

# **REAR AXLE & SUSPENSION**

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## REAR AXLE & SUSPENSION COMPONENTS



## PRIMARY INSPECTION

## Inspection of tire & wheel

- 1. Check that the wheel exhibits no breakage, cracks, dent, and so forth.
- 2. Check the tire for wear, breakage and cracks. Also, check that no foreign substance is embedded into the tire.
- 3. Inspect the air inflation pressure of the tires.
- 4. Inspect the runout of the tires. (Refer to the FS section.)

#### Inspection of wheel bearing free play

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the rear wheels.
- 3. Perform the free play measurement at a point of the hub edge with a dial gauge.
- 4. If the free play exceeds the allowable limit, replace the rear axle bearing.

Allowable Limit Axial Direction: 0.8 mm or less Vertically Against Axial Direction: 0.1 mm or less

#### Inspection of rear axle shaft runout

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the rear wheels.
- 3. Remove the brake drum. (Refer to the BR section.)
- 4. Perform the runout measurement at a point of the axle hub outer edge.
- 5. If the runout exceeds the allowable limit, change the rear axle shaft.

Runout Limit: 0.2 mm

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## SHOCK ABSORBER

## REMOVAL

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the rear wheels.
- 3. Remove the shock absorber attaching nuts. NOTE:
  - At this stage, do not take out the bolt.
- 4. Lift the rear axle carrier, using a garage jack, so that no tension may be applied to the shock absorber attaching bolt. Under this condition, remove the shock absorber attaching bolt.
- 5. Remove the plates, bushes and shock absorber from the shock absorber attaching stud bolt.



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## INSPECTION

## Shock absorber

Check that the shock absorber exhibits no oil leakage nor major scores by observing its external appearance.

Extend and contract the shock absorber by your hands. During this operation, ensure that the shock absorber moves smoothly and that there is no abnormal resistance or rattle. Ensure that the maximum and minimum lengths conform to the specified values.

> Specified Length: Min: 305 mm Max: 496 mm

If any damage or malfunction is exists, replace the part with new one.

## Upper bush and Plate

Bush

Check that the bush exhibits no breakage cracks, deformation, and so forth.

Plate

Check that the plate exhibits no deformation, warpage, and so forth.

If any damage is exists, replace the part with new one.

## INSTALLATION

1. Install the plate and bush to the shock absorber attaching stud bolt.

CAUTION:

• Assemble the plate and bush as indicated in the figure.



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- 2. Install the shock absorber to the shock absorber attaching stud bolt.
- Install the bush and plate to the shock absorber attaching stud bolt.
   CAUTION:
  - Assemble the plate and bush, as indicated in the figure in Step 1.
- 4. Temporarily tighten the shock absorber attaching nut.
- 5. Lift the rear axle carrier, using a garage jack, so that the installation section of the shock absorber may be aligned with that of the lower control arm. Under this condition, install and temporarily tighten the shock absorber attaching bolt.

CAUTION:

- Make sure that the threaded portions of the bolts face toward the vehicle outside.
- Install the rear wheels.
   Tightening Torque: 88.2 117.6 N·m

(9.0 - 12.0 kgf-m)

- 7. Jack down the vehicle.
- 8. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
- Tighten the sock absorber attaching bolt and nuts.
   Tightening Torque: 53.9 78.5 N·m (5.5 8.0 kgf-m)







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JRS00012-00010

## LATERAL CONTROL ROD

## REMOVAL

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the lateral control rod. CAUTION:
  - Never reuse the removed nuts.
- 3. Remove the dynamic dumper from the lateral control rod.



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## INSPECTION

#### Lateral control rod

Check that the lateral control rod exhibits no warpage, deformation and major scores.

If any damage is exists, replace the damaged part with new one.

Check that the bush exhibits no cracks, breakage, deformation, and so forth.

Replace any abnormal bush.

#### Dynamic dumper

Check that the rubber section exhibits no cracks, deformation, and so forth.

If any damage is exists, replace the damaged part with new one.







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#### Bush, Plate and collar

Bush

Check that the bush exhibits no cracks, deformation, and so forth.

Plate and collar

Check that the bush and collar exhibit no deformation, warpage, and so forth.

If any damage is exists, replace the damaged part with new one.



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## Replacement of lateral control rod bush

- Remove the bush, using a suitable tool in combination with a hydraulic press. NOTE:
  - Use a suitable tool, such as a tool indicated in the figure.
- 2. Apply the Samper<sup>®</sup> 107 to a new bush. Then, press-fit the bush in the lateral control rod, using a suitable tool in combination with a hydraulic press.
  - CAUTION:
  - Be very careful not to apply pressure to the inner sleeve of the bush. Make sure that the difference in dimensions at the sections A and B is within 1 mm during the press-fitting, as indicated in the figure.

## INSTALLATION

 Install the dynamic dumper to the lateral control rod. Tightening Torque: 6.9 - 15.7 N·m (0.7 - 1.6 kgf-m)

- Install the plate and bush to the lateral control rod attaching stud bolt.
   CAUTION:
  - Assemble the plate and bush, as indicated in the figure.
- 3. Install the lateral control rod to the lateral control rod attaching stud bolt. (Lower control arm attaching side)
- Install the collar, bush and washer to the lateral control rod attaching stud bolt. (Lower control arm attaching side.) CAUTION:
  - Assemble the collar, bush and plate, as indicated in the figure in Step 2.
- 5. Temporarily tighten the lateral control rod attaching nut. (Lower control arm attaching side)









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5. Temporarily install the lateral control rod to the reinforcement.

CAUTION:

- Make sure that the threaded portions of the bolts face toward the vehicle outside.
- 6. Jack down the vehicle.
- 7. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
- 8. Tighten the lateral control rod attaching nuts.

Tightening Torque: Rear axle shaft housing side: 49.0 - 88.3 N·m (5.0 - 9.0 kgf-m) Reinforcement side: 73.5 - 93.1 N·m (7.5 - 9.5 kgf-m)



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## UPPER CONTROL ARM

## REMOVAL

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the rear wheels.
- 3. Retain the rear axle shaft housing, using a garage jack, etc.
- 4. Remove the speed sensor wire from the bracket at the upper control arm. (Only for vehicles equipped with ABS)
- 5. Remove the upper control arm.

## INSPECTION

#### Upper control arm

Check that the upper control arm exhibits no warpage, deformation and major scores.

If any damage is exists, replace the damaged part with new one.

Check that the bush exhibits no cracks, breakage, deformation, and so forth.

Replace any abnormal bush.

### Replacement of upper control arm bush

For the replacement procedure for the bush, refer to the procedure for the lateral control rod bush, for the replacement procedure is the same. However, care must be exercised so that the difference in dimensions at the sections A and B of the bush may become within 1 mm. Also, make sure that the slit assumes the position indicated in the figure during the press-fitting.

## INSTALLATION

- 1. Temporarily install the upper control arm. CAUTION:
  - With regard to the bolts connecting the upper control and rear axle shaft housing, make sure that the threaded portions of the bolts face toward the vehicle outside.







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- 2. Install the rear wheels. (Refer to the RS-5.)
- 3. Jack down the vehicle.
- Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
   Tighten the upper control arm attaching bolt and nut.
- Tightening Torque: 73.5 - 107.9 N⋅m (7.5 - 11.0 kgf-m)



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## LOWER CONTROL ARM

## REMOVAL

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the rear wheels.
- 3. Remove the brake cable from the bracket at the lower control arm.
- 4. Loosen the bolts and nuts at the following sections: Lower control arm × shock absorber, lower control arm × rear axle shaft housing, and lower control arm × body.
- 5. Lift the rear axle carrier, using a garage jack, so that no tension may be applied to each bolt that has been loosened in Step 4. Then, remove the lower control arm by removing the bolts and nuts.



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## INSPECTION

#### Lower control arm

Check that the lower control arm exhibits no warpage, deformation and major scores.

If any damage is exists, replace the damaged part with new one.

Check that the bush exhibits no cracks, breakage, deformation, and so forth.

Replace any abnormal bush.

### Replacement of lower control arm bush

For the replacement procedure for the bush, refer to the procedure for the lateral control rod bush, for the replacement procedure is the same.





## INSTALLATION

1. Temporarily install the lower control arm attaching bolts and nuts.

CAUTION:

- As regards the bolts connecting the lower control arm to the shock absorber, and the lower control arm to the rear axle shaft housing, make sure that the threaded portions of the bolts face toward the vehicle outside.
- 2. Install the rear wheels. (Refer to the RS-5.)
- 3. Jack down the vehicle.
- 4. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
- 5. Tighten the lower control arm attaching bolts and nuts.

Tightening Torque: lower control arm  $\times$  shock absorber : 53.9 - 78.5 N·m (5.5 - 8.0 kgf-m) lower control arm  $\times$  rear axle shaft housing : 73.5 - 107.9 N·m (7.5 - 11.0 kgf-m) lower control arm  $\times$  body : 73.5 - 107.9 N·m (7.5 - 11.0 kgf-m)

6. Connect the brake cable to the bracket at the lower control arm.



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## **REAR AXLE SHAFT**

## **REMOVAL**

- 1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 2. Remove the rear wheels.
- 3. Drain the rear differential oil. (Refer to the DF section.)
- 4. Remove the rear brake drum. (Refer to the BR section.)

5. Remove the rear axle shaft bearing outer retainer attaching nuts, using the box wrench through the hole on the rear axle hub.

6. Remove the rear axle shaft assembly, using the following SST.

SST: 09520-00031-000

## CAUTION:

- Be very careful not to damage the oil seal of the rear • axle shaft housing when removing the rear axle shaft.
- 7. Remove the shim.

CAUTION:

• Never make damage on the shim during removal.













## DISASSEMBLY

- 1. Clamp the rear axle shaft in a vice.
- 2. Grind off the rear axle shaft bearing inner retainer, using a hand grinder or the like.

## WARNING:

- Be sure to observe the operation instructions by the hand grinder manufacturer.
- Be sure to wear goggles during the grinding operation.

## CAUTION:

- When grinding the retainer with a grinder, if the bearing should be ground inadvertently, most likely the bearing may break off during the vehicle running, (because this bearing is a critical part that sustains fully the vehicle weight.) Also a defective bearing could result in poor sealing. Therefore, be certain to replace the bearing with a new one.
- Likewise, when the bearing inner race should be ground inadvertently, also be sure to replace it with a new one.
- 3. Split the retainer with a chisel and a hammer. WARNING:
  - Before splitting the retainer with a chisel, be sure to wear protective goggles and gloves.
- 4. Pull out the rear axle shaft bearing with the rear axle shaft bearing inner retainer.
- 5. Remove the rear axle shaft outer retainer from the rear axle shaft.
- Drive out the hub bolts from the rear axle shaft, using a plastic hammer or the like.
   CAUTION:
  - Never reuse the removed hub bolts.





## INSPECTION

## Rear axle shaft

- 1. Place the rear axle shaft on a V-block.
- 2. Ensure that the runout at the flange end surface is within the allowable limit.

Maximum Allowable Limit: 0.2 mm

## NOTE:

- This maximum allowable runout does not include the runout caused by roughness on the flange surface.
- If the flange surface exhibits roughness, finish the surface with an abrasive paper or the like.
- 3. Ensure that the runout at the center unmachined section is within the allowable limit.

Maximum Allowable Limit: 1.5 mm

- 4. Ensure that the rear axle shaft spline section exhibits no damage, such as cracks and/or wear.
- 5. Ensure that the oil seal contact surface or rear axle shaft exhibits no damage, such as cracks, scores and/or rust.

If any damage is exists, replace the damaged part with new one.









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# SST SST

ASSEMBLY

1. Install the hub bolt to the rear axle shaft.

- 2. Install the rear axle shaft bearing outer retainer to the rear axle shaft.
- 3. Install the rear axle shaft bearing to the rear axle shaft, using a hydraulic press.

- 4. Installation of rear axle shaft bearing inner retainer.
  (1) Heat the retainer to 150 ± 15°C in an oil bath.
  NOTE:
  - Perform this operation promptly before the retainer temperature drops.
  - When the temperature exceeds  $150 \pm 15^{\circ}$ C, the surface of the retainer will be turned to yellow. In this case, be careful not to heat the retainer any further.

## WARNING:

- Special attention must be paid not to burn yourself.
- (2) Install a new retainer to the rear axle shaft, using a hydraulic press.



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## Replacement of rear axle shaft housing oil seal

- 1. Remove the rear axle shaft housing oil seal, using the following SST.
  - SST: 09308-00010-000



 Install a new oil seal to the rear axle shaft housing, using the following SST.
 SST: 09517-12010-000

- CAUTION:
- Make sure that the oil seal assumes the position indicated in the figure.
- 3. Apply lithium-based multi purpose grease to the lip section of the installed oil seal.



## INSTALLATION

1. Apply Three Bond<sup>®</sup> 11040 or relevant to both sides of the shim, as indicated in the figure.

CAUTION:

- Do not apply sealer to the drain hole.
- As regards the rear axle shaft bearing shim, the thickness of the shim has been determined according to the thickness of the backing plate. Therefore, be sure to select a shim having the same thickness as that of the removed shim. (For selection of the rear axle bearing shim, refer to the BR section.)
- 2. Install the rear axle shaft bearing shim to the backing plate.
- 3. Install the rear axle shaft to the rear axle shaft housing. CAUTION:
  - Be very careful not to damage the rear axle shaft hous-• ing oil seal by the spline section of the rear axle shaft.
  - Care must be exercised so that the rear differential may not be damaged when inserting the rear axle shaft. Never insert it forcibly.
- 4. Tighten the attaching nuts of the rear axle shaft. Tightening Torque : 53.9 - 68.6 N·m (5.5 - 7.0 kgf-m)
- 5. Install the brake drum to the backing plate.
- 6. Fill the differential oil. (Refer to the DF section.)
- 7. Install the rear wheels. (Refer to the RS-5.)
- 8. Jack down the vehicle.



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## **REAR AXLE SHAFT HOUSING**

## REMOVAL

- 1. Drain the brake fluid. (Refer to the BR section.)
- 2. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
- 3. Remove the rear wheels.
- 4. Drain the differential oil. (Refer to the DF section.)
- 5. Remove the brake drum. (Refer to the BR section.)
- 6. Remove the rear axle shaft. (Refer to the "REAR AXLE SHAFT" section.)
- 7. Disconnect the brake tube from the backing plate. CAUTION:
  - Since the brake fluid flows out, be very careful not to get the fluid to your hands. Also, care must be exercised so that the fluid may not get to other parts.
- 8. Remove the ABS sensor from the backing plate. (Only for vehicles equipped with ABS)
- 9. Remove the backing plate from the rear axle housing. NOTE:
  - If any difficulty is encountered in removing the backing plate, prior to the removal, lightly tap the backing plate, using a plastic hammer or the like.
  - Leave the backing plate suspended, as indicated in the figure.
- 10. Remove the rear propeller shaft. (Refer to the PR section.)

- Disconnect the brake tube from the brake hose at the rear axle shaft housing.
   CAUTION:
  - Since the brake fluid flows out, be very careful not to get the fluid to your hands. Also, care must be exercised so that the fluid may not get to other parts.
- 12. Disconnect the brake hose from the bracket by removing the E-ring.



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- 13. Remove the lateral control rod and upper control arm so that the rear axle shaft housing may be retained by the lower control arm and shock absorber. (Refer to the "LAT-ERAL CONTROL ROD, UPPER CONTROL ARM" section.)
- 14. Retain the rear axle shaft housing with a garage jack, etc. Under this condition, remove the shock absorber and lower control arm.
- 15. Remove the coil spring.
- 16. Take out the rear axle shaft housing.

- 17. Remove the rear spring bumper from the body.
- 18. Remove the upper rear spring seat from the body.

- DISASSEMBLY
- 1. Remove the under rear spring seat from the rear axle shaft housing.
- 2. Remove the brake tube from the rear axle shaft housing.

- 3. Remove the breather plug oil deflector from the rear axle shaft housing.
- 4. Remove the rear differential carrier assembly from the rear axle shaft housing. (Refer to the DF section.)











## INSPECTION

## Rear axle shaft housing

Check that the external appearance of the rear axle shaft housing exhibits no major dent and scores. Also, check that the lateral control rod attaching stud bolt exhibits no scores.

If any damage is exists, replace the damaged part with new one.

Replace the oil seal, if necessary. (For the changing procedure, refer to the RS-16.)  $\,$ 

## Coil spring

Ensure that the coil spring is free from deformation, deterioration, crack or other damage.

If any damage is exists, replace the damaged part with new one.





**Upper and under rear spring seats and rear spring bumper** Ensure that the upper and under rear spring seats and rear

spring bumper free from cracks, deterioration, aging and other damage.

If any damage is exists, replace the damaged part with new one.



## ASSEMBLY

- 1. Install the rear differential carrier assembly to the rear axle shaft housing. (Refer to the DF section.)
- 2. Install the breather plug oil deflector to the rear axle shaft housing.
- 3. Install the brake tube to the rear axle shaft housing.
- 4. Install the under rear spring seat to the rear axle shaft housing.





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## INSTALLATION

- 1. Install the rear spring bumper to the body.
- 2. Install the upper rear spring seat to the body.

- Put the coil spring on the spring seat. Then, lift the rear axle shaft housing to an appropriate height, using a garage jack or the like.
   NOTE:
  - Set the coil spring in such a way that the marking comes at the lower side, as viewed from the rear side of the vehicle.
  - Be sure to insert the coil spring into the specified position when lifting the rear axle shaft housing, using a garage jack.
- 4. Temporarily install the lateral control rod, upper control arm, lower control arm and shock absorber.
- 5. Install the rear propeller shaft. (Refer to the PR section.)

- 6. Connect the brake hose to the bracket with the E-ring.
- Connect the brake tube to the brake hose
   Tightening Torque : 12.8 17.6 N·m (1.3 1.8 kgf-m)

- 8. Installation of backing plate
  - (1) Apply silicon bond No. 1212 or relevant to the housing end, as indicated in the figure.
  - (2) Install the backing plate to the rear axle shaft.















- 9. Install the rear axle shaft. (Refer to the "REAR AXLE SHAFT" section.)
- Connect the brake tube to the backing plate.
   Tightening Toque: 12.8 17.6 N·m (1.3 1.8 kgf-m)
- 11. Connect the brake hose to the bracket of the upper control arm.
- 12. Install the ABS sensor to the backing plate.
- 13. Install the brake drum.



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- 14. Fill the differential oil. (Refer to the DF section.)
- 15. Install the rear Wheel. (Refer to the RS–5.)
- 16. Jack down the vehicle.
- 17. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
- 18. Securely tighten the attaching bolts and nuts of the lateral control rod, upper control rod, lower control rod and shock absorber. (For the tightening torque and tightening procedure, refer to the relevant sections.)
- 19. Fill the brake oil. (Refer to the MA section.)

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## **TIGHTENING TORQUE**

Components	N∙m	kgf-m	
Shock absorber × Body	53.9 - 78.5	5.5 - 8.0	
Shock absorber × Lower control arm	53.9 - 78.5	5.5 - 8.0	
Lateral control rod × Dynamic dumper	6.9 - 15.7	0.7 - 1.6	
Lateral control rod × Rear axle shaft housing	49.0 - 88.3	5.0 - 9.0	
Lateral control rod × Stay	73.5 - 93.1	7.5 - 9.5	
Upper control arm × Body	73.5 - 107.9	7.5 - 11.0	
Upper control arm × Rear axle shaft housing	73.5 - 107.9	7.5 - 11.0	
Lower control arm × Rear axle shaft housing	73.5 - 107.9	7.5 - 11.0	
Lower control arm × Body	73.5 - 107.9	7.5 - 11.0	
Rear axle shaft × Backing plate	53.9 - 68.6	5.5 - 7.0	
Brake tube × Brake hose	12.8 - 17.6	1.3 - 1.8	At the rear axle shaft housing
Brake tube × Backing plate	12.8 - 17.6	1.3 - 1.8	

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## SST

Shape	Part number	Part name	Remarks
	09520-00031-000	Puller, rear axle shaft	
and the second sec	09308-00010-000	Puller, oil seal	
	09517-12010-000	Replacer, oil seal	

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