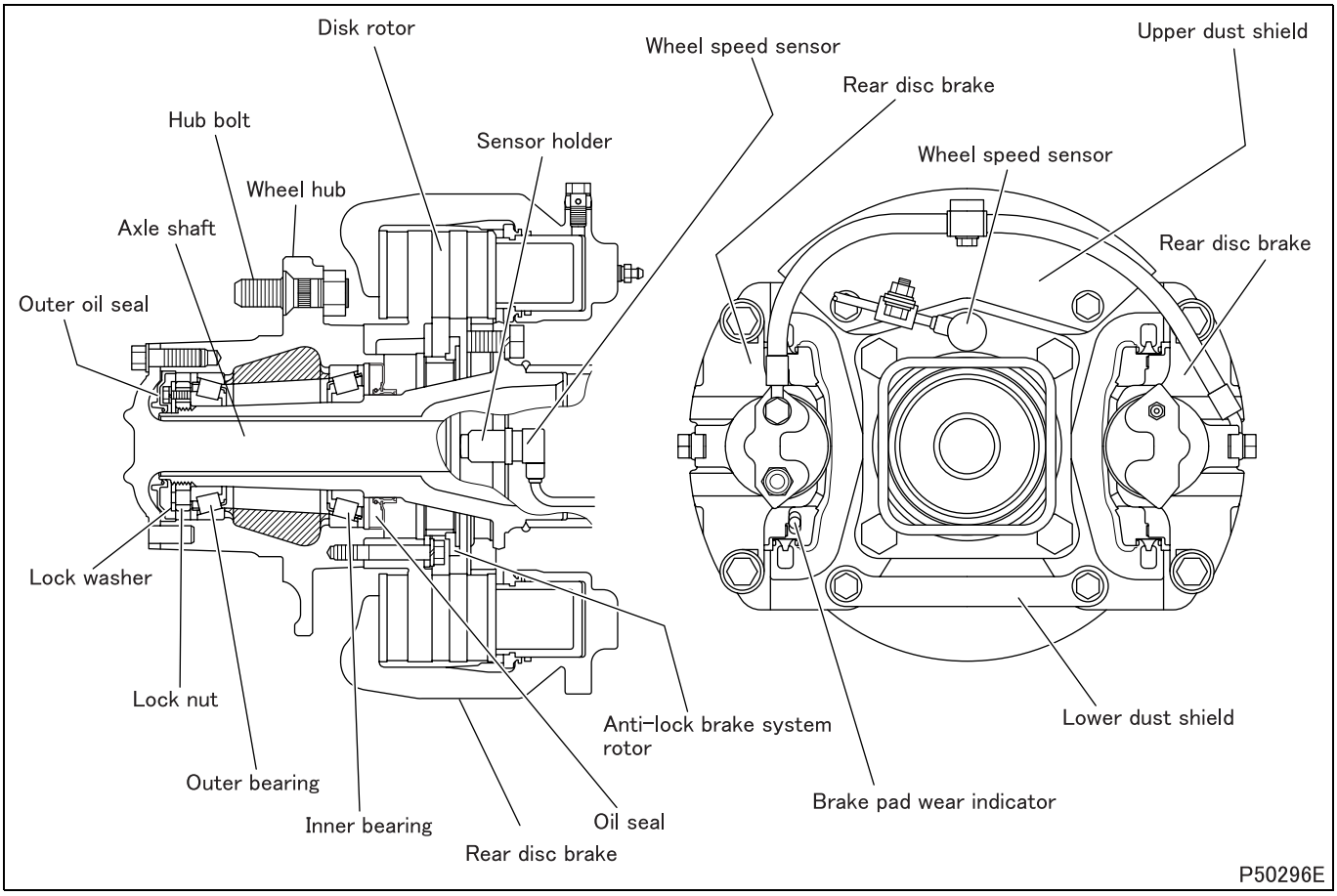
GROUP 27 INDEX

SPECIFICATIONS

Item		Specifications	
		COE 40/45	COE 50
Rear axle	Model	R033T	R035T
	Type	Banjo type, full floating	
Reduction	Model	D033H	D035H
	Type	Single-reduction hypoid gear	
	Gear ratio	4.875 5.285	5.285 5.714
Differential	Tooth shape	Straight bevel gear	
Gear oil	Grade	Normal: Maximum air temperature during operation below 40°C {104°F} API GL-5 SAE 90 Hot area: Maximum air temperature during operation above 40°C {104°F} API GL-5 SAE 140	
	Quantity L {qt}	4.5 {4.8}	
Weight kg {lb}		210 to 230 {460 to 505} (approximately)	250 {550} (approximately)

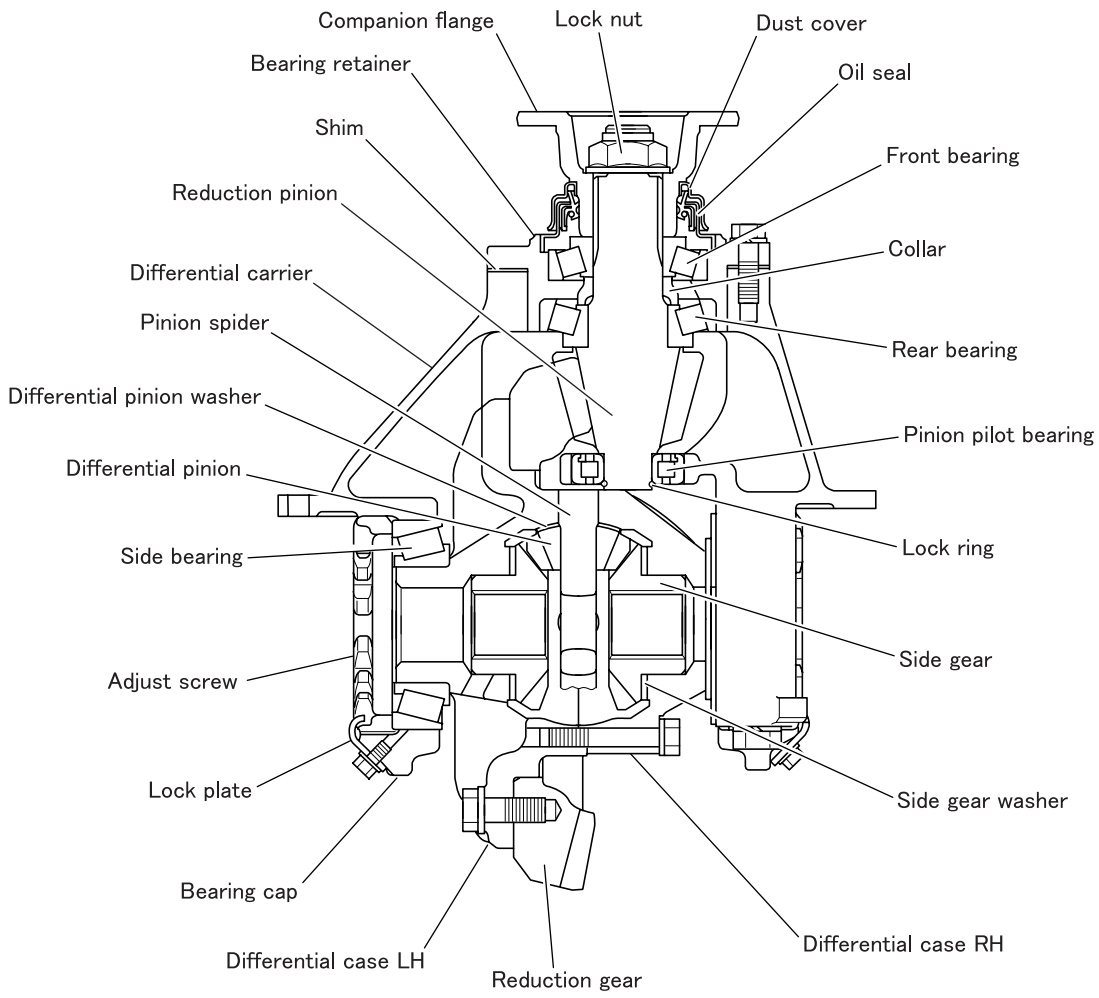
- Use gear oil with a SAE viscosity of 140 when a vehicle is used under heavy load conditions, including frequent driving on prolonged upgrades when the air temperature is above 10°C.
- Limited-slip differential oil API GL-5 SAE 90 is used for models with LSD (limited-slip differential).
- The weight varies according to vehicle model.

1. Wheel Hub and Rotor

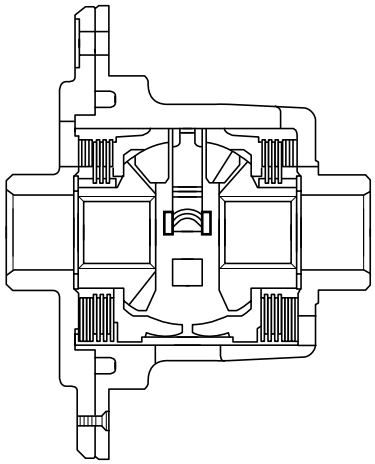


- The brake pad wear indicator is installed only on the right wheels.

2. Reduction and Differential



Limited slip differential



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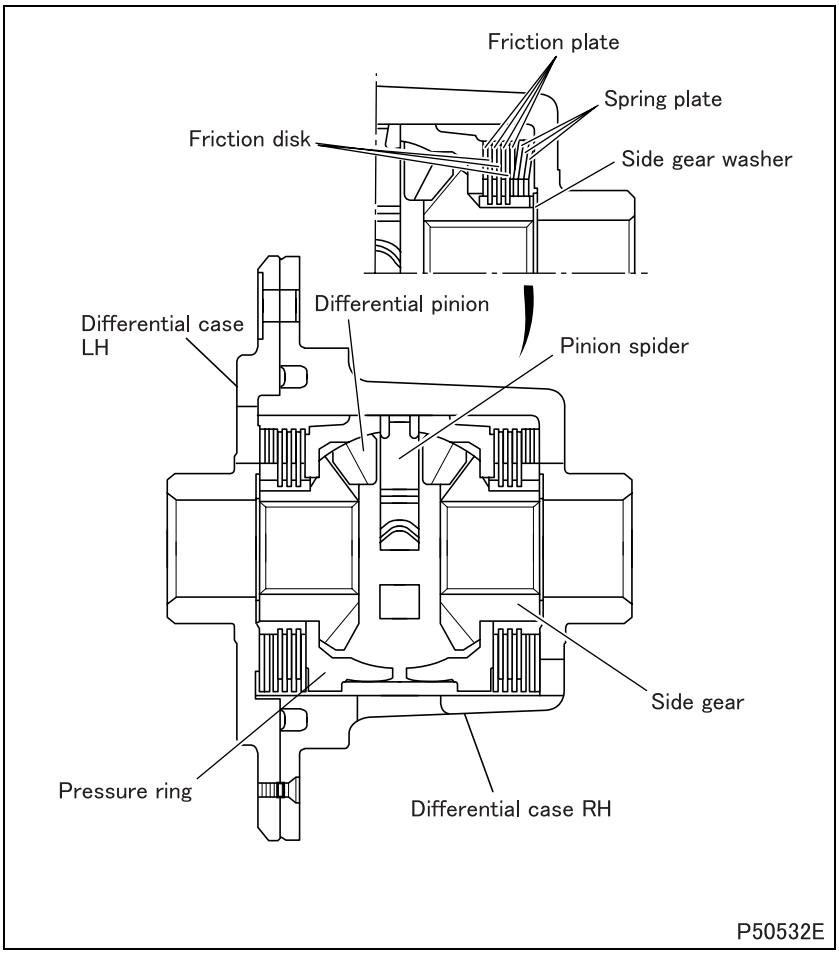
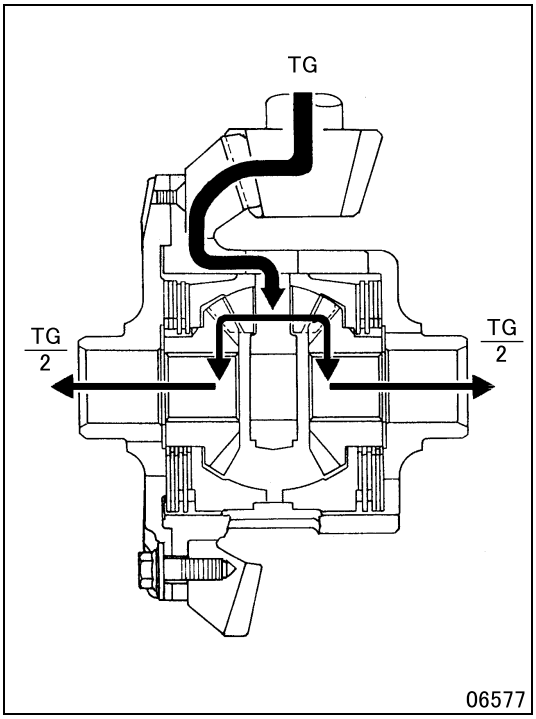
3. Limited Slip Differential



- The friction discs and spring discs, which are fitted in the side gears, and the friction plates, which are fitted in the R/H differential case, are pushed against the pressure rings by the spring plates.
- The pressure rings fit in the groove inside the R/H differential case and always rotate at the same speed.

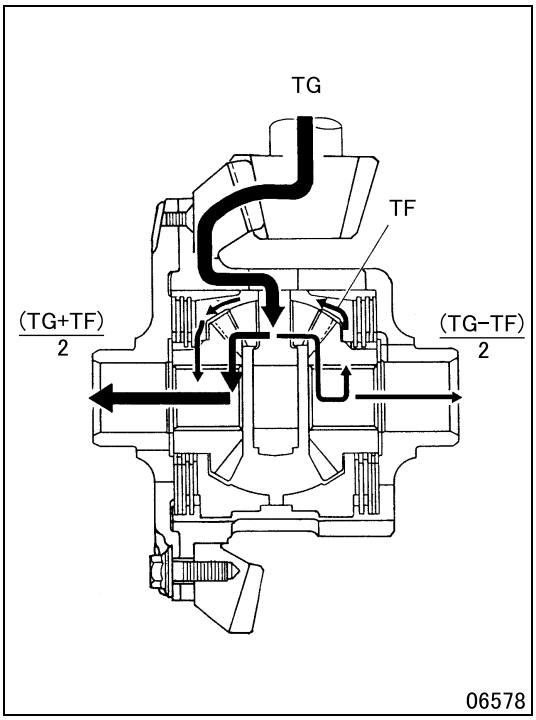
3.1 Operating mechanism

- When one wheel spins, a difference in the revolution speed generates between the side gear and the differential case, L/H and R/H, which causes the friction discs, spring discs and friction plates to revolve with respect to each other. This relative revolution produces a friction torque between the friction discs and friction plates.



3.2 Operation during straight driving

- During straight driving, the right and left axle shafts rotate at the same speed, and no friction torque generates.
  TG: input torque



3.3 Operation when there is a difference in rotation speed between right and left wheels

- If one wheel is on a slippery surface such as mud and the other wheel is not, the differential function becomes effective. Under these conditions, friction torque **TF** is generated, reducing the difference in rotations between right and left wheels. That is, the faster axle shaft is forced to slow down, and the slower axle shaft is forced to turn faster.
  If one wheel spins, a large friction torque is generated, because the spinning creates a large difference in rotational speed. In this way, a small torque is distributed to the spinning wheel at the same time that a large torque is distributed to the non-spinning wheel, which makes it easier for the vehicle to get out of the mud.

$\frac{\mathbf{TG-TF}}{\mathbf{2}}$ High-speed side (spinning side)

$\frac{\mathbf{TG+TF}}{\mathbf{2}}$ Low-speed side

M E M O

Possible causes	Symptoms	Power transmission insufficient									
		Noise when starting and changing gears	Continuous noise while cruising	Intermittent noise while cruising	Noise while cornering	Tires drag while cornering	Propeller shaft turns but vehicle does not move	Oil leakage from companion flange assembly	Oil leakage from differential carrier and axle housing	Oil leakage from axle shaft	Reference Gr
Wheel hub, axle shaft, axle housing	Wheel hub bearing seized, worn or rotation faulty		O								
	Wheel hub bearing broken			O							
	Axle shaft mounting bolts loose			O						O	
	Axle shaft broken						O				
	Axle shaft slips out of spline of side gear						O				
	Axle shaft to spline of side gear backlash excessive	O									
	Oil seal faulty									O	
	Axle housing bent		O								
	Inspection plug and drain plug loose								O		
	Air breather and vent plug clogged							O		O	
Reduction and differential	Gear oil excessive							O			
	Gear oil insufficient	O	O								
	Oil seal faulty							O			
	Sealant faulty								O		
	Reduction and differential assembly mounting nuts and bolts loose			O					O		
	Differential carrier cracked or damaged								O		
	Bearing cap mounting bolts loose			O							
	Side bearing seized, worn or rotation faulty		O		O						
	Side bearing broken			O							
	Side bearing preload adjusted incorrectly		O								
	Reduction pinion or reduction gear broken	O		O	O		O				
	Reduction pinion or reduction gear worn		O		O						
	Reduction pinion or reduction gear damaged		O								
	Reduction gear backlash excessive	O									
	Reduction gear backlash or tooth contact adjusted incorrectly		O								

Possible causes	Symptoms	Power transmission insufficient									
		Noise when starting and changing gears	Continuous noise while cruising	Intermittent noise while cruising	Noise while cornering	Tires drag while cornering	Propeller shaft turns but vehicle does not move	Oil leakage from companion flange assembly	Oil leakage from differential carrier and axle housing	Oil leakage from axle shaft	Reference Gr
Reduction and differential	Starting torque of pinion bearing faulty	O	O								
	Locknut loose	O	O								
	Front and rear bearings seized		O								
	Front and rear bearings worn		O								
	Front and rear bearings broken			O							
	Pinion pilot bearing worn		O								
	Pinion pilot bearing seized or broken			O							
	Pinion shaft and pinion spider broken						O				
	Reduction gear and differential case mounting bolt and nut loose	O		O							
	Side gear backlash excessive	O									
	Side gear or differential pinion broken			O	O	O	O				
	Side gear or differential pinion seized					O	O				
	Side gear or differential pinion worn				O	O					
	Side gear washer worn or damaged			O	O	O					
	Limited-slip differential (LSD) broken <On vehicles with LSD>	O	O	O	O		O				

ON-VEHICLE INSPECTION AND ADJUSTMENT

1. Axle Oil Level Check and Axle Oil Change

Torque value: N·m (lbf·ft)

Mark	Component	Torque value	Remarks
–	Inspection plug	110 ± 10 (81 ± 7.4)	–
	Drain plug		

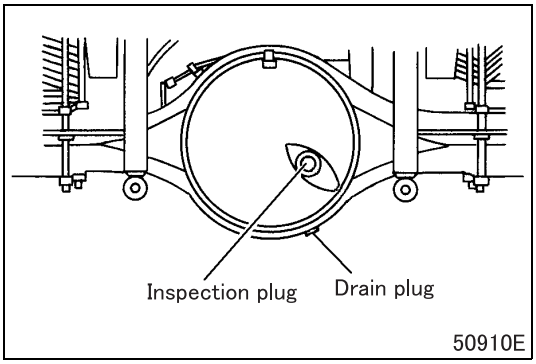
Lubricant and/or sealant

Mark	Points of application		Specified lubricant and/or sealant	Quantity
–	Axle housing	D033H, D035H	Normal: Maximum air temperature during operation below 40°C {104°F} API GL-5 SAE 90 Hot area: Maximum air temperature during operation above 40°C {104°F} API GL-5 SAE 140	4.5 L {4.8 qt}

- Use gear oil with a SAE viscosity of 140 when a vehicle is used under heavy load conditions, including frequent driving on prolonged upgrades when the air temperature is above 10°C.
- Limited-slip differential oil API GL-5 SAE 90 is used for models with LSD (limited-slip differential).

WARNING ⚠

- **Axle oil is extremely hot immediately after vehicle operation. Hot axle oil can cause burns.**



(1) Oil level check

- Remove the fill plug, and check that the axle is filled with oil up to the level of the fill opening.
- If needed, add oil through the fill hole until it is at the level of the fill opening.
- Install the fill plug and tighten it to the specified torque.

(2) Oil change

[Draining and inspection]

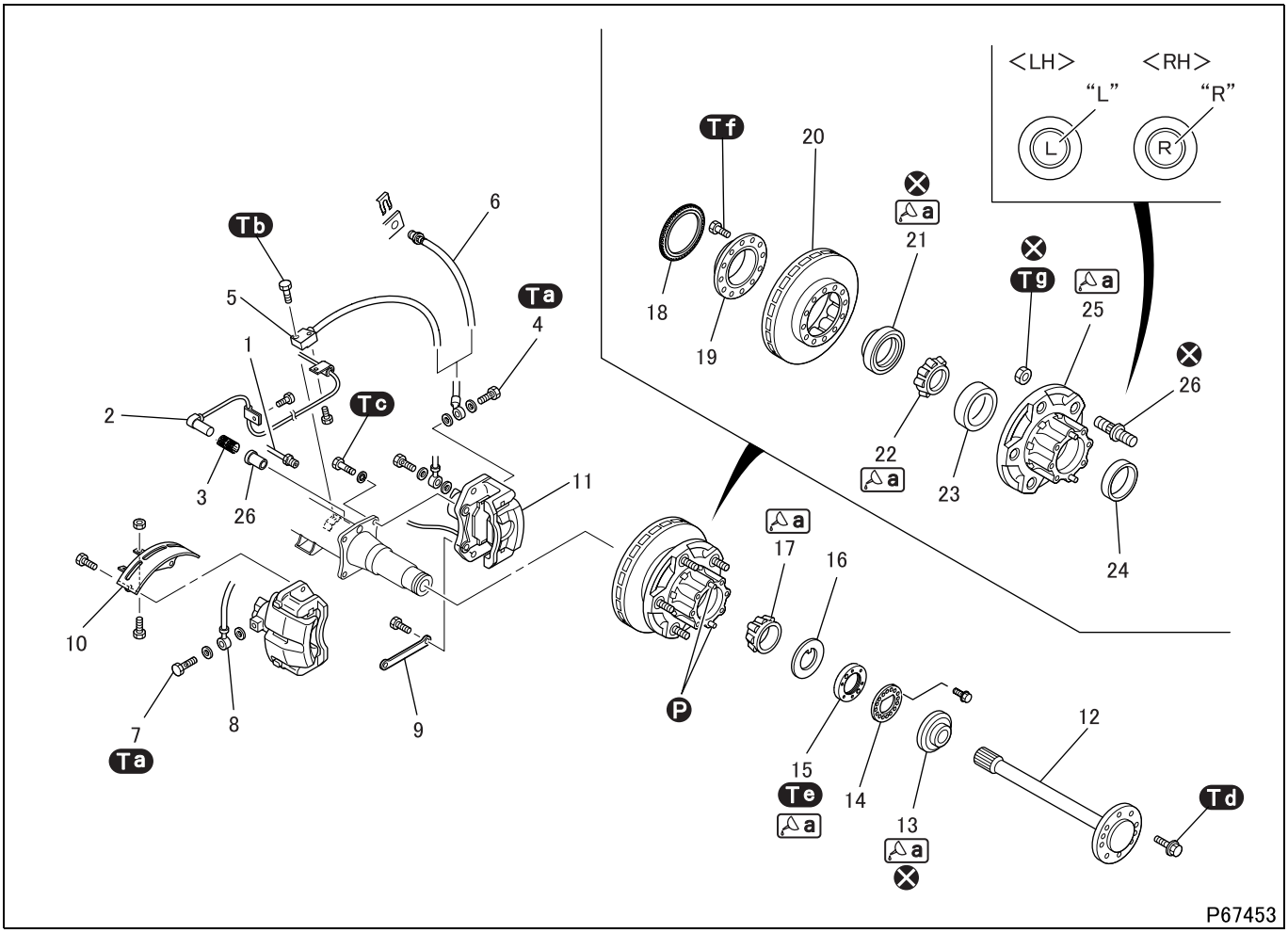
- Remove the fill plug and magnetic drain plug. Drain the oil while the axle is still warm. Catch the unused oil in a suitable container.
- Check the drained oil for presence of metal chips and metal powder. Dispose of the oil properly.
- If an abnormally large amount of metal chips and metal powder is found, remove the axle.

[Filling]

- Clean the magnetic drain plug before installation.
- Add gear oil in the specified quantity through the fill plug opening.
- After filling, check that oil is filled up to the level of the fill opening. If needed, add oil through the fill hole until it is at the level of the fill opening.
- Tighten the fill and drain plugs to the specified torque.

M E M O

WHEEL HUB AND ROTOR



● Disassembly sequence

1 Brake line
2 Wheel speed sensor
3 Spring spacer
4 Eye bolt
5 Brake hose (with connector)
6 Brake hose (without connector)
7 Eye bolt
8 Brake hose
9 Lower dust shield
10 Upper dust shield
11 Rear disc brake (see Gr35A)
12 Axle shaft
13 Outer oil seal
14 Lock washer
15 Locknut
16 Lock plate <COE 50>
17 Outer bearing inner race
18 Antilock brake system rotor
19 Antilock brake system rotor flange
20 Disc rotor
21 Oil seal
22 Inner bearing inner race
23 Inner bearing outer race
24 Outer bearing outer race
25 Wheel hub
26 Hub bolt
27 Sensor holder

Ⓟ: Locating pin
⊗: Non-reusable parts

CAUTION ⚠

- **Plug the brake hose to prevent entry of dust and dirt after it has been removed.**

NOTE

- **Do not remove the antilock brake system rotor and sensor holder except to replace them.**
- **Do not disassemble the disc rotor and wheel hub except to replace them.**

● Assembly sequence

Follow the disassembly sequence in reverse.

CAUTION ⚠

- **Make sure that the disc rotor surface and disc brake pad surface are free from grease.**
- **Make sure that the brake hose is not twisted or kinked.**
- **Inspect the drag torque of disc brakes after assembly. (See Gr35A.)**

Service standards: mm {in}

Location	Maintenance item		Standard value	Limit	Remedy
–	Starting torque of wheel hub bearing (inertial force at hub bolt position with oil seal assembled)		2.0 to 3.9 N·m {1.4 to 2.9 lbf·ft} (inertial force: 18 to 32 N {4.0 to 7.2 lb}	–	Adjust or replace
12	Axle shaft	Bend	1 {0.039} or less	2 {0.079}	Replace
		Bend at flange face	0.03 {0.0012} or less	0.05 {0.0020}	
19	Disc rotor	Runout (measure runout, assembling disc rotor in rear axle)	0.07 {0.0028} or less	0.10 {0.0039}	Replace
		Thickness	40 {1.57}	38 {1.50}	

Torque value: N·m (lbf·ft)

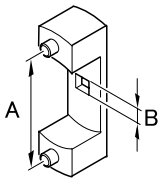
Mark	Fastener			Torque value	Remarks
Ta	Eye bolt			22 ± 2 (16 ± 1.5)	–
Tb	Bolt (brake hose mounting) (with connector)			43.2 ± 10 (32 ± 7.4)	–
Tc	Bolt (rear disc brake mounting)			98 to 140 (72 to 103)	–
Td	Bolt (axle shaft mounting)			98 to 120 (72 to 87)	–
Te	Locknut	Primary tightening	COE 40/45	98 to 130 (72 to 96)	–
			COE 50	150 to 180 (110 to 130)	
		Secondary tightening after complete tightening	COE 40/45	30 to 40 (22 to 29)	–
			COE 50	50 to 60 (37 to 44)	
Tf	Bolt (wheel hub and disc rotor mounting)			45 to 60 (33 to 44)	–
Tg	Nut (hub bolt mounting)			340 ± 40 (251 ± 30)	–

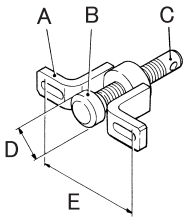
Lubricant and/or sealant

Mark	Points of application	Specified lubricant and/or sealant	Quantity
△a	Lip area of outer oil seal	Wheel bearing grease [NLGI No. 2 (Li soap)]	As required
	Thread area of locknut		
	Pack space between rollers of outer bearing inner race and inner bearing inner race		
	Lip area of oil seal		
	Pack interior of wheel hub		370 ± 37 g ※ {13.1 ± 1.31 oz}

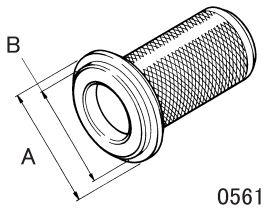
※: For a wheel hub

Special tools (Unit: mm {in})

<table>
<tr><th>Mark</th><th>Tool name and shape</th><th>Part No.</th><th>Application</th></tr>
<tr><td>a</td><td>Locknut adjuster
 

P05617
<table><tr><th>Parts No.</th><th>A</th><th>B</th></tr><tr><td>MB999150</td><td>70
{2.76}</td><td>□12.7
{0.50}</td></tr><tr><td>MC888793</td><td>80
{3.15}</td><td>□12.7
{0.50}</td></tr></table></td><td><FE84>
MB999150
<FE85>
MC888793</td><td>Removal and installation of locknut</td></tr>
<tr><td>b</td><td>Hub puller
A: Hub puller body
B: Attachment
C: Bolt
 

05618
<table><tr><th>D</th><th>E</th></tr><tr><td>ϕ50
{1.97}</td><td>165
{6.50}</td></tr></table></td><td>MB999070

A: MB999071
B: MB999073
C: MB999072</td><td>Removal of wheel hub and rotor</td></tr>
<tr><td>c</td><td>Oil seal installer
 

05619
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{3.31}</td><td>ϕ70
{2.76}</td></tr></table></td><td>MB999097</td><td rowspan="3">Installation of oil seal (to be used in combination)</td></tr>
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 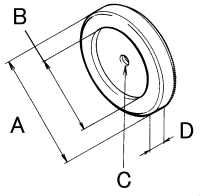

51705
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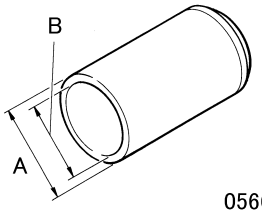
{4.61}</td><td>ϕ84
{3.31}</td><td>M10 × 1.25</td><td>20
{0.79}</td></tr></table></td><td>MH062607</td></tr>
<tr><td>e</td><td>Bearing installer
 

05668
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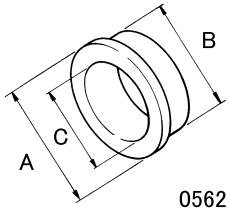
{2.76}</td><td>ϕ57
{2.24}</td></tr></table></td><td>MB999100</td><td rowspan="2">Installation of inner and outer bearing outer races (to be used in combination)</td></tr>
<tr><td>f</td><td>Bearing installer
 

05621
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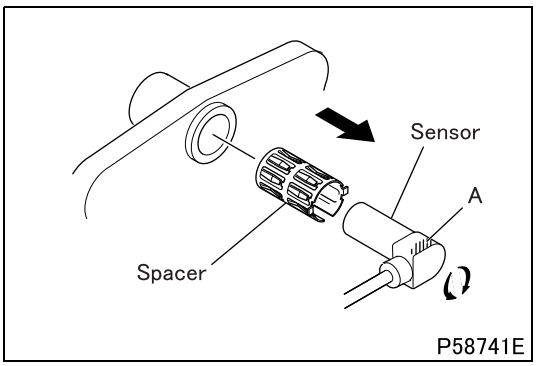
{4.29}</td><td>ϕ99
{3.90}</td><td>ϕ77
{3.03}</td></tr></table></td><td>MB999098</td></tr>
</table>

◆Removal procedure◆

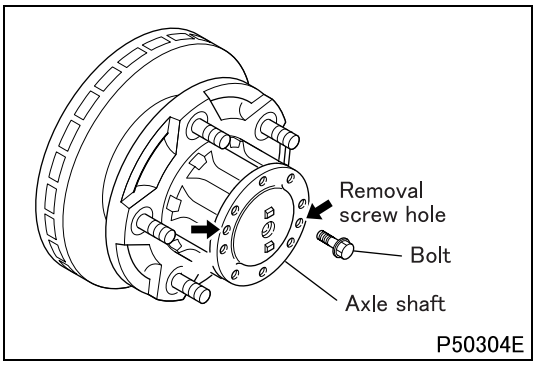


■ Removal: Wheel speed sensor

- Hold the shaded section (section A) of the wheel speed sensor with pliers. Remove the sensor by twisting it slightly to the left and right.
- If the wheel speed sensor pulls out without any resistance, replace the spring spacer.

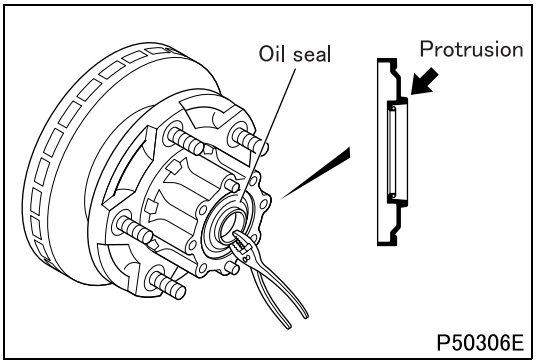
CAUTION ⚠

- **When removing the wheel speed sensor, never apply force to it, such as tapping it with a hammer, prying it with a screwdriver, or yanking on the harness. This could cause the wire to break.**



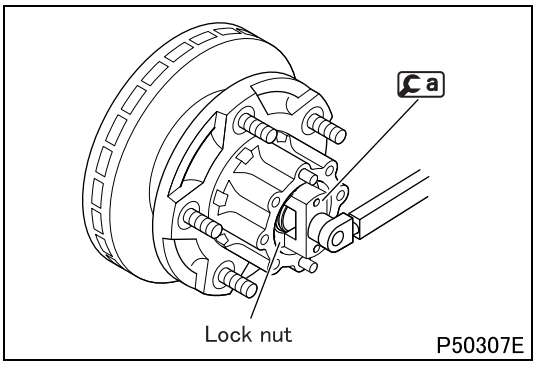
■ Removal: Axle shaft

- Remove the axle shaft mounting bolts that attach the axle shaft to the wheel hub.
- Screw two axle shaft mounting bolts evenly into the axle shaft removal screw holes. Use them as handles to remove the axle shaft.

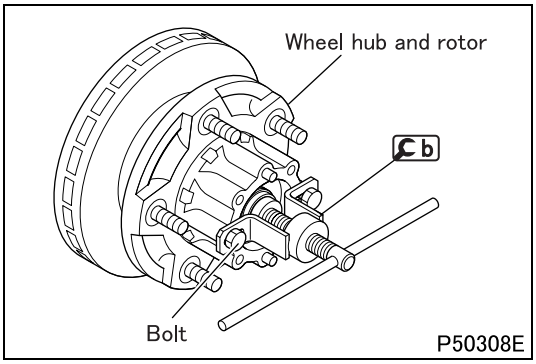


■ Removal: Outer oil seal

- To remove the outer oil seal, use pliers to pull on the protrusions on the outer edge of the outer oil seal. Pull evenly around the whole circumference of the seal.

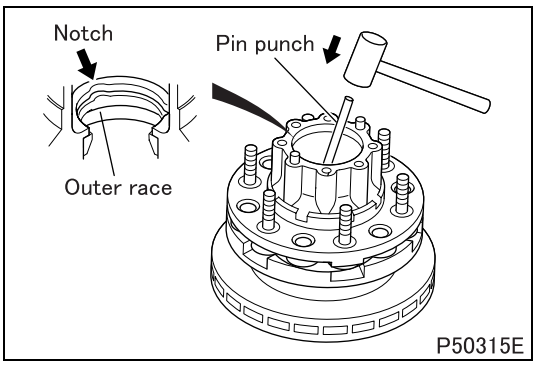


■ Removal: Locknut



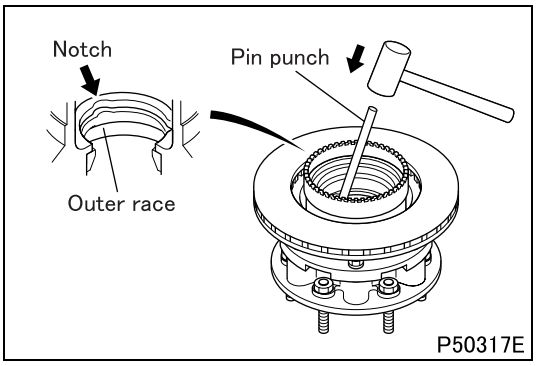
■ **Removal: Wheel hub and rotor**

- Install the hub puller b and fasten it with axle shaft mounting bolts. Remove the wheel hub and rotor assembly.



■ **Removal: Inner bearing outer race**

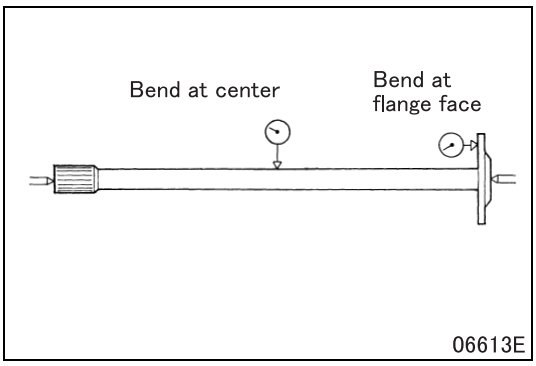
- Drive out the inner bearing outer race by tapping at each of the three indentations in the wheel hub. Keep the race level as it is being removed.



■ **Removal: Outer bearing outer race**

- Drive out the outer bearing outer race by tapping at each of the three indentations in the wheel hub. Keep the race level as it is being removed.

◆Inspection procedure◆

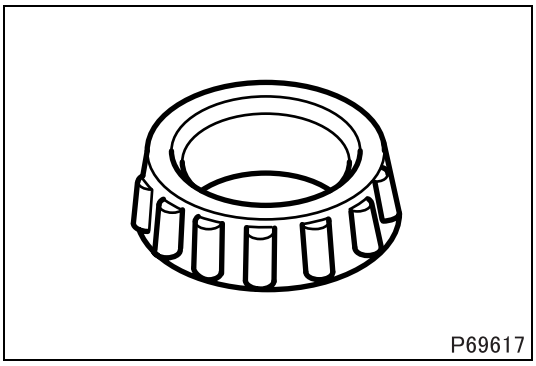


■ **Inspection: Axle shaft**

- Measure the bend of the axle shaft at its center.

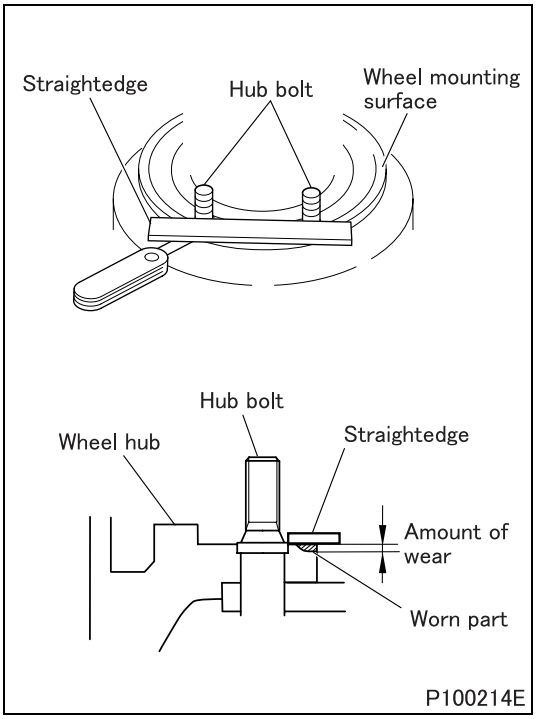
NOTE

- **Give the axle shaft one complete turn and read the dial gauge at this time. The bend is one half of the dial gauge reading.**
- If the measured value exceeds the limit, replace the axle shaft.
- Measure the bend of the flange face of the axle shaft.
- If the measured value exceeds the limit, replace the axle shaft.



■ **Inspection: Outer bearing inner race**

- Inspect the outer bearing inner race after cleaning the bearing to remove grease completely.
- If any damage, wear, or poor rotating condition is evident in the inner race, replace it with a new one.
- The inner race and outer race should be replaced as a set.



■ **Inspection: Wear at the outer periphery of wheel hub**

- Clean the wheel mounting surface of the wheel hub before inspection.
- Place a straight edge on the hub so as to contact to the two hub bolts on the wheel mounting surface.

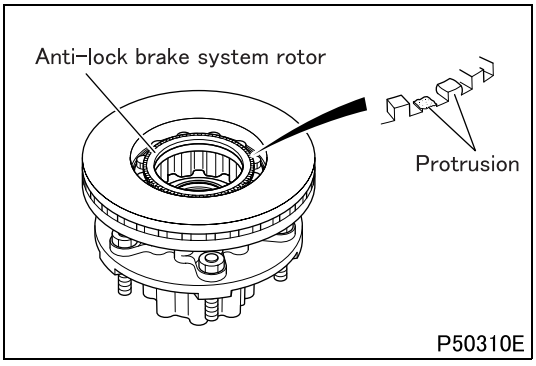
CAUTION ⚠

- **Make sure that the straight edge does not run onto the hub bolt.**

- Use feeler gauges to measure the amount of wear at the outer periphery of the wheel hub.
  Measure the amount of wear in the area of every hub bolt.
- If the amount of wear at any point exceeds the limit, replace the wheel hub.
- If the wheel has cracks or has a stepped wear at the wheel hub mounting surface, replace the wheel.

CAUTION ⚠

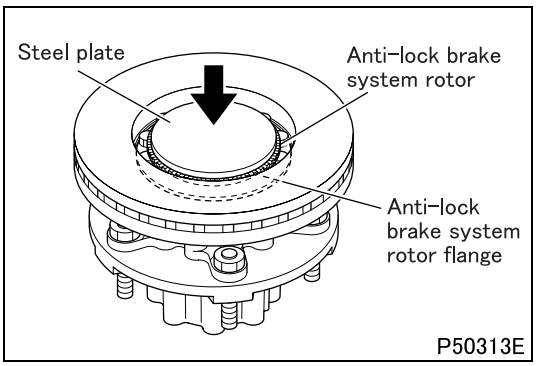
- **Never paint the wheel mounting surface of the wheel hub as it may be a cause of loose wheel nut.**



■ **Inspection: Antilock brake system rotor**

[Inspection]

- Remove any debris on the antilock brake system rotors. Check the protrusions on the antilock brake system rotor for chipping and flattening.
- If any problem is found, replace the antilock brake system rotor.



[Installation]

- Heat the antilock brake system rotor to approximately 150°C (302°F).
- Install the antilock brake system rotor and antilock brake system rotor flange evenly using a steel plate so as not to allow them to tilt.

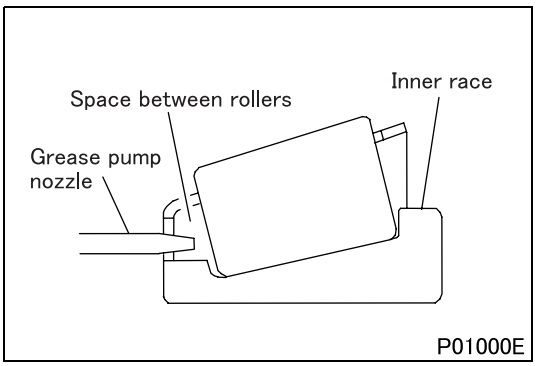
WARNING ⚠

- **Touching the heated rotor will cause burns.**

■ **Inspection: Inner bearing inner race**

- Inspect the inner bearing inner race in the same manner as for the outer bearing inner race.
  (See **"■ Inspection: Outer bearing inner race".**)

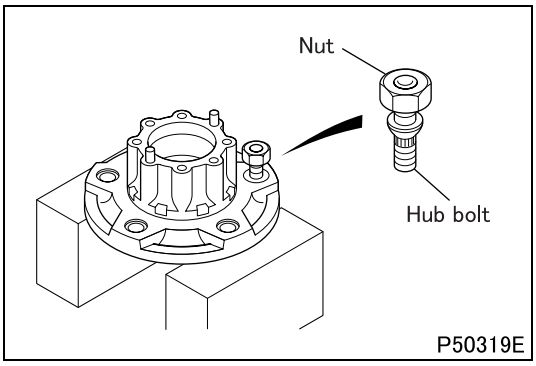
◆Installation procedure◆



■ **Installation: Packing grease in inner bearing inner race**

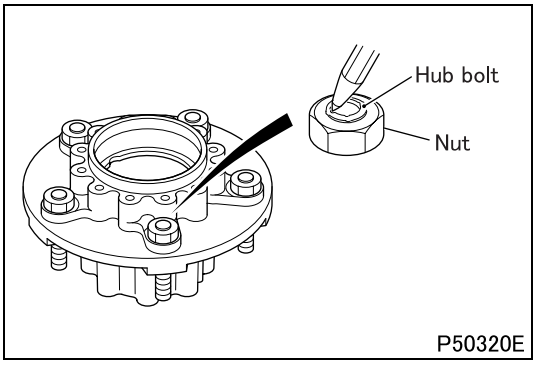
- Insert the grease pump nozzle into the space between rollers of the inner bearing inner race to pack grease sufficiently.

◆Installation procedure◆

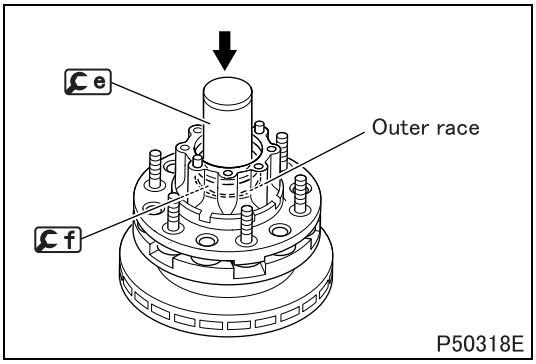


■ **Installation: Hub bolt**

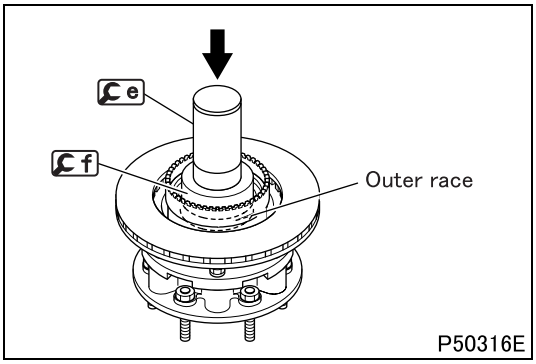
- Screw the nuts into the hub bolt until they are almost flush with the flange.
- Drive the hub bolt into the wheel hub vertically by hitting the end face of the nut with a brass punch, or similar tool.



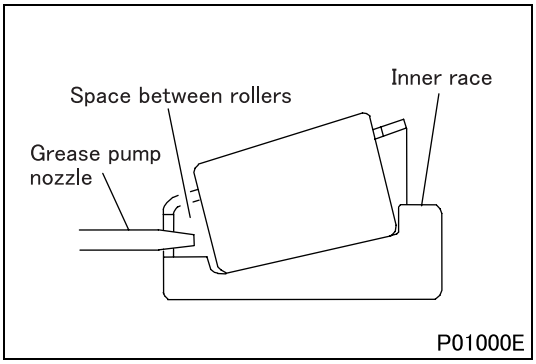
- After tightening the nut to the specified torque, use a punch to lock it in place.



■ **Installation: Outer bearing outer race**

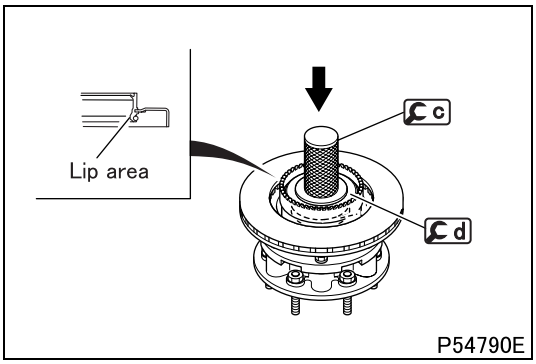


■ **Installation: Inner bearing outer race**



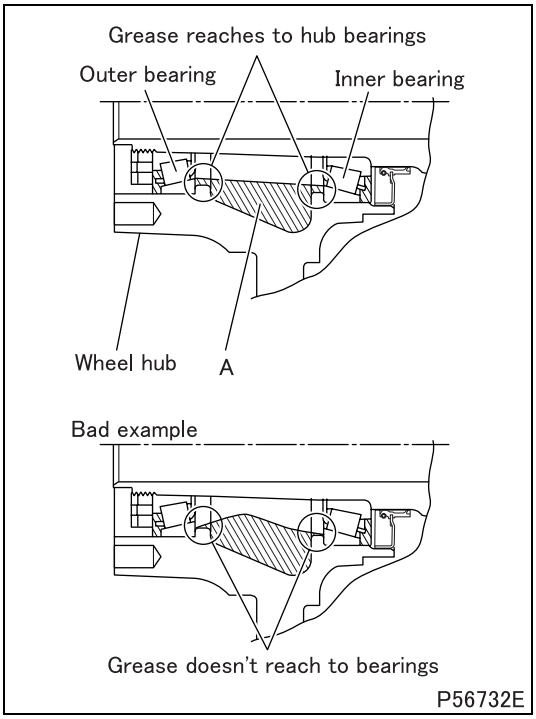
■ **Installation: Packing grease in inner bearing inner race**

- Insert the nozzle of the grease pump into the space between rollers of the inner bearing inner race to pack grease sufficiently.



■ **Installation: Oil seal**

- Apply grease to the lip area of the oil seal and install it on the wheel hub in the illustrated direction.

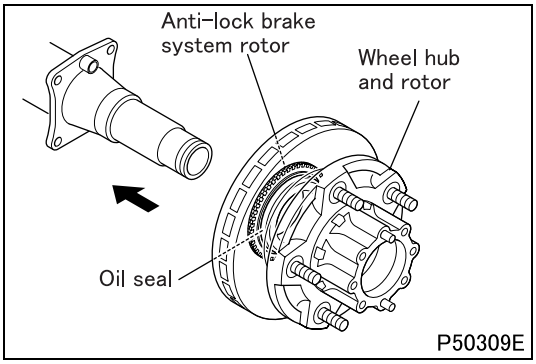


■ **Installation: Wheel hub and rotor**

- Apply the specified amount of grease to area A of wheel hub. The grease must reach to both the inner and outer bearing as shown in the illustration.

CAUTION ⚠

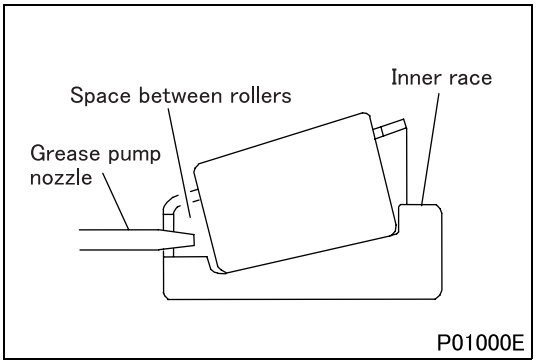
- **Applying grease as shown in the "bad example" causes the wheel hub bearing to seize.**



- Slowly install the wheel hub and rotor assembly so as not to cause damage to the oil seal and antilock brake system rotor.

CAUTION ⚠

- **If the antilock brake system rotor is damaged, wheel speed sensor signals become abnormal, causing the antilock brake system to malfunction.**

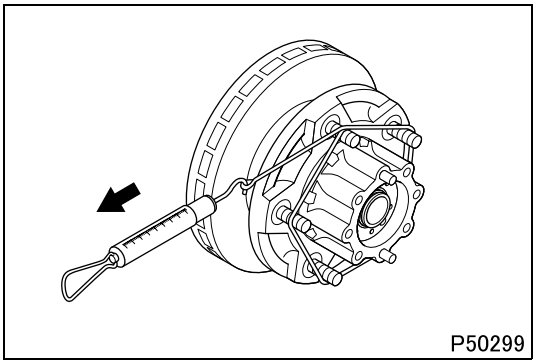


■ Installation: Packing grease in outer bearing inner race

- Insert the nozzle of the grease pump into the space between rollers of the inner bearing inner race to pack grease sufficiently.

■ Installation: Locknut

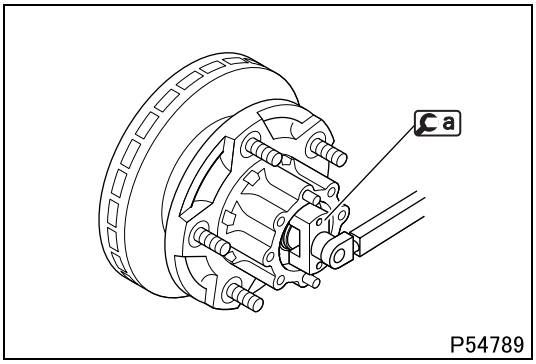
- Install the locknut, as removed. (See **■ Removal: Locknut**.)



■ Inspection: Starting torque of wheel hub bearing

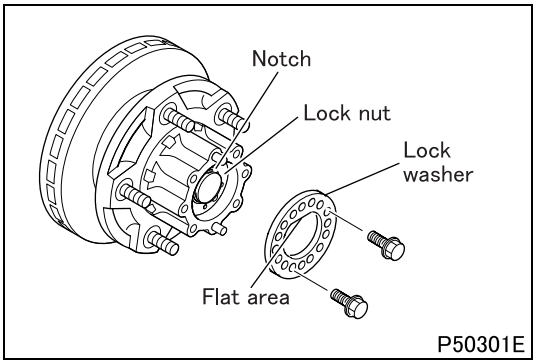
[Inspection]

- After installing the lock washer, carry out the following inspections.
- Measure the inertial force at the hub bolt position using a spring balance.
- If the inertial force is within the specified value, the starting torque conforms to the standard value. If the measured value deviates from the specified value, do the adjustment below.

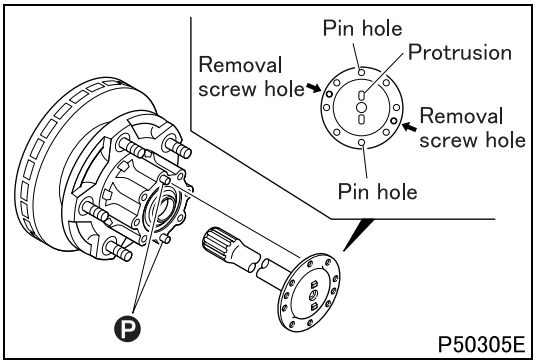


[Adjustment]

- Tighten the locknut to the specified torque (primary tightening) while turning the wheel hub and rotor, and then loosen it completely.
- Turn the wheel hub and rotor back and forth several times until it operates smoothly. Then tighten the locknut to the specified torque (secondary tightening).



- Insert the flat area of the lock washer and align it with the notch in the axle housing. Fasten the locknut with two bolts installed across from each other.
- If the locknut does not align with one of the holes in the lock washer, adjust the locknut until it aligns. Make sure that there is no play in the axial direction.
- Do the measurement again after the adjustment. If any problem is found, replace the outer and inner bearings.

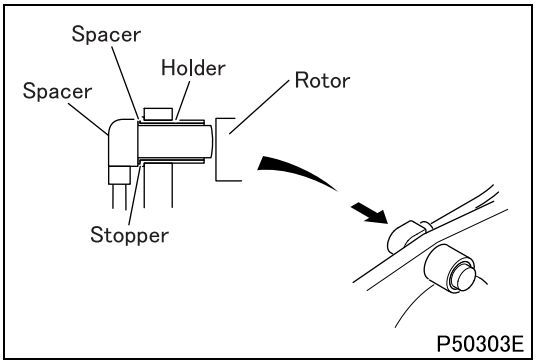


■ Installation: Axle shaft

- Align the pin hole of the locating pin with that of the axle shaft to install the axle shaft.

NOTE

- **The pin holes do not necessarily line up with the protrusions on the axle shaft flange as shown in the illustration. To locate a pin hole, go clockwise to the second hole from a removal screw hole.**

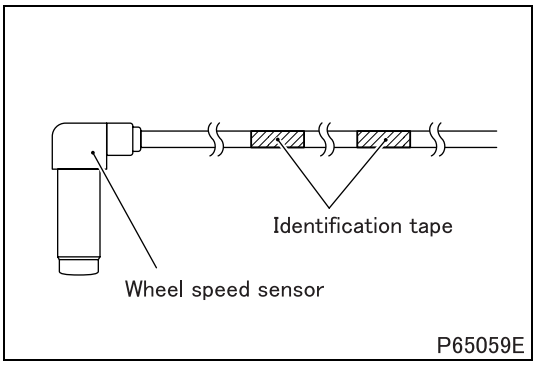


■ Installation: Wheel speed sensor

- Install the wheel speed sensor so that it securely contacts the sensor holder together with the spring spacer.

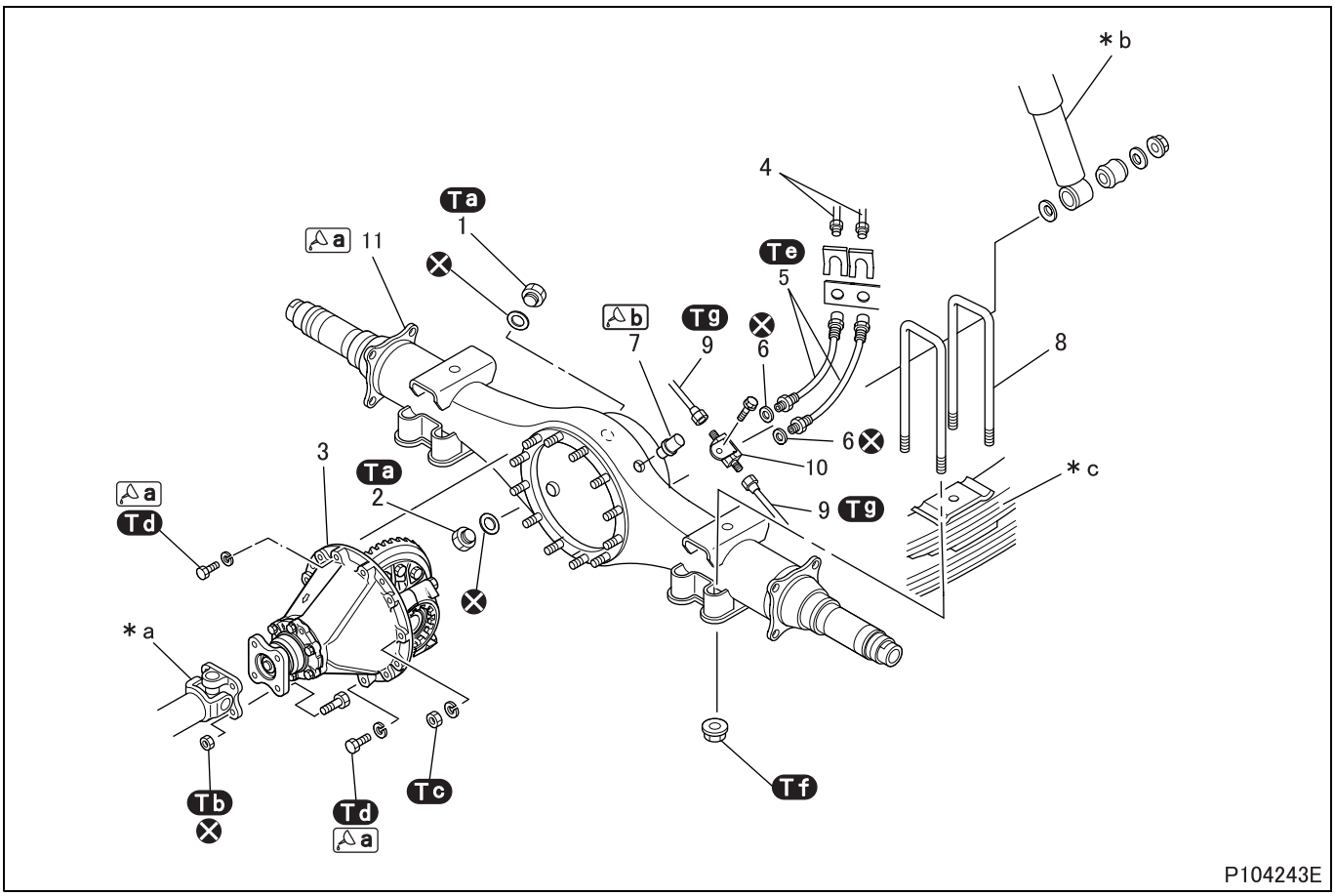
CAUTION ⚠

- **When installing the wheel speed sensor, never apply force to it, such as tapping it with a hammer, prying it with a screwdriver, or yanking on the harness. This could cause the wire to break.**



- Use clips to secure the wheel speed sensor harness at the identification tape portions. Ensure that the harness is free of kinks, slack, and/or interference with other parts.

AXLE HOUSING



● Removal sequence

1 Inspection plug
2 Drain plug
3 Reduction and differential (see later sections)
4 Brake pipe
5 Brake hose
6 Packing <COE 45/50>
7 Vent plug
8 U-bolt
9 Brake pipe
10 Connector
11 Axle housing

∗a: Propeller shaft
∗b: Shock absorber
∗c: Leaf spring

⊗: Non-reusable parts

CAUTION ⚠

- **Plug the brake hose and brake line to prevent the entry of dust and dirt into the brake system.**

NOTE

- **Do not remove the axle housing unless a problem is found.**

● Installation sequence

Follow the removal sequence in reverse.

Service standards: mm {in}

Location	Maintenance item		Standard value	Limit	Remedy
7	Injection-valve opening pressure of vent plug		4.9 kPa {0.7 psi} or less	–	Replace
11	Axle housing	Runout at outer bearing portion	0.5 {0.020} or less	1 {0.039}	Replace
		Difference between before and after rotation at center <drive axle>	1 {0.039} or less	5 {0.20}	

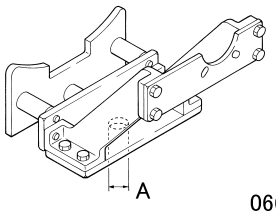
Torque value: N·m (lbf·ft)

Mark	Component		Torque value	Remarks
Ta	Inspection plug		98 ± 120 (72 ± 89)	–
	Drain plug			
Tb	Nut (propeller shaft mounting)		100 to 120 (74 to 89)	M12
Tc	Nut (reduction and differential mounting)		69 to 93 (51 to 69)	–
Td	Bolt (reduction and differential mounting)		83 to 108 (61 to 80)	–
Te	Brake hose	<COE 40>	25.5 to 34.3 (18.8 to 25.3)	–
		<COE 45/50>	20.6 to 31.4 (15.2 to 23.2)	–
Tf	Nut (U-bolt mounting)		292 to 394 (215 to 290)	M18
Tg	Brake pipe		12.7 to 16.7 {9.4 to 12, 1.3 to 1.7}	–

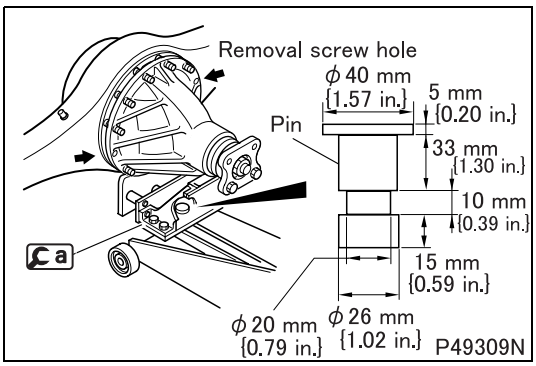
Lubricant and/or sealant

Mark	Points of application	Specified lubricant and/or sealant	Quantity
a	Thread area of bolt	ThreeBond 1215	As required
	Reduction and differential mounting surface of axle housing		
b	Axle housing mounting surface of vent plug	ThreeBond 1216	As required

Special tools (Unit: mm {in})

Mark	Tool name and shape	Part No.	Application
Ca	Differential carrier base A: ϕ28 {1.10}  06679	MB999102	Removal and installation of reduction and differential

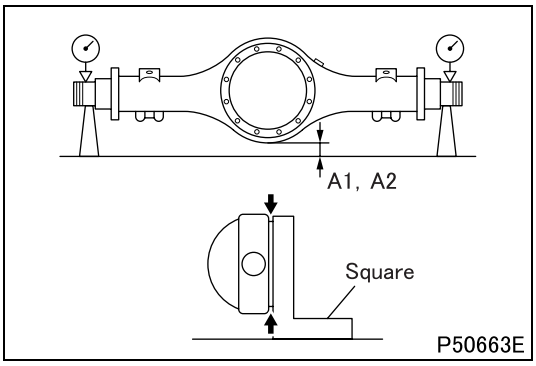
◆Removal procedure◆



■Removal: Reduction and differential

- Lower the garage jack and place the differential carrier base [a] on it. Use a pin fabricated to the dimensions in the illustration. Insert the pin and fasten it.
- Screw two bolts evenly into the reduction and differential removal screw holes (as shown in illustration), Use them as handles to remove the reduction and differential.
  Bolt size: M12 × 1.25 mm

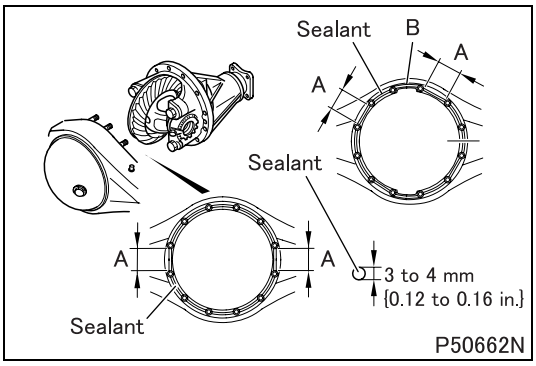
◆Inspection procedure◆



■Inspection: Axle housing

- Horizontally support the inner bearing fittings at both ends of the housing spindle of the axle housing.
- Apply a dial gauge to the outer bearing fitting and turn it 360 degrees to measure runout.
- For measurement of dimensions **A1** and **A2**, place the axle housing at right angles using a square and measure dimension **A1**. Then, turn it 180 degrees and measure dimension **A2**.
- If the measured value exceeds the limit, replace the axle housing.

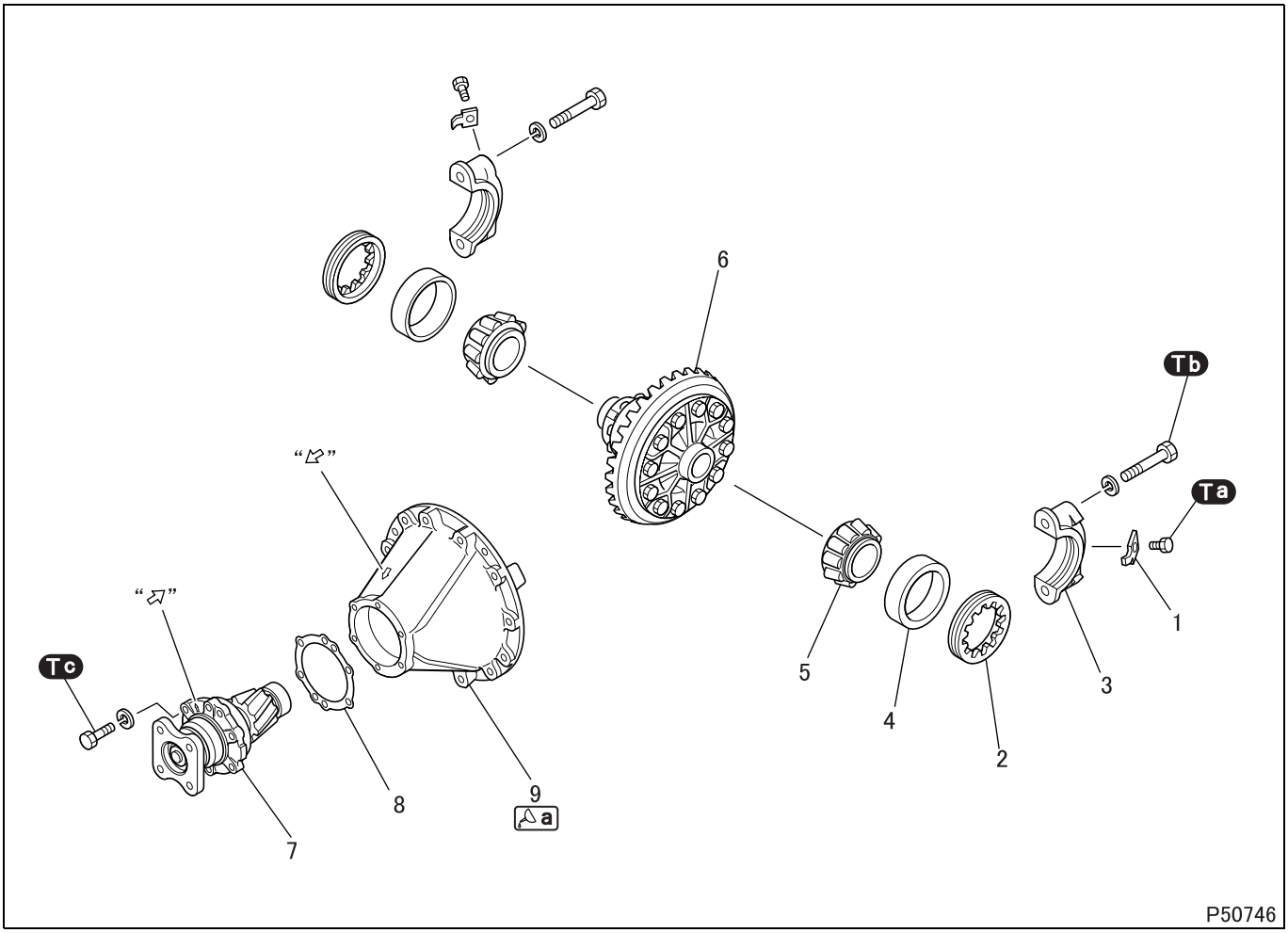
◆Installation procedure◆



■Installation: Reduction and differential

- Clean a seal surface of each part.
- Apply sealant to the reduction and differential mounting surface of the axle housing evenly and without breaks. Apply sealant in a straight line direction for illustrated position **A** and along the outer periphery for notches of illustrated position **B**.

M E M O



● **Disassembly sequence**

1 Lock plate
2 Side bearing nut
3 Bearing cap
4 Side bearing outer race
5 Side bearing inner race
6 Differential (see later sections)
7 Reduction pinion (see later sections)
8 Shim
9 Differential carrier

CAUTION ⚠

- **Keep side bearings that have been removed separated from each other and ensure that during installation each one is correctly placed.**
- **Be sure to replace the bearing cap, differential carrier and bolts as a differential carrier set.**
- **Be sure to replace the reduction pinion and the reduction gear of the differential as a reduction gear set.**

NOTE

- **Record the number and thickness of shims to use them as reference at assembly.**

● **Assembly sequence**

Follow the disassembly sequence in reverse.

Service standards: mm {in}

Location	Maintenance item	Standard value	Limit	Remedy
7, 8	Starting torque of side bearing	2.0 to 2.9 N·m {1.4 to 2.2 ft.lbs}	–	Adjust
9	Wobble at back face of reduction gear	0.1 {0.0039} or less	–	Replace
9, 11	Backlash between reduction gear and reduction pinion	0.20 to 0.28 {0.0079 to 0.011}	0.5 {0.020}	Adjust or replace

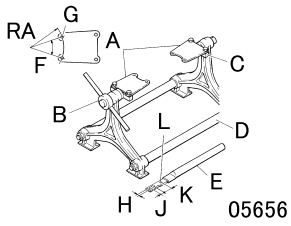
Torque value: N·m (lbf·ft)

Mark	Fastener	Torque value	Remarks
Ta	Bolt (lock plate mounting)	20 to 26 (15 to 19)	–
Tb	Bolt (bearing cap mounting)	200.9 (150)	–
Tc	Bolt (pinion mounting)	67 to 90 (49 to 67)	–

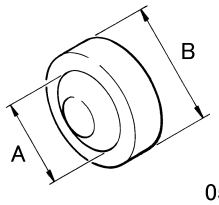
Lubricant and/or sealant

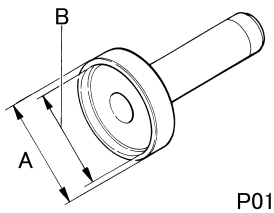
Mark	Points of application	Specified lubricant and/or sealant	Quantity
a	Pinion pilot bearing mounting surface of differential carrier	Loctite 601	As required

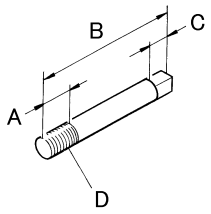
Special tools (Unit: mm {in})

<table>
<tr><th>Mark</th><th>Tool name and shape</th><th>Part No.</th><th>Application</th></tr>
<tr>
<td>a</td>
<td>
Differential working base


05656
<table>
<tr><th colspan="4">Component</th><th>Part No.</th></tr>
<tr><td rowspan="2">A</td><td colspan="3">Attachment</td><td>–</td></tr>
<tr><td>RA</td><td>F</td><td>G</td><td>–</td></tr>
<tr><td></td><td>R158 {6.22}</td><td>30°</td><td>ϕ13 {0.51}</td><td>MB999040</td></tr>
<tr><td>B</td><td colspan="3">Holder</td><td>MB999036</td></tr>
<tr><td>C</td><td colspan="3">Holder</td><td>MB999037</td></tr>
<tr><td>D</td><td colspan="3">Working base</td><td>MB999035</td></tr>
<tr><td>E</td><td colspan="3">Flange stopper</td><td>MB999096</td></tr>
</table>
<table>
<tr><th>H</th><th>J</th><th>K</th><th>L</th></tr>
<tr><td>11 {0.43}</td><td>20 {0.79}</td><td>40 {1.57}</td><td>ϕ11 {0.43}</td></tr>
</table>
</td>
<td>MB999034</td>
<td>Workbench for reduction and differential

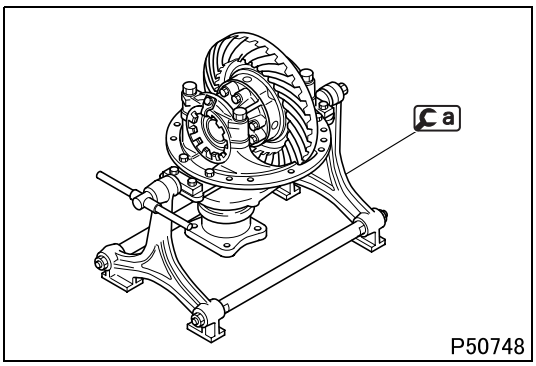
(flange stopper is unused)</td>
</tr>
<tr>
<td>b</td>
<td>
Adapter
<table>
<tr><th>A</th><th>B</th></tr>
<tr><td>ϕ45 {1.77}</td><td>ϕ59 {2.32}</td></tr>
</table>


05658
</td>
<td>MB999076</td>
<td>Removal of side bearing inner race (to be used in combination with commercial bearing puller)</td>
</tr>
<tr>
<td>c</td>
<td>
Bearing installer
<table>
<tr><th>A</th><th>B</th></tr>
<tr><td>ϕ80 {3.15}</td><td>ϕ70 {2.76}</td></tr>
</table>


P01039
</td>
<td>MH061748</td>
<td>Installation of side bearing inner race</td>
</tr>
<tr>
<td>d</td>
<td>
Bearing retainer guide pin


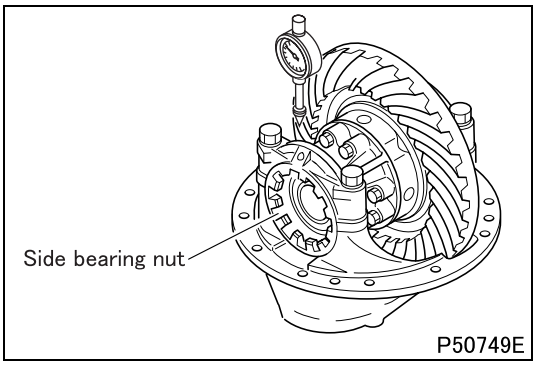
P01041
<table>
<tr><th>A</th><th>B</th><th>C</th><th>D</th></tr>
<tr><td>18 {0.71}</td><td>85 {3.35}</td><td>12 {0.47}</td><td>M12 × 1.25</td></tr>
</table>
</td>
<td>MH061745</td>
<td>Installation of reduction pinion (two pieces are used)</td>
</tr>
</table>

◆Work before removal◆



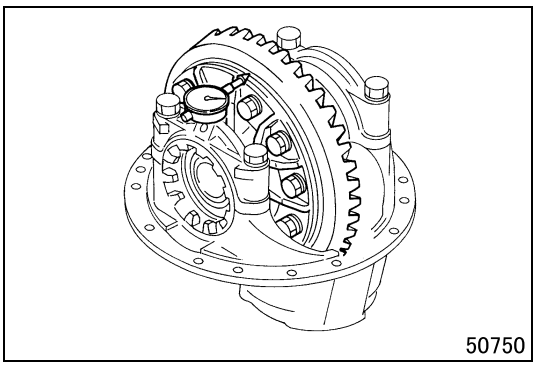
■ **Preparatory work: Installation of differential working base assembly**

- Install the reduction and differential on the differential working base a.



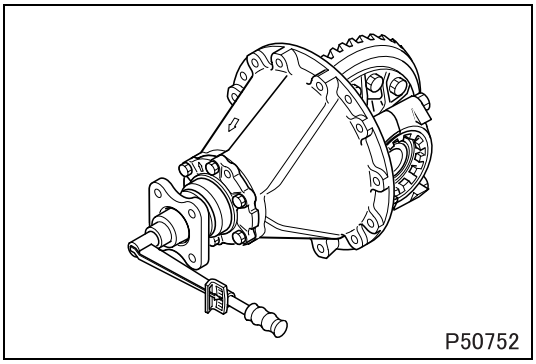
■ **Inspection: Backlash between reduction gear and reduction pinion**

- If backlash is found faulty, the tightening amount of the side bearing nut is probably inappropriate.



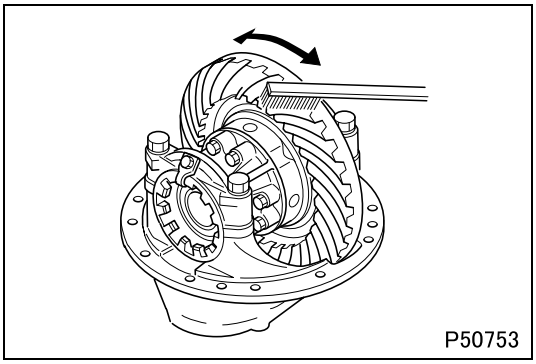
■ **Inspection: Wobble at back face of reduction gear**

- Measure wobble at the illustrated position of the reduction gear.



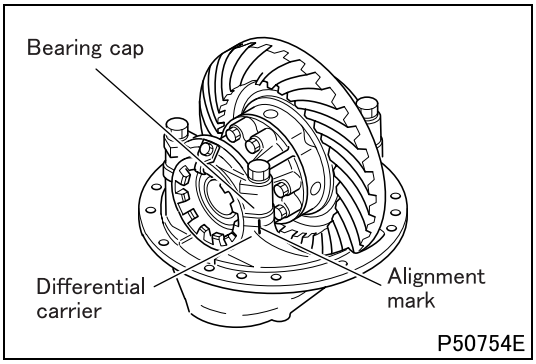
■ **Inspection: Starting torque of side bearing**

- Measure starting torque of the pinion assembly using a torque wrench and calculate the starting torque of the side bearing using the following formula.
  (Total starting torque – Pinion bearing starting torque (See later section.)) × Final ratio = Side bearing starting torque


P50753

■ **Inspection: Tooth contact of reduction gear**

- Apply red lead to three to four teeth at three equally spaced points of the reduction gear.
- Turn the reduction gear several times to check for tooth contact.

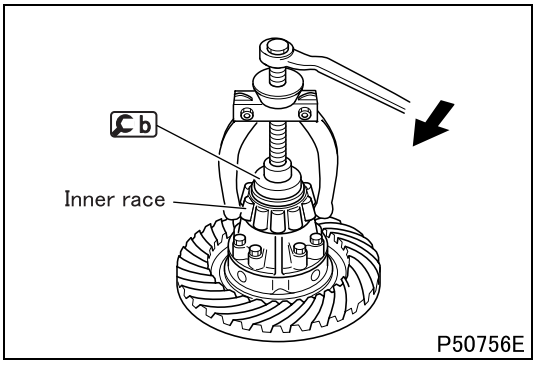


P50754E

■ **Alignment marks: Bearing cap and differential carrier**

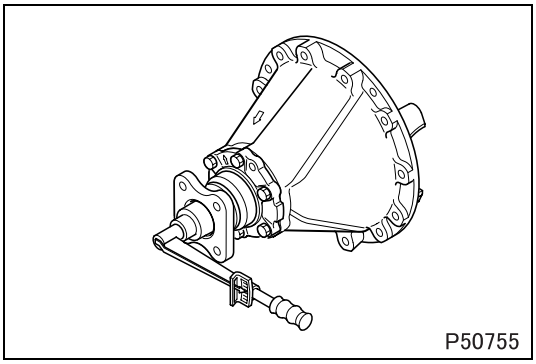
- Put alignment marks on the bearing cap and differential carrier for correct identification of right and left parts.

◆Removal procedure◆



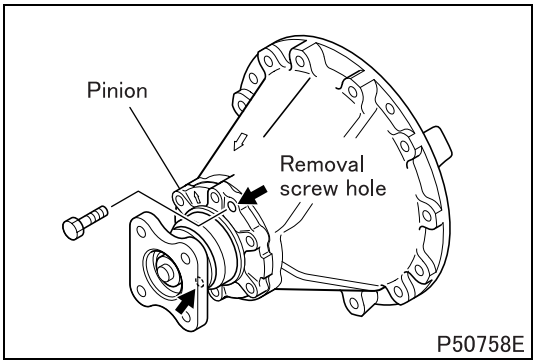
P50756E

■ **Removal: Side bearing inner race**


P50755

■ **Inspection: Starting torque of pinion bearing**

- After removing the differential, measure the starting torque of the pinion bearing.

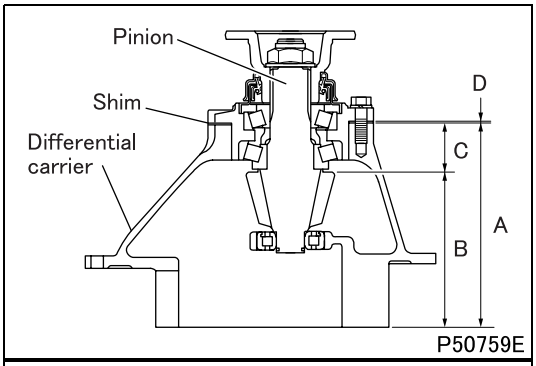


P50758E

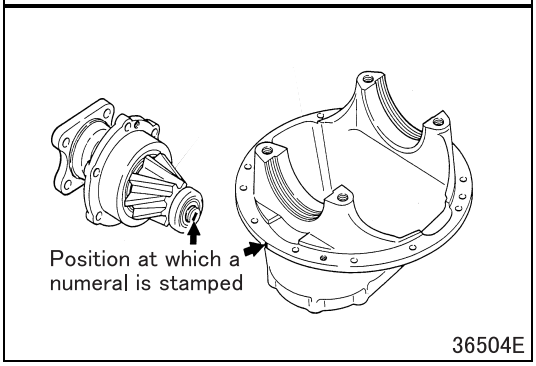
■ **Removal: Pinion**

- Screw two bolts evenly into the pinion removal screw holes to remove the pinion.

◆Adjustment procedure◆



P50759E



36504E

■ Adjustment: Reduction pinion

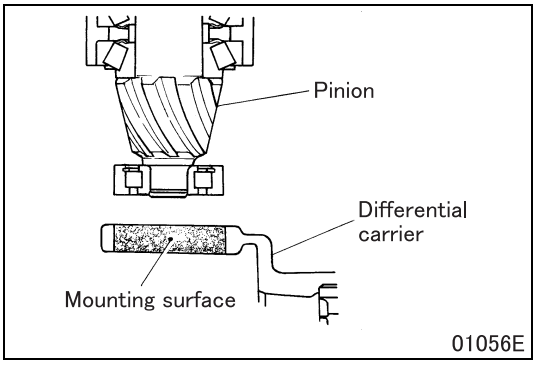
- Perform the following steps to adjust dimensions **A**, **B** and **C**.
- Calculate shim thickness (dimension **D**) by using the following formula based on the machining error data stamped on pinion assembly and differential carrier.
- Formula:
  D = 0.5 mm {0.020 in} – a + b + c
  a = Deviation from standard dimension **A**
  b = Deviation from standard dimension **B**
  c = Deviation from standard dimension **C**

Unit: mm {in}

Location	Standard dimension	How to calculate deviation
Shim thickness	0.5 {0.020}	–
A	203 {7.99}	A numeral, multiplied by 100, is stamped on the outer periphery of the flange of the differential carrier.
B	157 {0.18}	A numeral is stamped on the top of the pinion assembly.
C	46.5 {1.8}	Measure deviation from dimension **C** using a dial gauge. Taking measurement is usually not feasible and assume a value from 0 to 0.2 mm.

- Select a shim based on shim thickness **D**.
  Thickness of shims available
  0.1 mm {0.0039 in}, 0.2 mm {0.0079 in} (two thickness)

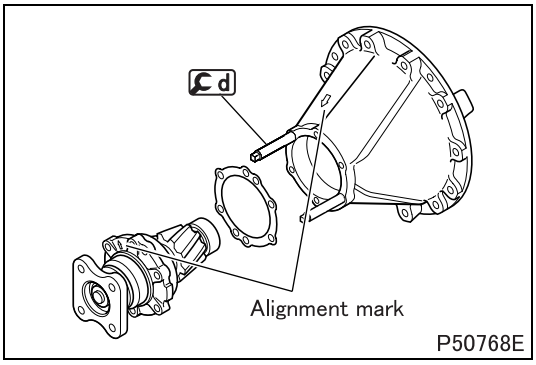
◆Installation procedure◆



01056E

■ Installation: Reduction pinion

- Apply sealant to the pilot bearing mounting surface of the differential carrier.

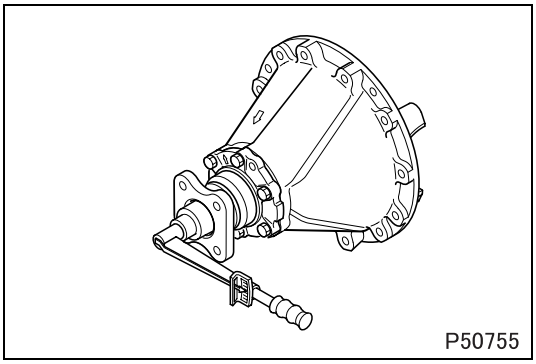


P50768E

- Aligning the embossed alignment mark on the bearing retainer of the pinion assembly with that on the differential carrier, mount the pinion assembly.

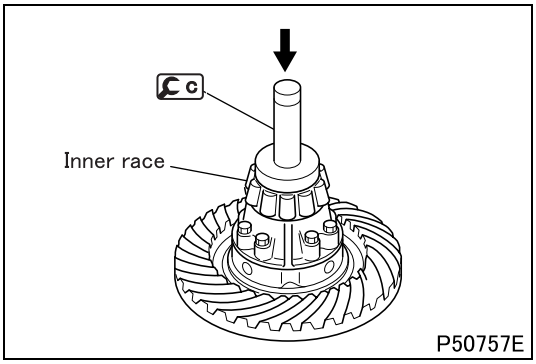
CAUTION ⚠

- **Leave for 30 minutes to 2 hours after installation to let the sealant harden.**
- **Wait at least three hours or, if feasible 24 hours, before running the vehicle to let the sealant harden.**


P50755

■ **Inspection: Starting torque of pinion bearing**

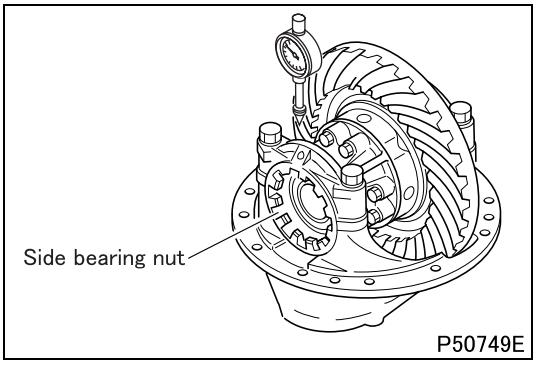
- After installing the pinion, measure the starting torque of the pinion bearing.
- If the measured value deviates from the standard value, adjust.



P50757E

■ **Installation: Side bearing inner race**

◆**Work after installation**◆



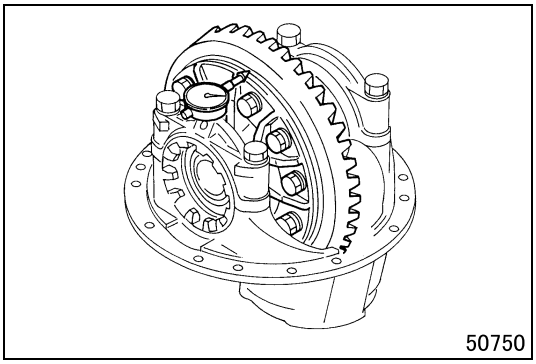
P50749E

■ **Adjustment: Backlash between reduction gear and reduction pinion**

- Adjust backlash with the side bearing nut, using care not to allow the side bearing starting torque to change.

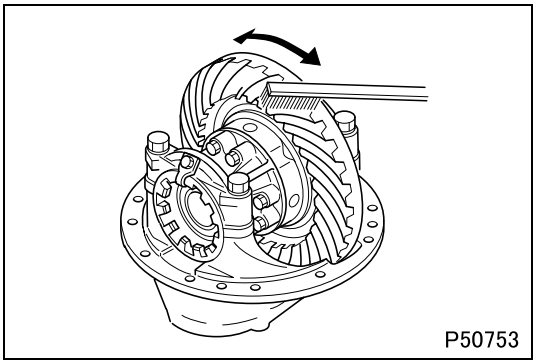
CAUTION ⚠

- **When one side bearing nut is loosened, be sure to tighten the other one the same amount to prevent the side bearing starting torque from changing.**


50750

■ **Inspection: Wobble at back face of reduction gear**

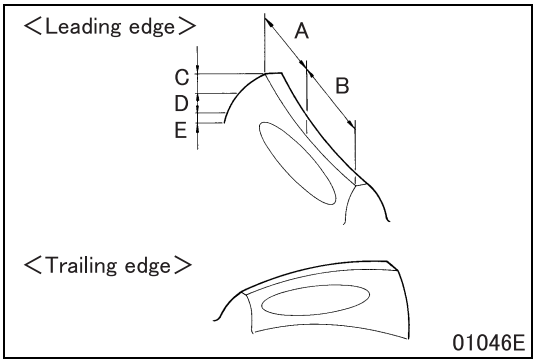
- Measure wobble at the illustrated position of the reduction gear.
- If the measured value deviates from the standard value, replace the reduction gear and reduction pinion of the differential as a set.



■ Inspection: Tooth contact of reduction gear

[Inspection]

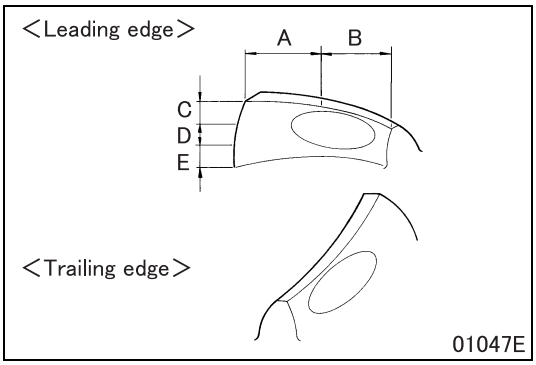
- Apply red lead to three to four teeth at three equally spaced points of the reduction gear.
- Turn the reduction gear several times to check for tooth contact.
- Adjust tooth contact if it is remarkably offset.



● Correct tooth contact at no load

<Reduction gear>

A: Heel
B: Toe
C: Face
D: Flank
E: Clearance



<Reduction pinion>

A: Heel
B: Toe
C: Face
D: Flank
E: Clearance

Maintenance item			Assembly standards
At no load	Tooth contact position	Lengthwise direction of tooth	From center towards toe
		Vertical direction	From center towards top of tooth for reduction gear and center for reduction pinion
	Tooth contact shape	Length	Approximately 50 to 70% of tooth width
		Width	Approximately 50 to 70% of tooth depth
	Degree of tooth contact		It becomes weaker as it nears tooth root and tooth tip

NOTE

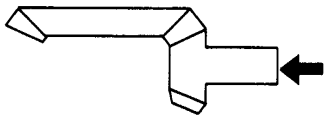
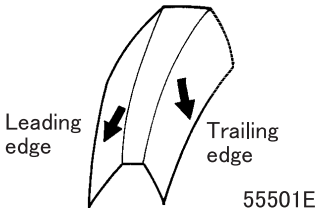
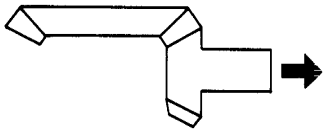
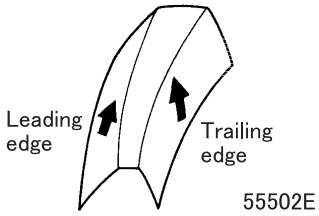
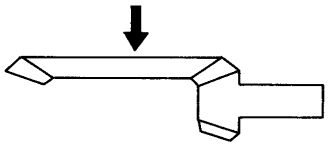
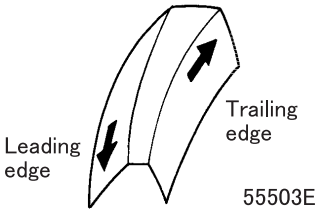
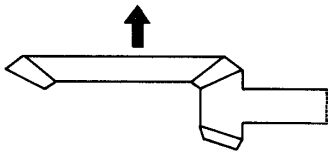
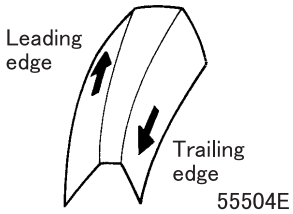
- **When tooth contact is near the toe at no load, it becomes middle area contact at load.**

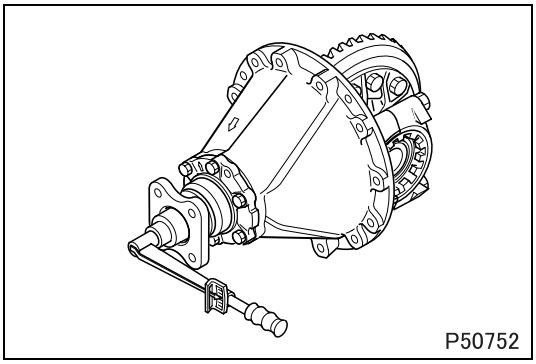
[Adjustment]

- Adjust by backlash between reduction gear and reduction pinion (to be adjusted with the side bearing nut) and addition or reduction of rear bearing shims.

CAUTION ⚠

- **Make sure you replace as a reduction gear set (reduction gear and reduction pinion), when you replace the gear because of excessive teeth wear.**

	Method of adjustment	Moving direction	
Tooth contact by addition or reduction of shims	Advance reduction pinion to reduction gear (shims are reduced)  55497	 55501E	Tooth contact moves towards tooth root
	Retard reduction pinion from reduction gear (shims are added)  55498	 55502E	Tooth contact moves towards tooth tip
Tooth contact by adjustment with side bearing nut	Advance reduction gear to reduction pinion center (less backlash)  55499	 55503E	Tooth contact moves in lengthwise direction of tooth Leading edge: Nearer to toe and slightly nearer to root of tooth Trailing edge: Nearer to heel and slightly nearer to top of tooth
	Retard reduction gear from reduction pinion center (more backlash)  55500	 55504E	Tooth contact moves in lengthwise direction of tooth Leading edge: Nearer to heel and slightly nearer to top of tooth Trailing edge: Nearer to toe and slightly nearer to root of tooth


P50752

■ **Inspection: Starting torque of side bearing**

[Inspection]

- Measure starting torque of the pinion assembly using a torque wrench and calculate the starting torque of the side bearing using the following formula.
  (Total starting torque – Pinion bearing starting torque (See later section.)) × Final ratio = Side bearing starting torque

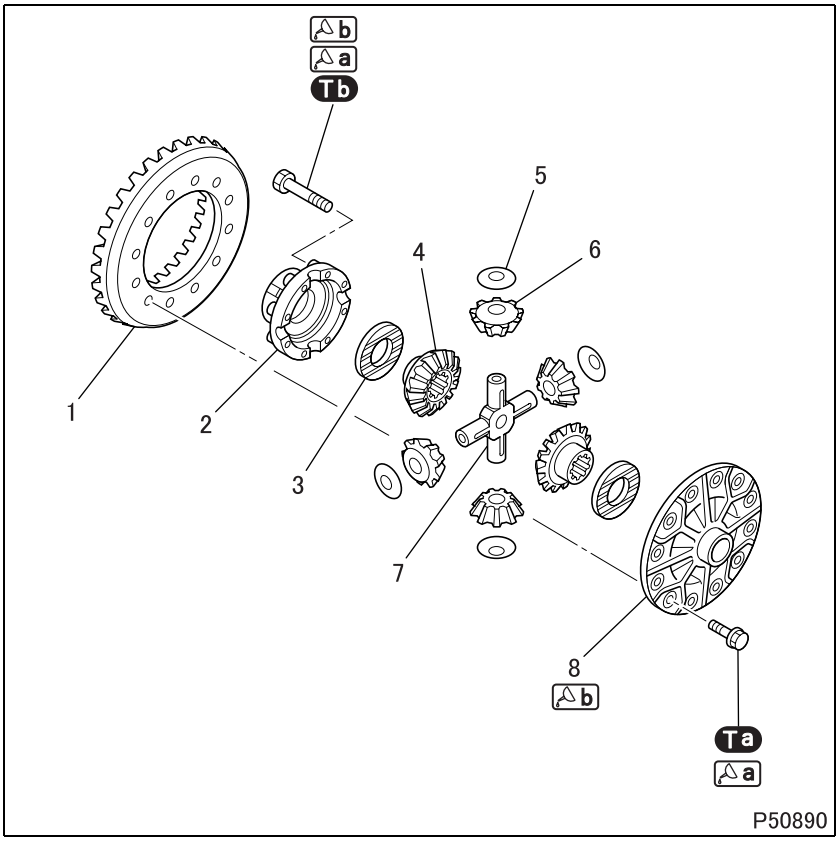
[Adjustment]

- Adjust by means of the right- and left-hand adjusting screws.

CAUTION ⚠

- **Always adjust both adjusting screws by the same amount.**
- **The starting torque must be adjusted without causing the backlash between the reduction gear and reduction pinion out of the standard value.**

Differential



● Disassembly sequence

1 Reduction gear
2 Differential case, R/H
3 Side gear washer
4 Side gear
5 Pinion washer
6 Differential pinion
7 Pinion spider
8 Differential case, L/H

CAUTION ⚠

- **Be sure to replace the R/H differential case and the L/H differential case as a differential case set.**
- **Be sure to replace the side gear and the differential pinion as a side gear set.**

● Assembly sequence

Follow the disassembly sequence in reverse.

Service standards: mm {in}

Location	Maintenance item	Standard value	Limit	Remedy
4	Backlash between side gear and spline of axle shaft	0.05 to 0.15 {0.0020 to 0.0059}	0.5 {0.020}	Replace
4, 6	Backlash between side gear and differential pinion	0.15 to 0.20 {0.0059 to 0.0079}	0.5 {0.020}	Replace
6, 7	Clearance between differential pinion and pinion spider	0.17 to 0.27 {0.0067 to 0.011}	0.5 {0.020}	Replace

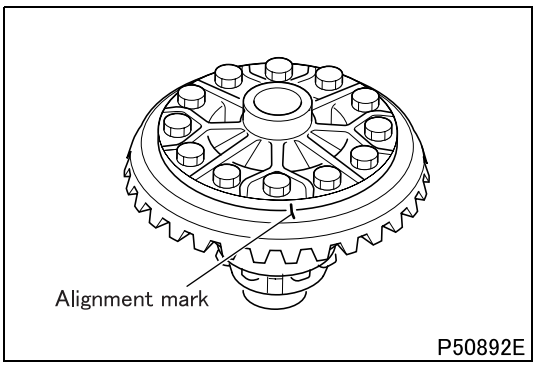
Torque value: N·m (lbf·ft)

Mark	Fastener	Torque value	Remarks
Ta	Bolt (reduction gear mounting)	166.6 to 225.4 (120 to 165)	–
Tb	Bolt (R/H and L/H differential case mounting)	83.3 to 112.7 (61 to 83)	–

Lubricant and/or sealant

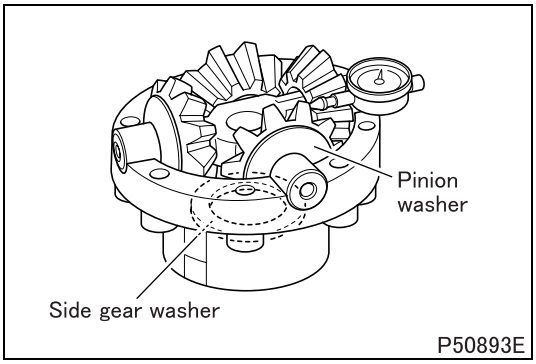
Mark	Points of application	Specified lubricant and/or sealant	Quantity
a	Entire bolt	Rust preventive	As required
b	Thread area of bolt	Loctite 271	As required
	Bolt tip of L/H differential case		

◆Work before removal◆



■ **Alignment marks: Reduction gear and L/H differential case**

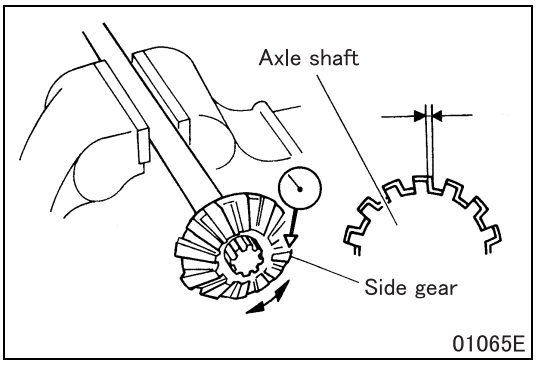
- Put alignment marks on the reduction gear and L/H differential case.



■ **Inspection: Backlash between side gear and differential pinion**

- If backlash is found faulty, thickness of the side gear washer and pinion washer is probably inappropriate.

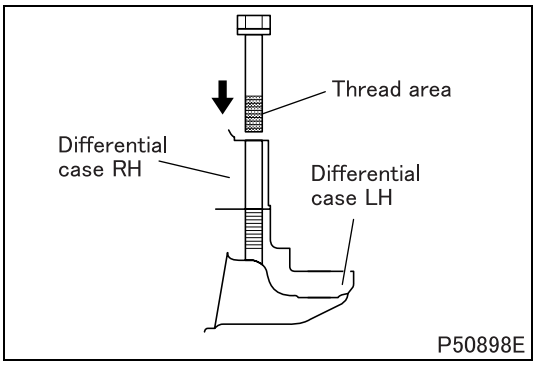
◆Inspection procedure◆



■ **Inspection: Backlash between side gear and axle shaft**

- If the measured value exceeds the limit, replace defective parts.

◆Installation procedure◆

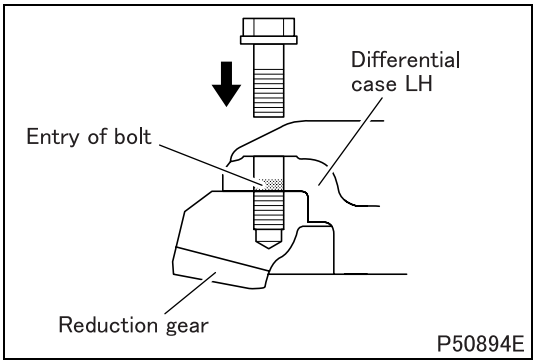


■ **Installation: Differential case, R/H and L/H**

- Apply rust preventive to the entire surface of the bolt. After applying it, blow off the excess rust preventive on the bolt by compressed air.
- Apply thread lock cement to the bolt threads.
- Tighten the bolt to the specified torque.

CAUTION ⚠

- **Make sure to apply rust preventive when tightening the bolt to the specified torque.**
- **Wait at least one hour after installation before actually running the vehicle to let the thread lock cement harden.**
- **Wait at least four hours after installation before operating the vehicle at full torque to let the thread lock cement harden.**



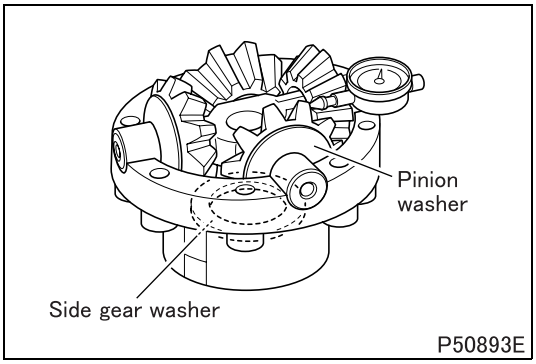
■ **Installation: Reduction gear and L/H differential case**

- Apply rust preventive to the entire surface of the bolt. After applying it, blow off the excess rust preventive on the bolt by compressed air.
- Apply thread lock cement at the entry of bolt holes on the L/H differential case.
- Tighten the bolt to the specified torque.

CAUTION ⚠

- **Make sure to apply rust preventive when tightening the bolt to the specified torque.**
- **Wait at least one hour after installation before actually running the vehicle to let the thread lock cement harden.**
- **Wait at least four hours after installation before operating the vehicle at full torque to let the thread lock cement harden.**

◆Work after installation◆



■ **Inspection: Backlash between side gear and differential pinion**

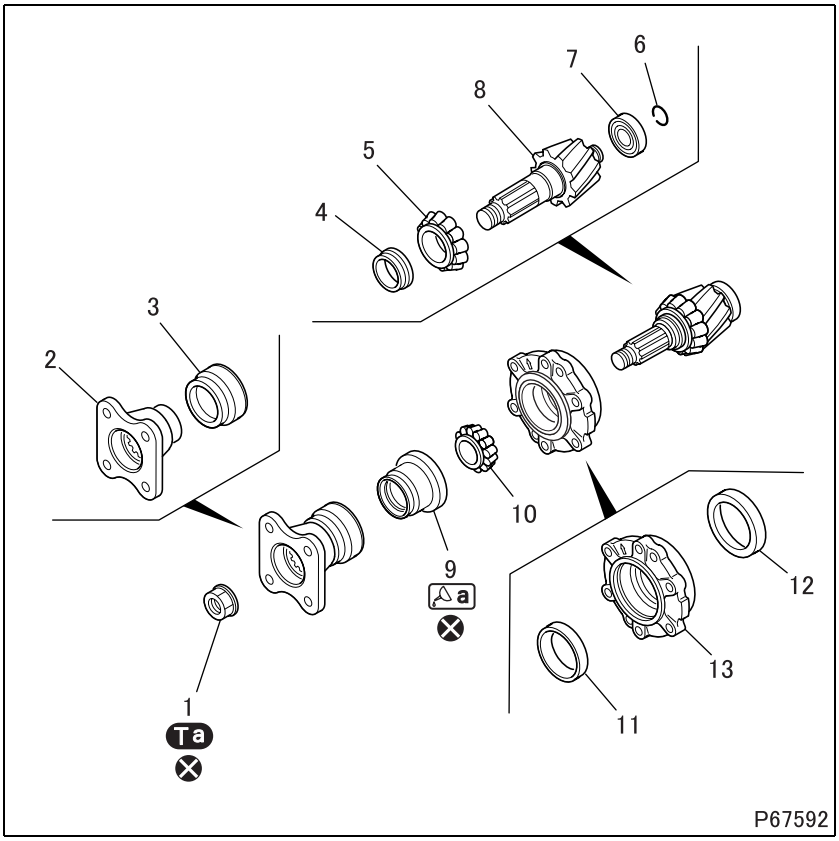
- If the measured value deviates from the standard value, replace the side gear washer and pinion washer.
  Thickness of side gear washers available
  3.0 mm {0.11 in} (one thickness)
  Thickness of pinion washers available
  1.6 mm {0.063 in} (one thickness)

CAUTION ⚠

- **Use side gear washers of the same thickness for the right and left sides.**
- **Use pinion washers of the same thickness at four locations.**

M E M O

Pinion



● Disassembly sequence

1 Locknut
2 Companion flange
3 Dust cover
4 Collar
5 Rear bearing inner race
6 Lock ring
7 Pinion pilot bearing
8 Reduction pinion
9 Oil seal
10 Front bearing inner race
11 Front bearing outer race
12 Rear bearing outer race
13 Bearing retainer

⊗: Non-reusable parts

NOTE

- **Record the height of the collar to use it as reference at assembly.**

● Assembly sequence

Follow the disassembly sequence in reverse.

Service standards: mm {in}

Location	Maintenance item		Standard value	Limit	Remedy
–	Starting torque of pinion bearing (inertial force at outer periphery point of bearing retainer)	When new bearing is used	2.0 to 2.9 N·m {1.4 to 2.2 lbf·ft} (inertial force: 34 to 52 N {7.6 to 11 lb})	–	Adjust or replace
		When old bearing is reused	1.6 to 2.4 N·m {1.2 to 1.7 lbf·ft} (inertial force: 27 to 41 N {6.1 to 9.2 lb})	–	Adjust or replace

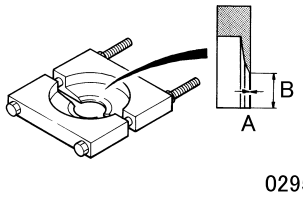
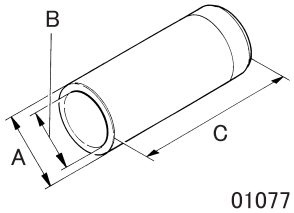
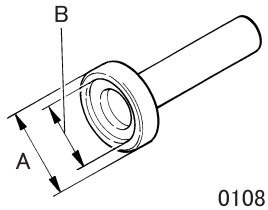
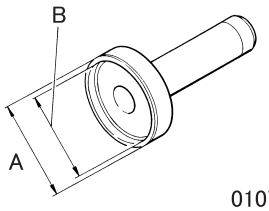
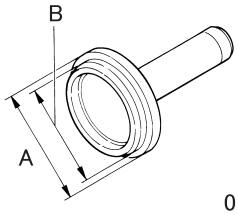
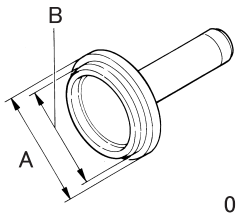
Torque value: N·m (lbf·ft)

Mark	Fastener	Torque value	Remarks
Ta	Locknut (companion flange mounting)	372.4 to 470.4 (275 to 345)	–

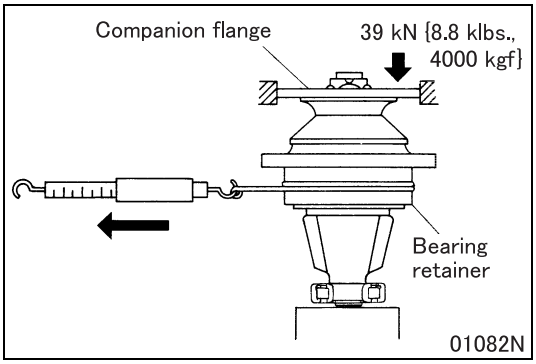
Lubricant and/or sealant

Mark	Points of application	Specified lubricant and/or sealant	Quantity
a	Lip area of oil seal	Wheel bearing grease [NLGI No. 2 (Li soap)]	As required

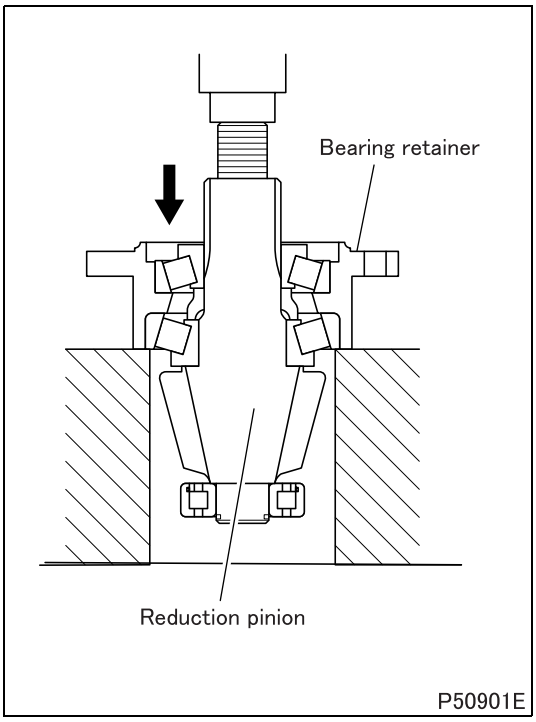
Special tools (Unit: mm {in})

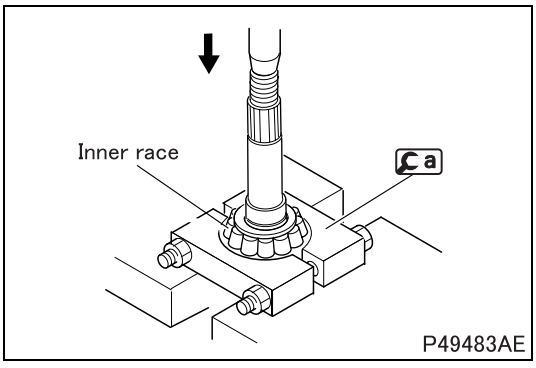
Mark	Tool name and shape	Part No.	Application
a	Pinion bearing remover A: 0.5 {0.020}, B: 25.6 {1.00}  02956	MB999045	Removal of rear bearing inner race
b	Pinion bearing installer A: ϕ62 {2.44}, B: ϕ52 {2.05}, C: 125 {4.92}  01077	MH061005	Installation of rear bearing inner race and front bearing inner race
c	Pinion pilot bearing installer A: ϕ45.2 {1.78}, B: ϕ39.2 {1.54}  01081	MH061976	Installation of pinion pilot bearing
d	Oil seal installer A: ϕ112 {4.41}, B: ϕ88 {3.46}  01076	MH061750	Installation of oil seal
e	Pinion bearing installer A: ϕ89 {3.50}, B: ϕ78 {3.07}  01078	MH061977	Installation of front bearing outer race
f	Pinion bearing installer A: ϕ99 {3.90}, B: ϕ88 {3.46}  01078	MH061264	Installation of rear bearing outer race

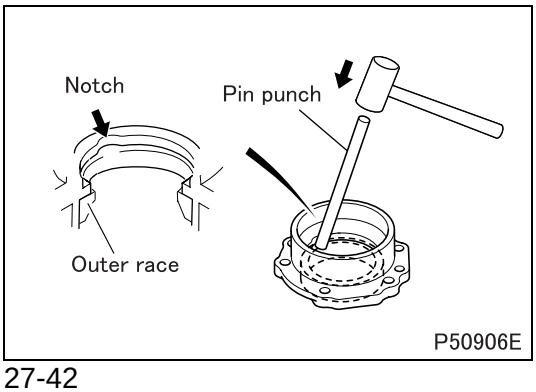
◆Work before removal◆



◆Removal procedure◆







■ Inspection: Starting torque of pinion bearing

- Apply the specified load to the companion flange or tighten the locknut to the specified torque.
- Measure the inertial force at outer periphery point of the bearing retainer using a spring balancer.

CAUTION ⚠

- **Securely fix the companion flange to measure.**

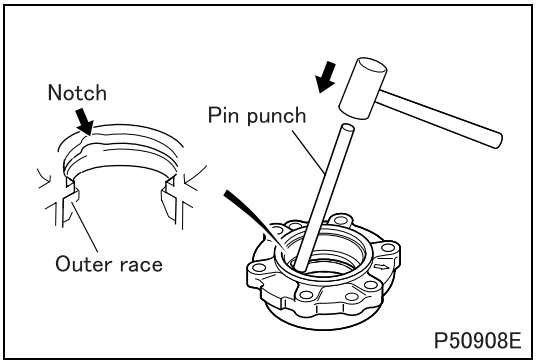
- If the measured inertial force is within the specified value, the starting torque conforms to the standard value.

■ Removal: Reduction pinion

■ Removal: Rear bearing inner race

■ Removal: Front bearing outer race

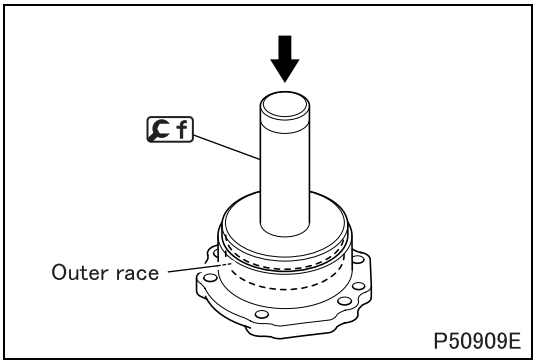
- Drive out the front bearing outer race by tapping at each of the three indentations in the bearing retainer. Keep the race level as it is being removed.



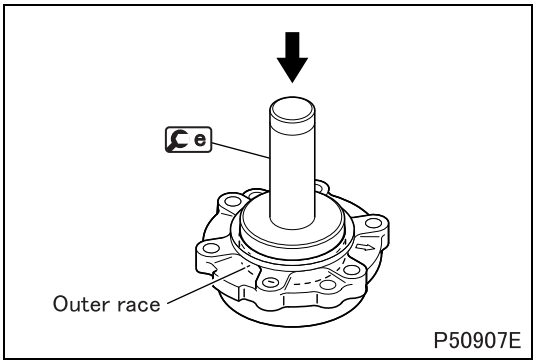
■ **Removal: Rear bearing outer race**

- Drive out the rear bearing outer race by tapping at each of the three indentations in the bearing retainer. Keep the race level as it is being removed.

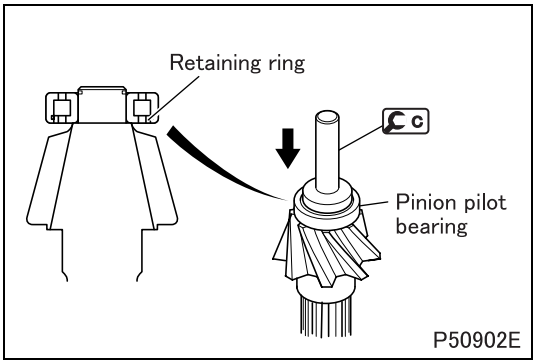
◆**Installation procedure**◆



■ **Installation: Rear bearing outer race**

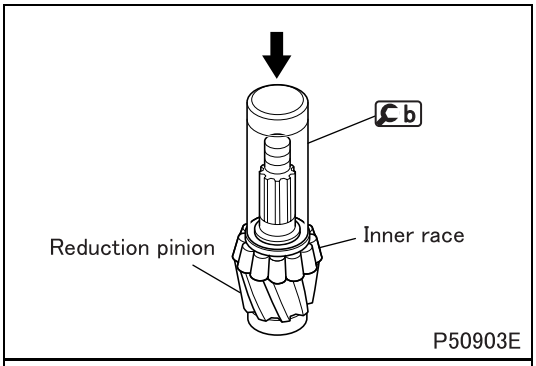


■ **Installation: Front bearing outer race**

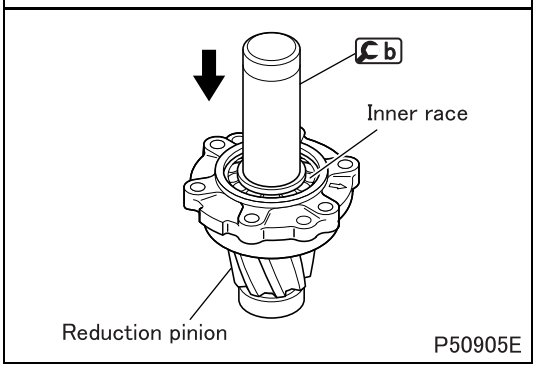


■ **Installation: Pinion pilot bearing**

- Install the pinion pilot bearing with its retaining ring placed on the gear.

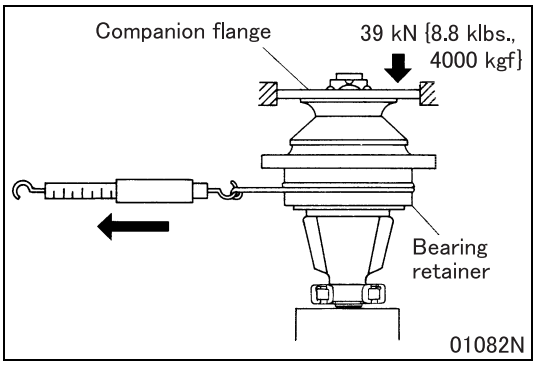


■ **Installation: Rear bearing inner race**



■ **Installation: Front bearing inner race**

- Install the front bearing inner race with the pinion assembled into the bearing retainer.



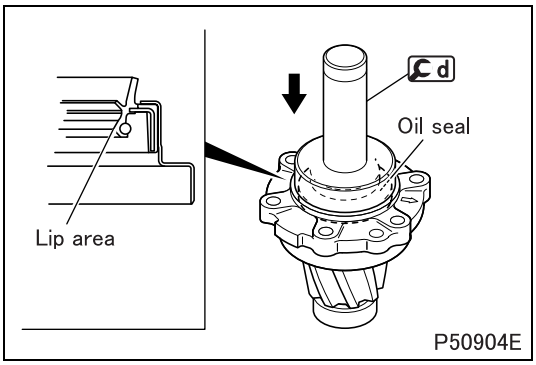
■ **Inspection: Starting torque of pinion bearing**

- Apply the specified load to the companion flange or tighten the locknut to the specified torque.
- Measure the inertial force at outer periphery point of the bearing retainer using a spring balance.

CAUTION ⚠

- **Securely fix the companion flange to measure.**
- **Do not assemble the oil seal when measuring the inertial force.**

- If the measured inertial force is within the specified value, the starting torque conforms to the standard value.
- If the measured value deviates from the standard value, adjust by changing a collar.
  Thickness of collars available
  15.600 to 16.200 mm {0.61 to 0.64 in} (25 thickness in 0.025 mm {0.00098 in} increments)

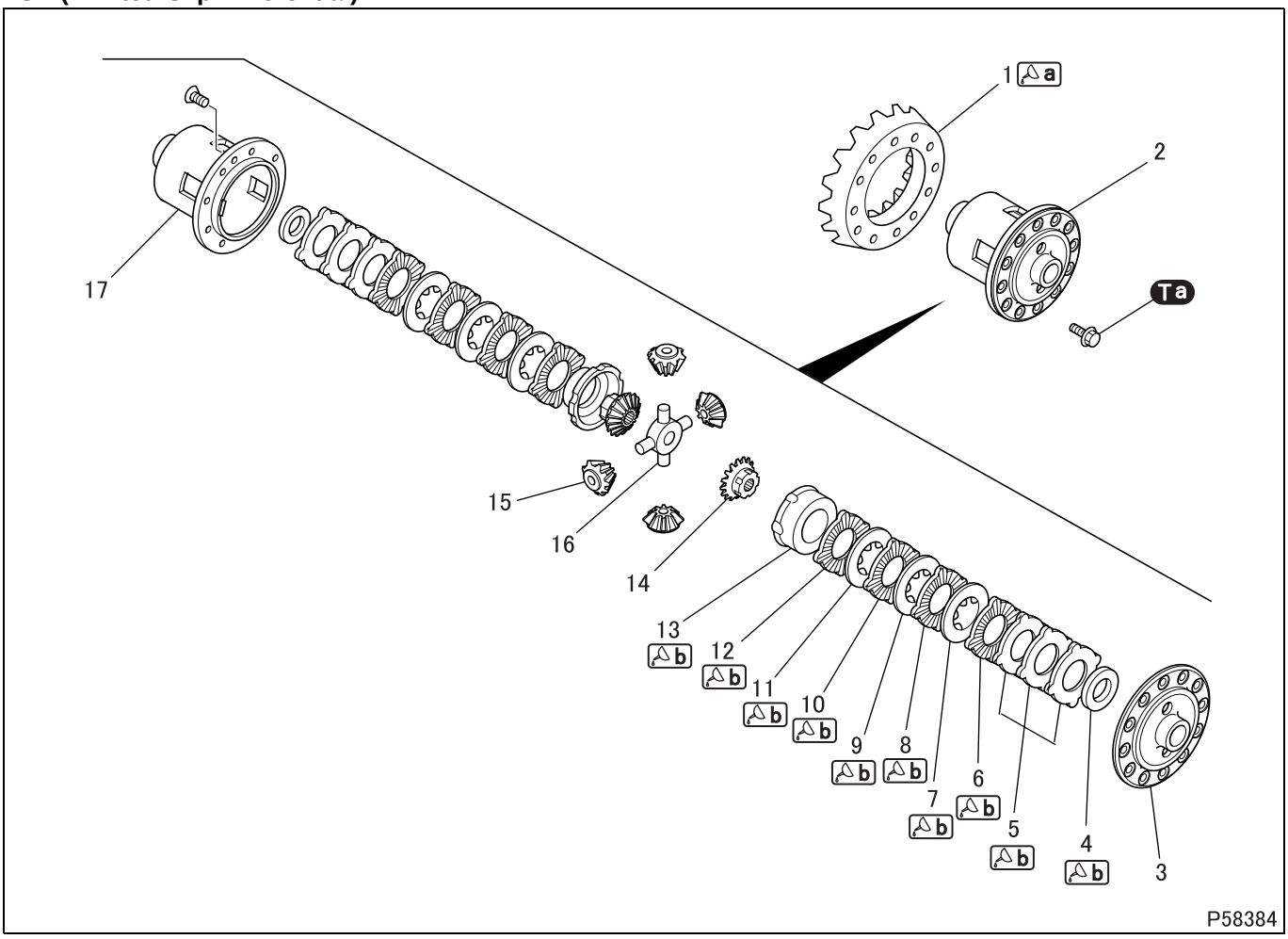


■ **Installation: Oil seal**

- Apply grease to the lip area of the oil seal and install it on the bearing retainer in the illustrated direction.

M E M O

LSD (Limited-Slip Differential)



● Disassembly sequence

1 Reduction gear
2 LSD (limited-slip differential)
3 Differential case, L/H
4 Side gear washer
5 Spring plate
6 Friction plate
7 Friction disc
8 Friction plate
9 Friction disc
10 Friction plate
11 Friction disc
12 Friction plate
13 Pressure ring
14 Side gear
15 Differential pinion
16 Pinion spider
17 Differential case, R/H

CAUTION ⚠

- **Make sure to replace the side gear and the differential pinion as a side gear set.**

● Assembly sequence

Follow the disassembly sequence in reverse.

Service standards: mm {in}

Location	Maintenance item			Standard value	Limit	Remedy
2	LSD	Rotation torque of clutch plate	When new clutch plate is assembled	201 to 298 N·m {150 to 220 ft.lbs}	–	Replace
			When old clutch plate is reassembled	117 to 298 N·m {86 to 220 ft.lbs}	–	
		Clearance in side gear axial direction		0.05 to 0.20 {0.0020 to 0.0079}	–	
		Clearance in differential case axial direction		0.05 to 0.20 {0.0020 to 0.0079}	–	
4, 11 to 14	Difference in dimensions from side gear washer end face to pressure ring back face between right and left			0 to 0.05 {0 to 0.0020}	–	Replace
7 to 10	Friction disc and friction plate		Distortion	–	0.08 {0.0031}	Replace
			Wear	–	0.1 {0.0039}	
			Difference in thickness of right and left combination	0 to 0.05 {0 to 0.0020}	–	Adjust

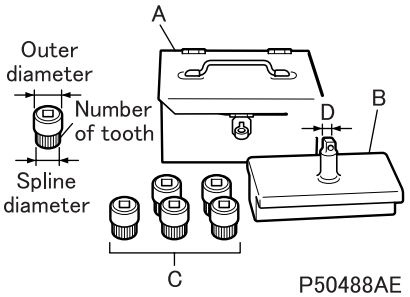
Torque value: N·m (lbf·ft)

Mark	Fastener	Torque value	Remarks
Ta	Bolt (reduction gear mounting)	167 to 225 (120 to 165)	–

Lubricant and/or sealant

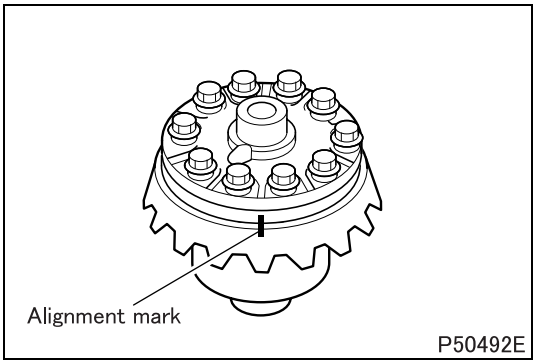
Mark	Points of application	Specified lubricant and/or sealant	Quantity
a	Bolt threads of reduction gear	Loctite 271	As required
b	Each part	Limited slip differential oil API GL-5 SAE 90	As required

Special tools (Unit: mm {in})

<table>
<tr><th>Mark</th><th>Tool name and shape</th><th>Part No.</th><th>Application</th></tr>
<tr><td>a</td><td>
Side gear holding tool se
<table><tr><th>D</th></tr><tr><td>20
{0.79}</td></tr></table>


P50488AE
<table>
<tr><th colspan="2">Component</th><th>Part No.</th><th>Applied type</th></tr>
<tr><td>A</td><td>Gauge case</td><td>MB990551</td><td>–</td></tr>
<tr><td>B</td><td>Side gear holding base</td><td>MB999141</td><td>–</td></tr>
<tr><td rowspan="5">C</td><td>Side gear holding tool</td><td>–</td><td>–</td></tr>
<tr><td>Outer diameter / Number of teeth / Spline diameter</td><td>–</td><td>–</td></tr>
<tr><td>ϕ39 {1.54} / 16 {0.63} / ϕ35.6 {1.40}</td><td>MH063422</td><td>–</td></tr>
<tr><td>ϕ42 {1.65} / 18 {0.71} / ϕ39.6 {1.56}</td><td>MB999142</td><td>D033H</td></tr>
<tr><td>ϕ42 {1.65} / 20 {0.79} / ϕ42 {1.65}</td><td>MH063423</td><td>D035H</td></tr>
</table>
</td><td>MB999140</td><td>Measure rotation torque of LSD clutch plate</td></tr>
</table>

◆Work before removal◆

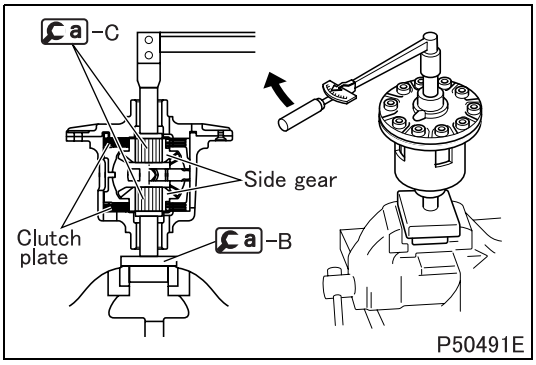


P50492E

■ **Alignment marks: Reduction gear and limited slip differential**

- Put alignment marks on the reduction gear and limited slip differential.

◆Inspection procedure◆



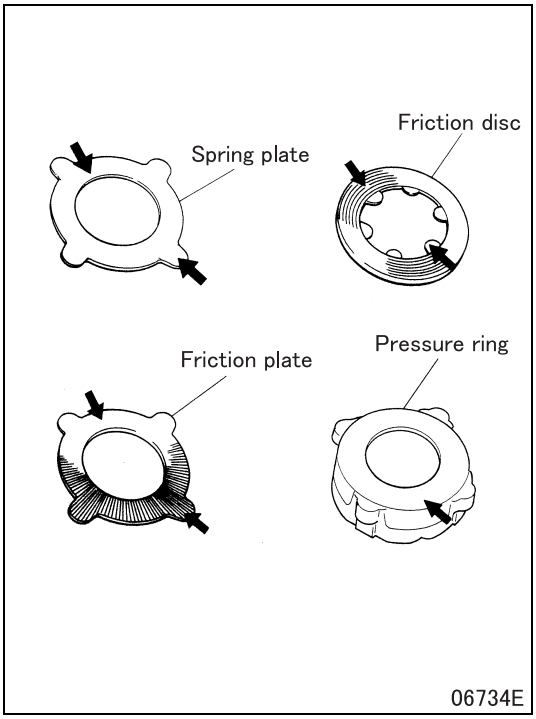
P50491E

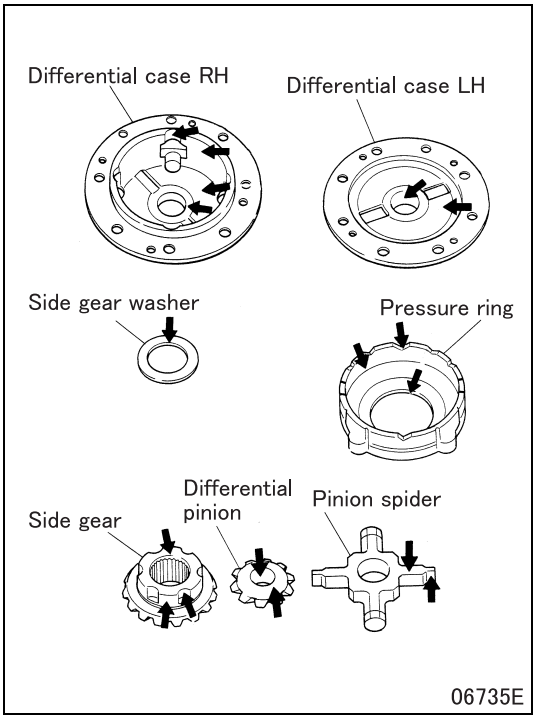
■ **Inspection: Rotation torque of LSD clutch plate**

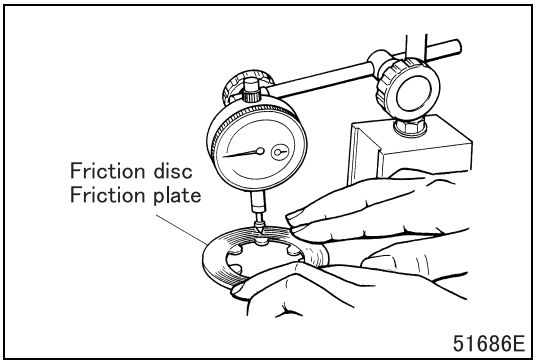
- After removing the reduction gear, carry out the following inspection.
- Measure the rotation torque to check for the friction force of the clutch plate.

NOTE

- **For measurement of rotation torque, rotate the side gears to sufficiently smooth their operation and measure the value during their rotation.**







■ **Inspection: Limited slip differential**

(1) Inspection of contacting and sliding surfaces

- If heat discoloration and remarkable wear are found on friction surfaces and sliding surfaces of the spring plates, spring discs, friction discs and friction plates, replace defective parts.

NOTE

- **Strong contact on the inner periphery of friction surfaces is caused by the spring force of each plate and disc. Do not mistake that it is caused by abnormal wear.**

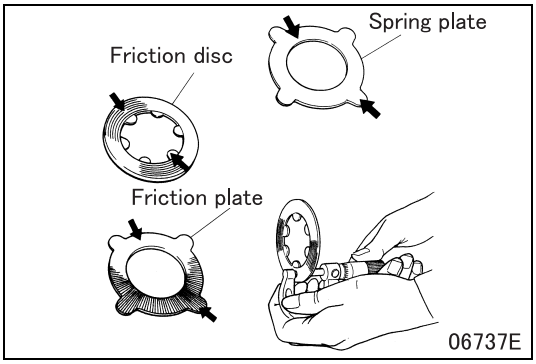
- If cracks and damage are found on protrusions on the inside and outside periphery of the spring plates, friction discs and friction plates, replace defective parts.
- If dents and damage are found on the friction surfaces and sliding surfaces of the pressure rings to friction discs, polish them with an oilstone, and lap and correct them with a compound on a surface plate.

NOTE

- **Strong contact on the inner periphery of friction surfaces is caused by the spring force of each plate and disc. Do not mistake that it is caused by abnormal wear.**
- Inspect contacting and sliding areas ⬅ of the L/H differential case, side gear washers, pressure rings, side gears, differential pinion, pinion spider and R/H differential case, and correct burrs and dents with an oilstone.

(2) Inspection of distortion

- Apply a dial gauge to the friction disc and friction plate on a surface plate and measure their distortion (flatness) while turning them. If the measured value exceeds the limit, replace.



(3) Inspection of thickness

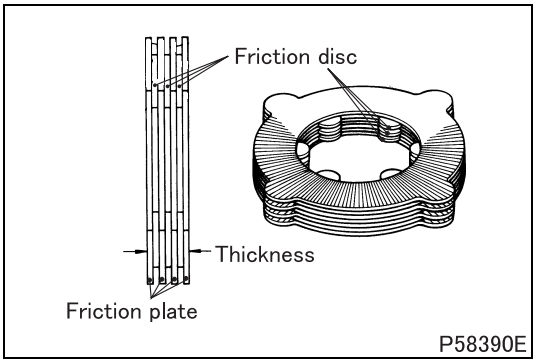
- Measure thickness of the friction surfaces and protrusions ⬅ of the spring plate, friction disc and friction plate, and find the difference. If it exceeds the limit, replace defective parts.

NOTE

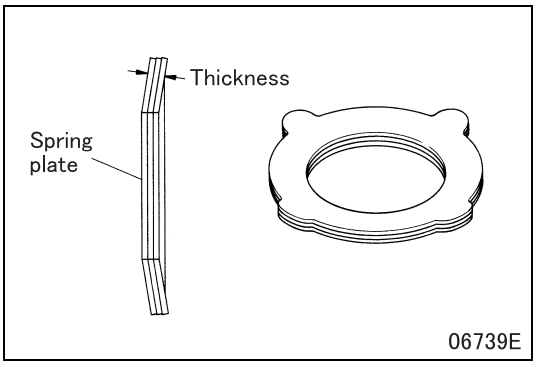
- **Take measurement at several points for each part.**

◆Work before assembly◆

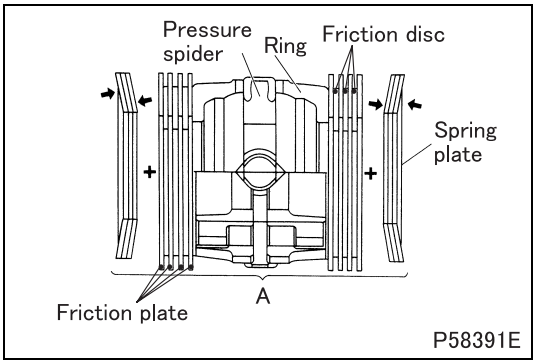
- Before assembling the limited slip differential, adjust the dimensional difference (friction force of clutch plate) in the axial direction and the clearance in the side gear axial direction.



- Pile friction discs and friction plates as illustrated and measure thickness with a micrometer. Select the combination so that the difference in thickness between the right and left combination falls within the range of the standard value.
  Thickness of friction discs available
  1.9, 2.0, 2.1 mm {0.075, 0.079, 0.083 in} (three sizes)
  Thickness of friction plates available
  2.0 mm {0.079 in} (one size)



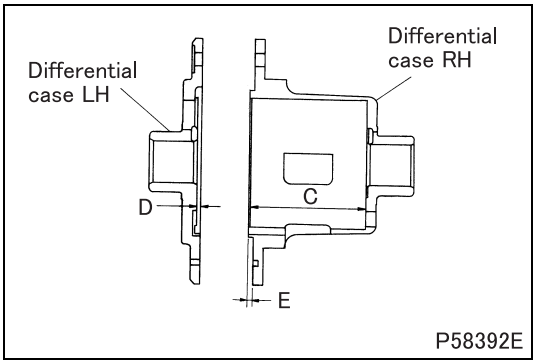
- Pile a spring plate and a spring disc as illustrated and measure thickness with a micrometer. Select the combination so that the difference in thickness between the right and left combination is as small as possible.
  Thickness of spring plates available
  2.0 mm {0.079 in} (one size)



- Assemble the pressure rings, pinion spiders, friction discs, friction plates, spring plates and spring discs and measure overall width **A** with a micrometer.

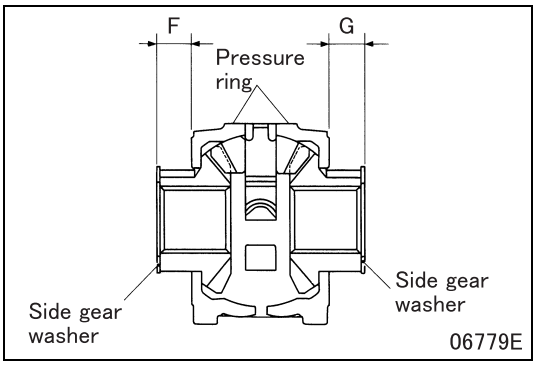
NOTE

- **Measure the overall width with the V-shaped groove of the pressure ring pressed against the pinion spider from both sides to obtain secure contact.**



- Find dimension **B** between spring plate contact faces when the L/H and R/H differential cases are combined.
  B=**C**+**D**–**E**

- If overall width **A** measured in the previous item and the clearance (**B**-**A**) between the L/H and R/H differential cases deviate from the standard value, adjust by changing a friction plate.
  Thickness of friction plates available
  1.9, 2.0, 2.1 mm {0.075, 0.079, 0.083 in} (three sizes)

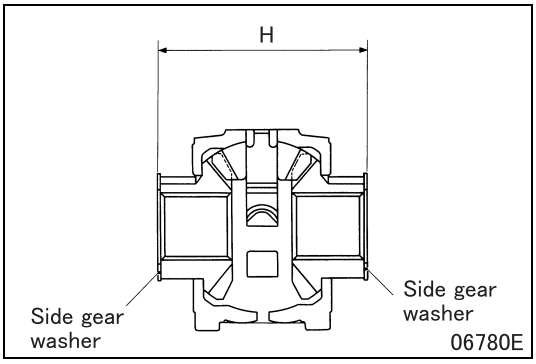


- After installing the side gear washers as illustrated, make sure that the difference between dimensions **F** and **G** from the back face of the pressure rings to the end face of the side gear washers falls within the range of the standard value.

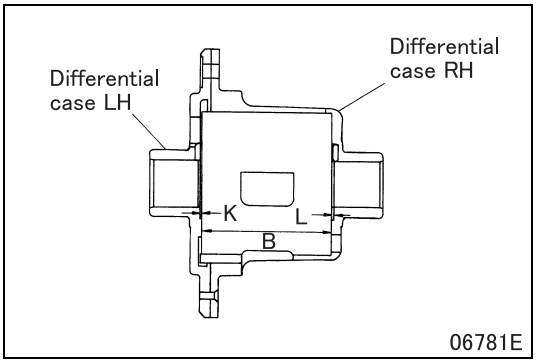
NOTE

- **Measure the dimensions with the V-shaped groove of the pressure ring pressed against the pinion spider from both sides to obtain secure contact.**

- If the difference in dimension deviates from the standard value, adjust by changing the side gear washer.
  Thickness of side gear washers available
  1.5, 1.6, 1.7 mm {0.059, 0.063, 0.067 in} (three sizes)



- Measure overall width **H**.



- Find dimension **J** between side gear washer contact faces when the L/H and R/H differential cases are combined.
  J=**B**+**K**+**L**

NOTE

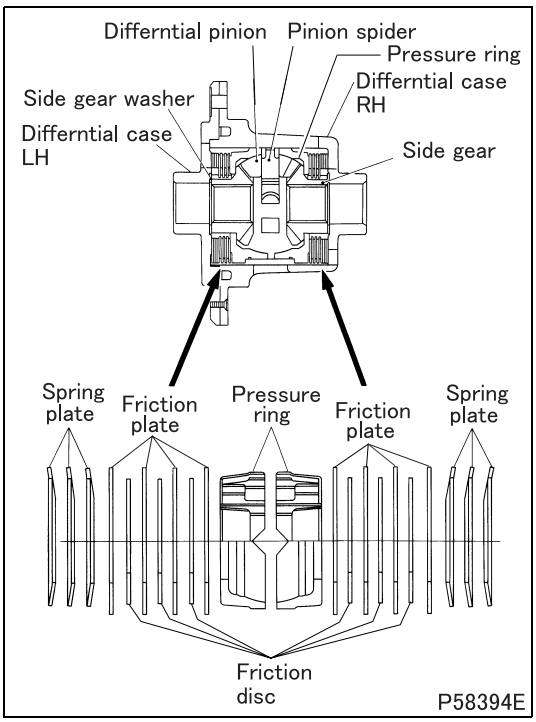
- **For dimension B, refer to the difference between spring plate contact surfaces found in the previous item when the L/H and R/H differential cases are combined.**

- Check that clearance in the side gear axial direction is within the range of the standard value.
- If the clearance deviates from the standard value, adjust by changing the side gear washer.
  Thickness of side gear washer available
  1.5, 1.6, 1.7 mm {0.059, 0.063, 0.067 in} (three sizes)

NOTE

- **Select side gear washers so that the right and left dimensional difference from the back face of the pressure rings to the end face of the side gear washers conforms to the standard value.**

◆Assembly procedure◆

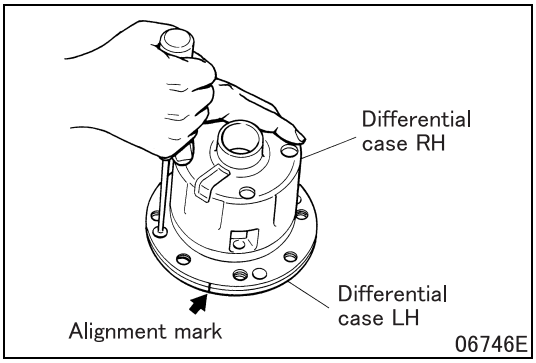


■ **Assembly: LSD (Limited Slip Differential)**

- Assemble each part into the R/H differential case in the illustrated direction.

NOTE

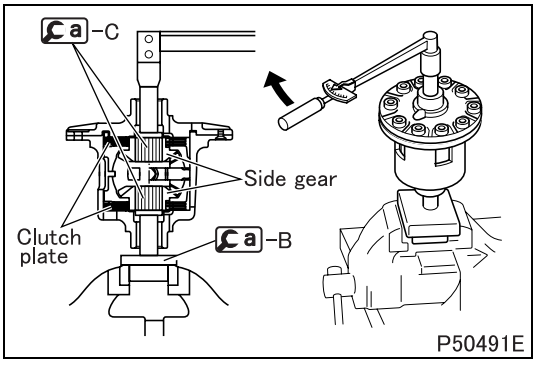
- **Take care not to install the friction discs and friction plates in a wrong sequence and the spring plates in a wrong direction.**
- **When assembling, apply gear oil to each part. Especially, apply gear oil carefully to contact surfaces and sliding surfaces.**



- Aligning the alignment mark (the same Arabic numeral) of the L/h differential case with that of the R/H differential case, tighten screws in the diagonal sequence gradually and evenly.

NOTE

- **If the L/H and R/H differential cases do not contact positively each other even after screws have been tightened fully, improperly assembled side gear washers and spring plates are suspected. In that case, reassemble these parts.**



■ **Inspection: Rotation torque of limited slip differential clutch plate**

- After assembling LSD, carry out the following inspection.
- Measure the rotation torque to check for the friction force of the clutch plate.

NOTE

- **For measurement of rotation torque, rotate the side gears to sufficiently smooth their operation and measure the value during their rotation.**

- If the measured value deviates from the standard value, replace defective parts of the internal components.