

## SUSPENSION

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## DESCRIPTION

The front suspension units are comprized of the upper arms, and lower arms, and these are pivoted onto the No.1 cross-member.

The coil spring are provided between the lower arm, and the top of the spring housing of the No.1 cross-member.

The double acting shock absorber is bolted to the lower arm and also to the top of the spring housing.

The upper, and power ends of the steering knuckle are attached to the upper, and lower ball joints which are mounted onto the upper, and lower arms respectively.

The rear suspension units are comprised of the upper, and lower control arms to which these are pivoted on the rear frame with rubber bushings. Also control arm No.2, and the stabilizer bar are attached onto the lower control arm. The ball joint provided on the outer end of the upper control arm, and is connected to the knuckle.

The shock absorber is of the double acting type which is mounted together with the coil spring between the upper control arm, and the coil spring housing of the rear frame.

## TROUBLE SHOOTING

Symptoms & Probable CausesRemedies

## 1. Hard steering.

Jack up the front end of the car, and check by turning the steering wheel with the two front wheels off the ground.

If the steering is easy, check the tire inflation, and suspension.

If the steering is hard, check the steering system.

For hard steering, disconnect the steering universal joint from the steering pinion, then operate the steering wheel.

If the steering becomes easy, check the steering linkage.

If the steering is still hard, check the steering post mechanism.

a. Low tire pressure

Inflate the tires to proper pressure

b. Incorrect front wheel alignment

Adjust front end alignment

c. Lack of lubricant

Lubricate

d. Frozen or rusted ball joint

Replace

e. Tight linkage connections

Replace

f. Steering rack housing improperly adjusted or damaged

Repair or replace

## 2. Steering wheel shimmy.

This is caused by excessive play in the steering wheel or wobbles in the front wheels. The phenomenon becomes evident on rough road or at high speed operation.

Tests should be performed under various conditions.

a. Tires improperly inflated

Inflate the tires to proper pressure

b. Incorrect front wheel alignment

Adjust alignment

c. Front wheel bearing improperly adjust or damaged.

Adjust or replace

d. Unbalanced wheel and tire

Check and balance the wheel and tire

e. Loose hub nuts

Tighten

## 11-2 SUSPENSION - Trouble Shooting

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- |  |                   |
|--|-------------------|
| f. Distorted suspension arm or improperly installed suspension arm | Repair or replace |
| g. Improperly adjusted steering rack housing                       | Check and repair  |
| h. Worn or damaged ball joint/s                                    | Replace           |
| i. Loose or damaged linkage connections.                           | Repair or replace |
| j. Worn arm bushing  | Replace           |
3. Steering wheel pulls.  
While driving, the steering wheel may pull to one side causing difficulty to steer straight ahead. This phenomenon is due to abnormal front suspension which may have been caused by collision, skidding or excessive bouncing on rocks or uneven road surface, and may lead to serious accident.
- |  |                                  |
|--|----------------------------------|
| a. Uneven tire inflation   | Inflate tires to proper pressure |
| b. Improperly adjusted or worn wheel bearing                       | Adjust or replace                |
| c. Improper front and rear alignment                               | Adjust                           |
| d. Broken or weak spring   | Replace                          |
| e. Incorrect shock absorber  | Replace                          |
| f. Distorted suspension arm or improperly installed suspension arm | Inspect, repair or replace       |
| g. Improperly adjusted steering rack housing                       | Adjust                           |
4. Shock in steering wheel.  
When the front wheels bounce on uneven road surface, shocks are transmitted to the steering wheel.
- |                                   |                                |
|-----------------------------------|--------------------------------|
| a. Improper front end alignment   | Adjust                         |
| b. Over-inflated tires            | Reduce to proper tire pressure |
| c. Improper rack, and pinion mesh | Adjust gear mesh               |
| d. Improperly adjusted rack guide | Adjust                         |
5. Wheel tramp.
- |  |                                 |
|--|---------------------------------|
| a. Over-inflated or uneven tire pressure | Inflate to proper tire pressure |
| b. Unbalanced wheel or tire              | Repair or replace               |
| c. Defective shock absorber              | Replace                         |
| d. Weak stabilizer or bushing            | Replace                         |
6. Excessive or abnormal tire wear
- |                           |   |
|---------------------------|---|
| a. Improper tire pressure | Inflate or reduce to proper tire pressure |
|---------------------------|---|
- Over-inflation will cause tire to wear at the center of the tread.  
Under-inflation will cause tire to wear near the shoulder.
- |   |                   |
|---|-------------------|
| b. Improper front or rear wheel alignment | Adjust            |
| c. Unbalanced wheel or tire               | Check and balance |

- |                                 |         |
|---------------------------------|---------|
| d. Excessive wheel bearing play | Adjust  |
| e. Wobbling wheel               | Replace |

## 7. Tire noise.

- |   |                              |
|---|------------------------------|
| a. Improper tire inflation                      | Inflation to proper pressure |
| b. Incorrect wheel alignment                    | Adjust                       |
| c. Suspension arm or steering knuckle distorted | Repair or replace            |

## 8. Noise.

- |   |                           |
|---|---------------------------|
| a. Over-inflated tires                    | Reduce to proper pressure |
| b. Lack of lubrication                    | Lubricate                 |
| c. Defective wheel bearing                | Replace                   |
| d. Defective shock absorber               | Replace                   |
| e. Loose or worn connections or retainers | Tighten or replace        |
| f. Broken or weak coil springs            | Replace                   |
| g. Improperly installed coil springs      | Repair                    |

## WHEEL &amp; TIRE

The model MF10 is installed with radial ply tires, 165-HR-15-TL as standard equipment, and these tires are specially designed for cars with high speed range. When replacing worn or damaged tires, it is essential that tires with exactly the same characteristics are installed.

Due to the high speed performance capabilities of MF10, it is important that no attempt is made to repair damaged or punctured tires.

The wheels are made of magnesium alloy, and care should be taken not to scratch or deform. If the wheel/s is scratched, it should be painted immediately to prevent oxidation.

Tire Inflation

It is important to maintain the tire pressures at the correct figures. Incorrect pressure will affect the steering comfort, and the tire wear.

Since the inflation pressure varies in accordance to the operating conditions, check the inflation pressure when the tires are cold, and not when these are at normal running temperature.

Always ensure that the valve caps are fitted properly onto the valves.

## Recommended tire inflation pressures:

For speeds up-to 120 kph ( 80 mph)	1.9 kg/cm <sup>2</sup> ( 27 psi)
For speeds up-to 200 kph (125 mph)	2.2 kg/cm <sup>2</sup> (31.3 psi)
For speeds up-to maximum	3.2 kg/cm <sup>2</sup> (45.5 psi)

Tire Rotation

To obtain maximum protection of tire wear, the rotation of tires is essential. The tires should be rotated every 10,000 kilos or 6,000 miles.

Rotate the tires as per following illustration.

To remove the wheel, use the hub nut wrench, and the mallet furnished in the tool kit, and loosen the hub nut, but do not remove the hub nut at this stage.

The hub nuts are provided with indication marks, and the direction of rotation for removal, that is clockwise for the right hand side, and counter-clockwise for the left hand side.

Place the jack under the raising position, and raise the car until the wheel is off the ground.

Remove the hub nut, and remove the wheel.

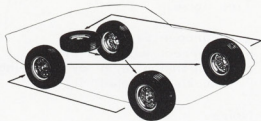


Fig.11-1 Tire Rotation Y5229

### Tire & Wheel Balance

Wheel balance is the correct distribution of weight of a wheel and tire assembly to counteract the centrifugal forces acting on the heavy area. The purpose of wheel balancing is to maintain a true running wheel perpendicular to its rotating axis. A proper balanced wheel will eliminate vibration, and abnormal wear of suspension components, and tire wear.

There are two types of wheel balancing, referred to as static balance, and dynamic balance to check and correct an unbalance condition.

Static balance should be established first.

The following weights for MF only should be used as balance weights.

1. A wheel that is statically unbalanced will rotate by itself until the heavy side will be at the bottom.

Balancing a wheel statically is accomplished by adding a compensating weight to the top of the wheel opposite to the heavy section.

2. If a wheel is dynamically unbalanced, it will wiggle or oscillate horizontally in motion.

To eliminate this dynamic unbalance, install compensating weights 180° opposite each other, one on the outside of the wheel assembly, and another one on the inside. The static balance will not be affected.

When establishing either static or dynamic balance, carefully follow the instruction of the wheel balancing equipment manufacturer.

Balance weight (only for MF model)

#### Balance weight clip

Part No. 90942-03062	1.8 grams (0.063 oz)
Part No. 90942-03063	3.6 grams (0.127 oz)

#### Balance weight

Part No. 90942-03056	8.2 grams (0.289 oz)
Part No. 90942-03057	16.4 grams (0.578 oz)
Part No. 90942-03058	26.4 grams (0.931 oz)
Part No. 90942-03059	36.4 grams (1.284 oz)
Part No. 90942-03060	46.4 grams (1.636 oz)
Part No. 90942-03061	56.4 grams (1.989 oz)

## ALIGNMENT

The car could be driven, but it would steer poorly, and at high speeds it would become dangerous to handle. The alignment of the wheels is very important.

To secure easy steering, sure handling, smooth operation, and ensure tire wear proper alignment is essential. If the alignment is improper, the tire will be worn abnormally, and if necessary, it should be checked as soon as possible.

### Precaution for checking with the alignment

1. When adjusting the front end alignment, always check the rear wheel alignment also.
2. Ensure that the tire pressure are correct, and that the car is standing on a level surface.
3. Check that the car is full with fuel, lubricant, and coolant.

### Adjustment

Many types of alignment testers are available for use, therefore, it is recommended that the tester manufacturer's instructions be followed when performing the alignment.

The specification will vary without the passenger, or with the passenger, but it is recommended that it should be in accordance with two passengers load.

#### 1. Camber.

- a. The camber adjustment is made by adding or removing the camber adjusting shim/s inserted between the upper arm shaft, and the frame. To increase the camber of the front suspension, remove the adjusting shim/s from the arm shaft mounting bolts equally, and to increase the camber of the rear suspension, add the adjusting shim or shims.

The camber adjusting shims are available in the following two thicknesses.

Part No. 48195-88110  
Thickness 2.0 mm (0.08")  
Part No. 48196-88110  
Thickness 1.0 mm (0.04")

b. The specific camber is as follows:

Front:  
With two passengers  $30' \pm 20'$   
Without passenger  $50' \pm 20'$

Rear:  
With two passengers  $-30'$   
Without passenger  $-12'$

Allowable difference of the right, and left sides is  $20'$ .

#### 2. Caster.

a. Also the caster adjustment is made by adding or removing the adjusting shim/s inserted between the upper arm shaft, and the frame. To increase the caster of the front suspension, add the camber adjusting shim to the rear side of the upper arm shaft, and also the precision adjustment of the caster can be adjusted by the adjusting shim/s insert between the ball joint, and the arms.

If adding the adjusting shim to the front side of the upper ball joint or to the rear side of the lower ball joint, the caster will increase. To increase the caster of the rear suspension, add the camber adjusting shim to the front side of the upper arm shaft, and also add the adjusting shim between the front side of the ball joint, and the upper arm.

The adjusting shims for precision adjustment are available in the following thickness.

For rear upper ball joint:  
Part No. 48737-88110  
Thickness 2.0 mm (0.08")

Part No. 48738-88110  
 Thickness 1.0 mm (0.04")  
 Part No. 48739-88110  
 Thickness 0.6 mm (0.024")

For front upper ball joint:  
 Part No. 48616-88110  
 Thickness 2.0 mm (0.08")  
 Part No. 48617-88110  
 Thickness 1.0 mm (0.04")  
 Part No. 48618-88110  
 Thickness 0.6 mm (0.024")

For lower ball joint:  
 Part No. 48644-88110  
 Thickness 2.0 mm (0.08")  
 Part No. 48645-88110  
 Thickness 1.0 mm (0.04")  
 Part No. 48646-88110  
 Thickness 0.6 mm (0.024")

b. The specific caster is as follows.

Front:

With two passengers  $2^{\circ} \pm 30'$   
 Without passenger  $2^{\circ} \pm 30'$

Rear:

With two passengers 0  
 Without passenger 0

Allowable difference of the right, and left sides is 30'.

3. Steering axis inclination.

After the camber, and caster have been correctly adjusted, check this inclination.

If this inclination does not fall within the specification, recheck the upper or lower arm, and the knuckle.

Repair or replace the necessary part/s.

Specification:

Front:

With two passengers  $7^{\circ} 30' \pm 30'$   
 Without passenger  $7^{\circ} 10' \pm 30'$

Rear:

$5^{\circ}$

4. Toe-in.

Check the toe-in with a suitable toe-in gauge.

To adjust the toe-in of the front straighten the lock washer, and loosen the rack end ball socket, and the lock nut of the tie-rod end slightly.

Turn both rack end balls an equal amount until the correct toe-in is obtained, then tighten the rack end ball socket, and the lock nut. Bent the lock washer, and secure the ball socket.

To adjust the toe-in of the rear, disconnect the lower control arm No.2 from the lower control arm. Loosen the lock nuts, and turn both control ends clockwise or counterclockwise an equal amount until the correct toe-in is obtained. Tighten the lock nuts securely.

Specification:

Front:

With two passengers  $2 \pm 1.5$  mm  
 (0.08  $\pm$  0.06")  
 Without passenger  $2.5 \pm 1.5$  mm  
 (0.10  $\pm$  0.06")

Rear:

zero

5. Side slip.

After adjustment of camber, caster, steering axis inclination, and toe-in, check the side slip with a suitable side slip tester.

If it is not within the specification, readjust the alignment.

Specification:

Front:  $0 \pm 1/1000$  m ( $0 \pm 3/3000$  ft)

Rear: same



## FRONT SUSPENSION

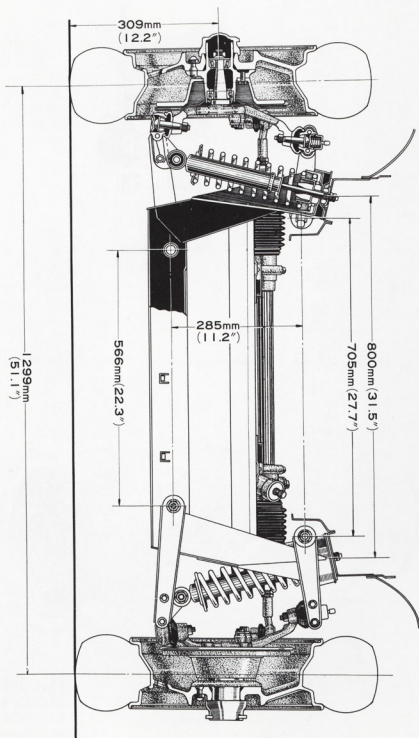


Fig.11-2 Front Suspension

Y5232

FRONT AXLE HUB

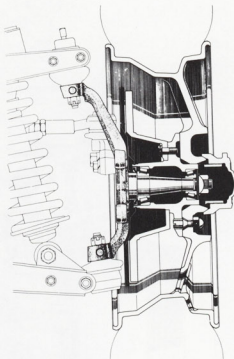
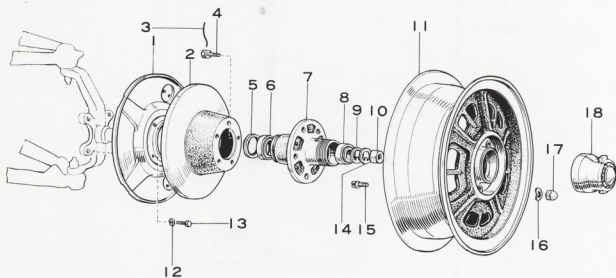


Fig.11-3 Cross Sectional View of Front Axle Hub

Y5230



- 1. Dust cover
- 2. Brake disc
- 3. Lock wire
- 4. Bolt
- 5. Oil seal
- 6. Bearing

- 7. Axle hub
- 8. Bearing
- 9. Crawl washer
- 10. Nut
- 11. Wheel disc
- 12. Lock washer

- 13. Bolt
- 14. Crawl washer
- 15. Wheel set pin
- 16. Washer
- 17. Nut
- 18. Hub nut

Fig.11-4 Front Axle Hub Components

Y5231

Removal

1. Remove the wheel.  
To remove, refer to Tire Rotation.
2. Disconnect the flexible hose from the disc brake cylinder.  
Remove the bolts mounting the disc brake caliper onto the steering knuckle, then withdraw the disc brake caliper assembly.
3. Straighten the claw washer in the axle hub, and remove the knuckle spindle nut.  
Remove the axle hub outer bearing.
4. Remove the axle hub together with the front disc from the steering knuckle.

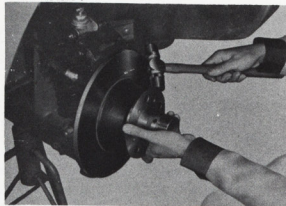


Fig.11-5 Removing Axle Hub & Brake Disc V1326

Disassembly

1. Remove the front axle hub from the front disc.

Caution:

Do not disassemble the front axle hub, and the front disc for general repair or inspection.

If the front axle hub, and front disc are disassembled, stamp mating marks on the front disc, and the front axle hub to obtain the original position for balancing upon assembly.

2. Remove the bearing cup from the axle hub.

The inner side bearing cup should be removed with the oil seal.

Inspection

Wash the disassembled parts thoroughly. Repair or replace the part/s if necessary.

1. Inspect the front disc, and hub for wear, damage or crack.
2. Inspect the bearing and cup for wear or damage.

Assembly

Follow the disassembly procedures in the reverse order.

Caution:

1. Always replace the oil seal upon assembly.
2. Assemble the front axle hub onto the front disc by matching the marks on the front axle hub and front disc.  
Tighten the retaining bolts to 3 to 4.5m·kg (22 ~ 33 ft·lb) torque, then lock the retaining bolts with lock wire.

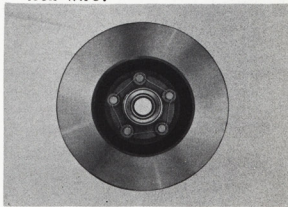


Fig.11-6 Front Axle Hub Assembly V1327

3. Apply and coat the multipurpose grease onto the bearing, and the oil seal, and pack the grease into the axle hub.

Installation

1. Install the front axle hub together with the front disc onto the steering knuckle.
2. Install the outer bearing, and the claw washer, and tighten the spindle nut to 4 ~ 5 m-kg (29 ~ 36 ft-lb) torque.

3. Adjust the axle hub bearing preload.

- a. To tighten the nut to specified torque, rotate the axle hub to be sure that the bearing is properly seated.

- b. Wind a cord onto the hub flange, then hook a pull scale to the other end of the cord.

Pull the scale slowly, then read the scale applying a steady pull on it.

The reading of the scale should be 300 ~ 600 grams (10.58 ~ 21.16 oz).

- c. Check the axle hub bearing axial play, and the axle hub rotation.

4. If the axle hub rotates properly, check the front disc for run-out. The limit of the run-out is 0.15 mm (0.006").

If it exceeds this limit, recheck the front disc flange contacting the axle hub surface, and replace them if necessary.

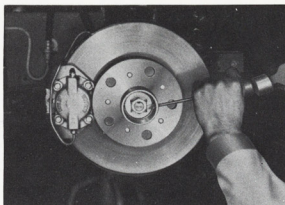


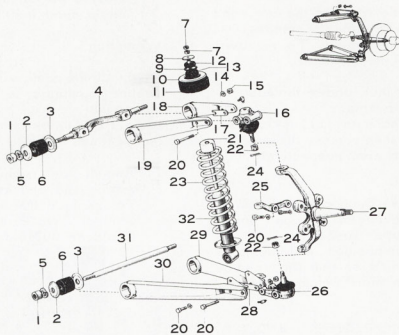
Fig.11-7 Bending Claw Washer V1328

5. Bend the claw washer with a screwdriver, and secure the nut.
6. Assemble the disc brake caliper onto the steering knuckle, and torque the mounting bolts to 9.3 ~ 12 m-kg (67 ~ 87 ft-lb) for the 12 mm bolts, and 4 ~ 5.5 m-kg (29 ~ 40 ft-lb) torque for 10 mm bolts.

For detail assembling and adjustment, refer to Installation on BRAKE.

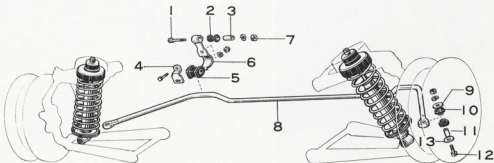
7. Connect the flexible hose onto the disc brake cylinder, and bleed the air from the hydraulic system.

SUSPENSION UPPER ARM & UPPER ARM SHAFT



- 1. Nut
- 2. Washer
- 3. Washer
- 4. Upper arm shaft
- 5. Lock washer
- 6. Bushing
- 7. Lock nut
- 8. Cushion retainer
- 9. Cushion retainer
- 10. Coil spring spacer
- 11. Coil spring insulator
- 12. Cushion
- 13. Cushion
- 14. Lock washer
- 15. Nut
- 16. Upper ball joint

- 17. Adjusting shim
- 18. Upper arm
- 19. Upper arm
- 20. Bolt
- 21. Cushion retainer
- 22. Nut
- 23. Coil spring
- 24. Cotter pin
- 25. Steering knuckle arm
- 26. Lower ball joint
- 27. Steering knuckle
- 28. Adjusting shim
- 29. Lower arm
- 30. Lower arm
- 31. Lower arm shaft
- 32. Shock absorber



- 1. Bolt
- 2. Stabilizer cushion
- 3. Collar
- 4. Link cover
- 5. Stabilizer link
- 6. Stabilizer bush
- 7. Nut

- 8. Stabilizer bar
- 9. Cushion retainer
- 10. Cushion
- 11. Collar
- 12. Bolt
- 13. Cushion retainer

Fig.11-8 Front Suspension Components

Y5233, G0361

Removal

1. Jack up the front of the car, and support with suitable stands. Remove the wheel. To remove, refer to Tire Rotation.
2. Place the jack under the suspension lower arm. Remove the nuts (1), (4), (5), and (6), then remove the suspension upper arm respectively.

Caution:

Do not lose the upper arm shim/s installed between the ball joint, and the upper arm.

Record the position, and thickness of the shim/s so that they can be installed in their original location.

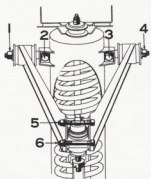


Fig.11-9 Suspension Upper Y5234 Removal

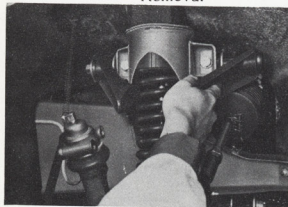


Fig.11-10 Removing Suspension Upper Arm V1329

3. Unscrew the bolts (2), and (3), then remove the upper arm shaft from the No.1 cross member. Record the camber adjusting shim

quantity, and thickness when removing the shaft to obtain the position upon installation.

Inspection

Wash all the removed parts except the rubber bushings in cleaning solvent thoroughly. Inspect the parts, and replace the defective part/s if required.

1. Inspect the rubber bushings for wear, and cracks. To replace the bushing, use the Control Arm Bushing Remover & Replacer 09716-62010.

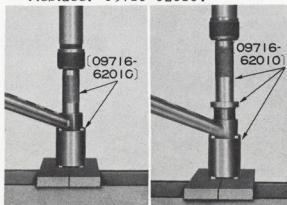


Fig.11-11 Bushing Removal V1840 & Instration V1841

2. Inspect the upper arm for bend or cracks.
3. Inspect the upper arm shaft for wear or other defects.

Installation

Follow the removal procedures in the reverse order.

The nuts retaining the upper arm to the upper arm shaft should be tightened with the load applied on the upper arm. Raise the lower arm with the jack until the car is free from the stand, then tighten the nuts.

Tightening torque (refer fig.11-9)

Bolts (2) & (3) 9 ~ 12 m-kg  
(65 ~ 87 ft-lb)

- Nuts (1) & (4) 5 ~ 7 m-kg  
(36 ~ 51 ft-lb)
- Nuts (5) & (6) 2 ~ 3 m-kg  
(14 ~ 22 ft-lb)

## UPPER BALL JOINT

### Removal

1. Jack the front end of the car, and support with suitable stands, and remove the wheel.
2. Place a jack under the suspension lower arm.
3. With the cotter pin removed, loosen and remove the retaining nut from the upper ball joint stud. Next, disconnect the upper ball joint with the Ball Joint Puller 09628-62010 from the steering knuckle.



Fig.11-12 Removing Ball Joint V1842

4. Remove the upper ball joint from the suspension upper arms.

### Caution:

Upper arm shim/s is installed between the upper ball joint, and the suspension upper arms.

Do not lose the shim/s, and note the position and thickness so that it can be installed in the original location.

### Inspection

Wash the ball joint, and inspect for damage. If defective, replace the ball joint.

1. Inspect the ball joint for wear, or cracks.
2. Inspect the seal cover for damage or break.

### Installation

Follow the removal procedures in the reverse order.

The tightening torque of ball joint to steering knuckle is 4 ~ 5.5 m-kg (29 ~ 40 ft-lb).

## STEERING KNUCKLE

### Removal

1. Jacking the front end of the car, and supporting with suitable stands, remove the wheel.
2. Disconnect the flexible hose from the disc brake cylinder.
3. Remove the bolts mounting the disc brake caliper onto the steering knuckle, then withdraw the disc brake caliper assembly.
4. Straighten the claw washer in the axle hub, and remove the knuckle spindle nut.
5. Remove the axle hub together with the front disc, and the bearing from the steering knuckle.

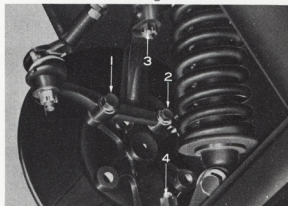


Fig.11-13 Steering Knuckle V1842 Removal

6. Unscrew the bolts (1), and (2), and remove the brake dust cover.
7. Place a jack under the suspension lower arm, then remove the ball joint nuts, (3), and (4).
8. Disconnect the upper and lower ball joints from the steering knuckle using the Ball Joint Puller 09628-62010.

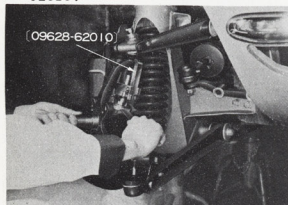


Fig.11-14 Removing Upper V1334 Ball Joint

#### Inspection

Inspect the steering knuckle spindle for cracks at the base, and threads. Replace if necessary.

The inspection can be accomplished visually or using a tester like the Magna-flux if available to find minute cracks in the steering knuckle. Always demagnetize the inspected material after using the tester.

#### Installation

Follow the removal procedures in the reverse order.

Tightening torque (refer fig.11-13)

- (1) 8 ~ 10 m-kg (58 ~ 72 ft-lb)
- (2) 5 ~ 6.5 m-kg (36 ~ 47 ft-lb)
- (3) 4 ~ 5.5 m-kg (29 ~ 40 ft-lb)
- (4) 11 ~ 13 m-kg (80 ~ 94 ft-lb)

Bleed the air from the hydraulic line.

#### LOWER BALL JOINT

1. Jack the front end of the car, and support with suitable stands. Remove both front wheels.
2. Disconnect both ends of the stabilizer bar from both suspension lower arms.
3. Remove the ball joint nut connecting to the steering knuckle, then disconnect the ball joint from the steering knuckle using the Ball Joint Puller 09628-62010.

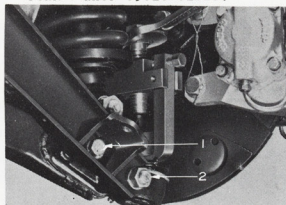


Fig.11-15 Removing Lower V1844 Ball Joint

4. Loosen and remove the retaining bolts (1), and (2), and remove the ball joint from the suspension lower arms.

#### Caution:

Do not lose the lower arm shim/s installed between the lower ball joint, and the suspension lower arms.

Record the position, and thickness of the lower arm shim/s so that it can be installed in its original location.

#### Inspection

Wash and inspect the disassembled ball joint.

Refer to inspection of upper ball joint in the same manner.



Installation

Follow the removal procedures in the reverse order.

Tightening torque (refer to fig.11-15)

- Retaining bolt (1) 3 ~ 4.5 m-kg  
(22 ~ 32 ft-lb)  
Retaining bolt (2) 8 ~11.5 m-kg  
(58 ~ 83 ft-lb)

### COIL SPRING, SHOCK ABSORBER & LOWER ARM

Removal

1. Jack the front end of the car, and support with suitable stands. Remove both front wheel.
2. Disconnect both ends of the stabilizer bar from the suspension lower arms.
3. Jack and raise the lower arm sufficiently, and remove the shock absorber upper retaining nut, and the cushions.
4. Remove the bolts attaching the lower ball joint to the suspension lower arms.
5. Lower the jack slowly, and remove the bolt attaching the lower end of the shock absorber to the suspension lower arms. Next, remove the coil spring, shock absorber, cushion retainer, spring insulator, and the spring spacer.
6. Remove both end nuts of the lower arm shaft, and remove the suspension lower arms.
7. Tap and remove the lower arm shaft from the No.1 cross member towards the front only for replacement.

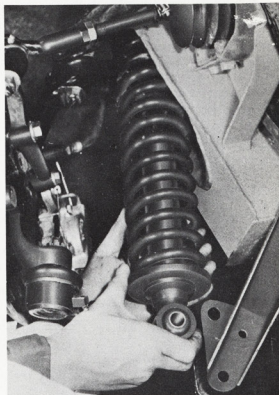


Fig.11-16 Removing Coil Spring & Shock Absorber V1336

Inspection

Wash all removed parts except the rubber parts, and shock absorber in cleaning solvent thoroughly.

1. Inspect the coil spring for cracks or weakness.

Coil spring specification:

Free length	391 mm (15.39")
Installed length	270 mm (10.63")
Installed load	365 kg (803 lb)

2. Inspect the insulator, and the cushion for cracks or damage.
3. Inspect the shock absorber for operating condition, abnormal noise, bend of stem, fluid leaks, and scores of stem.

11-16 SUSPENSION - Coil Spring, Shock Absorber & Lower Arm

4. Inspect the suspension lower arm for bend or cracks.
5. Inspect the lower arm bushings for wear or cracks.
6. Inspect the lower arm shaft for bend or wear.

Installation

Follow the removal procedures in the reverse order.

1. The both ends of the lower arm shaft nuts should be tightened with the load applied on the suspension lower arms.

After installing all the components, raise the suspension lower arm with a jack until the car is free from the stands, then tighten the lower arm shaft nuts.

2. Bolts and nuts tightening torque:  
Shock absorber lower end bolt 8 ~ 11.5 m-kg (58 ~ 83 ft-lb)  
Lower arm shaft end nuts 7.5 to 11 m-kg (54 ~ 80 ft-lb).
3. Before any check on the coil spring setting is made, the car must be placed on a perfectly level surface with the wheels straight ahead position, and tire pressure correctly inflated.

\* \* \* \* \*

## REAR SUSPENSION

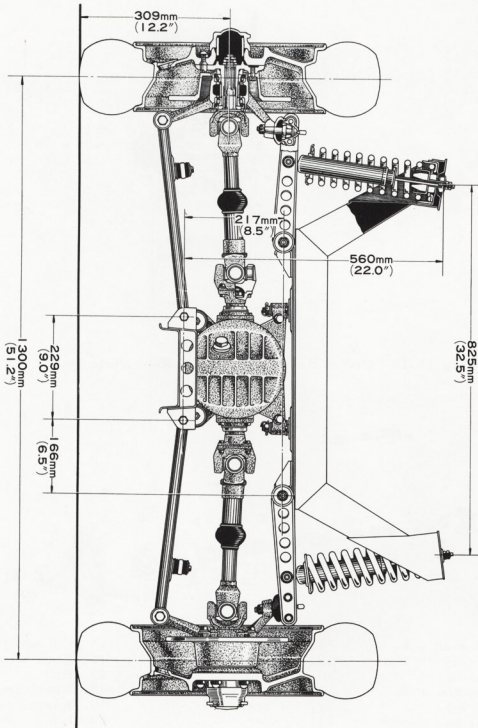


Fig.11-17 Rear Suspension

Y5238

REAR AXLE HUB

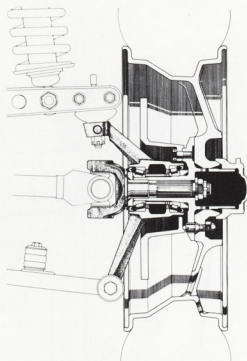
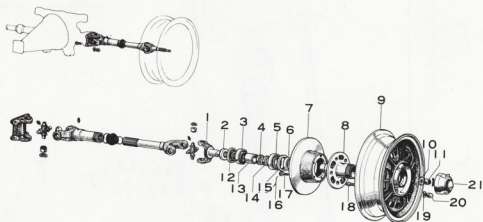


Fig.11-18 Cross Sectional View of Rear Axle Hub

Y5235



- |                    |                    |                   |
|--------------------|--------------------|-------------------|
| 1. Hub shaft yoke  | 8. Rear axle hub   | 15. Oil seal      |
| 2. Spacer          | 9. Wheel disc      | 16. Lock wire     |
| 3. Bearing         | 10. Washer         | 17. Bolt          |
| 4. Adjusting shim  | 11. Nut            | 18. Wheel set pin |
| 5. Bearing         | 12. Oil seal       | 19. Washer        |
| 6. Axle hub spacer | 13. Spacer         | 20. Nut           |
| 7. Brake disc      | 14. Adjusting shim | 21. Hub nut       |

Fig.11-19 Rear Axle Hub Components

G0363

Removal

1. Jack the rear end of the car, and support with suitable stands. Remove the wheel.
2. Remove the cotter pin, and the nut from the hub shaft yoke. Remove the universal joint flange yoke attaching bolts, then withdraw the rear axle shaft.
3. Remove the disc brake caliper assembly from the knuckle.
4. Remove the rear axle hub together with the rear disc, and the spacer.
5. Remove the brake dust cover from the knuckle.
6. Tap out the inner, and outer bearing cups together with the oil seals using a blunt punch, and a hammer.

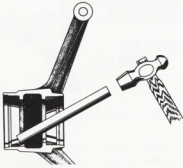


Fig.11-20 Removing Bearing Cup Y2380

7. Remove the spacer, and the shims from the knuckle.

Disassembly, Inspection & Assembly

The disassembly, inspection, and assembly should be referred to the Front Hub.

Installation

1. Insert the outer, and inner bearing cups into the rear knuckle. Do not install the oil seals at this stage.

2. Adjustment of the rear axle hub bearing preload.

a. Slide the spacer, and the outer bearing onto the rear axle hub. Reinstall the same thickness shim and spacer onto the rear axle hub those removed during disassembly. Next, assemble the rear axle hub onto the rear knuckle.

b. Install the bearing spacer, and the inner bearing onto the hub shaft yoke, and insert the shaft yoke into the rear axle hub. Install the washer, and tighten the axle hub retaining nut to 17 ~ 19 m-kg (123 ~ 137 ft-lb) torque.

Caution:

Do not apply any grease on the bearings when adjusting the bearing preload.

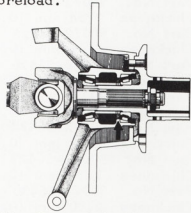


Fig.11-21 Rear Axle Hub Y5236 Assembly

c. Wind a cord onto the rear axle hub, then hook a pull-scale onto the other end of the cord. Pull the scale slowly, then read the pull-scale applying a steady pull on the scale.

Repeat the above procedure until the specified preload is obtained by selecting proper shim/s, and spacer.

## Specific preload:

New bearing 600 ~ 1,500 grams  
(1.32 ~ 3.3 lb)

Reuse bearing 300 ~ 750 grams  
(0.66 ~ 1.65 lb)

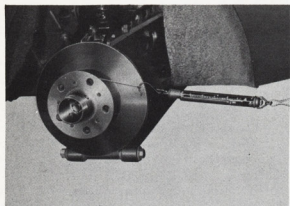


Fig.11-22 Checking Bearing V1845 Preload

The spacers, and shims are available in the following thicknesses.

**Adjusting shims:**

Part No.	90072-56423
Thickness	2.52 mm (0.0992")
Part No.	90072-56424
Thickness	2.54 mm (0.1000")
Part No.	90072-56425
Thickness	2.56 mm (0.1008")
Part No.	90072-56426
Thickness	2.58 mm (0.1017")
Part No.	90072-56427
Thickness	2.50 mm (0.0985")
Part No.	90072-56428
Thickness	2.60 mm (0.1024")
Part No.	90072-56429
Thickness	2.70 mm (0.1064")
Part No.	90072-56430
Thickness	2.80 mm (0.1102")
Part No.	90072-56431
Thickness	2.90 mm (0.1142")
Part No.	90072-56432
Thickness	3.00 mm (0.1181")

**Adjusting spacers:**

Part No.	90072-56014
Length	28.7 mm (1.1299")
Part No.	90072-56015
Length	29.3 mm (1.1535")

3. Check the rear disc run-out with a dial gauge.  
The limit of the run-out is 0.15 mm (0.006"), and if it exceeds this limit, recheck the mounting surface of the rear disc, and the rear axle hub. Replace as a set if necessary.

4. After adjusting the bearing preload, loosen the rear axle hub retaining nut, then remove the hub shaft yoke from the axle hub.  
Remove the rear axle hub, bearing, shim/s, and spacer.
5. Install the inner bearing, and the oil seal into the rear knuckle.  
Install the selected spacer and shim/s into the rear knuckle, then install the outer bearing, and the oil seal using the Rear Knuckle Oil Seal Replacer 09529-62010.

**Caution:**

Coat the bearings, and the oil seal lips with multipurpose grease when assembling.

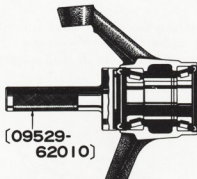


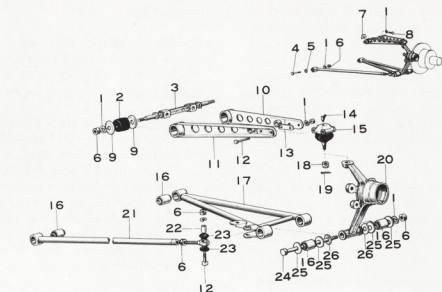
Fig.11-23 Installing Oil Seal Y5237

6. Repack the inside of the rear knuckle with multipurpose grease.  
Position the brake dust cover, then install the rear axle hub assembly into the rear knuckle.
7. Insert the rear axle shaft into the axle hub, then install the washer, and nut. Tighten the nut finger tight.

**Note:**

The cotter pin is used to lock the retaining nut, therefore, when installing the rear axle shaft into the axle hub, the holes in the axle hub and the hub shaft yoke should be aligned.

8. Install the disc brake caliper to the rear knuckle, and tighten the mounting bolts to 9.3 - 12 m-kg or



- |                            |                            |
|----------------------------|----------------------------|
| 1. Lock washer             | 14. Grease fitting         |
| 2. Bushing                 | 15. Upper ball joint       |
| 3. Upper control arm shaft | 16. Bushing                |
| 4. Bolt                    | 17. Lower control arm No.1 |
| 5. Spacer                  | 18. Nut                    |
| 6. Nut                     | 19. Cotter pin             |
| 7. Camber adjusting shim   | 20. Rear knuckle           |
| 8. Bolt                    | 21. Control arm No.2       |
| 9. Washer                  | 22. Collar                 |
| 10. Upper control arm      | 23. Bushing                |
| 11. Upper control arm      | 24. Bolt                   |
| 12. Bolt                   | 25. Washer                 |
| 13. Adjusting shim         | 26. Spacer                 |

1. Stabilizer bar
2. Bolt
3. Nut
4. Lock washer
5. Link cover
6. Collar
7. Stabilizer link
8. Bushing
9. Cushion
10. Coil spring insulator
11. Cushion retainer
12. Coil spring spacer
13. Coil spring
14. Shock absorber
15. Cushion retainer
16. Stabilizer cushion

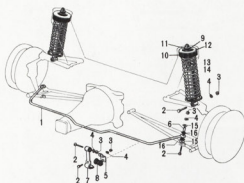


Fig.11-24 Rear Suspension Components

G0364 Y5239

67 ~ 87 lb torque.

9. Tighten the rear axle hub retaining nut to 17 ~ 19 m-kg (123 to 137 ft-lb) torque, and install the cotter pin, and lock the retaining nut.
10. Connect the rear axle shaft to the differential.

### COIL SPRING & SHOCK ABSORBER

#### Removal

1. Jack the rear end of the car, and support with suitable stand. Remove the wheel.
2. Remove the bolts connecting both

ends of the stabilizer bar to the lower control arms, then disconnect it.

- Place the jack under the lower control arm, and raise it. Remove the spring housing cover to the interior, and loosen the shock absorber upper mounting nut.
- Lower the jack slowly, and remove the bolts (1), (2), and (3) then withdraw the coil spring together with the shock absorber.

**Caution:**

Shim/s are installed between the upper ball joint, and the upper control arms, thus care should be taken not to lose the shim/s when removing.

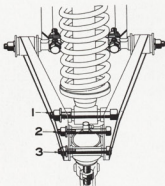


Fig.11-25 Coil Spring & Shock Absorber Removal Y5240

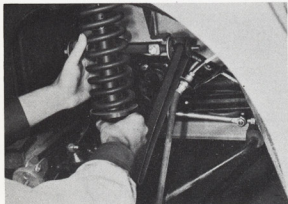


Fig.11-26 Removing Coil Spring & Shock Absorber V1341

- Remove the coil spring insulator, spacer, and the cushions.

**Inspection**

Refer to inspection on Front Coil Spring & Shock Absorber.

**Installation**

- Screw the shaft of the Rear Spring Compressor 09727-62010 onto the shock absorber rod. Next, install the coil spring, and the shock absorber together with the spring insulator, and spacer into the coil housing of the frame. Install the plate of the Rear Spring Compressor, and screw the nut completely.

**Caution:**

Check and align the center of the coil spring with the spring housing.

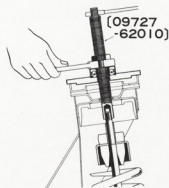


Fig.11-27 Coil Spring Y5241 Installation

- Place the upper control arm shim/s between the ball joint, and the upper control arm, then connect the ball joint, and the shock absorber with the upper control arms.

Attaching bolts tightening torque.  
 Ball joint to control arm:  
 3.0 ~ 4.5 m-kg (22 ~ 32 ft-lb)  
 Shock absorber to control arm:  
 7.5~ 11 m-kg (54 ~ 79 ft-lb)

- Jack the lower control arm, and remove the Rear Spring Compressor 09727-62010. Install the cushion, and washer, then tighten the shock absorber rod



mounting nut securely. Install the spring housing cover.

4. Connect the stabilizer to the lower control arms.

### UPPER CONTROL ARM & SHAFT

#### Removal

1. Remove the coil spring, and shock absorber.  
To remove, refer to Coil Spring & Shock Absorber removal, paragraph 1 - 4.
2. Loosen the nuts at both ends of the upper control arm shaft, then remove the upper control arms.
3. Remove the bolts mounting the upper control arm shaft to frame, then remove the shaft, and the camber adjusting shim/s.

#### Inspection

Refer to inspection on Suspension Upper Arm & Shaft.

To replace the rubber bushings, use the Control Arm Bushing Remover & Replacer 09716-62010.

#### Installation

Follow the removal procedures in the reverse order.

#### Note:

1. When tightening, the control arm shaft bushing should be applied with load.  
If the bushing is tightened without the load on the bushing, it may cause improper seating of the bushing which will result in excessive wear of the bushing.
2. To install the control arm shaft, connect the control arm rear to the control arm shaft temporary, and install the control arm shaft with the upper control arm rear to the frame.

3. The tightening torque of the upper control arm shaft mounting bolts is 9 ~ 12 m-kg (65 ~ 87 ft-lb) torque.

### REAR KNUCKLE

#### Removal

1. Remove the rear axle hub.  
To remove, refer to Rear Axle Hub removal, paragraph 1 ~ 5.
2. Disconnect both ends of the stabilizer bar from the lower control arms.
3. Remove the cotter pin, and nut from the stud ball, then disconnect the rear knuckle upper end from the ball joint using the Ball Joint Puller 09628-62010.

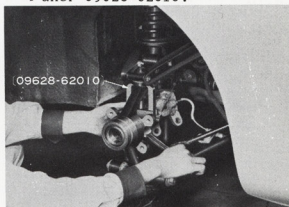


Fig.11-28 Removing Ball Joint V1342

4. Remove the bolt attaching the lower end of the rear knuckle to the lower control arm, then withdraw the rear knuckle.

#### Inspection

Refer to inspection on Steering Knuckle.

#### Installation

Follow the removal procedures in the reverse order.

Tighten the knuckle attaching bolt to 10 ~ 15 m-kg (72 ~ 108 ft-lb) torque

## 11-24 SUSPENSION - Lower Control Arm

with the load applied on the lower control arm.

### LOWER CONTROL ARM

#### Removal

1. Jack the rear end of the car, and support with suitable stands. Remove the wheel.
2. Disconnect the stabilizer bar from the lower control arms.
3. Remove the bolt attaching the rear knuckle to the lower control arm.
4. Disconnect the control arm No.2 from the lower control arm. Remove the lower control arm, and the control arm No.2 attaching bolts from the frame, and then remove them.

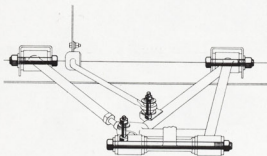


Fig.11-29 Lower Control Arm Removal Y5242

#### Inspection

Do not clean the bushing with cleaning solvent.

1. Inspect the lower control arm, and the control arm No.2 for bend, cracks or other damage.

2. Inspect the bushing pivot portions of the control arms for cracks or other damage.
3. Inspect all bushings for wear, and cracks.

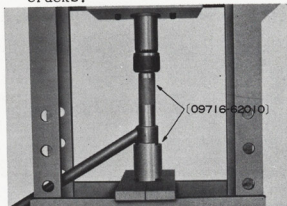


Fig.11-30 Lower Control Arm Bushing Replacer V1846

To replace the bushing, use the Control Arm Bushing Remove & Replacer 09716-62010.

#### Installation

Follow the removal procedures in the reverse order.

#### Note:

The arm bushing should be tightened to 7.5 ~ 11 m-kg (54 ~ 80 ft-lb) torque with the load applied.

If the upper or lower control arm, control arm No.2, and the rear knuckle are replaced, always the wheel alignment should be checked. For detail adjustment, refer to alignment.