



REAR AXLE

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SPECIFICATIONS

GENERAL SPECIFICATIONS

	Vehicles with conventional differential	Vehicles with limited slip differential
Axle shaft		
Type	Semi-floating type	Semi-floating type
Shaft dimension		
Outer bearing portion dia. mm (in.)	35 (1.38)	35 (1.38)
Inner bearing portion dia. mm (in.)	30 (1.18)	30 (1.18)
Center portion dia. mm (in.)	33 (1.30)	33 (1.30)
Overall length mm (in.)	204 (8.03)	204 (8.03)
Bearing		
O.D. × I.D. Outer mm (in.)	72 × 35 (2.83 × 1.38)	72 × 35 (2.83 × 1.38)
Inner mm (in.)	62 × 30 (2.44 × 1.18)	62 × 30 (2.44 × 1.18)
Drive shaft		
Joint type	Double offset joint	Double offset joint
Outer	Birfield joint	Birfield joint
Inner		
Length × diameter mm (in.)		
Vehicles without an intercooler	341.6 × 26 (13.4 × 1.0)	—
Vehicles with an intercooler	328.1 × 27 (12.9 × 1.1)	328.1 × 27 (12.9 × 1.1)
Differential		
Reduction gear type	Hypoid gear	Hypoid gear
Reduction ratio	3.545	3.545
Differential lock type	—	Disc type
Differential gear type and configuration		
Side gear	Straight bevel gear × 2	Straight bevel gear × 2
Pinion gear	Straight bevel gear × 2	Straight bevel gear × 4
Number of teeth		
Drive gear	39	39
Drive pinion	11	11
Side gear	14	14
Pinion gear	10	10



SERVICE SPECIFICATIONS

	Vehicles with conventional differential	Vehicles with limited slip differential
Standard value		
Setting of D.O.J. boot length mm (in.)	80 ± 3 (3.1 ± .12)	80 ± 3 (3.1 ± .12)
Final drive gear backlash mm (in.)		
Vehicles without an intercooler	0.11–0.16 (.004–.006)	—
Vehicles with an intercooler	0.13–0.18 (.005–.007)	0.13–0.18 (.005–.007)
Differential gear backlash mm (in.)	0–0.076 (0–.003)	—
Drive pinion rotating torque		
with oil seal Ncm (in.lbs.)		
Vehicles without an intercooler	35–45 (3.0–3.9)	—
Vehicles with an intercooler	40–50 (3.5–4.3)	40–50 (3.5–4.3)
without oil seal Ncm (in.lbs.)	15–25 (1.3–2.2)	15–25 (1.3–2.2)
Difference in total thickness between left and right clutch plates mm (in.)	—	0.05 (.002) or less
Clearance between the clutch plates and the differential case mm (in.)	—	0.06–0.20 (.002–.008)
Clutch plate preload		
when equipped with new clutch plates Nm (ft.lbs.)	—	49–78 (36–58)
when equipped with old clutch plates Nm (ft.lbs.)	—	34–78 (25–58)
Limit		
Rear axle total backlash mm (in.)	5 (.2)	5 (.2)
Drive gear runout mm (in.)	0.05 (.002)	0.05 (.002)
Differential gear backlash mm (in.)	0.20 (.008)	—
Axle shaft end play mm (in.)	0.8 (.031)	0.8 (.031)
Torque tube companion flange runout mm (in.)	0.1 (.004)	0.1 (.004)
Spline coupling runout mm (in.)	0.1 (.004)	0.1 (.004)
Clutch plate wear		
Difference in the thicknesses of the friction surface and the projection mm (in.)	—	0.1 (.004) or less
Flatness of the friction plates and friction discs mm (in.)	—	0.08 (.003)



SPECIFICATIONS

TORQUE SPECIFICATIONS

Nm (ft.lbs.)

Axle shaft companion flange	260–300 (188–217)
Drive shaft to axle shaft companion flange	54–64 (40–47)
Rear axle housing to caliper support	40–50 (29–36)
Torque tube companion flange	160–220 (116–159)
Propeller shaft to torque tube	50–60 (36–43)
Torque tube to front support	35–45 (25–33)
Torque tube to differential carrier	70–85 (51–61)
Differential carrier to spline coupling	
Vehicles without an intercooler	160–220 (116–159)
Vehicles with an intercooler	190–250 (137–181)
Filler plug	40–60 (29–43)
Drain plug	60–70 (43–51)
Bearing cap	55–65 (40–47)
Differential case to drive gear	80–90 (58–65)
Cover	15–22 (11–16)

LUBRICANTS

	Specified lubricant	Quantity
Rear axle gear oil		
Conventional differential	MOPAR Hypoid Gear Oil or equivalent	1.30 lit. (1.37 U.S.qts., 1.14 Imp.qts.)
Limited slip differential	MITSUBISHI Genuine Gear Oil Part No. 8149630EX, MOPAR Hypoid Gear Lubricant Part No. 4318058 plus MOPAR Hypoid Gear Oil Additive-Friction Modifier Part No. 4318060 or equivalent	1.30 lit. (1.37 U.S.qts., 1.14 Imp.qts.)
Axle housing grease	MOPAR Multi-Mileage Lubricant Part No. 2525035 or equivalent	85 gr (3.0 oz)
D.O.J. boot grease	Repair kit grease	100–150 gr (3.5–5.3 oz)
B.J. boot grease	Repair kit grease	100–150 gr (3.5–5.3 oz)


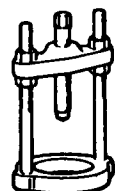


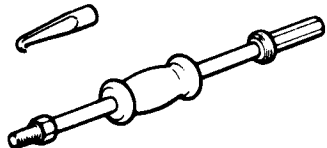

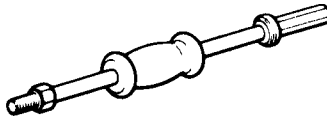





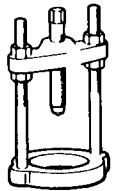



NOTE

D.O.J.: Double offset joint

B.J.: Birfield joint

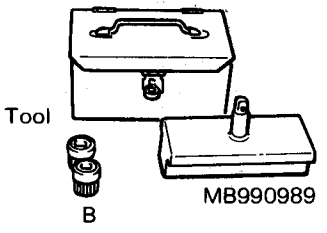
SPECIAL TOOLS



Tool (Number and name)	Use	Tool (Number and name)	Use
<p>C-4381 Spanner wrench</p>  <p>C-293-PA Bearing puller</p> 	Removal of the axle shaft outer bearing	<p>DT-1007-B Axle shaft oil seal installer</p>  <p>C-4171 Drive handle</p> 	<p>Insertion of the axle shaft oil seal</p> <p>Press-fitting of the oil seal of the drive pinion</p> <p>Press-fitting of the oil seal onto the side of the differential carrier</p>
<p>C-637 Sliding hammer set</p> 	Removal of extension shaft bearing	<p>MB990906 Drive shaft, torque tube remover and installer attachment</p>  <p>C-637 Sliding hammer</p> 	Removal and insertion of the drive shaft assembly
<p>C-4637-1 Torque tube bearing installer</p> 	Press-fitting of the extension shaft bearing	<p>MB990907 Coupling holder</p> 	Removal and installation of the spline coupling
<p>MB990810 Side bearing puller</p>  <p>MB990811 Side bearing cup</p> 	Removal of the side bearing inner race	<p>MB990648 Bearing remover</p>  <p>C-293-PA Bearing puller</p> 	Removal of the drive pinion rear bearing inner race
<p>MB990802 Bearing installer</p> 	<p>Press-fitting of the drive pinion rear bearing inner race</p> <p>Press-fitting of the side bearing inner race</p>	<p>C-4626 Pinion height gauge unit</p>  <p>MB990552 Cylinder gauge</p> 	Measurement of the drive pinion height (For vehicles with an intercooler, use this tool together with C-4626-13.)



SPECIAL TOOLS

Tool (Number and name)	Use
<p data-bbox="116 268 483 325">MB990988 Side gear holding tool set</p>  <p data-bbox="129 462 178 493">Tool</p> <p data-bbox="203 556 227 588">B</p> <p data-bbox="324 535 446 567">MB990989</p>	<p data-bbox="492 268 802 325">Measurement of the clutch plate preload</p>



Symptom	Probable cause	Remedy
AXLE SHAFT, AXLE HOUSING Noise while wheels are rotating	Brake drag Bent axle shaft Worn or scarred axle shaft bearing	Replace
Grease leakage	Worn or damaged oil seal Malfunction of bearing seal	Replace
DRIVE SHAFT Noise	Wear, play or seizure of ball joint Excessive drive shaft spline looseness	Replace
TORQUE TUBE Noise	Wear, play or seizure of bearing	Replace
DIFFERENTIAL (CONVENTIONAL DIFFERENTIAL) Constant noise	Improper final drive gear tooth contact adjustment Loose, worn or damaged side bearing Loose, worn or damaged drive pinion bearing	Correct or replace
	Worn drive gear, drive pinion Worn side gear thrust washer or pinion shaft Deformed drive gear or differential case Damaged gear	Replace
	Foreign material	Eliminate the foreign material and check; replace the parts if necessary
	Insufficient oil	Replenish
Gear noise while driving	Poor gear engagement Improper gear adjustment Improper drive pinion preload adjustment	Correct or replace
	Damaged gear	Replace
	Foreign material	Eliminate the foreign material and check; replace the parts if necessary
	Insufficient oil	Replenish
Gear noise while coasting	Improper drive pinion preload adjustment	Correct or replace
	Damaged gear	Replace
Bearing noise while driving or coasting	Cracked or damaged drive pinion rear bearing	Replace
Noise while turning	Loose side bearing Damaged side gear, pinion gear or pinion shaft	Replace



TROUBLESHOOTING

Symptom	Probable cause	Remedy
Heat	Insufficient gear backlash Excessive preload	Adjust
	Insufficient oil	Replenish
Oil leakage	Clogged vent plug	Clean or replace
	Cover insufficiently tightened Seal malfunction	Retighten, apply sealant, or replace the gasket
	Worn or damaged oil seal	Replace
	Excessive oil	Adjust the oil level
DIFFERENTIAL (LIMITED SLIP DIFFERENTIAL) Abnormal noise during driving or gear changing	Excessive final drive gear backlash Insufficient drive pinion preload	Adjust
	Excessive differential gear backlash	Adjust or replace
	Worn spline of a side gear	Replace
	Loose spline coupling self-locking nut	Retighten or replace

NOTE

In addition to a malfunction of the differential carrier components, abnormal noise can also be caused by the universal joint of the propeller shaft, the axle shafts, the wheel bearings, etc. Before disassembling any parts, take all possibilities into consideration and confirm the source of the noise.

Abnormal noise when cornering	Damaged differential gears Damaged pinion shaft Nicked and/or abnormal wear of inner and outer clutch plates Inferior gear oil	Replace
	Insufficient gear oil quantity	Replenish
Gear noise	Improper final drive gear tooth contact adjustment	Adjust or replace
	Incorrect final drive gear backlash Improper drive pinion preload adjustment	Adjust
	Damaged, broken, and/or seized tooth surfaces of the drive gear and drive pinion Damaged, broken, and/or seized drive pinion bearings Damaged, broken, and/or seized side bearings Damaged differential case Inferior gear oil	Replace
	Insufficient gear oil quantity	Replenish

TROUBLESHOOTING



Symptom	Probable cause	Remedy
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NOTE

Noise from the engine, muffler vibration, transmission, propeller shaft, wheel bearings, tires, body, etc., is easily mistaken as being caused by malfunctions in the differential carrier components. Be extremely careful and attentive when performing the driving test, etc.

Test methods to confirm the source of the abnormal noise include: coasting, acceleration, constant speed driving, raising the rear wheels on a jack, etc. Use the method most appropriate to the circumstances.

Gear oil leakage	Worn or damaged front oil seal, or an improperly installed oil seal Damaged gasket	Replace
	Loose spline coupling self-locking nut	Retighten or replace
	Loose filler or drain plug	Retighten or apply adhesive
	Clogged or damaged vent plug	Clean or replace
Seizure	Insufficient final drive gear backlash Excessive drive pinion preload Excessive side bearing preload Insufficient differential gear backlash Excessive clutch plate preload	Adjust
	Inferior gear oil	Replace
	Insufficient gear oil quantity	Replenish

NOTE

In the event of seizure, disassemble and replace the parts involved, and also be sure to check all components for any irregularities and repair or replace as necessary.

Breakdown	Incorrect final drive gear backlash Insufficient drive pinion preload Insufficient side bearing preload Excessive differential gear backlash Insufficient clutch plate preload	Adjust
	Loose drive gear clamping bolts	Retighten
	Operational malfunction due to overloaded clutch	Avoid excessively rough operation

NOTE

In addition to disassembling and replacing the failed parts, be sure to check all components for irregularities and repair or replace as necessary.

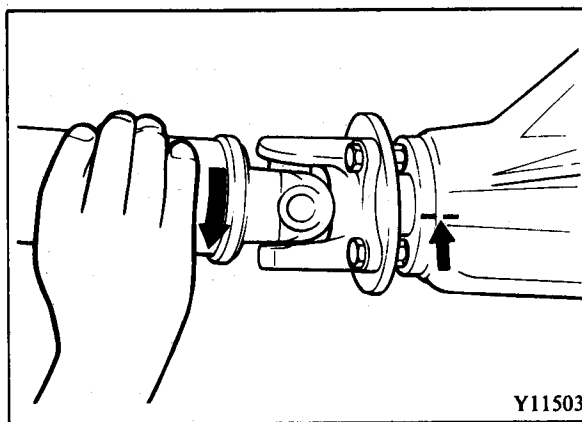
The limited slip differential does not function (on snow, mud, ice, etc.)	The limited slip device is damaged	Disassemble, check the functioning, and replace the damaged parts
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REAR AXLE TOTAL BACKLASH

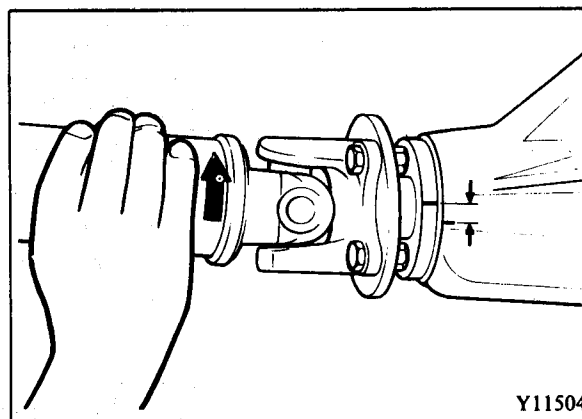
If the vehicle vibrates and produces a booming sound due to the unbalance of the driving system, measure the rear axle total backlash by the following procedures to see if the differential carrier assembly requires removal.

- (1) Place the gearshift lever in the neutral position, apply the parking brake and jack up the vehicle.
- (2) Turn the companion flange fully clockwise. Scribe mating marks on the dust cover of the companion flange and on the differential carrier. (Y11503)



Y11503

- (3) Turn the companion flange fully counterclockwise, and measure the amount of distance through which the mating marks moved. (Y11504)
- (4) If the backlash exceeds the limit, remove the differential carrier assembly and adjust the backlash.



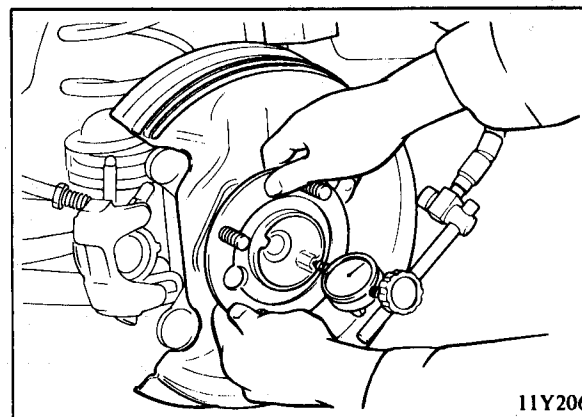
Y11504

Rear axle total backlash [Limit] 5 mm (.2 in.)

AXLE SHAFT END PLAY

1. Measure the axle shaft end play with a dial indicator.
2. Push the axle shaft all the way in, then mount and zero dial indicator.
3. Pull the axle shaft all the way out and read dial indicator for end play.
4. If the end play exceeds the limit, replace the bearing.

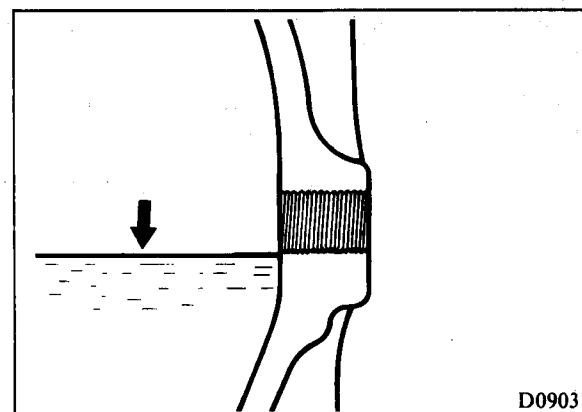
Axle shaft end play [Limit] 0.8 mm (.031 in.)



11Y206

CHECKING GEAR OIL LEVEL

Remove the filler plug, and check the oil level. The oil level is sufficient if it reaches the level of the plug hole.



D09031



LIMITED SLIP DIFFERENTIAL PRELOAD MEASUREMENT

To measure the preload of the limited slip differential, set the shift lever of the transmission to the neutral position, lock the front wheels, and fully release the parking brake. One of the rear wheels should be maintained in contact with the ground surface, and the other should be raised up.

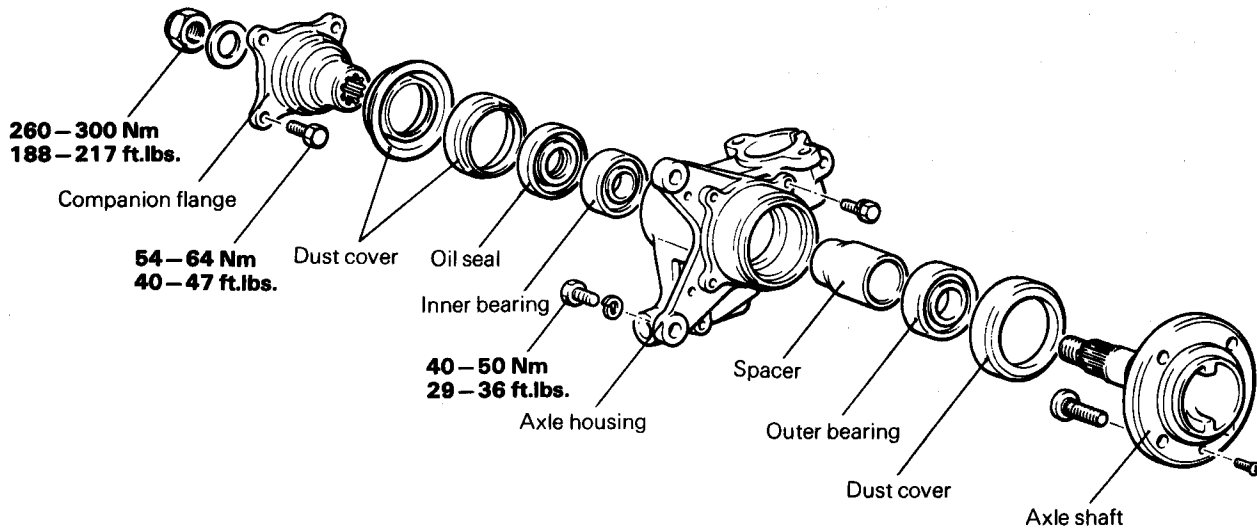
Measure the starting torque at the side on which the wheel is in the raised position by using the following procedures:

1. Attempt to rotate wheel by applying turning force with hands gripping tire tread area.
2. If you find it extremely difficult, if not impossible to manually turn either wheel, you can consider the Sure-Grip differential to be performing satisfactorily.

If you find it relatively easy to continuously turn either wheel, the differential is not performing properly and should be removed and serviced.



COMPONENTS



Y11500

REMOVAL

1. Disconnect the parking brake cable from the rear brake caliper assembly. (Refer to GROUP 5.)
2. Remove the rear disc caliper assembly, caliper support and brake disc. (Refer to GROUP 5.)

NOTE

Support the caliper body by suspending it with wires or other suitable method so that the brake hoses are not twisted.

3. Remove the drive shaft and the companion flange. (Refer to P. 3-15.)
4. Remove the axle housing from the lower control arm. (Refer to GROUP 17.)
5. Remove the strut assembly from the axle housing. (Refer to GROUP 17.)
6. Remove the axle shaft assembly.
7. Loosen the companion flange mounting nut, and then tap the axle shaft out of the axle housing with a plastic hammer. (11Y121)

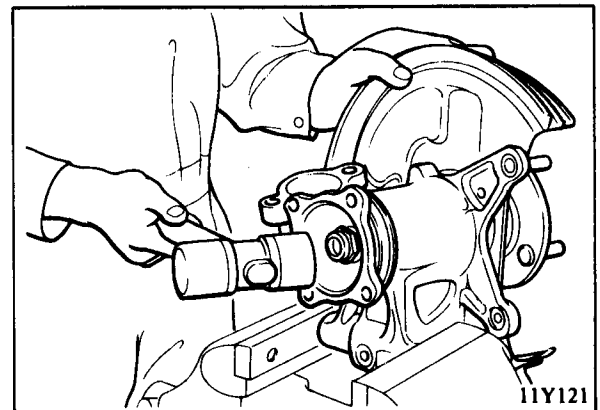
Caution

Be careful not to scratch the oil seal.

8. Take out the spacer and dust covers from inside the axle housing.

Caution

Do not remove the inner and outer bearings unless they are to be replaced.





INSPECTION

1. Check companion flange for wear or damage.
2. Check the dust cover for deformation or damage.
3. Check oil seal for damage or leakage.
4. Check inner and outer bearings for wear, damage or discoloration.
5. Check axle shaft for cracks, wear, or damage.

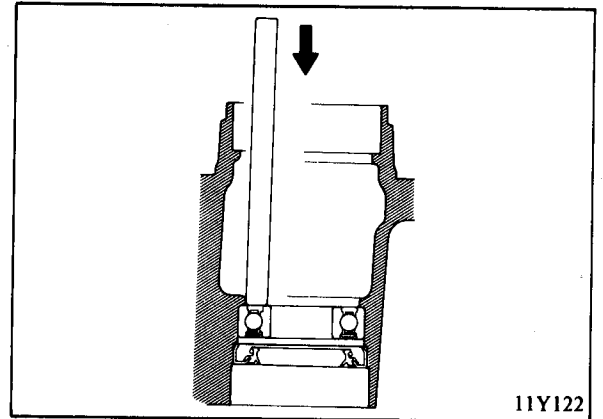
INNER AND OUTER BEARING REPLACEMENT

1. Remove the rear axle bearing with the special tool C-4381 and Bearing Puller C-293-PA.

NOTE

The dust shield has to be depressed to remove the bearing. A new dust shield has to be installed with the new bearing.

2. Drive the inner bearing and oil seal from the axle housing with a drift. (11Y122)

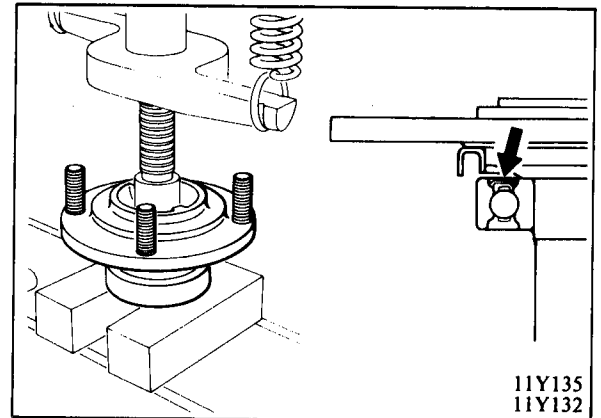


3. Press-fit the new outer bearing to the axle shaft.

NOTE

The seal side of the outer bearing should face the flange side of the axle shaft.

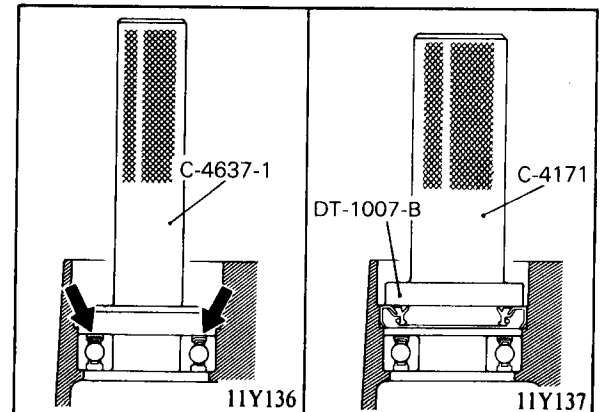
4. Apply specified multipurpose grease to the inside surface of the axle housing.



Recommended multipurpose grease
 MOPAR Multi-Mileage Lubricant
 Part Number 2525035 or equivalent

5. Position the new inner bearing so that the seal side faces the companion flange, and then press-fit the bearing with the special tools illustrated. (11Y136)

Apply the specified multipurpose grease to the area of the axle housing where the oil seal is to be press-fitted, and then use the special tool to drive the oil seal in until it contacts the edge of the axle housing. (11Y137)





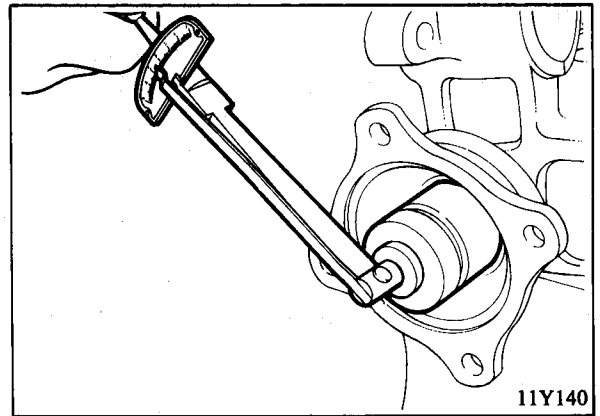
INSTALLATION

1. Install the dust cover to the axle housing.
Apply specified multipurpose grease to the oil seal lip.

Recommended multipurpose grease

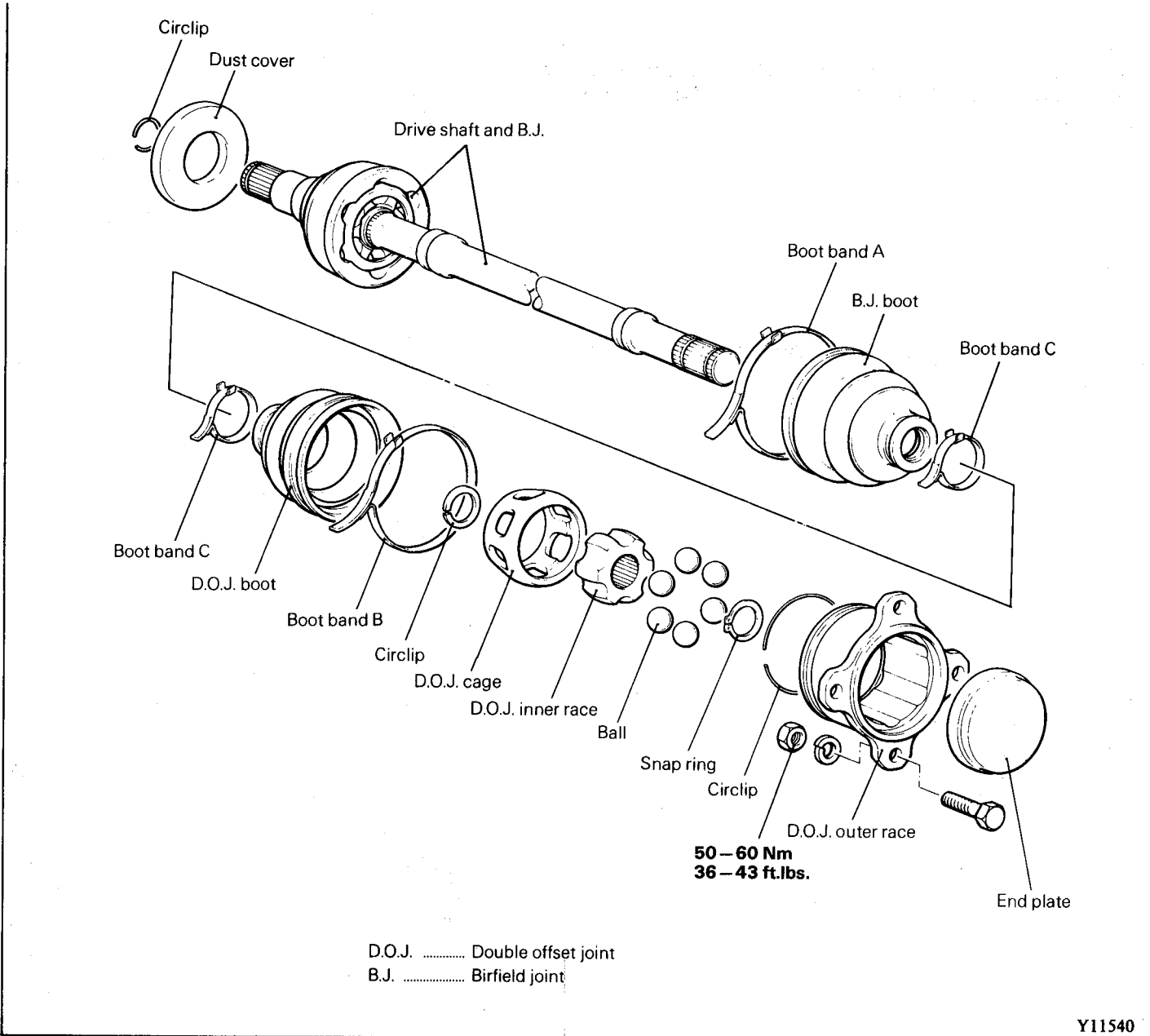
MOPAR Multi-Mileage Lubricant
Part Number 2525035 or equivalent

2. Insert the axle shaft and spacer into the axle housing, and attach the companion flange.
3. Secure the axle housing in a vice, and tighten the companion flange attaching nut to the specified torque.
4. Install the axle housing to the lower control arm and the strut assembly. (Refer to GROUP 17.)
5. Assure that the axle shaft end play is within the limit. (Refer to P. 3-10.)



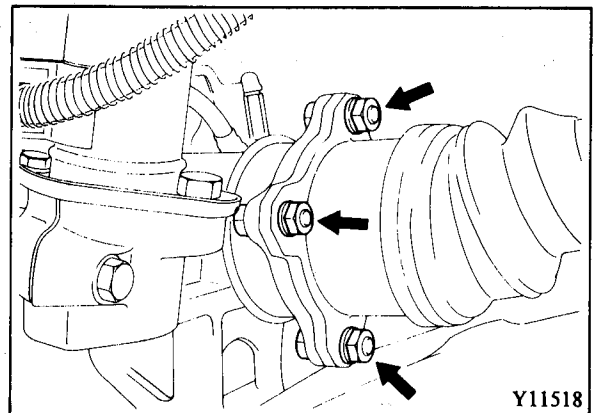


COMPONENTS



REMOVAL

1. Remove the 4 bolts and separate the drive shaft from the companion flange.



Y11518

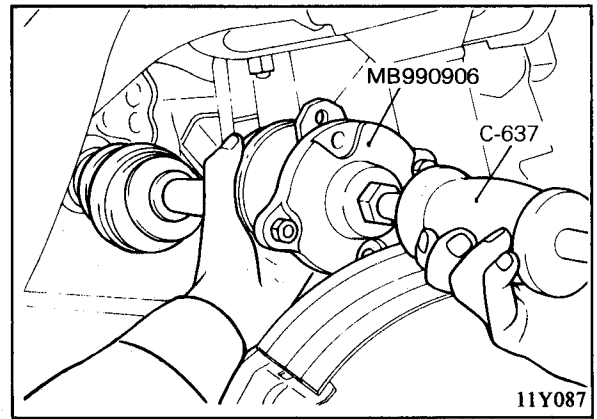


COMPONENT SERVICE — DRIVE SHAFT

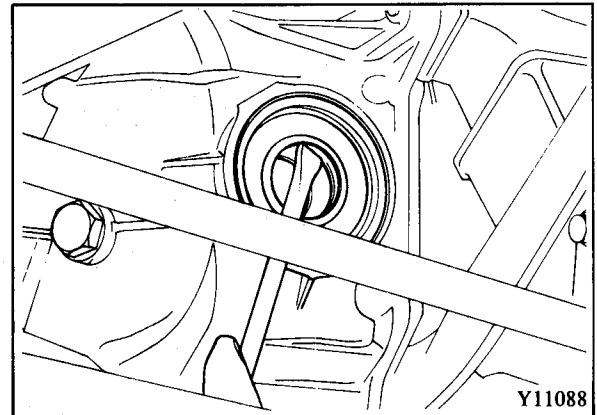
2. Remove the drive shaft from the differential carrier with the special tools.

Caution

When removing the drive shaft from the differential carrier, be careful that the spline of the drive shaft does not damage the oil seal.

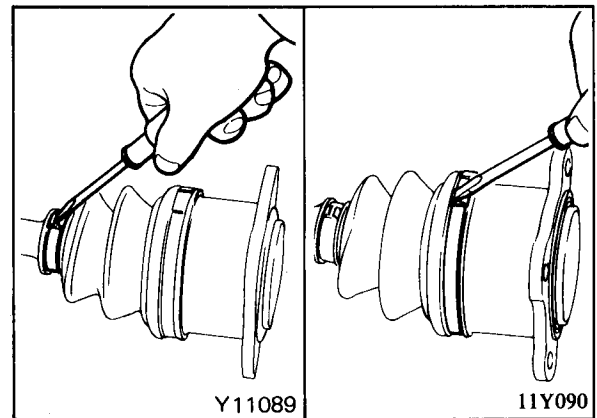


3. Remove the oil seal from the differential carrier, if necessary.

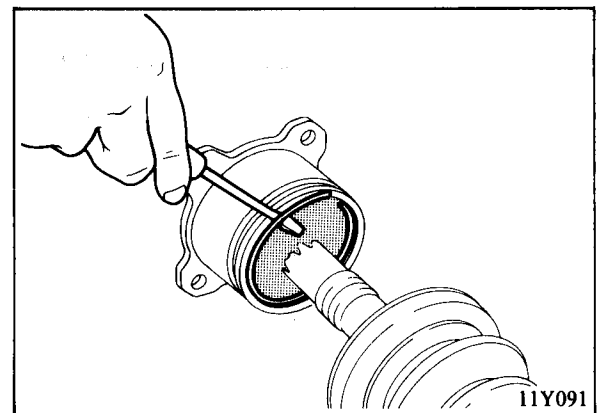


DISASSEMBLY

1. Remove the boot bands.

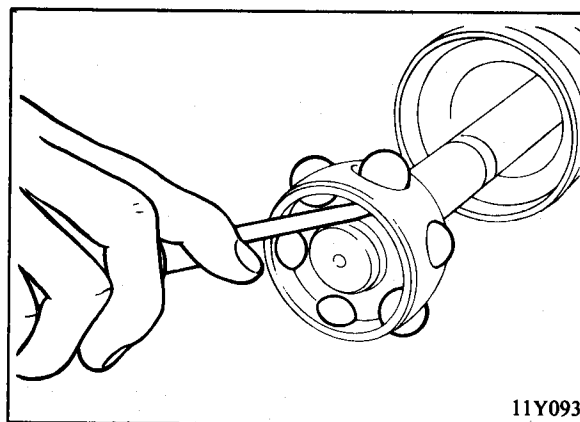


2. Remove the circlip from the D.O.J. outer race. Separate the drive shaft from the D.O.J. outer race.

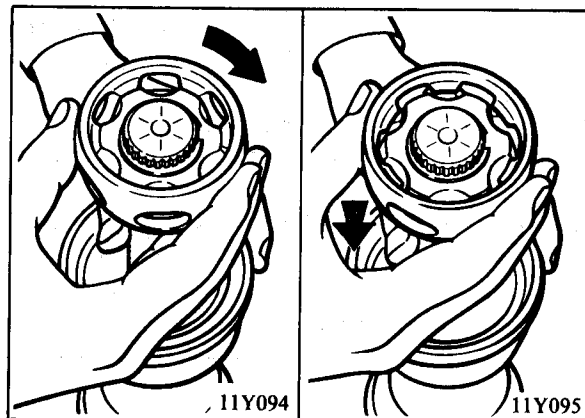




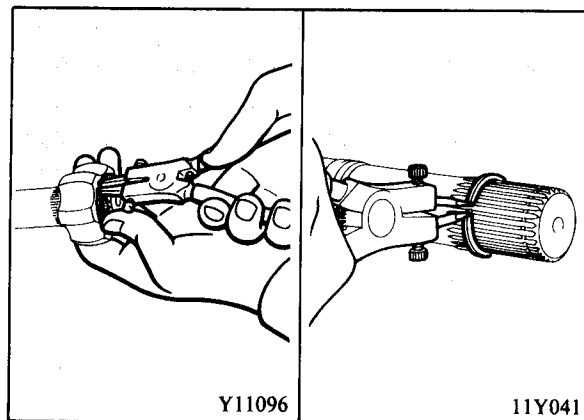
- Remove the balls from the D.O.J. cage.



- Remove the D.O.J. cage from the D.O.J. inner race in the direction of the B.J.



- Remove the snap ring from the drive shaft with snap ring pliers, and then withdraw the D.O.J. inner race and D.O.J. cage from the drive shaft. Remove the circlip from the drive shaft with snap ring pliers.



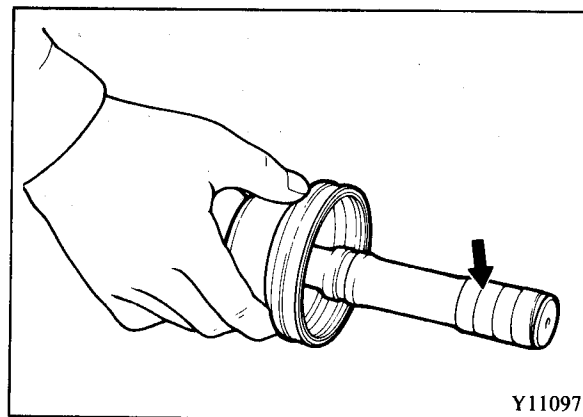
- Wrap vinyl tape around the spline on the D.O.J. side of the drive shaft so that the D.O.J. and B.J. boots are not damaged when they are removed. (Y11097)
- Remove the D.O.J. and B.J. boots from the drive shaft.

Caution

Do not disassemble the B.J.

INSPECTION

- Check the drive shaft for wear or bend.
- Check the B.J. and D.O.J. joints for wear or damage.
- Check the circlip for distortion or damage.





REASSEMBLY

1. Apply the specified grease to the drive shaft, and wrap vinyl tape around the spline on the D.O.J. side of the drive shaft.

Recommended grease Repair kit grease

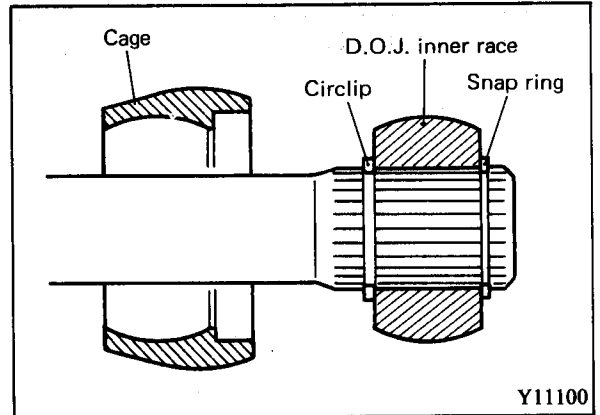
2. Install the B.J. boot, boot bands (new ones), and D.O.J. boot on the drive shaft, in that order.

Caution

The B.J. and D.O.J. boots are different in size and shape, so make sure to install them correctly.

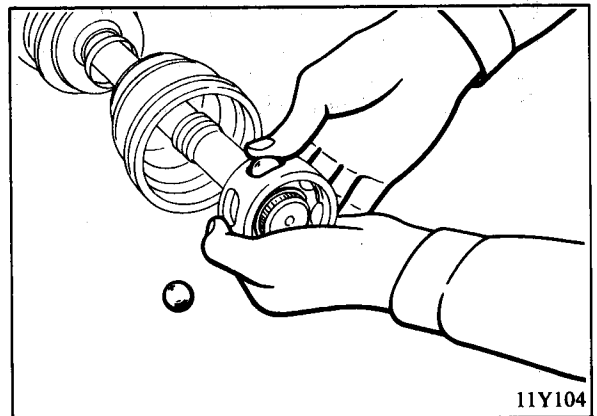
3. Install the D.O.J. cage onto the drive shaft so that the smaller diameter side of the cage is installed first. (Y11100)
4. Install the circlip on the drive shaft.
5. Install the D.O.J. inner race onto the drive shaft, and secure it with a snap ring.
6. Apply specified grease to the D.O.J. inner race and the D.O.J. cage, and then fit them together.

Recommended grease Repair kit grease



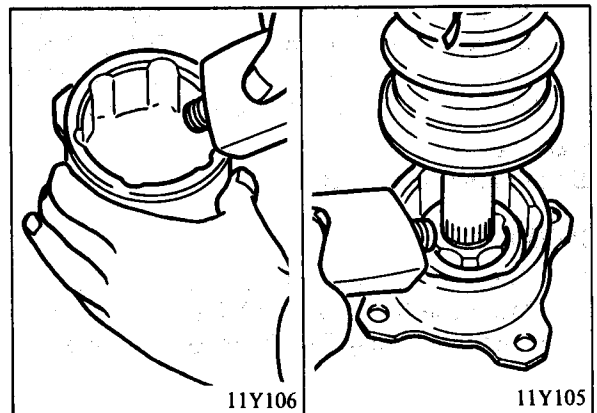
7. Apply specified grease to the ball insertion parts of the D.O.J. inner race and D.O.J. cage, and insert the balls.

Recommended grease Repair kit grease



8. Apply 50 to 80 gr (1.8 to 2.8 oz) of specified grease to the D.O.J. outer race.
9. Install the drive shaft into the D.O.J. outer race, and apply 50 to 70 gr (1.8 to 2.5 oz) of specified grease to the race.

Recommended grease Repair kit grease





10. Install the circlip onto the D.O.J. outer race.
11. Place the D.O.J. boot over the D.O.J. outer race, and then use boot band B to secure the boot.
12. Place boot band C at the specified distance in order to adjust the amount of air inside the D.O.J. boot, and then tighten the boot band C. (11Y099)

Setting of D.O.J. boot length [Standard value]
 $80 \pm 3 \text{ mm (} 3.1 \pm .12 \text{ in.)}$

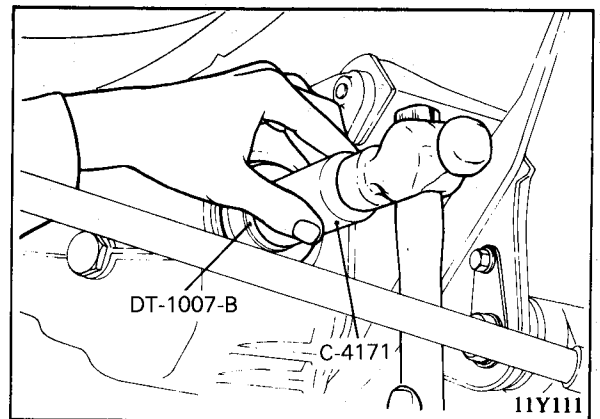
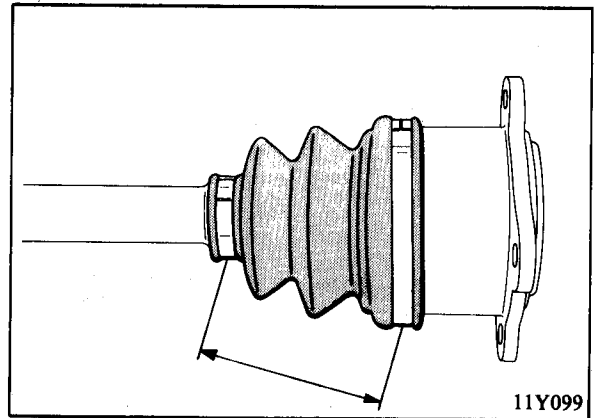
13. If the B.J. is to be reused, pack 100 to 150 gr (3.5 to 5.3 oz) of the specified grease into the B.J. boot, and secure the boot with the boot band.

Recommended grease Repair kit grease

INSTALLATION

1. If the oil seal is to be replaced because of damage, drive it in with the special tool. (11Y111)
2. Apply the specified multipurpose grease to the oil seal lip.

Recommended multipurpose grease
 MOPAR Multi-Mileage Lubricant
 Part Number 2525035 or equivalent



3. Drive the drive shaft into the differential carrier with special tools (C-637 and MB990906). (Refer to P. 3-16.)

Caution

Be careful not to damage the lip of the oil seal. Replace the circlip which is attached to the B.J. side spline part with a new one.

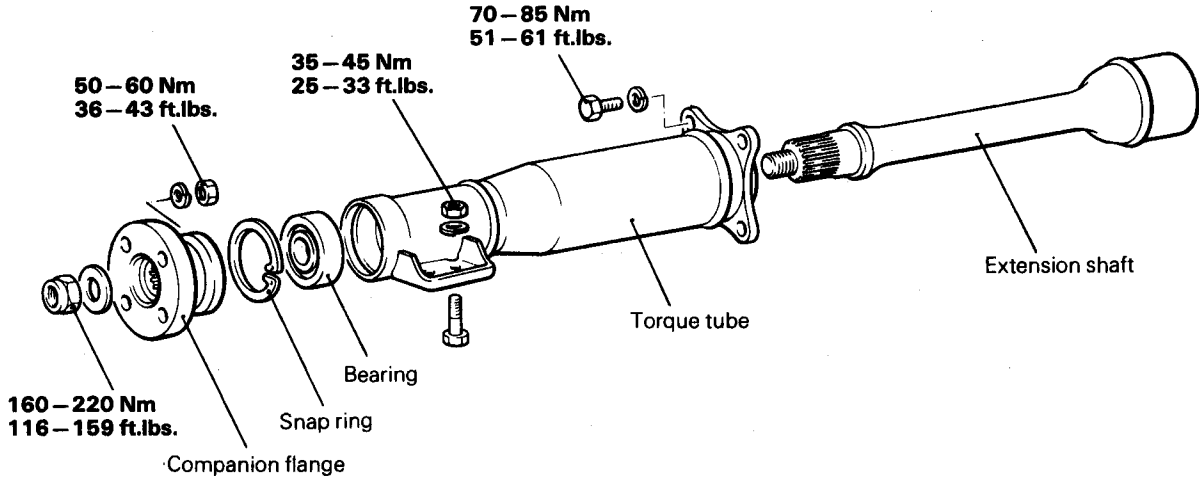
4. Install the bolts from the axle shaft side, and then tighten the companion flange of the axle shaft and the drive shaft. (Refer to P. 3-15.)

Caution

Before and after coupling the drive shaft to the companion flange, move the drive shaft in the axial direction to verify that it does not slip out of the differential gear carrier.



COMPONENTS



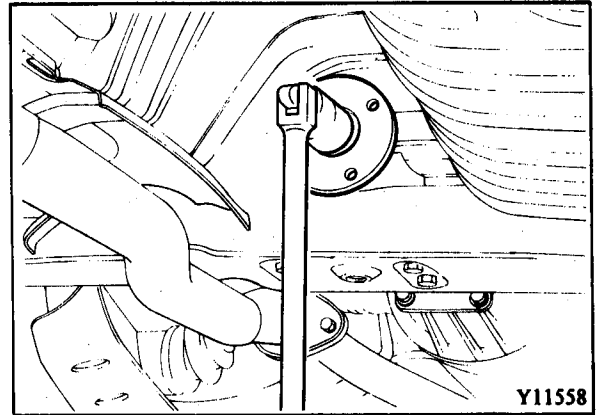
11Y154

REMOVAL

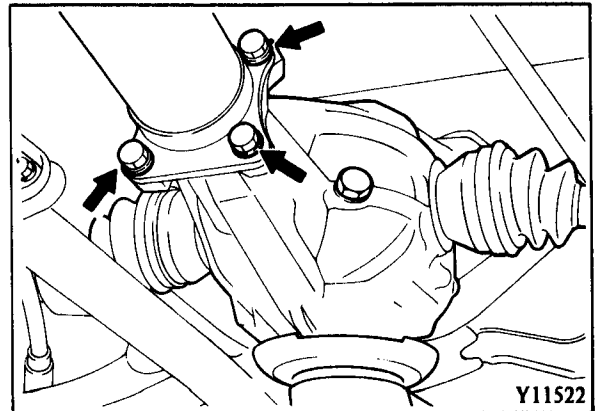
1. Remove the propeller shaft. (Refer to GROUP 16.)
2. Hold the extension shaft by applying the parking brake, and loosen the companion flange attaching nut. (Y11558)

NOTE

The nut should only be loosened, not removed.



3. Remove the bolts which connect the torque tube assembly to the differential carrier assembly. (Y11522)
4. Remove the bolts connecting the torque tube assembly to the front support. (Refer to GROUP 17.)

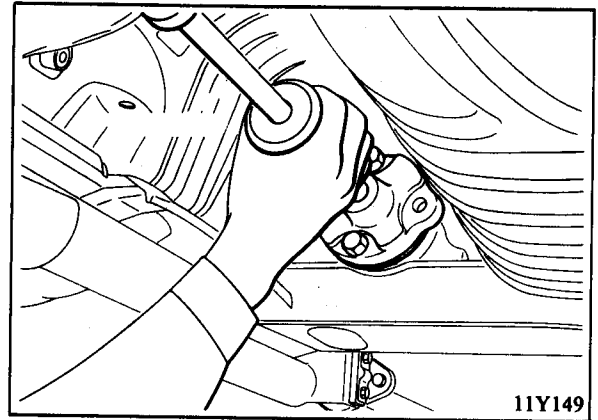




5. Remove the extension shaft spline from the spline coupling. (11Y149)
6. Disconnect the special tools from the torque tube, and pull the torque tube assembly out toward the rear.

Caution

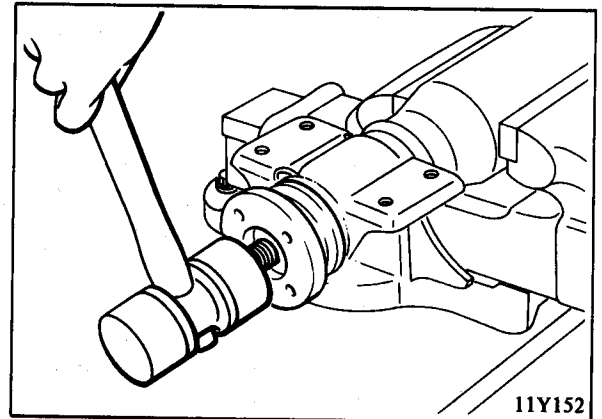
Whenever the torque tube assembly is removed, be sure to disassemble and install it in accordance with the procedure below, to prevent damage to the bearing.



11Y149

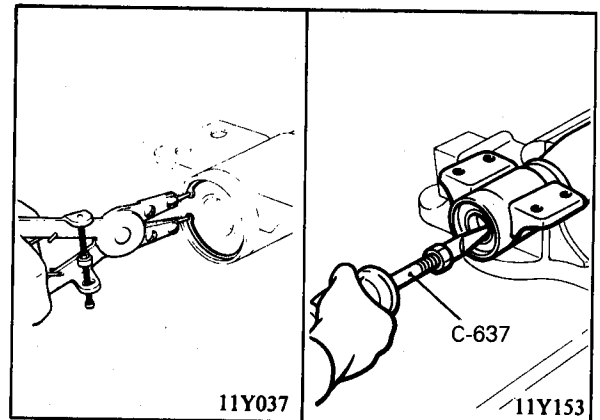
DISASSEMBLY

1. Scribe mating marks on the extension shaft and companion flange.
2. Drive the extension shaft from the torque tube with a plastic hammer. (11Y152)
3. Remove the companion flange from the torque tube.



11Y152

4. Remove the snap ring from the torque tube with snap ring pliers. (11Y037)
5. Pull the bearing from the torque tube with the special tool. (11Y153)



11Y037

11Y153

INSPECTION

1. Check the bearing for looseness or damage.
2. Check the torque tube for cracks or breakage.
3. Check the extension shaft for bend, wear or damage.

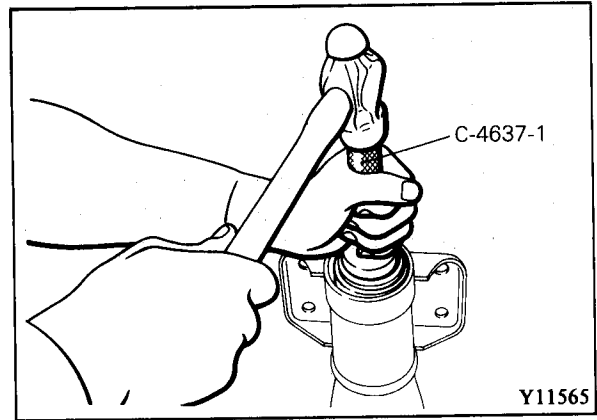


REASSEMBLY AND INSTALLATION (1)

1. Install the bearing into the extension shaft with special tool.

NOTE

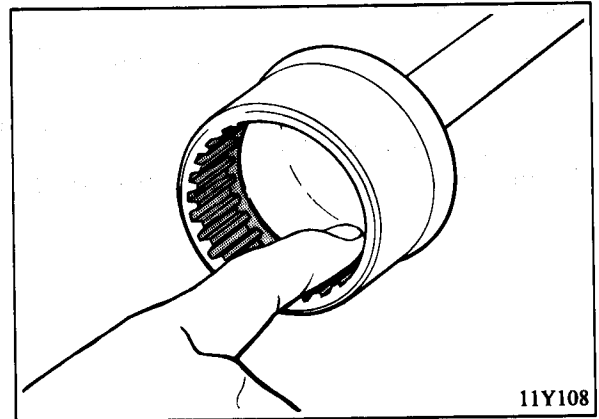
Continue driving the bearing in until the flange surface of the special tool comes in contact with the edge of the torque tube.



2. Apply the specified multipurpose grease to the pocket and the spline of the differential side of the extension shaft. (11Y108)

Recommended multipurpose grease

MOPAR Multi-Mileage Lubricant
Part Number 2525035 or equivalent



3. Insert the extension shaft into the torque tube.
4. Install the snap ring to secure the bearing in place.
5. Loosely tighten the companion flange with nuts.
6. Drive the extension shaft into the differential spline coupling until the surface of the torque tube flange comes fully in contact with the surface of the differential carrier flange. (Refer to P. 3-21.)
7. Install the torque tube onto the differential carrier and front support.
8. Install the companion flange with mating marks properly aligned.
9. Hold the extension shaft by applying the parking brake, and tighten the companion flange attaching nut to the specified torque.

Companion flange tightening torque

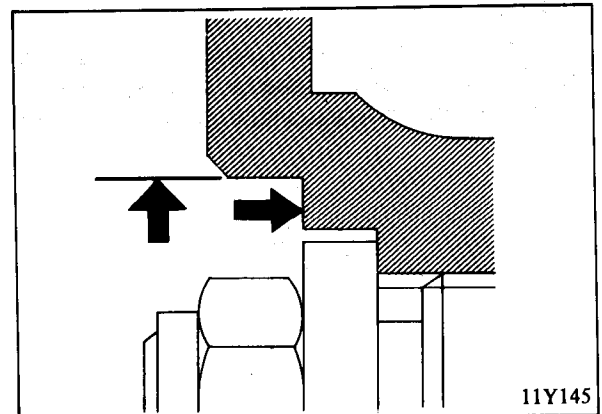
160–220 Nm (116–159 ft.lbs.)

10. Measure companion flange runout with a dial indicator. (11Y145)
11. If the companion flange runout exceeds the limit, change the phase of the companion flange and extension shaft and measure the runout once again. If runout still exists, replace parts.

Companion flange runout [Limit]

0.1 mm (.004 in.)

12. Install the propeller shaft. (Refer to GROUP 16.)



**REASSEMBLY AND INSTALLATION (2)**

1. Apply the specified multipurpose grease to the pocket and the spline part of the differential side of the extension shaft. (Refer to P. 3-22.)
2. Insert the extension shaft into the torque tube.
3. Install the torque tube onto the differential carrier and front support.
4. Drive the bearing into the extension shaft with the special tool (C-4637-1). (Refer to P. 3-22.)

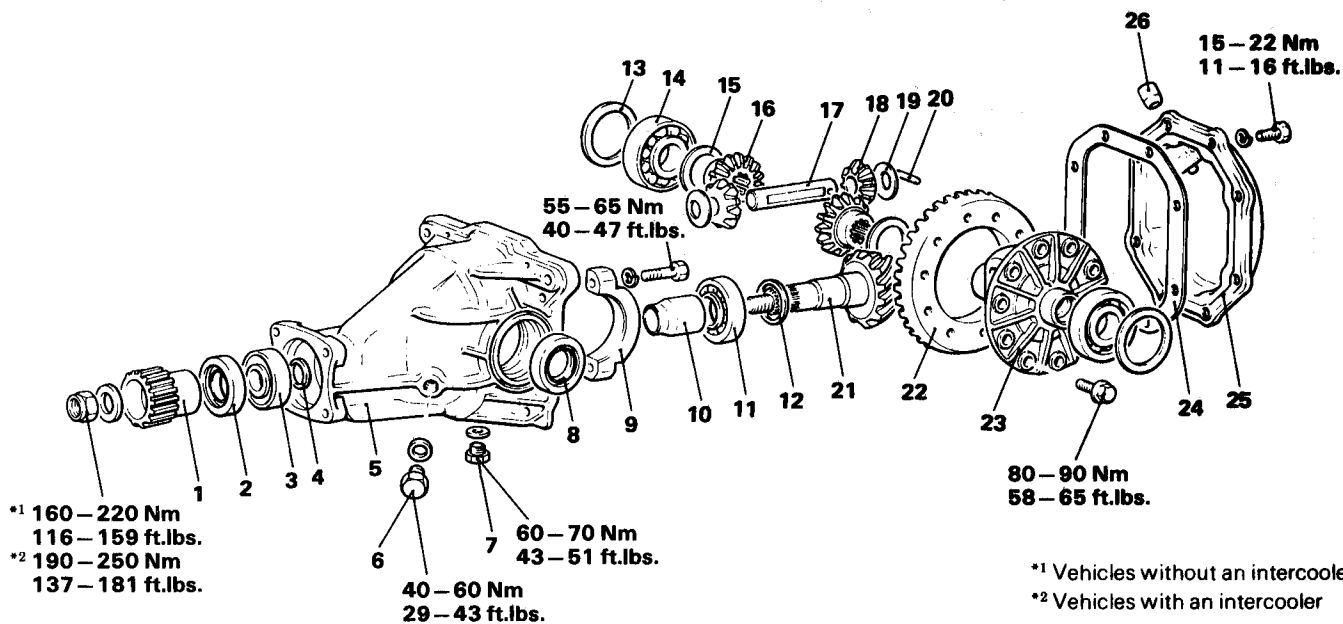
NOTE

Continue driving the bearing in until the flange surface of the special tool comes in contact with the edge of the torque tube.

5. Install the snap ring to secure the bearing in place.
6. Properly align the mating marks and install companion flange.
7. For the remaining service procedure, refer to P. 3-22.



COMPONENTS



*1 Vehicles without an intercooler
*2 Vehicles with an intercooler

- | | |
|---|-----------------------------|
| 1. Spline coupling | 14. Side bearing |
| 2. Oil seal | 15. Side gear thrust spacer |
| 3. Drive pinion front bearing | 16. Side gear |
| 4. Drive pinion front shim (for preload adjustment) | 17. Pinion shaft |
| 5. Gear carrier | 18. Pinion gear |
| 6. Level plug | 19. Pinion washer |
| 7. Drain plug | 20. Lock pin |
| 8. Oil seal | 21. Drive pinion |
| 9. Bearing cap | 22. Drive gear |
| 10. Drive pinion spacer | 23. Differential case |
| 11. Drive pinion bearing | 24. Gasket |
| 12. Drive pinion rear shim (for pinion height adjustment) | 25. Cover |
| 13. Side bearing adjusting spacer | 26. Vent plug |

11Y160

REMOVAL

1. Drain gear oil.
2. Remove the drive shafts from the differential carrier assembly. (Refer to P. 3-16.)
3. Remove the torque tube. (Refer to P. 3-20.)
4. Remove the nuts connecting the rear support insulator to the crossmember, and the nuts connecting the rear support to the rear support insulator. (Refer to GROUP 17.)
5. Raise the differential carrier with a jack and disconnect the differential carrier from the rear support insulators.
6. Remove the rear supports, cover and gasket.



INSPECTION BEFORE DISASSEMBLY

Final Drive Gear Backlash

With the drive pinion locked in place, measure the final drive gear backlash with a dial indicator.

Final drive gear backlash [Standard value]	
Vehicles without an intercooler	0.11–0.16 mm (.004–.006 in.)
Vehicles with an intercooler	0.13–0.18 mm (.005–.007 in.)

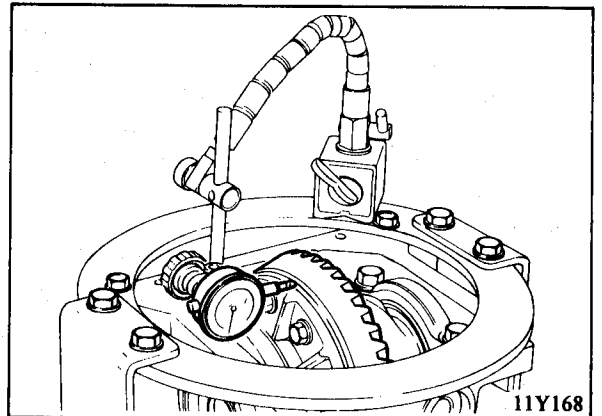
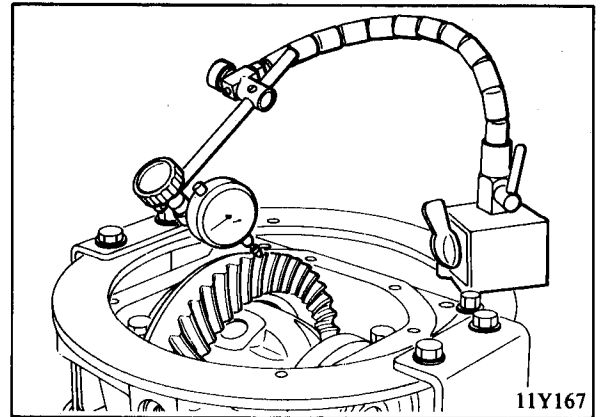
NOTE

Measure at four points on the circumference of the drive gear.

Drive Gear Runout

Measure the drive gear runout at the shoulder on the reverse side of the gear teeth.

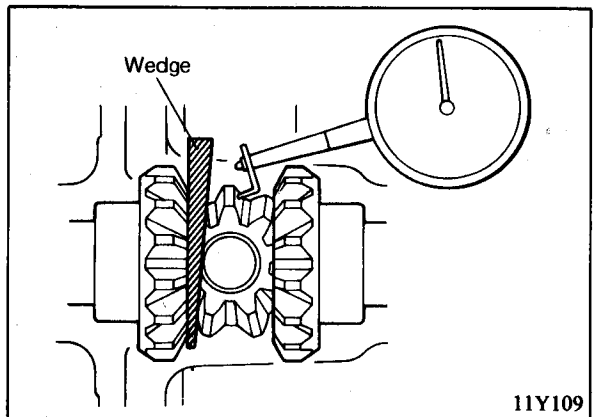
Drive gear runout [Limit]	0.05 mm (.002 in.)
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Differential Gear Backlash

Lock the side gear with a wedge and measure the differential gear backlash with a dial indicator on the pinion gear.

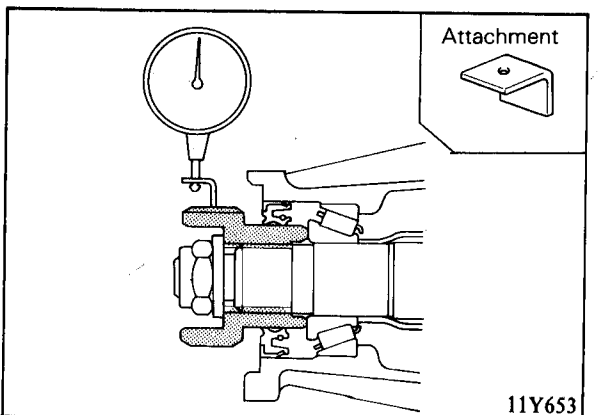
Differential gear backlash	
[Standard value]	0–0.076 mm (0–.003 in.)
[Limit]	0.20 mm (.008 in.)



Spline Coupling Runout

Measure the spline coupling runout with a dial indicator.

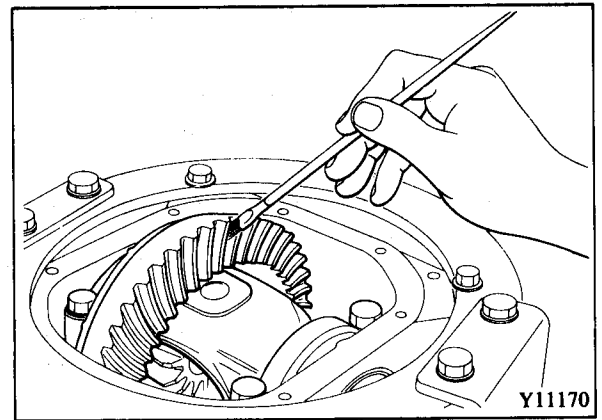
Spline coupling runout [Limit]	0.1 mm (.004 in.)
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Final Drive Gear Tooth Contact

1. Apply a thin, uniform coat of marking compound to both surfaces of the drive gear teeth.



2. Insert a brass rod between the differential carrier and the differential case, and then rotate the spline coupling by hand (once in the normal direction, and then once in the reverse direction) while applying a load to the drive gear [approximately 2.5 to 3.0 Nm (1.8 to 2.2 ft.lbs.) at the drive pinion].

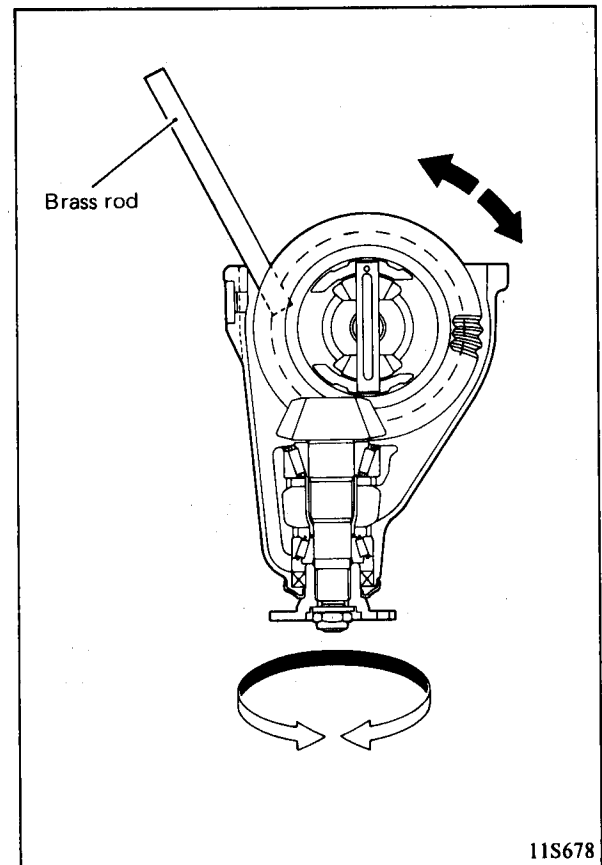
Caution

If the drive gear is rotated too much, the tooth contact pattern will become unclear and difficult to check.

3. Inspect the tooth contact pattern of the drive gear and drive pinion.

NOTE

Checking the tooth contact pattern is the way to confirm that the adjustments of the pinion height and backlash have been done properly. Continue to adjust the pinion height and backlash until the tooth contact pattern resembles the standard pattern.





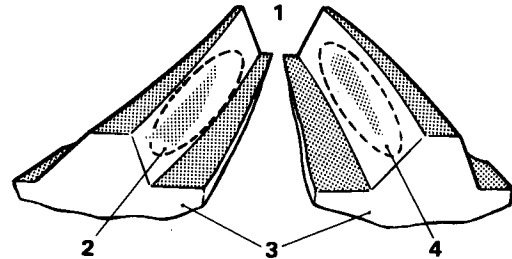
4. If, even after adjustments have been made, the correct tooth contact pattern cannot be obtained, replace the drive gear and pinion.

Caution

If either the drive gear or the drive pinion is to be replaced, be sure to replace both gears as a set.

Standard tooth contact pattern

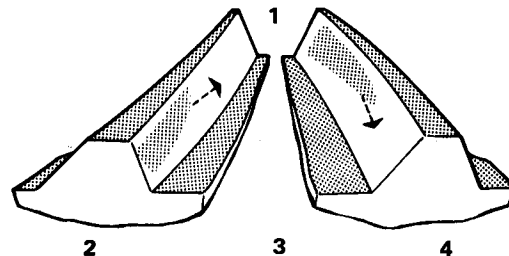
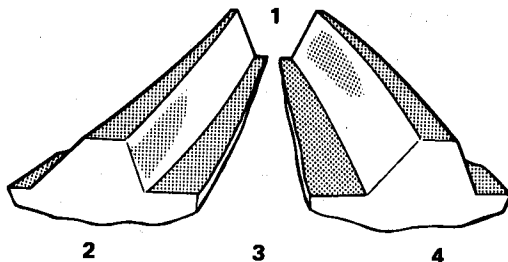
1. Toe
2. Drive-side
3. Heel
4. Coast-side



Problem

Solution

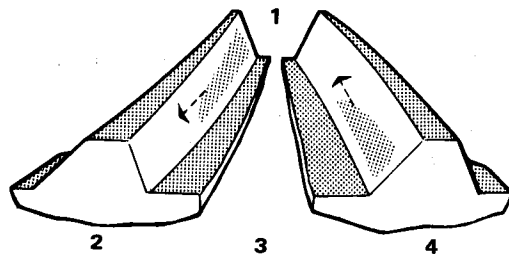
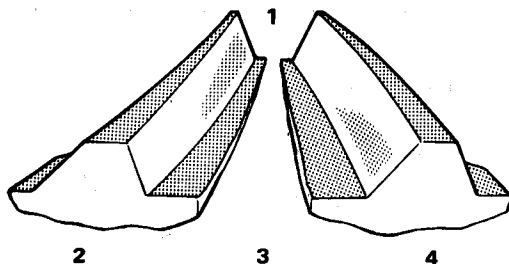
Tooth contact pattern resulting from excessive pinion height



The drive pinion is positioned too far from the center of the drive gear.

Increase the thickness of the pinion height adjusting shim, and position the drive pinion closer to the center of the drive gear. Also, for backlash adjustment, position the drive gear farther from the drive pinion.

Tooth contact pattern resulting from insufficient pinion height



The drive pinion is positioned too close to the center of the drive gear.

Decrease the thickness of the pinion height adjusting shim, and position the drive pinion farther from the center of the drive gear. Also, for backlash adjustment, position the drive gear closer to the drive pinion.

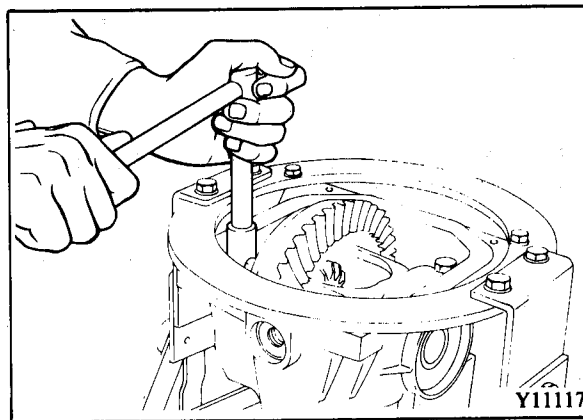
11S642



DISASSEMBLY

Differential Case Assembly

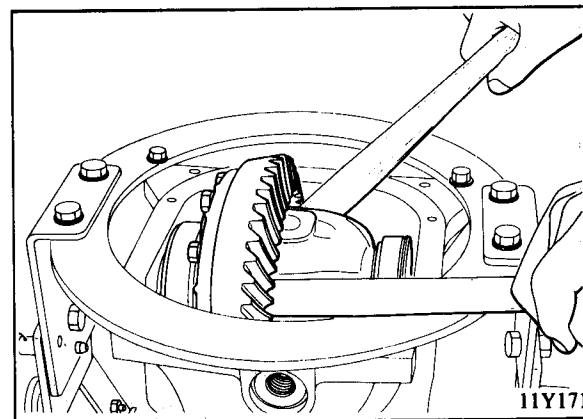
1. Remove the bearing caps.



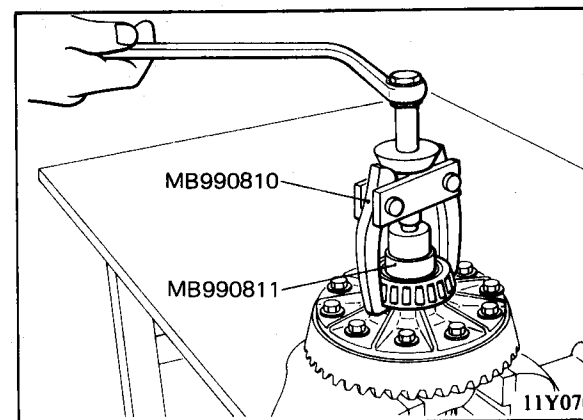
2. Remove the differential case assembly with hammer handles.

NOTE

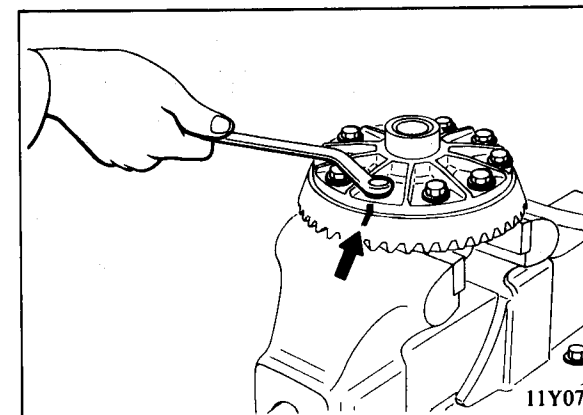
Keep the right and left side bearings, bearing caps and side bearing adjusting spacers separate, so that they do not become mixed at the time of reassembly.



3. Remove the side bearing inner races with the special tools illustrated.

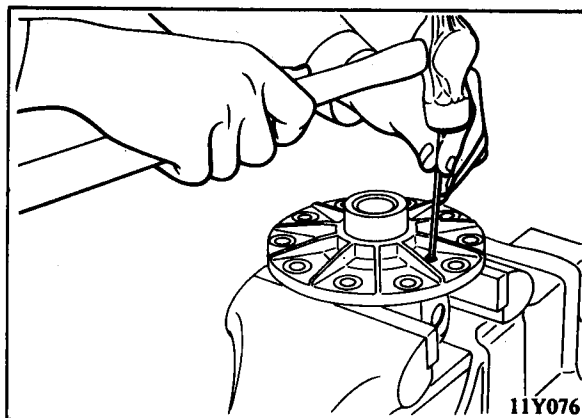


4. Scribe mating marks on the differential case and the drive gear.
5. Loosen the drive gear bolts in diagonal sequence and remove the drive gear.



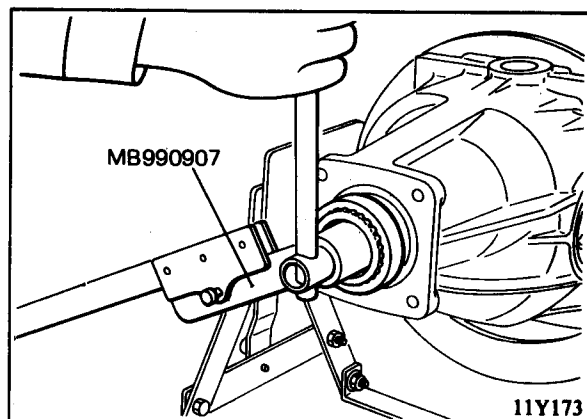


6. Remove the lock pin with a punch.
Then take out the pinion shaft, pinion gears, pinion washers; side gears and side gear thrust spacers.

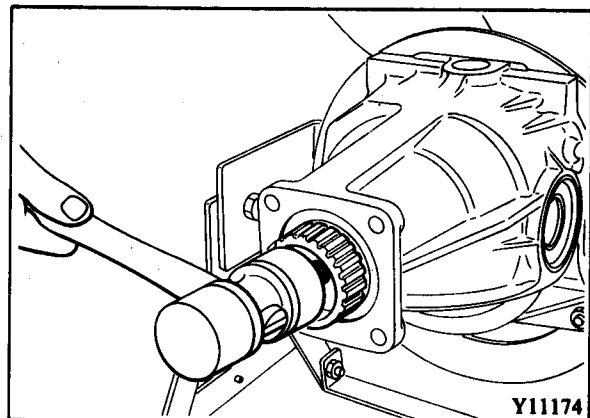


Drive Pinion

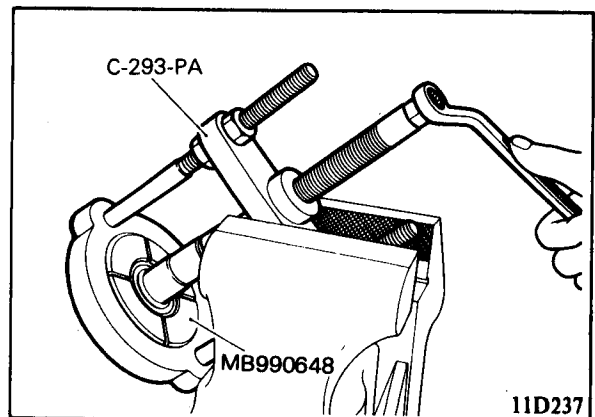
1. Use the special tools illustrated to hold the spline coupling and remove the mounting nut.



2. Scribe mating marks on the drive pinion and spline coupling.
3. Drive out the drive pinion together with the drive pinion spacer and drive pinion front shims.

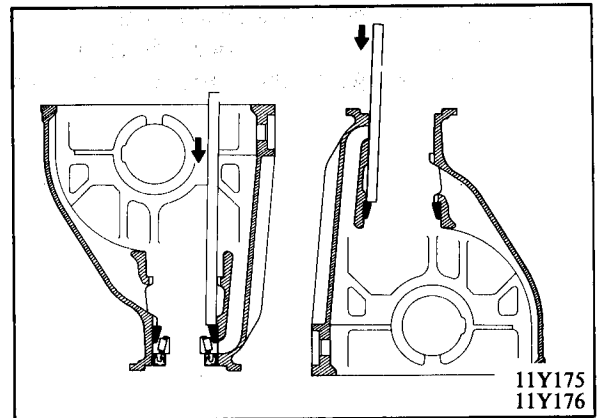


4. Remove the drive pinion rear bearing inner race with the special tools illustrated.

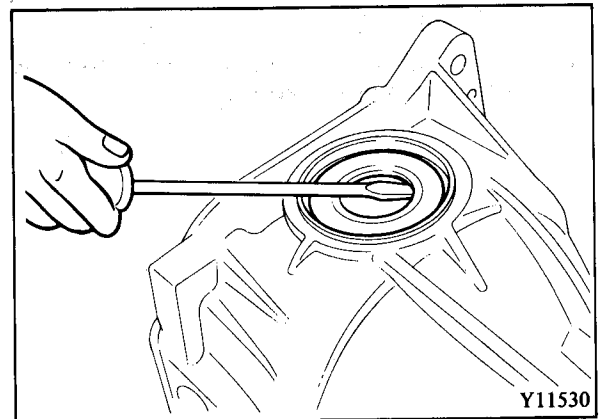




5. Remove the drive pinion front and rear bearing outer races with a bar or drift.



6. Remove the drive shaft oil seal.



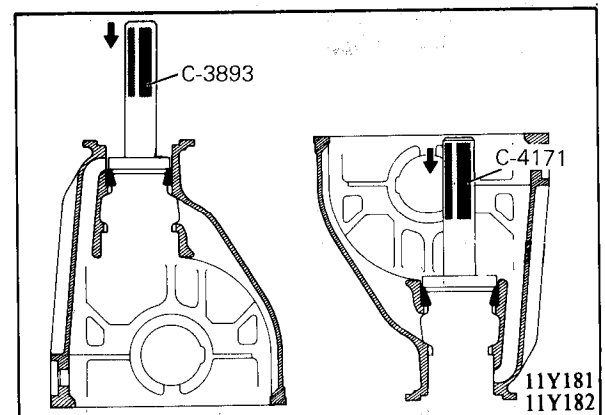
INSPECTION

1. Check the spline coupling for wear or damage.
2. Check the oil seal for wear or deterioration.
3. Check the bearings for wear or discoloration.
4. Check the gear carrier for cracks.
5. Check the drive pinion and drive gear for wear or cracks.
6. Check the side gears, pinion gears and pinion shaft for wear or damage.
7. Check the drive shaft spline for wear.

REASSEMBLY

Drive Pinion

1. Press the drive pinion front and rear bearing outer races into the gear carrier.



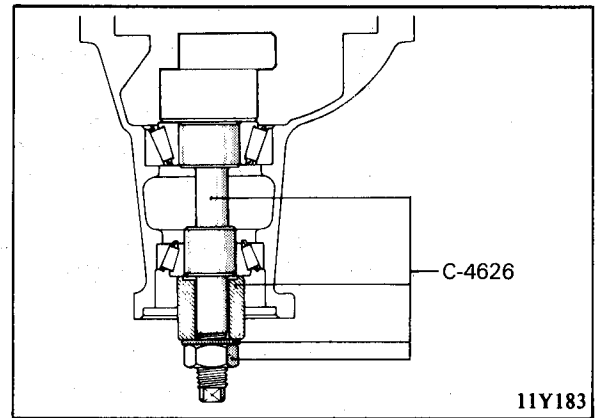


2. Adjust the drive pinion height.

- (1) Install special tool and drive pinion front and rear bearings to the gear carrier.

NOTE

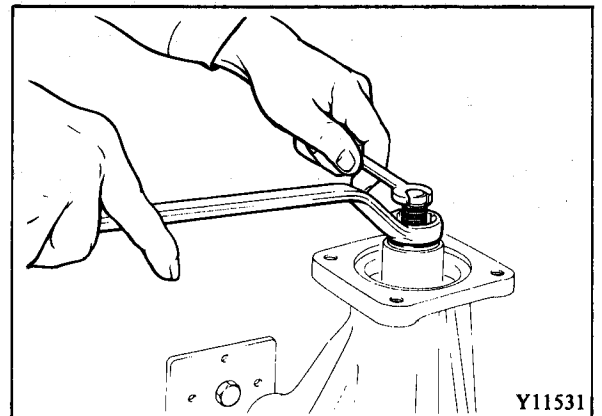
Apply a thin coat of the specified multipurpose grease to the mating face of the washer of the special tool.



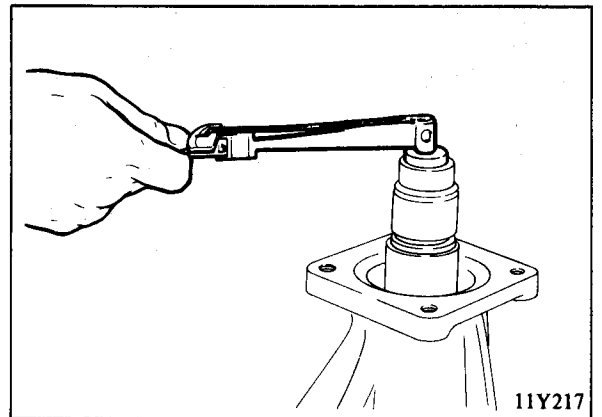
- (2) Tighten the nut of the special tool and measure the drive pinion rotating torque (without the oil seal). (Y11531, 11Y217)

NOTE

It is impossible to give a complete turn to the special tool due to interference with the gear carrier. Therefore, turn the special tool several times within the turning range to have a good fit of the bearing before measurement of the rotating torque. Loosen or tighten the nut as necessary to obtain the specified drive pinion rotating torque.



Drive pinion rotating torque (without oil seal)
 [Standard value] 15–25 Ncm (1.3–2.2 in.lbs.)

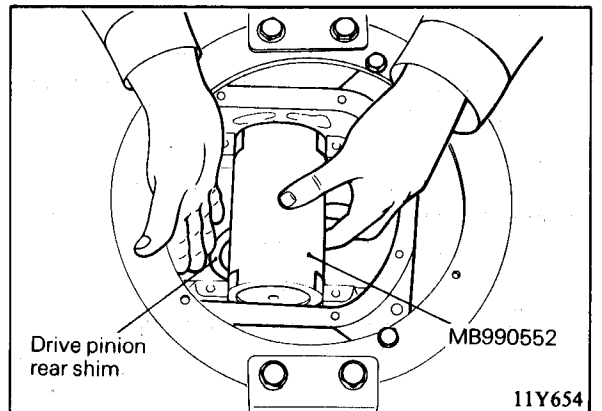


- (3) Position the drum of special tool in the side bearing seat of the gear carrier, and then select a drive pinion rear shim of a thickness which corresponds to the gap between the special tools.

NOTE

Be sure to clean the side bearing seat thoroughly. When positioning the special tool, be sure that the cut-out sections of the special tool are in the position shown in the illustration, and also confirm that the special tool is in close contact with the side bearing seat.

When selecting the drive pinion rear shims, keep the number of shims to a minimum.





- (4) Install the selected drive pinion rear shim(s) to the drive pinion, and press the drive pinion rear bearing to the pinion with special tool. (11D252)
- 3. Adjust the drive pinion rotating torque.
 - (1) Fit the drive pinion front shim(s) between the drive pinion spacer and the drive pinion front bearing inner race.
 - (2) Tighten the spline coupling to the specified torque with special tool (MB990907). (Refer to P. 3-29.)

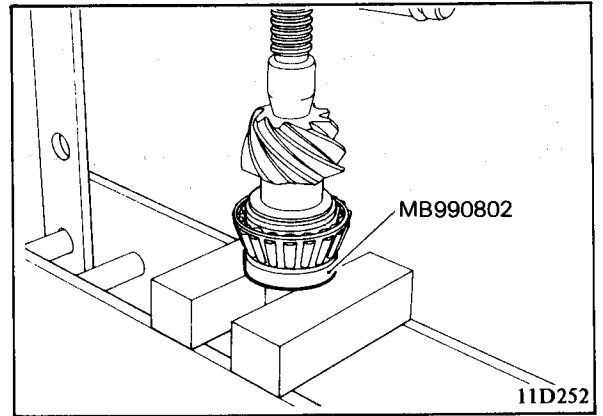
NOTE

Do not install the oil seal at this time.

- (3) Measure the drive pinion rotating torque (without the oil seal). (Refer to P. 3-31.)
- (4) If the drive pinion rotating torque is not within the range of the standard value, adjust the rotating torque by replacing the drive pinion front shim(s) or the drive pinion spacer.

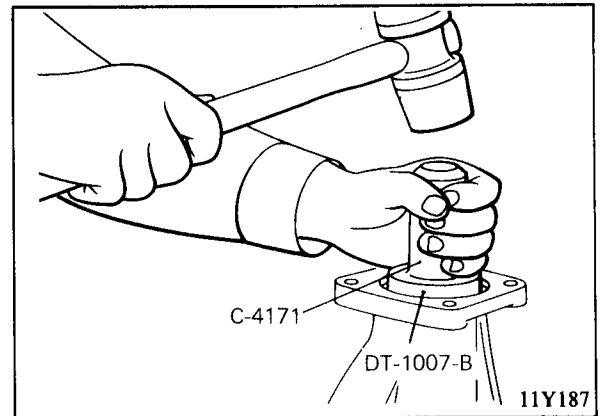
NOTE

Select a thicker drive pinion spacer if necessary to avoid using a large number of shims.



- 4. Remove the spline coupling and drive pinion and drive the pinion seal into place with the special tool. (11Y187)
- 5. Apply specified multipurpose grease to the oil seal lip.

Recommended multipurpose grease
 MOPAR Multi-Mileage Lubricant
 Part Number 2525035 or equivalent

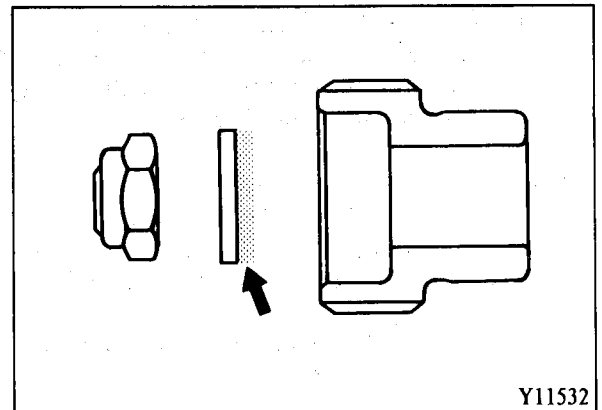


- 6. Install the drive pinion assembly and spline coupling with mating marks properly aligned, and tighten the spline coupling attaching nut to the specified torque with special tool (MB990907). (Refer to P. 3-29.)

NOTE

Apply a thin coat of specified multipurpose grease to the spline coupling contacting surface of the washer before installing drive pinion assembly.

Recommended multipurpose grease
 MOPAR Multi-Mileage Lubricant
 Part Number 2525035 or equivalent





7. Measure the drive pinion rotating torque (with oil seal) to verify that the drive pinion rotating torque complies with the standard value. (Refer to P. 3-31.) If the measured value is not within the standard value range, check for faulty installation of the oil seal or faulty tightening of the self-locking nut.

Drive pinion rotating torque (with oil seal)	
[Standard value]
Vehicles without an intercooler	35 – 45 Ncm (3.0 – 3.9 in.lbs.)
Vehicles with an intercooler	40 – 50 Ncm (3.5 – 4.3 in.lbs.)

8. Measure the spline coupling runout. (Refer to P. 3-25.)
If the spline coupling runout exceeds the service limit, change the phase of the spline coupling and drive pinion after disassembling the differential carrier and drive pinion after disassembling the differential carrier and measure the runout once again.

Differential Case Assembly

1. Assemble the side gears, side gear thrust spacers, pinion gears, and pinion washers into the differential case.

NOTE

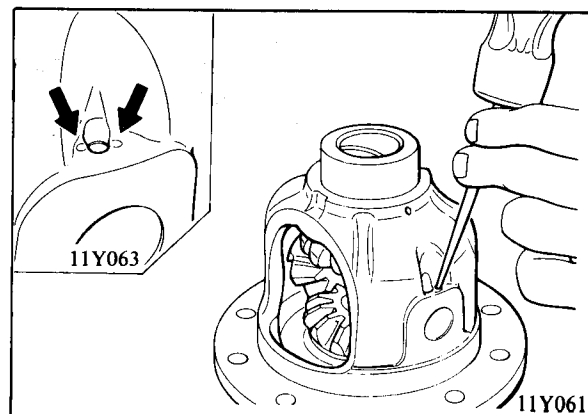
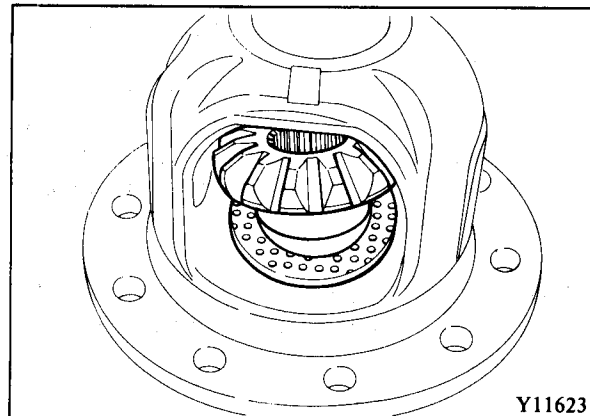
Install the side gear thrust spacers with their oil grooves facing the side gears.

2. Install the pinion shaft.

NOTE

Do not drive in the lock pin at this time.

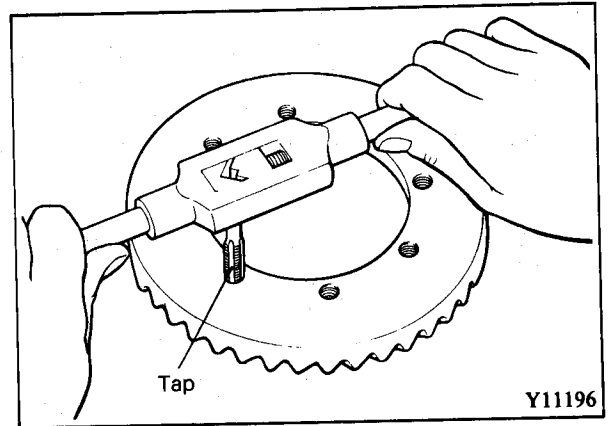
3. Adjust the differential gear backlash.
 - (1) Insert a wedge between the side gear and the pinion shaft to lock the side gear.
 - (2) Measure the differential gear backlash with a dial indicator. (Refer to P. 3-25.)
 - (3) If the differential gear backlash exceeds the repair limit, adjust the backlash by installing thicker side gear thrust spacers.
 - (4) Measure the differential gear backlash once again, and confirm that it is within the repair limit.
4. Align the pinion shaft lock pin hole with the differential case lock pin hole, and drive in the lock pin.
5. Stake the lock pin with a punch at two points. (11Y061)





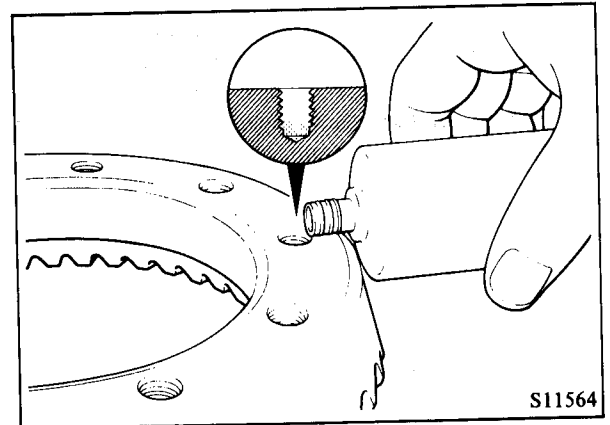
COMPONENT SERVICE — CONVENTIONAL DIFFERENTIAL

6. Clean the drive gear attaching bolts and remove the adhesive from the threaded holes of the drive gear with a M10 × 1.25 tap. Clean the threaded holes with compressed air.



7. Apply LOCTITE 270 or 271 to the threaded holes of the drive gear. (S11564)
8. Install the drive gear onto the differential case with the mating marks properly aligned. Be sure to tighten the bolts to the specified torque in a diagonal sequence.

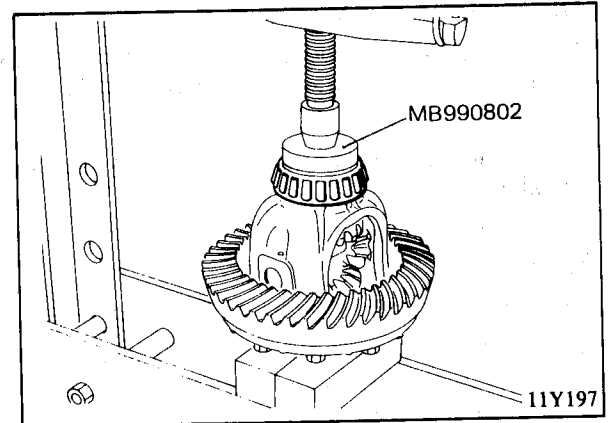
Drive gear bolt tightening torque
80–90 Nm (58–65 ft.lbs.)



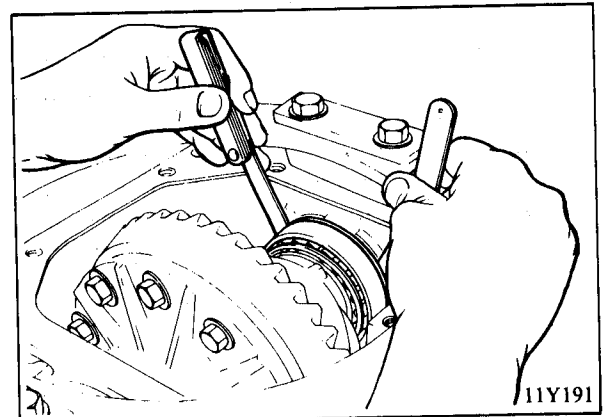
9. Press the side bearings to the differential case with the special tool. (11Y197)
10. Adjust the final drive gear backlash.
(1) Install side bearing adjusting spacers which are thinner than those removed, to the side gear bearings, and then install the differential case assembly into the gear carrier.

NOTE

Select side bearing adjusting spacers with the same thickness for both the drive pinion side and the drive gear side.

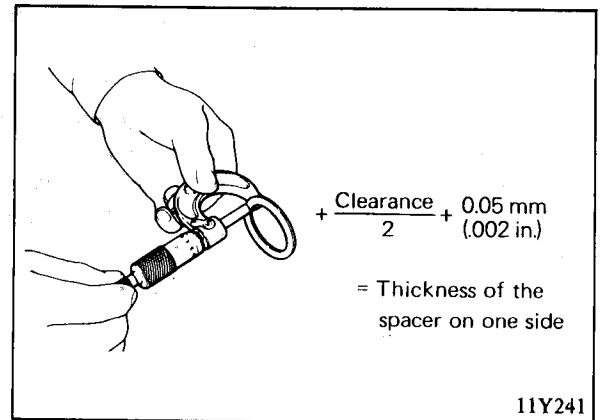


- (2) Push the differential case assembly to one side, and measure the clearance between the gear carrier and the side bearing adjusting spacer with two feeler gauges. (11Y191)

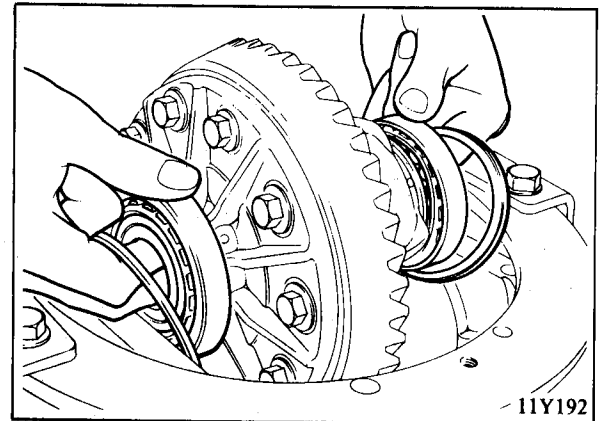




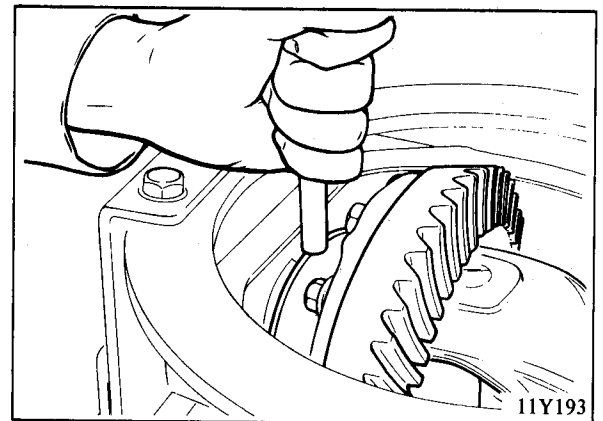
- (3) Measure the thickness of the side bearing adjusting spacers on one side, select two pairs of spacers which correspond to that thickness plus one half of the clearance plus 0.05 mm (.002 in.), and then install one pair each to the drive pinion side and the drive gear side.



- (4) Install the side bearing adjusting spacers and differential case assembly, as shown in the illustration, to the gear carrier.

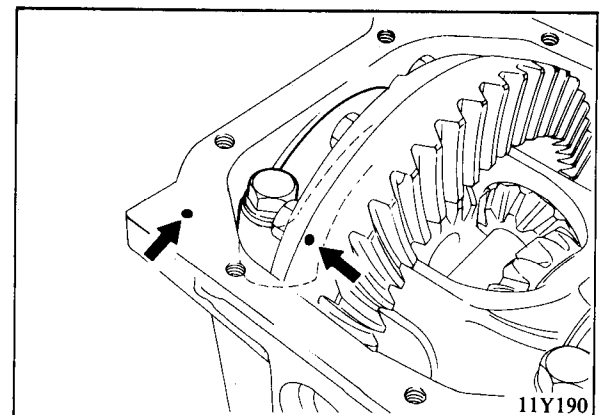


- (5) Tap the side bearing adjusting spacers with a brass bar to fit them to the side bearing outer race.



- (6) Align the mating marks on the gear carrier and the bearing caps, and then torque the bearing caps. (11Y190)

- (7) Measure the final drive gear backlash. (Refer to P. 3-25.)

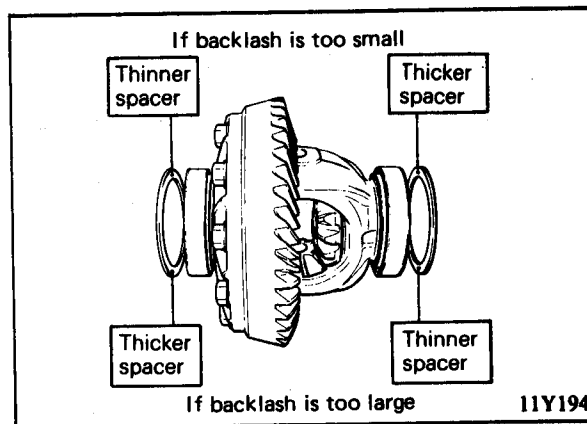




- (8) If necessary, change the side bearing adjusting spacers as illustrated, and recheck backlash.

NOTE

Be sure to change the side bearing adjusting spacers on the drive pinion side and on the drive gear side so that the total thickness is equal to that obtained from the calculation in item (3). When selecting the side bearing adjusting spacers, keep the number of spacers to a minimum.



- (9) Check the drive gear and drive pinion for tooth contact. If poor contact is evident, make adjustment. (Refer to P. 3-26.) Then remeasure the backlash to verify that the backlash complies with the standard value.

NOTE

There is a correlation between the backlash and tooth contact of the drive gear. Coordinate their adjustment, while checking both, until both are within specifications. If correct adjustment cannot be made by only moving the drive gear sideways, adjustment of the drive pinion height is required.

11. Measure the drive gear runout. (Refer to P. 3-25.) If the drive gear runout exceeds the repair limit, reinstall by changing the phase of the drive gear and differential case, and remeasure.

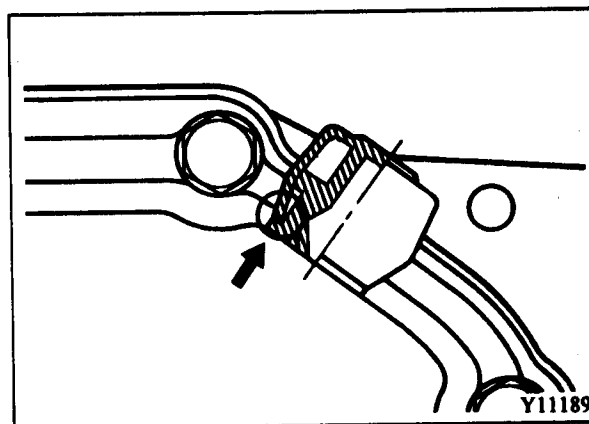
INSTALLATION

1. When installing the vent plug, apply semi-drying sealant to the mating surfaces of the vent plug and the cover.

Caution

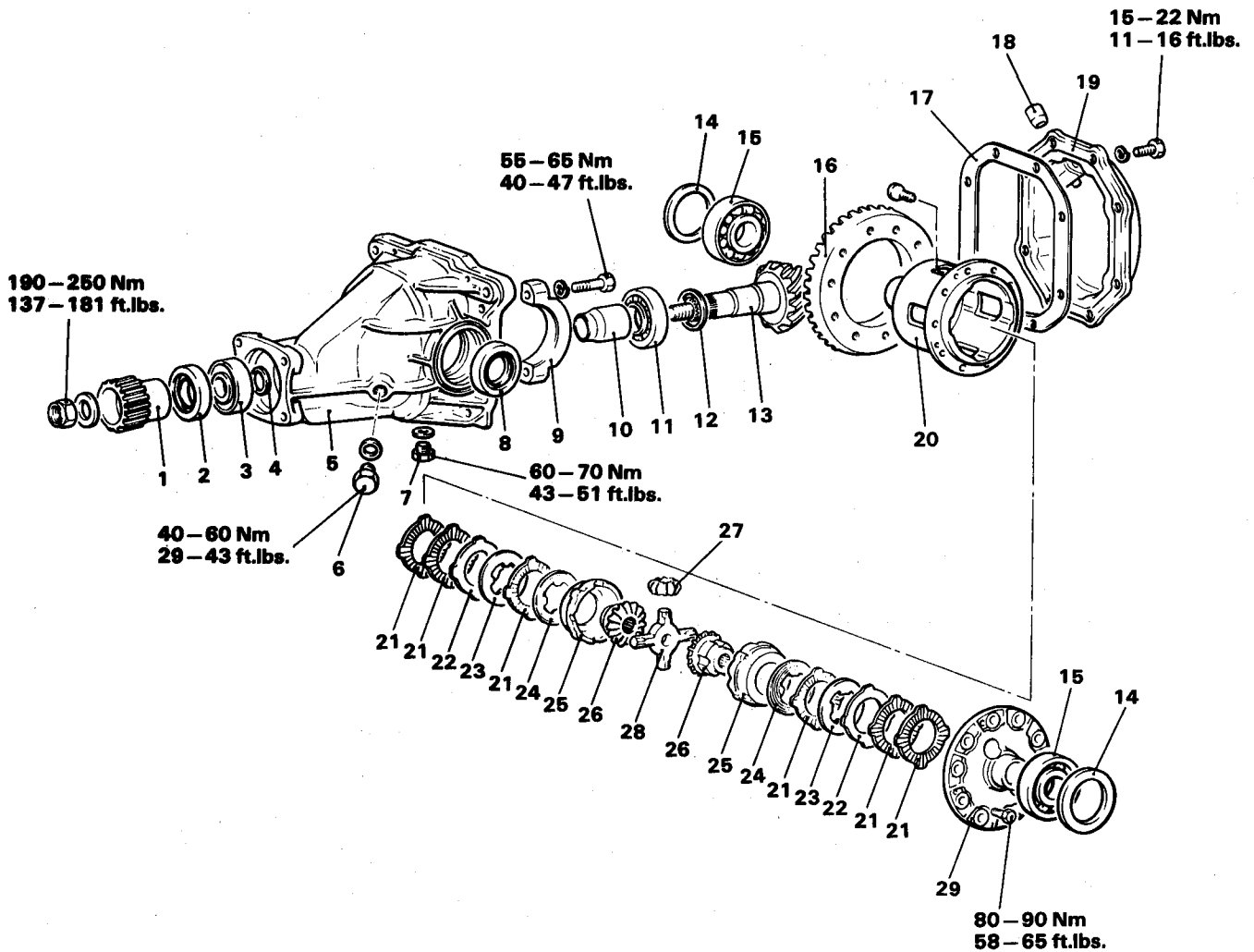
Do not apply sealant to the part shown in the illustration. (Y11189)

2. Apply semi-drying sealant to both sides of the gasket, and then install the cover.





COMPONENTS



- | | |
|--|---------------------------|
| 1. Spline coupling | 15. Side bearing |
| 2. Oil seal | 16. Drive gear |
| 3. Drive pinion front bearing | 17. Gasket |
| 4. Drive pinion front shim
(for preload adjustment) | 18. Vent plug |
| 5. Gear carrier | 19. Cover |
| 6. Level plug | 20. Differential case (B) |
| 7. Drain plug | 21. Friction plate |
| 8. Oil seal | 22. Spring plate |
| 9. Bearing cap | 23. Spring disc |
| 10. Drive pinion spacer | 24. Friction disc |
| 11. Drive pinion rear bearing | 25. Pressure ring |
| 12. Drive pinion rear shim
(for pinion height adjustment) | 26. Side gear |
| 13. Drive pinion | 27. Pinion gear |
| 14. Side bearing adjusting spacer | 28. Pinion shaft |
| | 29. Differential case (A) |

11Y668



OUTLINE

A differential slip device is a kind of anti-slipping device which functions as a differential during cornering to turn the outer wheel at a faster revolution speed than the inner wheel. In the event that one wheel begins spinning (driving on slippery road surfaces, one wheel leaves the road surface, etc.), it automatically functions to prevent such spinning.

The only component of the limited slip differential that differs from a conventional differential is the differential case assembly. Therefore, the basic operation procedures for the following points are the same as those for a conventional differential. Refer to the following items.

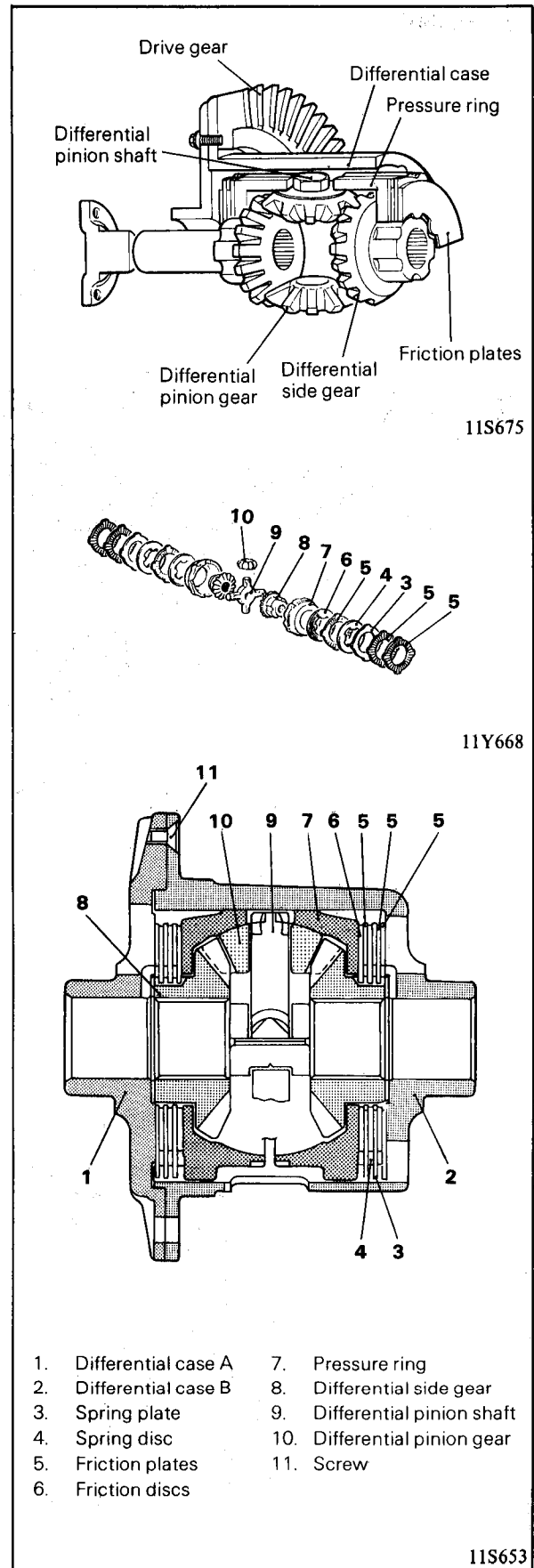
INSTALLATION and REMOVAL of the DIFFERENTIAL CARRIER ASSEMBLY. (Refer to P. 3-24 and 36.)

INSPECTION BEFORE DISASSEMBLY of the Final Drive Gear Backlash, Drive Gear Runout, Spline Coupling Runout and Final Drive Gear Tooth Contact. (Refer to P. 3-25.)

DISASSEMBLY, INSPECTION and REASSEMBLY of the Drive Pinion. (Refer to P. 3-29 and 30.)

CONSTRUCTION AND FUNCTION

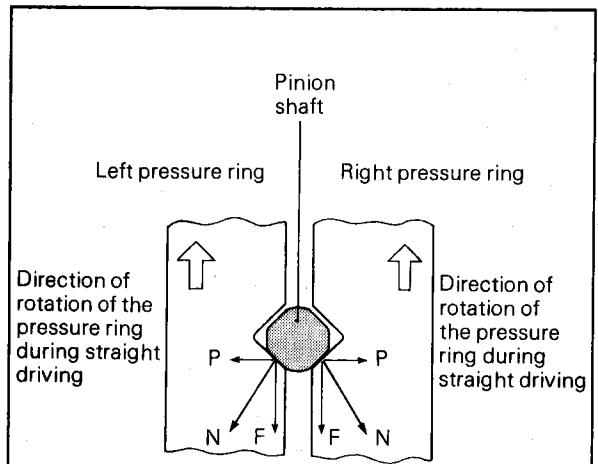
With a conventional differential, in the event that one wheel of the vehicle is on ice, mud, or some other slippery surface, the wheel will spin and the drive force of the vehicle will be greatly reduced. If this happens, the speeds of the differential case and of the side gear (axle shaft) are different because of differential operation. The limited slip function acts to limit this differential operation. The construction is shown in the illustration. The multi-plate clutches engage with the differential case and with each of the differential side gears. If spinning causes a difference in component speeds, the frictional force between the clutch plates will cause the speed of the differential side gear to become closer to that of the differential case, and thus the limited slip function will control the spinning. In addition, the purpose of the pressure rings inside the differential case is to transmit the driving force to the pinion gear, and the reason for the separation is to provide an increase in the clutch plate pressing force through the leverage of the pinion shaft.





OPERATION (TORQUE TRANSMISSION) DURING STRAIGHT DRIVING

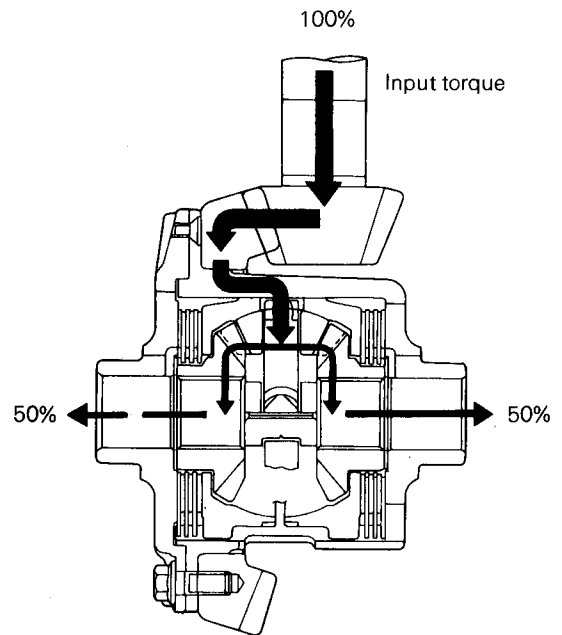
When the differential case is turned the drive pinion via the ring gear, the pressure rings which are interlocked with the differential case will also turn at the same speed. (The projections located on the outside of the pressure rings engage (with some play) the grooves located on the inside of the differential case.) When the pressure rings move in the direction of rotation, they contact the tapered portion of the differential pinion shaft, and thereby receive reaction force in both the lateral direction and the direction of rotation. The reaction force in the lateral direction presses the clutch plates together, and maintains straight driving. During such driving, because the road surface gives equal resistance to both the left and right wheels, equal resistance is applied to the left and right differential side gears. Therefore, the differential pinion gear does not revolve, and the ring gear, the differential case, the differential pinion shaft, the differential pinion gear, and the left and right differential side gears all turn as one unit.



Reaction force symbol code
 P = Force of the pressure rings on the clutch plates
 F = Force of the pressure rings on the pinion shaft
 N = Resultant force of P + F

11F108

Distribution of the reaction force of the pressure rings



Transmission of torque (during straight driving)

11S652



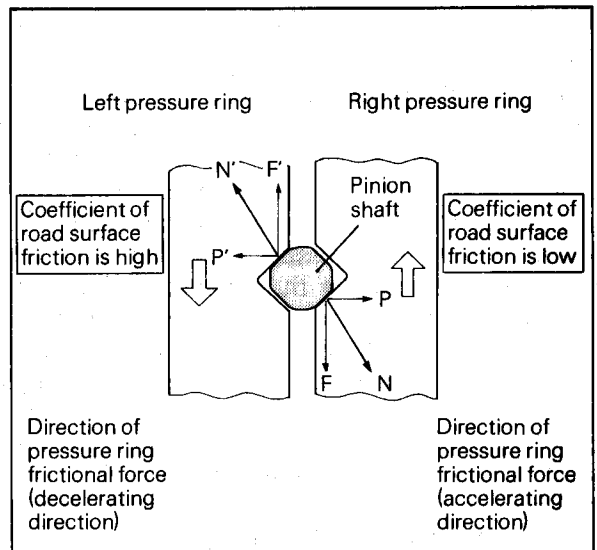
OPERATION (TORQUE TRANSMISSION) WHEN THE SPEEDS OF THE LEFT AND RIGHT WHEELS ARE DIFFERENT

When one wheel is in contact with a concrete road surface (which has high coefficient of friction) and the other wheel is in contact with a muddy or other slippery road surface (which has low coefficient of friction), the differential operation will cause the speed of the wheel in contact with the slippery surface to be faster than the speed of the ring gear, lowering the maximum drive force. If this occurs, the limited slip function will control the differential operation and increase the driving force. The transmission of torque through the limited slip device in this event is as follows:

When the differential case is turned by the ring gear and the drive pinion, the pressure rings which are interlocked with the differential case will turn at the same speed. Also, the difference in the road surface resistances will cause differential operation and the left and right side gears will revolve at speeds different from that of the differential case. Because of the friction produced between the clutch plates in mesh with both the differential side gear and differential case, one of the pressure rings increases its rotating speed, whereas the other reduces its rotating speed. The pressure rings press the tapered portion of the differential pinion shaft with which they are in contact, and thereby receive reaction force in both the lateral direction and the direction of rotation. The reaction force in the lateral direction causes the clutch plates to mesh, increasing the frictional and the drive force.

FEATURES OF THE LIMITED SLIP DIFFERENTIAL

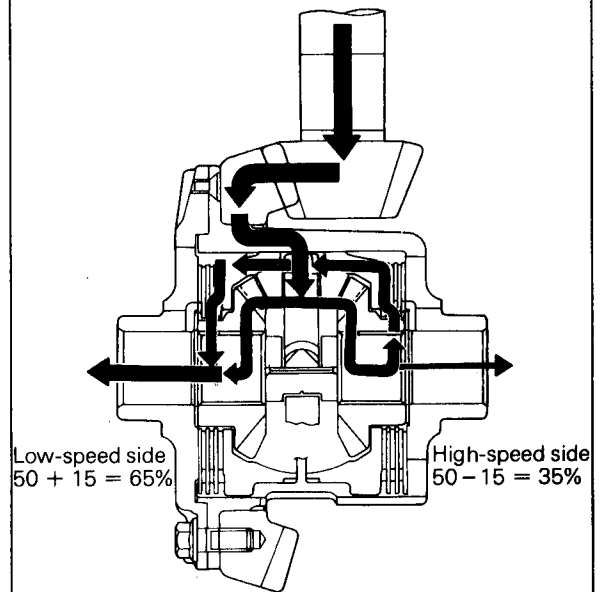
When one wheel of the vehicle is in contact with a road surface which has poor traction, the limited slip differential, in comparison to a conventional differential, supplies additional torque to the wheel which has the better traction conditions by utilizing clutch plates, thus improving the traction capacity. Moreover, the effect of the limited slip differential is to prevent the vehicle from becoming stuck, even if the traction of one of the wheels becomes radically reduced.



Distribution of the reaction force of the pressure rings when there is a difference in the turning speed between the left and right wheels

11F109

- Opposing force symbol code
 P, P' = Pressing force of the pressure rings on the clutch plates
 F, F' = Pressing force of the pressure rings on the pinion shaft
 N, N' = Resultant force of P + F and P' + F'



Transmission of torque (when the revolution speeds of the left and right wheels are different)

11W511



When one wheel moves from a road surface which has poor traction onto one which has good traction, or when the wheels are constantly leaving the road surface while driving on a rough, bumpy road, the clutch plates of the limited slip differential allow the torque to absorb the differences between the revolution speeds of the right and left wheels. In addition, the sudden changes (jolting) in the drive force are also absorbed, thus preventing skidding.

Because in the limited slip differential, the differential operation is slightly restricted during normal cornering, the understeer tendency (the tendency for the cornering of the vehicle to exceed the turning of the steering wheel) becomes greater; however, this does not have any detrimental effect on the driving of the vehicle. Moreover, in the event that the inside wheel lifts up (the tire leaves the road surface) during high-speed cornering, the clutch plates function to limit differential operation which would simultaneously decrease the drive force of the outside wheel; therefore, the limited slip differential moderates sudden speed reductions during vehicle cornering, and thereby provides greater cornering capability than a conventional differential.

MAKING EFFECTIVE USE OF A LIMITED SLIP DIFFERENTIAL

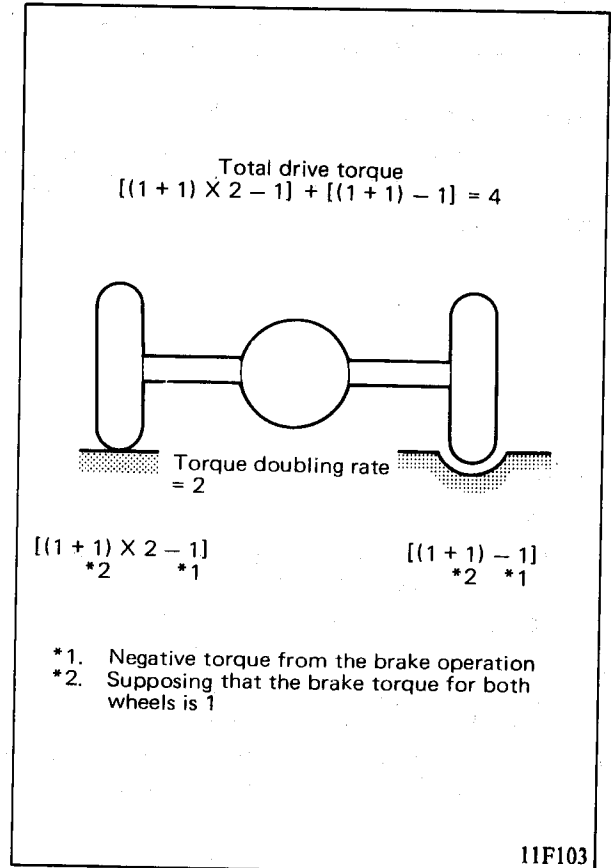
Effective Use in Combination with the Brakes

If a wheel is in contact with a slippery road surface and has begun to spin, using the brakes in combination with the limited slip differential will provide even greater traction capability. The resistance caused by the brakes will further increase the drive torque of the engine, and this increased torque will increase the clutch plate pressing force of the pressure ring, thus increasing the traction. Also, the drive force transmitted to the brakes will not function as real drive force.

This is shown in the illustration at right.

In the illustration at the right, the application rate is $R_t = 2$, and, supposing the torque from the brake operation is 1, a drive torque of $1 + 1 = 2$ will be applied to the spinning wheel (the right wheel), and a drive torque of twice that which is applied to the spinning wheel, or $(1 + 1) \times 2 = 4$, will be applied to the wheel which is not spinning (the left wheel). However, because the brake force of 1 is a negative value with regard to the propulsion torque of each wheel, the propulsion torque actually obtained by the right wheel is $(1 + 1) - 1 = 1$, and that obtained by the left wheel is $[(1 + 1) \times 2 - 1] = 3$.

Therefore, the total drive torque is $1 + 3 = 4$. In the same circumstances, the total drive torque of a conventional differential is $1 + 1 = 2$, and that of a limited slip differential when the brakes are not used in combination is $1 + 2 = 3$. This represents an increase in the traction by a factor of 2 over that of a conventional differential, and by a factor of 1.3 over that of a limited slip differential when the brakes are not used.





NOTES REGARDING SERVICE PROCEDURES FOR THE LIMITED SLIP DIFFERENTIAL

The engine must never be operated while only a single wheel is jacked up. Doing so is extremely dangerous; if the differential functions while the engine is operated at high speed, the oil film between the clutch plates will decrease, thus causing the friction coefficient to increase, the prescribed torque ratio will be exceeded, an excessive amount of torque will be applied to the stationary wheel, and the vehicle will move forward. Also, resistance must never be applied to the spinning wheel.

In the event that one of the wheels comes in contact with a slippery road surface and begins to spin, if the engine continues to be operated at high speed for too long, the clutch plates might become abnormally worn; such action must be avoided.

Use only specified gear oils. These oils have been developed exclusively for use in the limited slip differential and they differ from ordinary gear oil. When changing the oil, the oil which is removed will appear considerably blacker than ordinary oil. This, however, is not a change in color due to the deterioration of the oil, but rather the oil has become mixed with worn particles of the special treatment on the clutch plates.

Caution

Installation of compact spare tire on one rear wheel will constantly operate the limited slip differential, resulting in early wear of the clutch plates inside the differential. When the compact spare tire is used on one rear wheel, replace it with a standard tire as soon as possible.

REMOVAL/INSPECTION BEFORE DISASSEMBLY

For information concerning REMOVAL/INSPECTION BEFORE DISASSEMBLY (except for differential gear backlash), refer to P. 3-24 and P. 3-25.

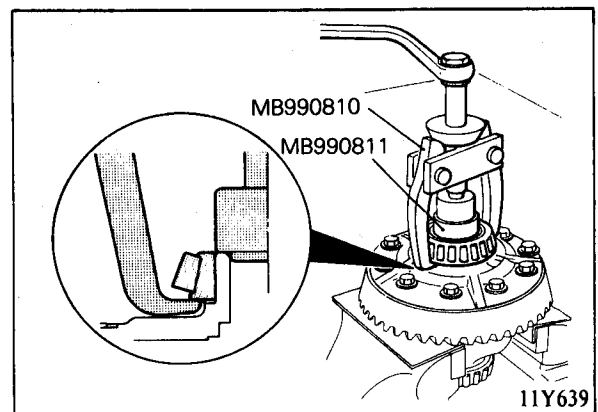
DISASSEMBLY

Differential Case Assembly

1. Remove the differential case assembly from the gear carrier. (Refer to P. 3-28.)
2. Remove the side bearings with the special tools.

NOTES

1. Attach the right and left wheel bearings separate in order to be able to distinguish them for reassembly.
2. Keep the right and left wheel bearings separate in order to be able to distinguish them for reassembly.

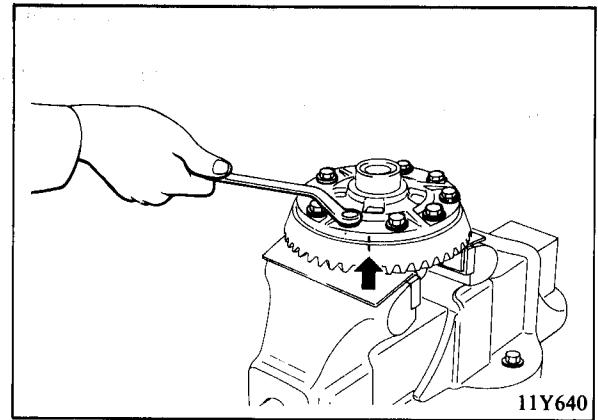




3. Make mating marks on the case and the drive gear and remove the drive gear bolts in diagonal order. (11Y640)
4. Remove the drive gear.

NOTE

An anti-looseness agent has been used on the bolts. If they cannot be loosened, heat the area to approximately 150°C (302°F) with a propane torch, and then loosen them.



5. Loosen the screws of differential cases A and B evenly, a little at a time. (11Y641)
6. Separate differential case A from differential case B.

NOTE

Before disassembling the differential cases, confirm that the mating marks (numbers) on case A and case B are the same.

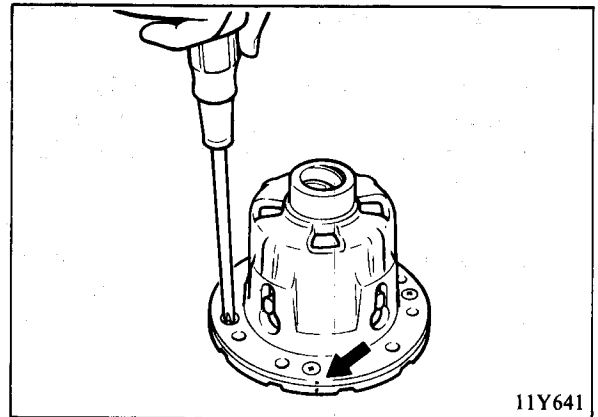
7. Remove the components from differential case B.

NOTE

Keep the right and left thrust washers, spring plates, spring discs, friction plates, and friction discs separate in order to be able to distinguish them for reassembly.

Drive Pinion

Refer to P. 3-29 for information concerning drive pinion DISASSEMBLY.



INSPECTION AND REPAIR

Wash the disassembled parts in cleaning solvent and dry them with compressed air, then check the following areas.

NOTE

For INSPECTION information other than the given below, refer to P. 3-30.

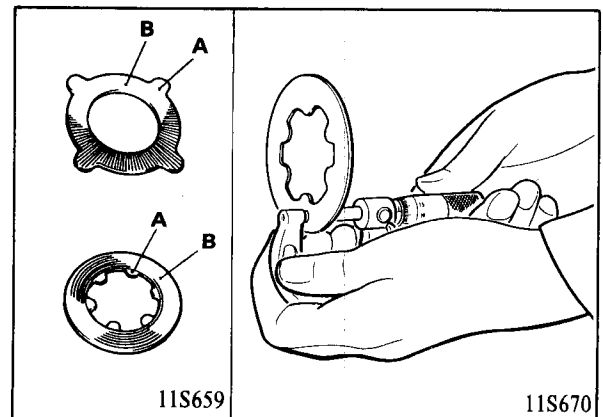
Inspection of Friction Plates and Discs for Wear

1. In order to check the wear, use a micrometer to measure the thicknesses of the friction surfaces (B) and projections (A) of the friction discs and plates, and then find the difference.
(The same procedure is used for the spring discs and the spring plates.) (11S670)

Clutch plate thickness [Limit]
0.1 mm (.004 in.) or less

NOTE

Make the measurement at several different points.



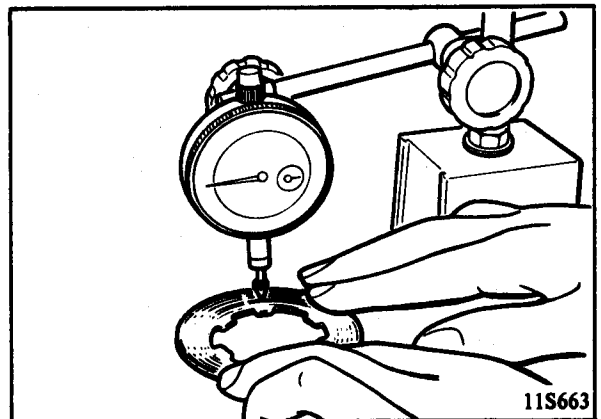


2. If the parts are worn beyond the allowable limit, replace them with new parts.
Refer to the section regarding adjustments for information concerning selection of thickness.

Inspecting the Flatness of the Friction Plates and Friction Discs

1. Place the friction plates and friction discs on a surface plate and position a dial gauge as shown in the illustration.
2. Turn the friction plates and friction discs and measure their flatness.

Flatness deviation of the friction plates and friction discs [Limit] 0.08 mm (.003 in.) or less





Inspection of Contact and Sliding Surfaces of Parts

1. Inspect the clutch plates and pressure rings.
 - (1) The friction surfaces of the friction plates, friction discs, spring plates, and spring discs.
If there are any signs of seizure, severe friction, or color change from heat, the locking performance will be adversely affected. Replace the part with a new one.

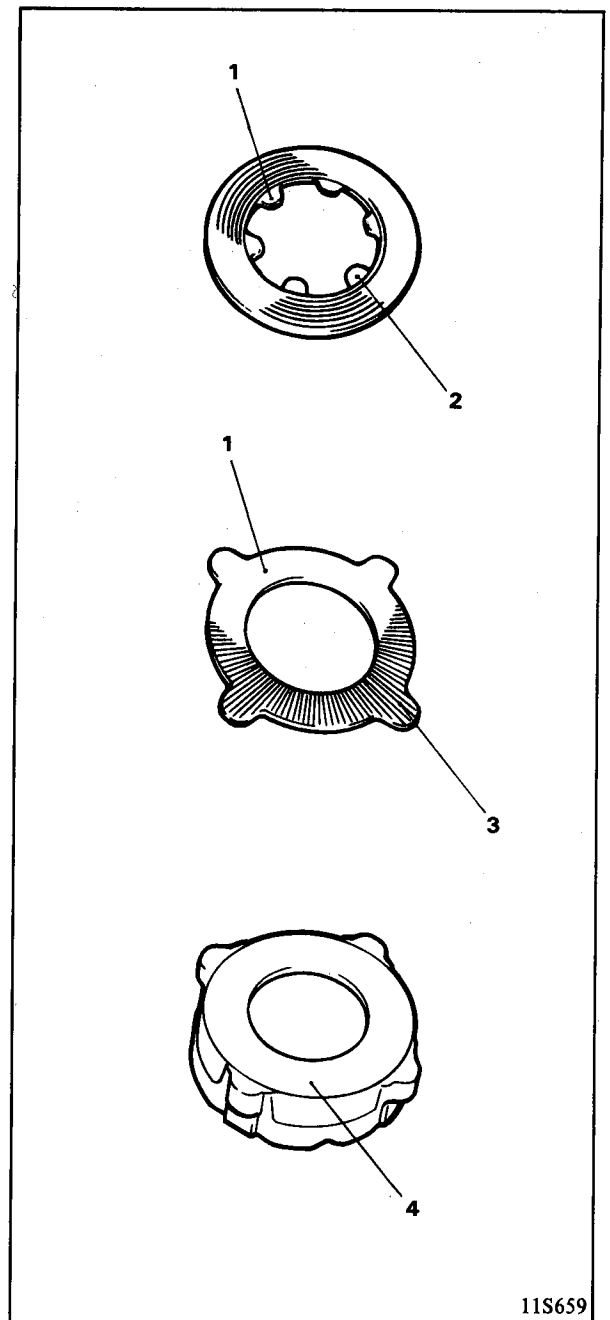
NOTE

The strong contact on the inner circumference of the friction surfaces is because of the spring plate and the spring disc; this wear is not abnormal.

- (2) The six projections on the inner circumference of the friction disc.
Nicks or dents will cause abnormalities in the clutch pressure; if present, repair with an oil stone, or replace the parts if necessary.
- (3) The four projections on the outer circumference of the friction disc.
Nicks and dents will cause abnormalities in the clutch pressure; if present, repair with an oil stone, or replace the parts if necessary.
- (4) The friction surface of the friction disc of the pressure ring.
If there are nicks or scratches, repair by first grinding with an oil stone and then polishing with rubbing compound on a surface plate.

NOTE

The strong contact on the inner circumference of the friction surface is because of the spring plate and the spring disc; this wear is not abnormal.

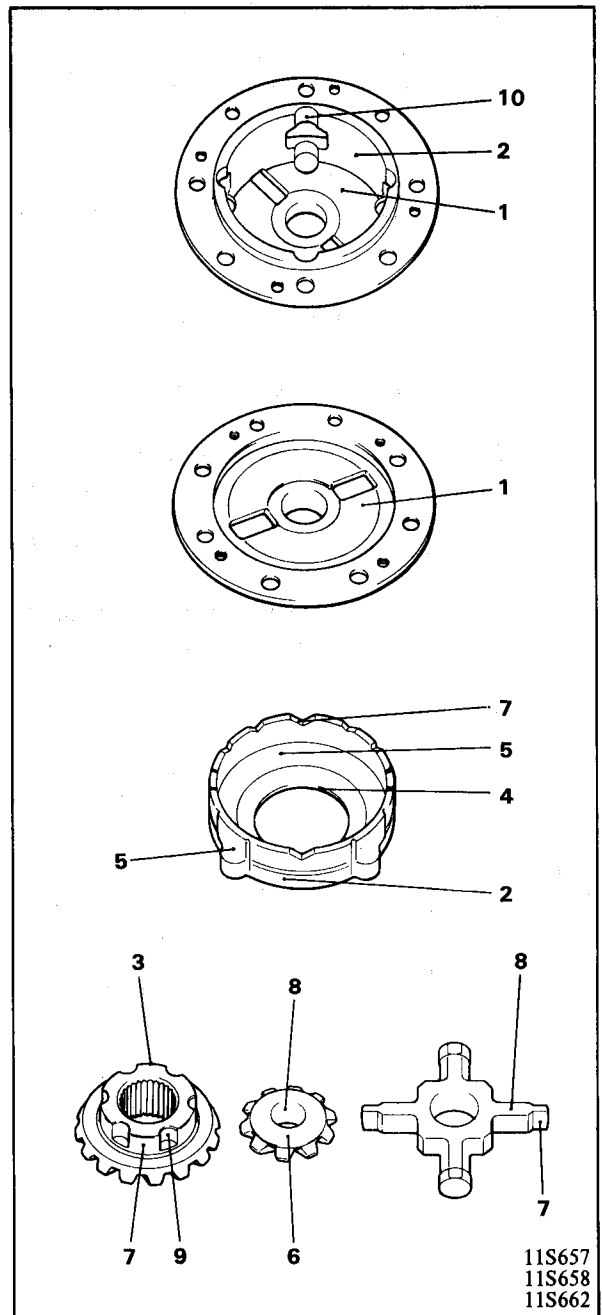


11S659



COMPONENT SERVICE — LIMITED SLIP DIFFERENTIAL

2. Inspect the contact and sliding surfaces listed below, and repair any nicks and burrs with an oil stone.
- (1) The spring contacting surface of the differential case.
 - (2) The contact surfaces of the outer circumference of the pressure rings and the inner circumference of the differential case.
 - (3) The sliding surface of the thrust washers.
 - (4) The sliding surfaces of the hole in the pressure rings and the outer circumference of the side gears.
 - (5) The projections on the outer circumference of the pressure rings.
 - (6) The spherical surface of the differential pinion gears and the inner diameter of the pressure rings.
 - (7) The V-shaped groove in the pressure rings, and the V-shaped part in the pinion shaft.
 - (8) The outer diameter of the pinion shaft and the hole in the differential pinion gears.
 - (9) The outer circumference groove of the side gears.
 - (10) The inner circumference groove of the differential case.





REASSEMBLY

Drive Pinion

For information concerning drive pinion REASSEMBLY, refer to P. 3-30.

Differential Case Assembly

1. Before assembly, use the following method to adjust the dimensional differences of the clearance between the clutch plates and differential case when installing the internal components into the differential case.

(1) Measurement of differential case depth

Depth of the differential case: A

$$A = E - F + G$$

(2) Measurement of spring disc and spring plate thickness
Measure the thickness using a micrometer, with the spring disc and spring plate both extended in the same direction and one placed over the other. Arrange them so that the difference between right and left is minimized.

Right side: L_r

Left side: L_l

(3) Measurement of friction disc and friction plate thickness

In the same way as described the above, combine the two friction discs and the two friction plates, as shown in the illustration, so that the difference in thickness is minimized.

Right side: K_r

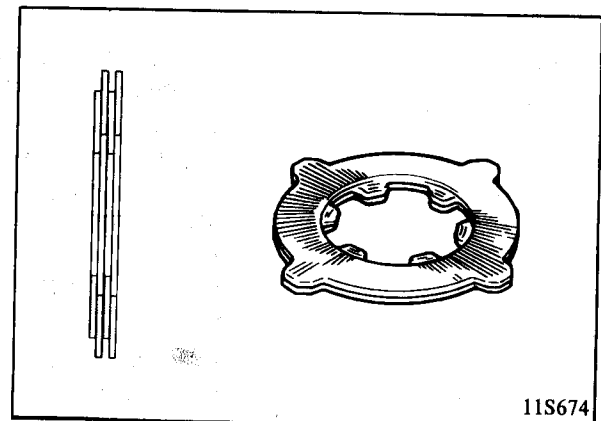
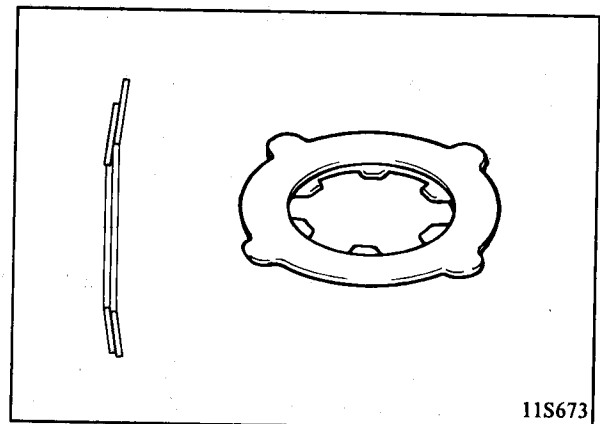
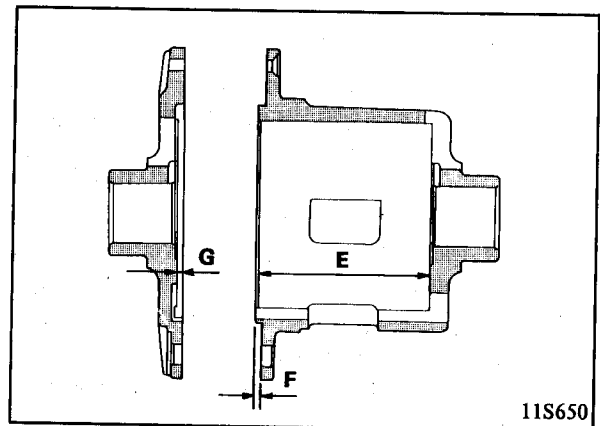
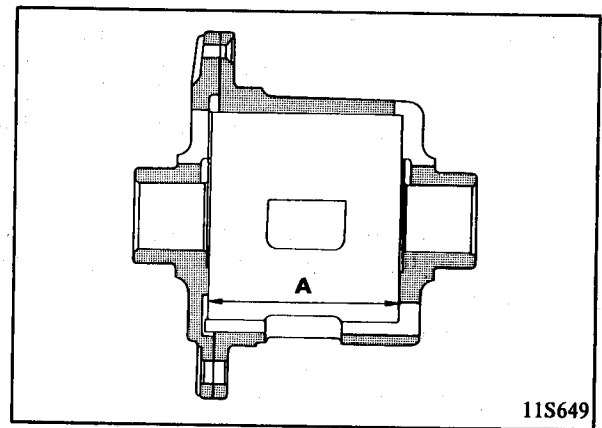
Left side: L_l

(4) Measure the thicknesses of the left and right clutch plate assemblies and obtain the difference between the two. The clutch plate assembly thickness is the thickness of the assembly of the spring disc, spring plate, friction disc, and friction plate.

Difference between total thicknesses of left and right clutch plates:

$$(L_r + K_r) - (L_l + K_l)$$

Difference between total thicknesses of left and right clutch plates [Standard value]
0.05 mm (.002 in.) or less





- (5) Assemble the right and left friction plates, friction discs, differential pinion shafts, and pressure rings, and then measure the total width, as shown in the illustration. Consider this to be "B". (11S665)

NOTE

Measure the distance between the clutch plates on a line with the V-shaped groove in the pressure ring while pressing from both sides so that the groove is securely pressed against the pinion shaft.

All parts should be dry.

- (6) Measure the clearance "S" between the clutch plate and the differential case.

Clearance between the clutch plate and the differential case:

$$A - (B + L_r + L_l)$$

Clearance between the clutch plate and the differential case [Standard value]
0.06–0.20 mm (.002–.008 in.)

- (7) If the difference "S" between the depth "A" of the differential case and the overall width "B" obtained previously plus the spring plate and spring disc assembly thickness is not within the range of the standard value, replace the friction discs to adjust.

NOTE

Be careful not to mix the types of clutch plates selected for the right and left sides.

- The directions for assembly is as shown in the illustration. (11F128)
- Be careful not to insert the clutch plates in the incorrect order or to install the spring plate and spring disc in the wrong direction.

NOTE

Be sure that mating marks on the differential cases are matched.

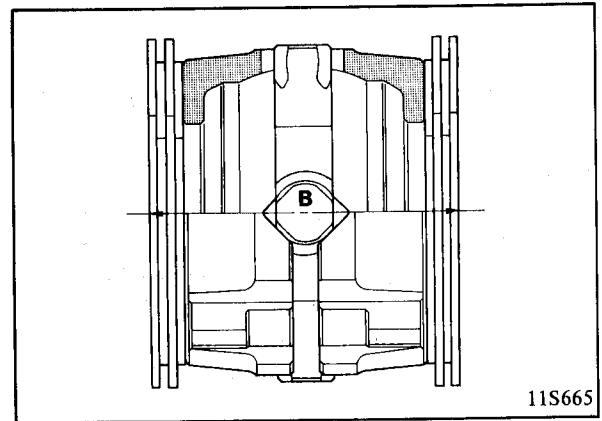
- After assembly, in order to check the frictional force of the clutch plates, use the special tools to measure the drive pinion starting torque. (11S684)

NOTE

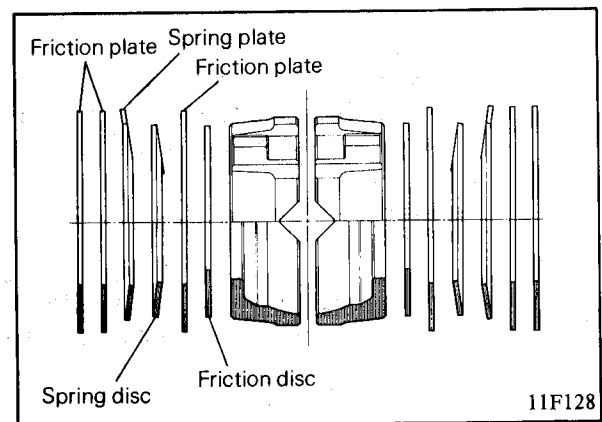
Rotate the unit slightly before measuring the drive pinion starting torque and measure while the unit is rotating.

Limited slip differential preload [Standard values]
When equipped with new clutch plates
49–78 Nm (36–58 ft.lbs.)
When equipped with old clutch plates
34–78 Nm (25–58 ft.lbs.)

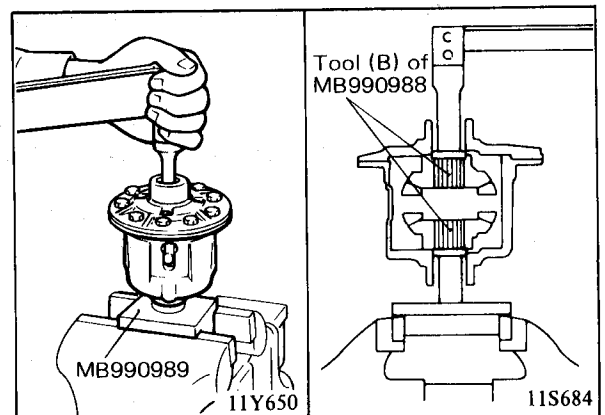
- For information following this, from the assembly of the drive gear to the adjustment of the final drive gear runout, refer to P. 3-33.



11S665



11F128



11Y650

11S684