

FRONT AND REAR AXLES

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GENERAL PROCEDURES

Wheel and tire removal/installation

- The removal and installation procedures for the wheels and tires are not mentioned in this section. When a wheel is removed, retighten the wheel nuts to the specified torque. (See TD Wheels and Tires.)

Brake line disconnection/connection

Caution

- **Brake fluid will damage painted surfaces. If brake fluid gets on a painted surface, wipe it off immediately.**
- If any brake line has been disconnected any time during the procedure, add brake fluid, bleed the brakes, and inspect leakage after the procedure has been completed.

Brake Pipe Flare Nut Installation

- Tighten the brake pipe flare nut using the **SST** (49 0259 770B). Be sure to modify the brake pipe flare nut tightening torque to allow use of a torque wrench-**SST** combination. (Refer to section GI, FUNDAMENTAL PROCEDURES, TORQUE FORMULAS.)

Suspension arm removal/installation

- Tighten any part of the suspension that uses rubber bushings only after vehicle has been lowered and unloaded.

Note

- Unloaded: Fuel tank is full. Engine coolant and engine oil are at a specified level. Spare tire, jack and tools are in designated position.

Connectors disconnection/connection

- Disconnect the negative battery cable before doing any work that requires the handling of connectors. Reconnect the negative battery cable only after the work is completed.

FRONT AXLE (4 × 2)

WHEEL HUB, STEERING KNUCKLE INSPECTION

Wheel Bearing Play Inspection

- After jacking up the vehicle and supporting it at the specified places with safety stands, inspect for noticeable bearing play by holding the top and bottom of the tire.

Wheel bearing axial play

0 mm {0 in}

Preload Adjustment

1. Verify that the tire rotates smoothly when rotated strongly, and that there is no rough feeling or is abnormal noise from the bearing.
2. Remove the brake caliper component and suspend it by a rope.
3. Remove the hub cap, pull out the cotter pin and remove the set cover.
4. Loosen the locknut to the extent that it can be turned by hand.
5. Attach a pull scale to a hub bolt and measure the frictional force.
6. Tighten the locknut until the reading reaches the specified amount.

Preload

Frictional force plus

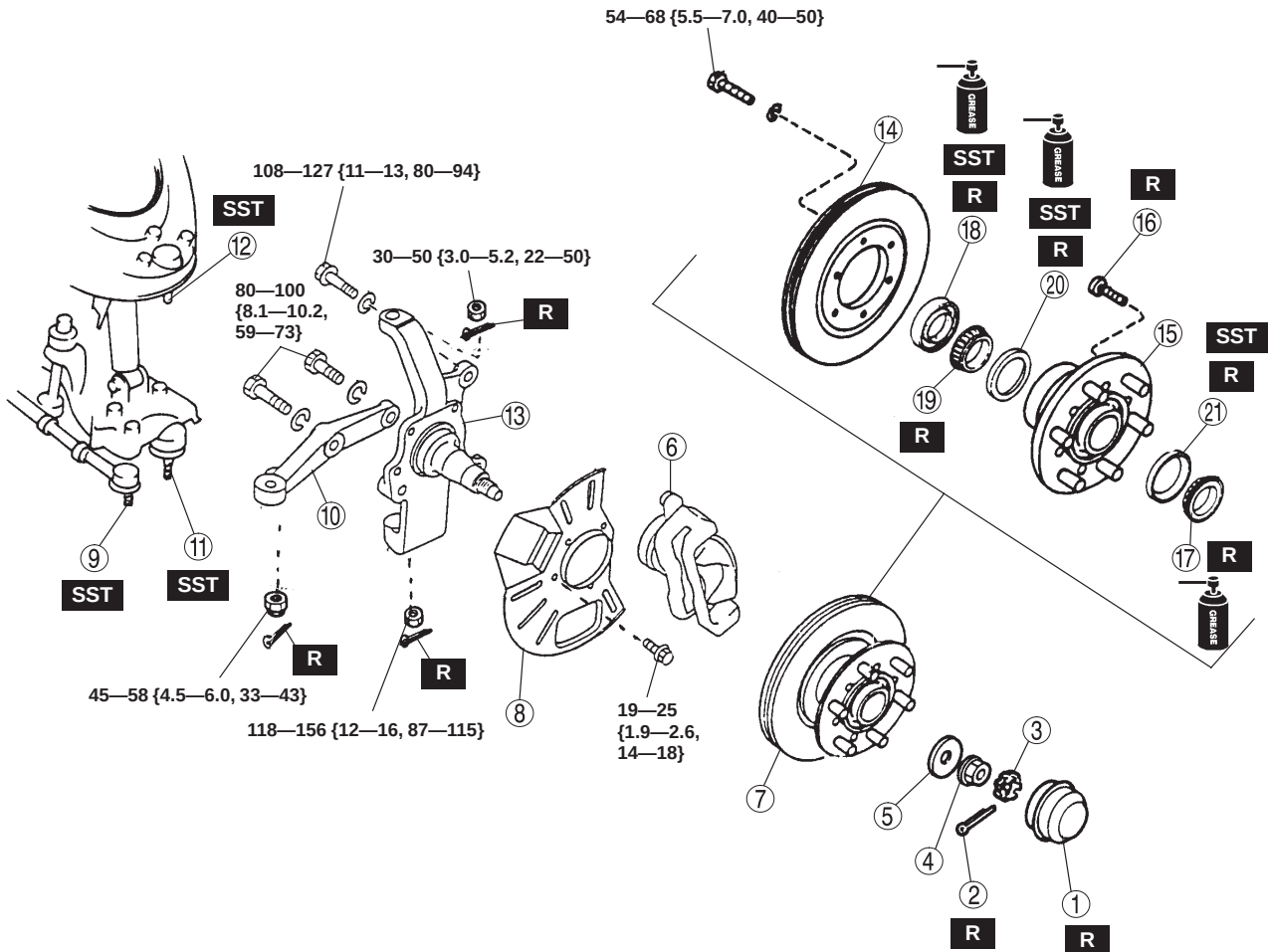
5.9—10.7 N {0.6—1.1 kgf, 1.4—2.4 lbf}

7. Install the set cover, and secure with a new cotter pin.
8. Install the hub cap and brake caliper component.

FRONT AXLE (4×2)

WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION (VEHICLES BUILT UP 07/2002)

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

1	Hub cap
2	Cotter pin
3	Set cover
4	Locknut
5	Washer
6	Brake caliper component + Removal Note
7	Hub and disc plate component + Installation Note
8	Dust cover
9	Tie-rod end ball joint + section N, MANUAL STEERING, STEERING GEAR AND LINKAGE REMOVAL/ INSTALLATION, Tie-rod End Ball Joint Removal Note
10	Knuckle arm

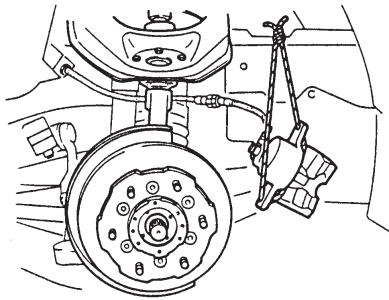
11	Lower arm ball joint + section R, FRONT SUSPENSION, TORSION BAR SPRING AND LOWER ARM (4×2) REMOVAL/INSTALLATION, Lower Arm Ball Joint/Knuckle Removal Note
12	Upper arm ball joint + section R, FRONT SUSPENSION, UPPER ARM REMOVAL/INSTALLATION, Upper Arm Ball Joint/Knuckle Removal Note
13	Steering knuckle
14	Disc plate + Removal Note
15	Wheel hub + Removal Note
16	Hub bolt + Removal Note + Installation Note

FRONT AXLE (4 × 2)

17	Outer bearing inner race
18	Oil seal + Installation Note
19	Inner bearing inner race
20	Inner bearing outer race + Removal Note + Installation Note
21	Outer bearing outer race + Removal Note + Installation Note

Brake Caliper Component Removal Note

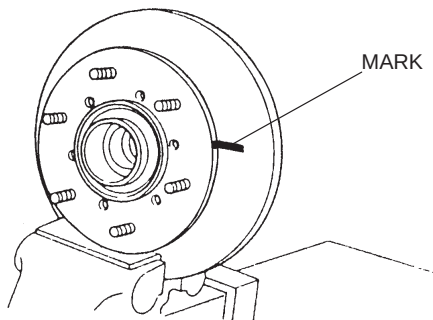
- Remove the brake caliper component, and suspend it by a rope.



Disc Plate, Wheel Hub, Hub Bolt Removal Note

Note

- The hub bolt does not need to be removed unless it is being replaced.
- After putting markings on the disc plate and the wheel hub, remove the bolt and disassemble the plate and hub.

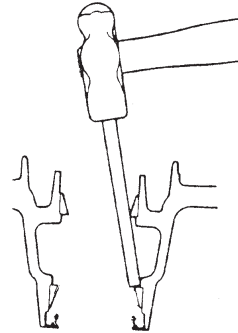


- Remove the hub bolt using a press as necessary.

Inner Bearing Outer Race, Outer Bearing Outer Race Removal Note

Note

- When the inner bearing outer race is removed, the inner race and oil seal are removed together.
- Remove the bearing outer race using a suitable round bar and a hammer. For the other side, reverse the wheel hub and remove the outer race.



Outer Bearing Outer Race, Inner Bearing Outer Race Installation Note

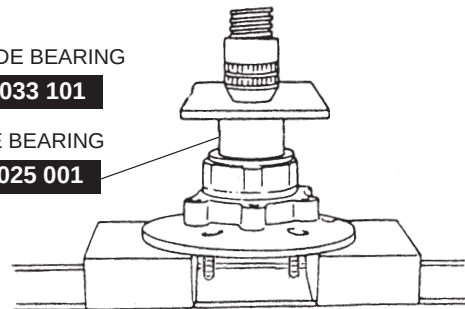
- Install the bearing outer race using the SSTs and a press. For the other side, reverse the wheel hub and install the outer race.

OUTSIDE BEARING

49 H033 101

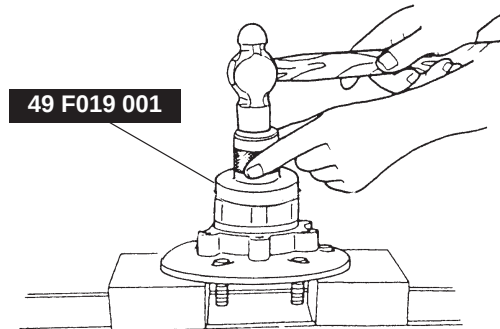
INSIDE BEARING

49 B025 001



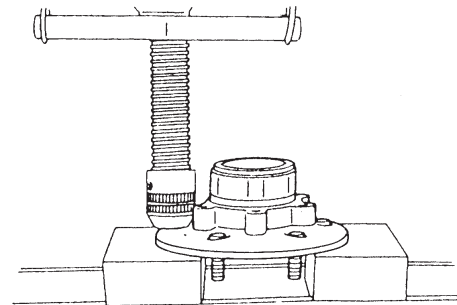
Oil Seal Installation

- After inserting the bearing in the hub, use the SST to tap in the oil seal until it is flush with the hub end surface.
- Apply grease to the oil seal lip.



Hub Bolt Installation Note

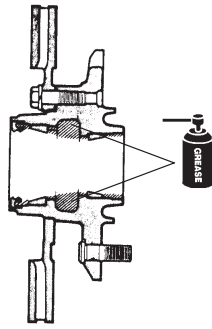
- Press new hub bolts into the wheel hub using a press.



FRONT AXLE (4 × 2)

Hub and Disc Plate Component Installation Note

1. Apply grease to the areas indicated in the figure.



2. Install the hub and disc plate component, then adjust the preload. (Refer to FRONT AXLE (4 × 2), WHEEL HUB, STEERING KNUCKLE INSPECTION, Preload Adjustment.)

FRONT AXLE (4 × 2)

WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION (VEHICLES BUILT FROM 08/2002)

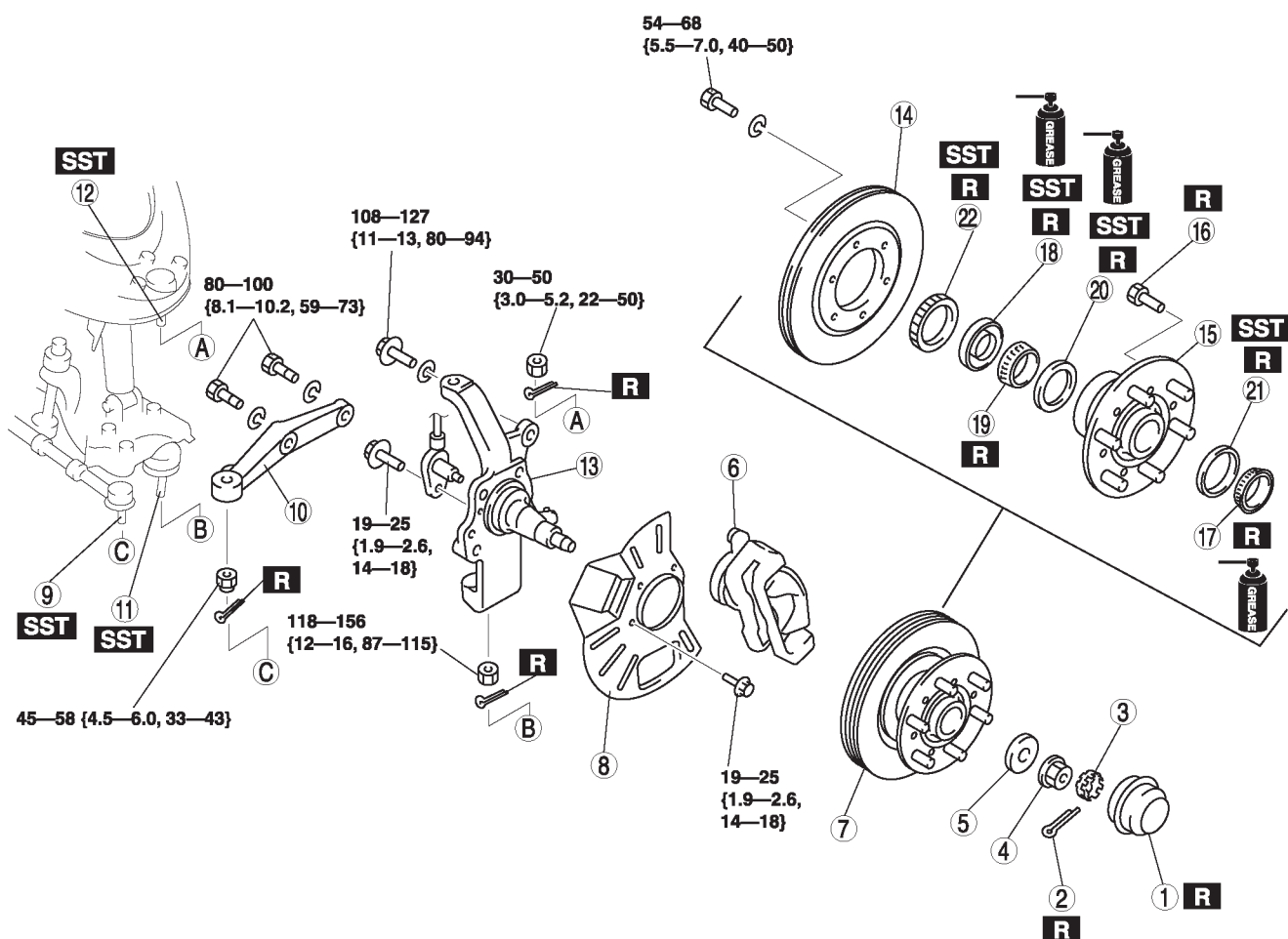
Caution

- Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while the vehicle is being serviced.

Note

- For this procedure, only the tightening torque of the ABS wheel speed sensor and ABS sensor rotor removal/installation procedures have been added from the current models. No change has been made for other procedures, **SSTs** and notes from the current models.

- Remove in the order indicated in the table.
- Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

1	Hub cap
2	Cotter pin
3	Set cover
4	Locknut
5	Washer
6	Brake caliper component
7	Hub and disc plate component
8	Dust cover
9	Tie-rod end ball joint
10	Knuckle arm

11	Lower arm ball joint
12	Upper arm ball joint
13	Steering knuckle
14	Disc plate
15	Wheel hub
16	Hub bolt
17	Outer bearing inner race
18	Oil seal
19	Inner bearing inner race
20	Inner bearing outer race

FRONT AXLE (4 × 2)

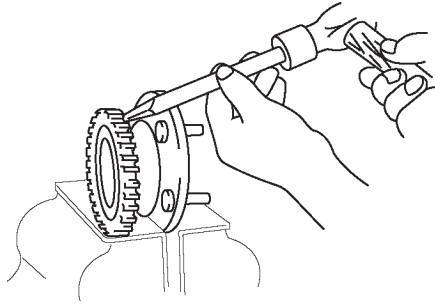
21	Outer bearing outer race
22	ABS sensor rotor + See ABS Sensor Removal Note + See ABS Sensor Installation Note

ABS Sensor Rotor Removal Note

Note

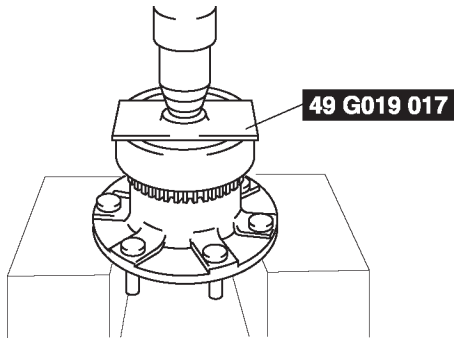
- The sensor rotor does not need to be removed unless it is being replaced.

1. Remove the sensor rotor using a chisel.

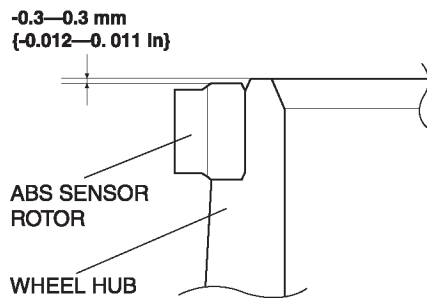


ABS Sensor Rotor Installation Note

1. Set the SST as shown in the figure.



2. Press the new sensor rotor in until flush with the end of the wheel hub using the SST and a press.



FRONT AXLE (4 × 4)

FRONT AXLE (4 × 4)

WHEEL HUB, STEERING KNUCKLE INSPECTION (VEHICLES BUILT UP TO 07/2002)

Wheel Bearing Play Inspection

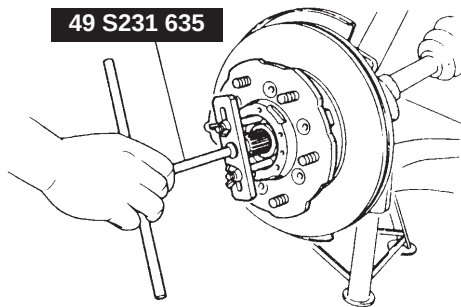
(Refer to FRONT AXLE (4 × 2), WHEEL HUB, STEERING KNUCKLE INSPECTION, Wheel Bearing Play Inspection.)

Preload Adjustment

Caution

- When replacing the locknut, tighten it using the SST and turn the wheel hub a few times to seat the bearing. Then, perform the preload adjustment.

- For RFW model, remove the hub cap and drive shaft end flange. For MFW model, remove the freewheel hub component.
- Remove the spacer and set plate.
- Remove the brake caliper component, and suspend it by a rope.
- Loosen the locknut to the extent that it can be turned by hand using the SST.



- Attach a pull scale to a hub bolt and measure the frictional force.
- Tighten the locknut until the reading reaches the specified amount.

Preload

Frictional force plus

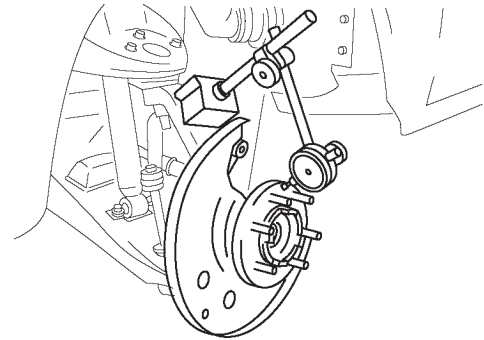
5.9—10.7 N {0.6—1.1 kgf, 1.4—2.4 lbf}

- Install the set plate, spacer, freewheel hub or drive shaft end flange, hub cap and brake caliper component.

WHEEL HUB, STEERING KNUCKLE PRE-INSPECTION (VEHICLES BUILT FROM 08/2002)

Wheel Bearing Play Inspection

- Position a dial indicator against the wheel hub.



- Push and pull the wheel hub by hand in the axial direction and measure the wheel bearing play.

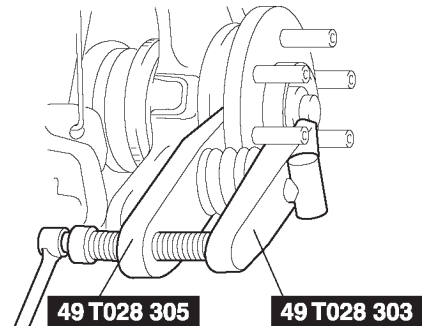
Maximum wheel bearing play

0.05 mm {0.002 in}

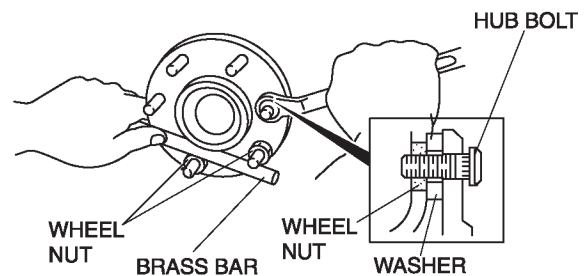
- If the bearing play exceeds the specification, replace and tighten the locknut to the specified torque and retest.
 - Replace the wheel bearing as necessary.

WHEEL HUB BOLT, (4X4) REPLACEMENT (VEHICLES BUILT FROM 08/2002)

- Remove the hub bolt using the SSTs.



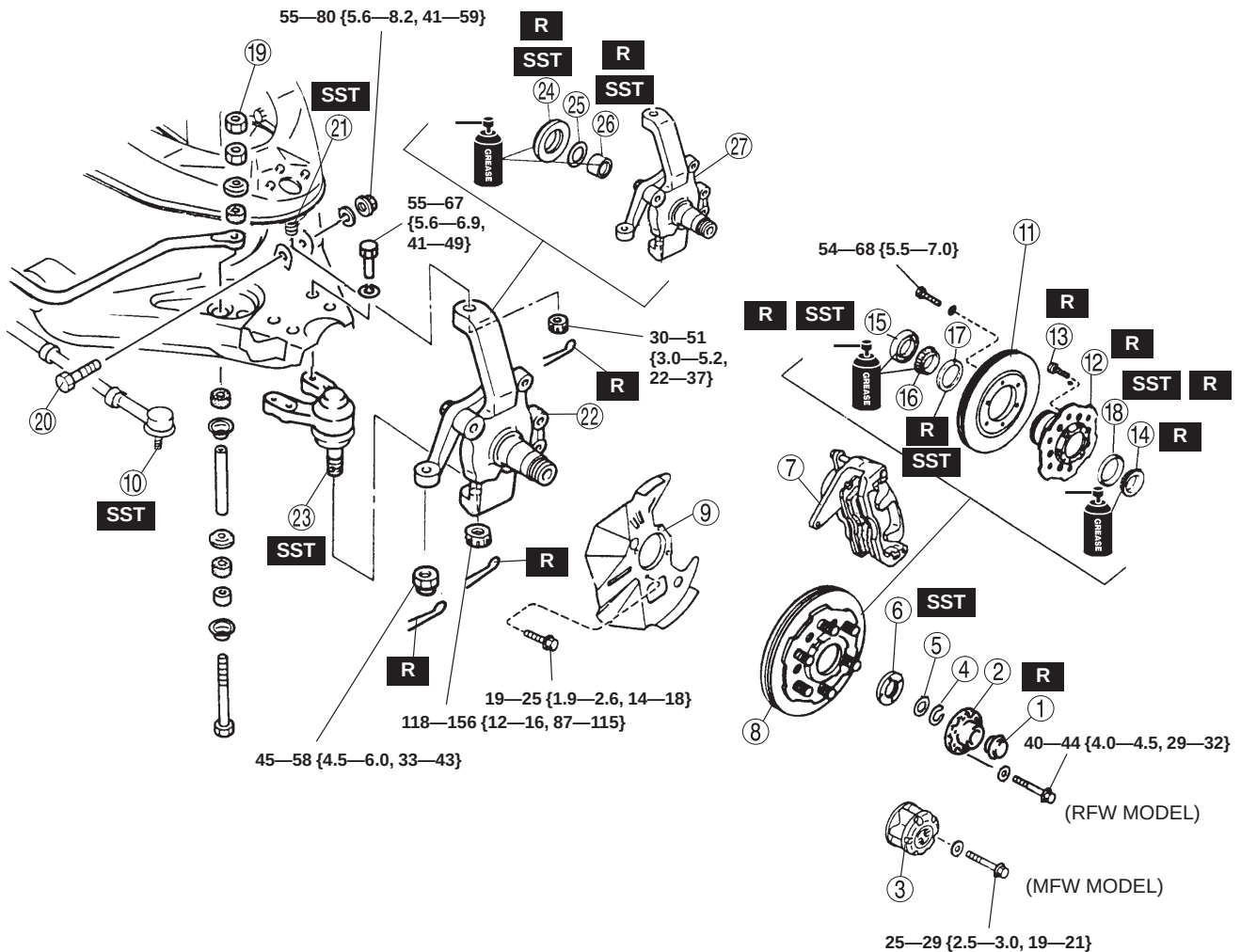
- Install the hub bolt into the wheel hub and install a washer and hub nut on the hub bolt.
- Tighten the hub nut while holding the wheel hub using a brass bar.



FRONT AXLE (4×4)

WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION (VEHICLES BUILT UP TO 07/2002)

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

1	Hub cap
2	Drive shaft end flange
3	Freewheel hub component
4	Spacer
5	Set plate
6	Locknut + Removal Note + Installation Note
7	Brake caliper component + FRONT AXLE (4×2), WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Brake Caliper Component Removal Note.
8	Hub and disc plate component

9	Dust cover
10	Tie-rod end ball joint + Section N, MANUAL STEERING, STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION, Tie-rod End Ball Joint Removal Note
11	Disc plate + FRONT AXLE (4×2), WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Disc Plate Removal Note
12	Wheel hub + FRONT AXLE (4×2), WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Wheel Hub Removal Note

FRONT AXLE (4 × 4)

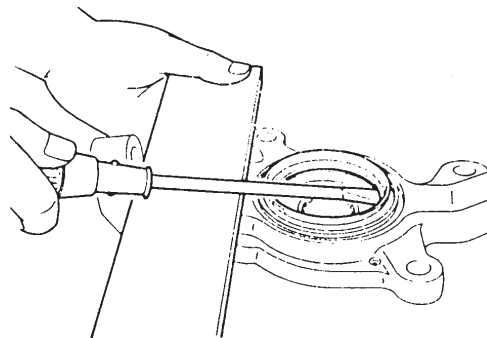
13	Hub bolt + FRONT AXLE (4 × 2), WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Hub Bolt Removal Note + FRONT AXLE (4 × 2), WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Hub Bolt Installation Note
14	Outer bearing inner race
15	Oil seal + Installation Note
16	Inner bearing inner race
17	Inner bearing outer race + FRONT AXLE (4 × 2) WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Inner Bearing Outer Race, Outer Bearing Outer Race Removal Note + Installation Note
18	Outer bearing outer race + FRONT AXLE (4 × 2) WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION, Inner Bearing Outer Race, Outer Bearing Outer Race Removal Note + Installation Note
19	Nut + Section R, FRONT SUSPENSION, TORSION BAR SPRING AND LOWER ARM (4 × 2) REMOVAL/INSTALLATION, Nut Installation Note
20	Shock absorber bolt
21	Upper arm ball joint + Section R, FRONT SUSPENSION, UPPER ARM REMOVAL/INSTALLATION, Upper Arm Ball Joint/Knuckle Removal Note
22	Steering knuckle component + Removal Note
23	Lower arm ball joint
24	Oil seal + Removal Note + Installation Note
25	Spacer
26	Needle bearing + Removal Note + Installation Note
27	Steering knuckle

Steering Knuckle Component Removal Note

1. Remove the lower arm ball joint from the knuckle using the **SST**. (Refer to section R, FRONT SUSPENSION, TORSION BAR SPRING AND LOWER ARM (4 × 2) REMOVAL/INSTALLATION, Lower Arm Ball Joint/Knuckle Removal Note.)
2. Remove the lower arm installation bolt and remove the lower arm with the knuckle.

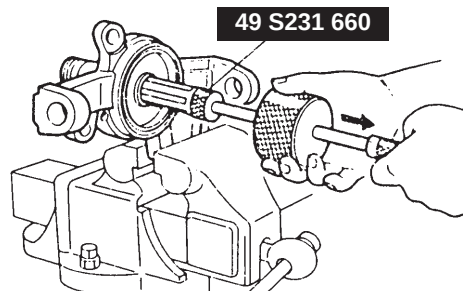
Oil Seal Removal Note

- Remove the oil seal using a screwdriver.



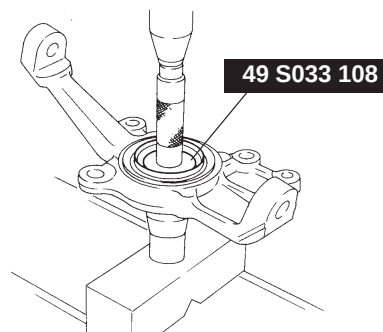
Needle Bearing Removal Note

- Remove the needle bearing using the **SST**.



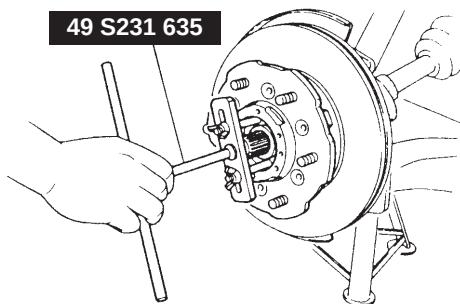
Needle Bearing Installation Note

1. Install the needle bearing using the **SST** and a press.
2. Apply grease to the needle bearing.



Locknut Removal Note

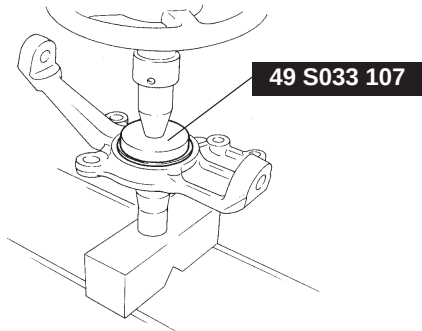
- Remove the locknut using the **SST**.



FRONT AXLE (4 × 4)

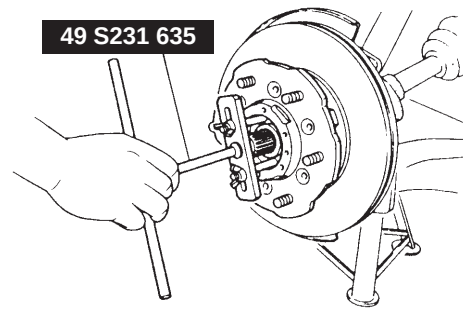
Oil Seal Installation Note

1. Install the new oil seal using the **SST** and a press.
2. Apply grease to the oil seal lip.



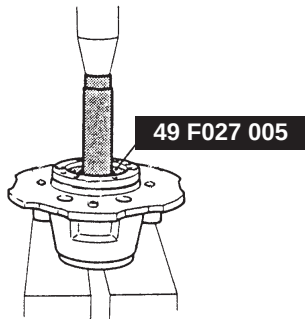
Locknut Installation Note

1. Install the locknut using the **SST**.



Outer Bearing Outer Race Installation Note

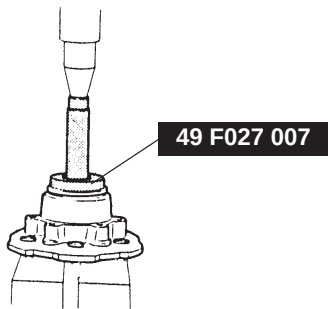
- Install the outer bearing outer race using the **SST** and press.



2. Adjust the preload. (Refer to FRONT AXLE (4 × 4) WHEEL HUB, STEERING KNUCKLE INSPECTION, Preload Adjustment)

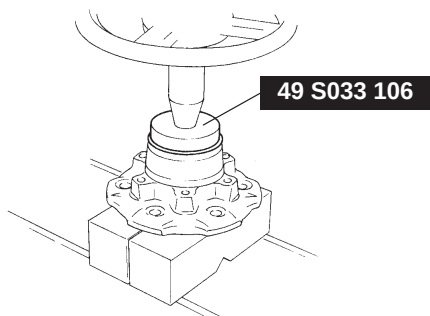
Inner Bearing Outer Race Installation Note

- Install the inner bearing outer race using the **SST** and a press.



Oil Seal Installation Note

- Install the new oil seal using the **SST** and a press.



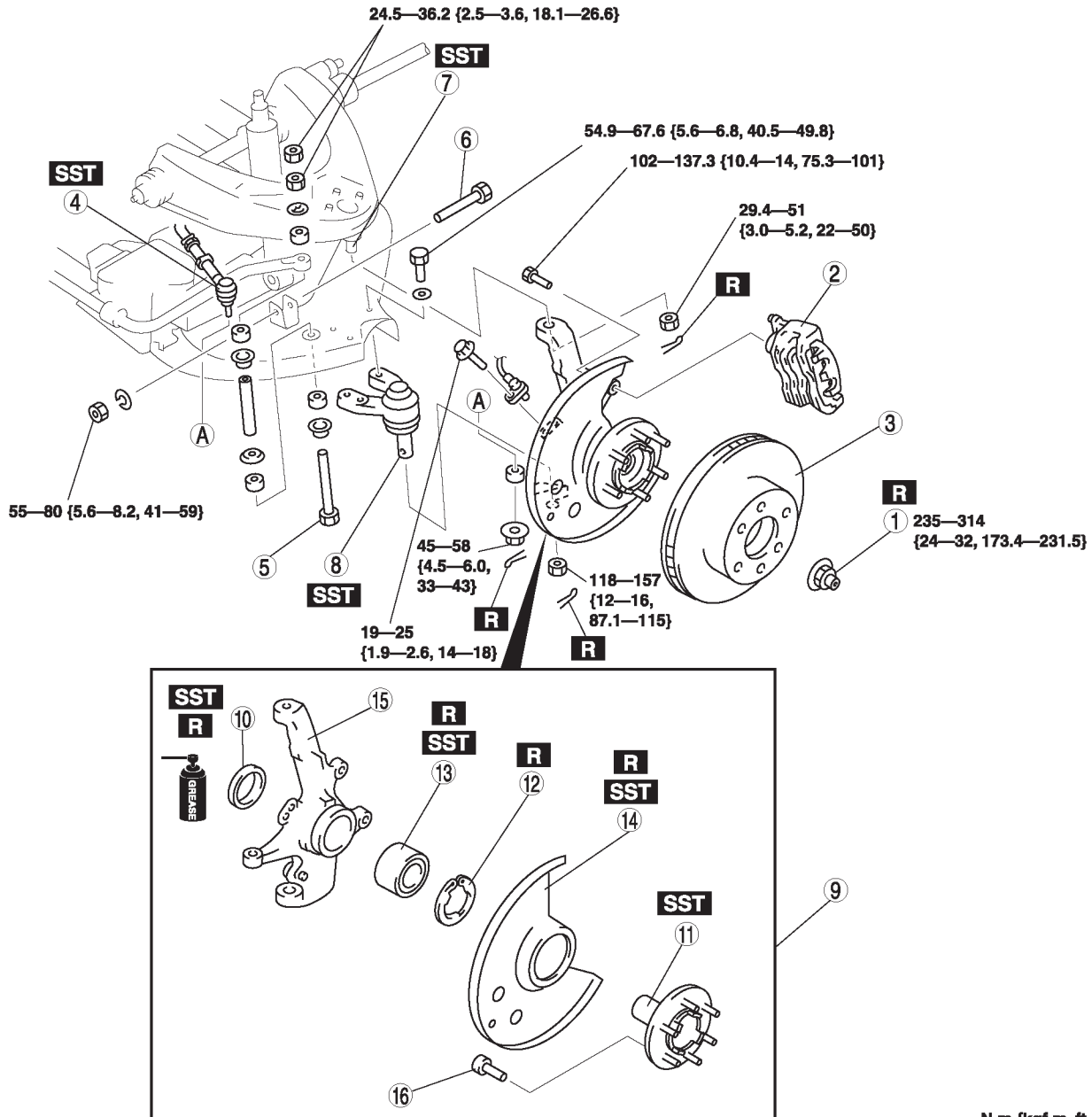
FRONT AXLE (4×4)

WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION (VEHICLES BUILT FROM 08/2002)

Caution

- Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while the vehicle is being serviced.

- Remove in the order indicated in the table.
- Install in the reverse order of removal.



N·m {kgf·m, ft·lbf}

1	Locknut + See Locknut Removal Note + See Locknut Installation Note
2	Brake caliper component + See Brake Caliper Component Removal Note
3	Disc plate
4	Tie-rod end ball joint + See Oil Seal Removal Note
5	Bolt (stabilizer)

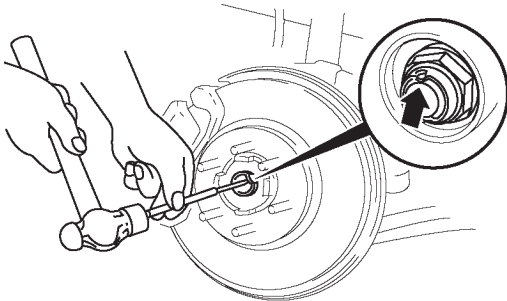
6	Bolt (shock absorber)
7	Upper arm ball joint
8	Lower arm ball joint
9	Wheel hub, steering knuckle, dust cover
10	Oil seal + See Oil Seal Removal Note + See Oil Seal Installation Note

FRONT AXLE (4 × 4)

11	Wheel hub component + See Wheel Hub Component Removal Note + See Wheel Hub Component Installation Note
12	Retaining ring
13	Wheel Bearing + See Wheel Bearing Removal Note + See Wheel Bearing Installation Note
14	Dust cover + See Dust Cover Removal Note + See Dust Cover Installation Note
15	Steering Knuckle
16	Hub bolt + See Hub Bolt Removal Note + See Hub Bolt Installation Note

Locknut Removal Note

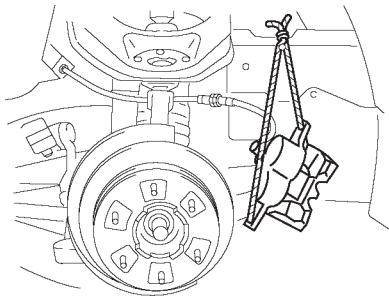
1. Knock the crimped portion of the locknut outward using a small chisel and hammer.



2. Lock the hub by applying the brakes.
3. Remove the locknut.

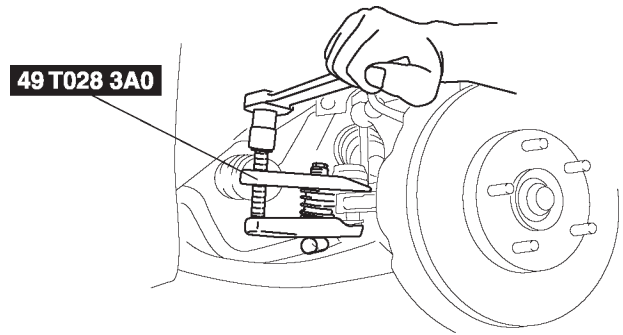
Brake Caliper Component Removal Note

1. Remove the brake caliper component, and suspend it with rope.



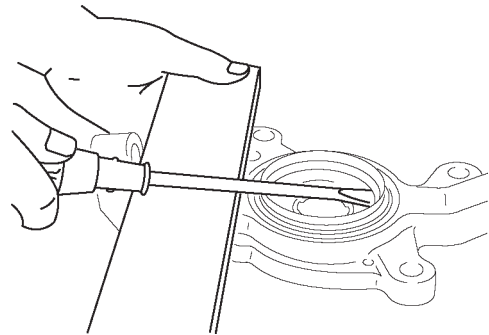
Tie-rod End Ball Joint Removal Note

1. Remove the tie rod-nut.
2. Separate the tie-rod end from the steering knuckle using the SSTs.



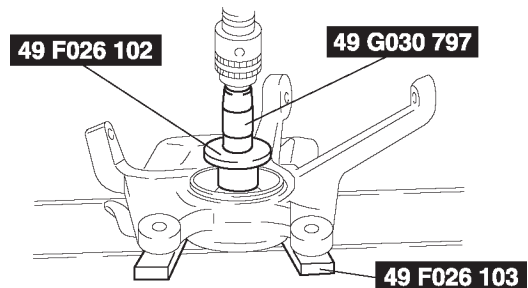
Oil Seal Removal Note

1. Remove the oil seal by using a screwdriver.

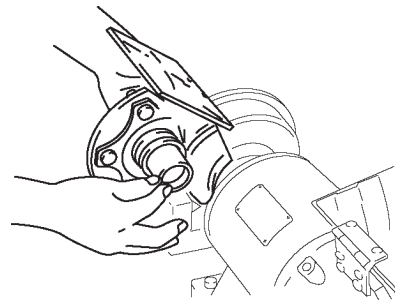


Wheel Hub Component Removal Note

1. Remove the wheel hub component using the SSTs and a press.



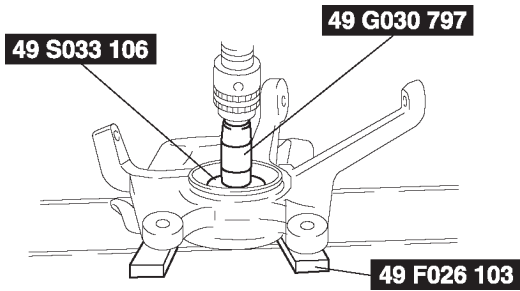
2. If the bearing inner race remains on the front wheel hub component, grind a section of the bearing inner race until **approx. 0.5 mm {0.02 in}** remains. Then remove it using a chisel.



Wheel Bearing Removal Note

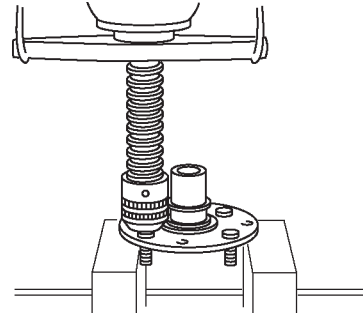
1. Remove the wheel bearing using the SSTs and a press.

FRONT AXLE (4 × 4)



Hub Bolt Installation Note

1. Install the new hub bolts using a press.

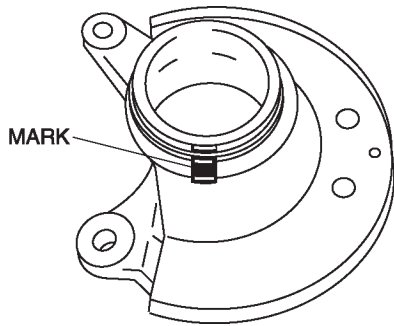


Dust Cover Removal Note

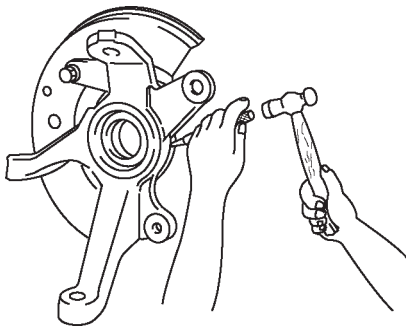
Note

- The dust cover does not need to be removed unless it is being.

1. Mark the dust cover and steering knuckle for proper installation.

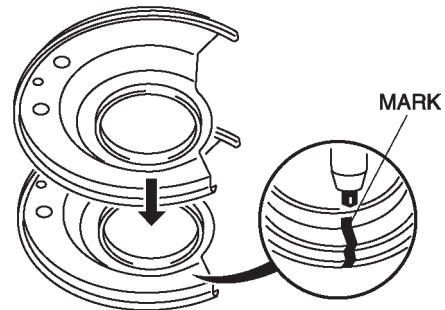


2. Remove the dust cover using a chisel.

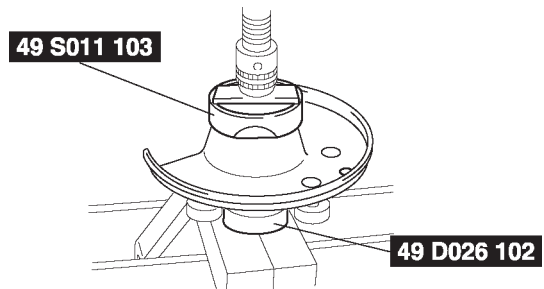


Dust Cover Installation Note

1. Mark the new dust cover in the same way as the removed one.
2. Align the marks of the new dust cover and the knuckle.



3. Install the new dust cover using the SSTs and a press.

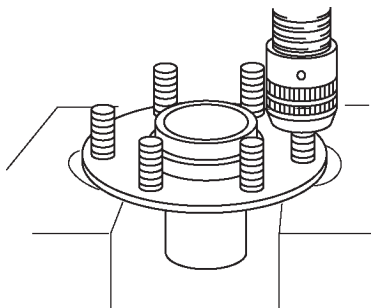


Hub Bolt Removal Note

Note

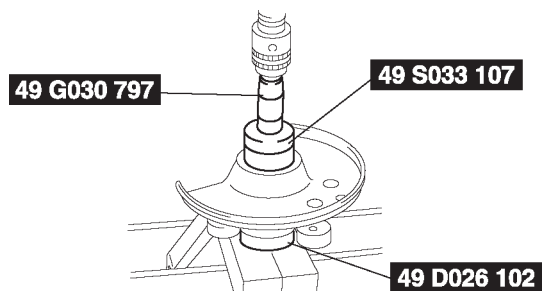
- The hub bolts do not need to be removed unless they are being replaced.

1. Remove the hub bolts using a press.



Wheel Bearing Installation Note

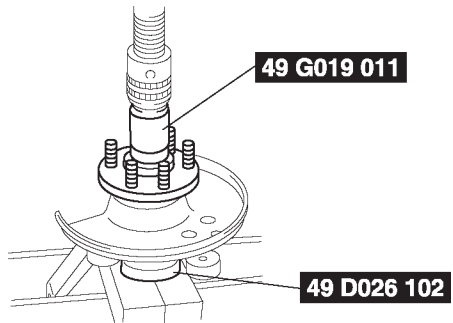
1. Install the new wheel bearing using the SSTs and a press.



FRONT AXLE (4 × 4)

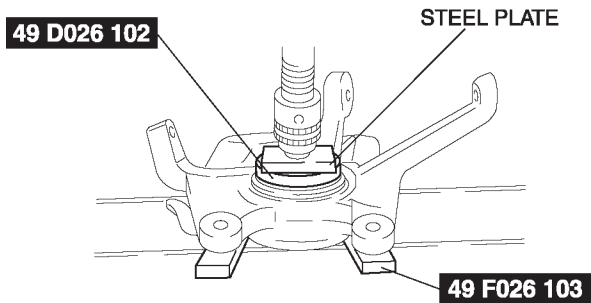
Wheel Hub Component Installation Note

1. Install the wheel hub component using the SSTs and a press.



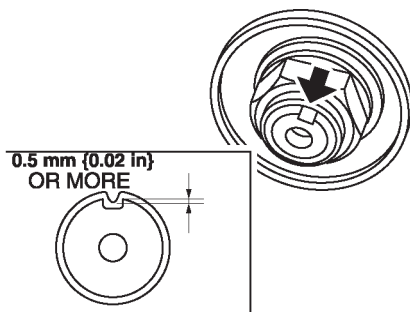
Oil Seal Installation Note

1. Apply grease to the new oil seal lip.
2. Install the new oil seal flush with the knuckle using the SSTs.



Locknut Installation Note

1. Install a new locknut and stake it as shown.



REAR AXLE

REAR AXLE

REAR AXLE INSPECTION

Wheel Bearing Play Inspection

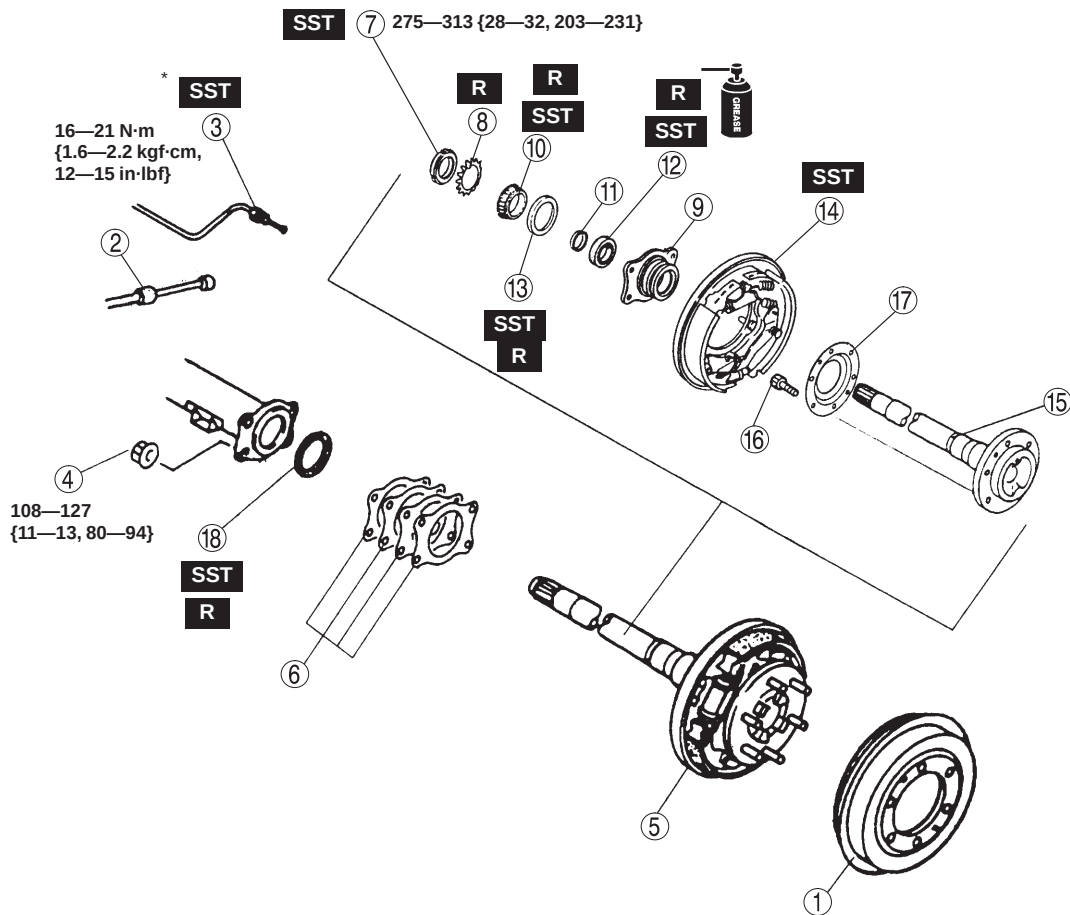
1. Jack up the rear end and support it with safety stands.
2. Verify that there is no abnormal noise and that the tire rotates smoothly when forcefully rotated by hand.
3. With a hand on top of the tire, inspect the bearing play.

Wheel bearing axial play
0.05—0.25 mm {0.002—0.010 in}

4. If not as specified, adjust the bearing play. (Refer to REAR AXLE, AXLE SHAFT REMOVAL/INSTALLATION, Bearing Inner Race, Bearing Locknut Installation Note, Bearing play adjustment.)

AXLE SHAFT REMOVAL/INSTALLATION (VEHICLES BUILT UP TO 07/2002)

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



*49 0259 770B

N·m {kgf·m, ft·lbf}

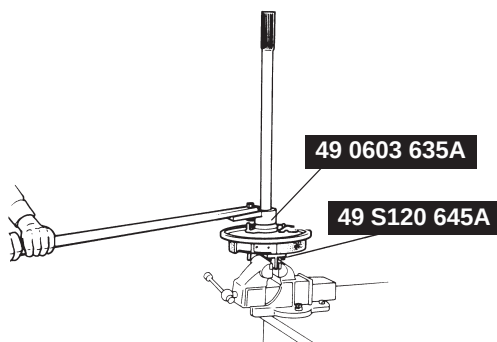
REAR AXLE

1	Brake drum
2	Parking brake connecting pin
3	Brake pipe
4	Nut
5	Axle shaft and back plate component
6	Shim
7	Bearing locknut + Removal Note + Installation Note
8	Lock washer
9	Bearing housing + Removal Note
10	Bearing inner race + Installation Note
11	Bearing spacer
12	Oil seal (bearing housing side) + Installation Note
13	Bearing outer race + Removal Note + Installation Note
14	Back plate component
15	Axle shaft
16	Hub bolt
17	Baffle
18	Oil seal (axle casing side) + Removal Note + Installation Note

Bearing Locknut Removal Note

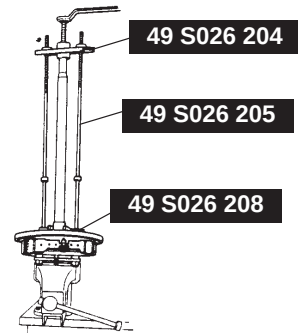
Note

- Be careful when removing or installing the bearing locknuts for the left wheels because they are left threaded (tightened by turning counterclockwise).
- Set the **SSTs** as shown in the figure, and remove the bearing locknut from the rear axle shaft.



Bearing Housing Removal Note

- Remove the bearing and bearing housing using the **SSTs**.



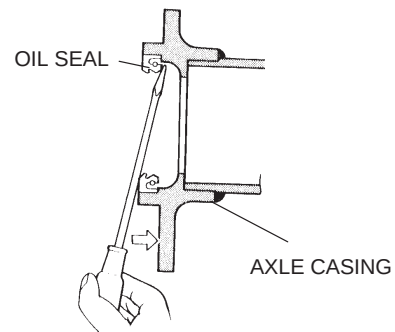
Bearing Outer Race Removal Note

- After removing the bearing inner race and oil seal from the rear wheel hub, tap lightly using a suitable round bar to force out the outer race.



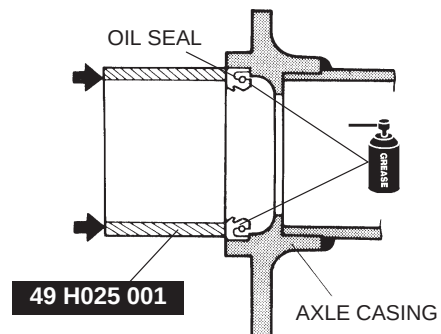
Oil Seal (Axle Casing Side) Removal Note

- Remove the oil seal from the axle casing using a screwdriver.



Oil Seal (Axle Casing Side) Installation Note

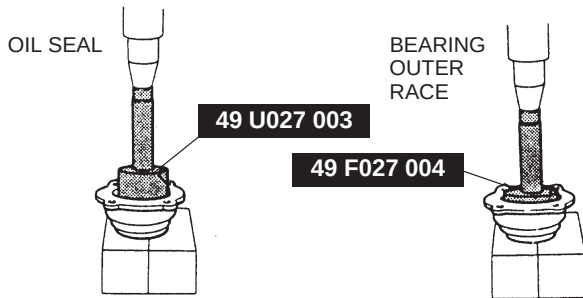
- Use the **SST** to tap the oil seal in until it is flush with the end of the axle casing.
- After installation, apply grease to the oil seal lip.



REAR AXLE

Bearing Outer Race, Oil Seal (Bearing Housing Side) Installation Note

- Press the bearing outer race and the oil seal using the SSTs.

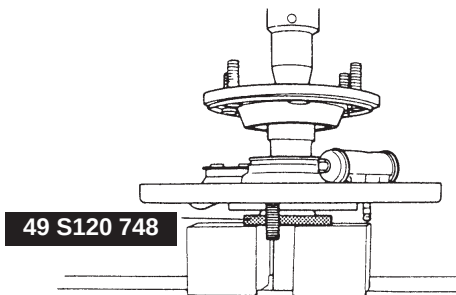


Bearing Inner Race, Bearing Locknut Installation Note

Caution

- The torque wrench must be attached perpendicular to the SST.

- Set the SST and then press the bearing inner race in until 3 to 5 threads of the bearing locknut mounting screw of the axle shaft are visible above the top of the bearing outer race.

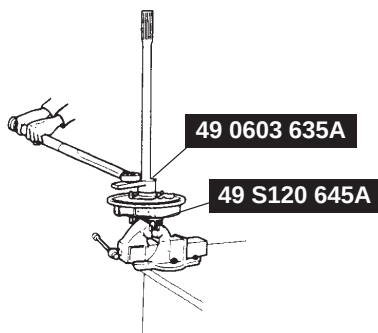


- Remove the SST, and then install the bearing locknut to the axle shaft.
- Tighten the bearing locknut using the SST to press in the bearing inner race.
- Remove the SST and install the lock washer so that its tab fits into the groove of the axle shaft.
- Tighten the bearing locknut to the specified torque.

Bearing locknut tightening torque

275—313 N·m

{28.0—32.0 kgf·m, 203—231 ft·lbf}

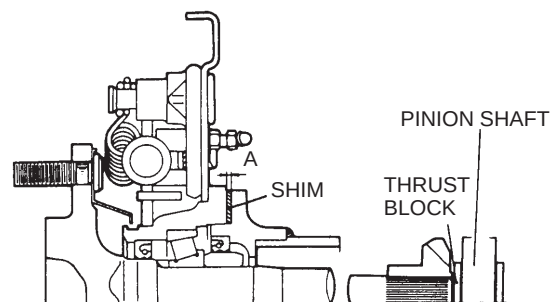


Bearing play adjustment

- Adjust the bearing play in the axial direction (only when the bearing is replaced).
- First insert one side of the rear axle shaft component and push the end of the shaft to the thrust block, then insert a shim(s) at point A so that the clearance between the end of the shaft and the thrust block becomes **0.65—0.95 mm {0.026—0.037 in}**.
 - Next insert the opposite shaft component and push the end of the shaft to the thrust block.
 - Use a shim(s) at point A so that the clearance between the end of the shaft and the thrust block becomes **0.05—0.25 mm {0.002—0.010 in}**.

Bearing play in axial direction

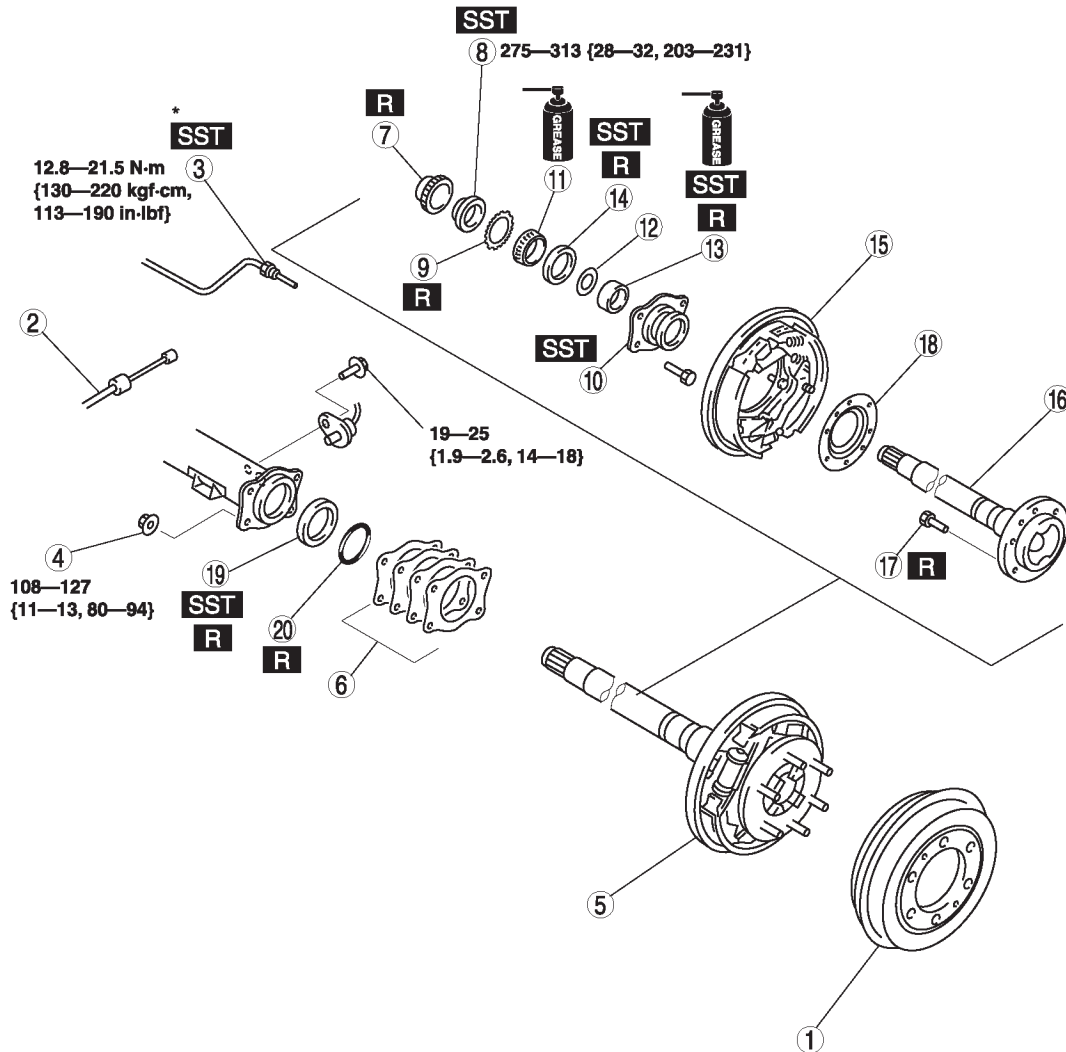
0.05—0.25 mm {0.002—0.010 in}



REAR AXLE

AXLE SHAFT (WITH ABS) REMOVAL/INSTALLATION (VEHICLES BUILT FROM 08/2002)

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



*49 0259 770B

N·m {kgf·m, ft·lbf}

1	Brake drum
2	Parking brake connecting pin
3	Brake pipe
4	Nut
5	Axle shaft and back plate component + See Axle Shaft and Back Plate Component, Shim Installation Note (Bearing play adjustment)
6	Shim + See Axle Shaft and Back Plate Component, Shim Installation Note (Bearing play adjustment)
7	ABS sensor rotor + See ABS Sensor Rotor Removal Note + See ABS Sensor Rotor Installation Note

8	Bearing locknut + See Bearing Locknut Removal Note + See Bearing Inner Race, Bearing Locknut Installation Note
9	Lock washer
10	Bearing housing + See Bearing Housing Removal Note
11	Bearing inner race + See Bearing Inner Race, Bearing Locknut Installation Note
12	Bearing spacer
13	Oil seal (bearing housing side) + See Bearing Outer Race, Oil Seal (Bearing Housing Side) Installation Note
14	Bearing outer race + See Bearing Outer Race, Removal Note + See Bearing Outer Race, Oil Seal (Bearing Housing Side) Installation Note

REAR AXLE

15	Back plate component
16	Axle shaft
17	Hub bolt
18	Baffle
19	Oil seal (axle casing side) + See Oil Seal (Axle Casing Side) Removal Note + See Oil Seal (Axle Casing Side) Installation Note

ABS Sensor Rotor Removal Note

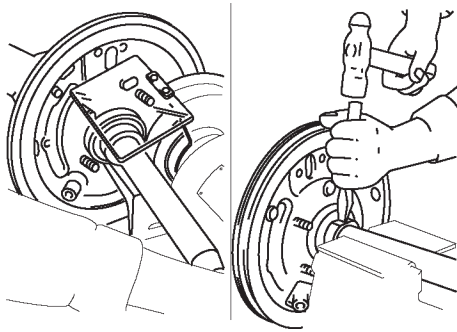
Warning

- When grinding, be careful of debris coming from the grinder or bearing collar. Always wear eye protectors.

Caution

- Because the ABS sensor rotor and rear wheel hub edge are almost flush even if the axle shaft is moved as far as it will go, be careful not to damage the rear wheel hub when grinding.

- Grind a part of the ABS sensor rotor using a grinder until **0.5 mm {0.02 in}** remains, and then brake it using a chisel and remove from the shaft.

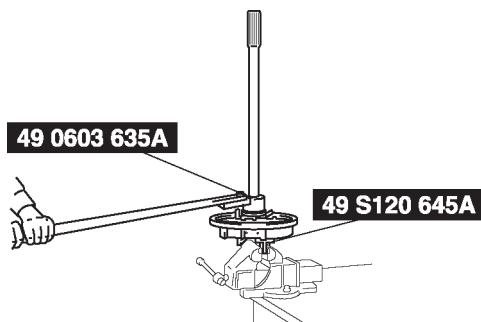


Bearing Locknut Removal Note

Note

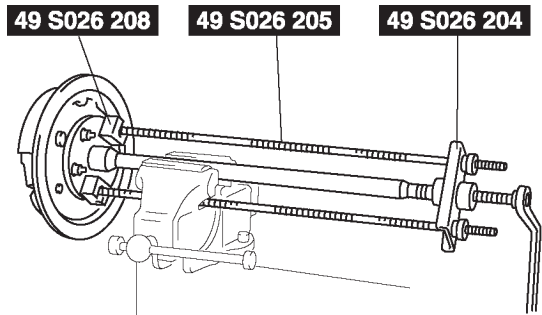
- Be careful when removing or installing the bearing locknuts for the left wheels because they are left threaded (tightened by turning counterclockwise).

- Set the **SSTs** as shown in the figure, and remove the bearing locknut from the rear axle shaft.



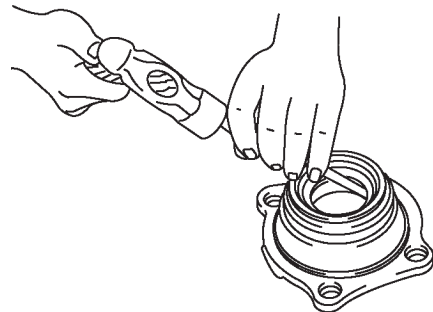
Bearing Housing Removal Note

- Remove the bearing and bearing housing using the **SSTs**.



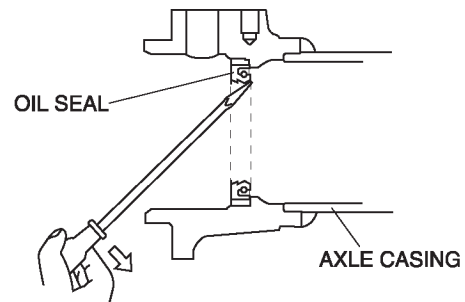
Bearing Outer Race Removal Note

- After removing the bearing inner race and oil seal from the rear wheel hub, tap lightly using a suitable round bar to force out the outer race.



Oil Seal (Axle Casing Side) Removal Note

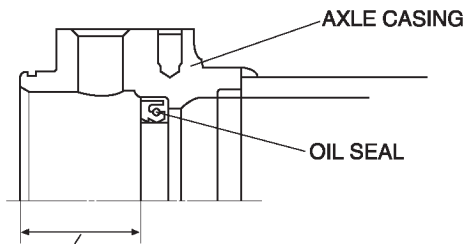
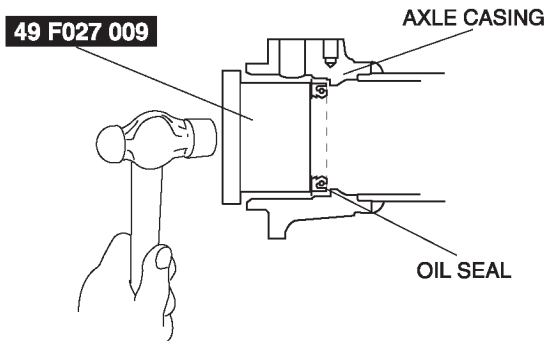
- Remove the oil seal from the axle casing using a screwdriver.



REAR AXLE

Oil Seal (Axle Casing Side) Installation Note

1. Tap the oil seal in until it is flush with the end of the axle casing using the SST.

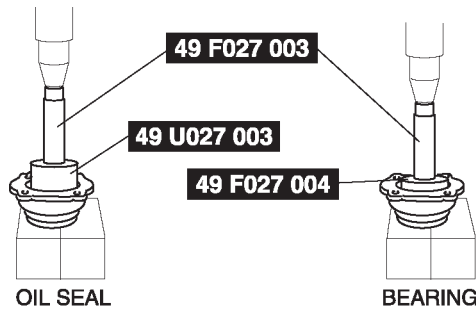


OIL SEAL PRESS IN VALUE: 40.0—41.0 mm {1.58—1.68 in}

2. After installation, apply grease to the oil seal lip.

Bearing Outer Race, Oil Seal (Bearing Housing Side) Installation Note

1. Press the bearing outer race and the oil seal using the SSTs.

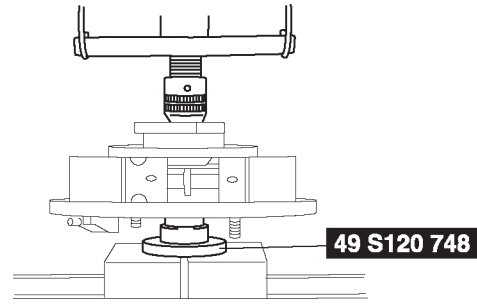


Bearing Inner Race, Bearing Locknut Installation Note

Caution

- The torque wrench must be attached perpendicular to the SST

1. Set the SST and then press the bearing in until 3 to 5 threads of the bearing locknut mounting screw of the axle shaft are visible above the top of the bearing outer race.

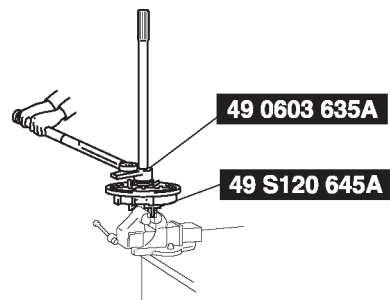


2. Remove the SST, and then install the bearing locknut to the axle shaft.
3. Tighten the bearing locknut using the SST to press in the bearing inner race.
4. Remove the SST and install the lock washer so that its tab fits in the groove of the axle shaft.
5. Tighten the bearing locknut to the specified torque.

Bearing locknut tightening torque

275—313 N·m

{28.0—32.0 kgf·m, 203—231 ft·lbf}

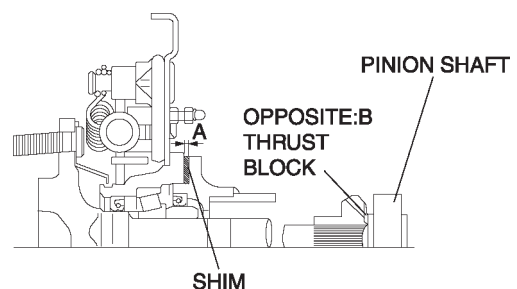


Axle Shaft and Back Plate Component, Shim Installation Note (Bearing play adjustment)

- Adjust the bearing play in the axial direction (only when the bearing is replaced).
- (1) First insert one side of the rear axle shaft component, insert a shim(s) at point A so that the clearance between the end of the shaft and the thrust block becomes 0.65—0.95 mm {0.026—0.037 in}.
 - (2) Next insert the opposite shaft component and push the end of the shaft to the thrust block.
 - (3) Use a shim(s) at point B so that the clearance between the end of the shaft and the thrust block becomes 0.05—0.25 mm {0.002—0.010 in}.

Bearing play in axial direction

0.05—0.25 mm {0.002—0.009 in}



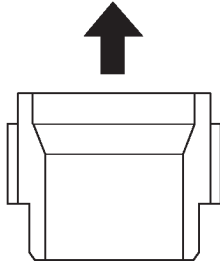
REAR AXLE

ABS Sensor Rotor Installation Note

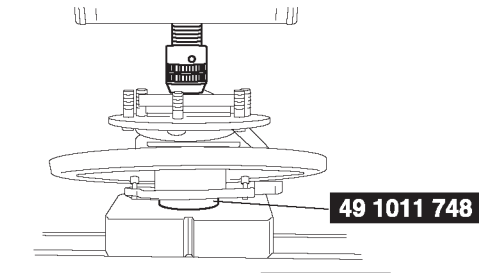
Note

- Install the ABS sensor rotor in the direction shown in the figure

BEARING LOCKNUT SIDE



1. Press the ABS sensor rotor in until it is flush with the end of the bearing lock nut using the **SST**.

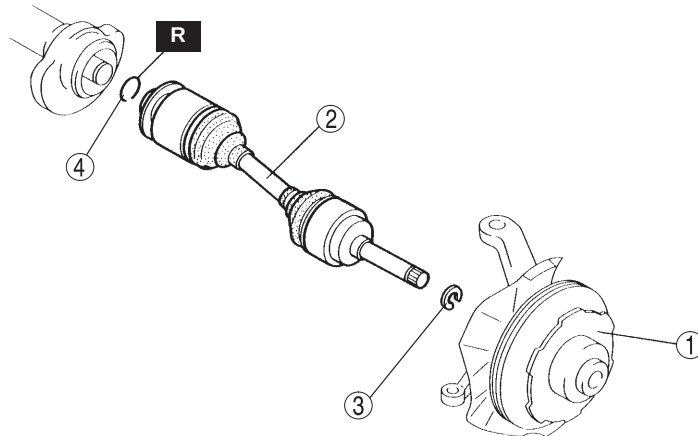


DRIVE SHAFT

DRIVE SHAFT

DRIVE SHAFT REMOVAL/INSTALLATION (VEHICLES BUILT UP TO 07/2002)

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



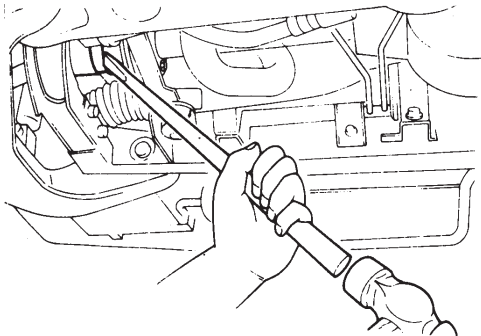
1	Wheel hub, steering knuckle + FRONT AXLE (4×4), WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION
2	Drive shaft + Removal Note + Installation Note

3	Snap ring
4	Clip + Installation Note

Drive Shaft Removal Note

Caution

- Do not damage the dust cover or oil seal.
- Remove the drive shaft by prying with a bar inserted between the differential casing and the drive shaft.



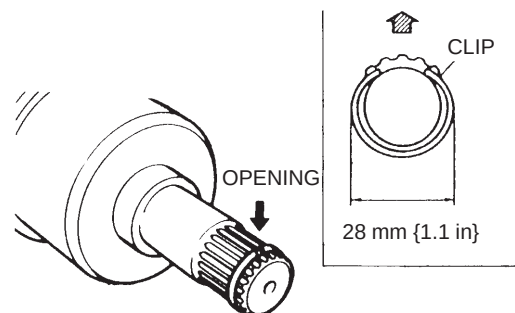
Clip Installation Note

Left side

- Install a new clip to the output shaft clip groove with the opening facing upward.

Right side

- Install a new clip to the clip groove of the drive shaft end with the opening facing upward.



Drive Shaft Installation Note

- Be careful not to damage the oil seal with the shaft spline when installing the drive shaft.

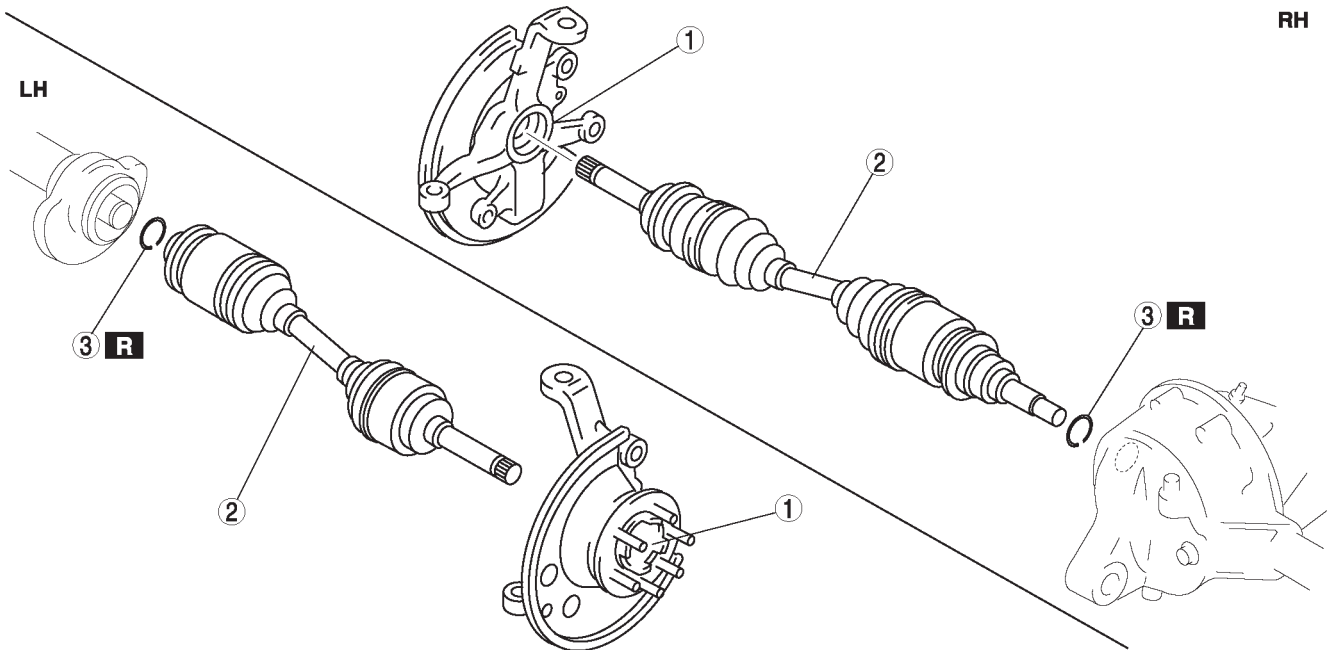
DRIVE SHAFT

DRIVE SHAFT REMOVAL/INSTALLATION (VEHICLES BUILT FROM 08/2002)

Caution

- Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.

1. If removing the RH drive shaft, drain the front differential oil.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



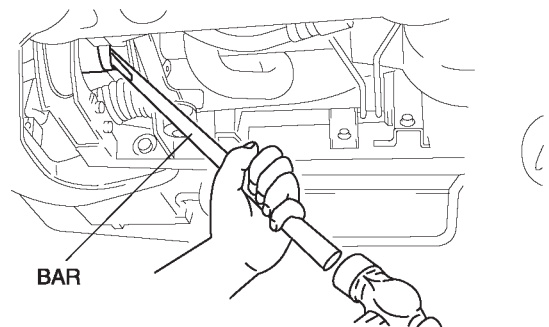
1	Wheel hub, steering knuckle + See WHEEL HUB, STEERING KNUCKLE (4x4) REMOVAL/INSTALLATION
2	Drive shaft + See Drive Shaft Removal Note + See Drive Shaft Installation Note
3	Clip

Drive Shaft Removal Note

Caution

- Do not damage the dust cover or the ABS sensor rotor on the drive shaft. These parts cannot be purchased separately. Replace the assembled unit if the dust cover or the ABS sensor rotor is damaged.
- The sharp edges of the drive shaft can splice or puncture the oil seal. Be careful when removing the drive shaft from the front differential.

1. Remove the drive shaft by prying with a bar inserted between the differential casing and the drive shaft, as shown in the figure.



DRIVE SHAFT

Drive Shaft Installation Note

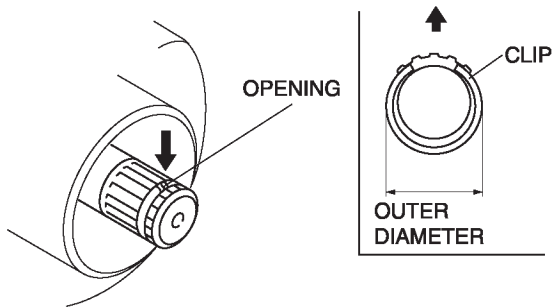
28 mm {1.1 in}

Caution

- The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful when installing the drive shaft to the front differential.
 - The oil seals are damaged easily if this procedure is not done correctly.
3. Install the drive shaft into the front differential.
 4. Push the drive shaft into the wheel hub.
 5. After installation, pull the front differential side outer ring forward to confirm that the drive shaft is securely held by the clip.

• (LH)

1. Install a new clip onto the output shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification for installation.



2. After installation, measure the outer diameter.
- If it exceeds the specification, repeat Steps 1–2 using a new clip.

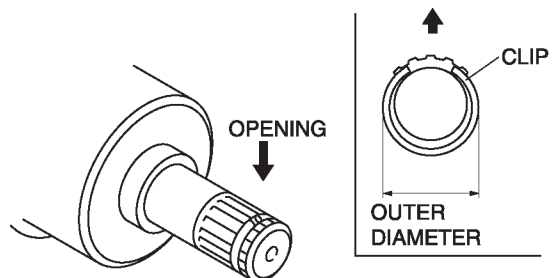
Outer diameter specification

28 mm {1.1 in}

3. Apply differential oil to the oil seal lip.
4. Insert the drive shaft into the output shaft.
5. Push the drive shaft into the wheel hub.
6. After installation, pull the output shaft side outer ring forward to confirm that the drive shaft is securely held by the clip.

• (LH)

1. Install a new clip onto the drive shaft with the opening of a new clip facing upward.



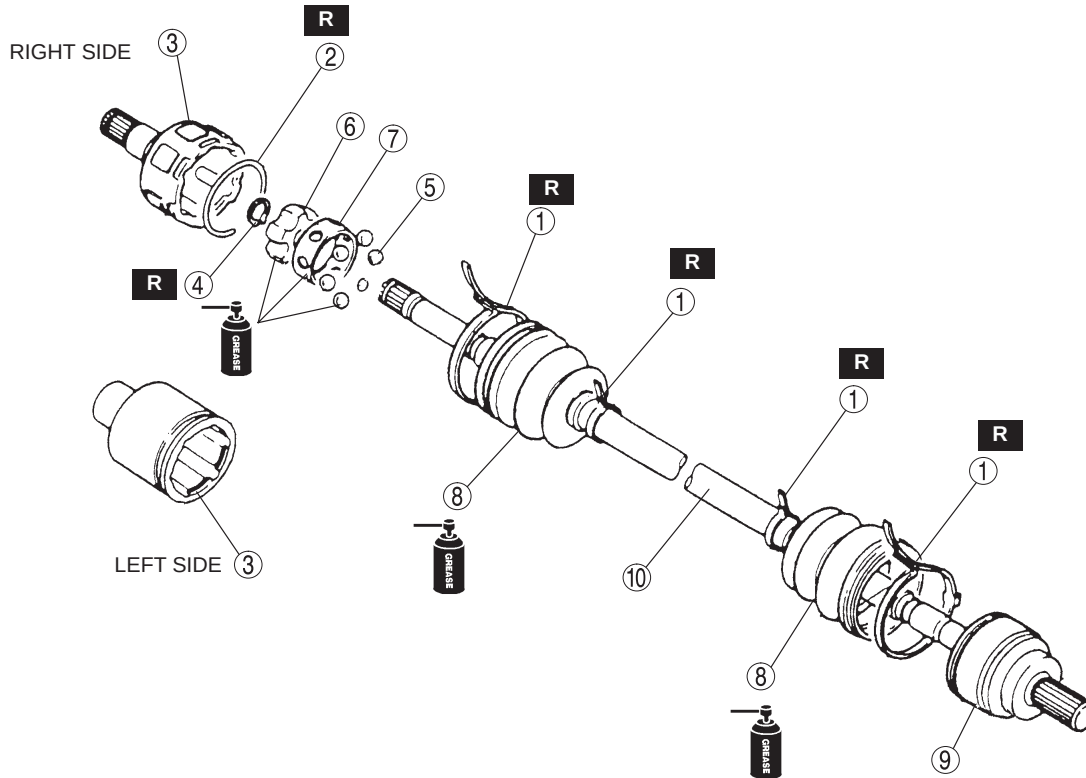
2. After installation, measure the outer diameter.
- If it exceeds the specification, repeat Steps 1–2 using a new clip.

Outer diameter specification

DRIVE SHAFT

DRIVE SHAFT DISASSEMBLY/ASSEMBLY (VEHICLES BUILT UP TO 07/2002)

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of removal.



1	Boot band + Disassembly Note + Assembly Note
2	Clip
3	Outer ring + Disassembly Note + Assembly Note
4	Snap ring + Assembly Note
5	Balls + Disassembly Note + Assembly Note

6	Inner ring + Disassembly Note + Assembly Note
7	Cage + Disassembly Note + Assembly Note
8	Boot + Disassembly Note + Assembly Note
9	Bell joint component
10	Drive shaft

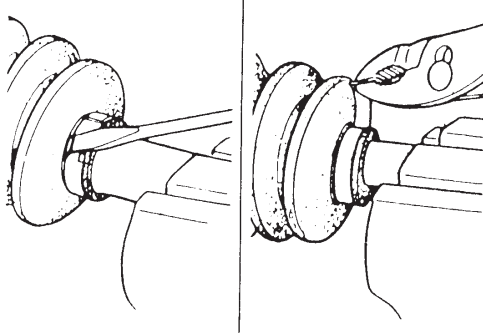
DRIVE SHAFT

Boot Band Disassembly Note

Note

- The wheel side boot band does not need to be removed unless replacing it.

1. Pry up the locking clip using a screwdriver and remove the band using pliers.
2. Slide the boot along the shaft to expose the joint.

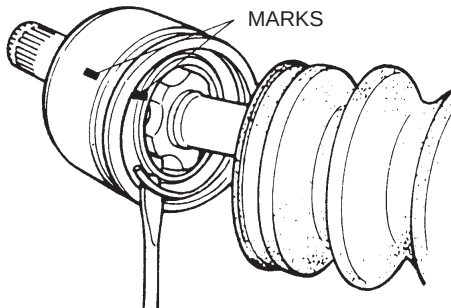


Outer Ring Disassembly Note

Caution

- Mark with paint; do not use a punch.

1. Mark the cage and outer ring for proper assembly.
2. Remove the clip using a screwdriver.
3. Remove the outer ring from the inner ring and the balls.
4. Clean the grease away.

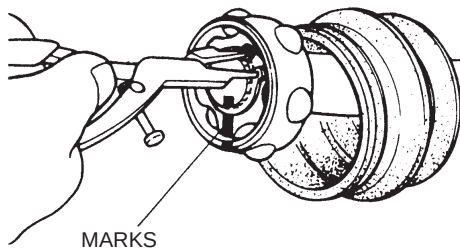


Balls, Inner Ring, Cage Disassembly Note

Caution

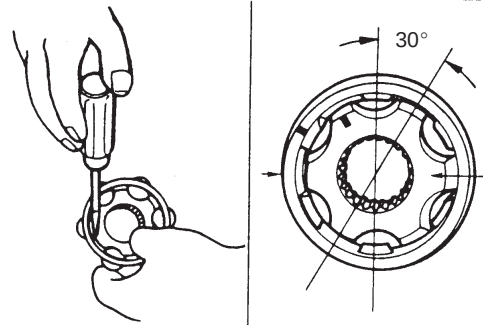
- Mark with paint; do not use a punch.

1. Mark the drive shaft and inner ring for proper assembly.



2. Disassemble the snap ring from the drive shaft using a snap-ring pliers.

3. Disassemble the balls, inner ring, cage from the drive shaft as component.
4. Turn the cage by **approximately 30 degrees** and pull the cage and balls away from the inner ring.

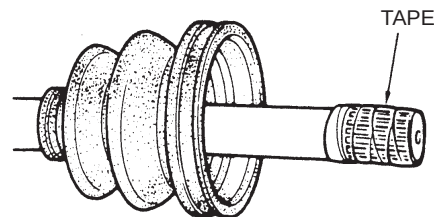


Boot Disassembly Note

Note

- The wheel side boot does not need to be removed unless it is being replaced.

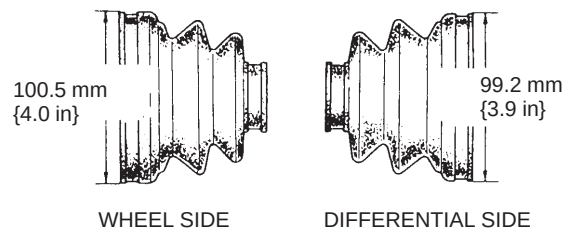
1. Wrap the shaft splines with tape.
2. Remove the boot.



Boot Assembly Note

Note

- The wheel side and differential side boots are different.



1. With the splines of the shaft still wrapped in tape from disassembly, assemble the boot.
2. Temporarily assemble the wheel side boot, new boot bands, and differential side boot to the drive shaft.
3. Remove the tape.

DRIVE SHAFT

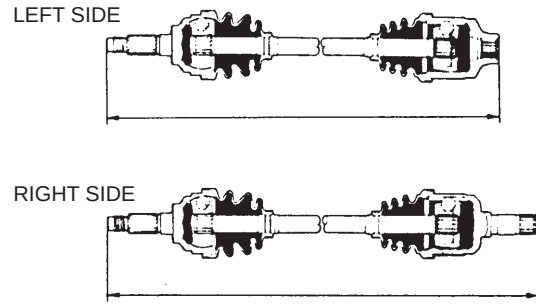
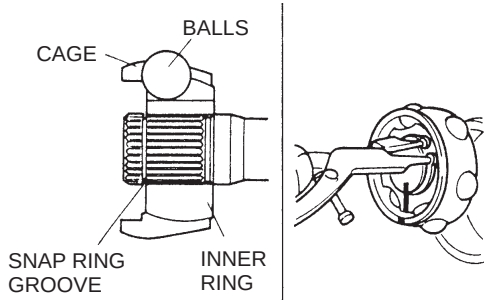
Cage, Inner Ring, Balls, Snap Ring Assembly Note

1. Align the marks, and install the balls and cage to the inner ring in the direction shown in the figure.

Caution

- Install the cage with the offset facing the snap ring groove. If incorrectly installed, the drive shaft may become disengaged.

2. Install a new snap ring.

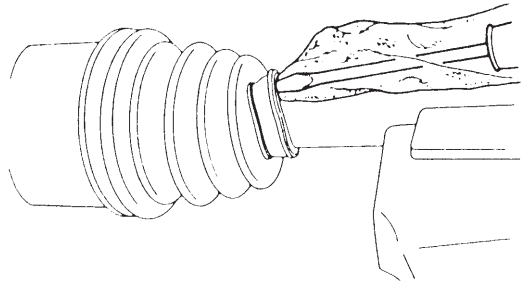


Standard length

Right side : 619.0—629.0 mm {24.4—24.7 in}

Left side : 551.0—561.0 mm {21.7—22.0 in}

3. Release trapped air from inside the boot using a screwdriver covered with a rag.



Outer Ring Assembly Note

Note

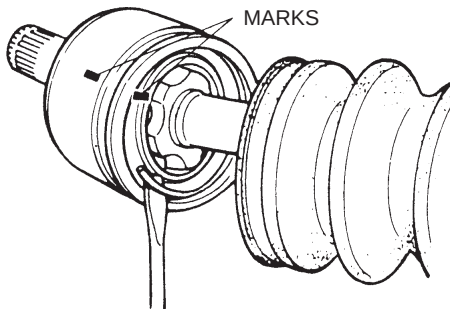
- Use the specified grease supplied in the boot kit.

1. Apply grease to the cage, inner ring, balls, and the outer ring.

Wheel side : 110—130 g {3.8—4.6 oz}

Differential side : 95—105 g {3.4—3.7 oz}

2. Align the marks, and install the outer ring onto the shaft.
3. Install a new clip.



4. Set the new boot band to the boot groove.
5. Fold the band back and use pliers to pull it tight.
6. Lock the end of the band by bending the locking clips.

Boot Band Assembly Note

Caution

- Do not damage the boot.
- For wheel side, apply grease only when assembling the boot.

1. Apply grease to the inside of the boot.
2. Set the drive shaft to the standard length.

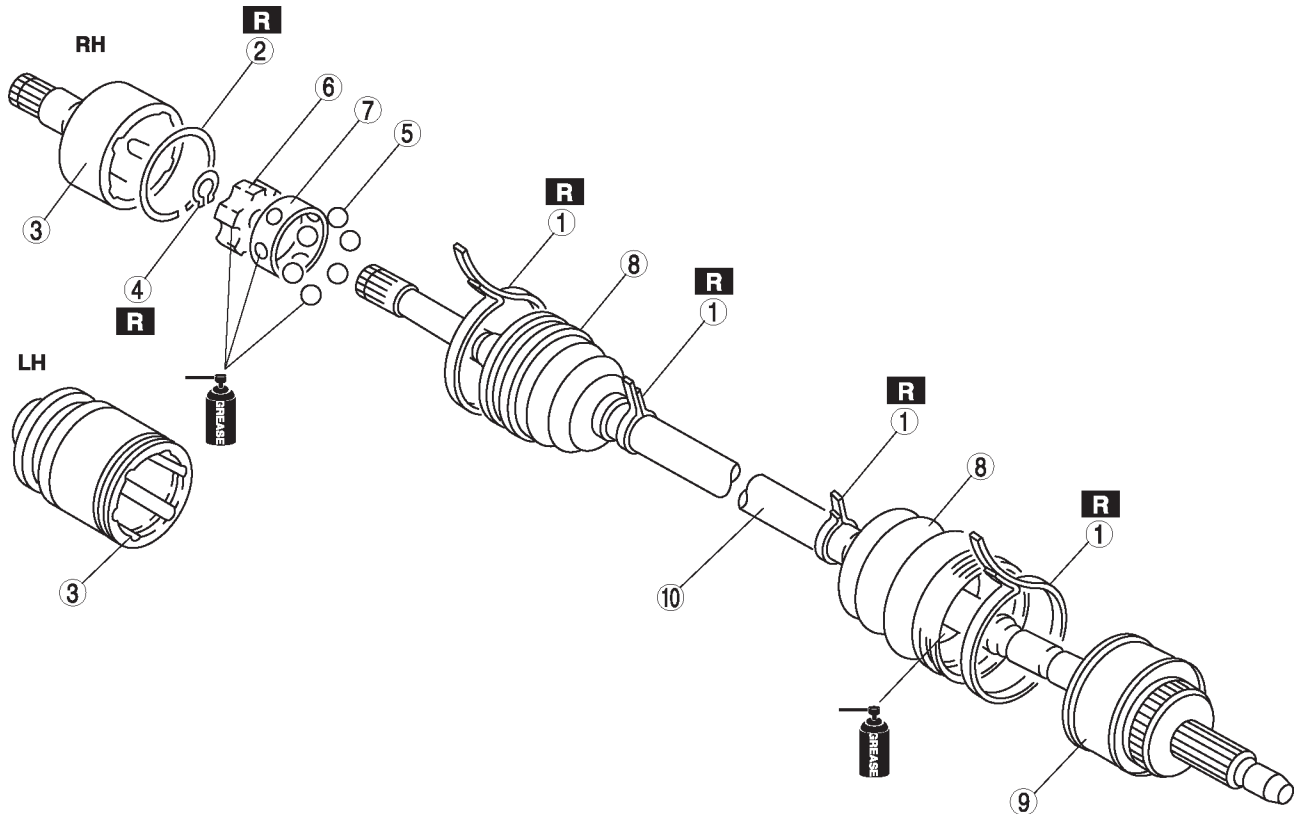
DRIVE SHAFT

DRIVE SHAFT DISASSEMBLY/ASSEMBLY (VEHICLES BUILT FROM 08/2002)

Caution

- Do not damage and remove the dust cover or the ABS sensor rotor on the drive shaft. These parts cannot be purchased separately. Replace the assembled unit if the dust cover or the ABS sensor rotor is damaged and removed.

- Disassemble in the order indicated in the table.
- Assemble in the reverse order of removal.



1	Boot band + See Boot Band Disassembly Note + See Boot Band Assembly Note
2	Clip
3	Outer ring + See Outer Ring Disassembly Note + See Outer Ring Assembly Note
4	Snap ring + See Cage, Inner Ring, Balls, Snap Ring Assembly Note
5	Balls + See Balls, Inner Ring, Cage Disassembly Note + See Cage, Inner Ring, Balls, Snap Ring Assembly Note

6	Inner ring + See Balls, Inner Ring, Cage Disassembly Note + See Cage, Inner Ring, balls, Snap Ring Assembly Note
7	Cage + See Balls, Inner Ring, Cage Disassembly Note + See Inner ring, Balls, Snap Ring Assembly Note
8	Boot + See Boot Disassembly Note + See Boot Assembly Note
9	Bell joint component
10	Drive shaft

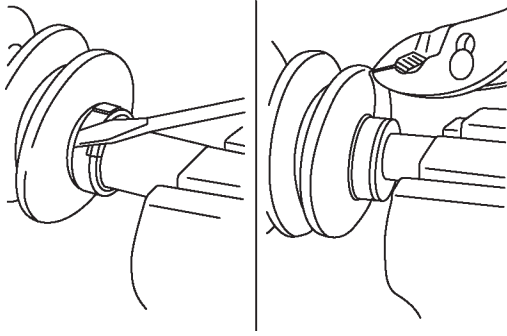
Boot Band Disassembly Note

Note

- The wheel side boot band does not need to be removed unless replacing it.

- Pry up the locking clip using a screwdriver.
- Remove the band using pliers.
- Slide the boot along the shaft to expose the joint.

DRIVE SHAFT



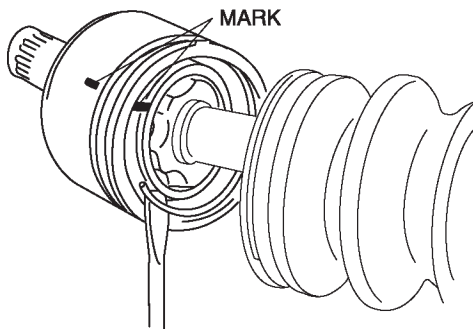
Outer Ring Disassembly Note

1. Mark the cage and outer ring for proper assembly.

Caution

- Mark with paint; do not use a punch.

2. Remove the clip using a screwdriver.
3. Remove the outer ring from the inner ring and the balls.
4. Clean the grease away.



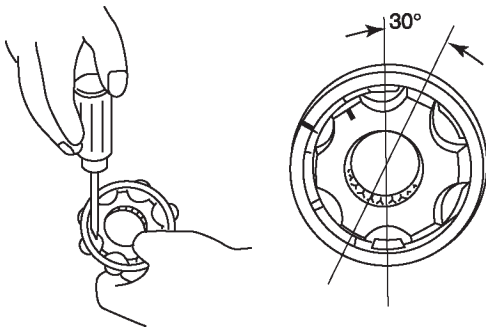
Balls, Inner Ring, Cage Disassembly Note

1. Mark the inner ring and cage.

Caution

- Mark with paint; do not use a punch.

2. Remove the snap ring using snap-ring pliers.
3. Disassemble the balls, inner ring, cage from the drive shaft as component.
4. Turn the cage **approximately 30 degrees** and pull the cage and balls away from the inner ring.



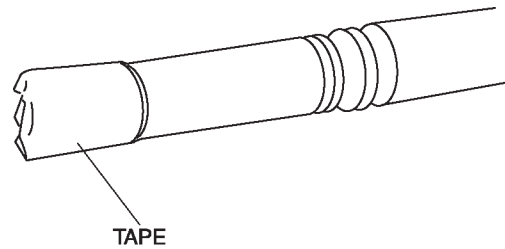
Boot Disassembly Note

Note

- The wheel side boot does not need to be removed unless replacing it or the bell joint and shaft component.

- Do not strip the tape until the boot is assembled.

1. Wrap the shaft splines with tape.



2. Remove the boot.

Boot Assembly Note

1. Fill the boot (wheel side) with the specified grease from a tube, not by hand.

Caution

- Do not touch the grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.

Note

- The wheel side and differential side boots are different.
- Use the specified grease supplied in the boot.

Grease amount

110–130 g {3.88–4.58 oz}

2. With the splines of the shaft still wrapped in tape from disassembly, install the boot.
3. Remove the tape.

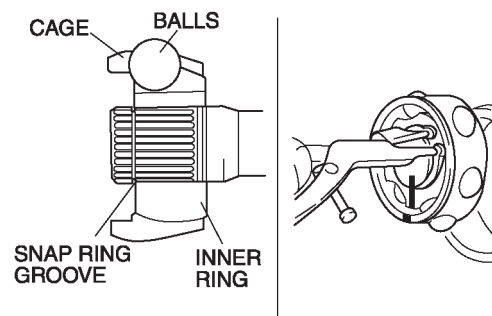
Cage, Inner Ring, Balls, Snap Ring Assembly Note

1. Align the marks and install the balls and cage to the inner ring in the direction shown in the figure.

Caution

- Install the cage with the offset facing the snap ring groove. If incorrectly installed, the drive shaft may become disengaged.

2. Install a new snap ring.



DRIVE SHAFT

Outer Ring Assembly Note

1. Fill the outer ring and boot with the specified grease.

Caution

- Do not touch the grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.

Note

- Use the specified grease supplied in the boot kit.

Grease amount

95–115 g {3.36–4.05 oz}

2. Align the marks, and install the outer ring on to the shaft.
3. Install a new clip.
4. Install the boot,
5. Set the drive shaft to the standard length.

Standard length

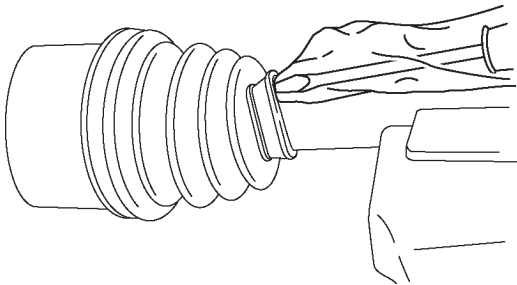
Right side: 593.5—603.5 mm {23.37—23.75 in}

Left side: 525.5—535.5 mm {20.69—21.08 in}

6. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth wrapped screwdriver.

Caution

- Be careful not to allow the grease to leak.
- Do not damage the boot.



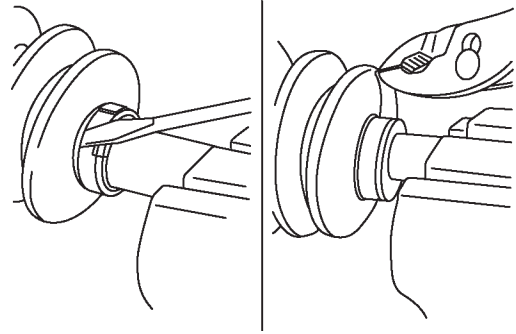
7. Verify that the drive shaft length is within the specification.

Boot Band Assembly Note

Note

- Always use new bands.
- The band should be folded in the direction opposite to the forward revolving direction of the drive shaft.

1. Fold the band back and use pliers to pull it tight.

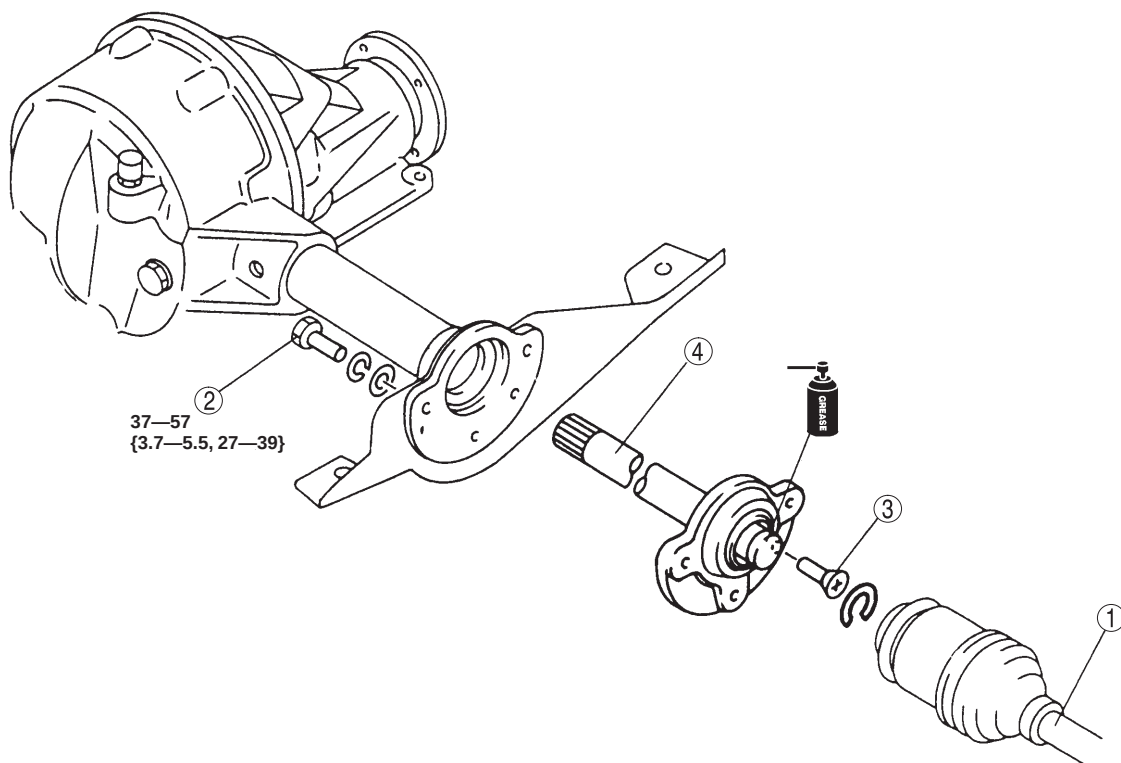


2. Lock the end of the band by bending the locking clips.

DRIVE SHAFT

OUTPUT SHAFT (MFW) REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.



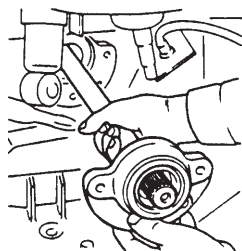
N·m {kgf·m, ft·lb}

1	Drive shaft + DRIVE SHAFT, DRIVE SHAFT REMOVAL/ INSTALLATION
2	Bolt

3	Screw
4	Output shaft component + Removal Note

Output Shaft Component Removal Note

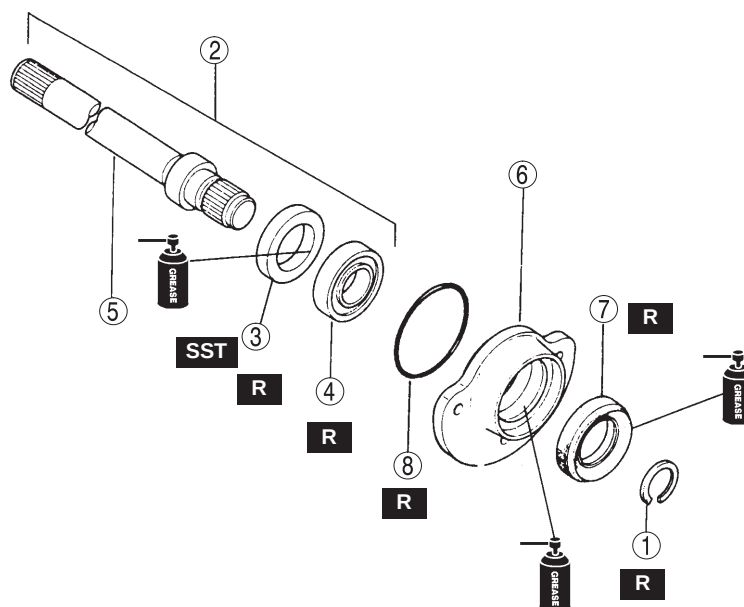
- Remove the output shaft by prying with a bar inserted between the bearing housing of the output shaft and the differential casing.



DRIVE SHAFT

OUTPUT SHAFT DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

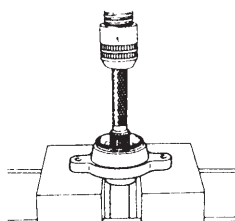


1	Clip + DRIVE SHAFT, DRIVE SHAFT REMOVAL/ INSTALLATION, Clip Assembly Note
2	Output shaft component + Disassembly Note + Assembly Note
3	Oil seal + Assembly Note

4	Bearing + Disassembly Note + Assembly Note
5	Output shaft
6	Bearing housing
7	Oil seal + Assembly Note
8	O-ring

Output Shaft Component Disassembly Note

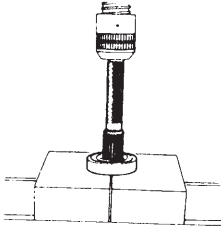
- Disassemble the output shaft component using a press.



DRIVE SHAFT

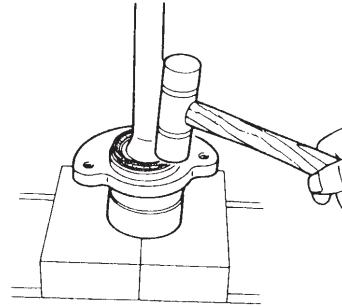
Bearing Disassembly Note

- Remove the bearing from the output shaft component using a press.



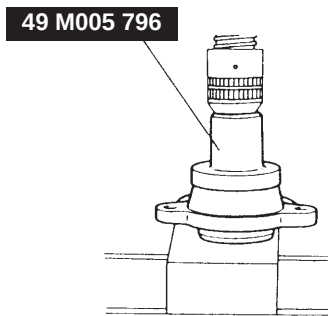
Oil Seal Assembly Note

- Assemble the new oil seal by lightly tapping it using a plastic hammer.



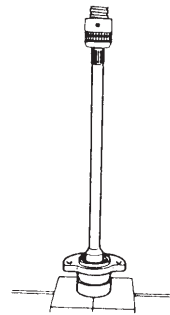
Oil Seal Assembly Note

- Use the **SST** to assemble the new oil seal until it is flush with the bearing housing end using the **SST**.



Output Shaft Component Assembly Note

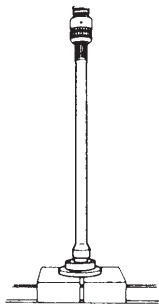
- Press the output shaft and bearing to the bearing housing.



Bearing Assembly Note

Caution

- Press the bearing center and shaft center vertically.
- Press the new bearing to the output shaft.



REAR DIFFERENTIAL

REAR DIFFERENTIAL

REAR DIFFERENTIAL OIL INSPECTION

Caution

- Position the vehicle level.

1. Remove the filler plug.
2. Verify that the oil is at the brim of the filler plug hole. If it is low, add the specified oil.

Specified oil

Type

Standard differential:

API service GL-5, SAE 90

LSD:

API service GL-6, SAE 90

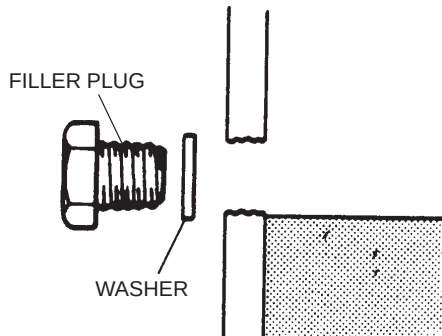
Capacity

4 × 2:

1.40 L {1.48 US qt, 1.23 Imp qt}

4 × 4:

1.85 L {1.96 US qt, 1.63 Imp qt}



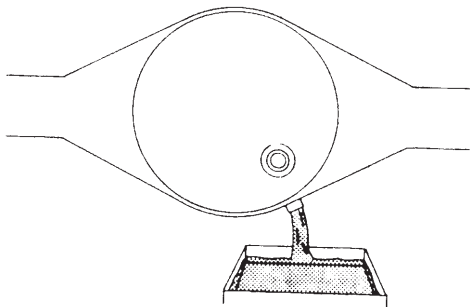
3. Install a new washer and the filler plug.

Tightening torque

40—53 N·m {4.0—5.5 kgf·m, 29—39 ft·lbf}

REAR DIFFERENTIAL OIL REPLACEMENT

1. Remove the filler and drain plugs.
2. Drain the differential oil into a container.



3. Wipe the plugs clean.
4. Install a new washer and the drain plug.

Tightening torque

40—53 N·m {4.0—5.5 kgf·m, 29—39 ft·lbf}

5. Add the specified oil from the filler plug hole until it reaches the brim of the hole.

Specified oil

Type

Standard differential:

API service GL-5, SAE 90

LSD:

API service GL-6, SAE 90

Capacity:

4 × 2:

1.40 L {1.48 US qt, 1.23 Imp qt}

4 × 4:

1.85 L {1.96 US qt, 1.63 Imp qt}

6. Install a new washer and the filler plug.

Tightening torque

40—53 N·m {4.0—5.5 kgf·m, 29—39 ft·lbf}

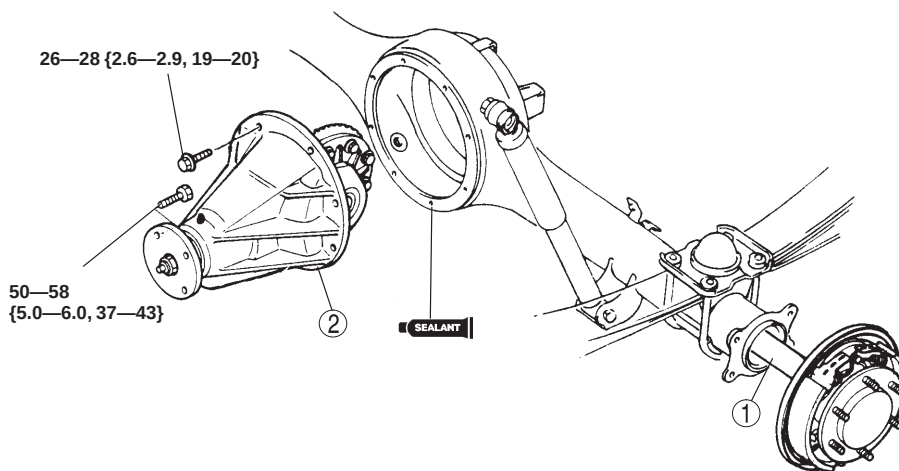
REAR DIFFERENTIAL

REAR DIFFERENTIAL REMOVAL/INSTALLATION

Caution

- Clean away the old sealant before applying the new sealant.
- Install the differential carrier within 10 minutes after applying sealant.
- Allow the sealant to set at least 30 minutes after installation before filling the differential with the specified oil.

1. Drain the differential oil. (Refer to REAR DIFFERENTIAL, REAR DIFFERENTIAL OIL REPLACEMENT.)
2. Remove the rear propeller shaft. (Refer to section L, REAR PROPELLER SHAFT (4 × 4), REAR PROPELLER SHAFT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



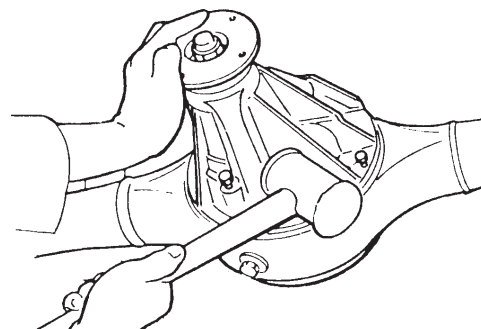
N·m {kgf·m, ft·lbf}

1	Axle shaft and back plate component + REAR AXLE, AXLE SHAFT REMOVAL/ INSTALLATION
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2	Differential + Removal Note
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Differential Removal Note

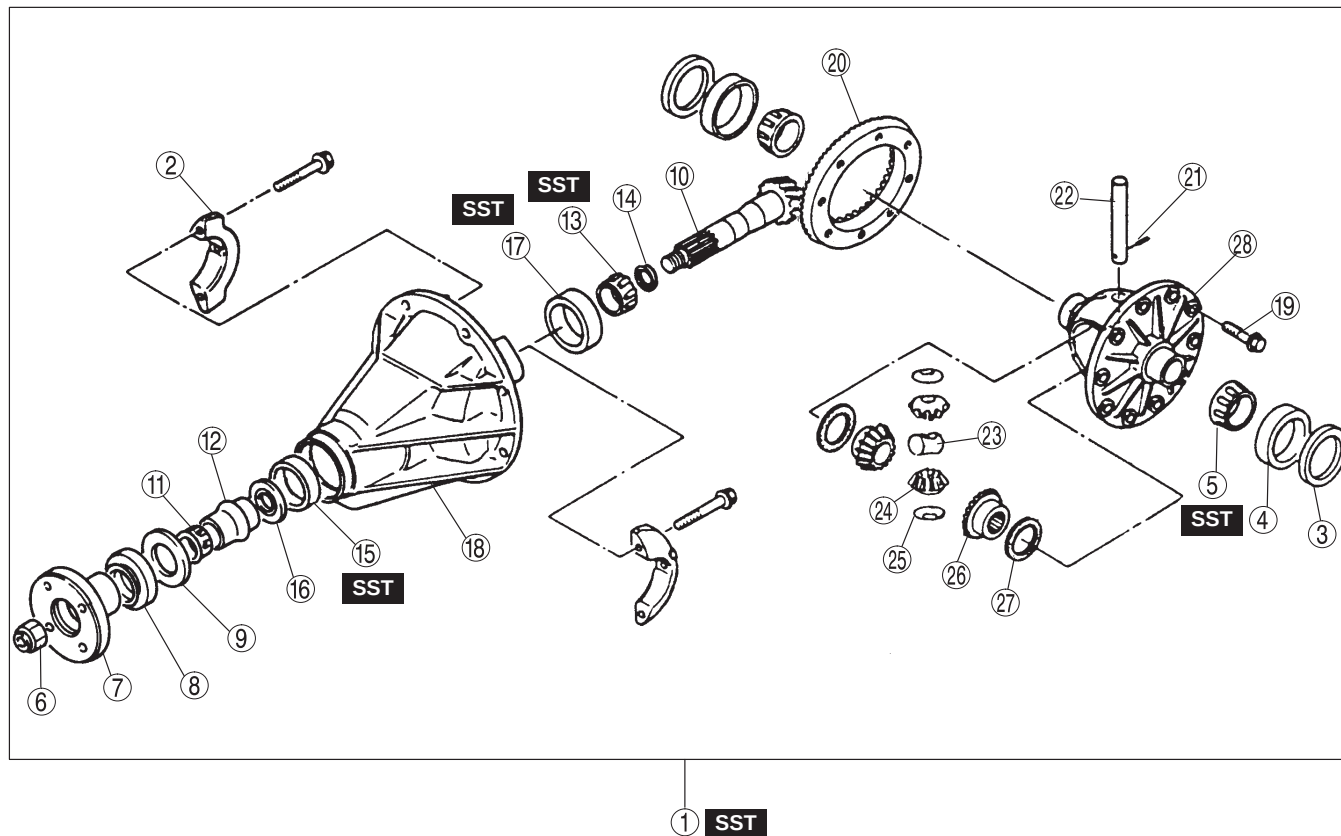
- To prevent the differential from dropping, leave the two bolts loosely tightened. Then hit the differential carrier using a wooden hammer.



REAR DIFFERENTIAL

STANDARD DIFFERENTIAL DISASSEMBLY

- Disassemble in the order indicated in the table.



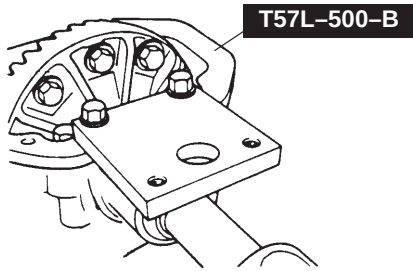
1	Differential component + Disassembly Note
2	Bearing cap + Disassembly Note
3	Adjusting shim
4	Side bearing cup
5	Side bearing cone + Disassembly Note
6	Pinion nut + Disassembly Note
7	Companion flange + Disassembly Note
8	Oil seal + Disassembly Note
9	Thrust washer
10	Drive pinion + Disassembly Note
11	Front bearing cone
12	Collapsible spacer
13	Rear bearing cone + Disassembly Note

14	Adjusting shim
15	Front bearing cup + Disassembly Note
16	Oil baffle
17	Rear bearing cup + Disassembly Note
18	Carrier
19	Hex screw
20	Ring gear
21	Roll pin + Disassembly Note
22	Pinion shaft
23	Thrust block
24	Pinion gear
25	Pinion gear thrust washer
26	Side gear
27	Side gear thrust washer
28	Case

REAR DIFFERENTIAL

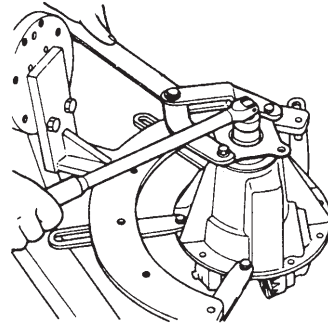
Differential Component Disassembly Note

- Mount a carrier component to the **SST** or equivalent.



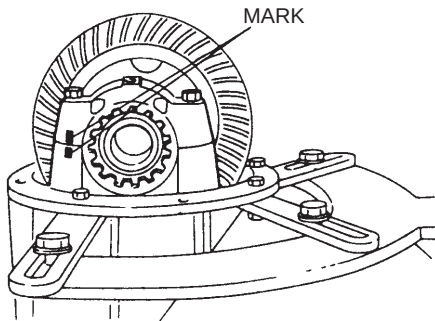
Pinion Nut Removal Note

- Hold the companion flange and remove the pinion nut.



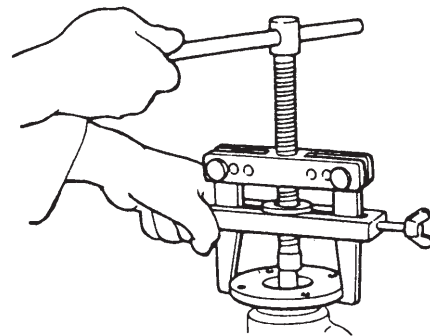
Bearing Cap Disassembly Note

- Place a mark on one of the bearing caps so that the left and right bearing caps won't get mixed up. Use the mark for matching at the time of assembly.



Companion Flange Disassembly Note

- Remove the companion flange using universal puller.



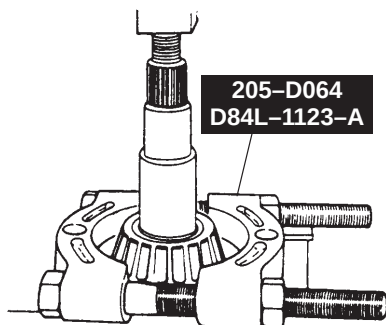
Side Bearing Cone Disassembly Note

Warning

- When pulling the side bearing cone, do not allow differential component to fall. It can strike legs or feet and may cause serious injury.

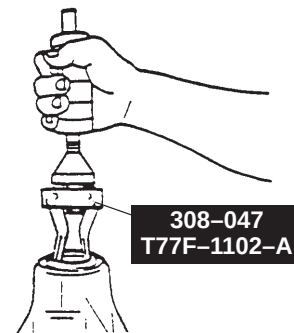
Caution

- Mark the left bearing in order to install in the same position.
- Remove the side bearing cone using a press and the **SST**.



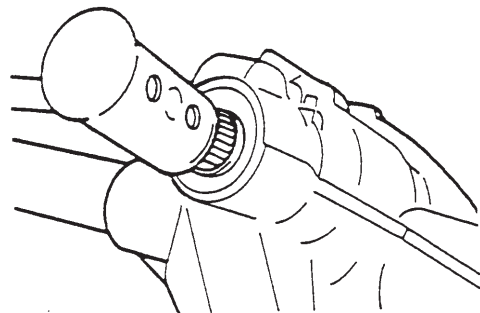
Oil Seal Disassembly Note

- Pull out the oil seal using the **SST**.



Drive Pinion Disassembly Note

- Remove the drive pinion by tapping with a plastic hammer.

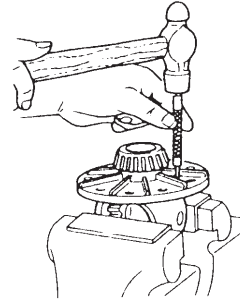
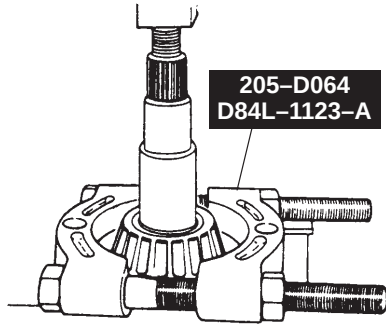


REAR DIFFERENTIAL

Rear Bearing Cone Disassembly Note

Note

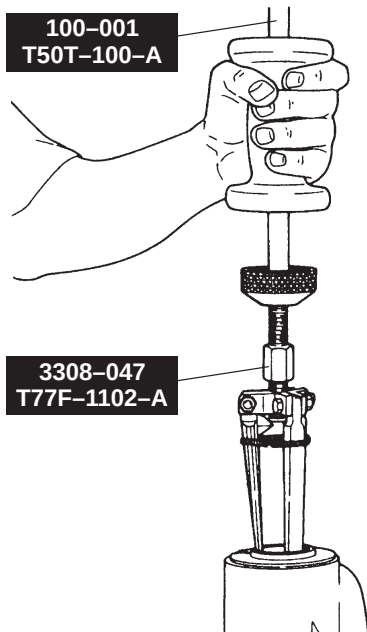
- Mark or otherwise distinguish between the front and rear cones so that they are not mixed up at the time of reassembly.
- Remove the rear bearing cone using the **SST**.



Front Bearing Cup, Rear Bearing Cup Disassembly Note

Note

- Mark or otherwise distinguish between the front and rear cups so that they are not mixed up at the time of reassembly.
- Remove the bearing races using the **SSTs** (308 047 T77F-1102A and 100 001 T50T-100-A).



Roll Pin Disassembly Note

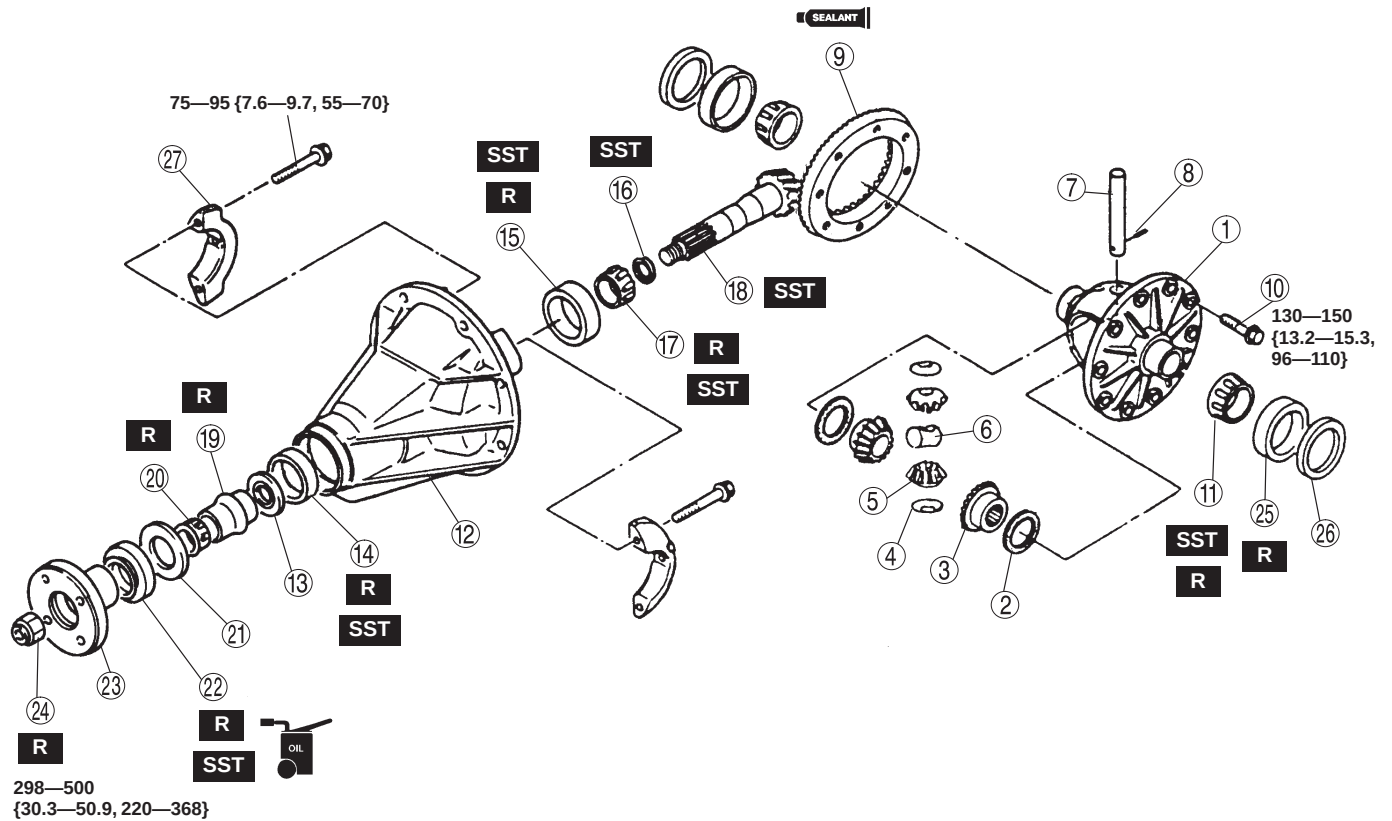
Caution

- Insert the bar from the knock pin hole at the opposite side from where the ring gear is installed.
- Secure the gear case in a vise and remove the roll pin using a small drift.

REAR DIFFERENTIAL

STANDARD DIFFERENTIAL ASSEMBLY

- Assemble in the order indicated in the table.



N·m {kgf·m, ft·lbf}

1	Case + Assembly Note
2	Side gear thrust washer + Assembly Note
3	Side gear
4	Pinion gear thrust washer
5	Pinion gear
6	Thrust block
7	Pinion shaft
8	Roll pin
9	Ring gear
10	Hex screw
11	Side bearing cone + Assembly Note
12	Carrier
13	Oil baffle
14	Front bearing cup + Assembly Note
15	Rear bearing cup + Assembly Note

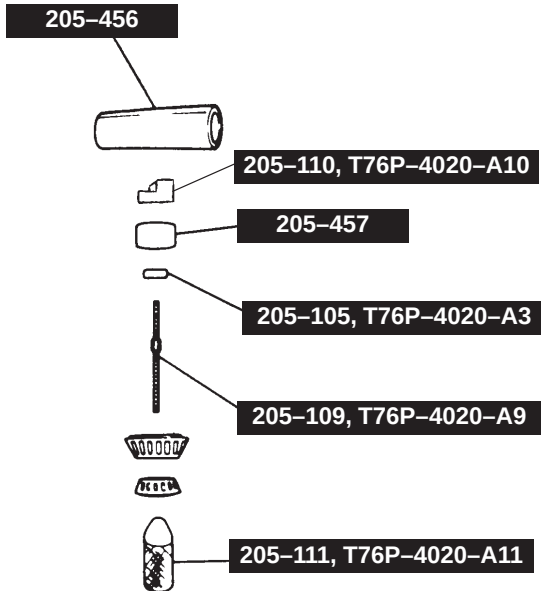
16	Adjusting shim + Assembly Note
17	Rear bearing cone + Assembly Note
18	Drive pinion + Assembly Note
19	Collapsible spacer
20	Front bearing cone
21	Thrust washer
22	Oil seal + Assembly Note
23	Companion flange
24	Pinion nut
25	Side bearing cup + Assembly Note
26	Adjusting shim + Assembly Note
27	Bearing cap + Assembly Note

REAR DIFFERENTIAL

Adjusting Shim Assembly Note

Pinion height Adjustment

1. Assemble the rear bearing cone over the **SST** and insert it into the rear bearing cup of the carrier.
2. Assemble the front bearing cone into the front bearing cup and assemble the **SSTs**.



3. Roll the **SST** component back and forth a few times to seat the bearings while tightening the **SST** by hand.

Tightening torque

27 N·m {2.8 kgf·m, 20 ft·lbf}

4. Center the **SST** (205-456) into the side bearing bore. Install the bearing caps and tighten the bolt.

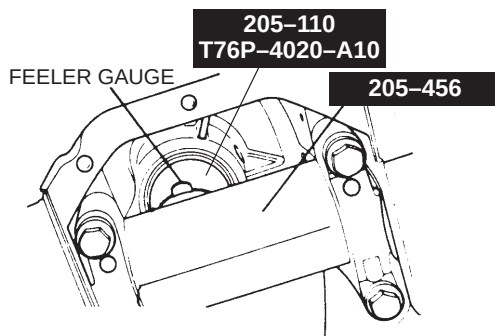
Tightening torque

75—95 N·m {7.6—9.7 kgf·m, 55—70 ft·lbf}

Note

- There should be drag on the feeler gauge when it is inserted between the **SSTs** (205-110, T76P-4020-A10 and 205-456).

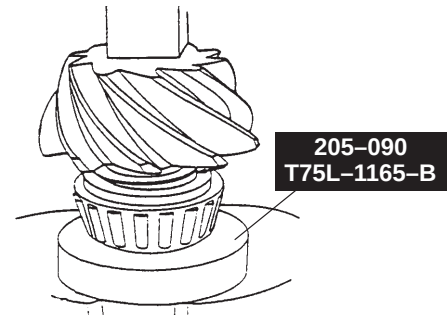
5. Insert the thickest feeler gauge possible between the **SSTs** (205-110, T76P-4020-A10 and 205-456).



6. This measurement is the thickness needed for the selective shim if there was no marking on the drive pinion. If the drive pinion is marked with a plus (+) reading, the amount marked should be subtracted from the feeler gauge measurement. If the drive pinion is marked with a minus (–) reading, the amount marked should be added to the feeler gauge measurement.

Rear Bearing Cone Assembly Note

- Assemble the selected spacer on the drive pinion and press the rear bearing inner race until it is firmly seated on the shaft.



Drive Pinion Assembly Note

Drive pinion preload adjustment

Caution

- Never loosen pinion nut to decrease drive pinion preload torque, and never exceed specified preload torque. If preload torque is exceeded, a new collapsible spacer must be installed and the torque sequence repeated.

1. Install the drive pinion, collapsible spacer and companion flange to the carrier, and tighten the pinion nut until all end play is removed.
2. Continue to tighten in small increments until the specified preload can be obtained.

Drive pinion preload

1.2—1.5 N·m

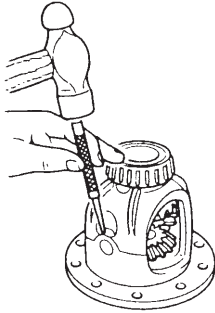
{12.2—15.3 kgf·cm, 10.6—13.2 in·lbf}

3. If the specified preload can't be obtained within the specified tightening torque range, replace the collapsible spacer and inspect again.

REAR DIFFERENTIAL

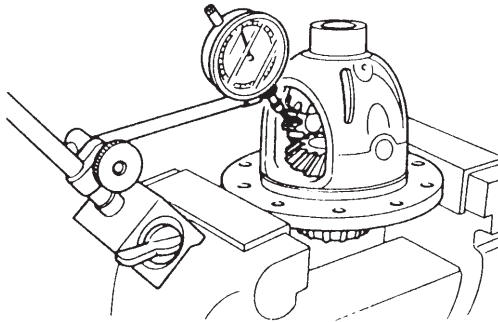
Case Assembly Note

- Assemble the side gears, thrust washer, thrust block, pinion gears, pinion shaft and knock pin. After assembling the knock pin, make a crimp so that the pin will not come out of the gear case.



Side Gear Thrust Washer Assembly Note

- Adjust the backlash of the side gears and pinion gear as follows.
 - Set a dial gauge to the pinion gear as shown in the figure.
 - Secure one of the side gears.
 - Move the pinion gear and measure the backlash at the end of the pinion gear.



Standard backlash

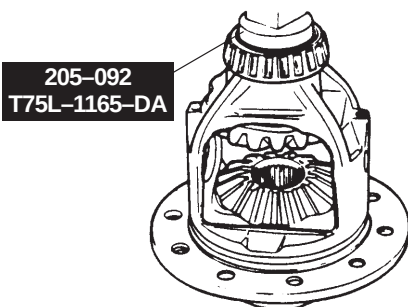
0—0.1 mm {0—0.004 in}

- If the backlash exceeds the standard, use the thrust washers to adjust.

Side Bearing Cone Assembly Note

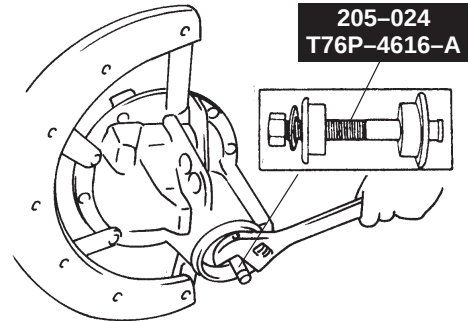
Caution

- Bearings should be assembled to the original positions.
- Press the side bearings into the gear case using the SST.



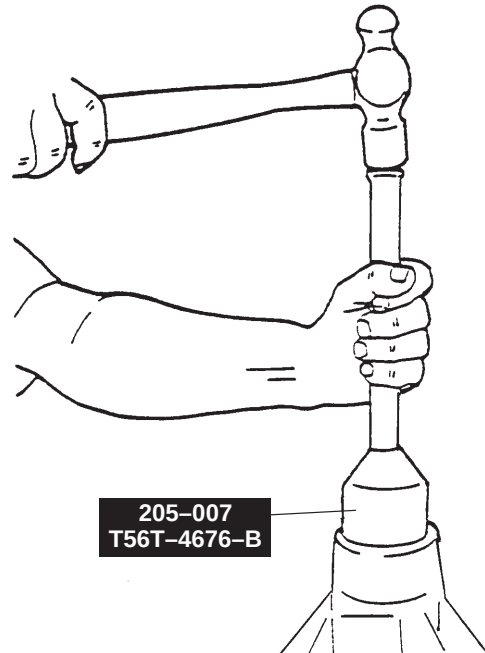
Front Bearing Cup, Rear Bearing Cup Assembly Note

- Install the oil baffle in the outer bearing cup bore of the carrier.
- Install the outer bearing cup and inner bearing cup using the SST.



Oil Seal Assembly Note

- Apply a light coat of oil to the lip of a new oil seal.
- Assemble the new oil seal using the SST.

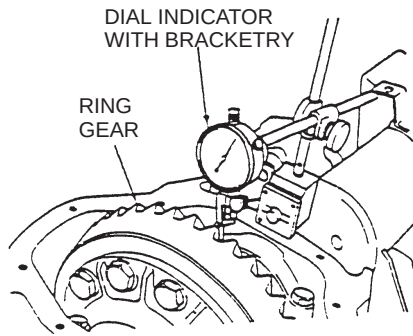


Side Bearing Cup, Adjusting Shim, Bearing Cap Assembly Note

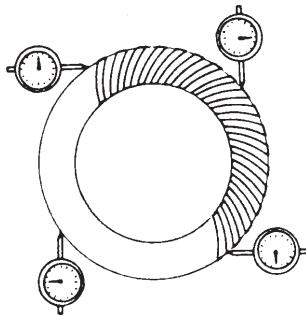
Ring gear backlash adjustment

- Install the gear case component on the carrier.
- Push the gear case component to the left side of the carrier and measure the clearance between the side bearing and carrier. This measurement is the left and right total shim thickness.
- Divide the amount of shim in step 2 appropriately between the right and left side, then install the bearing cap.
- Adjust the drive pinion, ring gear backlash and the side bearing preload as follows.
 - Mark the ring gear at four points at **approx. 90°** intervals and mount a dial indicator to the carrier so that the feeler comes in contact at a **90°** angle with one of the ring gear teeth.

REAR DIFFERENTIAL



5. Inspect the backlash at the three other marked points and make sure that the minimum backlash is more than **0.12 mm {0.005 in}** and difference of the maximum and minimum backlash value is less than **0.08 mm {0.003 in}**.

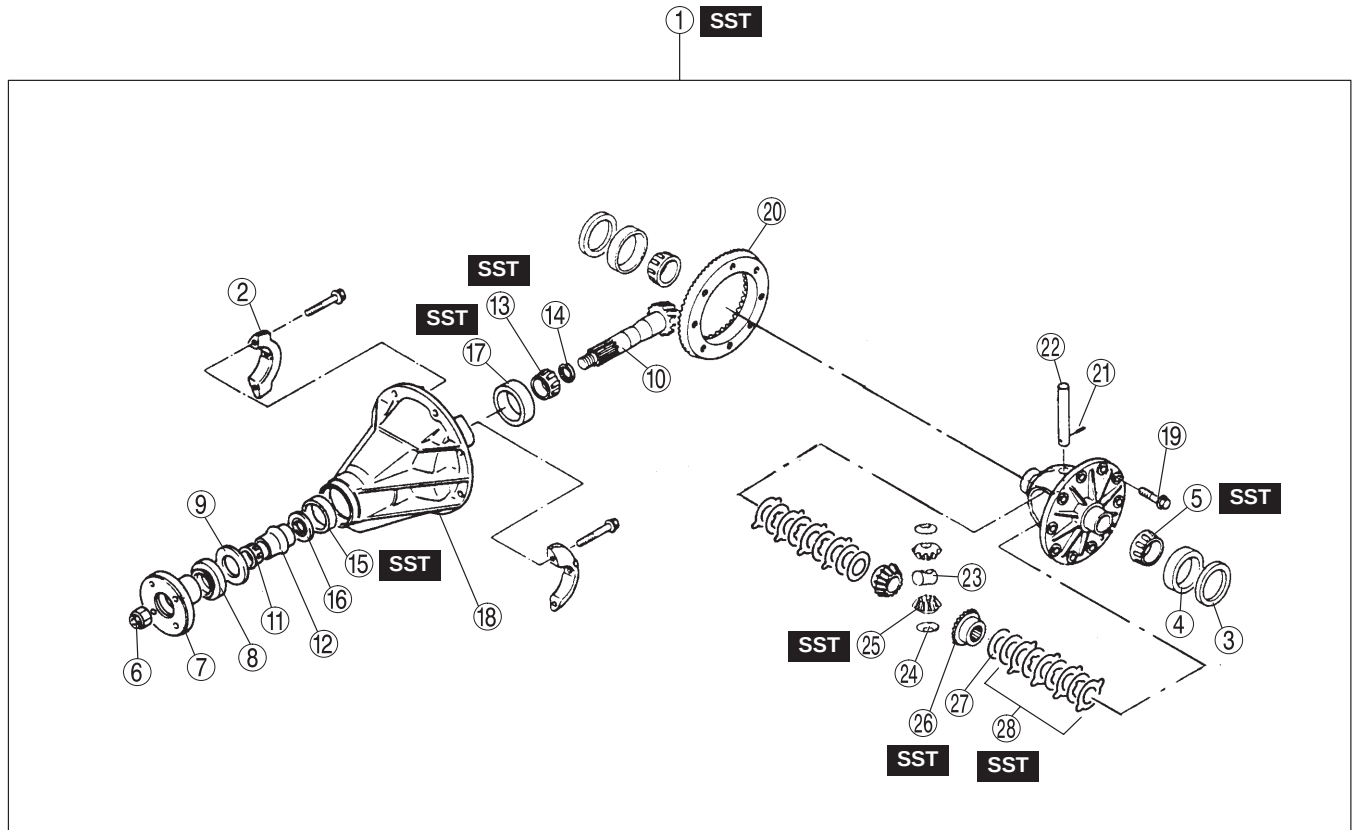


6. If backlash is not as specified, correct the backlash by switching shims from one side of the differential case to the other.
7. Using a torque wrench, inspect the total rotating torque of the pinion and differential component by rotating the pinion three complete revolutions, and then reading the rotating torque. The readings should not exceed **2.4 N·m {24.0 kgf·cm, 20.8 in·lbf}**. If the backlash is within specification but the rotating torque is too high, the preload may be adjusted by removing an equal amount of shims from both sides of the differential.
8. Inspect the drive pinion and ring gear tooth contact.
- (1) Coat both surfaces of 6—8 teeth of the ring gear uniformly with a thin red lead coating.
 - (2) While moving the ring gear back and forth by hand, rotate the drive pinion several times and inspect the tooth contact.
 - (3) If the tooth contact is good, wipe off the red lead coating.
 - (4) If it is not good, adjust the pinion height, then adjust the backlash.

REAR DIFFERENTIAL

LIMITED SLIP DIFFERENTIAL DISASSEMBLY

- Disassemble in the order indicated in the table.



1	Differential component + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Differential Component Disassembly
2	Bearing cap + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Bearing Cap Disassembly Note
3	Adjusting shim
4	Side bearing cup
5	Side bearing cone + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Side Bearing cone Disassembly Note
6	Pinion nut + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Pinion nut Disassembly Note
7	Companion frange + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Companion Frang Disassembly Note

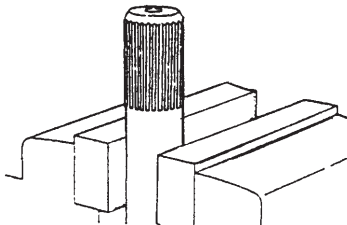
8	Oil seal + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Oil Seal Disassembly Note
9	Thrust washer
10	Drive pinion + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Drive Pinion Disassembly Note
11	Front bearing cone
12	Collapsible spacer
13	Rear bearing cone + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Rear Bearing Inner Race Disassembly Note
14	Adjusting shim
15	Front bearing cup + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Front Bearing cup Disassembly Note
16	Oil baffle

REAR DIFFERENTIAL

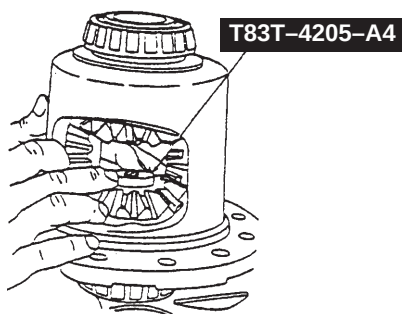
17	Rear bearing cup + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Rear Bearing cup Disassembly Note
18	Carrier
19	Hex screw
20	Ring gear
21	Roll pin + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL DISASSEMBLY, Roll Pin Disassembly Note
22	Pinion shaft
23	Thrust block
24	Pinion gear thrust washer
25	Pinion gear
26	Side gear
27	Side gear thrust washer
28	Limited slip differential component + Disassembly Note

Limited Slip Differential Component Disassembly Note

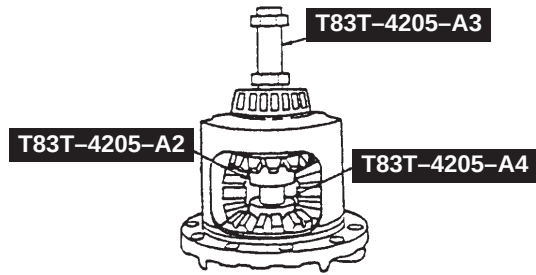
1. Place one of the axle shafts, which was removed from the component, into a vise, with the splines extending above the jaws of the vise far enough to engage the side gears of the differential case component, and position the differential case onto the axle shaft as a holding fixture by aligning the splines of the side gear with those of the axle shaft.



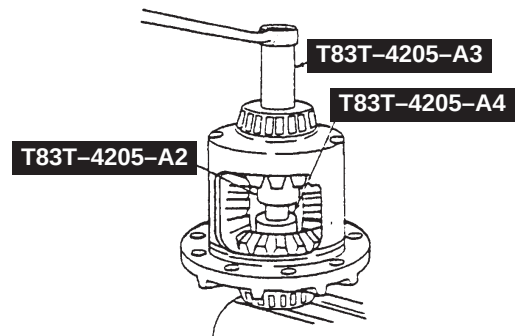
2. Install the **SST** into the bottom of the side gear, and apply grease to the centering hole of it.



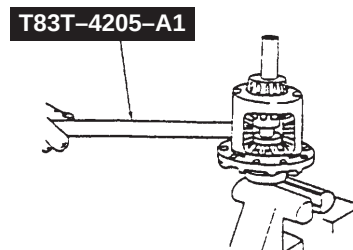
3. Install the **SSTs** into the differential case.



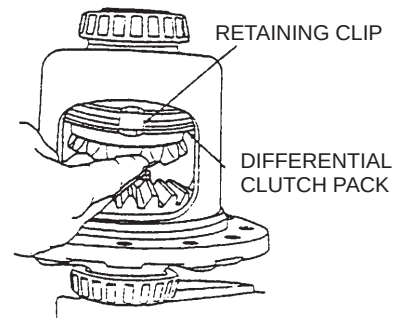
4. Tighten the **SST** to move the side gears away from the pinion gears and relieve the normal loaded condition.



5. Push out the thrust washers located behind the pinion gears.
6. Momentarily, loosen the **SST**. Retighten the **SST** until a very slight movement of the pinion gears is seen.
7. Insert **SST** into the bore of the pinion shaft and rotate the differential case until the pinion gears can be removed through the large openings in the differential case.



8. Retain the top side gear and clutch pack in the differential case by hand and remove the **SSTs**.

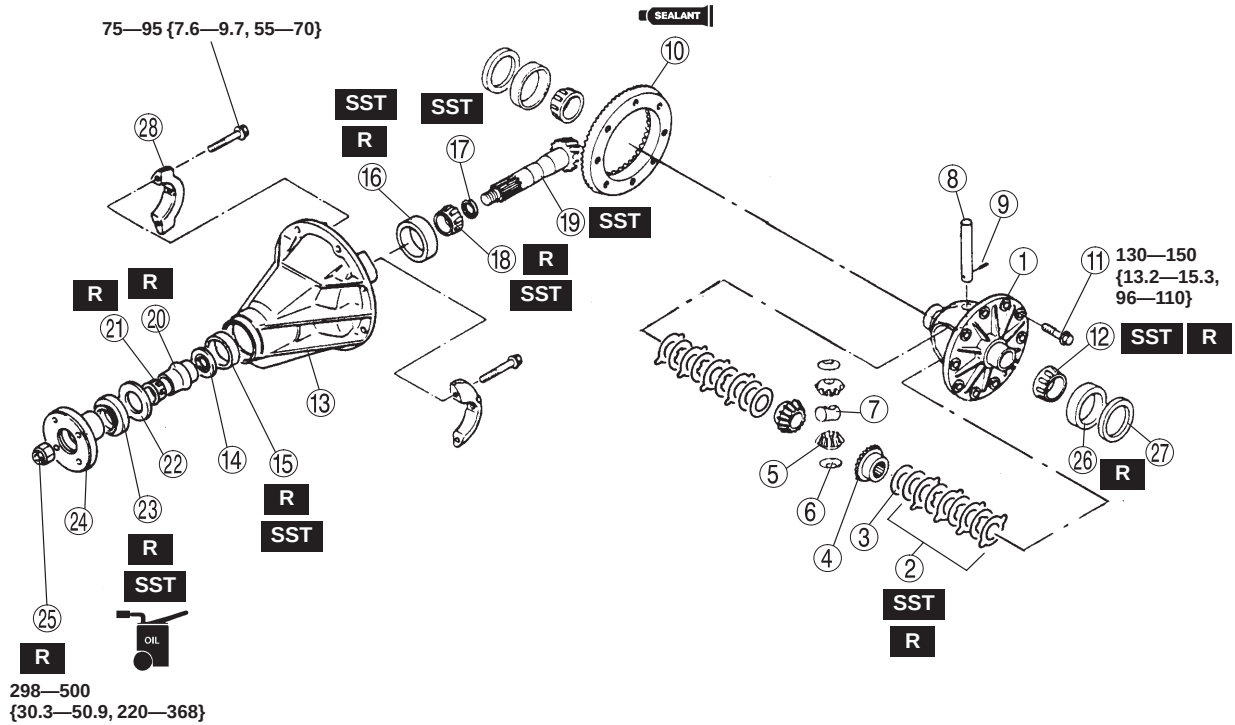


9. Remove the top side gear and clutch pack. Keep the stack of clutch plates and clutch discs in exact order.
10. Remove the retainer clips from both clutch packs to allow separation of the clutch discs and clutch plates for cleaning and inspection.

REAR DIFFERENTIAL

LIMITED SLIP DIFFERENTIAL ASSEMBLY

- Assemble in the order indicated in the table.



N·m {kgf·m, ft·lbf}

1	Case
2	Limited slip differential component + Assembly Note
3	Side gear thrust washer
4	Side gear
5	Pinion gear
6	Pinion gear thrust washer
7	Thrust block
8	Pinion shaft
9	Roll pin + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Roll Pin Assembly Note
10	Ring gear + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Ring Gear Assembly Note
11	Hex screw
12	Side bearing cone + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Side Bearing Cone Assembly Note
13	Carrier

14	Oil baffle
15	Front bearing cup + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Front Bearing Cup Assembly Note
16	Rear bearing cup + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Rear Bearing Cup Assembly Note
17	Adjusting shim + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Adjusting Shim Assembly Note
18	Rear bearing cone + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Rear Bearing Cone Assembly Note
19	Drive pinion + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Drive Pinion Assembly Note
20	Collapsible spacer

REAR DIFFERENTIAL

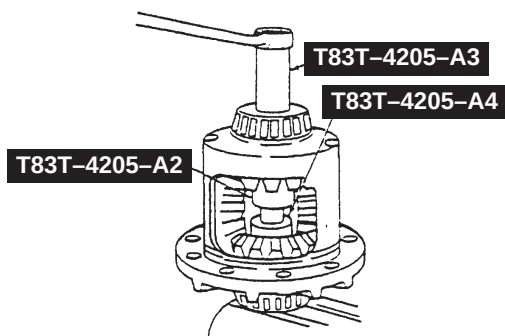
21	Front bearing cone
22	Thrust washer
23	Oil seal + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Oil Seal Assembly Note
24	Companion frange
25	Pinion nut
26	Side bearing cup + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Side Bearing Cup Assembly Note
27	Adjusting shim + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Adjusting Shim Assembly Note
28	Bearing cap + REAR DIFFERENTIAL, STANDARD DIFFERENTIAL ASSEMBLY, Bearing Cap Assembly Note

Limited Slip Differential Component Assembly Note

Note

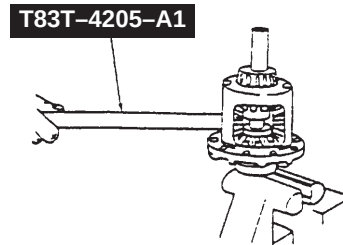
- Always replace the entire disc and plate kits, even if only one component requires it.

- Assemble the retainer clips to the ears of the clutch plates. Make sure both clips are completely assembled or seated onto the ears of the clutch plates.
- Place the differential case on a bench. Assemble the clutch pack and side gear into the differential case. Make sure the clutch pack stays assembled to the splines of side gear, and the retainer clips are completely seated into the pockets of differential case.
- Install the **SSTs** to the differential case.

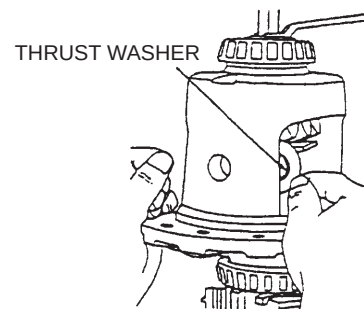


- With tools assembled to the differential case, position the differential case onto the axle shaft by aligning the splines of the differential side gear with those of the axle shaft.
- Position both pinion gears opposite one another through the openings in the differential case. Align holes of the differential pinion gears with each other. Hold the pinion gears by hand.

- Tighten the **SST** so the side gears move away from the pinion gears and relieve the loaded condition.
- While holding the pinion gears in place, insert **SST** into the hole of pinion shaft in the differential case. Pull on the **SST** rotating differential case allowing the differential pinion gears to rotate and enter into the differential case.



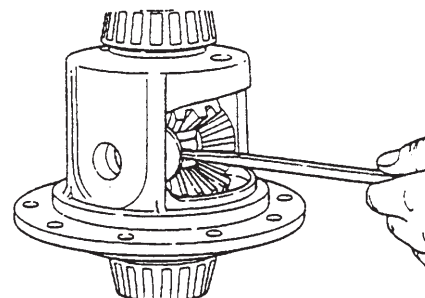
- Adjust the **SST** by very slightly loosening or tightening until the required load is applied to allow the side gears and pinion gears to rotate.
- Rotate the differential case until the holes of both pinion gears are aligned with those of the differential case.
- Apply torque to the **SST** for clearance to assemble the differential thrust washers.



Note

- During assembly, be sure the holes of the thrust washers and gears are lined up exactly with those of the differential case.

- Assemble thrust washers into the differential case. Use a very small screwdriver or shim stock to push the washers into place.



MANUAL FREEWHEEL (MFW) MECHANISM REMOTE FREEWHEEL (RFW) MECHANISM

MANUAL FREEWHEEL (MFW) MECHANISM

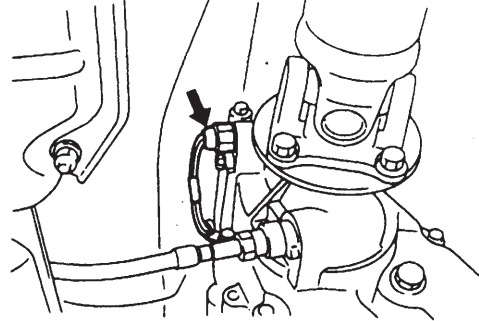
ON-VEHICLE INSPECTION

1. Jack up the front of the vehicle and support it on safety stands.
2. Set the select lever in "2H" position.
3. Set the freewheel hub control handle to the "FREE" position, then turn the handle clockwise and counterclockwise by hand, and inspect that it turns smoothly.
4. Set the freewheel hub control handle to "LOCK" position and inspect that the wheel turns with considerable force applied to make it turn.
5. If not as specified, replace the freewheel hub component as necessary.

REMOTE FREEWHEEL (RFW) MECHANISM

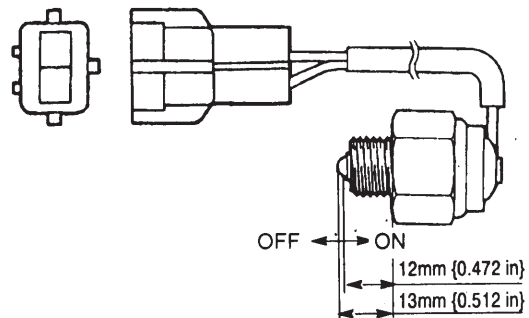
4 × 4 INDICATOR SWITCH INSPECTION

1. Jack up the vehicle and support it on safety stands.
2. Remove the transfer case switch (4 × 4 indicator switch).



3. Inspect for continuity between the terminals as shown using an ohmmeter.

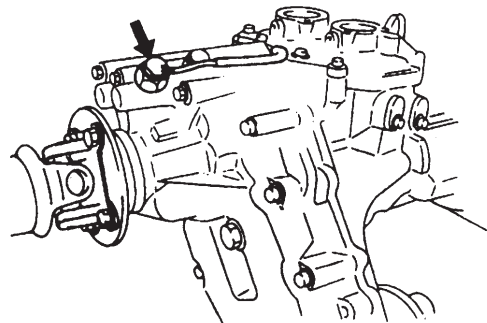
Continuity	Switch
Yes	Depressed (ON)
No	Released (OFF)



4. If not correct, replace the switch.

TRANSFER NEUTRAL SWITCH INSPECTION

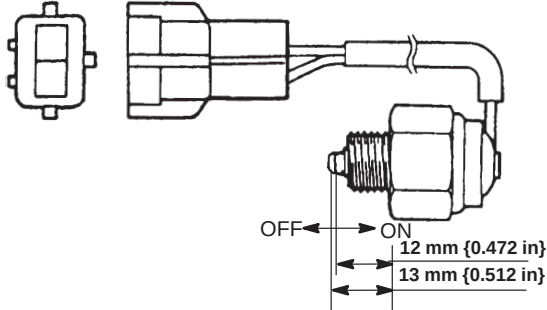
1. Jack up the vehicle and support it on safety stands.
2. Remove the transfer case switch (neutral switch).



REMOTE FREEWHEEL (RFW) MECHANISM

1. Inspect for continuity at the switch using an ohmmeter.

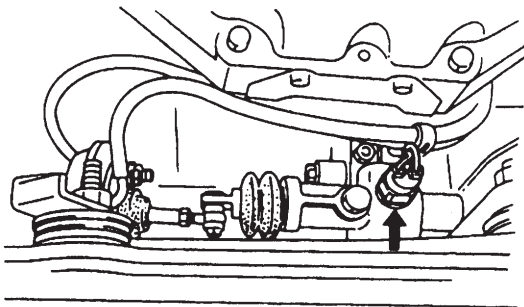
Continuity	Switch
Yes	Depressed (ON)
No	Released (OFF)



2. If not correct, replace the switch.

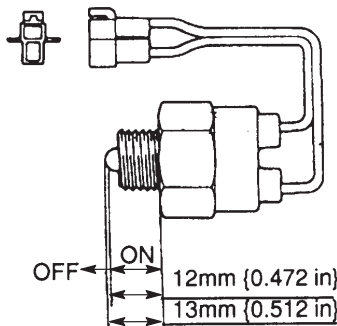
RFW SWITCH INSPECTION

1. Jack up the vehicle and support it on safety stands.
2. Disconnect the RFW switch connector and remove the switch.



3. Inspect for continuity at the switch using an ohmmeter.

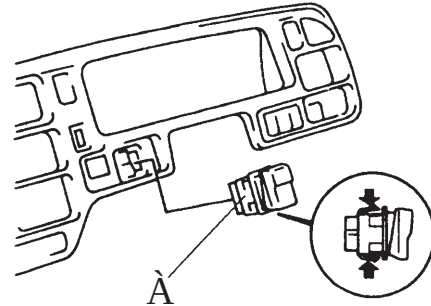
Continuity	Switch
Yes	Depressed (ON)
No	Released (OFF)



4. If not correct, replace the switch.

RFW MAIN SWITCH REMOVAL/INSTALLATION

1. Remove the meter hood.
(Refer to Section S, DASHBOARD AND CONSOLE, METER HOOD REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



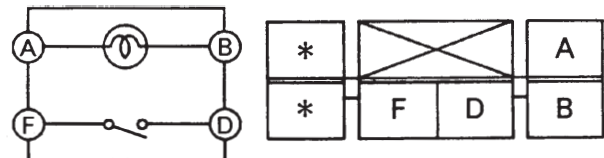
1	RFW main switch
---	-----------------

RFW MAIN SWITCH INSPECTION

1. Remove the RFW main switch.
2. Inspect for continuity between the terminals as shown using an ohmmeter.

○—○ : Continuity

Switch	Terminal			
	A	B	D	F
OFF	○—○	○—○		
ON	○—○	○—○	○—○	○—○

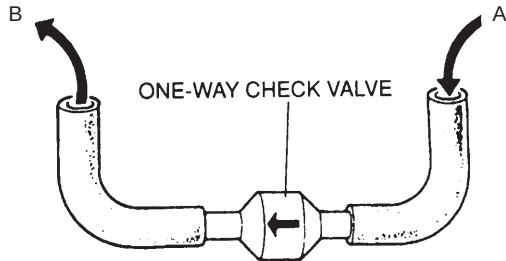


3. If not correct, replace the switch.

REMOTE FREEWHEEL (RFW) MECHANISM

ONE-WAY CHECK VALVE INSPECTION

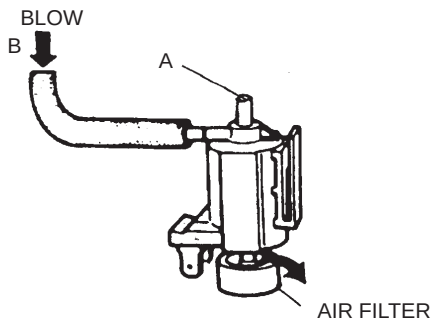
1. Remove the one-way check valve.
2. Blow through A and inspect that air flows from B.
3. Blow through B and inspect that air does not flow from A.



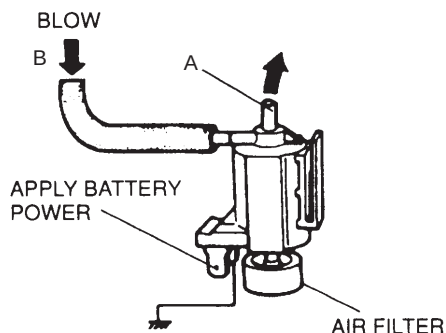
4. If not correct, replace the one-way check valve.

LOCK AND FREE SOLENOID VALVES INSPECTION

1. Disconnect the vacuum hoses and the connector from each solenoid valve.
2. Blow through each valve from port B.
3. Inspect that air flows from the air filter.



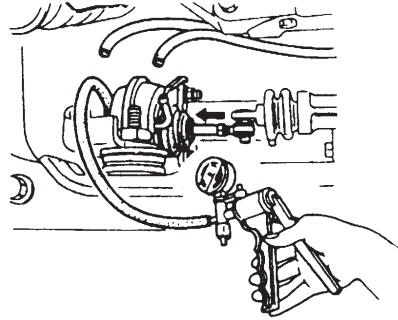
4. Connect 12V and a ground to the terminals of each valve.
5. Blow through each valve from port B.
6. Inspect that air flows from port A.



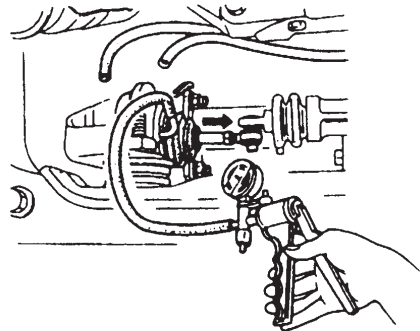
7. If not correct, replace the solenoid valve(s).

RFW ACTUATOR INSPECTION

1. Jack up the vehicle and support it on safety stands.
2. Disconnect the vacuum hoses from the actuator.
3. Connect a vacuum pump tester to the actuator (free side) as shown.
4. Apply **26.66 kPa {200 mmHg, 7.87 inHg}** vacuum, and verify that the rod moves toward the left (driver's side).



5. Disconnect the vacuum pump tester.
6. Connect the vacuum pump tester to the actuator (lock side) as shown.
7. Apply **26.66 kPa {200 mmHg, 7.87 inHg}** vacuum, and inspect that the rod moves toward the right (passenger side).

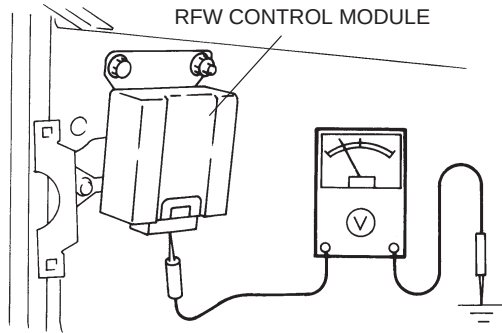


8. If not correct, replace the actuator.

REMOTE FREEWHEEL (RFW) MECHANISM

RFW CONTROL MODULE INSPECTION

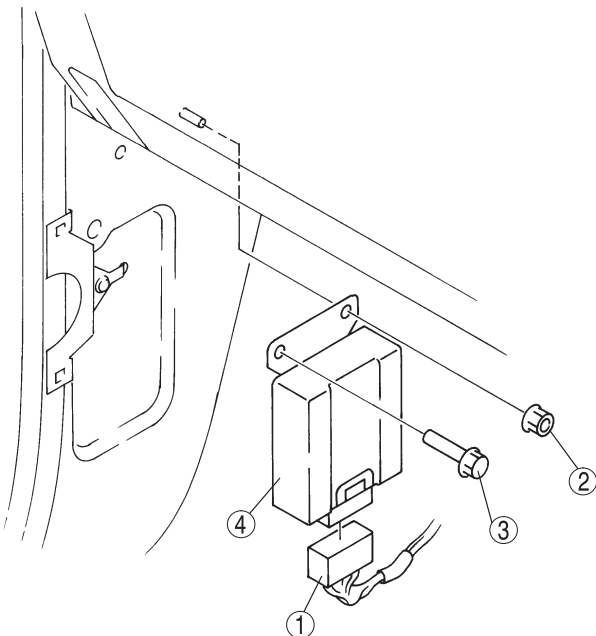
1. Remove the scuff plate. (Refer to section S, TRIM, SCUFF PLATE REMOVAL/INSTALLATION.)
2. Remove the front side trim. (Refer to section S, TRIM, FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Turn the ignition switch on and inspect the RFW control module terminal voltages, referring to the Terminal Voltage Chart.



4. If not correct, replace the component(s), wiring, and/or RFW control module.

REW CONTROL MODULE REMOVAL/INSPECTION

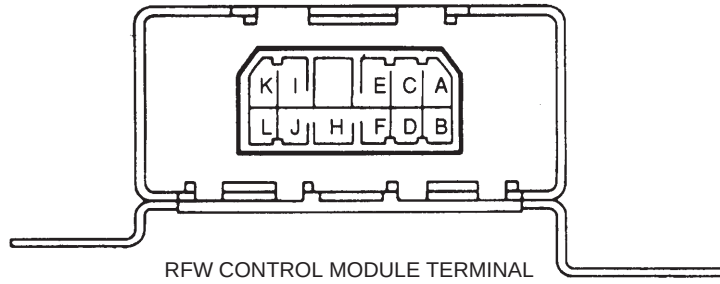
1. Remove the scuff plate. (Refer to section S, TRIM, SCUFF PLATE REMOVAL/INSTALLATION.)
2. Remove the front side trim. (Refer to section S, TRIM, FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



1	Connector
2	Nut
3	Bolt
4	RFW control module

REMOTE FREEWHEEL (RFW) MECHANISM

Terminal Voltage Chart



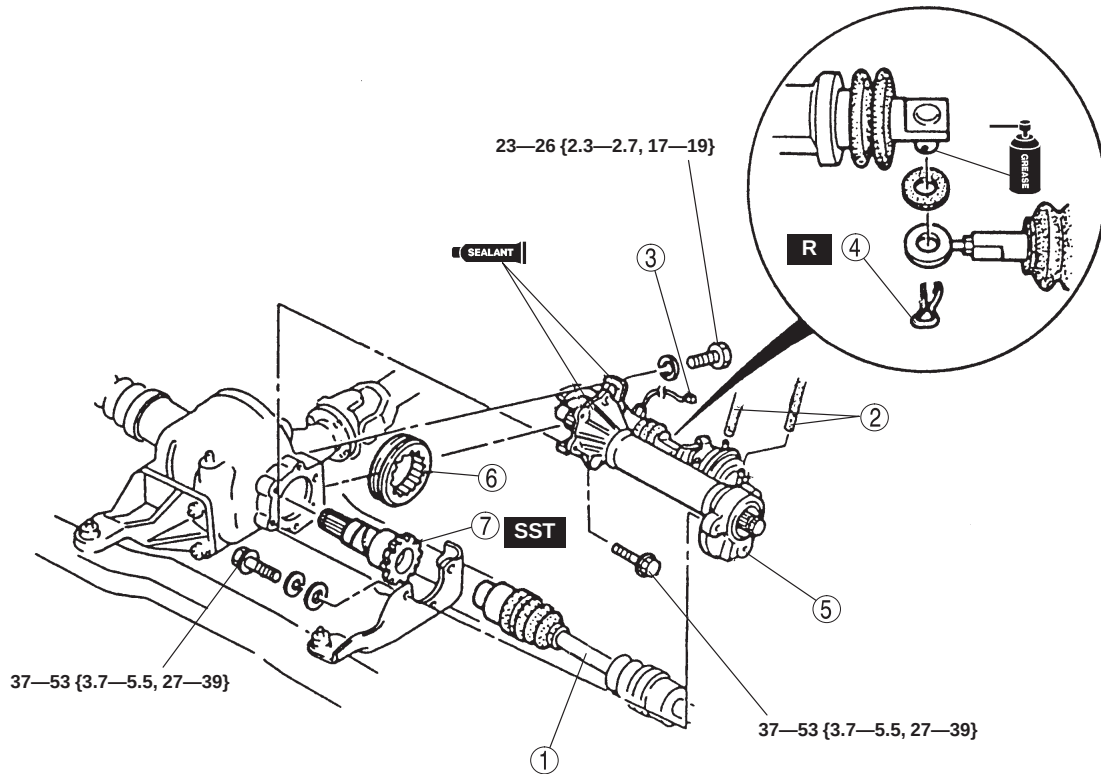
B+: Battery positive voltage

Terminal	Signal name	Connected to	Condition	Voltage	Inspection point
A	Lock solenoid	Lock solenoid	Solenoid OFF	B+	• Harness (Lock solenoid—RFW CM) • Lock solenoid
			Solenoid ON	Below 0.5 V	
B	Ground	Body	—	Below 0.5 V	Harness to ground point
C	Free solenoid	Free solenoid	Solenoid OFF	B+	• Harness (Free solenoid—RFW CM) • Free solenoid
			Solenoid ON	Below 0.5 V	
D	—	—	—	—	—
E	4 × 4 indicator light	4 × 4 indicator light	4 × 4 indicator light OFF	B+	• Harness (4 × 4 indicator light—RFW CM) • 4 × 4 indicator light
			4 × 4 indicator light ON	Below 0.5 V	
F	Lock indicator light	LOCK indicator light	Lock indicator light OFF	B+	• Harness (Lock indicator light—RFW CM) • Lock indicator light
			Lock indicator light ON	Below 0.5 V	
H	Battery	Battery	Ignition switch ON	B+	Harness, Fuse (Battery-Ignition switch—RFW CM)
			Ignition switch OFF	Below 0.5 V	
I	RFW main switch	RFW main switch	RFW main switch released (OFF)	B+	• Harness (RFW main switch—RFW CM) • RFW main switch
			RFW main switch depressed (ON)	Below 0.5 V	
J	RFW switch	RFW switch	RFW switch OFF	B+	• Harness (RFW switch—RFW CM) • RFW switch
			RFW switch ON	Below 0.5 V	
K	4 × 4 indicator switch	4 × 4 indicator switch	4 × 4 indicator switch OFF	B+	• Harness (4 × 4 indicator switch—RFW CM) • 4 × 4 indicator switch
			4 × 4 indicator switch ON	Below 0.5 V	
L	Transfer neutral switch	Transfer neutral switch	Transfer neutral switch OFF	B+	• Harness (Transfer neutral switch—RFW CM) • Transfer neutral switch
			Transfer neutral switch ON	Below 0.5 V	

REMOTE FREEWHEEL (RFW) MECHANISM

JOINT SHAFT COMPONENT REMOVAL/INSTALLATION

1. Drain the front differential oil. (Refer to FRONT DIFFERENTIAL, DIFFERENTIAL OIL REPLACEMENT.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



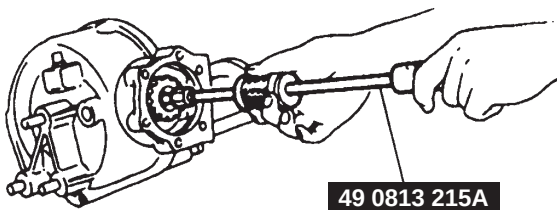
N·m {kgf·m, ft·lbf}

1	Drive shaft + DRIVE SHAFT, DRIVE SHAFT REMOVAL/ INSTALLATION
2	Vacuum hose
3	RFW switch connector

4	Snap pin
5	Joint shaft component, control box component
6	Gear sleeve
7	Output shaft + Removal Note

Output Shaft Removal Note

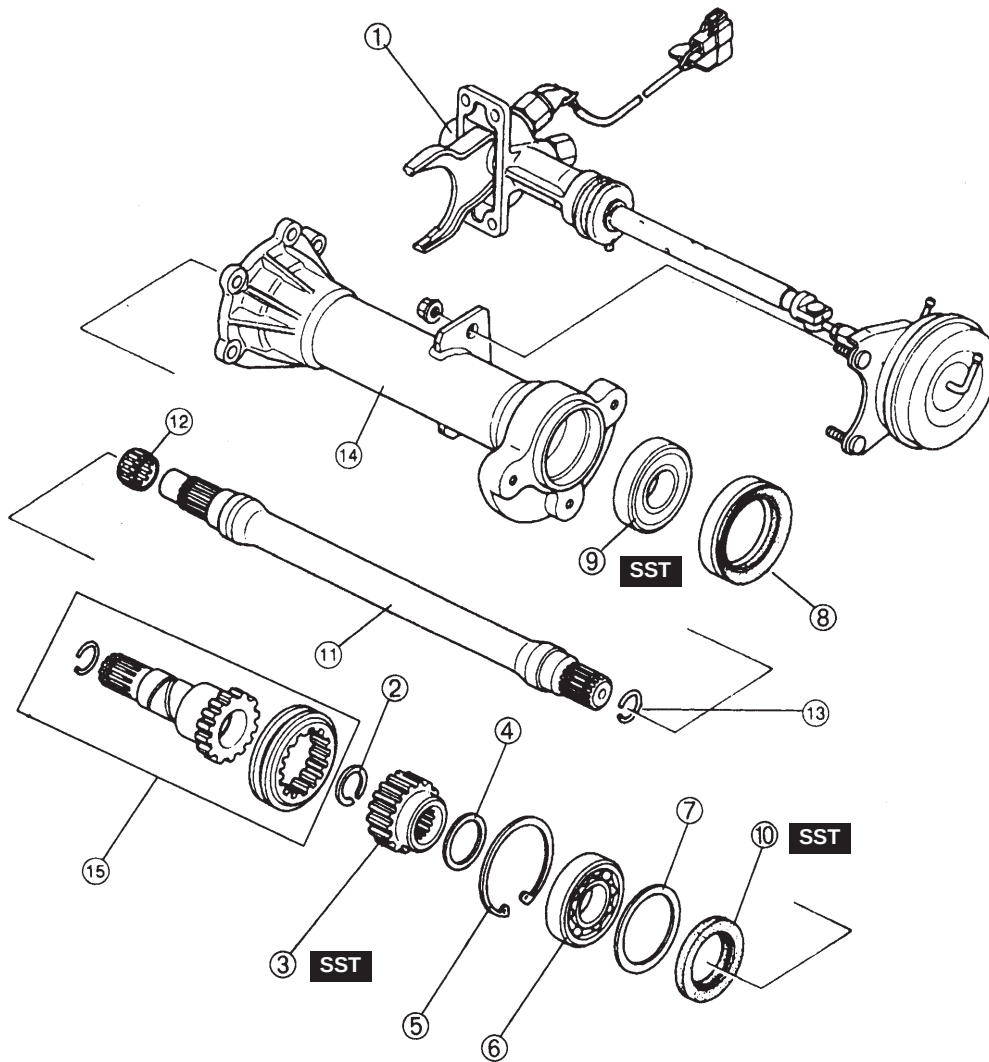
- Remove the output shaft using the SST.



REMOTE FREEWHEEL (RFW) MECHANISM

JOINT SHAFT COMPONENT DISASSEMBLY

- Disassemble in the order indicated in the table.



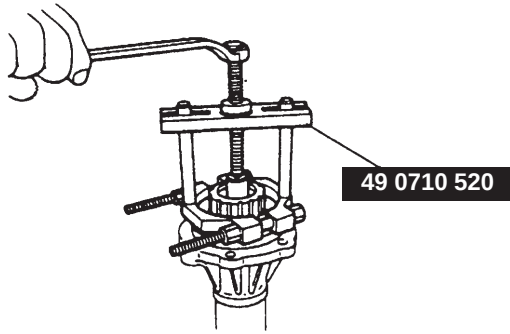
1	Control box
2	Clip
3	Remote freewheel hub + Disassembly Note
4	Spacer
5	Retaining ring
6	Ball bearing + Disassembly Note
7	Adjustment shim (s)
8	Dust seal

9	Bearing + Disassembly Note
10	Oil seal + Disassembly Note
11	Joint shaft
12	Needle bearing
13	Clip
14	Casing
15	Output shaft and gear sleeve

REMOTE FREEWHEEL (RFW) MECHANISM

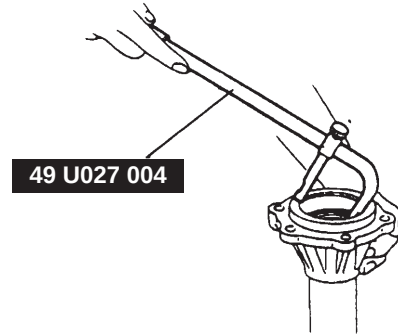
Remote Free Wheel Hub Disassembly Note

- Remove the remote free wheel hub using the SST.



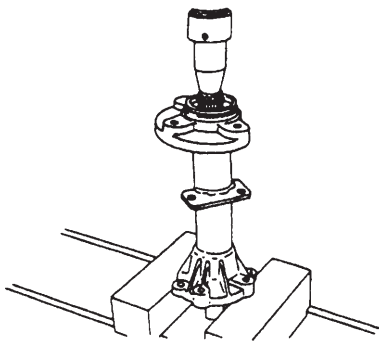
Oil Seal Disassembly Note

- Remove the oil seal using the SST.

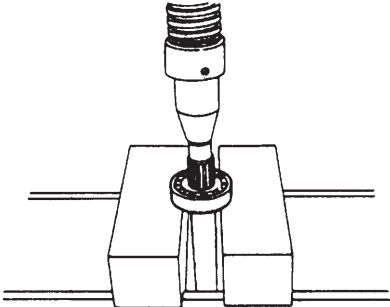


Ball Bearing Disassembly Note

1. Remove the ball bearing and the joint shaft using a press.



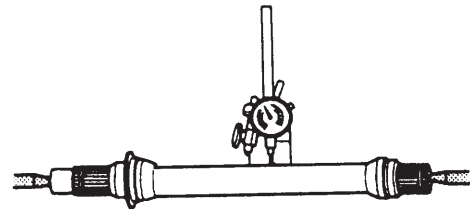
2. Remove the ball bearing using a press.



JOINT SHAFT INSPECTION

1. Measure the joint shaft runout.

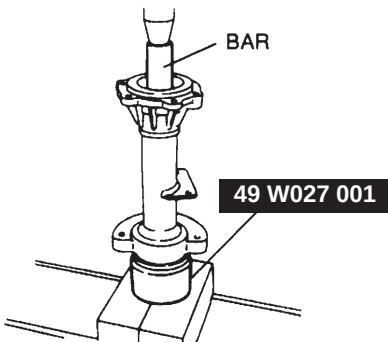
Maximum runout
0.03 mm {0.0012 in}



2. If not correct, replace the joint shaft.

Bearing Disassembly Note

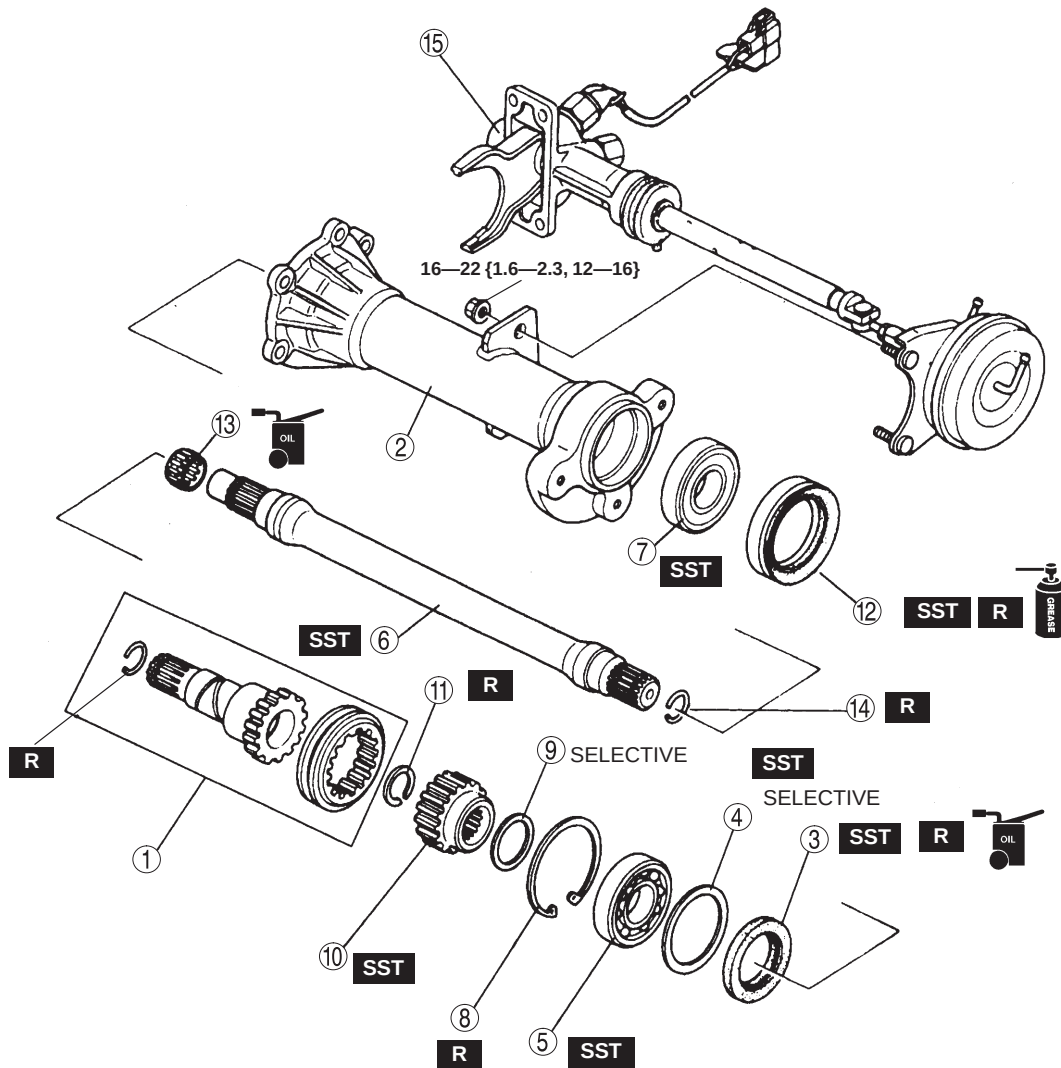
- Remove the dust seal and bearing using the SST and a suitable bar.



REMOTE FREEWHEEL (RFW) MECHANISM

JOINT SHAFT COMPONENT ASSEMBLY

- Assemble in the order indicated in the table.



N·m {kgf·m , ft·lbf}

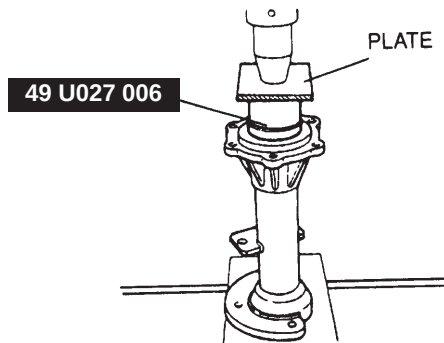
1	Output shaft and gear sleeve
2	Casing
3	Oil seal + Assembly Note
4	Adjustment shim(s) + Assembly Note
5	Ball bearing + Assembly Note
6	Joint shaft + Assembly Note
7	Bearing + Assembly Note
8	Retaining ring

9	Spacer + Assembly Note
10	Remote freewheel hub + Assembly Note
11	Clip
12	Dust seal + Assembly Note
13	Needle bearing
14	Clip
15	Control box

REMOTE FREEWHEEL (RFW) MECHANISM

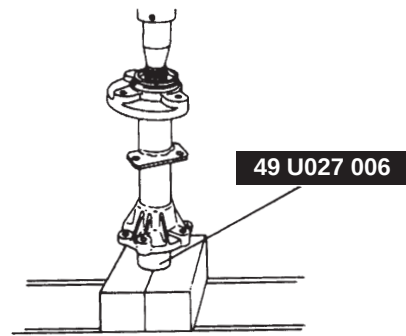
Oil Seal Assembly Note

1. Apply differential oil to a new oil seal.
2. Install the new oil seal using the **SST** and a press.



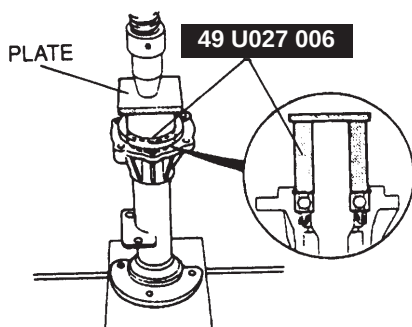
Joint Shaft Assembly Note

- Install the joint shaft using the **SST** and a press.

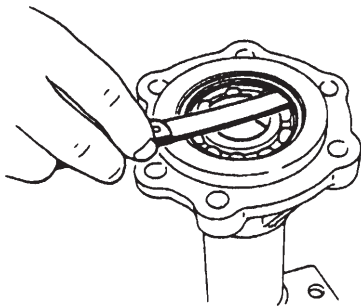


Adjustment Shim(s), Ball Bearing Assembly Note

1. Install the removed shim(s) and the ball bearing using the **SST** and a press.



2. Install a new retaining ring.
3. Measure the clearance between the ball bearing and the retaining ring.



4. If not as specified, adjust by adding or removing shims. Use no more than two shims on either side.

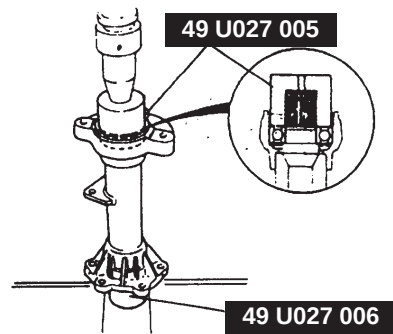
Maximum clearance
0.15 mm {0.0059 in}

Available shim thickness
0.15 mm {0.0059 in}, 0.30 mm {0.0118 in},
0.35 mm {0.0138 in}, 0.40 mm {0.0157 in},
0.50 mm {0.0197 in}

5. Remove the retaining ring.

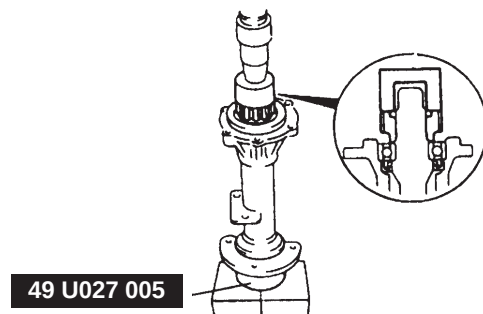
Bearing Assembly Note

- Install the bearing using the **SSTs** and a press.

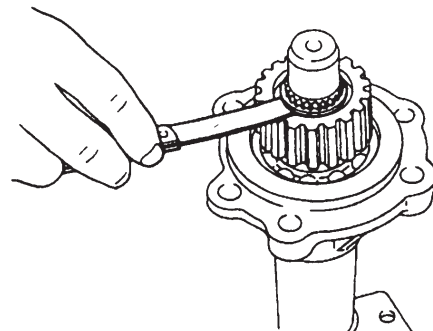


Spacer, Remote FreeWheel Hub Assembly Note

1. Install the removed spacer and the remote freewheel hub using a suitable pipe and the **SST** and a press.



2. Install a new clip.
3. Measure the clearance between the remote freewheel hub and the clip.



REMOTE FREEWHEEL (RFW) MECHANISM

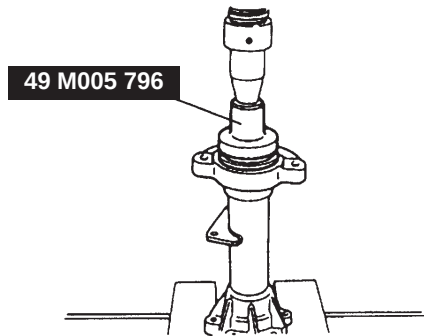
- If not as specified, adjust by adding or removing spacers. Use no more than two spacers on either side.

Maximum clearance
0.15 mm {0.0059 in}

Available shim thickness
0.15 mm {0.0059 in}, 0.30 mm {0.0118 in},
0.35 mm {0.0138 in}, 0.40 mm {0.0157 in},
0.50 mm {0.0197 in}

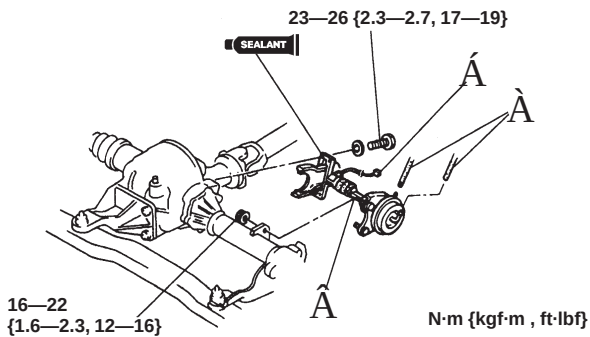
Dust Seal Assembly Note

- Install the new dust seal using the **SST** and a press.



CONTROL BOX REMOVAL/INSTALLATION

- Drain the front differential oil. (Refer to FRONT DIFFERENTIAL, FRONT DIFFERENTIAL OIL REPLACEMENT.)
- Remove in the order indicated in the table.
- Install in the reverse order of removal.

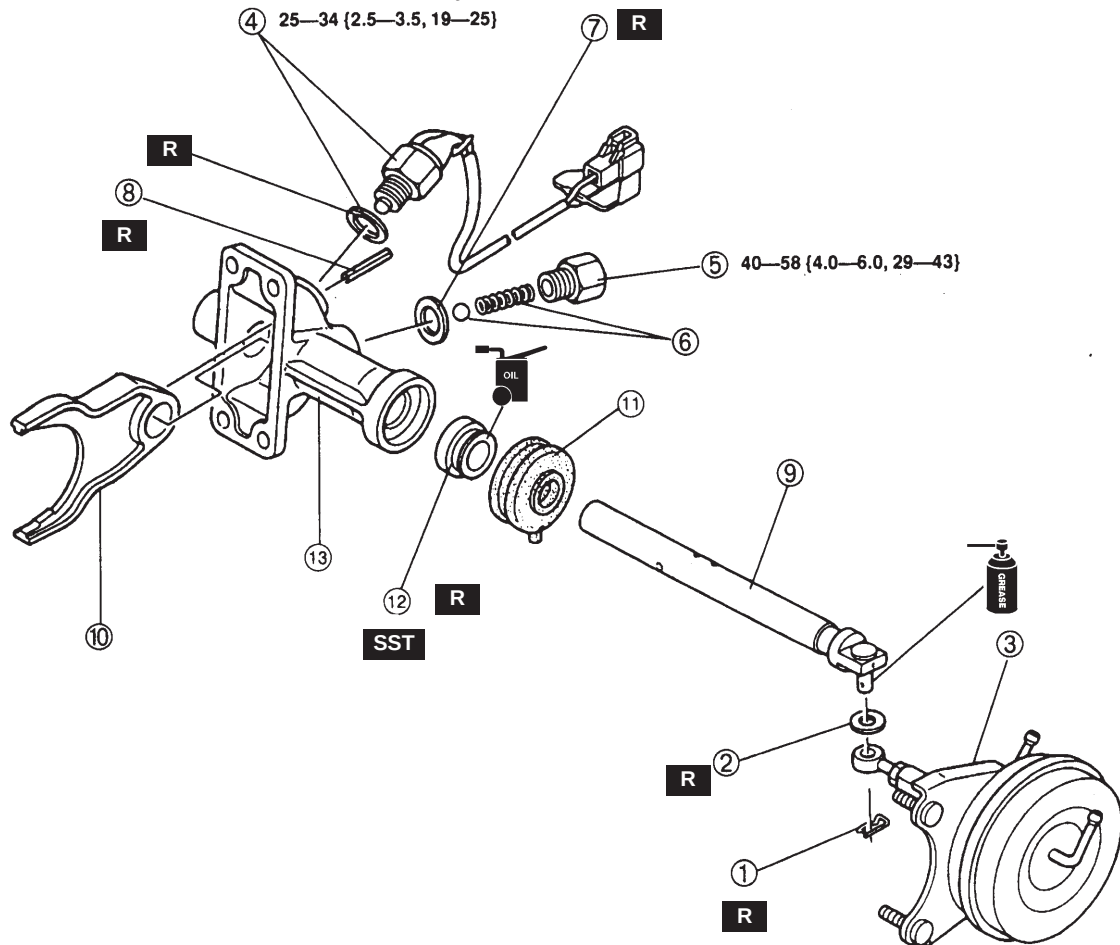


1	Vacuum hose
2	RFW switch connector
3	Control box

REMOTE FREEWHEEL (RFW) MECHANISM

CONTROL BOX DISASSEMBLY/ASSEMBLY

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



N·m {kgf·m , ft·lbf}

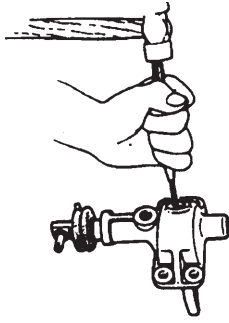
1	Snap pin
2	Washer
3	RFW actuator
4	RFW switch and washer
5	Spring cap
6	Spring and ball
7	Washer
8	Roll pin + Disassembly Note + Assembly Note

9	Change rod
10	Shift fork
11	Boot + Assembly Note
12	Oil seal + Assembly Note
13	Control box

REMOTE FREEWHEEL (RFW) MECHANISM

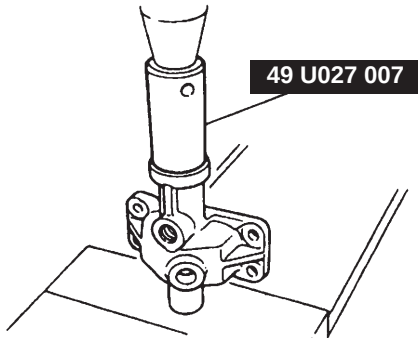
Roll Pin Disassembly Note

- Remove the roll pin as shown in the figure.



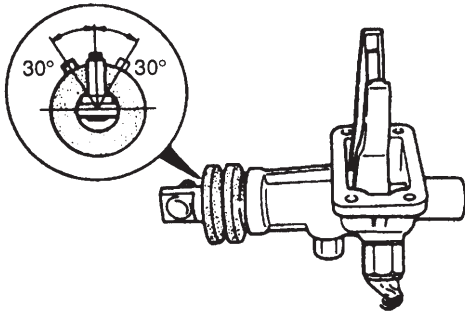
Oil Seal Assembly Note

- Install a new oil seal using the SST and a press.



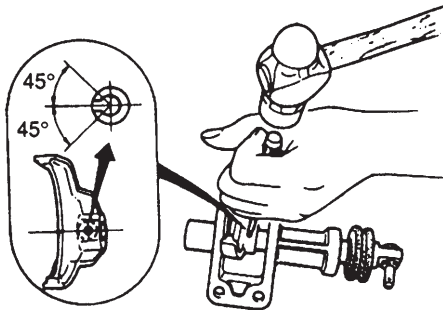
Boot Assembly Note

- Install the boot as shown in the figure.



Roll Pin Assembly Note

- Install a new roll pin as shown in the figure.



SHIFT FORK INSPECTION

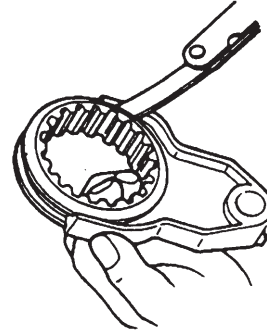
- Measure the clearance between the gear sleeve and the shift fork.

Standard clearance

0.1—0.40 mm {0.0040—0.0157 in}

Maximum clearance

0.50 mm {0.0197 in}



- Inspect the output shaft and gear sleeve of the splines for damage and wear.
- If not correct, replace the output shaft and gear sleeve as necessary.

FRONT DIFFERENTIAL

FRONT DIFFERENTIAL OIL INSPECTION

(Refer to REAR DIFFERENTIAL, REAR DIFFERENTIAL OIL INSPECTION.)

Specified oil

Type

Above -18°C $\{0^{\circ}\text{F}\}$: API GL-5, SAE 90

Below -18°C $\{0^{\circ}\text{F}\}$: API GL-5, SAE 80

Capacity

MFW: 1.2 L {1.3 US qt, 1.1 Imp qt}

RFW: 1.5 L {1.6 US qt, 1.3 Imp qt}

FRONT DIFFERENTIAL OIL REPLACEMENT

(Refer to REAR DIFFERENTIAL, REAR DIFFERENTIAL OIL REPLACEMENT.)

Specified oil

Type

Above -18°C $\{0^{\circ}\text{F}\}$: API GL-5, SAE 90

Below -18°C $\{0^{\circ}\text{F}\}$: API GL-5, SAE 80

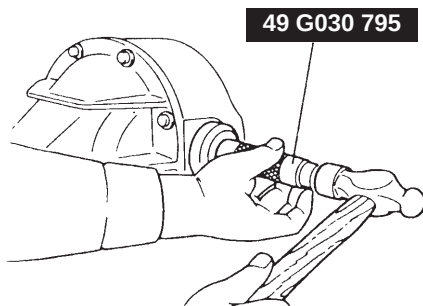
Capacity

MFW: 1.2 L {1.3 US qt, 1.1 Imp qt}

RFW: 1.5 L {1.6 US qt, 1.3 Imp qt}

FRONT DIFFERENTIAL OIL SEAL REPLACEMENT

1. Remove the drive shaft.
(Refer to DRIVE SHAFT, DRIVE SHAFT REMOVAL/INSTALLATION, Drive shaft removal Note.)
2. Drain the differential oil.
(Refer to REAR DIFFERENTIAL, REAR DIFFERENTIAL OIL REPLACEMENT.)
3. Remove the oil seal using a screwdriver.
4. Tap in the new oil seal to the differential using the SST.



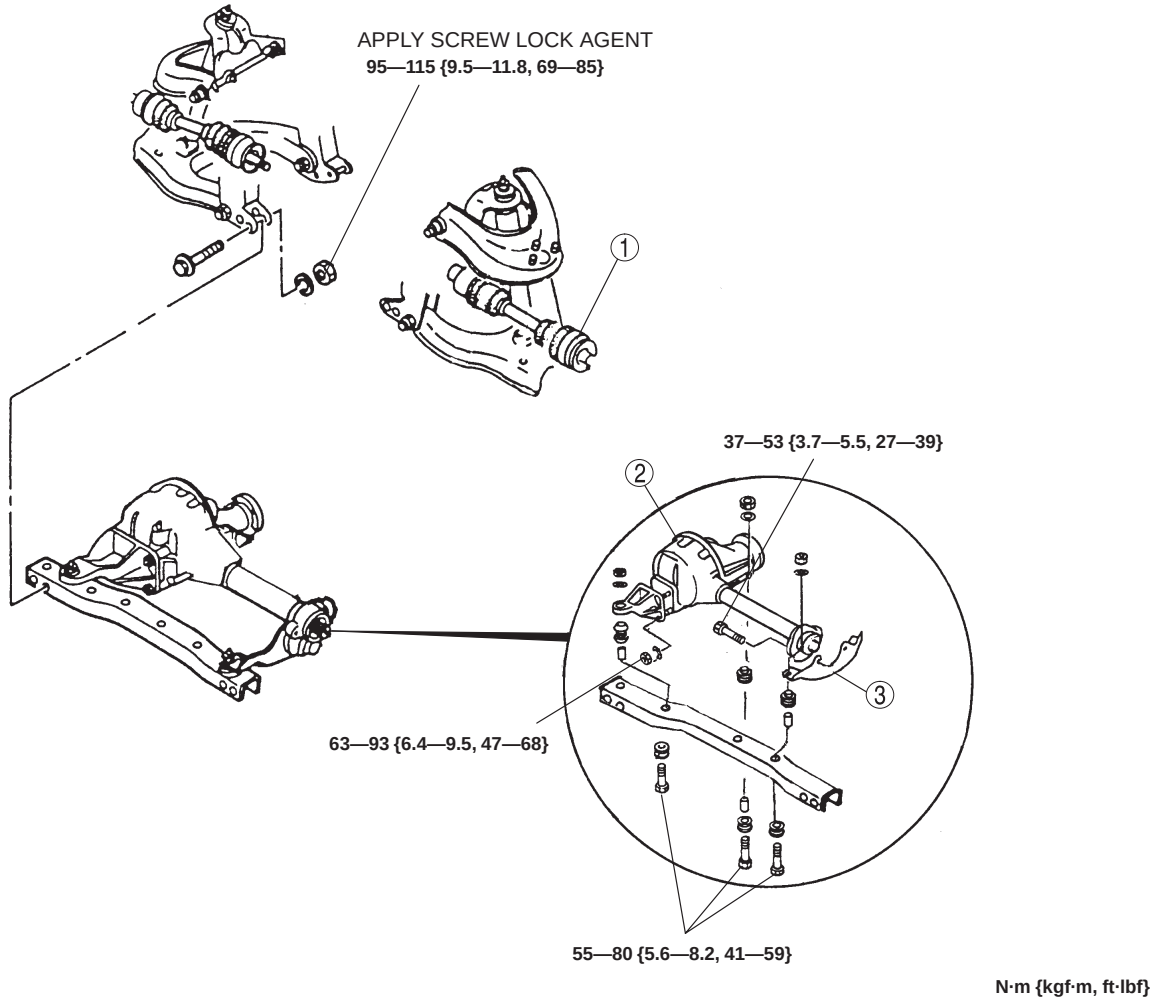
5. Install the drive shaft.
(Refer to DRIVE SHAFT, DRIVE SHAFT REMOVAL/INSTALLATION, Drive Shaft Installation Note.)
6. Add the differential oil to the specified level.
(Refer to FRONT DIFFERENTIAL, FRONT DIFFERENTIAL OIL REPLACEMENT.)

FRONT DIFFERENTIAL

FRONT DIFFERENTIAL REMOVAL/INSTALLATION

1. Drain the differential oil. (Refer to FRONT DIFFERENTIAL, FRONT DIFFERENTIAL OIL REPLACEMENT.)
2. Remove the propeller shaft. (Refer to section L, FRONT PROPELLER SHAFT (4 × 4), FRONT PROPELLER SHAFT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

MFW

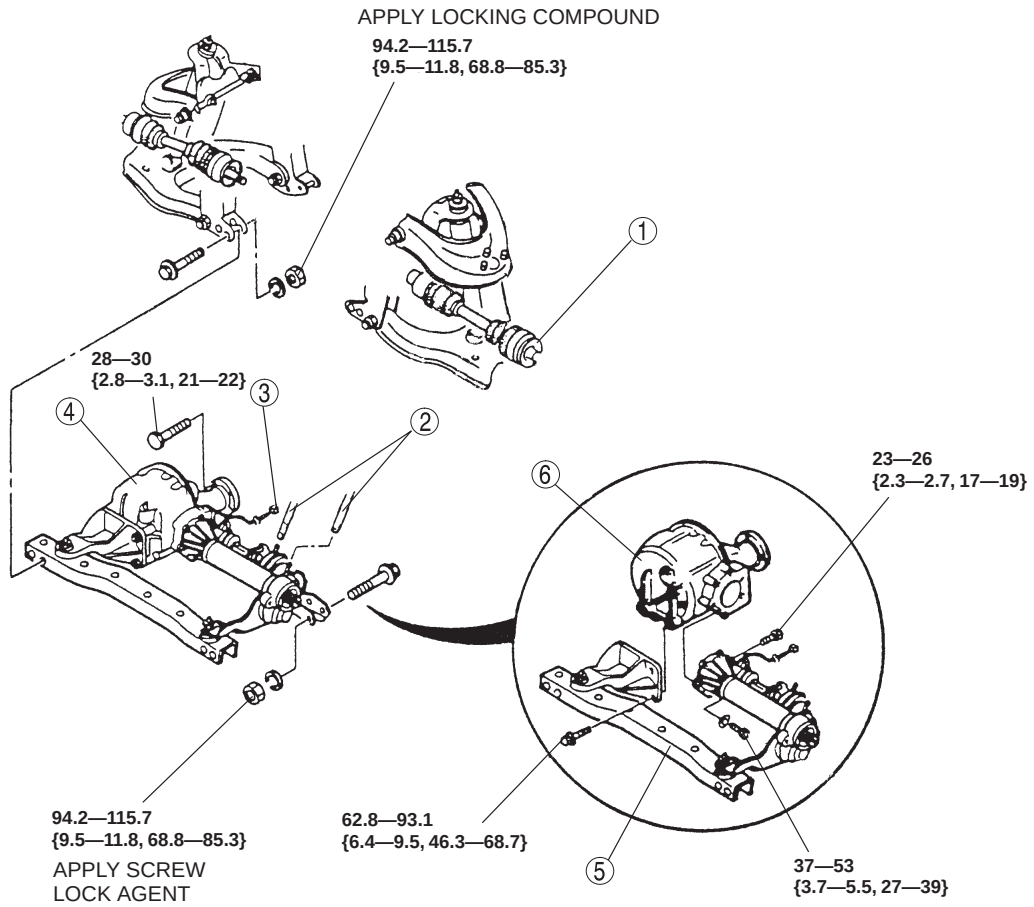


1	Drive shaft + DRIVE SHAFT, DRIVE SHAFT REMOVAL/ INSTALLATION, Drive Shaft Removal Note
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2	Front differential component + Removal Note
3	Differential bracket

FRONT DIFFERENTIAL

RFW



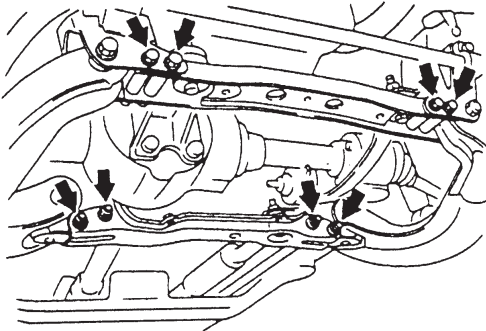
N·m {kgf·m, ft·lbf}

1	Drive shaft + DRIVE SHAFT, DRIVE SHAFT REMOVAL/ INSTALLATION, Drive Shaft Removal Note
2	Vacuum hose
3	RFW switch component

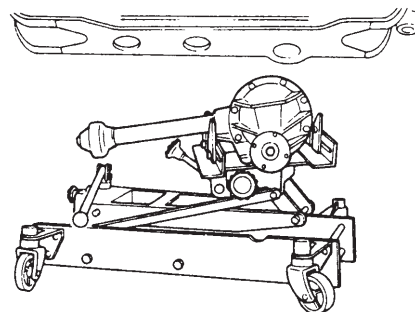
4	Front differential, joint shaft component + Removal Note
5	Joint shaft, crossmember
6	Front differential

Front Differential, Joint Shaft Component Removal Note

1. Set the transmission jack on the differential.
2. Remove the bolts and nuts indicated by arrows.

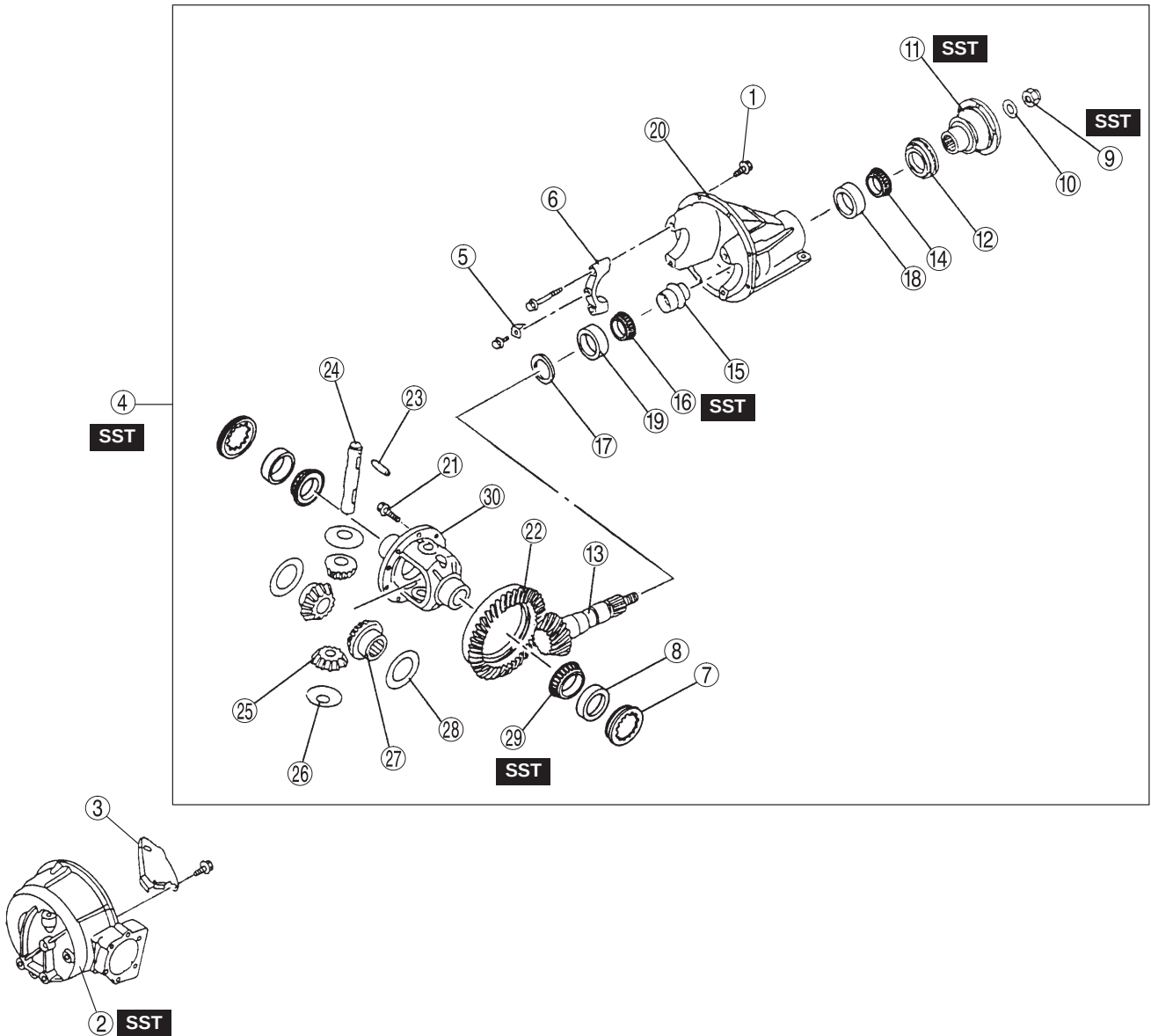


3. Remove the front differential and joint shaft component from the vehicle using the transmission jack.



FRONT DIFFERENTIAL DISASSEMBLY

- Disassemble in the order indicated in the table.



1	Bolt
2	Differential casing
3	Oil baffle
4	Differential component + Disassembly Note
5	Lock plate
6	Bearing cap + Disassembly Note

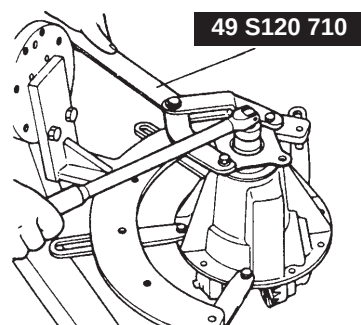
7	Adjusting screw
8	Side bearing outer race
9	Locknut + Disassembly Note
10	Washer
11	Companion flange + Disassembly Note

FRONT DIFFERENTIAL

12	Oil seal + Disassembly Note
13	Drive pinion + Disassembly Note
14	Front bearing inner race
15	Collapsible spacer
16	Rear bearing inner race + Disassembly Note
17	Spacer
18	Front bearing outer race + Disassembly Note
19	Rear Bearing outer race + Disassembly Note
20	Carrier
21	Bolt
22	Ring gear
23	Knock pin + Disassembly Note
24	Pinion shaft
25	Pinion gear
26	Thrust washer
27	Side gear
28	Thrust washer
29	Side bearing inner race + Disassembly Note
30	Gear case

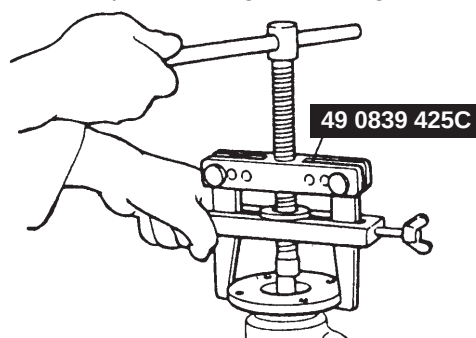
Locknut Disassembly Note

- Hold the companion flange using the **SST** and remove the locknut.



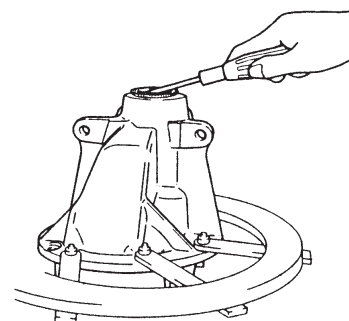
Companion Frange Disassembly Note

- Pull the companion flange out using the **SST**.



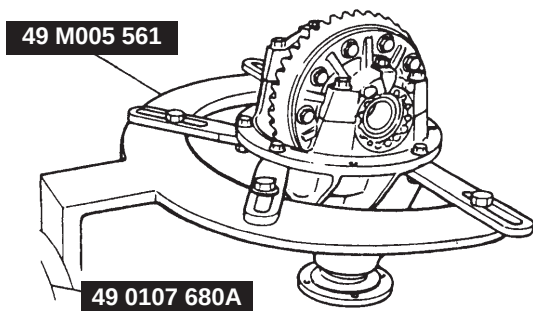
Oil Seal Disassembly Note

- Remove the oil seal using a screw driver.



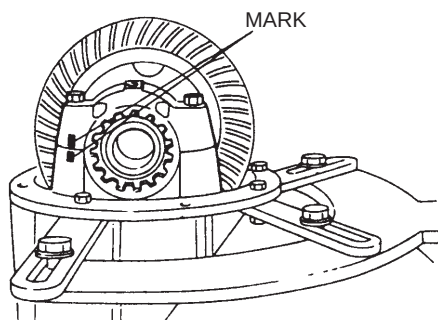
Differential Component Disassembly Note

- Install the differential component on the **SSTs**.



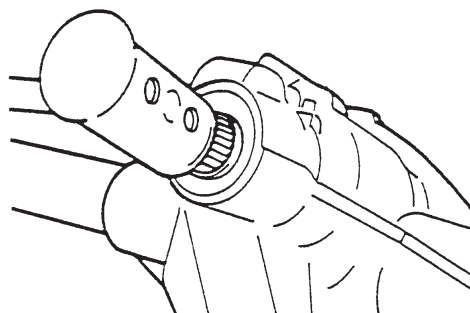
Bearing Cap Disassembly Note

- Place a mark on one of the bearing caps so that the left and right bearing caps won't get mixed up. Use the mark for matching at the time of assembly.



Drive Pinion Disassembly Note

- Remove the drive pinion by tapping with a plastic hammer.

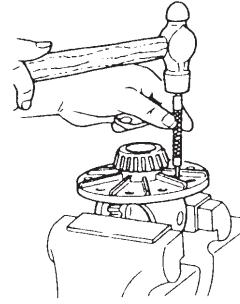
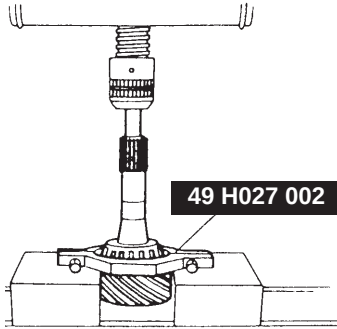


FRONT DIFFERENTIAL

Rear Bearing Inner Race Disassembly Note

Note

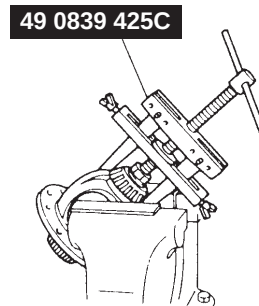
- Mark or otherwise distinguish between the front and rear inner races so that they are not mixed up at the time of reassembly.
- Remove the rear bearing inner race using the SST.



Side Bearing Inner Race Disassembly Note

Caution

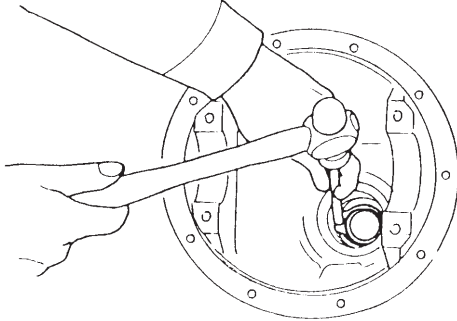
- Mark the left bearing in order to install in the same position.
- Remove the side bearing inner race from the gear case using the SST.



Front Bearing Outer Race, Rear Bearing Outer Race Disassembly Note

Note

- Mark or otherwise distinguish between the front and rear outer races so that they are not mixed up at the time of reassembly.
- Remove the bearing outer races using the two grooves on the carrier and tapping the outer races alternately.



Knock Pin Disassembly Note

Caution

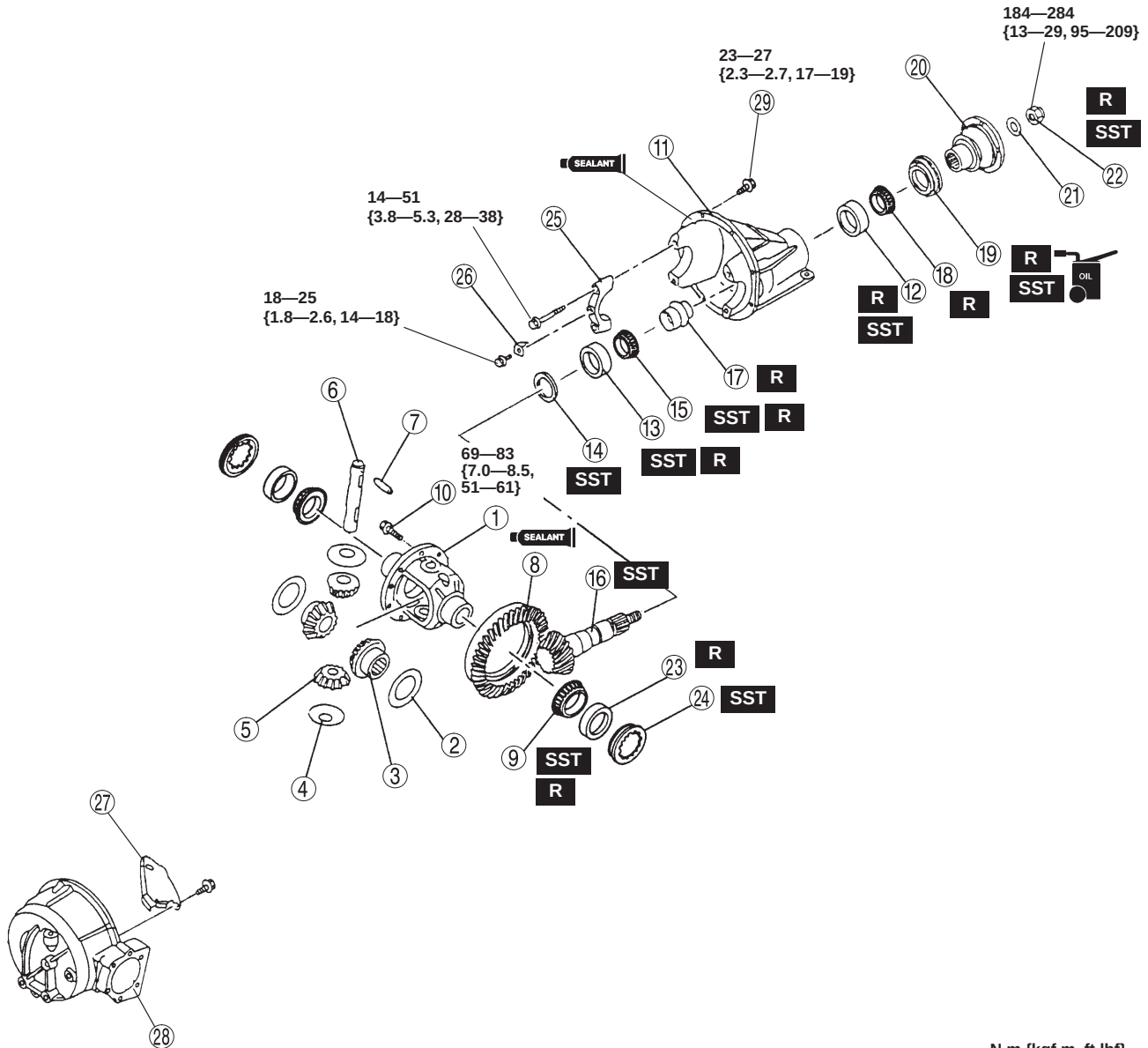
- Insert the bar from the knock pin hole at the opposite side from where the ring gear is installed.
- Secure the gear case in a vise and remove the knock pin using a 4 mm {0.16 in} diameter bar.

FRONT DIFFERENTIAL

FRONT DIFFERENTIAL ASSEMBLY

Caution

- Clean away the old sealant before applying the new sealant.
- Install the differential carrier within 10 minutes after applying sealant.
- Allow the sealant to set at least 30 minutes after installation before filling the differential with the specified oil.
- Assemble in the order indicated in the table.



N·m {kgf·m, ft·lbf}

1	Gear case + Assembly Note
2	Thrust washer + Assembly Note
3	Side gear
4	Thrust washer
5	Pinion gear
6	Pinion shaft
7	Knock pin
8	Ring gear + Assembly Note

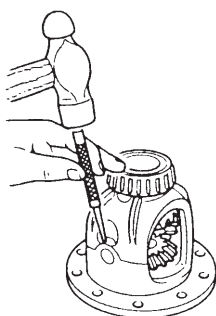
9	Side bearing inner race + Assembly Note
10	Bolt
11	Carrier
12	Front Bearing outer Race + Assembly Note
13	Rear bearing outer race + Assembly Note
14	Spacer + Assembly Note
15	Rear bearing inner race + Assembly Note

FRONT DIFFERENTIAL

16	Drive pinion + Assembly Note
17	Collapsible spacer
18	Front bearing inner race
19	Oil seal + Assembly Note
20	Companion flange
21	Washer
22	Locknut + Assembly Note
23	Side bearing outer race + Assembly Note
24	Adjusting screw + Assembly Note
25	Bearing cap + Assembly Note
26	Lock plate
27	Baffle plate
28	Differential casing
29	Bolt

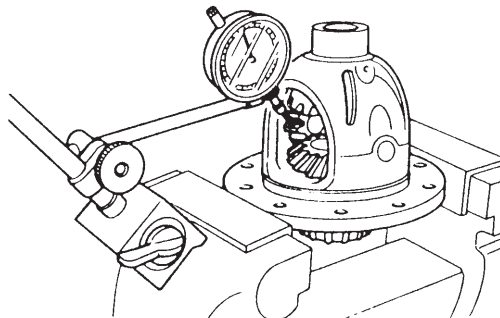
Gear Case Assembly Note

- Assemble the side gears, thrust washer, pinion gears, pinion shaft and knock pin. After assembling the knock pin, make a crimp so that the pin will not come out of the gear case.



Thrust Washer Assembly Note

- Set a dial gauge to the pinion gear as shown in the figure.
- Secure one of the side gears.
- Move the pinion gear and measure the backlash at the end of the pinion gear.



Standard backlash
0—0.1 mm {0—0.004 in}

- If the backlash exceeds the standard, use the thrust washers to adjust.

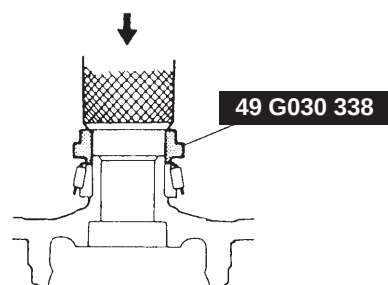
Ring Gear Assembly Note

- Coat the ring gear and gear case facing surfaces with locking agent.
- Install the ring gear and tighten the bolt to the specified torque.

Side Bearing Inner Race Assembly Note

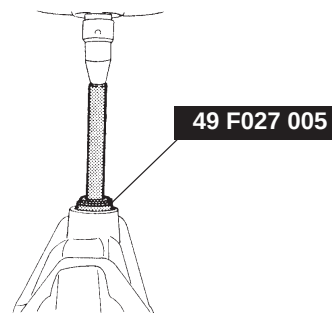
Caution

- Bearings should be assembled to the original positions.
- Press the side bearings into the gear case using the SST.



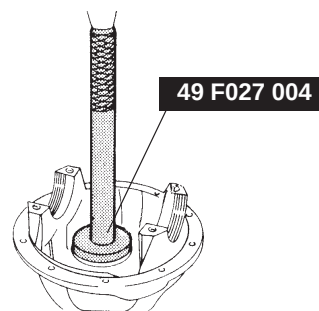
Front Bearing Outer Race Assembly Note

- Press the front bearing outer race into the carrier using the SST and a press.



Rear Bearing Outer Race Assembly Note

- Press the rear bearing outer race into the carrier using the SST and a press.



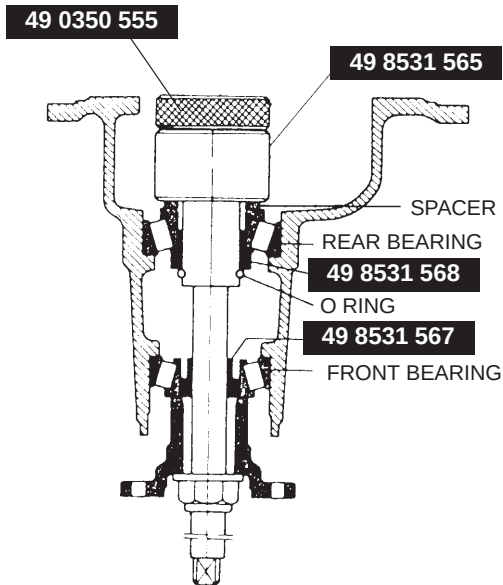
FRONT DIFFERENTIAL

Spacer Assembly Note Pinion height adjustment

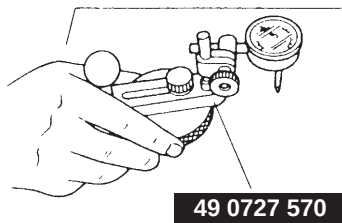
Notes

- Use the same spacer and nut.
- Be careful to install collars A and B in the correct position and facing in the correct direction.

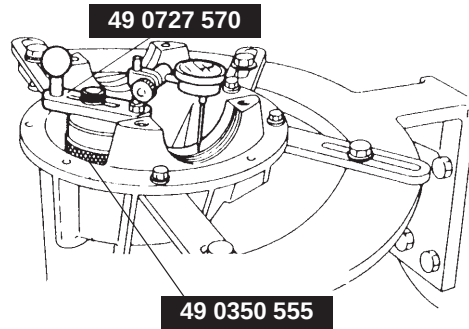
1. Assemble the spacer, rear bearing inner race and **SST** (49 8531 568) on to the **SST** (49 8531 565). Secure the collar with the O-ring. Then install this to the carrier.
2. Assemble the front bearing inner race, **SST** (49 8531 567), companion flange, washer and nut to the **SST** (49 8531 565).
3. Tighten the nut to the extent that the **SST** (49 8531 565) can be turned by hand.



4. Place the **SST** on the surface plate and set the dial indicator to zero.



5. Place the **SST** (49 0350 555) on top of the **SST** (49 8531 565), and then set the **SST** (49 0727 570) on top of the **SST** (49 0350 555).
6. Place the measuring probe of the dial indicator so that it contacts the place where the side bearing is installed in the carrier. Then measure left and right side of the lower position.



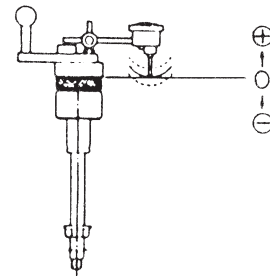
7. Add the two (left and right) values obtained by the measurements taken in Step 6 and then divide the total by 2. From this result, subtract the result obtained by dividing the number inscribed on the end surface of the drive pinion by 100. (If there is no figure inscribed, use 0.) This is the pinion height adjustment value.

Note

- For example, the measured results obtained at Step 6 are 0.06 mm and 0.04 mm, and the figure inscribed on the end of the drive pinion is -2:

$$\frac{0.06+0.04}{2} - \frac{-2}{100} = 0.07 = \text{pinion height adjustment value}$$

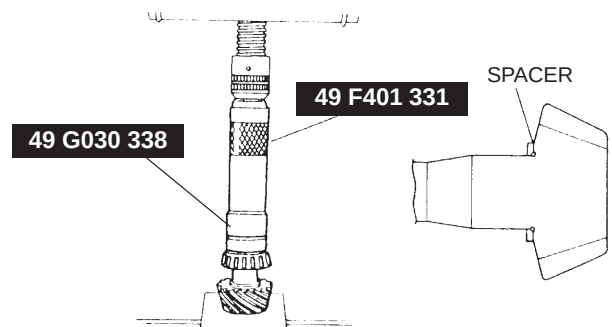
Therefore, replace it with a spacer **0.07 mm {0.003 in}** thicker than the currently used one.



Rear Bearing Inner Race Assembly Note

Caution

- Press in until the force required suddenly increases.
- Install the spacer selected for the pinion height adjustment, confirm that the installation direction is correct.
- Press the rear bearing inner race in using the **SSTs**.



FRONT DIFFERENTIAL

Drive Pinion Assembly Note

Drive pinion preload adjustment

Caution

- Do not install the oil seal.

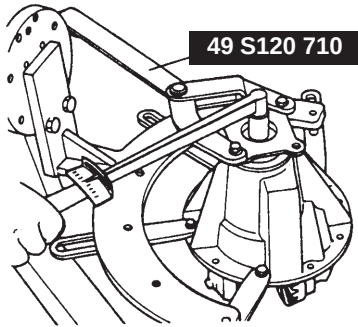
1. Install the drive pinion, spacer, front bearing, collapsible spacer and companion flange to the carrier, and temporarily tighten the locknut.
2. Adjust the preload of the drive pinion bearing as follows.
 - (1) Turn the companion flange by hand to seat the bearing.
 - (2) Use a torque wrench to tighten the locknut temporarily tightened in Step 1, and confirm that the specified preload can be obtained within the specified tightening torque range. The torque applied at this time will be used after the oil seal is installed.

Locknut tightening torque

128—284 N·m {13—29 kgf·m, 95—209 ff·lbf}

Drive pinion preload

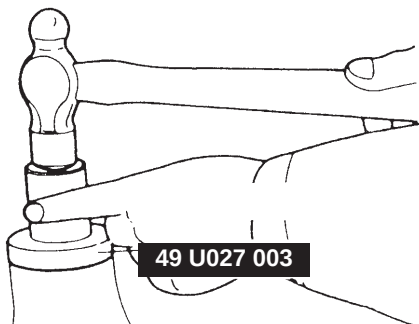
0.9—13.4 N·m {9—14 kgf·cm, 7.9—12.1 in·lbf}



- (3) If the specified preload can't be obtained within the specified tightening torque range, replace the collapsible spacer and inspect again.
- (4) Remove the locknut, washer and companion flange.

Oil Seal Assembly Note

- Apply differential oil to the oil seal lip and press the oil seal in until it touches the end of the differential carrier using the SST.

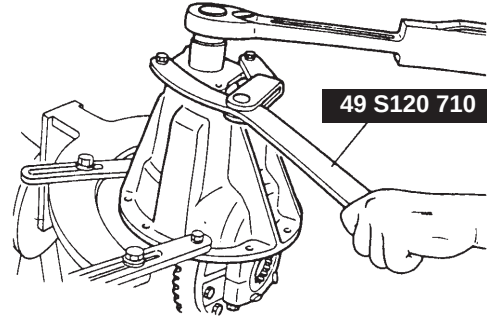


Locknut Assembly Note

1. Assemble the companion flange and washer.
2. Tighten the new locknut using the SST with the determined torque while performing drive pinion preload adjustment.
3. Verify that the preload is within the specification.

Preload

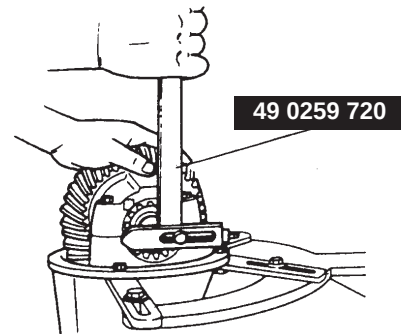
0.9—1.3 N·m {9—14 kgf·cm, 7.9—12.1 in·lbf}



Side Bearing Outer Race, Adjusting Screw, Bearing Cap Assembly Note

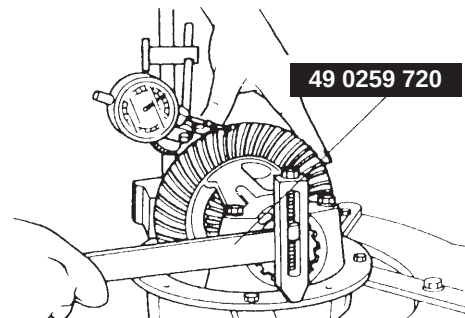
Ring gear backlash adjustment

1. Install the differential gear component to the carrier. After loosely tightening the bearing outer race and bearing cap mounting bolts, completely tighten the adjustment screw by hand. Then, while turning the ring gear, alternately tighten the left and right adjustment screws using the SST.



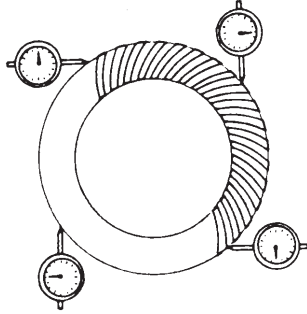
2. Adjust the drive pinion, ring gear backlash and the side bearing preload as follows.

- (1) Mark the ring gear at four points at **approx. 90°** intervals and mount a dial indicator to the carrier so that the feeler comes in contact at a 90° angle with one of the ring gear teeth.
- (2) Turn both bearing adjusters equally until the backlash becomes **0.09—0.11 mm** {0.0035—0.0043 in} using the SST.



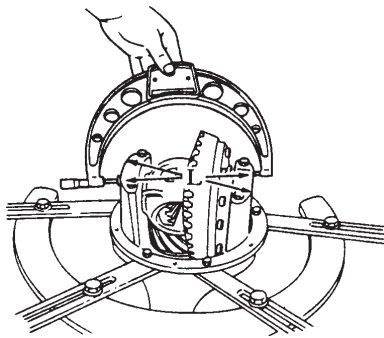
FRONT DIFFERENTIAL

- (3) Inspect for the backlash at the three other marked points and make sure that the minimum backlash is more than **0.05 mm {0.002 in}** and difference of the maximum and minimum backlash value is less than **0.07 mm {0.0028 in}**.



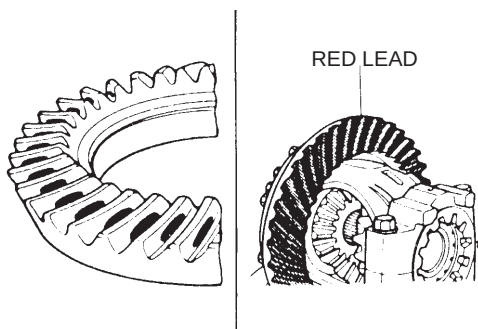
- (4) After adjusting the backlash, tighten the adjustment screws equally until the distance between both pilot sections on the bearing caps (L) become as specified.

Bearing cap bolt tightening torque
38—51 N·m {3.8—5.3 kgf·m, 28—38 ft·lbf}

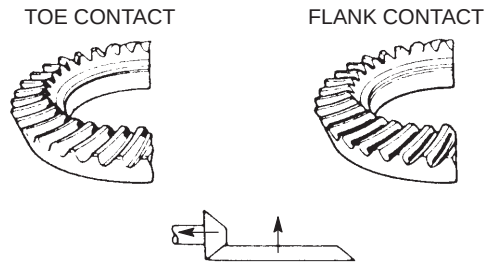


Standard distance
185.43—185.50 mm {7.300—7.303 in}

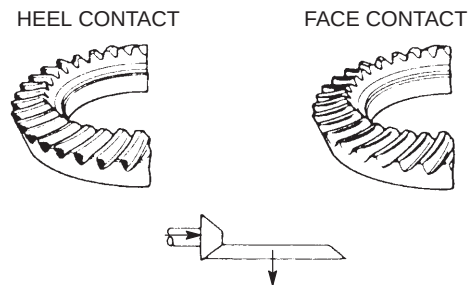
3. The inspection and adjustment procedure is as follows:
- (1) Coat both surfaces of 6—8 teeth of the ring gear uniformly with a thin red lead coating.
 - (2) While moving the ring gear back and forth by hand, rotate the drive pinion several times and inspect the tooth contact.
 - (3) If the tooth contact is good, wipe off the red lead coating.
 - (4) If it is not good, adjust the pinion height, then adjust the backlash.



Toe and flank contact
 Replace the spacer with a thinner one, and move the drive pinion outward.



Heel and face contact
 Replace the spacer with a thicker one. Bring the drive pinion inward.



TROUBLESHOOTING

TROUBLESHOOTING

REMOTE FREEWHEEL (RFW)

Foreword

- Refer to section GI, HOW TO USE THIS MANUAL, TROUBLESHOOTING PROCEDURE and thoroughly read and understand the basic flow of troubleshooting in order to properly perform the basic procedures.

Precaution

- This section only mentions unique symptoms of the trouble caused by RFW. Inspect and repair as necessary for trouble caused by other sources.
- Inspect the connector and terminal connections when inspecting the wiring harnesses. (The cause of the malfunction may be a poor connection in the connectors, terminals, or wiring harnesses.)

Diagnostic Index

No	TROUBLESHOOTING ITEM	DESCRIPTION
1	No RFW operation from free to lock (RFW indicator light does not illuminate)	• Free solenoid valve malfunction • RFW indicator light bulb malfunction • RFW actuator malfunction • RFW switch malfunction • Print plate in instrument cluster malfunction • METER 15 A fuse malfunction • ENGINE 15 A fuse malfunction • Transfer neutral switch malfunction • 4 × 4 indicator switch malfunction • RFW control module malfunction • Lock solenoid valve malfunction • RFW control box malfunction • Air leakage from vacuum hose • One-way check valve malfunction • Related fuses and/or harness malfunction
2	No RFW operation from lock to free (RFW indicator light does not go off)	• Lock solenoid valve malfunction • RFW switch malfunction • RFW actuator malfunction • Print plate in instrument cluster malfunction • Engine 15 A fuse malfunction • RFW main switch malfunction • Transfer neutral switch malfunction • 4 × 4 indicator switch malfunction • RFW control module malfunction • Free solenoid valve malfunction • RFW control box malfunction • Air leakage from vacuum hose • One-way check valve malfunction • Related fuses and/or harness malfunction
3	Noise	• Joint shaft bearing abrasion or damage • RFW hub abrasion • Joint shaft abrasion
4	Oil leakage	• RFW control box is poorly installed.

TROUBLESHOOTING

Quick Diagnosis Chart

Possible factor																				
Troubleshooting item	RFW indicator light bulb	RFW switch	RFW actuator	Print plate in instrument cluster	METER 15 A fuse	ENGINE 15 A fuse	Transfer neutral switch	4 x4 indicator switch	RFW main switch	RFW control module	Lock solenoid valve	Free solenoid valve	RFW control box	One-way check valve	Joint shaft bearing	RFW hub	Joint shaft	Conventional front differential parts	Vacuum hose	Related fuse and / or harnesses
No RFW operation from free to lock	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
No RFW operation from lock to free	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Noise	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Oil leakage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Symptom Troubleshooting

1	NO RFW OPERATION FROM FREE TO LOCK (RFW INDICATOR LIGHT DOES NOT ILLUMINATE)		
DESCRIPTION		RFW does not change from free to lock.	
[TROUBLESHOOTING HINTS]			
• Transfer neutral switch malfunction • 4 × 4 indicator switch malfunction • RFW control module malfunction • Lock solenoid valve malfunction • Free solenoid valve malfunction • RFW indicator light bulb malfunction • RFW control box malfunction		• METER 15 A fuse and/of ENGINE 15 A fuse malfunction • Print plate in instrument cluster malfunction • RFW switch malfunction • RFW actuator malfunction • Air leakage from vacuum hose • One-way check valve malfunction • Related fuses and/or harnesses malfunction	
STEP	INSPECTION		ACTION
1	Disconnect RFW control module connector. Turn ignition (engine) switch on. Measure voltage between RFW control module connector terminal F and ground. Is the voltage greater than 10 V ?	Yes	Go to Step 6.
		No	Turn ignition (engine) switch off. Then go to next step.
2	Is the METER 15 A fuse okay?	Yes	Go to next step.
		No	Replace 15 A METER fuse. Then go to Step 31.
3	Inspect RFW indicator light bulb. Is it okay?	Yes	Go to next step.
		No	Replace RFW indicator light bulb. Then go to Step 31.
4	Measure voltage between instrument cluster connector terminal 1J and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Repair wiring harness between METER 15 A fuse and instrument cluster. Then go to Step 31.
5	Measure voltage between instrument cluster connector terminal 2H and ground. Is the voltage greater than 10 V ?	Yes	Repair wiring harness between instrument cluster and RFW control module. Then go to Step 31.
		No	Replace print plate in instrument cluster. Then go to Step 31.
6	Measure voltage between RFW control module connector terminal H and ground. Is the voltage greater than 10 V ?	Yes	Go to Step 8.
		No	Turn ignition (engine) switch off. Then go to next step.

TROUBLESHOOTING

STEP	INSPECTION		ACTION
7	Is the ENG 15 A fuse okay?	Yes	Repair wiring harness between ENG 15 A fuse and RFW control module. Then go to Step 31.
		No	Replace the ENG 15 A fuse. Then go to Step 31.
8	Disconnect free solenoid valve connector. Measure voltage between free solenoid valve connector terminal A and ground. Is the voltage greater than 10 V ?	Yes	Connect free solenoid valve. Then go to next step.
		No	Repair wiring harness between ENG 15 A fuse and RFW control module. Then go to Step 31.
9	Measure voltage between free solenoid valve connector terminal B and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Inspect free solenoid valve. Then go to Step 31.
10	Measure voltage between RFW control module connector terminal C and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Repair wiring harness between free solenoid valve and RFW control module. Then go to Step 31.
11	Disconnect lock solenoid valve connector. Measure voltage between lock solenoid valve connector terminal A and ground. Is the voltage greater than 10 V ?	Yes	Connect lock solenoid valve. Then go to next step.
		No	Repair wiring harness between ENG 15 A fuse and RFW control module. Then go to Step 31.
12	Measure voltage between lock solenoid valve connector terminal B and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Inspect lock solenoid valve. Then go to Step 31.
13	Measure voltage between RFW control module connector terminal A and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Repair wiring harness between lock solenoid valve and RFW control module. Then go to Step 31.
14	Turn ignition (engine) switch off. Is there continuity between RFW control module connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between RFW control module and ground. Then go to Step 31.
15	Shift select lever to N position. Is there continuity between RFW control module connector terminal L and ground?	Yes	Go to Step 19.
		No	Go to next step.
16	Is there continuity between transfer neutral switch connector terminal A and ground?	Yes	Repair wiring harness between RFW control module and transfer neutral switch. Then go to Step 31.
		No	Go to next step.
17	Inspect transfer neutral switch. Is it okay?	Yes	Go to next step.
		No	Replace transfer neutral switch. Then go to Step 31.
18	Is there continuity between transfer neutral switch connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between transfer neutral switch and ground. Then go to Step 31.
19	Shift select lever to 4 × 4 indicator position. Is there continuity between RFW control module connector terminal K and ground?	Yes	Go to Step 23.
		No	Go to next step.
20	Is there continuity between 4 × 4 indicator switch connector terminal A and ground?	Yes	Repair wiring harness between 4 × 4 indicator switch and RFW control module. Then go to Step 31.
		No	Go to next step.

TROUBLESHOOTING

STEP	INSPECTION		ACTION
21	Inspect 4 × 4 indicator switch. Is it okay?	Yes	Go to next step.
		No	Replace 4 × 4 indicator switch. Then go to Step 31.
22	Is there continuity between 4 × 4 indicator switch connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between 4 × 4 indicator switch and ground. Then go to Step 31.
23	Shift select lever to 4H position. Is there continuity between RFW control module connector terminal J and ground?	Yes	Go to Step 27
		No	Go to next step.
24	Is there continuity between RFW switch connector terminal A and ground?	Yes	Repair wiring harness between RFW control module and RFW switch. Then go to Step 31.
		No	Go to next step.
25	Inspect RFW switch. Is it okay?	Yes	Go to next step.
		No	Replace RFW switch. Then go to Step 31.
26	Is there continuity between RFW switch connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between RFW switch and ground. Then go to Step 31.
27	Inspect one-way check valve. Is it okay?	Yes	Go to next step.
		No	Replace one-way check valve. Then go to Step 31.
28	Inspect RFW control box. Is it okay?	Yes	Go to next step.
		No	Replace RFW control box. Then go to Step 31.
29	Inspect vacuum in vacuum hoses. Is it okay?	Yes	Go to next step.
		No	Repair vacuum in vacuum hoses. Then go to Step 31.
30	Inspect RFW control module. Is it okay?	Yes	Go to next step.
		No	Repair or replace RFW control module. Then go to next step.
31	Turn ignition (engine) switch on. Shift select lever from 2H to 4H position. Does RFW operate from free to lock?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Inspect malfunction symptoms again, then repeat from Step 1 if malfunction occurs again.

2	NO RFW OPERATION FROM LOCK TO FREE (RFW INDICATOR LIGHT DOES NOT GO OFF)		
DESCRIPTION		RFW does not change from lock to free.	
[TROUBLESHOOTING HINTS]			
● RFW main switch malfunction ● Transfer neutral switch malfunction ● 4 × 4 indicator switch malfunction ● RFW control module malfunction ● Free solenoid valve malfunction ● Lock solenoid valve malfunction ● RFW control box malfunction ● ENGINE 15 A fuse malfunction ● RFW main switch malfunction ● RFW actuator malfunction ● RFW switch malfunction ● Air leakage from vacuum reservoir or actuator system ● One-way check valve ● Print plate in instrument cluster malfunction ● Related fuses and/or harnesses malfunction			
STEP	INSPECTION		ACTION
1	Disconnect RFW control module connector. Is there continuity between RFW control module connector terminal F and ground?	Yes	Go to next step.
		No	Go to Step 3.

TROUBLESHOOTING

STEP	INSPECTION		ACTION
2	Disconnect instrument cluster connector No.2. Is there continuity between instrument cluster terminal 2H and ground?	Yes	Repair wiring harness between RFW control module and instrument cluster. Then go to Step 32.
		No	Inspect for no continuity between Instrument cluster terminal 2H and ground.
3	Turn ignition (engine) switch off. Disconnect RFW control module connector. Turn ignition (engine) switch on. Measure voltage between RFW control module connector terminal H and ground. Is the voltage greater than 10 V ?	Yes	Go to Step 5.
		No	Turn ignition (engine) switch off. Then go to next step.
4	Is the ENG 15 A fuse okay?	Yes	Repair wiring harness between ENG 15 A fuse and RFW control module. Then go to Step 32.
		No	Replace the ENG 15 A fuse. Then go to Step 32.
5	Disconnect free solenoid valve connector. Measure voltage between free solenoid valve connector terminal A and ground. Is the voltage greater than 10 V ?	Yes	Connect free solenoid valve. Then go to next step.
		No	Repair wiring harness between ENG 15 A fuse and RFW control module. Then go to Step 32.
6	Measure voltage between free solenoid valve connector terminal B and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Inspect free solenoid valve. Then go to Step 32.
7	Measure voltage between RFW control module connector terminal C and ground. Is the voltage greater than 10 V ?	Yes	Go to next step.
		No	Repair wiring harness between free solenoid valve and RFW control module. Then go to Step 32.
8	Disconnect lock solenoid valve connector. Measure voltage between lock solenoid valve connector terminal A and ground. Is the voltage greater than 10 V ?	Yes	Connect lock solenoid valve. Then go to next step.
		No	Repair wiring harness between ENG 15 A fuse and RFW control module. Then go to Step 32.
9	Measure voltage between lock solenoid valve connector terminal B and ground. Is the voltage greater than 10 V ?	Yes	Go next step.
		No	Inspect lock solenoid valve. Then go to Step 32.
10	Measure voltage between RFW control module connector terminal A and ground. Is the voltage greater than 10 V ?	Yes	Go next step.
		No	Repair wiring harness between lock solenoid valve and RFW control module. Then go to Step 32.
11	Turn ignition (engine) switch off. Is there continuity between RFW control module connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between RFW control module and ground. Then go to Step 32.
12	Shift select lever to N position. Is there continuity between RFW control module connector terminal L and ground?	Yes	Go to Step 16.
		No	Go to next step.
13	Is there continuity between transfer neutral switch connector terminal A and ground?	Yes	Repair wiring harness between RFW control module and transfer neutral switch. Then go to Step 32.
		No	Go to next step.
14	Inspect transfer neutral switch. Is it okay?	Yes	Go to next step.
		No	Replace transfer neutral switch. Then go to Step 32.

TROUBLESHOOTING

STEP	INSPECTION		ACTION
15	Is there continuity between transfer neutral switch connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between transfer neutral switch and ground. Then go to Step 32.
16	Shift select lever to 2H position. Is there continuity between RFW control module connector terminal K and ground?	Yes	Go to Step 20.
		No	Go to next step.
17	Is there continuity between 4 × 4 indicator switch connector terminal A and ground?	Yes	Repair wiring harness between RFW control module and 4 × 4 indicator switch. Then go to Step 32.
		No	Go to next step.
18	Inspect 4 × 4 indicator switch. Is it okay?	Yes	Go to next step.
		No	Replace 4 × 4 indicator switch. Then go to Step 32.
19	Is there continuity between 4 × 4 indicator switch connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between 4 × 4 indicator switch and ground. Then go to Step 32.
20	Shift select lever to 4H position. Is there continuity between RFW control module connector terminal J and ground?	Yes	Go to Step 28.
		No	Go to next step.
21	Is there continuity between RFW switch connector terminal A and ground?	Yes	Repair wiring harness between RFW switch. Then go to Step 32.
		No	Go to next step.
22	Inspect RFW switch. Is it okay?	Yes	Go to next step.
		No	Replace RFW switch. Then go to Step 32.
23	Is there continuity between RFW switch connector terminal B and ground?	Yes	Go to next step.
		No	Repair wiring harness between RFW switch and ground. Then go to Step 32.
24	Push RFW main switch on. Is there continuity between RFW main switch connector terminal I and ground?	Yes	Go to Step 28.
		No	Go to next step.
25	Is there continuity between RFW main switch connector terminal F and ground?	Yes	Repair wiring harness between RFW main switch and RFW control module. Then go to Step 32.
		No	Go to next step.
26	Inspect RFW main switch. Is it okay?	Yes	Go to next step.
		No	Replace RFW main switch.
27	Is there continuity between RFW main switch connector terminal D and ground?	Yes	Go to next step.
		No	Repair wiring harness between RFW main switch and ground. Then go to Step 32.
28	Inspect one-way check valve. Is it okay?	Yes	Go to next step.
		No	Replace one-way check valve. Then go to Step 32.
29	Inspect RFW actuator. Is it okay?	Yes	Go to next step.
		No	Replace RFW actuator. Then go to Step 32.
30	Inspect vacuum in vacuum hoses. Is it okay?	Yes	Go to next step.
		No	Repair vacuum in vacuum hoses. Then go to Step 32.

TROUBLESHOOTING

STEP	INSPECTION	ACTION
31	Inspect RFW control module. Is it okay?	Yes Go to next step.
		No Repair or replace RFW control module. Then go to next step.
32	Turn ignition (engine) switch on. Move selector lever from 2H to 4H position. Does RFW operate from free to lock?	Yes Troubleshooting completed. Explain repairs to customer.
		No Inspect malfunction symptoms again, then repeat from Step 1 if malfunction occurs again.

3	NOISE		
DESCRIPTION		Noise is heard from front differential.	
[TROUBLESHOOTING HINTS]			
● Joint shaft bearing abrasion or damage		● Joint shaft abrasion	
● RFW hub abrasion		● Conventional front differential parts malfunction	
STEP	INSPECTION		ACTION
1	Inspect joint shaft bearing. Is it okay?	Yes	Go to next step.
		No	Replace joint shaft bearing.
2	Inspect RFW hub. Is it okay?	Yes	Go to next step.
		No	Replace RFW hub.
3	Inspect joint shaft. Is it okay?	Yes	Go to next step.
		No	Replace joint shaft.
4	Malfunction is caused by other than RFW. Inspect conventional front differential parts. Are they okay?	Yes	Go to next step.
		No	Replace defective part(s).
5	Has front differential noise stopped?	Yes	Troubleshooting completed. Explain repairs to customer.
		No	Inspect malfunction symptoms again, then repeat from Step 1 if malfunction occurs again.

4	OIL LEAKAGE		
DESCRIPTION		The oil leaks from front differential.	
[TROUBLESHOOTING HINTS]			
● Poor installation of the RFW control box		● Malfunction of conventional front differential parts	
STEP	INSPECTION		ACTION
1	Is RFW control box installed completely?	Yes	Go to next step.
		No	Install RFW control box securely. Then go to Step 3.
2	Malfunction is caused by something other than RFW. Inspect conventional front differential parts. Are they okay?	Yes	Go to next step.
		No	Replace defective part(s).
3	Is there any oil leakage from front differential?	Yes	Inspect malfunction symptoms again, then repeat from Step 1 if malfunction still occurs.
		No	Troubleshooting completed. Explain repairs to customer.