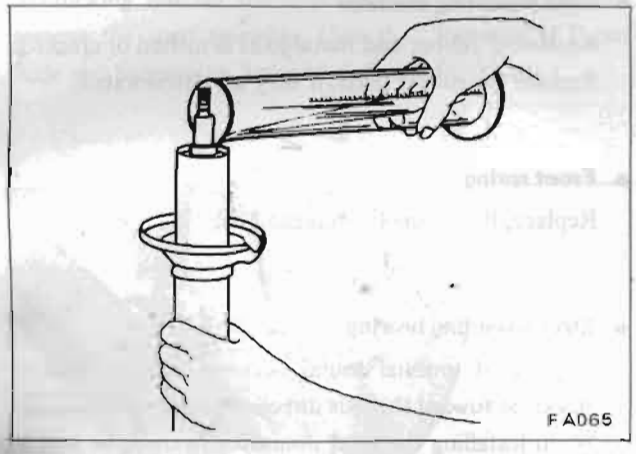



*Fig. FA-34 Pouring shock absorber oil*

**Note: a. Correctly measure amount of shock absorber oil to be poured because amount of oil directly affects damping power. [290 cc (17.7 cu in)]**

**b. Use Nissan genuine oil (Nisseki Shock Absorber Oil A-2) for the shock absorber oil.**

4. Install a rubber O-ring on top of the piston rod guide, and install the gland packing by the use of a gland packing guide (special tool ST35540000).

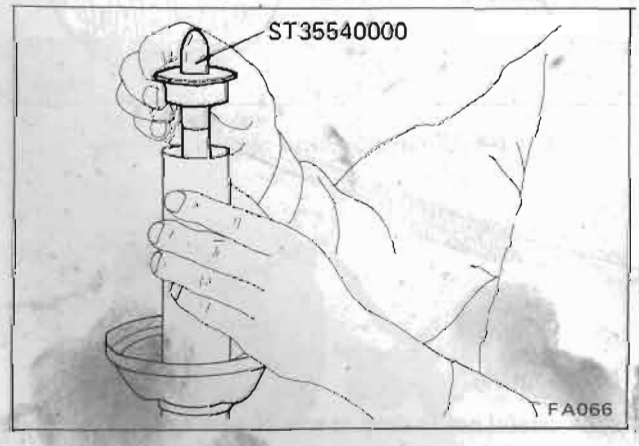



*Fig. FA-35 Installing gland packing*

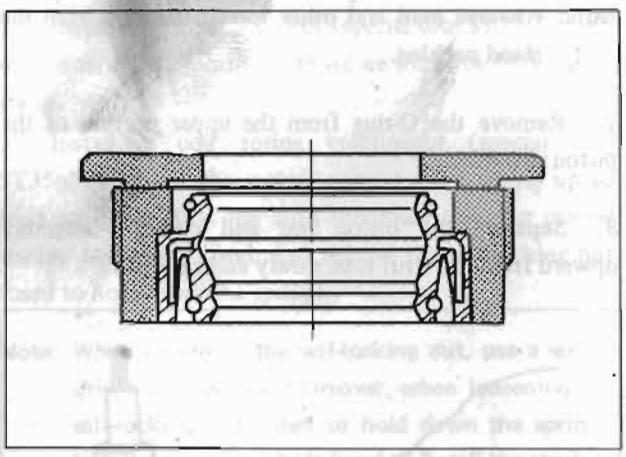


*Fig. FA-36 Cross-sectional view of gland packing*

5. Tighten the gland packing to 6.0 to 6.5 kg-m (43.4 to 47.0 ft-lb) by the use of a gland packing wrench (special tool ST35500000).

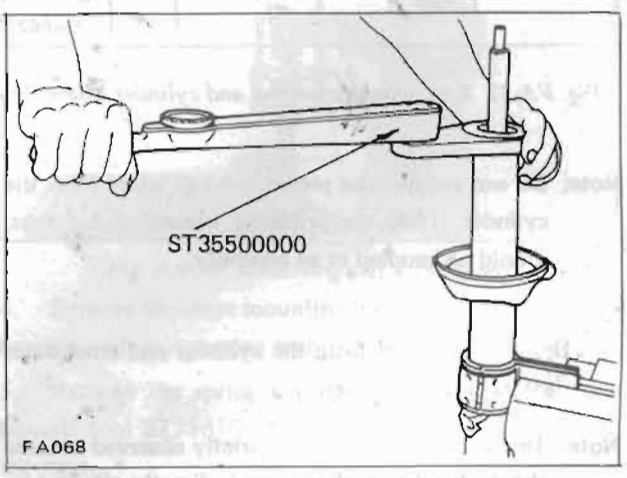



*Fig. FA-37 Tightening gland packing*

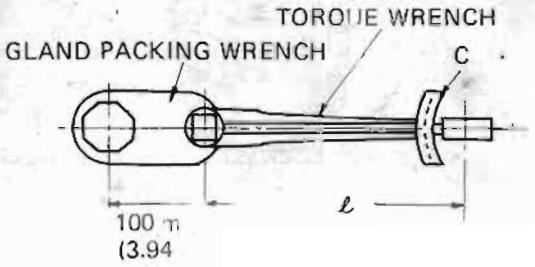
**Note: a. Before tightening the gland packing, pull the piston rod approximately 90 mm (3.543 in) upward. This will provide the shock absorber system with the best condition for bleeding.**

**b. Gland packing tightening torque is rated at 6.0 to 6.5 kg-m (43.4 to 47.0 ft-lb). However, arm length of this tool is extended by 100 mm (3.94 in) as shown in the following figure. Thus, when actually tightening the gland packing, measure effective length ($\ell$) of a torque wrench to be used, and set up torque wrench value based on the following formula.**

$$C = 6 \times \left(\frac{\ell}{\ell + 100}\right)$$

where, C ..... Value read on the torque wrench [kg-m (ft-lb)]

$\ell$ ..... Effective length of torque wrench [mm (in)]




6. Conduct air bleeding on the shock absorber system.

(1) Stand the strut assembly vertically with the spindle side down, and pull the piston rod within its stroke. Turn over the strut assembly (with the spindle side up), and depress the piston rod in the full stroke.

(2) Repeat the above described operations several times.

(3) Make sure that there is no feeling variation on pressure while depressing or pulling the piston rod. Thus, air bleeding completes.

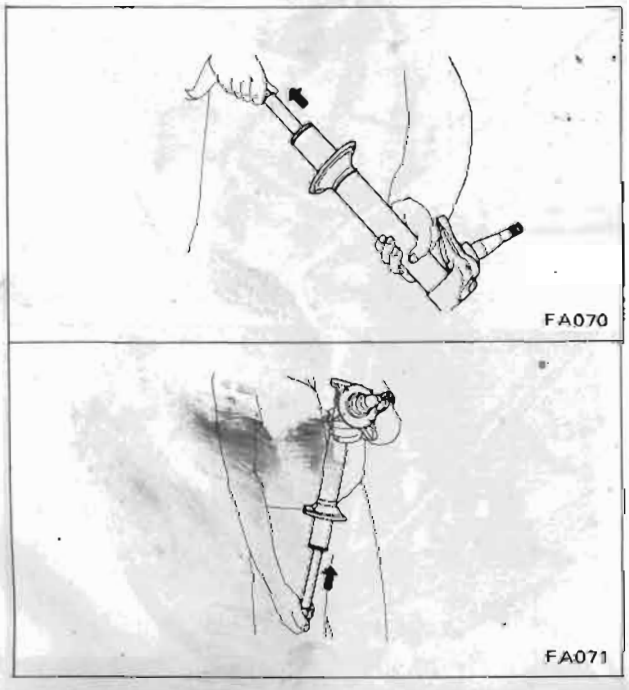



*Fig. FA-38 Conducting air bleeding on the shock absorber system*

7. Place the front spring on the lower spring seat correctly, compress the front spring with a coil spring compressor (special tool ST35650000), install the upper spring seat, strut mounting bearing, and strut mounting insulator, and tighten the self-locking nut.

Tightening torque:
7.3 to 10.0 kg-m (52.8 to 72.3 ft-lb)

**Note: a. Use new self-locking nuts whenever the strut assembly is reassembled.**

**b. Install the strut mounting bearing carefully so that it is installed correctly toward the prescribed direction, and be sure to apply multi-purpose grease (MIL G2108 or 10924) to the portion indicated by asterisk (*) in Figure FA-39.**

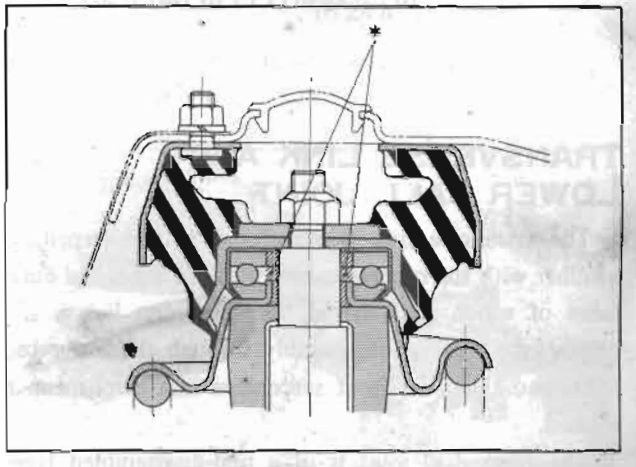



*Fig. FA-39 Strut mounting bearing greasing point*

8. Release the coil spring gradually from the coil spring compressor, and set the spring to the upper and lower spring seats correctly.

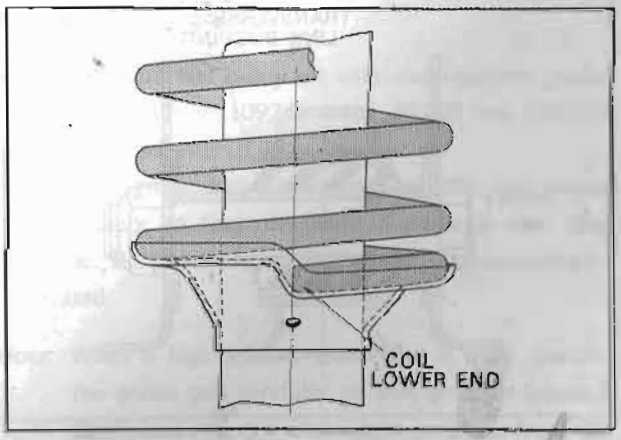



*Fig. FA-40 Installing front spring*

Tightening torque:

Nuts used to install the strut assembly on the body:
2.5 to 3.5 kg-m (18.1 to 25.3 ft-lb)

Bolts used to install the knuckle arm to strut:
7.3 to 10.0 kg-m (52.8 to 72.3 ft-lb)

Nut used to install the compression rod on the transverse link:
5.0 to 6.2 kg-m (36.2 to 44.8 ft-lb)

Stabilizer installation bolts

Transverse link bracket side:
1.2 to 1.7 kg-m (8.7 to 12.3 ft-lb)

Frame bracket side:
1.9 to 2.5 kg-m (13.7 to 18.1 ft-lb)

## TRANSVERSE LINK AND LOWER BALL JOINT

The transverse link is connected to the suspension member with the rubber bushing both the inner and outer tubes of which are adhered, the transverse link is also connected to the strut assembly through the lower ball joint, and thus, the front suspension link mechanism is formed.

The lower ball joint is of a non-disassembled type. Lubricate the lower ball joint every 50,000 km (30,000 miles) or two years.

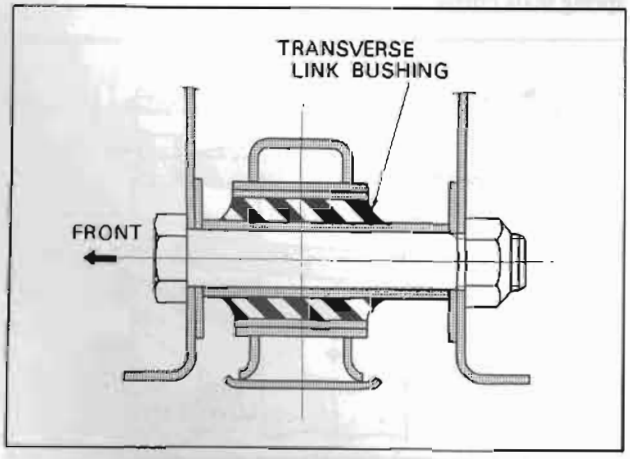
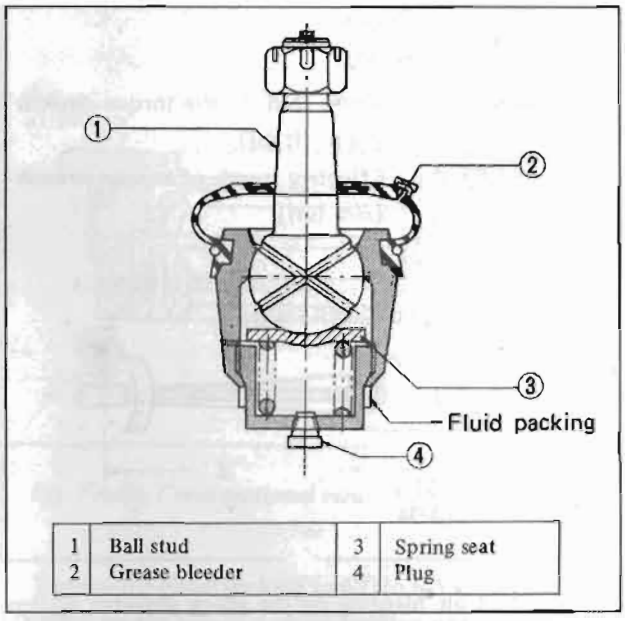



*Fig. FA-41 Cross-sectional view of transverse link bushing*




| | | | |
|---|---|---|---|
| 1 | Ball stud | 3 | Spring seat |
| 2 | Grease bleeder | 4 | Plug |

*Fig. FA-42 Cross-sectional view of ball joint*

### Removal

1. Jack up the vehicle, remove the wheel, and remove the stabilizer bar and compression rod from the transverse link. Loosen the knuckle arm fixing bolts ① and ②, and separate the ball joint from the strut assembly. (See "Removal of front axle and suspension assembly" above for details.)

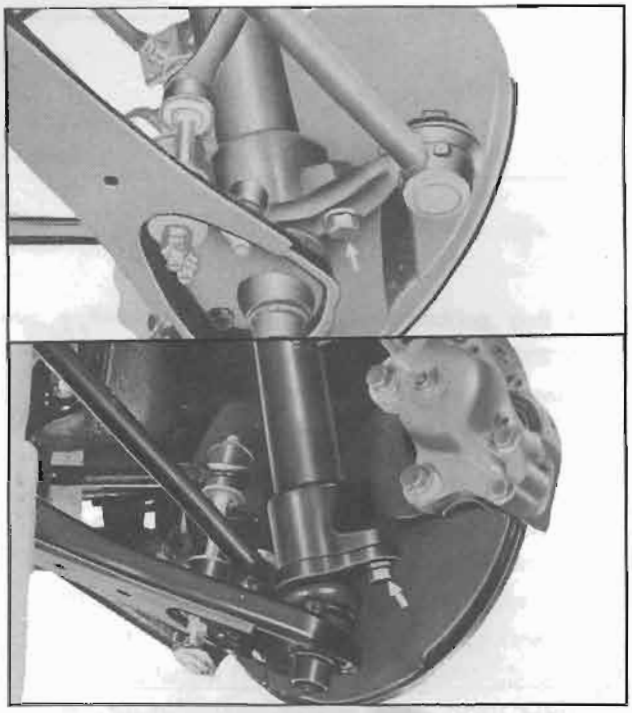


*Fig. FA-43 Loosening knuckle arm fixing bolts*

2. Loosen the transverse link mounting bolt, and separate the transverse link from the suspension member.

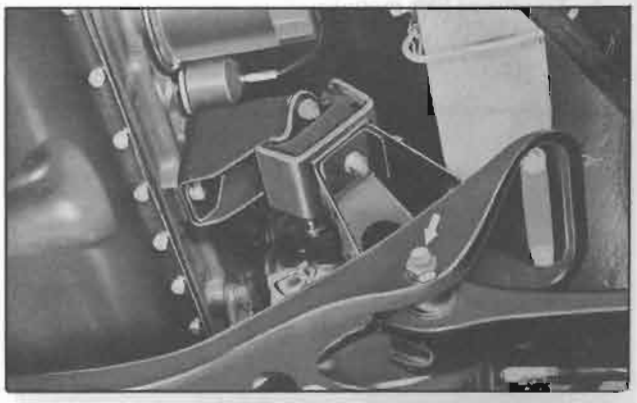


*Fig. FA-44 Loosening transverse link mounting bolt*

3. Remove cotter pin from the castle nut on the knuckle arm, loosen the castle nut, and remove the knuckle arm from the ball joint.



*Fig. FA-45 Removing knuckle arm*

4. Loosen the ball joint installation nut, and remove the ball joint from the transverse link.

5. Withdraw the transverse link bushing from the transverse link with a front transverse link bushing replacer (special tool ST36710000) and a press.

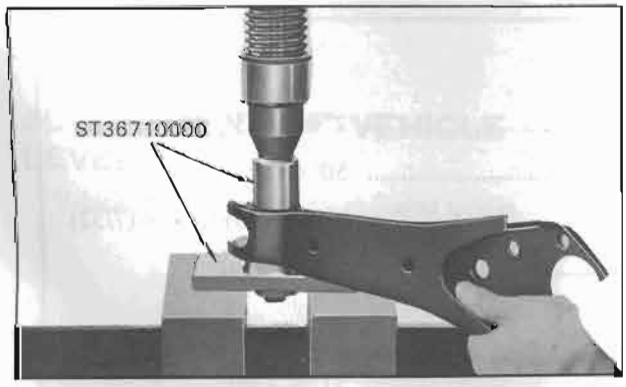



*Fig. FA-46 Removing transverse link bushing*

## Inspection

- **Transverse link bushing**

  If rubber and inner/outer tube joints (adhered) are sticky (melted) or cracked, replace the transverse link as an assembly.

- **Ball joint**

  1. The ball joint is of a non-disassembled type, and therefore, the ball joint cannot be disassembled. Measure end play toward the axial direction and shaking torque, and replace, when deviated from the standards.

  Standard end play (axial direction):
  0.03 to 0.6 mm (0.0012 to 0.0136 in)

  Shaking torque: 20 to 90 gr-cm
  (0.28 to 1.25 in-oz)

  [At the cotter pin opening position:
  3.9 to 17.3 kg (8.6 to 38.1 lb)]



*Fig. FA-47 Measuring ball joint shaking torque*

2. Replace the ball joint with a new one, when the dust cover is cracked.

3. Lubricate the ball joint with multi-purpose grease (MIL G2108 or 10924) every 50,000 km (30,000 miles) or two years.
Install a grease knipple on the plug hole, and grease completely so that old grease is replaced with new grease. Be sure to reinstall the plug when completely greased.

**Note: When a high-pressure grease gun is used, operate the grease gun carefully so that grease is injected slowly and new grease does not come out from the clamp portion.**

### Reinstallation

Reinstall the transverse link and lower ball joint in reverse sequence of removal. However, when installing the transverse link bushing, use the special tool (special tool ST36710000), and fit it to such an extent that the transverse link bushing inner tube end surface is aligned flush with the transverse link end surface. Be careful to align the bushing direction correctly (front and rear). (See Figure FA-41.)

First, tighten the transverse link mounting bolt temporarily, and finally tighten to the rated tightening torque with the vehicle loaded with the standard load (two passengers).

Tightening torque:

Ball joint bolt:
4.9 to 6.3 kg-m (35.4 to 45.6 ft-lb)

Ball joint castle nut:
5.5 to 7.5 kg-m (39.8 to 54.2 ft-lb)

Transverse link mounting bolt:
11.0 to 13.0 kg-m (79.6 to 94.0 ft-lb)



*Fig. FA-48 Tightening knuckle arm castle nut*

# ADJUSTMENT

## CONTENTS

ADJUSTMENT DATA ..... FA-18
ADJUSTMENT OF WHEEL ALIGNMENT .... FA-19
ADJUSTMENT OF VEHICLE LEVEL ..... FA-19
ADJUSTMENT OF TOE-IN ..... FA-19

1. Carry out wheel alignment on a flat surface with tire air pressure adjusted to the normal pressure.

2. Thoroughly check all component parts of the steering and suspension systems, and repair or replace defective parts before starting the wheel alignment.

3. The camber and caster angles are preset and cannot be adjusted. Adjust the toe-in and vehicle level only.

## ADJUSTMENT DATA

Wheel alignment (without load)

| | | |
|---|---|---|
| Caster | degrees | 2°55′ ± 45′ |
| Camber | minutes | 50′ ± 45′ |
| Toe-in | mm (in) | 1.59 (1/16) to 5.56 (7/32) |
| King pin inclination | degrees | 12°10′ ± 30′ |
| Steering angle | | |
| In | degrees | 33° ± 30′ |
| Out | degrees | 31.7° ± 30′ |

Tire pressure (To be measured when tire is cold)

175HR-14

| | | |
|---|---|---|
| Under 160 km/h (100 MPH) | kg/cm² (lb/sq in) | 2.0 (28) |
| Over 160 km/h (100 MPH) | kg/cm² (lb/sq in) | 2.3 (32) |

## ADJUSTMENT OF WHEEL ALIGNMENT



*Fig. FA-49 Measuring steering angle, camber and caster*

1. Use a turning radius gauge and alignment gauge for the measurement.

2. Carry out wheel alignment on a flat surface with tire air pressure adjusted to the normal pressure.

## ADJUSTMENT OF VEHICLE LEVEL

Vehicle level is adjusted by changing springs.

## ADJUSTMENT OF TOE-IN

1. Measure toe-in with a toe-in gauge.




*Fig. FA-50 Measuring toe-in*

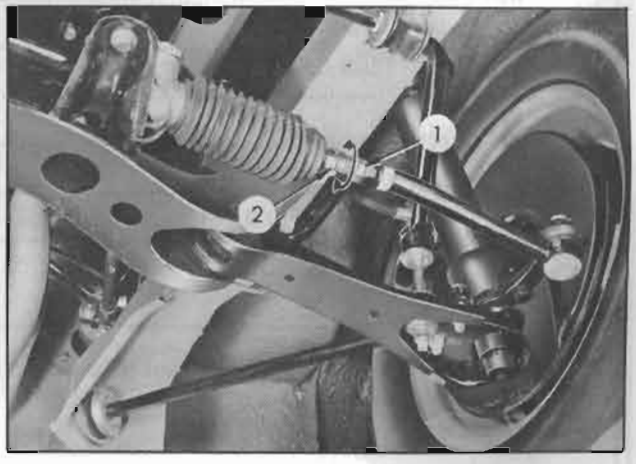



*Fig. FA-51 Adjusting toe-in*

2. Loosen the side rod lock nut (1), and adjust length of side rod (2) properly to the standard value.

**Note: a. Primarily, both side side rod ball joint center distances should be balanced.**

**Standard distance between side rod ball joint centers: 276.6 mm (10.89 in)**

**b. When the steering gear housing is removed, be**

sure to adjust the steering angle at the side rod unit with a turning radius gauge upon completion of reinstallation.

c. Adjust toe-in upon completion of the steering angle adjustment.

d. When adjusting toe-in, be sure to move the left and right side rods equally.

e. When steering angle is incorrect, reassemble the rack and pinion because incorrectly assembled rack and pinion cause improper steering angle.

f. Side rod lock nut end surface comes into contact with steering gear housing end forming a steering stopper.

# SERVICE DATA AND SPECIFICATIONS

**Wheel alignment (without load)**

| | | |
|---|---|---|
| Caster | | 2°55' ± 45' |
| Camber | | 50' ± 45' |
| Toe-in | | 1.59 to 5.56 mm (1/16 to 7/32 in) |
| King pin inclination | | 12°10' ± 30' |
| Steering angle | In | 33° ± 30' |
| | Out | 31.7° ± 30' |

| Coil spring | LH | RH |
|---|---|---|
| Wire diameter | 10.6 mm (0.417 in) | 10.6 mm (0.417 in) |
| Coil diameter | 110.6 mm (4.35 in) | 110.6 mm (4.35 in) |
| Coil turns | 10 | 10 |
| Coil effective turns | 8.5 | 8.5 |
| Free length | 373.5 mm (14.70 in) | 386 mm (15.20 in) |
| Installed height/load | 201 mm/255 kg (8 in/562 lb) | 201 mm/274 kg (8 in/604 lb) |
| Spring constant | 1.48 kg/mm (83 in/lb) | 1.48 kg/mm (83 in/lb) |

* "With standard load" means total weight of two riders or weighing 68 kg (150 lb) each.

**Strut assembly**

| | |
|---|---|
| Strut outer diameter | 50.8 mm (2.0 in) |
| Piston rod diameter | 25 mm (0.984 in) |
| Piston diameter | 32 mm (1.260 in) |
| Damping force at piston speed | 0.3 m/sec (1.08 ft/sec) |
| Expansion/Compression (Except Europe) | 40 kg (88 lb)/20kg (44 lb) |
| Expansion/Compression (Europe) | 100 kg (220 lb)/50 kg (110 lb) |
| Piston rod | |
| Bend limit | 0.1 mm (0.0039 in) |

| | |
|---|---|
| Wear limit | 0.05 mm (0.0020 in) |
| Piston cylinder | |
| Bend limit | 0.2 mm (0.0079 in) |
| Wear limit | 0.1 mm (0.0039 in) |
| Stabilizer bar diameter | 16 mm (0.630 in) |
| Front wheel bearing rotation starting torque | 4.0 to 8.5 kg-cm (3.47 to 7.37 in-lb) |
| Ball joint shaking torque | 20 to 90 gr-cm (0.28 to 1.25 in-oz) |
| Ball joint end play (axial direction) | 0.03 to 0.6 mm (0.0012 to 0.0136 in) |

## TIGHTENING TORQUE

| | |
|---|---|
| **Front axle** | |
| Brake disc rotor and h ssembly tightening bolt | 3.9 to 5.3 kg-m (28.2 to 38.3 ft-lb) |
| Brake tube caliper installation nut | 1.5 to 1.8 kg-m (10.9 to 13.0 ft-lb) |
| Wheel bearing lock nut | 3.0 to 3.5 kg-m (21.7 to 25.3 ft-lb) |
| Disc brake caliper fixing bolt | 7.3 to 9.9 kg-m (52.8 to 71.6 ft-lb) |
| Baffle plate installation screw | 0.32 to 0.44 kg-m (2.3 to 3.2 ft-lb) |
| **Strut assembly** | |
| Gland packing tightening torque | 6.0 to 6.5 kg-m (43.4 to 47.0 ft-lb) |
| Piston rod self-locking nut | 7.3 to 10.0 kg-m (52.8 to 72.3 ft-lb) |
| Nut used to install the strut assembly on the body | 2.5 to 3.5 kg-m (18.1 to 25.3 ft-lb) |
| **Transverse link and ball joint** | |
| Bolts used to install the knuckle arm to strut | 7.3 to 10.0 kg-m (52.8 to 72.3 ft-lb) |
| Ball joint castle nut | 5.5 to 7.5 kg-m (39.8 to 54.2 ft-lb) |
| Bolts used to install the transverse link to ball joint | 4.9 to 6.3 kg-m (35.4 to 45.6 ft-lb) |
| Transverse link mounting bolt | 11.0 to 13.0 kg-m (79.6 to 94.0 ft-lb) |
| **Compression rod** | |
| Transverse link side | 5.0 to 6.2 kg-m (36.2 to 44.8 ft-lb) |
| Body side | 4.5 to 5.5 kg-m (32.6 to 39.8 ft-lb) |
| **Stabilizer bar** | |
| Connecting rod and transverse link installation nut | 1.9 to 2.6 kg-m (13.7 to 18.8 ft-lb) |
| Connecting rod and stabilizer bar installation nut | 1.2 to 2.7 kg-m (8.7 to 19.5 ft-lb) |
| Stabilizer bar and body installation bolt | 1.9 to 2.5 kg-m (13.7 to 18.1 ft-lb) |

| | |
|---|---|
| **Suspension member** | |
| Body side | 4.0 to 5.0 kg-m (28.9 to 36.2 ft-lb) |
| Engine mounting bolt | 1.6 to 2.6 kg-m (11.6 to 18.8 ft-lb) |
| Steering mounting bolt | 2.2 to 3.0 kg-m (15.9 to 21.7 ft-lb) |
| Side rod socket and knuckle arm | 5.5 to 7.5 kg-m (39.8 to 54.2 ft-lb) |
| Hub nut | 8.5 to 9.0 kg-m (61.5 to 65.1 ft-lb) |

# TROUBLE DIAGNOSES AND CORRECTIONS

| Troubles | Possible causes | Corrective action |
|---|---|---|
| **Vibration, shock and shimmying of steering wheel.**<br>**Vibration:** Loose connection of the serration parts and rubber coupling parts, defective rubber coupling and wear of each part of linkage and vibration of front wheels are, in many cases, transmitted to the steering wheel. This is very noticeable when travelling over rough road.<br>**Shock:** When the front wheels are travelling over bumpy roads, the play of the steering linkage is transmitted to the steering wheel. This is especially noticeable when travelling rough road.<br>**Shimmying:** Abnormal vibrations of the front suspension group and the whole steering linkage, which occur when a specific speed is attained. | Improper air pressure of tire. | Adjust. |
| | Unbalance and deformation of road-wheel. | Correct the unbalance or replace. |
| | Unevenly worn tire or insufficient tightening. | Replace or tighten. |
| | Improperly adjusted or worn front wheel bearing. | Adjust or replace. |
| | Faulty wheel alignment. | Adjust. |
| | Worn fitting transverse link bushings. | Replace. |
| | Insufficiently tightened steering gear housing. | Retighten. |
| | Wear of steering linkage. | Replace defective parts. |
| | Worn suspension ball-joint. | Replace. |
| | Excessive backlash due to improper adjustment of the retainer parts. | Adjust correctly. |
| | Defective rubber coupling, or loose connection of rubber coupling (serration parts) and loose bolts. | Check the parts for tightness, and retighten if necessary.<br>Otherwise, replace the rubber coupling. |
| | Worn column bearing, weakened column bearing spring, or loose clamp. | Check and replace. |
| | Malfunction of shock absorber (inside the strut) or loose installation bolts. | Replace or retighten. |
| | Unbalance of vehicle level. | Correct the unbalance. |

| | | |
|---|---|---|
| **Vehicle pulls to right or left.**<br>When driving with hands off the steering wheel over a flat road, the vehicle gently swerves to right or left.<br>Note: A defective rear suspension may also be the cause of this trouble and, therefore, see also the chapter dealing with the rear suspension. | Improper air-pressure of tire or insufficient tightening of wheel nuts. | Adjust or tighten. |
| | Difference in height of right and left tire treads. | Replace tires. |
| | Incorrect adjustment or abrasion of front wheel bearing. | Adjust or replace. |
| | Collapsed or twisted front spring. | Replace. |
| | Incorrect wheel alignment. | Adjust. |
| | Incorrect brake adjustment (binding). | Adjust. |
| | Worn rubber bushings for transverse link and compression rod. | Replace. |
| | Deformed steering linkage and suspension link | Replace. |
| | Unbalanced vehicle level | Correct the unbalance. |
| **Instability of vehicle** | Improper air pressure of tire. | Adjust. |
| | Worn rubber bushings for transverse link and compression rod. | Adjust. |
| | Incorrect wheel alignment | Adjust. |
| | Worn or deformed steering linkage and suspension link | Replace. |
| | Incorrect adjustment of steering gear | Adjust. |
| | Deformed unbalanced wheel | Correct or replace. |
| **Stiff steering wheel**<br>(checking up procedure)<br>Jack up front wheels, detach the steering gear and operate the steering wheel, and;<br>If it is light, check steering linkage, and suspension groups.<br>If it is heavy, check steering gear and steering column groups. | Improper air pressure of tire. | Adjust. |
| | Insufficient lubricants or mixing impurities in steering linkage or excessively worn steering linkage. | Replenish grease or replace the part. |
| | Stiff or damaged suspension ball-joint, or lack of grease | Replace. |
| | Worn or incorrectly adjusted wheel bearing. | Replace or adjust. |
| | Worn damaged steering gear and bearing | Replace. |
| | Incorrectly adjusted steering gear. | Adjust. |
| | Deformed steering linkage | Replace. |

| | | |
|---|---|---|
| | Incorrect wheel alignment | Adjust. |
| | Damaged strut upper end bearing | Replace. |
| | Damaged or stiff piston or shock absorber rod (in the strut) | Replace. |
| | Interference of steering column with turn signal switch | Adjust. |
| **Excessive steering wheel play** | Incorrectly adjusted steering gear housing | Adjust. |
| | Worn steering linkage | Replace. |
| | Improperly fitted gear box | Retighten. |
| | Incorrectly adjusted wheel bearing | Adjust. |
| | Worn transverse link and compression fitting bushings | Replace. |
| **Noises** | Improper air pressure of tire | Adjust. |
| | Insufficient lubricating oil and grease for suspension ball joint and steering linkage, or their breakage. | Replenish lubricating oil and grease, or replace. |
| | Loose steering gear bolts, linkage and suspension groups. | Retighten. |
| | Defective shock absorber (inside the strut). | Replace. |
| | Defective wheel bearing | Replace. |
| | Worn steering linkage | Replace. |
| | Worn transverse link and compression rod fitting bushings | Replace. |
| | Broken collapsed coil spring | Replace. |
| | Loose strut mounting insulator tightening nuts | Retighten. |
| **Grating tire noise** | Improper air pressure of tire | Adjust. |
| | Incorrect wheel alignment | Adjust. |
| | Deformed knuckle spindle and suspension linkage | Replace. |
| **Jumping of disc wheel** | Improper air pressure of tire | Adjust. |
| | Unbalanced wheels | Adjust. |

| | | |
|---|---|---|
| | Defective shock absorber | Replace. |
| | Defective tire | Replace. |
| | Deformed wheel rim | Replace. |
| Excessively or partially worn tire | Improper air pressure of tire | Adjust. |
| | Incorrect wheel alignment | Adjust. |
| | Defective wheel bearing | Replace. |
| | Incorrect brake adjustment | Adjust. |
| | Improper tire shifting (rotation) | Adjust. |
| | Rough and improper driving manner. | Drive more gently. |

## SERVICE JOURNAL OR BULLETIN REFERENCE

| DATE | JOURNAL or BULLETIN No. | PAGE No. | SUBJECT |
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