
REAR AXLE

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GENERAL INFORMATION

The rear axle consists of rear hubs, wheel bearings, drive shafts, and rear differential and, it has the following features.

- The wheel bearing is a unit bearing (double-row angular contact ball bearing).
- The drive shaft incorporates B.J.-T.J. type constant velocity joints with high transmission efficiency and low vibration and noise.

- ABS rotors for detecting the wheel speeds are press-fitted to the B.J. outer wheels in vehicles with ABS or ACD.

NOTE

1. B.J.: Birfield Joint
2. T.J.: Tripod Joint

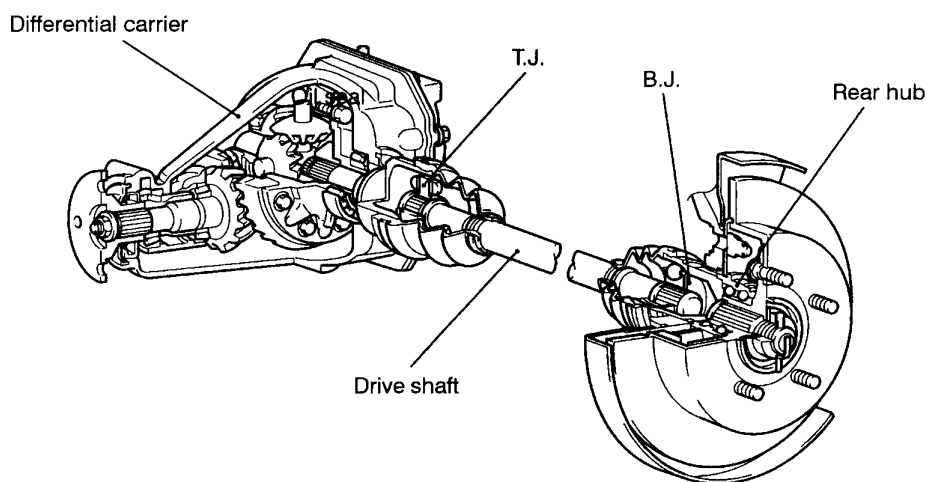
SPECIFICATIONS

Item		Vehicles without AYC	Vehicles with AYC
Wheel bearings	Wheel bearing type	Unit bearing (Double-row angular contact ball bearing)	
	Bearing (outside diameter × inside diameter) mm	78 × 40	
Drive shaft	Joint type	Outside	B.J.
		Inside	T.J.
	Shaft length*1 × Shaft diameter mm	Left	483 × 25
		Right	573 × 25

NOTE

*1: The shaft length indicates the length between the center points of each joint.

STRUCTURAL DIAGRAM



AY1837AU

SERVICE SPECIFICATIONS

Item			Standard value	Limit
Rear axle total backlash mm			–	6
Wheel bearing rotation starting torque N·m			–	1.0
Wheel bearing axial play mm			–	0.05 or less
Wheel bearing rotary-sliding resistance N			–	22 or less
TJ boot assembly dimension mm			90 ± 3	–
Drive gear backlash mm			0.11 – 0.16	–
Drive gear runout mm			–	0.05
Drive pinion turning torque N·m	Without oil seal		0.88 – 1.17	–
	With oil seal	Companion flange (oil seal contacting area) with anti-rust agent	0.98 – 1.27	–
		Companion flange (oil seal contacting area) with gear oil applied	0.49 – 0.58	–
Vehicles with mechanical LSD	Right-to-left difference in combined thickness of friction plate and friction disc mm		0 – 0.05	–
	Clearance between spring plate and differential case mm		0.06 – 0.25	–
	LSD differential torque N·m	When new clutch plate is installed	5 – 19	–
		When existing clutch plate is installed	2 – 19	–
	Distortion of friction plate and friction disc mm		–	0.08
	Difference in thickness between friction plate, friction disc, and spring plate mm		–	0.1
Vehicles with ACD and AYC	Pressure generated by hydraulic unit (pressure sensor value) MPa		0.9 – 1.1	–

LUBRICANTS

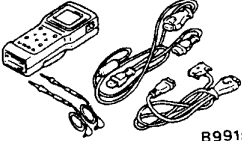
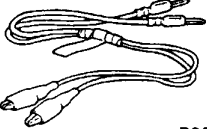
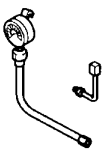
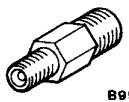
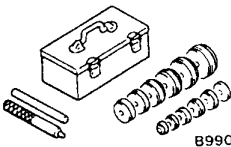
Item			Specified lubricants	Quantity
Vehicles with mechanical LSD	Gear oil		Hypoid gear oil MITSUBISHI Genuine Gear Oil Part No. 8149630 EX, CASTROL HYPOY LS (GL-5, SAE 90), SHELL-LSD (GL-5, SAE 80W – 90) or equivalent	0.55 L
Vehicles with ACD and AYC	Gear oil	Differential	Hypoid gear oil API classification GL-5 or higher SAE viscosity No.90, 80W	0.55 ± 0.02 L
		Torque transfer mechanism	ATF-SP III	0.65 – 0.7 L

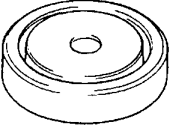
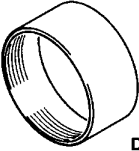
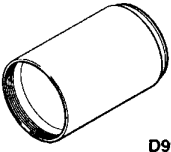
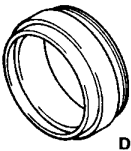
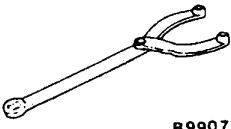
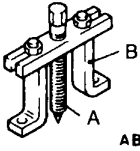
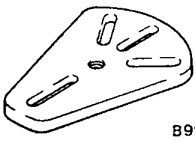
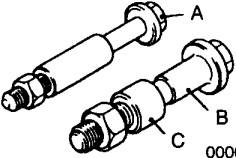
Item		Specified lubricants	Quantity
Vehicles with ACD and AYC	Hydraulic piping fluid	ATF-SP III	1 L
	Torque transfer mechanism oil seal lips	Vaseline	As required
B.J. joint		Repair kit grease	85 ± 10 g
T.J. joint		Repair kit grease	105 ± 10 g

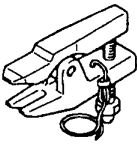
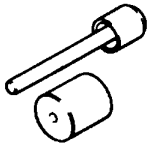
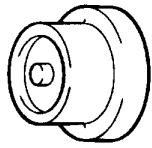
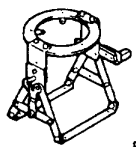
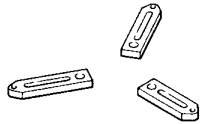
SEALANTS

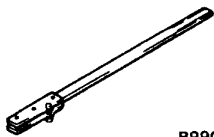
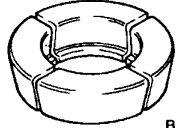
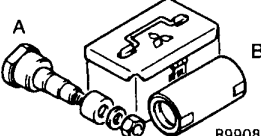
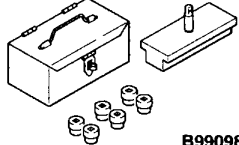
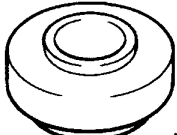
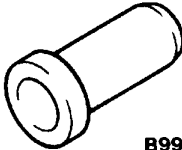
Items		Specified sealants	Remarks
Vehicles with me- chanical LSD	Vent plug	3M ATD Part No. 8661, 8663 or equivalent	Semi-drying sealant
	Differential cover assembly		
Vehicles with ACD and AYC	Vent plug		
	Differential carrier cover mounting part		
Vehicles with me- chanical LSD	Drive gear and differential case mounting part	3M Stud Locking 4170 or equivalent	Anaerobic sealant

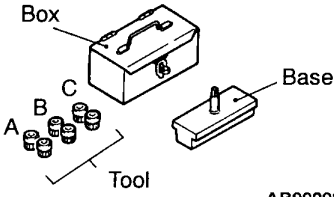
SPECIAL TOOLS

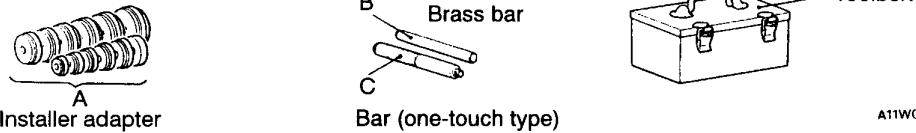
Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub as- sembly	Inspection of AYC (diagnosis display by MUT-II)
 B991529	MB991529	Diagnosis code check harness	Inspection of AYC (diagnosis display by ACD mode indicator lamp)
 D998330	MD998330 (MD998331)	Oil pressure gauge	Hydraulic pressure measurement <vehicles with AYC>
 B991705	MB991705	Hose adapter	
 B990925	MB990925	Bearing and oil seal installer set	Removal of wheel bearing

Tool	Number	Name	Use
 B991115	MB991115	Oil seal installer	Press-fitting of oil seal (AYC differential: used in combination with MB990938)
 D998812	MD998812	Installer cap	Press-fitting of oil seal (torque transfer mechanism of vehicles with AYC)
 D998813	MD998813	Installer 100	
 D998829	MD998829	Installer adapter (60)	
 B990767	MB990767	Front hub and flange yoke holder	
 AB990241	MB990241 A: MB990242 B: MB990244	Rear axle shaft puller A: Puller shaft B: Puller bar	- Removal of drive shaft - Removal of rear hub assembly
 B991354	MB991354	Puller body	
 00005697	A: MB991017 B: MB990998 C: MB991000	A,B: Front hub remover and installer C: Spacer	- Temporary fixing of wheel bearing - Measurement of wheel bearing rotation starting torque - Measurement of wheel bearing axial play Use MB991000 (component of MB990998) for the spacer.

Tool	Number	Name	Use
	MB990685	Torque wrench	Measurement of the starting torque of wheel bearing
	MB990326	Preload socket	
 B991113	MB991113 or MB990635	Steering linkage puller	Disconnection of ball joint
 B990641	MB990641	Lower arm bush (A) remover & installer	Removal and press-fitting of differential support member bush
 B991439	MB991439	Bush remover & installer	Removal and press-fitting of differential support arm bush
 B991460	MB991460	Plug	Prevention of differential oil from being discharged and entry of foreign matter <AYC differential>
 B990909	MB990909	Working base	Supporting of the differential carrier
	MB991116	Adapter	Support of differential carrier assembly
 B990810	MB990810	Side bearing puller	- Removal of the side bearing inner race - Removal of the companion flange

Tool	Number	Name	Use
 B990850	MB990850	End yoke holder	- Removal of the self-locking nut - Adjustment of the drive pinion turning torque
 B990339	MB990339	Bearing puller	Drive pinion rear bearing inner race removal
 B990374	MB990648	Bearing remover	
 B990835	MB990835 A: MB990836 B: MB990392	Drive pinion setting gauge set A: Drive pinion gauge assembly B: Cylinder gauge	Adjustment of drive pinion height
 B990988	MB990988	Side gear holding tool set	Measurement of clutch plate preload (vehicles with mechanical LSD)
 B990829	MB990728	Side & rear bearing inner race installer	Press-fitting of drive pinion rear bearing inner race
 B990727	MB990727	Oil seal installer	Press-fitting of drive pinion oil seal
	MB990813	Tap	Removal of adhesive

 AB990988	Number	Name	O.D. mm
	MB990551	Box	—
	MB990989	Base	—
	MB990990	Tool A	25
	MB990991	Tool B	28
	MB990992	Tool C	31

 A11W0113					
	Tool number	O.D. mm		Tool number	O.D. mm
A	MB990926	39	A	MB990933	63.5
	MB990927	45		MB990934	67.5
	MB990928	49.5		MB990935	71.5
	MB990929	51		MB990936	75.5
	MB990930	54		MB990937	79
	MB990931	57	B	MB990938	—
	MB990932	61	C	MB990939	—

TROUBLESHOOTING <AYC>

BASIC TROUBLESHOOTING CONDITIONS

Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.

NOTE

Before starting the troubleshooting procedure, make sure that the following items have been checked okay.

- The correct steering wheel has been properly installed in the neutral position of the steering column shaft.
- Tire and wheel sizes are correct with correct specifications. Inflation pressure, balance, and wear conditions are okay.
- Wheel alignment is correct.
- The engine, suspension, and other parts have not been remodeled so as to affect the AYC system.

DIAGNOSIS FUNCTION

READING THE DIAGNOSIS CODES

Read the diagnosis code using MUT-II or ACD mode indicator lamp. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)

NOTE

Connect the MUT-II to the 16-pin diagnosis connector.

ERASING THE DIAGNOSIS CODES

Connect the MUT-II to the 16-pin diagnosis connector and erase the diagnosis code. (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)

Caution

Turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the MUT-II.

INSPECTION CHART FOR DIAGNOSIS CODE

Diagnosis code No.	Diagnosis items	Reference page
12	Power supply voltage (valve power supply) system	Refer to GROUP 22.
13	Failsafe relay system <inside of 4WD-ECU>	
21	FR wheel speed sensor system	
22	FL wheel speed sensor system	
23	RR wheel speed sensor system	
24	RL wheel speed sensor system	
25	Wrong-diameter tire	
26	Wheel speed sensor (faulty output signal)	
31	Steer sensor (ST-1, ST-2, ST-N) system	
32	Steer sensor (ST-N) system	
33		
34	Steer sensor (ST-1, ST-2) system	
41	TPS system	
42		
45	Pressure sensor system	
46		
47		
51	G sensor (longitudinal) system	
52		
56	G sensor (lateral) system	
57		

Diagnosis code No.	Diagnosis items		Reference page
61	Stop lamp switch system	open-circuit	Refer to GROUP 22.
62	ACD mode changeover switch	stuck	
63	Parking brake switch system	short-circuit or not returned	
65	ABS monitor system	open-circuit or defective ABS	
71	Proportioning valve <AYC> system	open- or short-circuit	27B-11
72	Directional control valve (right) system	open- or short-circuit	27B-12
73	Directional control valve (left) system	open- or short-circuit	27B-13
74	Proportioning valve <ACD> system	open- or short-circuit	Refer to GROUP 22.
81	Electric pump relay system	open- or short-circuit	
82		electric pump malfunction or pressure sensor defect	
84	AYC control error		—
85	ACD control error		Refer to GROUP 22.

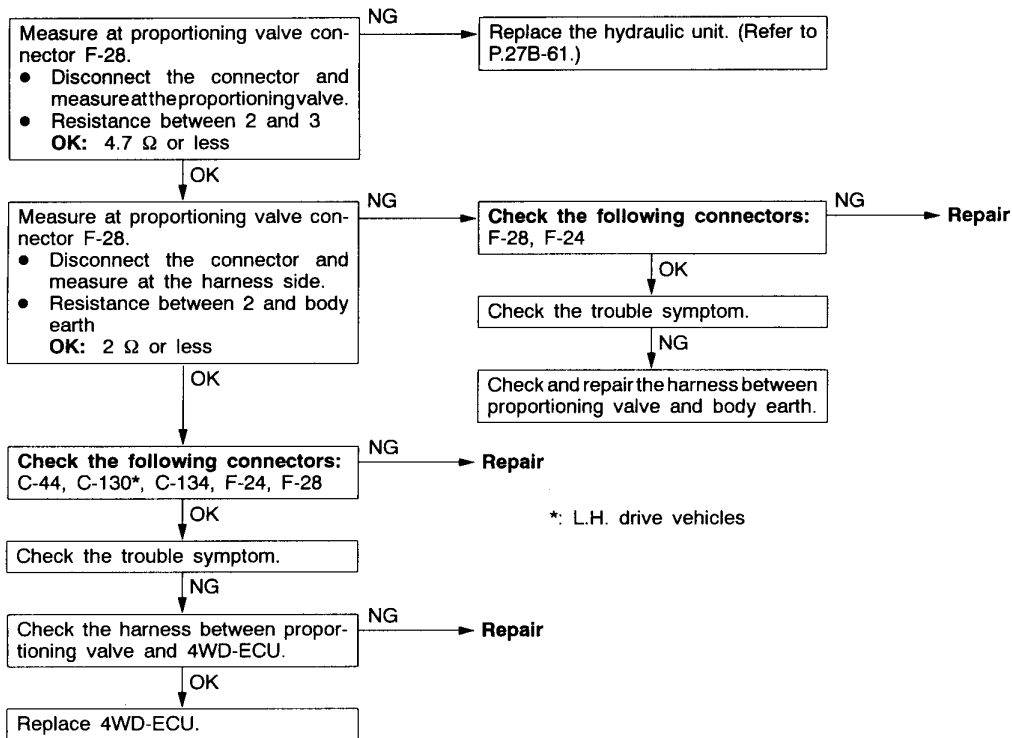
NOTE

Code No.84 is not a code number output due to malfunction, but a code number output when control for the 4WD-ECU to protect the AYC is stopped in excessive driving. AYC control can be recovered by turning the ignition switch ON to OFF to ON.

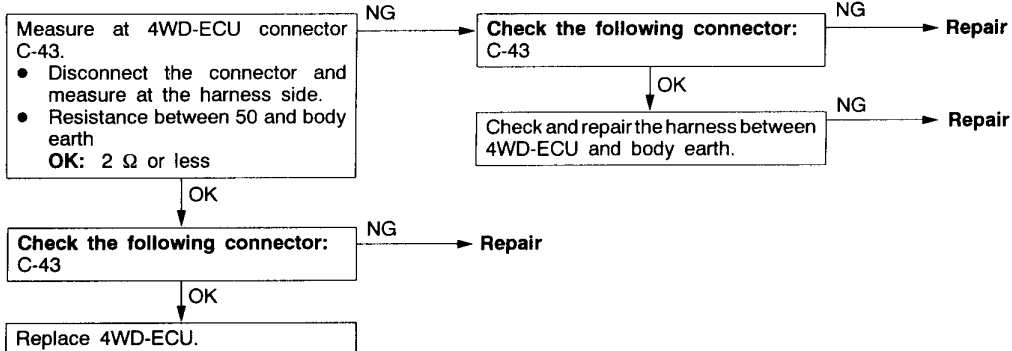
INSPECTION PROCEDURES FOR DIAGNOSIS CODES

Code No. 71 Proportioning valve system	Probable cause
This code is output when the proportioning valve control circuit is open- or short-circuited.	- Defective proportioning valve - Defective harness or connector - Defective 4WD-ECU

<Vehicles with ACD + AYC>

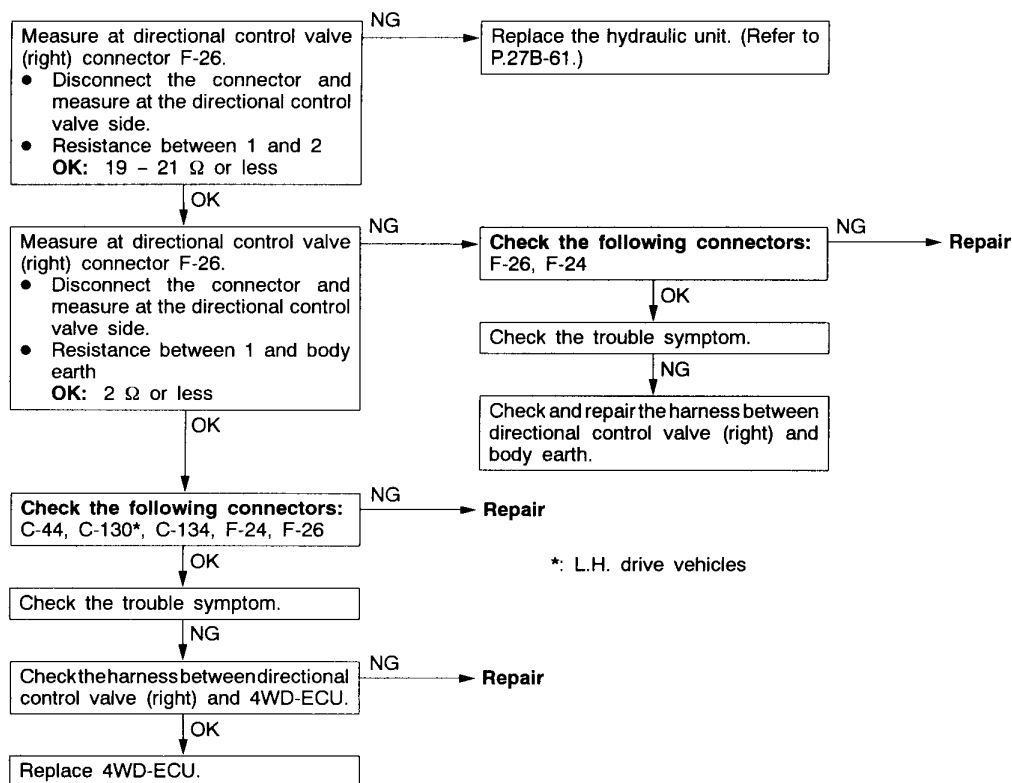


<Vehicles with ACD>

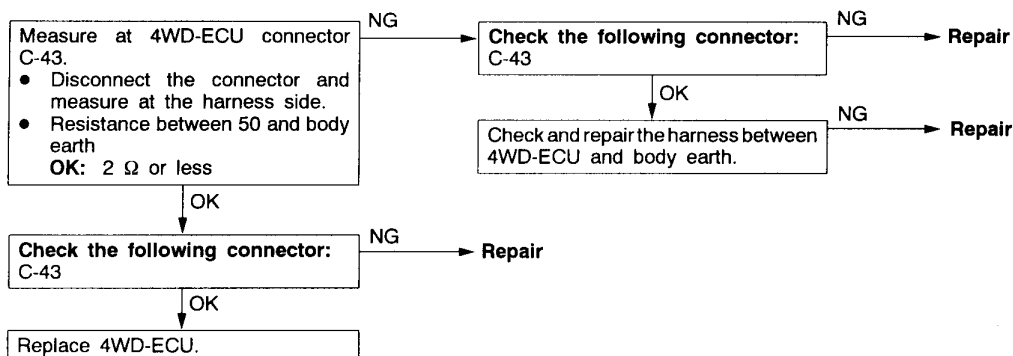


Code No. 72 Directional control valve (right) system	Probable cause
This code is output when the directional control valve (right) control circuit is open- or short-circuited.	- Defective directional control valve (right) - Defective harness or connector - Defective 4WD-ECU

<Vehicles with ACD + AYC>

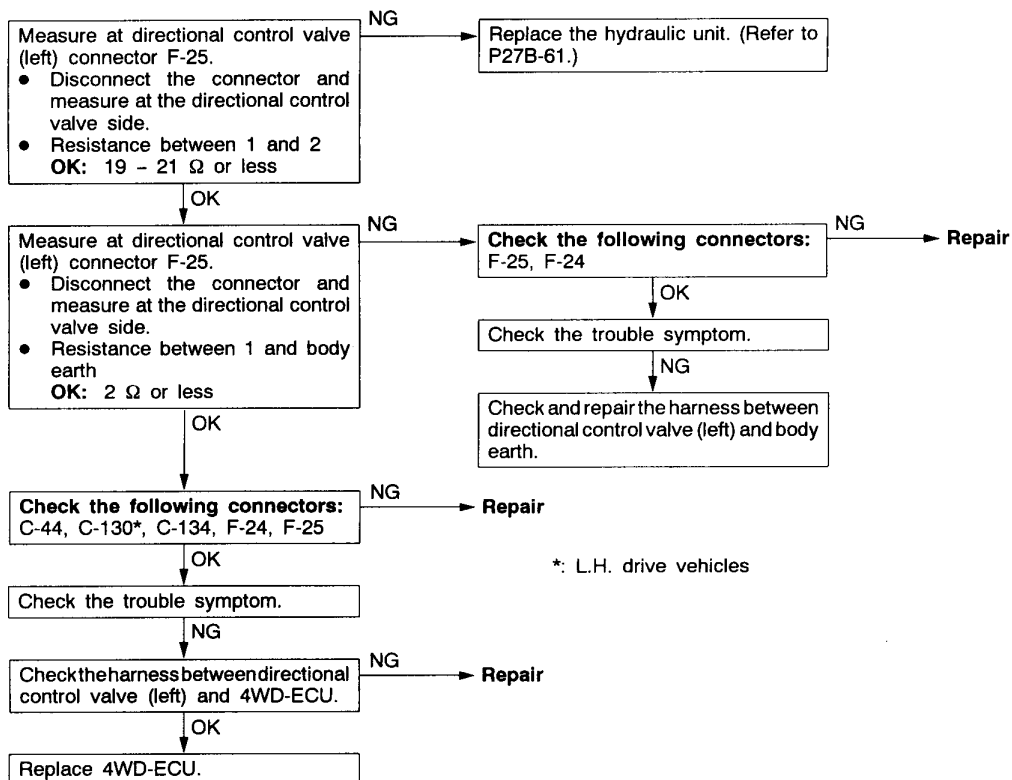


<Vehicles with ACD>

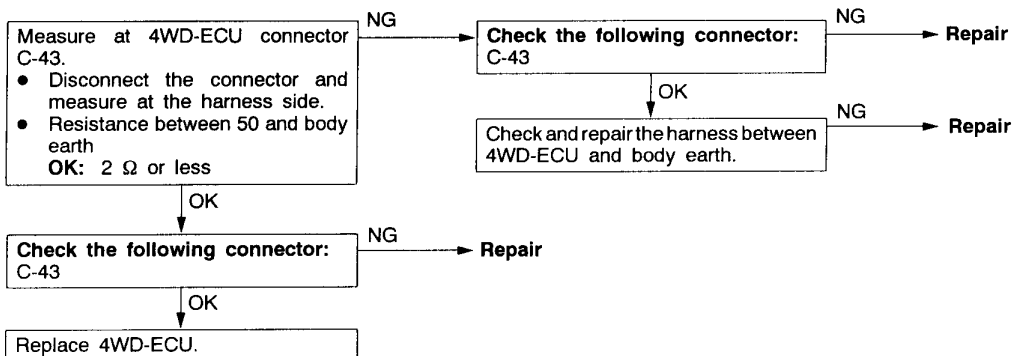


Code No. 73 Directional control valve (left) system	Probable cause
This code is output when the directional control valve (left) control circuit is open- or short-circuited.	- Defective directional control valve (left) - Defective harness or connector - Defective 4WD-ECU

<Vehicles with ACD + AYC>



<Vehicles with ACD>



INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure No.	Reference page
Communication between MUT-II and the whole system is not possible.	1	Refer to GROUP 22.
Communication between MUT-II and 4WD-ECU is not possible.	2	
3 ACD mode indicator lamps do not light up when the ignition key is turned to "ON" (engine stationary).	3	
3 ACD mode indicator lamps remain lit up after the engine has started.	4	
AYC is inoperative. Unable to start or accelerate on slippery road surfaces.	5	27B-14
Rear tires are noisy during low-speed cornering. Vehicle skews.	6	27B-15
Noise is produced from the torque transfer differential during turning.	7	27B-15

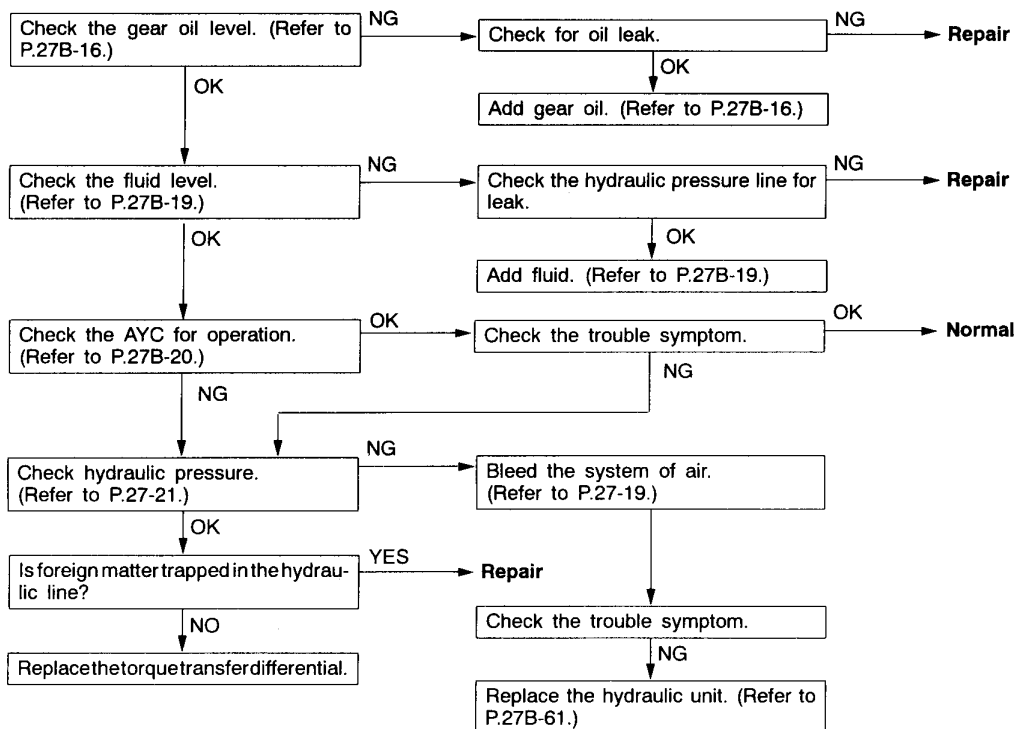
INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 5

AYC is inoperative. Unable to start or accelerate on slippery road surfaces.	Probable cause
The hydraulic oil level is probably low, there is an oil leak, the hydraulic unit is defective, or the torque transfer differential is defective.	• Low hydraulic oil level • Oil leak • Defective hydraulic unit • Defective torque transfer differential

NOTE

This symptom is limited only when the diagnosis code is correct.

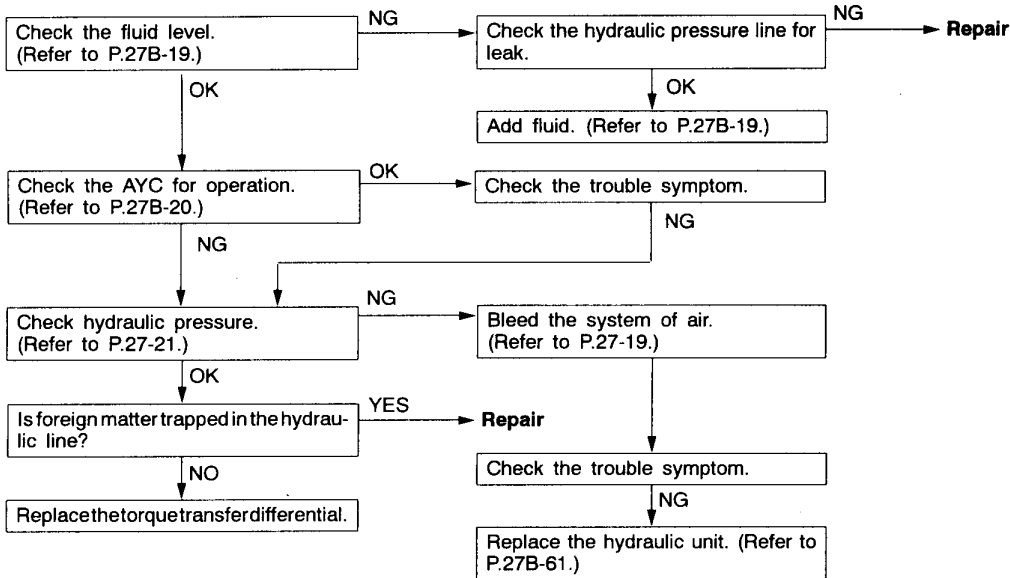


INSPECTION PROCEDURE 6

Rear tires are noisy during low-speed cornering. Vehicle skews.	Probable cause
The hydraulic unit or torque transfer differential is probably defective.	- Defective hydraulic unit - Defective torque transfer differential

NOTE

This symptom is limited only when the diagnosis code is correct.

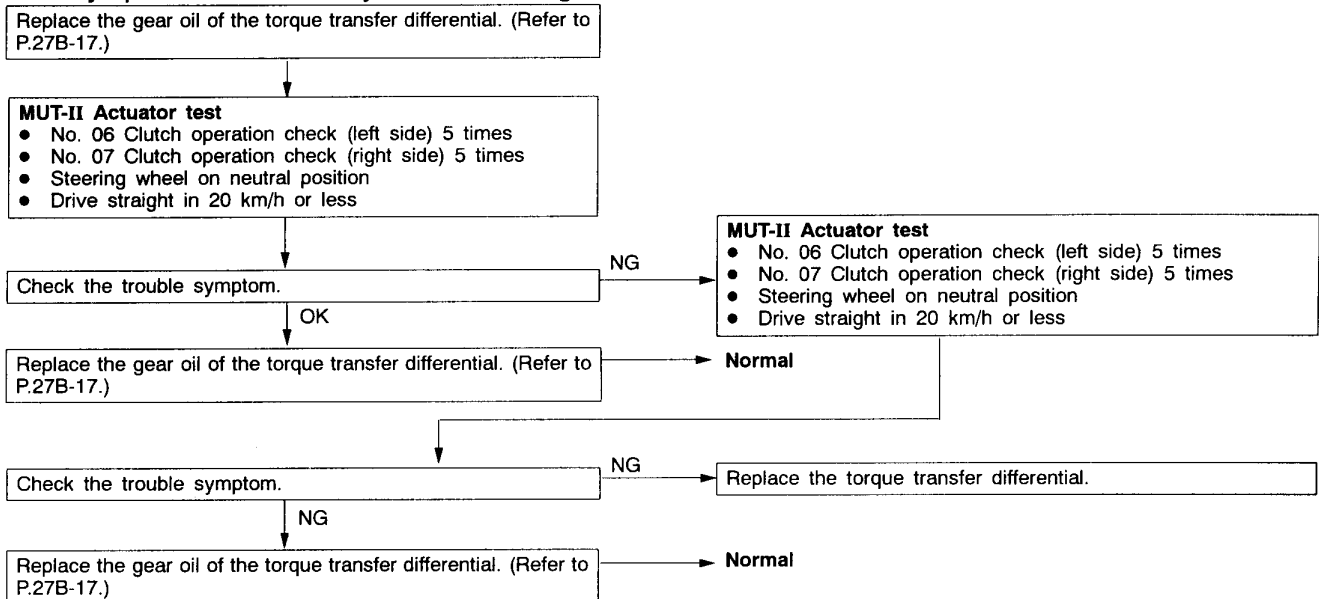


INSPECTION PROCEDURE 7

Noise is produced from the torque transfer differential during turning	Probable cause
The torque transfer differential is probably defective.	Defective torque transfer differential

NOTE

This symptom is limited only when the diagnosis code is correct.



DATA LIST REFERENCE TABLE

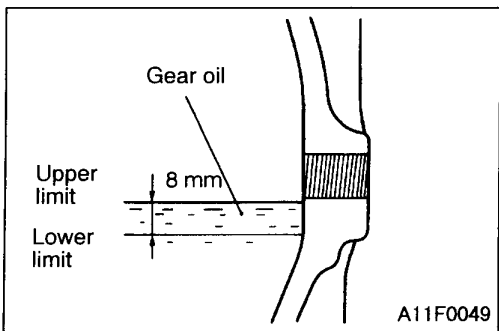
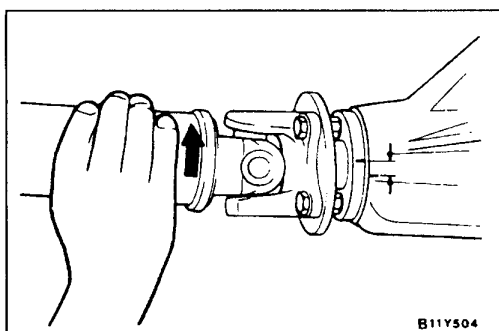
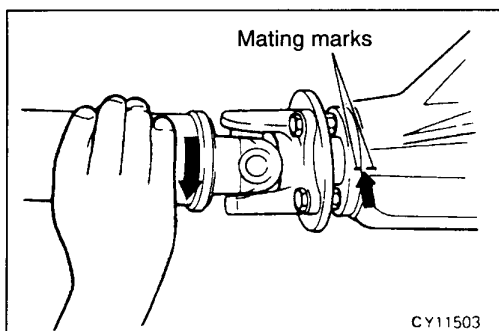
For check, refer to GROUP 22.

ACTUATOR TEST REFERENCE TABLE

For check, refer to GROUP 22.

CHECK AT 4WD-ECU TERMINALS

For check, refer to GROUP 22.

**ON-VEHICLE SERVICE****REAR AXLE TOTAL BACKLASH CHECK**

1. Park the vehicle on a flat, level surface.
2. Move the transmission control lever to the neutral position. Apply the parking brake. Raise the vehicle on a jack.
3. Turn the companion flange clockwise as far as it will go. Make the mating mark on the dust cover of the companion flange and on the differential carrier.
4. Turn the companion flange anti-clockwise as far as it will go, and measure the amount of distance the mating marks moved.

Limit: 6 mm

5. If the backlash exceeds the limit value, replace the differential carrier assembly.

GEAR OIL LEVEL CHECK

<Vehicles with mechanical LSD>

1. Remove the filler plug.
2. Check that the gear oil level is within the specified range from the bottom end of the filler plug hole.
3. If the gear oil level exceeds the standard value, add the specified gear oil up to the bottom end of the filler plug hole.

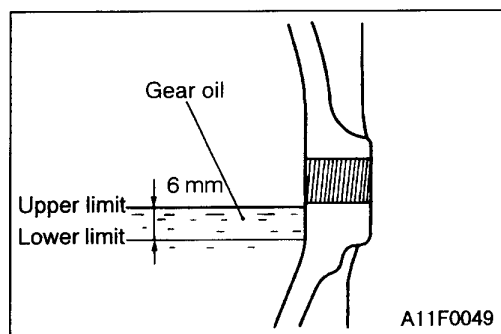
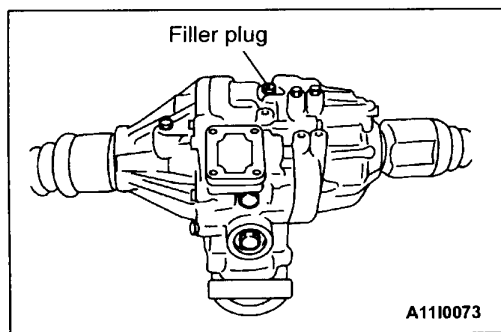
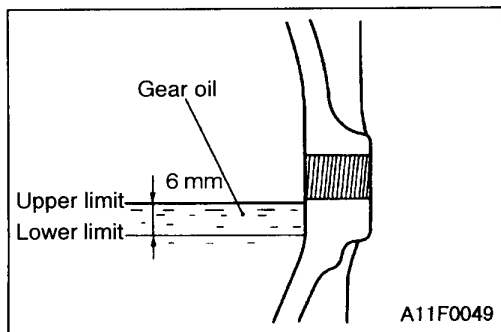
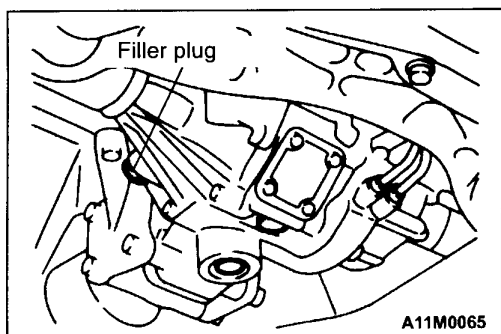
Specified gear oil:

Hypoid gear oil

MITSUBISHI Genuine Gear Oil Part No. 8149630
EX, CASTROL HYPOY LS (GL-5, SAE 90),
SHELL-LSD (GL-5, SAE 80W – 90) or equivalent

4. Fit the filler plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m



<Vehicles with AYC>

Differential part

1. Remove the filler plug.
2. Check that the gear oil level is within the specified range from the bottom end of the filler plug hole.
3. If the gear oil level exceeds the standard value, add the specified gear oil up to the bottom end of the filler plug hole.

Specified gear oil:

**Hypoid gear oil API classification GL-5 or higher
SAE viscosity Number 90, 80W**

NOTE

10°C or more: SAE90, less than 10°C: SAE80W

4. Fit the filler plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m

Torque transfer mechanism part

1. Remove the filler plug.
2. Check that the gear oil level is within the specified range from the bottom end of the filler plug hole.
3. If the gear oil level exceeds the standard value, add the specified gear oil up to the bottom end of the filler plug hole.

Specified gear oil: ATF-SP III

4. Fit the filler plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m

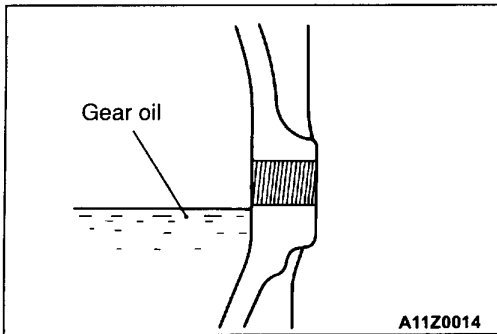
GEAR OIL CHANGE

<Vehicles with mechanical LSD>

1. Remove the drain plug to discharge the gear oil.
2. Fit the drain plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m

3. Remove the filler plug and add the specified gear oil up to the bottom end of the filler plug hole.

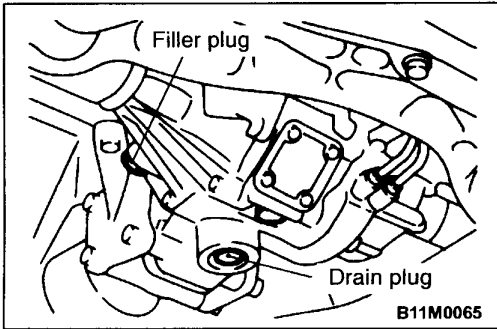
**Specified gear oil:**

Hypoid gear oil

MITSUBISHI Genuine Gear Oil Part No. 8149630
EX, CASTROL HYPOY LS (GL-5, SAE 90),
SHELL-LSD (GL-5, SAE 80W – 90) or equivalent
Quantity: 0.55 L

4. Fit the filler plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m



<Vehicles with AYC>

Differential part

1. Remove the drain plug to discharge the gear oil.
2. Fit the drain plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m

3. Remove the filler plug and add the specified gear oil up to the bottom end of the filler plug hole.

Specified gear oil:

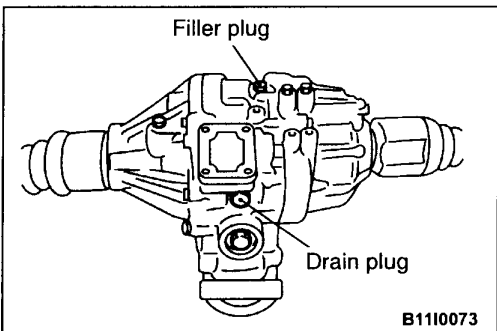
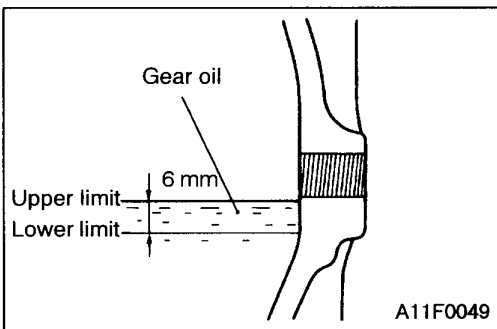
Hypoid gear oil API classification GL-5 or higher
SAE viscosity Number 90, 80W
Quantity: 0.55 ± 0.02 L

NOTE

10°C or more: SAE90, less than 10°C: SAE80W

4. Fit the filler plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m

**Torque transfer mechanism part**

1. Remove the drain plug to discharge the gear oil.
2. Fit the drain plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m

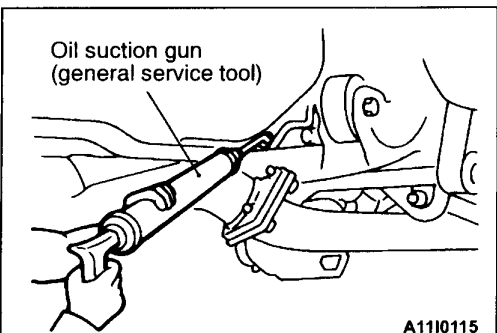
3. Remove the filler plug.
4. Using the oil suction gun (general service tool), between the body and differential support arm, apply the specified gear oil up to the under of the filler plug hall.

Specified gear oil: ATF-SP III

Quantity: 0.65 – 0.7 L

5. Fit the filler plug and tighten it to the specified torque.

Tightening torque: 49 ± 9 N·m



FLUID LEVEL CHECK

1. Remove the maintenance lid located in the luggage compartment.
2. <Not using MUT-II>
If the vehicle has been run, leave it for 90 min. or more in an ordinary temperature (10°C – 30°C) to allow the accumulator internal pressure to drop.

NOTE

If the ambient temperature is 10°C or less, allow more time to leave the vehicle to stand idle.

<Using MUT-II>

Set MUT-II to 16 pin diagnostic connector. Turn the ignition switch to the ON position, operate MUT-II, drive the hydraulic unit (item No.03) forcibly, release the pressure in the accumulator.

Caution

Turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the MUT-II.

NOTE

- (1) To drive (oil level check mode) forcibly, turn the directional valve of the hydraulic unit 20 turns from side to side, release the differential automatically. Drive can also be cleared forcibly using the Clear key of MUT-II.
- (2) If the function has been stopped by fail safe, the hydraulic unit can not be cleared forcibly.

3. Check that the fluid level in the oil reservoir is in the range between MAX and MIN.
4. If the fluid level is lower than MIN, add the specified fluid.

Specified fluid: ATF-SP III

5. Reinstall the maintenance lid.

BLEEDING

1. Lift up the vehicle.
2. Set the MUT-II to the 16-pin diagnosis connector.

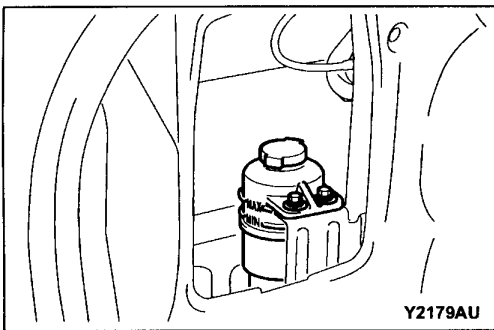
Caution

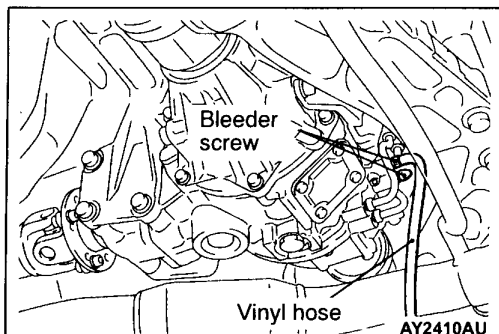
Turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the MUT-II.

3. Turn the ignition switch to the ON position.
4. Set the steering wheel in the straight-ahead position.
5. Operating the MUT-II, drive the hydraulic unit (item No.02) forcibly.

NOTE

- (1) Drive the bleeding mode forcibly for 5 minutes, release the operation automatically. Drive can also be cleared forcibly using the Clear key of MUT-II.
- (2) If the function has been stopped by fail safe, the hydraulic unit cannot be cleared forcibly.





6. Remove the cap of the left bleeder screw on the torque transfer differential and connect a vinyl hose.
7. Gradually turn the steering wheel clockwise from the straight-ahead position. At this time, loosen the left bleeder screw and check that fluid is discharged with air.
8. After air has been completely discharged, tighten bleeder screw and turn the steering wheel in the straight-ahead position.

Caution

While the system is being bled of air, add fluid as necessary to ensure that it is left in the oil reservoir during the entire procedure.

9. Repeat steps 6 and 7 two to three times until no air bubbles are recognized in the fluid that comes out. Then, tighten the bleeder screw to the specified torque.

Tightening torque: $9 \pm 1 \text{ N}\cdot\text{m}$

10. Perform steps 5 through 8 for the right bleeder screw. Note, however, that the steering wheel should be turned counterclockwise.
11. When removing the hydraulic unit, bleed the fluid line in ACD side. (Refer to GROUP 22 – On-vehicle Service.)
12. After the system has been completely bled of air, check for the fluid level. (Refer to P. 27B-19.)

Caution

If the system is not completely bled of air, the hydraulic unit could generate noise, degrading pump durability.

AYC OPERATION CHECK

1. Lift up the vehicles.
2. Set the MUT-II to the 16-pin diagnosis connector.

Caution

Turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the MUT-II.

3. Start the engine.
4. Set the gear to the 2nd gear or above, operate MUT-II, and check from the service data (Item No.09) that the wheel speed is within 10 km/h to 20 km/h.

NOTE

- (1) Set the steering wheel to the neutral position.
- (2) When turning the steering wheel, AYC operates continually (operation sound from the torque transfer differential), but it is not system fault. In this case, set the steering wheel to the neutral position, and perform the following operations in order to stop the ACD.
 - Release the clutch.
 - Set the gear to "Neutral".
 - Stop the engine.

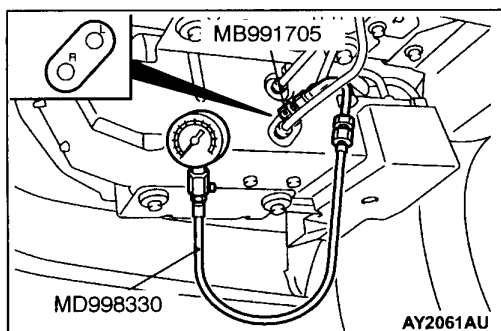
5. Operate the MUT-II, drive the torque transfer differential (item No.06 and 07) forcibly.

NOTE

- (1) Drive the clutch operating mode forcibly for 1 minutes, release the operation automatically. Drive can also be cleared forcibly using the Clear key of MUT-II.
 - (2) If the hydraulic unit function has been stopped by fail-safe, the torque transfer differential cannot be forcibly driven.
6. Operating the MUT-II, by service data (item no.07 and 08), check the condition of the wheel speed below.
 <Driving item No.06 forcibly>
 The left rear wheel is faster 2km/h than right rear wheel.
 <Driving item No.07 forcibly>
 The right rear wheel is faster 2km/h than left rear wheel.

NOTE

If the above are not satisfied, check the oil pressure as the system may be faulty.



OIL PRESSURE CHECK

1. Lift up the vehicle.
2. Set the MUT-II to the 16-pin diagnosis connector.

Caution

Turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the MUT-II.

3. Turn the ignition switch to ON.
4. Disconnect the hydraulic unit and the hydraulic unit hose assembly, connect the special tool to L port, put the lid to R port or connect the hydraulic unit hose assembly disconnected from L port to R port.
5. Operating the MUT-II, drive the hydraulic unit forcibly (item No.02).

NOTE

- (1) Drive the operation check mode of the clutch left side for 1 minutes, release the operation automatically. Drive can also be cleared forcibly using the Clear key of MUT-II.
 - (2) If the function has been stopped by fail safe, the hydraulic unit cannot be cleared forcibly.
6. Check that the generated oil pressure of the hydraulic unit satisfies the standard value.

Standard value: 0.9 – 1.1 MPa

Caution

While the oil pressure is checked, add fluid as necessary to ensure that it is left in the oil reservoir during the entire procedure.

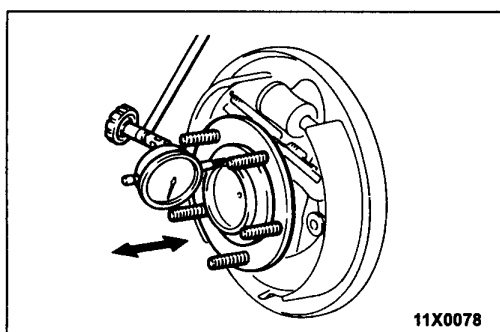
7. Check the oil pressure of the clutch right side following step 4 through 6. Connect the special tool to R port, put the lid to L port or hydraulic unit hose assembly disconnected from R port to L port, use the MUT-II drive item No.07 (operation check mode of clutch right side) forcibly.

8. If the measured value exceeds the standard value, replace the hydraulic unit.
9. Connect the hydraulic unit and the hydraulic unit hose assembly, and connect the torque transfer differential and hydraulic unit hose assembly, tighten the flare nut in specified torque.

Tightening torque: $34 \pm 5 \text{ N}\cdot\text{m}$ (Thread is not lubricated)
 $26 \pm 4 \text{ N}\cdot\text{m}$ (Thread is lubricated)

10. Supply the specified fluid up to the MAX level of the oil reservoir, and bleed.

Specified fluid: ATF-SP III
Quantity: 1 L

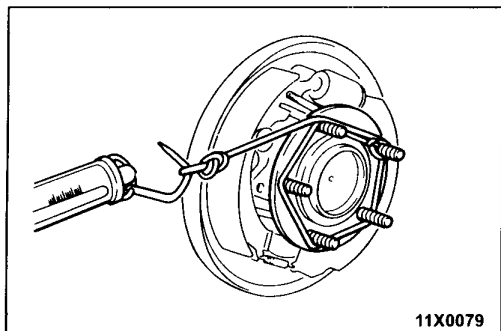


WHEEL BEARING AXIAL PLAY CHECK

1. Remove the brake caliper and brake disc.
2. Check the bearing's axial play.
Place a dial gauge against the hub surface; then move the hub in the axial direction and check whether or not there is axial play.

Limit: 0.05 mm

3. If the axial play exceeds the limit, the castle nut should be tightened to the specified torque $225 \pm 25 \text{ N}\cdot\text{m}$ and check the axial play again.
4. Replace the rear hub assembly if an adjustment cannot be made to within the limit.

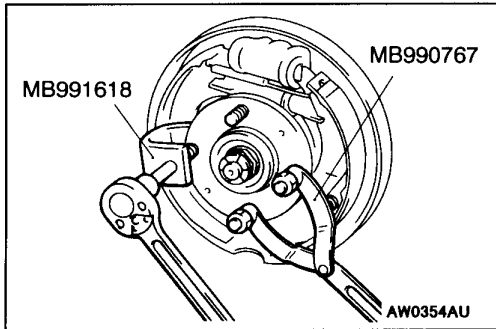


WHEEL BEARING ROTARY-SLIDING RESISTANCE CHECK

1. Remove the brake caliper and brake disc.
2. After turning the hub a few times to seat the bearing, wind a rope around the hub bolt and turn the hub by pulling at a 90° angle with a spring balance. Measure to determine whether or not the rotary-sliding resistance of the rear hub is at the limit value.

Limit: 22 N or less

3. If the limit value is exceeded, loosen the flange nut and then tighten it to the specified torque 225 ± 25 N·m and check the rear hub rotary sliding resistance again.
4. Replace the rear hub assembly if an adjustment cannot be made to within the limit.

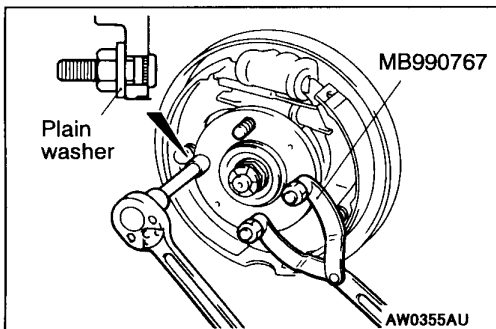


HUB BOLT REPLACEMENT

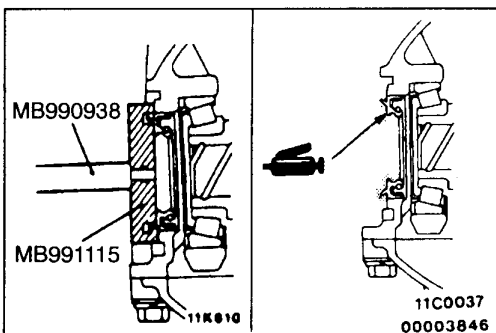
1. Remove the brake caliper and brake disc.
2. Use the special tools to remove the hub bolts.

NOTE

To retain a space for removing the hub bolts, remove near the retainer spring mounting position.



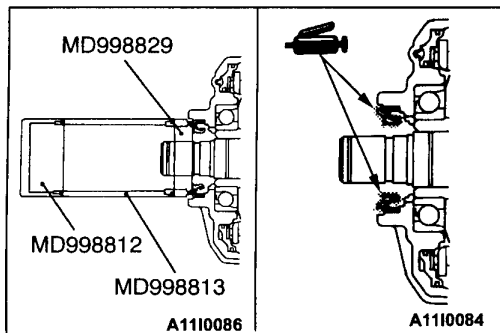
3. Install the plain washer to the new hub bolt, and install the bolt with a nut.



DIFFERENTIAL CARRIER OIL SEAL REPLACEMENT

Differential part

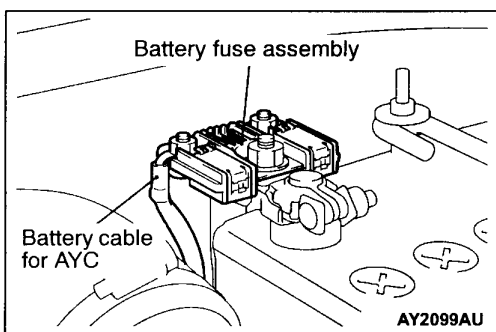
1. Remove the drive shaft. (Refer to P. 27B-29.)
2. Remove the oil seal from the differential carrier.
3. Using the special tool, drive a new oil seal all the way into position.
4. Coat the oil seal lips and the drive shaft surface in contact with the oil seal with multi-purpose grease.
5. Replace the drive shaft circlip with a new one and mount the drive shaft to the differential carrier. (Refer to P. 27B-29.)
6. Check for correct wheel alignment. (Refer to GROUP 34 – On-vehicle Service.)

**Torque transfer mechanism part**

1. Remove the drive shaft. (Refer to P. 27B-29.)
2. Remove the oil seal from the differential carrier.
3. Using the special tool, drive a new oil seal all the way into position.
4. Coat the oil seal lips and the drive shaft surface in contact with the oil seal with the specified grease.

Specified grease: Vaseline

5. Replace the drive shaft circlip with a new one and mount the drive shaft to the differential carrier. (Refer to P. 27B-29.)
6. Check for correct wheel alignment. (Refer to GROUP 34 – On-vehicle Service.)

**ACTION WHEN BATTERY RUNS OUT**

When the engine is started using a booster cable where the battery has completely run down and you attempt to start the vehicle without waiting for the battery to recover a certain charge, the engine can misfire and you just cannot start to move it. In such cases, charge the battery sufficiently; or, remove the AYC battery cable from the battery fuse assembly to make AYC inactive before attempting to start the vehicles. When the battery cable is removed, the ACD mode indicator lamp lights up. After the battery has been recharged, fit the battery cable back again and start the engine to ensure that the ACD mode indicator lamp is off.

REAR HUB ASSEMBLY

REMOVAL AND INSTALLATION

Caution

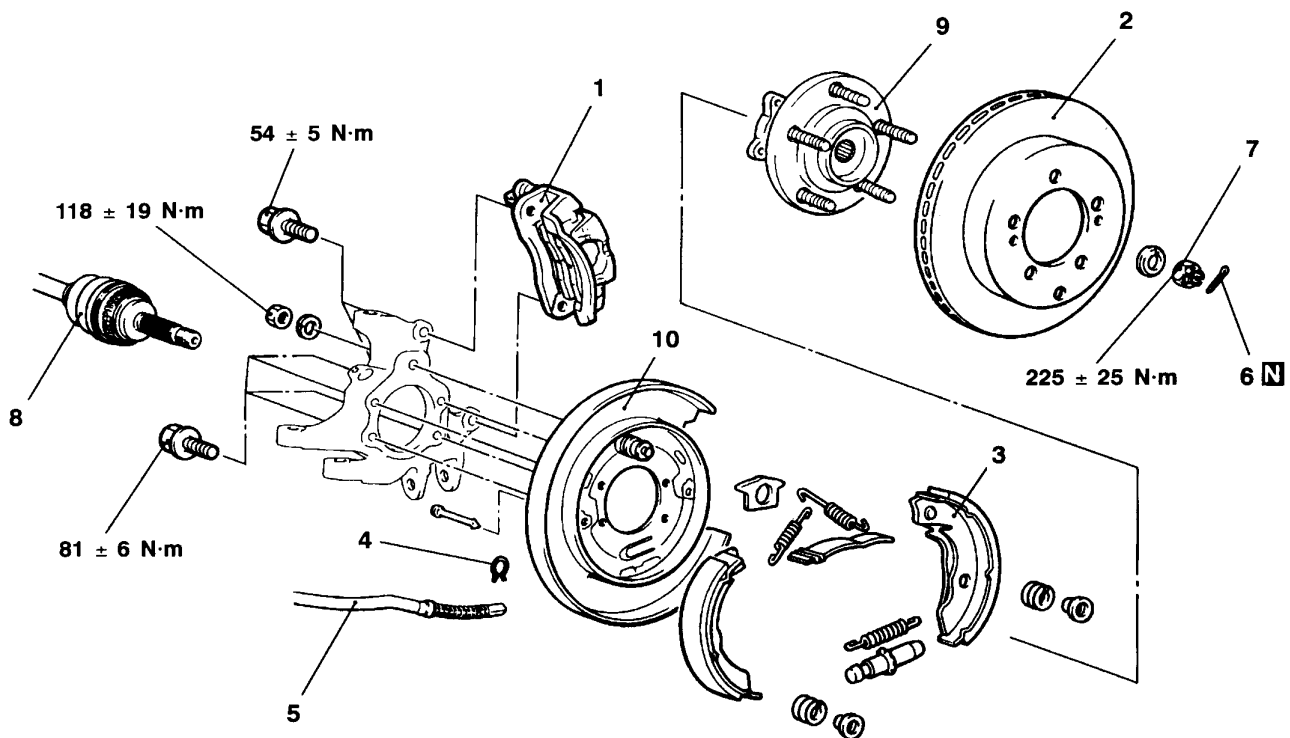
If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.

Pre-removal Operation

Gear Oil Draining (Refer to P. 27B-17.)

Post-installation Operation

- Gear Oil Filling (Refer to P. 27B-17.)
- Parking Brake Lever Stroke Adjustment (Refer to GROUP 36 – On-vehicle Service.)



A14M0117

Removal steps

1. Rear brake caliper
2. Rear brake disc
3. Parking brake shoe & lining assembly (Refer to GROUP 36 – Parking Brake Drum.)
4. Clip

5. Parking brake cable connection
6. Split pin
7. Drive shaft nut
8. Rear drive shaft assembly
9. Rear hub assembly
10. Backing plate

◀A▶

◀B▶ ▶A◀

◀C▶

REMOVAL SERVICE POINTS**◀A▶ REAR BRAKE CALIPER REMOVAL**

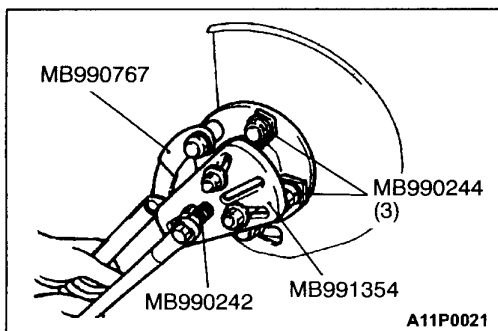
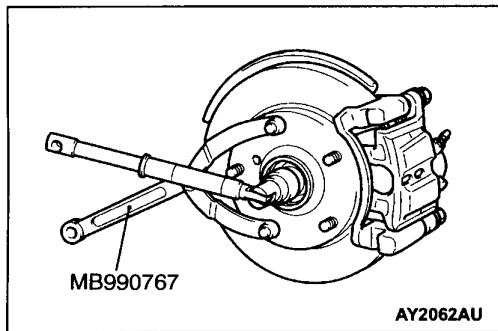
Suspend the rear brake caliper from the body with wire, etc. to prevent it from falling.

Caution

If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.

◀B▶ DRIVE SHAFT NUT REMOVAL**Caution**

Do not apply pressure to wheel bearing by the vehicle weight to avoid possible damage to wheel bearing before tightening drive shaft nut fully.

**◀C▶ REAR HUB ASSEMBLY REMOVAL**

1. Using the special tool, remove the drive shaft from the rear hub assembly.
2. Remove the mounting bolts and remove the rear hub assembly from the knuckle.

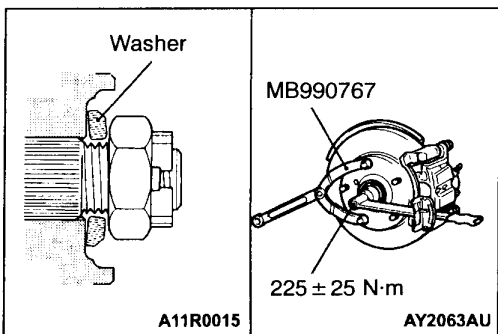
INSTALLATION SERVICE POINT**▶A◀ DRIVE SHAFT NUT INSTALLATION**

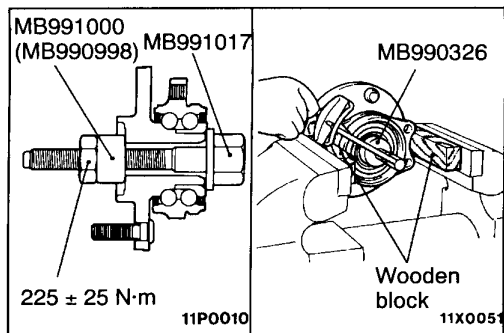
1. Assemble the drive shaft washer in the illustrated direction.
2. Tighten the drive shaft nut fully with special tools.

Caution

Do not apply pressure to wheel bearing by the vehicle weight to avoid possible damage to wheel bearing before tightening drive shaft nut fully.

3. If the pin hole does not align with another, tighten the drive shaft nut (less than 250 N·m) and find the nearest hole then bend the split pin to fit in.





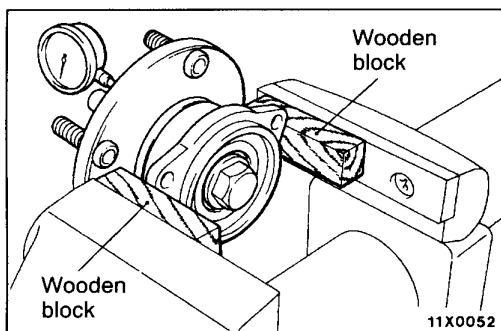
INSPECTION

WHEEL BEARING ROTATION STARTING TORQUE CHECK

1. Tighten special tools in rear hub assembly to the specified torque.
2. Hold rear hub assembly in a vice by way of wooden block.
3. Measure the wheel bearing rotation torque with special tools.

Limit: 1.0 N·m

4. Hub rotation starting torque must be under the limit value and there should be no stickiness or roughness when rotating the hub.



WHEEL BEARING AXIAL PLAY CHECK

1. Check the wheel bearing axial play.
- Limit: 0.05 mm**
2. If the wheel bearing axial play exceeds the limit value at the specified torque of (225 ± 25 N·m), replace the rear hub assembly.

KNUCKLE

REMOVAL AND INSTALLATION

Caution

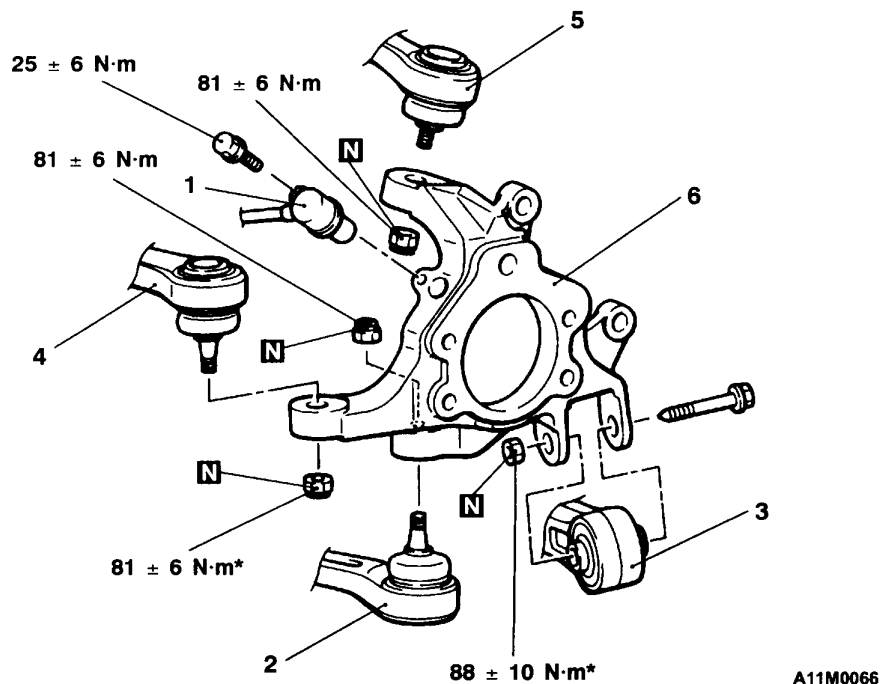
1. If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.
2. With the part marked with *, first temporarily tighten it, then ground the vehicle and tighten it to specification in unloaded condition.

Pre-removal Operation

Rear Hub Assembly Removal (Refer to P.27-25.)

Post-installation Operation

- Press dust cover with a finger to check for crack or damage in the dust cover.
- Rear Hub Assembly Installation (Refer to P.27-25.)

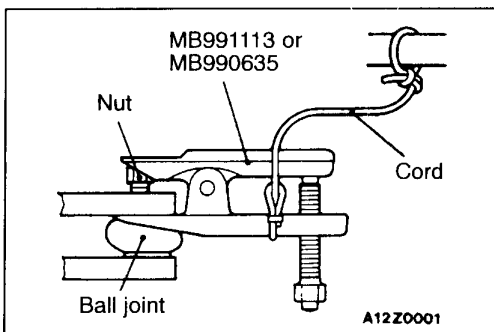


Removal steps

1. Vehicle speed sensor <Vehicles with ABS or ACD>
2. Knuckle and trailing arm connection
3. Knuckle and lower arm connection



4. Knuckle and toe-control arm connection
5. Knuckle and upper arm connection
6. Knuckle assembly



REMOVAL SERVICE POINT

◀A▶ KNUCKLE AND TRAILING ARM/TOE-CONTROL ARM/UPPER ARM DISCONNECTION

Caution

1. Use special tools to loosen the nut from the ball joint instead of removing it.
2. Hang special tools with ropes to prevent them from falling.

DRIVE SHAFT

REMOVAL AND INSTALLATION

Caution

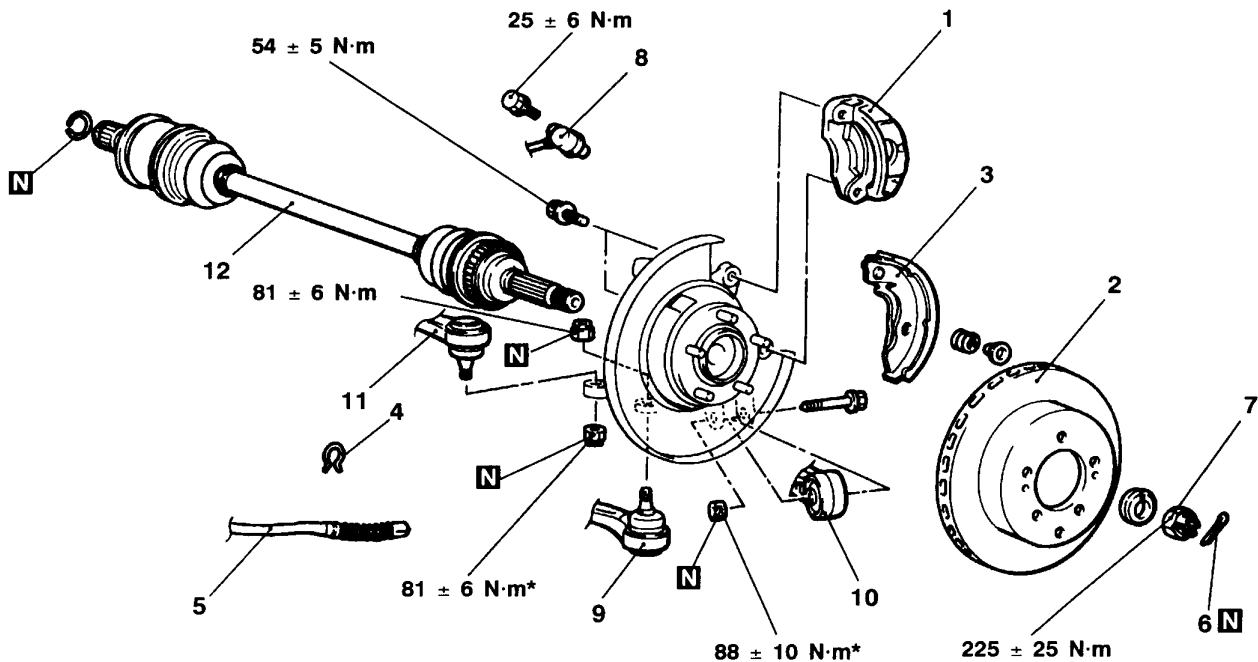
1. If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.
2. With the part marked with *, first temporarily tighten it, then ground the vehicle and tighten it to specification in unloaded condition.

Pre-removal Operation

- Gear Oil Draining (Refer to P.27-17.)
- Center Exhaust Pipe Removal (Refer to GROUP 15.)

Post-installation Operation

- Press dust cover with a finger to check for crack or damage in the dust cover.
- Center Exhaust Pipe Installation (Refer to GROUP 15.)
- Gear Oil Filling (Refer to P.27-17.)
- Parking Brake Lever Stroke Check and Adjustment
- Wheel Alignment Check and Adjustment (Refer to GROUP 34 – On-vehicle Service.)



A11M0069

Removal steps

◀A▶

1. Rear brake caliper
2. Rear brake disc
3. Parking brake shoe & lining assembly (Refer to GROUP 36 – Parking Brake Drum.)
4. Clip
5. Parking brake cable connection
6. Split pin

◀B▶ ▶B▶

7. Drive shaft nut
8. Vehicle speed sensor<Vehicles with ABS or ACD>
9. Knuckle and trailing arm connection
10. Knuckle and lower arm connection
11. Knuckle and toe-control arm connection

◀C▶ ▶A▶

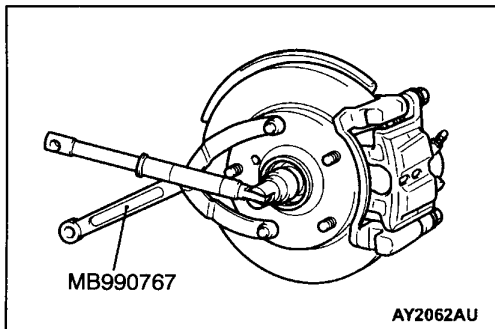
12. Rear drive shaft assembly

REMOVAL SERVICE POINTS**◀A▶ REAR BRAKE CALIPER REMOVAL**

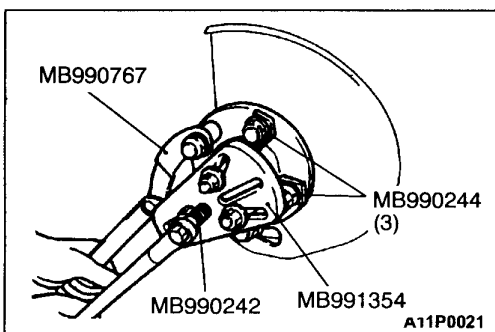
Suspend the rear brake caliper from the body with wire, etc. to prevent it from falling.

Caution

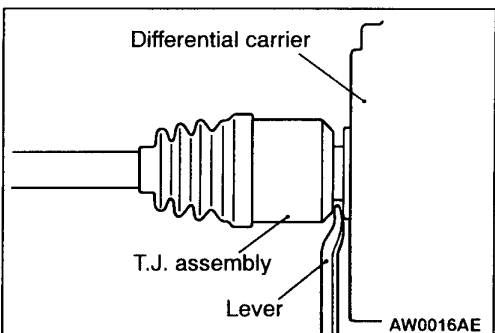
If the vehicle is equipped with the Brembo disc brake, during maintenance, take care not to contact the parts or tools to the caliper because the paint of caliper will be scratched. And if there is brake fluid on the caliper, wipe out quickly.

**◀B▶ DRIVE SHAFT NUT REMOVAL****Caution**

Do not apply pressure to wheel bearing by the vehicle weight to avoid possible damage to wheel bearing before tightening drive shaft nut fully.

**◀C▶ REAR DRIVE SHAFT ASSEMBLY REMOVAL**

1. Use the special tools to push out the drive shaft from the hub.

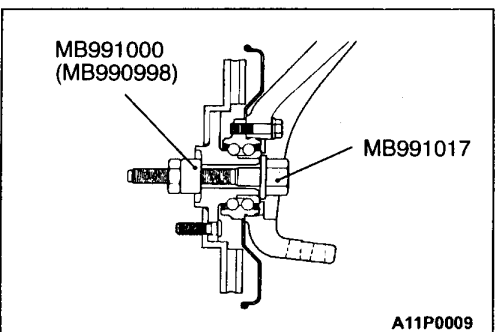


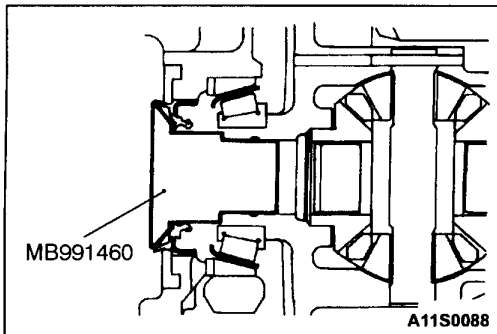
2. Remove the drive shaft from the transmission by the following procedure.

Insert a pry bar between the differential carrier and the drive shaft, and then pry the drive shaft from the differential carrier.

Caution

- (1) Do not pull on the drive shaft; doing so will damage the T.J.; be sure to use the pry bar.
- (2) When pulling the drive shaft out from the differential carrier, be careful that the spline part of the drive shaft does not damage the oil seal.
- (3) Do not apply the vehicle weight to the wheel bearing while loosening the drive shaft nut. Otherwise wheel bearing will be damaged. If, however, the vehicle weight must be applied to the bearing (because of moving the vehicle), temporarily secure the wheel bearing by using the special tool.





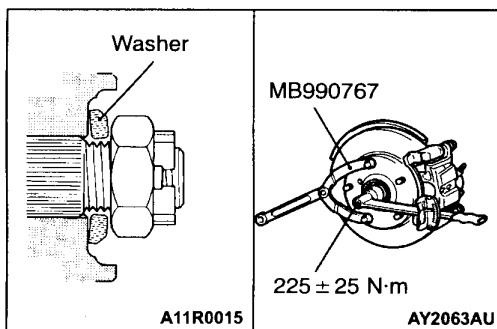
- (4) To prevent entry of foreign matter into the differential carrier, use the special tool as a cover.
<Vehicles with mechanical LSD (RH)>

INSTALLATION SERVICE POINTS

►A◄ DRIVE SHAFT INSTALLATION

Caution

When installing the drive shaft to the differential carrier, be careful that the spline part of the drive shaft does not damage the oil seal.



►B◄ DRIVE SHAFT NUT INSTALLATION

1. Assemble the drive shaft washer in the illustrated direction.
2. Tighten the drive shaft nut fully with special tools.

Caution

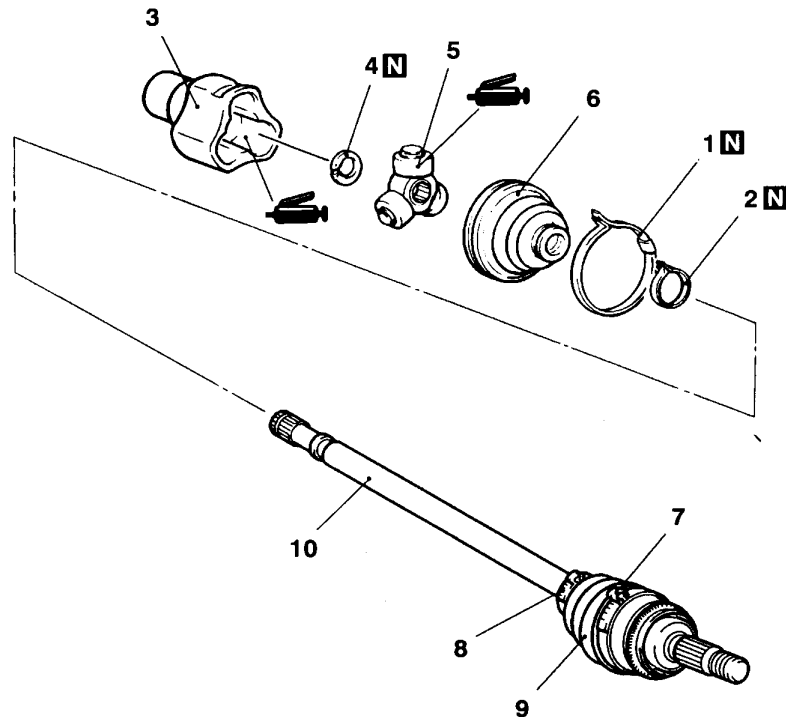
Do not apply pressure to wheel bearing by the vehicle weight to avoid possible damage to wheel bearing before tightening drive shaft nut fully.

3. If the pin hole does not align with another, tighten the drive shaft nut (less than 250 N·m) and find the nearest hole then bend the split pin to fit in.

DISASSEMBLY AND REASSEMBLY

Caution

- (1) On the vehicles with ABS or ACD, when the drive shaft is disassembled or reassembled, be careful not to interfere with the rotor for wheel speed sensor installed to the B.J. outer race to prevent the rotor from damage.
- (2) Never disassemble the B.J. assembly except when replacing the B.J. boot.



1110100	1110101	A11H0090
T.J. repair kit	T.J. boot repair kit	B.J. boot repair kit

Disassembly steps

- ▶B◀ 1. T.J. boot band (large)
 ▶B◀ 2. T.J. boot band (small)
 ◀A▶ ▶A◀ 3. T.J. case
 ◀A▶ ▶A◀ 4. Snap ring
 ◀A▶ ▶A◀ 5. Spider assembly

- ▶B▶ ▶A◀ 6. T.J. boot
 ▶B▶ ▶A◀ 7. B.J. boot band (large)
 ▶B▶ ▶A◀ 8. B.J. boot band (small)
 ▶B▶ ▶A◀ 9. B.J. boot
 ▶B▶ ▶A◀ 10. B.J. assembly

DISASSEMBLY SERVICE POINTS

◀A▶ T.J. CASE/SPIDER ASSEMBLY REMOVAL

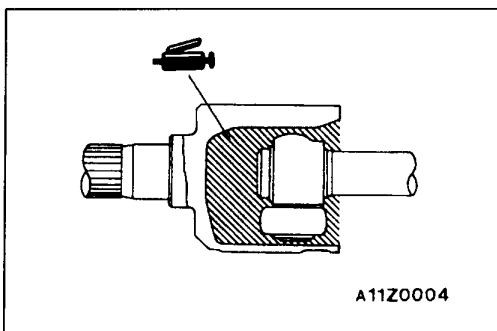
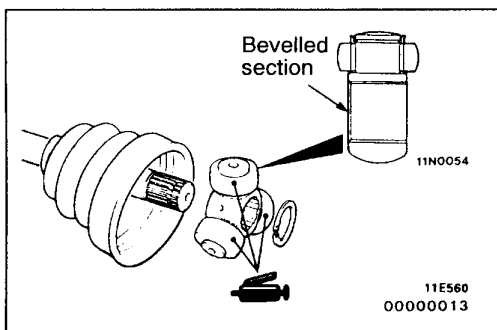
1. Wipe off grease from the spider assembly and the inside of the T.J. case.
2. Always clean the spider assembly when the grease contains water or foreign material.

Caution

Do not disassemble the spider assembly.

◀B▶ T.J. BOOT REMOVAL

1. Wipe off grease from the shaft spline.
2. When reusing the T.J. boot, wrap plastic tape around the shaft spline to avoid damaging the boot.



REASSEMBLY SERVICE POINTS

▶A▶ T.J. BOOT/SPIDER ASSEMBLY/T.J. CASE INSTALLATION

1. Apply the specified grease furnished in the repair kit to the spider assembly between the spider axle and the roller.

Specified grease: Repair kit grease

Caution

- (1) The drive shaft joint uses special grease. Do not mix old and new or different types of grease.
- (2) If the spider assembly has been cleaned, take special care to apply the specified grease.

2. Install the spider assembly to the shaft from the direction of the spline bevelled section.
3. After applying the specified grease to the T.J. case, insert the drive shaft and apply grease one more time.

Specified grease: Repair kit grease

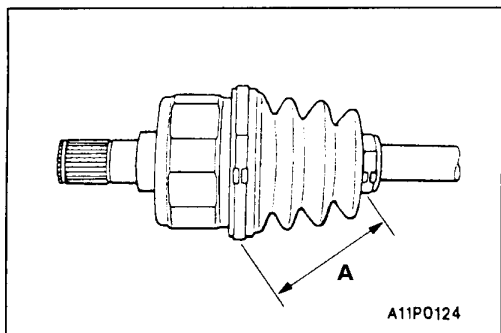
Amount to use: 105 ± 10 g

NOTE

The grease in the repair kit should be divided in half for use, respectively, at the joint and inside the boot.

Caution

The drive shaft joint uses special grease. Do not mix old and new or different types of grease.

**►B◄ T.J. BOOT BAND (SMALL)/T.J. BOOT BAND (LARGE) INSTALLATION**

Set the T.J. boot bands at the specified distance in order to adjust the amount of air inside the T.J. boot, and then tighten the T.J. boot bands securely.

Standard value (A): 90 ± 3 mm

INSPECTION

- Check the drive shaft for damage, bending or corrosion.
- Check the drive shaft spline part for wear or damage.
- Check the spider assembly for roller rotation, wear or corrosion.
- Check the groove inside T.J. case for wear or corrosion.
- Check the boots for deterioration, damage or cracking.
- Check the dust cover for damage or deterioration.

B.J. BOOT (RESIN BOOT) REPLACEMENT

Refer to GROUP26 Front Axle-Drive shaft.

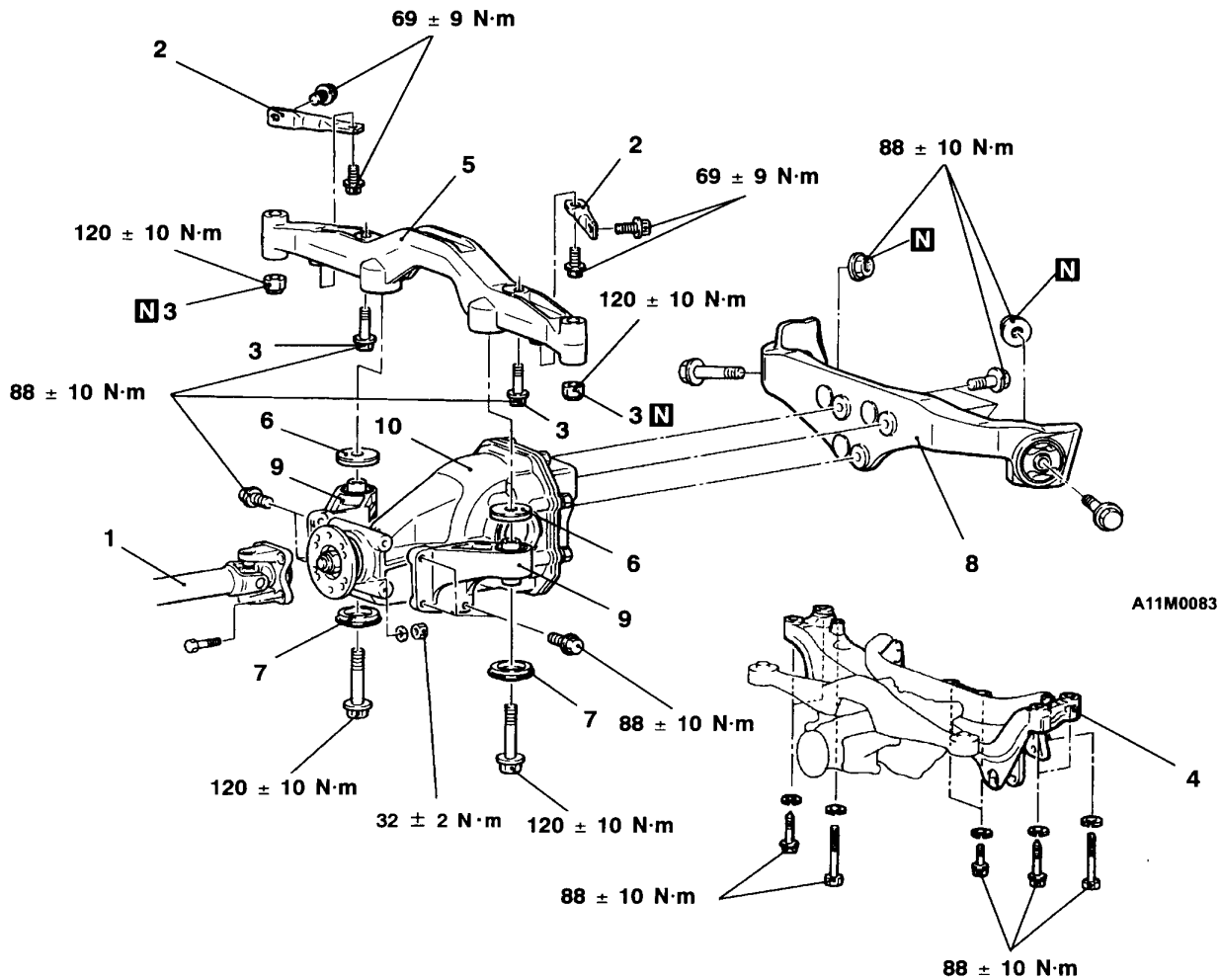
DIFFERENTIAL CARRIER <VEHICLES WITH MECHANICAL LSD> REMOVAL AND INSTALLATION

Pre-removal Operation

- Differential Gear Oil Draining (Refer to P.27B-17.)
- Lower Arm Assembly Removal (Refer to GROUP 34.)
- Rear Stabilizer Removal (Refer to GROUP 34.)
- Drive Shaft Removal (Refer to P. 27B-29.)

Post-installation Operation

- Drive Shaft Installation (Refer to P. 27B-29.)
- Rear Stabilizer Installation (Refer to GROUP 34.)
- Lower Arm Assembly Installation (Refer to GROUP 34.)
- Differential Gear Oil Filling (Refer to P.27B-17.)



Removal steps

◀A▶

1. Propeller shaft connection (Refer to GROUP 25.)
2. Toe control bar
3. Differential support member mounting boots and nuts

◀B▶ ▶A▶

4. Rear crossmember and differential carrier assembly

5. Differential support member
6. Upper stopper
7. Lower stopper
8. Differential support arm
9. Differential mount bracket
10. Differential carrier assembly

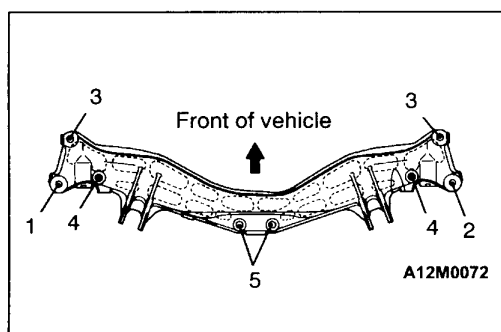
REMOVAL SERVICE POINTS

◀A▶ PROPELLER SHAFT DISCONNECTION

Suspend the removed propeller shaft from the body with a wire to prevent bending.

◀B▶ REAR CROSSMEMBER AND DIFFERENTIAL CARRIER ASSEMBLY REMOVAL

1. Using a jack, support the differential carrier from its underside.
2. Remove the rear crossmember mounting bolts and remove the differential carrier, where it is attached to the rear crossmember, from the vehicle.



INSTALLATION SERVICE POINTS

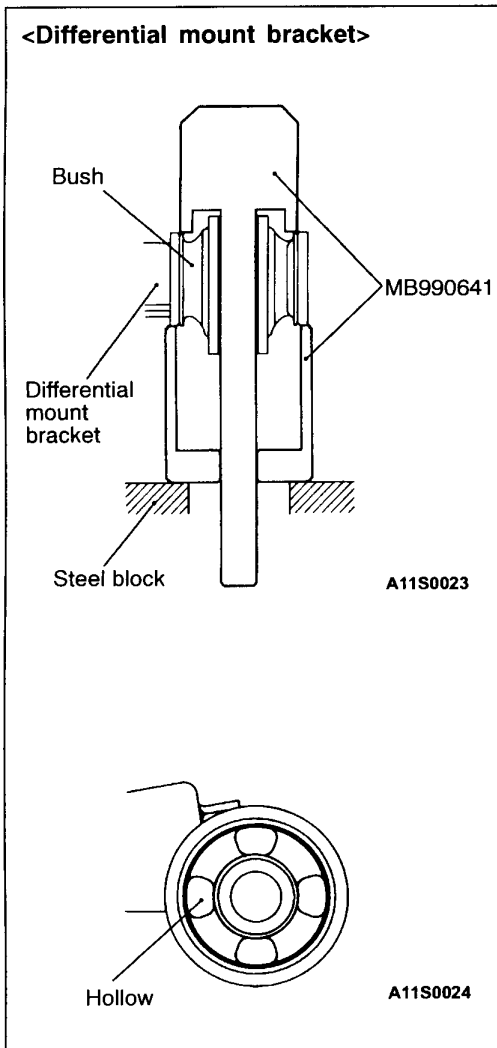
▶A▶ REAR CROSSMEMBER AND DIFFERENTIAL CARRIER ASSEMBLY INSTALLATION

Tighten the rear crossmember mounting bolts in the numerical order shown.

NOTE

To ensure both good installation accuracy and ease of installation, the rear crossmember mounting holes have different diameters between front and rear. This is the reason for specifying the tightening sequence of the mounting bolts.

No.	Bolt type	Bolt size (thread dia. × length) mm
1, 2, 3	Flange bolt (with washer)	12 × 105
4	Bolt (with spring washer and washer)	12 × 152
5	Flange bolt (with washer)	12 × 70

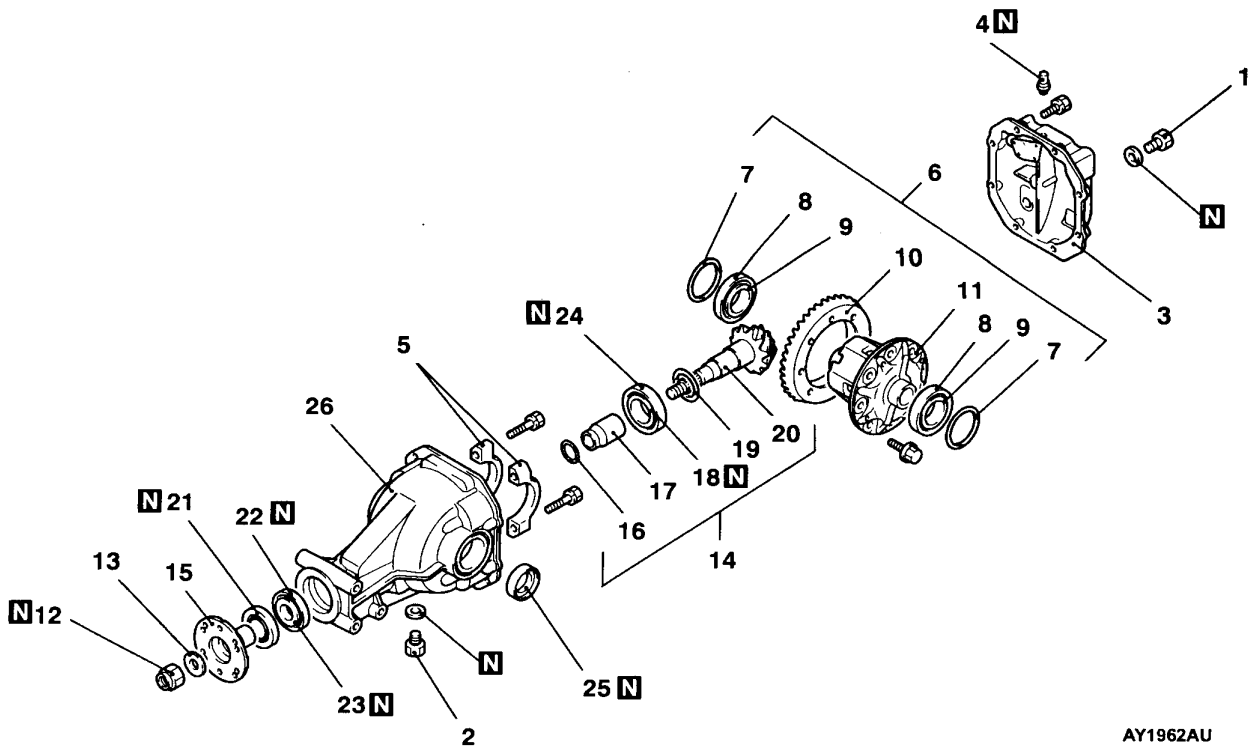


BUSHING REPLACEMENT

1. Remove and press fit the bush with special tool. (About removal and press fitting the bush of the differential support arm, refer to P. 27B-57.)
2. Press fit the bush so that the hollow of the bush is on the position shown as the illustration.
3. Press fill the bush until the surface of the outer sleeve of the bush, differential mounting bracket.

27B-38 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>

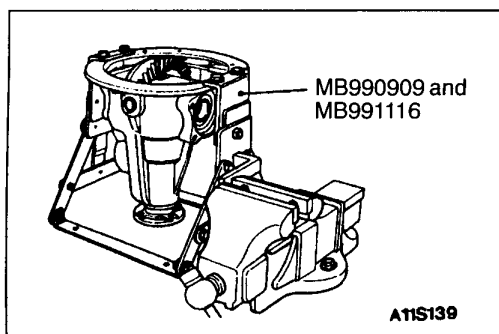
DISASSEMBLY



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Disassembly steps

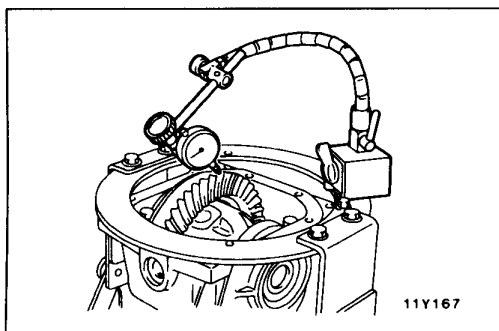
- | | |
|--|---|
| <p>◀A▶</p> <p>• Inspection before disassembly</p> <p>1. Filler plug</p> <p>2. Drain plug</p> <p>3. Differential cover assembly</p> <p>4. Vent plug</p> <p>5. Bearing cap</p> <p>6. Differential case assembly</p> <p>7. Side bearing spacer</p> <p>8. Side bearing outer race</p> <p>9. Side bearing inner race</p> <p>10. Drive gear</p> <p>11. Limited slip differential case assembly*</p> <p>12. Self-locking nut</p> <p>13. Washer</p> <p>14. Drive pinion assembly</p> | <p>◀F▶</p> <p>15. Companion flange</p> <p>16. Drive pinion front shim (For adjusting preload of drive pinion)</p> <p>17. Drive pinion spacer</p> <p>◀G▶</p> <p>18. Drive pinion rear bearing inner race</p> <p>19. Drive pinion rear shim (For adjusting drive pinion height)</p> <p>20. Drive pinion</p> <p>21. Oil seal</p> <p>22. Drive pinion front bearing inner race</p> <p>23. Drive pinion front bearing outer race</p> <p>24. Drive pinion rear bearing outer race</p> <p>25. Oil seal</p> <p>26. Differential carrier</p> |
|--|---|



DISASSEMBLY SERVICE POINTS

◀A▶ INSPECTION BEFORE DISASSEMBLY

1. Remove the cover.
2. Hold the special tool in a vise, and install the differential carrier assembly to the special tool.

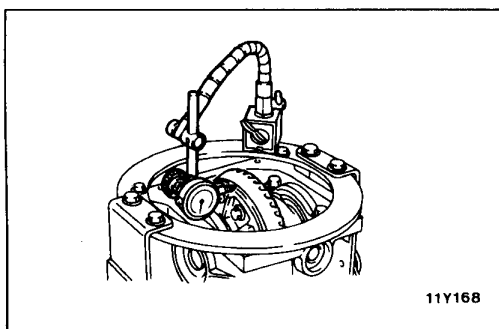


DRIVE GEAR BACKLASH

1. With the drive pinion locked in place, use a dial gauge to measure the drive gear backlash in four or more places on the drive gear.

Standard value: 0.11 – 0.16 mm

2. If the backlash is not within the standard value, adjust the final drive gear backlash. (Refer to P.27B-49.)
3. After the adjustment, inspect the drive gear tooth contact.

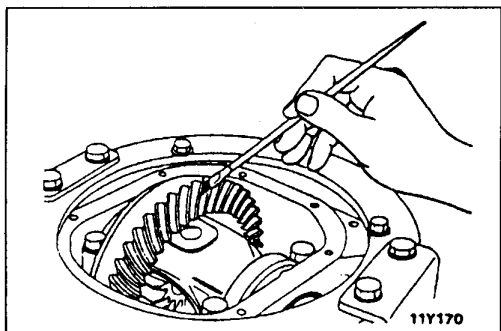


DRIVE GEAR RUNOUT

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

Limit: 0.05 mm

2. When runout exceeds the limit value, check for foreign object between drive gear rear side and differential case, or for loose drive gear installation bolts.
3. When check (2) gives normal results, reposition drive gear and differential case and remeasure.
4. If adjustment is impossible, replace differential case, or replace drive gear and pinion as a set.

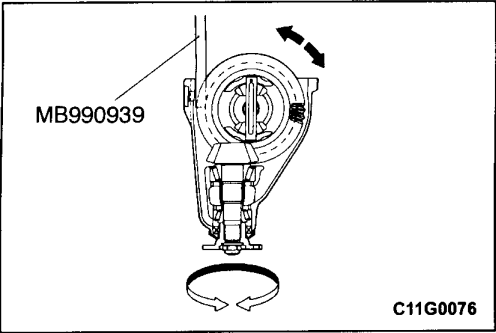


DRIVE GEAR TOOTH CONTACT

Check the tooth contact of drive gear by following the steps below.

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

27B-40 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>

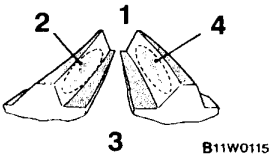
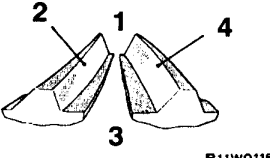
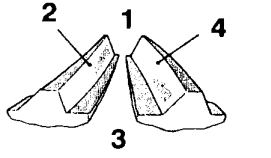
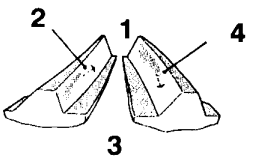
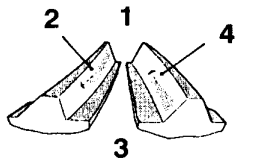


2. Insert the brass between the differential carrier and the differential case, and then rotate the companion flange by hand (once in the normal direction, and then once in the reverse direction) while applying a load to the drive gear so that the revolution torque (approximate 2.5 – 3.0 N·m) is applied to the drive pinion.

Caution

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

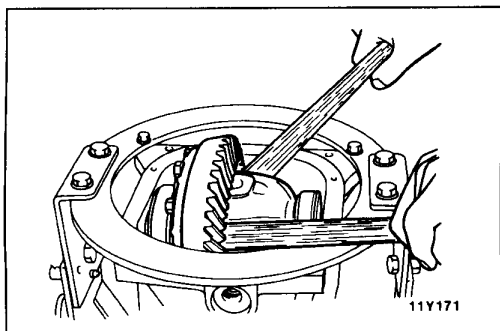
3. Check the tooth contact condition of the drive gear and drive pinion.

Standard tooth contact pattern	Problem	Solution
1 Narrow tooth side 2 Drive-side tooth surface (the side applying power during forward movement) 3 Wide tooth side 4 Coast-side tooth surface (the side applying power during reverse movement) 	Tooth contact pattern resulting from excessive pinion height  The drive pinion is positioned too far from the centre of the drive gear.	 Increase the thickness of the drive pinion rear shim, and position the drive pinion closer to the centre 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 centre of the drive gear.	 Decrease the thickness of the drive pinion rear shim, and position the drive pinion farther from the centre of the drive gear. Also, for backlash adjustment, position the drive gear closer to the 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.

If, even after adjustments have been made, the correct tooth contact pattern cannot be obtained, it means that the drive gear and the drive pinion have become worn beyond the allowable limit. Replace the gear set.



◀B▶ DIFFERENTIAL CASE ASSEMBLY/ SIDE BEARING SPACER/SIDE BEARING OUTER RACE REMOVAL

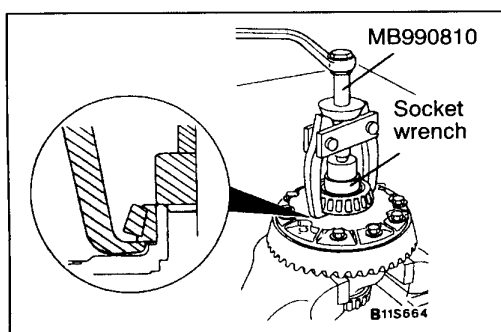
Use the handle of a hammer to remove the differential case assembly, side bearing spacers and side bearings.

Caution

When taking out the differential case assembly, be careful not to drop and damage the side bearing spacers or the side bearing outer races.

NOTE

Keep the right and left side bearings and side bearing outer race separate, so that they do not become mixed at the time of assembly.



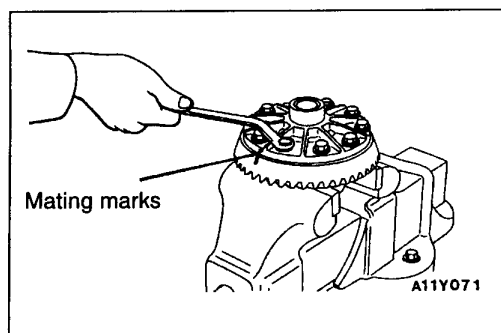
◀C▶ SIDE BEARING INNER RACE REMOVAL

Use special tools to pull out the side bearing inner race.

NOTE

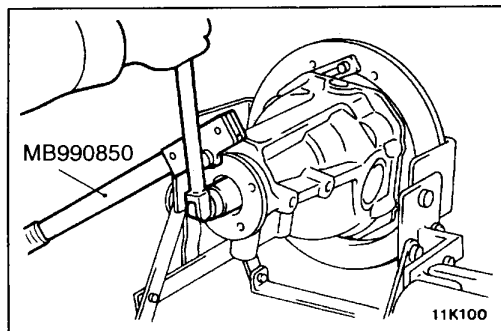
There are two notches provided (at the differential case side) for the claw part of the special tool; use the special tool at that position.

If notches of special tools touch the end of differential case and fail to hook with inner race, file the notches to be able to hook with inner race.



◀D▶ DRIVE GEAR REMOVAL

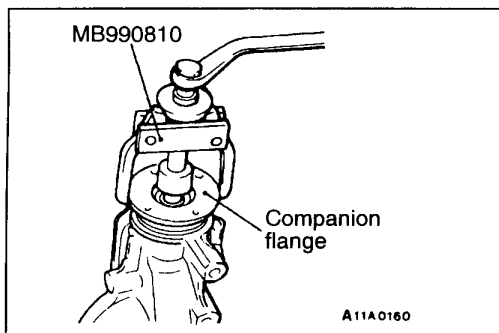
1. Make the mating marks to the differential case and the drive gear.
2. Loosen the drive gear attaching bolts in diagonal sequence to remove the drive gear.



◀E▶ SELF-LOCKING NUT REMOVAL

Use special tool to hold the companion flange, and then remove the companion flange self-locking nut.

27B-42 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>



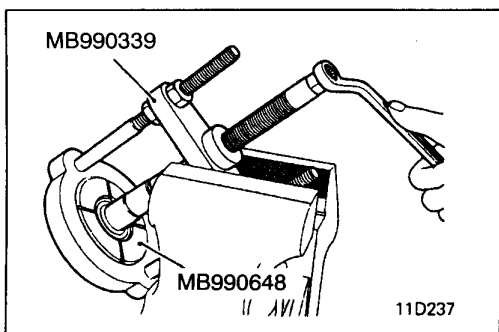
◀F▶ DRIVE PINION ASSEMBLY/COMPANION FLANGE REMOVAL

1. Make the mating marks to the drive pinion and companion flange.

Caution

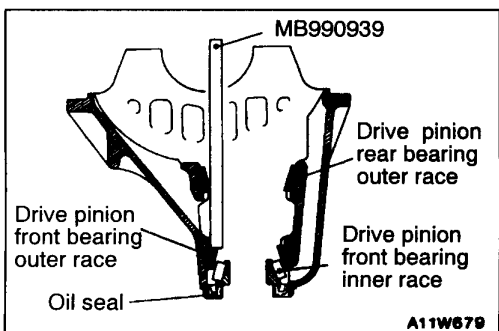
Do not make mating marks on the contact surfaces of the companion flange and propeller shaft.

2. Use special tools to pull out the companion flange.



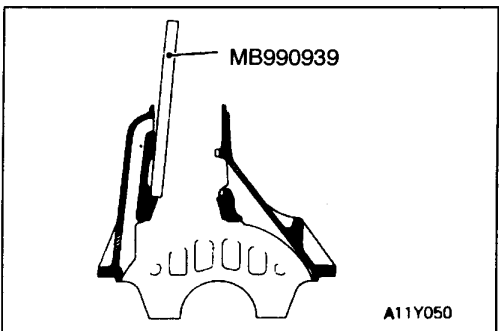
◀G▶ DRIVE PINION REAR BEARING INNER RACE REMOVAL

Use special tools to pull out the front bearing inner race.



◀H▶ OIL SEAL/DRIVE PINION FRONT BEARING INNER RACE/DRIVE PINION FRONT BEARING OUTER RACE REMOVAL

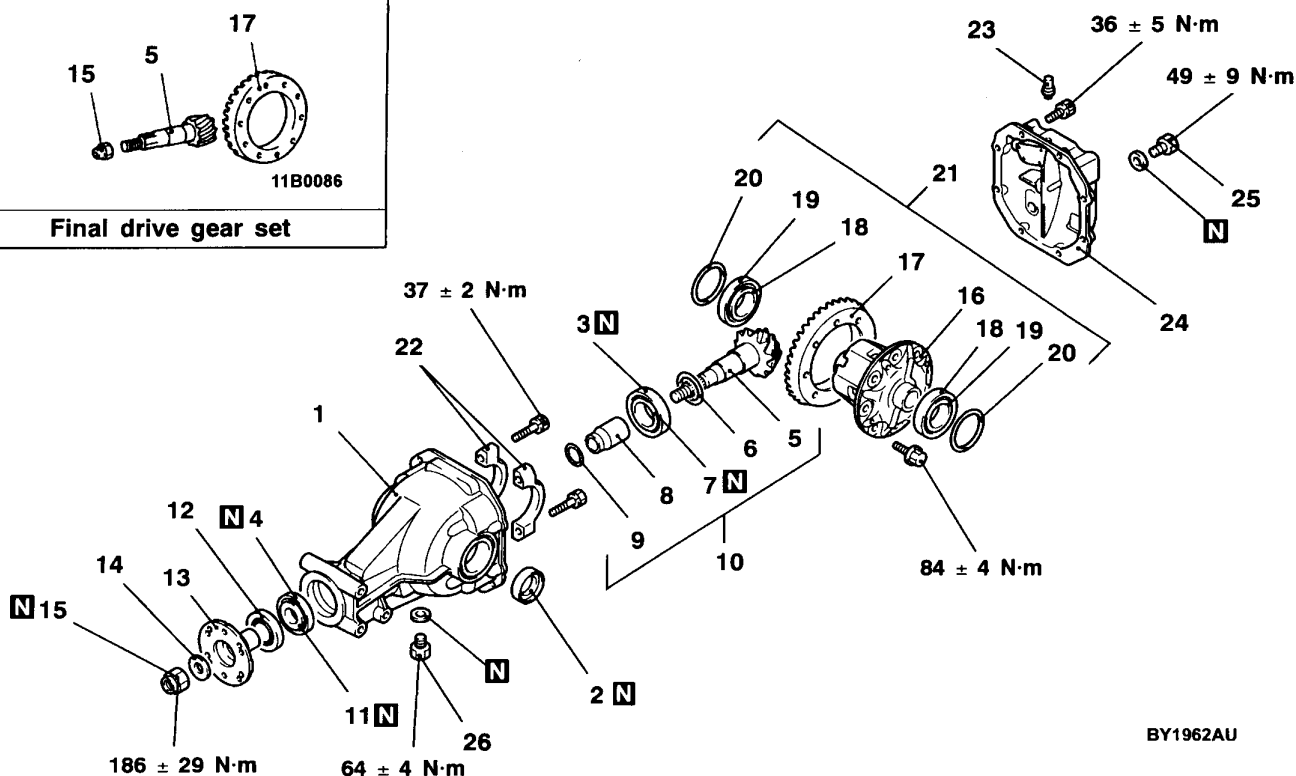
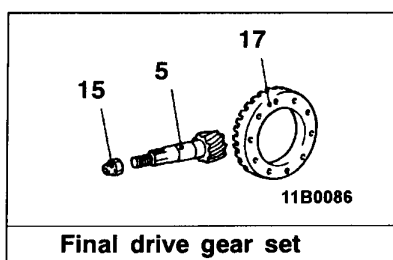
Use special tool to remove drive pinion front bearing outer race.



◀I▶ DRIVE PINION REAR BEARING OUTER RACE REMOVAL

Use special tool to remove the drive pinion rear bearing outer race.

REASSEMBLY



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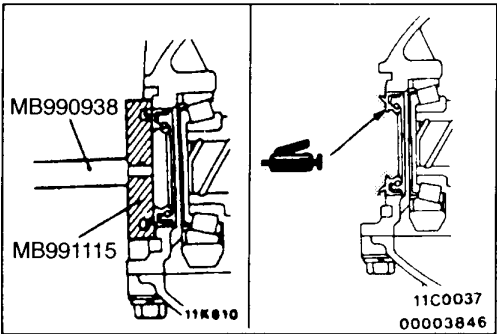
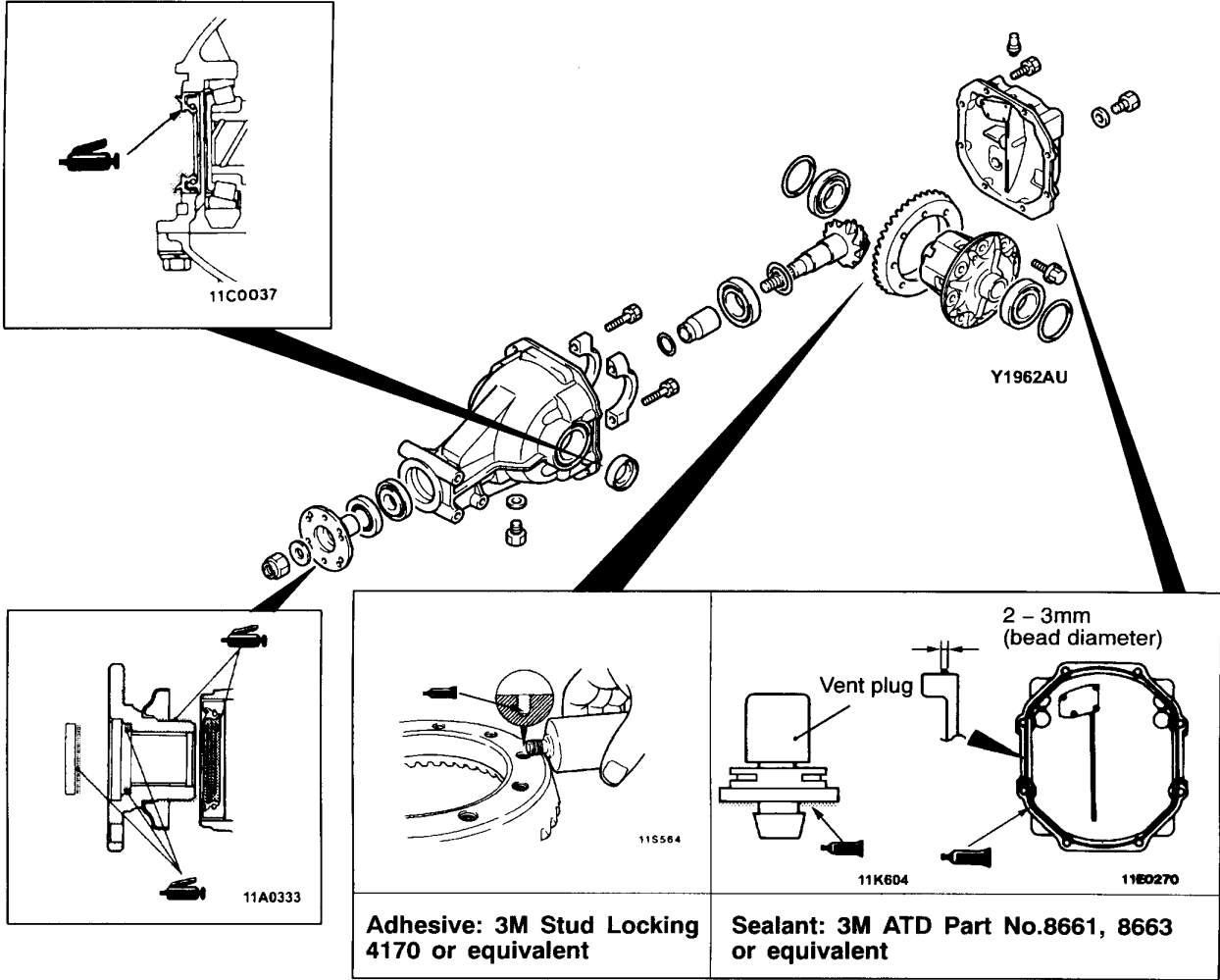
Reassembly steps

- 1. Differential carrier
- ▶A◀ 2. Oil seal
- ▶B◀ 3. Drive pinion rear bearing outer race
- ▶C◀ 4. Drive pinion front bearing outer race
- ▶D◀ • Drive pinion height adjustment
- 5. Drive pinion
- 6. Drive pinion rear shim (For adjusting drive pinion height)
- 7. Drive pinion rear bearing inner race
- 8. Drive pinion spacer
- ▶E◀ • Drive pinion turning torque adjustment
- 9. Drive pinion front shim (For adjusting drive pinion preload)
- 10. Drive pinion assembly
- ▶E◀ 11. Drive pinion front bearing inner race
- ▶E◀ 12. Oil seal

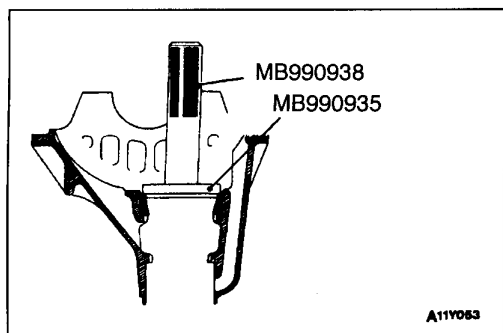
- 13. Companion flange
- 14. Washer
- 15. Self-locking nut
- 16. Limited slip differential case assembly
- ▶F◀ 17. Drive gear
- ▶G◀ 18. Side bearing inner race
- 19. Side bearing outer race
- 20. Side bearing spacer
- ▶H◀ 21. Differential case assembly
- 22. Bearing cap
- 23. Vent plug
- 24. Differential cover assembly
- 25. Drain plug
- 26. Filler plug
- ▶H◀ • Final drive gear backlash adjustment

27B-44 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>

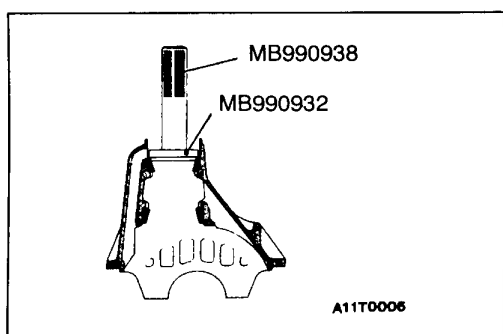
Lubrication and Adhesive Points



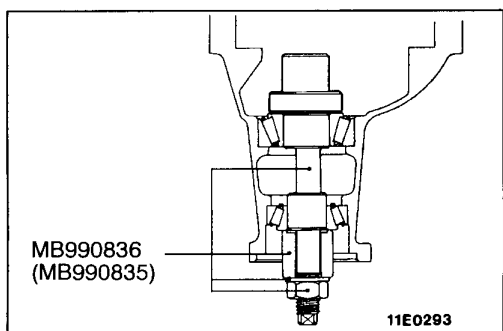
REASSEMBLY SERVICE POINTS
▶◀ OIL SEAL PRESS-FITTING



►B◄ **DRIVE PINION REAR BEARING OUTER RACE PRESS-FITTING**



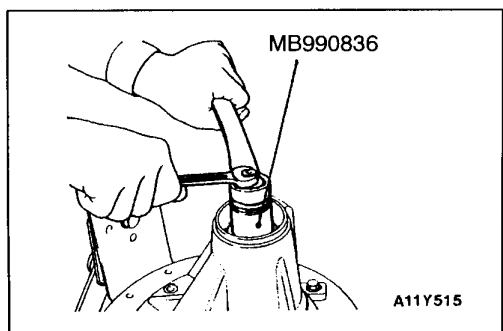
►C◄ **DRIVE PINION FRONT BEARING OUTER RACE PRESS-FITTING**



►D◄ **DRIVE PINION HEIGHT ADJUSTMENT**

Adjust the drive pinion height by the following procedures:

1. Apply multipurpose grease to the washer of special tool.
2. Install special tool and drive pinion front and rear bearing inner races to the gear carrier in the sequence shown in the illustration.



3. Tighten the nut of special tool a little at a time while measuring the turning torque of the drive pinion. Then confirm the turning torque (without the oil seal) is at the standard value.

Standard value:

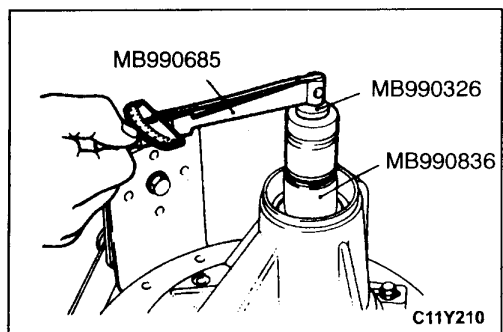
Bearing type	Turning torque
New	0.88 – 1.17 N·m

Caution

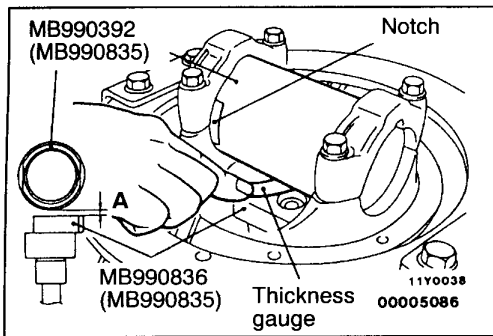
Take care not to fit gear oil on the bearing.

NOTE

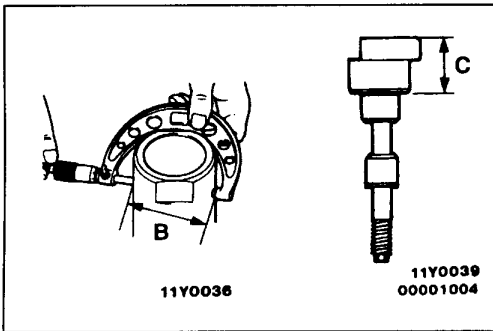
The special tool can not rotate, move several times in moving area, after rotating the bearing, measure the torque.



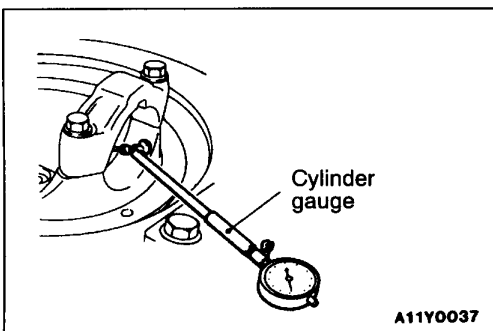
27B-46 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>



4. Clean the side bearing hub.
5. Place special tool between the side bearing hub of the gear carrier, and position the notch as shown in the illustration. Then tighten side bearing mounting bolt.
6. Use a thickness gauge to measure the clearance (A) between special tools.

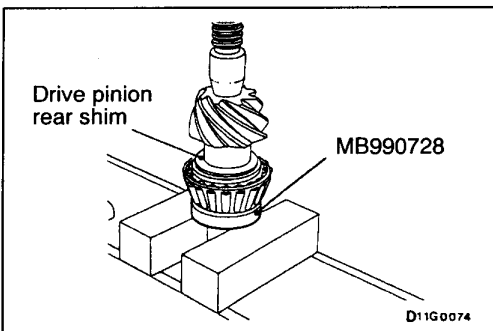


7. Remove special tools (MB990835, MB990326).
8. Use a micrometer to measure the shown dimensions (B, C) of special tools.

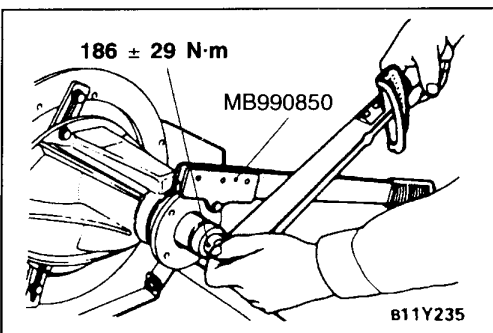


9. Install the bearing cap, and then use a cylinder gauge to measure inside diameter (D) of the bearing cap.
10. Calculate thickness (F) of the required drive pinion rear shim twice by the following formula. Select a shim which most closely matches this thickness.

$$F = A + B + C - 1/2D - 86.00 \text{ mm}$$



11. Fit the selected drive pinion rear shim(s) to the drive pinion, and press-fit the drive pinion rear bearing inner race by using special tool.



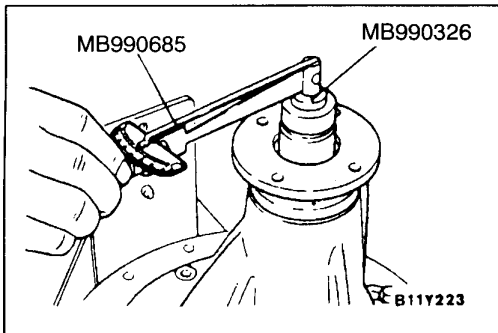
►E◀ DRIVE PINION TURNING TORQUE ADJUSTMENT /OIL SEAL INSTALLATION

1. Insert the drive pinion into the gear carrier, and then install the following parts in sequence from the carrier rear side. Drive pinion spacer, drive pinion front shim and drive pinion front bearing inner race, companion flange.

NOTE

Do not install the oil seal.

2. Tighten the companion flange to the specified torque by using special tool.



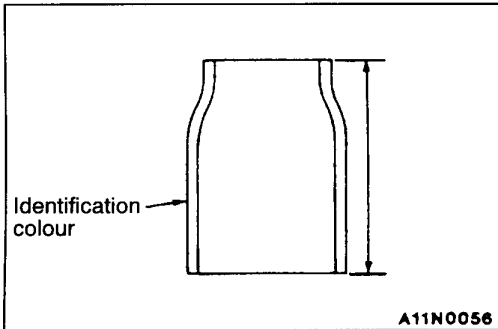
3. Measure the drive pinion turning torque (without the oil seal).

Standard value:

Bearing division	Turning torque
New	0.88 – 1.17 N·m

Caution

Take care not to fit gear oil on the bearing.



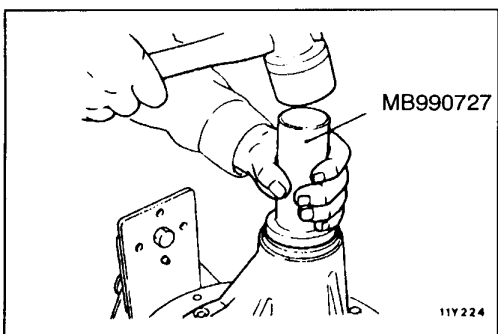
4. If the drive pinion turning torque is not within the standard value, adjust the turning torque by replacing the drive pinion front shim(s) or the drive pinion spacer.

NOTE

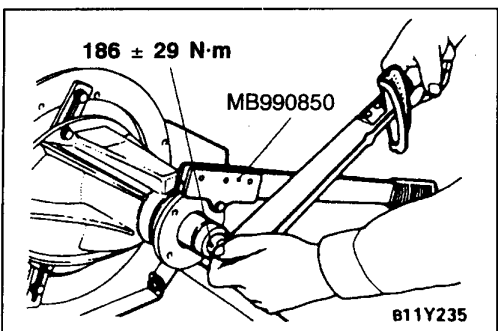
When selecting the drive pinion front shims, if the number of shims is large, reduce the number of shims to a minimum by selecting the drive pinion spacers.

Also, select the drive pinion spacer from the following two types.

Height of drive pinion spacer mm	Identification colour
57.72	–
57.08	Red

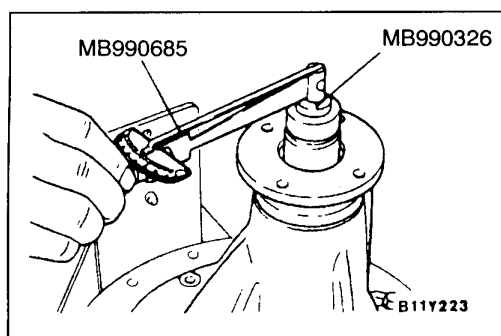


5. Remove the companion flange and drive pinion again. Then insert the drive pinion front bearing inner race into the gear carrier. Use special tool to press-fit the oil seal.



6. Install the drive pinion assembly and companion flange with mating marks properly aligned. Tighten the companion flange self-locking nut to the specified torque using special tool.

27B-48 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>

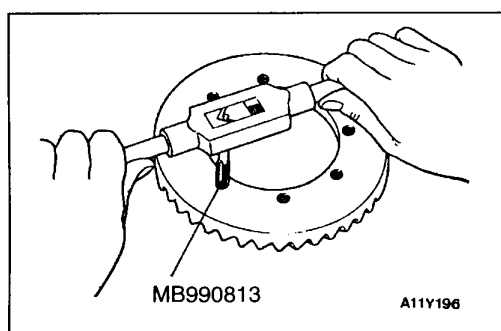


- Measure the drive pinion turning torque (with oil seal) to verify that the drive pinion turning torque complies with the standard value.

Standard value:

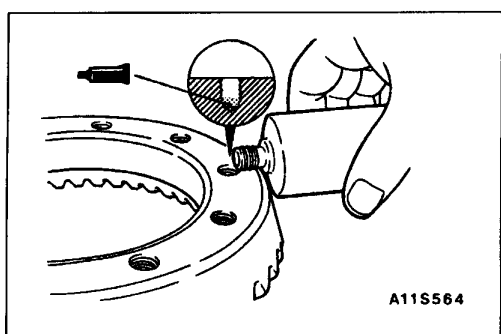
Bearing division	Companion flange lubrication	Turning torque
New	None (With anti-rust agent)	0.98 – 1.27 N·m
	Gear oil applied	0.49 – 0.58 N·m

- If the turning torque is not within the standard value, check the tightening torque of the companion flange self-locking nut, and the installation of the oil seal.



►F◀ DRIVE GEAR INSTALLATION

- Clean the drive gear attaching bolts.
- Remove the adhesive adhered to the threaded holes of the drive gear by turning the special tool (tap M8 x 1.0), and then clean the threaded holes by applying compressed air.



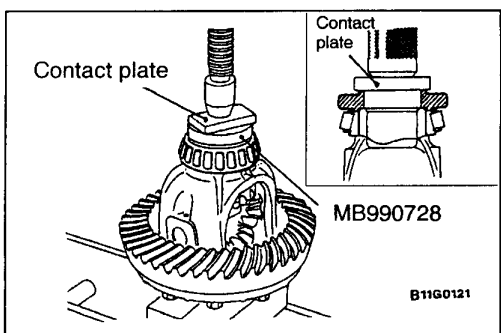
- Apply the specified adhesive to the threaded holes of the drive gear.

Specified adhesive:

3M Stud Locking 4170 or equivalent

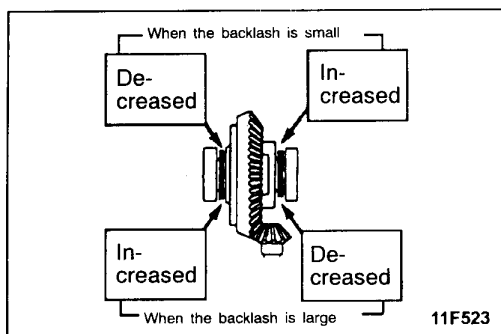
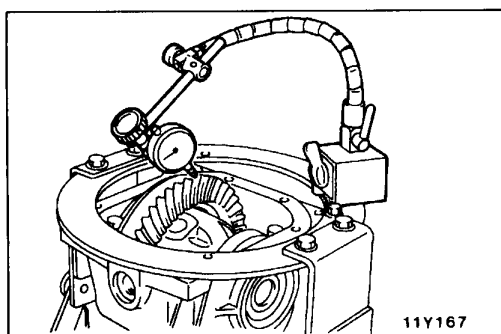
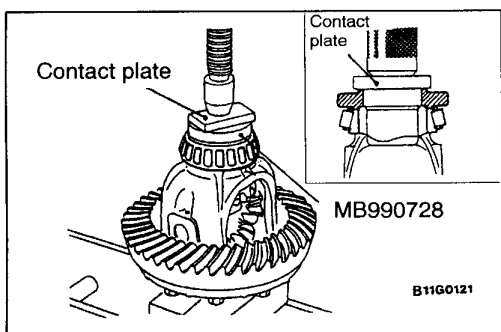
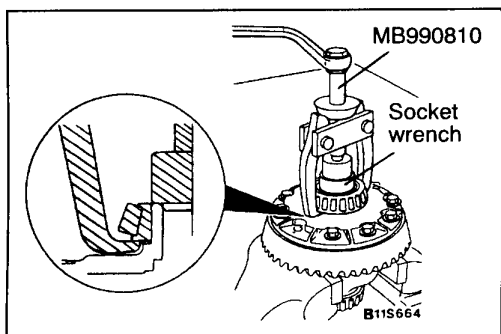
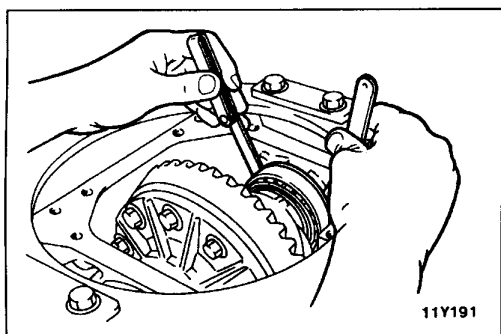
- Install the drive gear onto the LSD case with the mating marks properly aligned. Tighten the bolts to the specified torque in a diagonal sequence.

Tightening torque: 84 ± 4 N·m



►G◀ SIDE BEARING INNER RACE INSTALLATION

Use special tool to press-fit the side bearing inner races into the differential case.



►H◄ BEARING CAP INSTALLATION/FINAL DRIVE GEAR BACKLASH ADJUSTMENT

Adjust drive gear backlash as follows:

1. Assemble the differential case with the side bearing outer race to the gear carrier.
2. Press the differential case to one side to measure the clearance of the side bearing outer race and the gear carrier.
3. Select two pairs of the side bearing spacer with the thickness derived from the sum of the clearance and a half of pre-load, 0.05 mm.
4. Remove the side bearing with special tools.

NOTE

Hook the claws of the special tool with the side bearing inner race by using the notches (two areas) of the LSD case side.

5. Assemble the selected side bearing spacers to each side.

6. Use special tools to press-fit the side bearing inner case into the LSD case. After installing the outer race, assemble the LSD case to the gear carrier.

7. Align the mating marks of differential carrier and the bearing cap with each other to tighten to the specified torque.

Tightening torque: 37 ± 2 N·m

8. Measure the drive gear backlash.

NOTE

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

Standard value: 0.11 – 0.16 mm

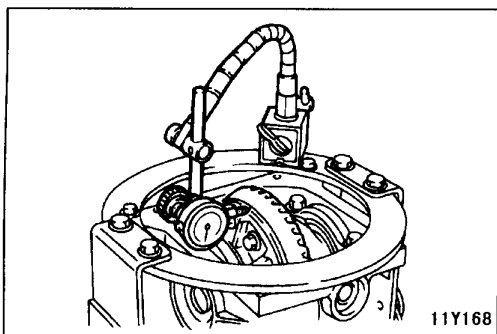
9. If the backlash is not within the standard value, move the side bearing spacer as shown in the illustration to adjust the backlash.

NOTE

The increment of side bearing spacer must be coincided with the decreased amount.

10. Inspect the tooth condition at the final drive gear and make an adjustment if required. (Refer to P.27B-39.)

27B-50 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>



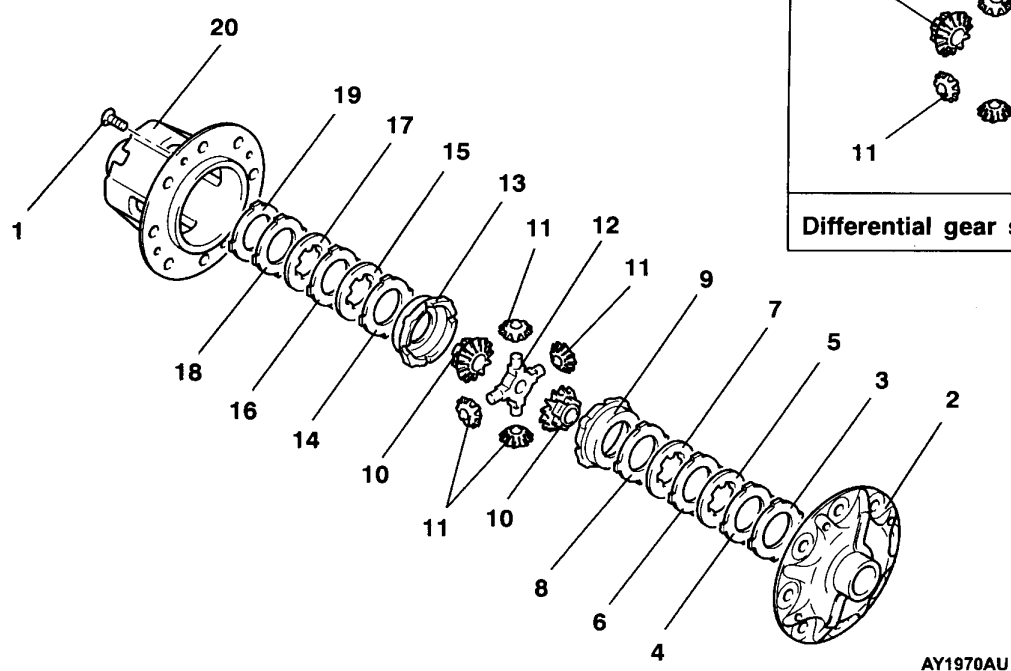
11. Measure the drive gear runout.

Limit: 0.05 mm

12. When drive gear runout exceeds the limit, remove the differential case and then the drive gears, moving them to different positions and reinstall them.

13. If adjustment is not possible, replace the differential case or drive gear and drive pinion as a set.

LSD CASE ASSEMBLY DISASSEMBLY AND REASSEMBLY



Differential gear set

AY1970AU

Disassembly steps

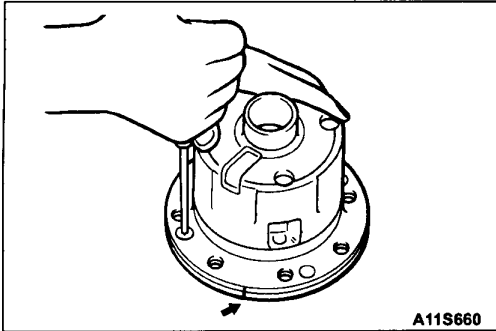
● LSD differential torque check

◀A▶ ▶C▶
▶B▶

1. Screw
2. Differential case A
3. Spring plate
4. Friction plate
5. Friction disc
6. Friction plate
7. Friction disc
8. Friction plate
9. Pressure ring

10. Side gear
11. Pinion gear
12. Pinion shaft
13. Pressure ring
14. Friction plate
15. Friction disc
16. Friction plate
17. Friction disc
18. Friction plate
19. Friction plate
20. Differential case B

▶A▶



REMOVAL SERVICE POINT

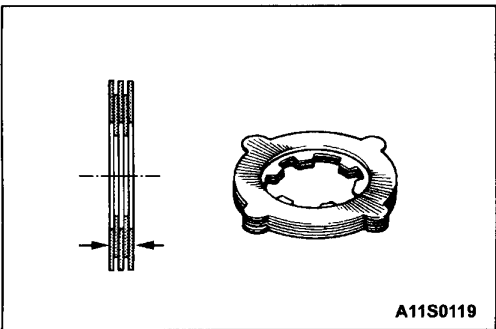
◀A▶ SCREWS REMOVAL

1. Check out the alignment marks.
2. Loosen a uniform amount little by little the screws securing differential case A to B.
3. Separate differential case B from differential case A and remove their components.
Keep the removed spring plates, friction plates, and friction discs organized in the order of removal and for right and left use.

INSTALLATION SERVICE POINTS

▶A◀ DIFFERENTIAL CASE B INSTALLATION

Before starting the assembly procedure, perform the following steps to adjust dimensional differences (clutch plate friction force) in the axial direction of the components inside the differential case and axial clearance of the differential side gear.



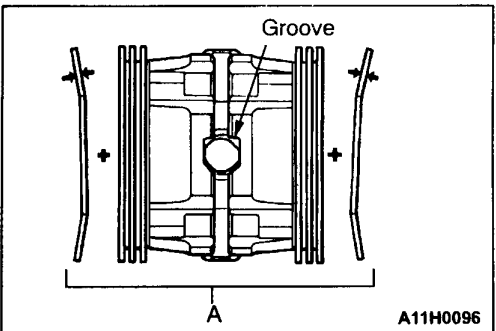
1. Place friction discs (two each) and friction plates (three each) one on top of another as illustrated and, using a micrometer, measure the thickness of each of the right and left assemblies. Select different discs and plates so that the difference between the right and left assemblies falls within the specified range.

Standard value: 0 – 0.05 mm

NOTE

If a new part is used, note that the friction disc comes in two thicknesses: 1.6 mm and 1.7 mm.

2. Measure the thickness of each of the right and left spring plates.



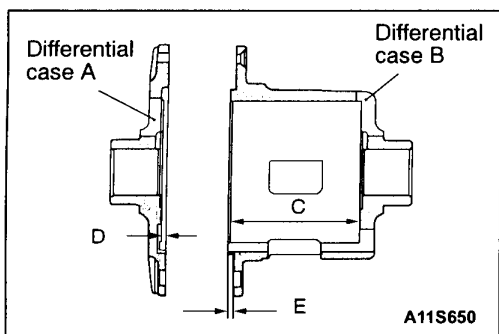
3. Assemble the pressure ring internal parts (pinion shaft and pressure ring), friction plates, and friction discs and, using a micrometer, measure the overall width.

NOTE

When taking measurements, press the assembly from both sides so that the pinion shaft makes a positive contact with the groove in the pressure ring.

4. Find value (A) which is the thickness measured in step (3) added to the thickness of two spring plates.

27B-52 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>

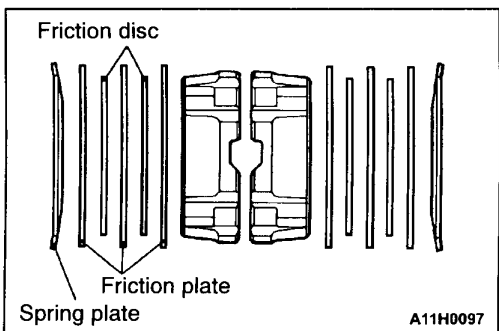


- Find dimension (B) between the spring plate faying surfaces when differential case A and B are assembled together.

$$B = C + D - E$$

- If the clearance between the spring plate and differential case (B – A) is outside the specified range, change the friction discs and make adjustments.

Standard value: 0.06 – 0.25 mm



- Coat each part with the specified gear oil and mount it in the specified direction and order into differential case B.

Specified gear oil:

Hypoid gear oil

MITSUBISHI Genuine Gear Oil Part No. 8149630
EX, CASTROL HYPOY LS (GL-5, SAE 90),
SHELL-LSD (GL-5, SAE 80W – 90) or equivalent

NOTE

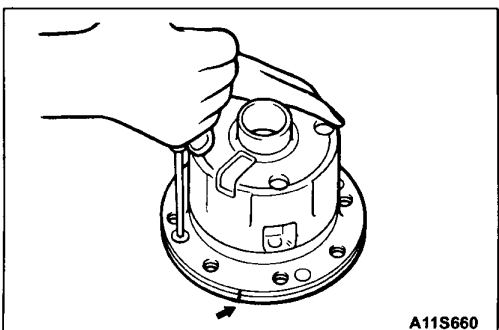
Apply a careful coat of gear oil to the contacting and sliding surfaces.

►B◄ SCREW TIGHTENING

- Align the alignment mark on differential case A with that on differential case B.
- Tighten the screws connecting differential case A and B a uniform amount little by little in the diagonal order.

NOTE

If tightening the screws does not bring the two cases properly together, spring plates are not probably assembled properly. Reassemble from the start.



►C◄ LSD DIFFERENTIAL TORQUE CHECK

- Using the special tool, check for differential torque.

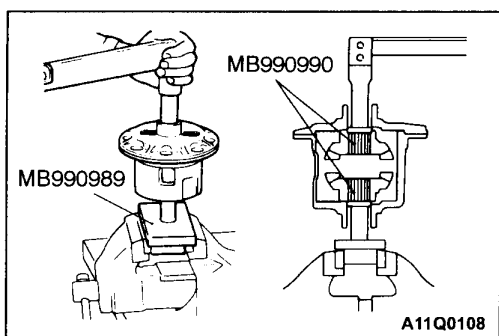
Standard value:

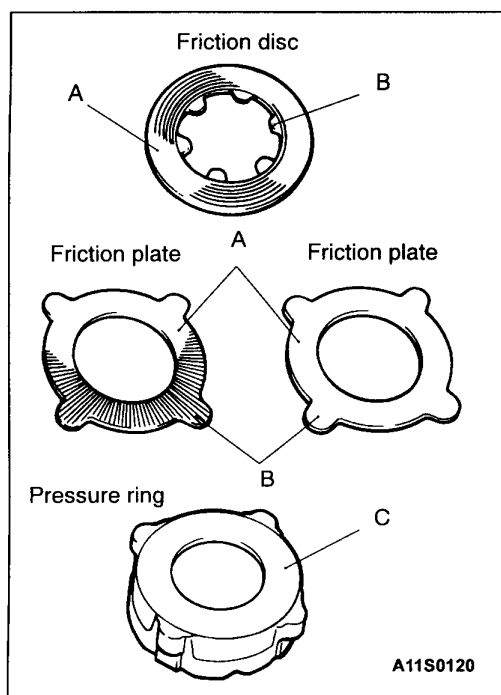
Item	LSD differential torque N·m
When new clutch plate is installed	5 – 19
When existing clutch plate is installed	2 – 19

NOTE

Before measuring the differential torque, first turn the gears so they snug each other, then take measurements during rotation.

- If the measurement falls outside the specified range, disassemble the differential case assembly and repair or replace defective parts.





INSPECTION

DIFFERENTIAL CASE INTERNAL PARTS CONTACT/ SLIDING SURFACE CHECK

1. Clean the disassembled parts with cleaning oil and dry them with compressed air.

2. Check each plate, disc, and pressure ring for the following:
 - A. Friction and sliding surfaces of friction discs, friction plates, and spring plates.
Replace a defective part with heat discoloration and excessive wear with a new one, as it degrades locking performance.

NOTE

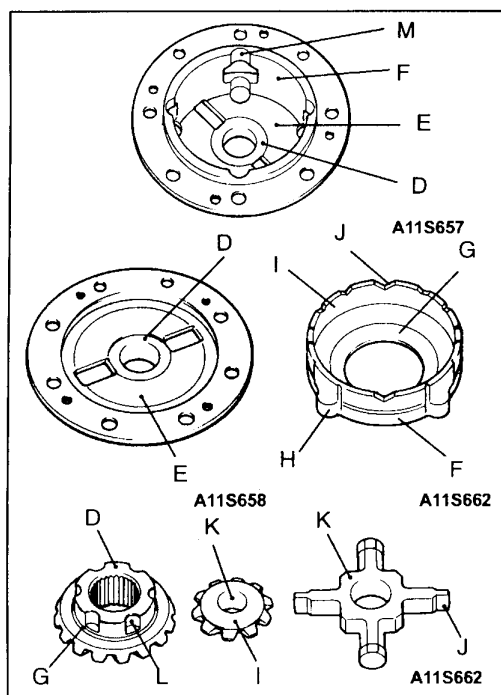
If the inner periphery of the friction face shows traces of harsh contact, it is because of the spring tension of each plate, disc and other part. Do not confuse this with abnormal wear.

- B. Inner periphery and outer periphery protrusions of friction discs, friction plates, and spring plates.
Replace a cracked or damaged part with a new one.

- C. Friction and sliding surfaces between pressure rings and friction discs.
Grind a dented or scratched part with oil stone and then lap and correct with a compound on a surface plate.

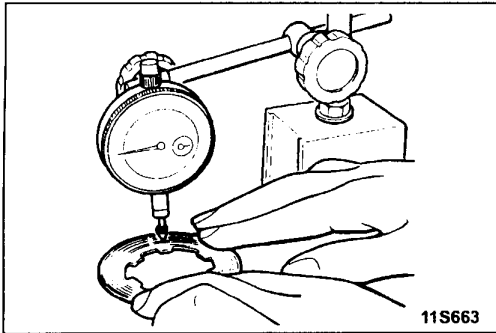
NOTE

If the inner periphery of the friction face shows traces of harsh contact, it is because of the spring tension of each plate, disc and other part. Do not confuse this with abnormal wear.



3. Check the following parts for contact and sliding surfaces (D to M) and correct burrs and dents with oil stone.
 - D: Sliding surfaces of side gear and case
 - E: Contacting surfaces of differential case and spring plate
 - F: Contacting surfaces of pressure ring and differential case inner face
 - G: Sliding surfaces of pressure ring hole and side gear
 - H: Protrusions on outer periphery of pressure ring
 - I: Pressure ring inner surface and differential pinion gear spherical surface
 - J: Pressure ring V-groove and pinion shaft V
 - K: Sliding surfaces of pinion shaft and differential pinion gear hole
 - L: Side gear grooves on outer periphery
 - M: Slits in inner periphery of differential

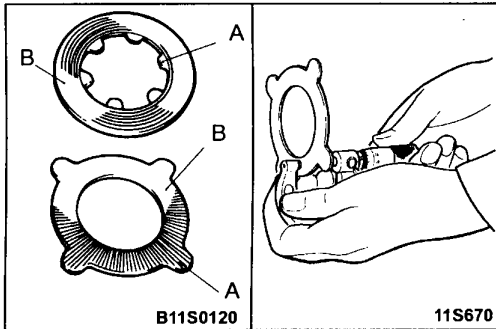
27B-54 REAR AXLE – Differential Carrier <Vehicles with mechanical LSD>



FRICTION PLATE AND FRICTION DISC DISTORTION CHECK

Apply a dial indicator to the friction plate or disc on a surface plate and, turning the friction plate or disc, measure the distortion (flatness).

Limit: 0.08 mm (total runout)



FRICTION PLATE, FRICTION DISC, AND SPRING PLATE WEAR CHECK

1. For the purpose of determining wear, measure thickness (A, B) of the friction surface and protrusion at several places and find the difference between the two.

Limit: 0.1 mm

2. If the wear exceeds the limit, replace the part with a new one.

DIFFERENTIAL CARRIER <VEHICLES WITH AYC>

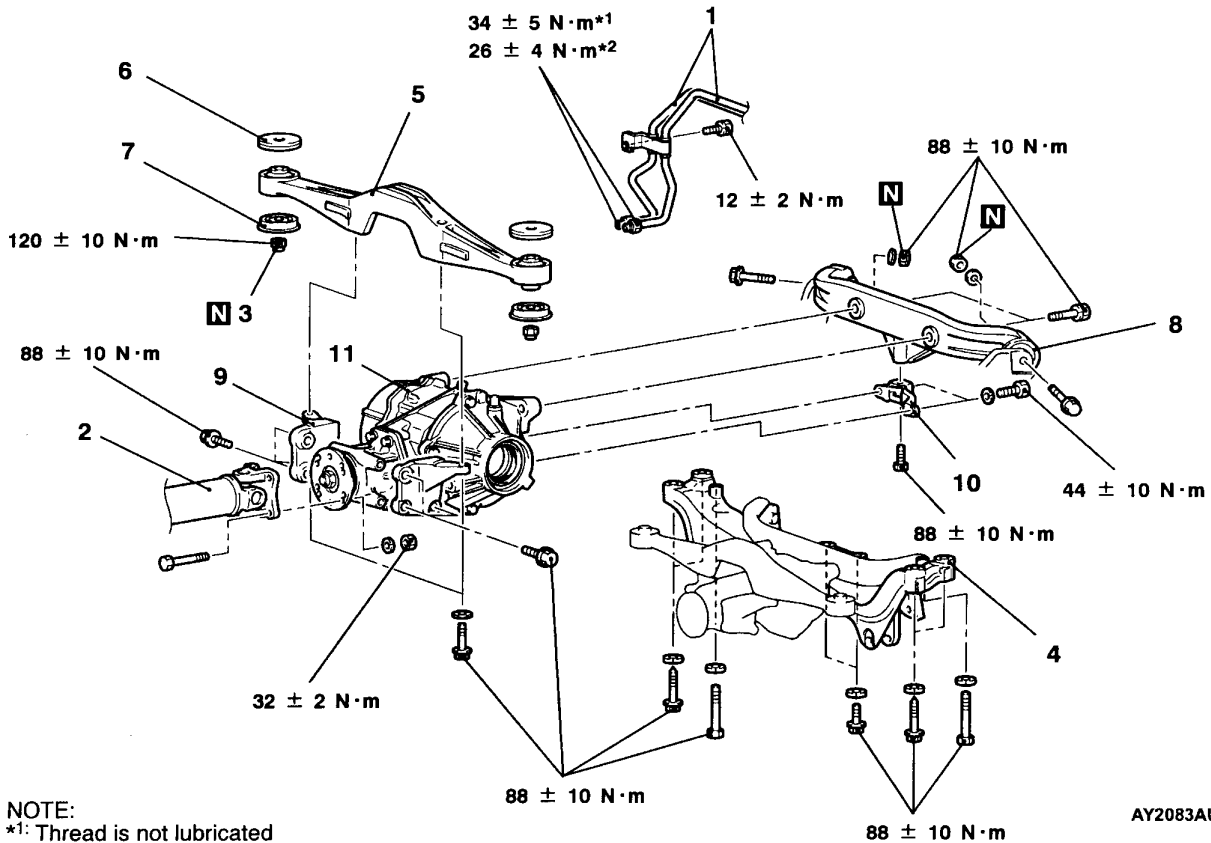
REMOVAL AND INSTALLATION

Pre-removal Operation

- Hydraulic Piping Fluid Draining
- Differential Gear Oil Draining (Refer to P. 27B-17.)
- Lower Arm Assembly Removal (Refer to GROUP 34.)
- Rear Stabilizer Removal (Refer to GROUP 34.)
- Drive Shaft Removal (Refer to P. 27B-29.)

Post-installation Operation

- Drive Shaft Installation (Refer to P. 27B-29.)
- Rear Stabilizer Installation (Refer to GROUP 34.)
- Lower Arm Assembly Installation (Refer to GROUP 34.)
- Differential Gear Oil Filling (Refer to P. 27B-17.)
- Hydraulic Piping Fluid Filling and Bleeding (Refer to P.27B-17 and P.27B-19.)



Removal steps

1. Hydraulic unit hose assembly connection
2. Propeller shaft connection (Refer to GROUP 25.)
3. Differential support member mounting nuts
4. Rear crossmember and differential carrier assembly (Refer to P. 27B-35.)

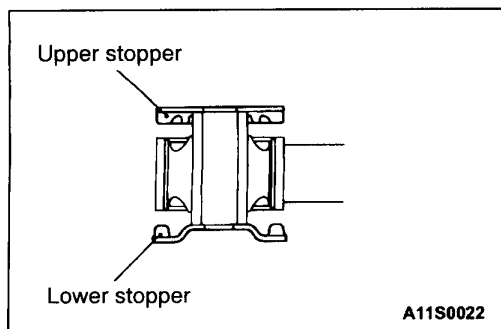
5. Differential support member
6. Upper stopper
7. Lower stopper
8. Differential support arm
9. Differential mount bracket
10. Differential mount bracket
11. Differential carrier assembly

A

A

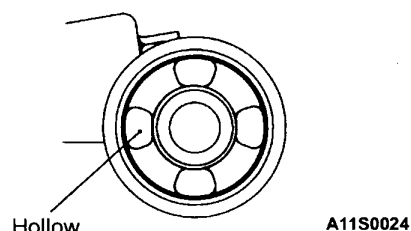
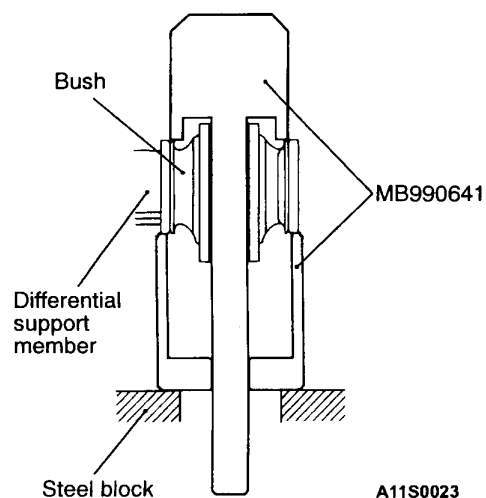
REMOVAL SERVICE POINT**◀A▶ PROPELLER SHAFT DISCONNECTION**

Suspend the removed propeller shaft from the body with a wire to prevent bending.

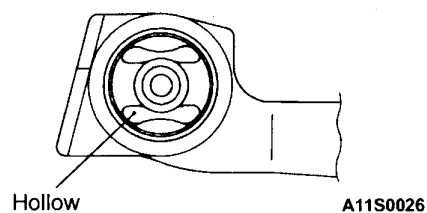
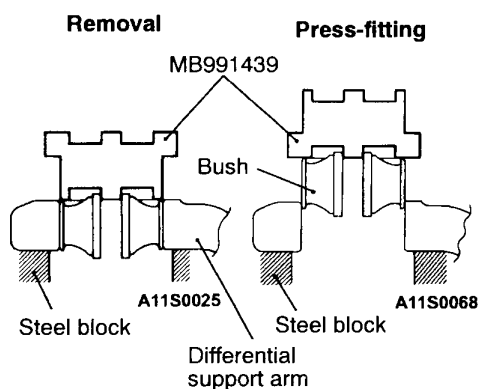
**INSTALLATION SERVICE POINTS****▶A◀ LOWER STOPPER/UPPER STOPPER INSTALLATION**

Install the lower and upper stopper as shown in the illustration.

<Differential support member>



<Differential support arm>



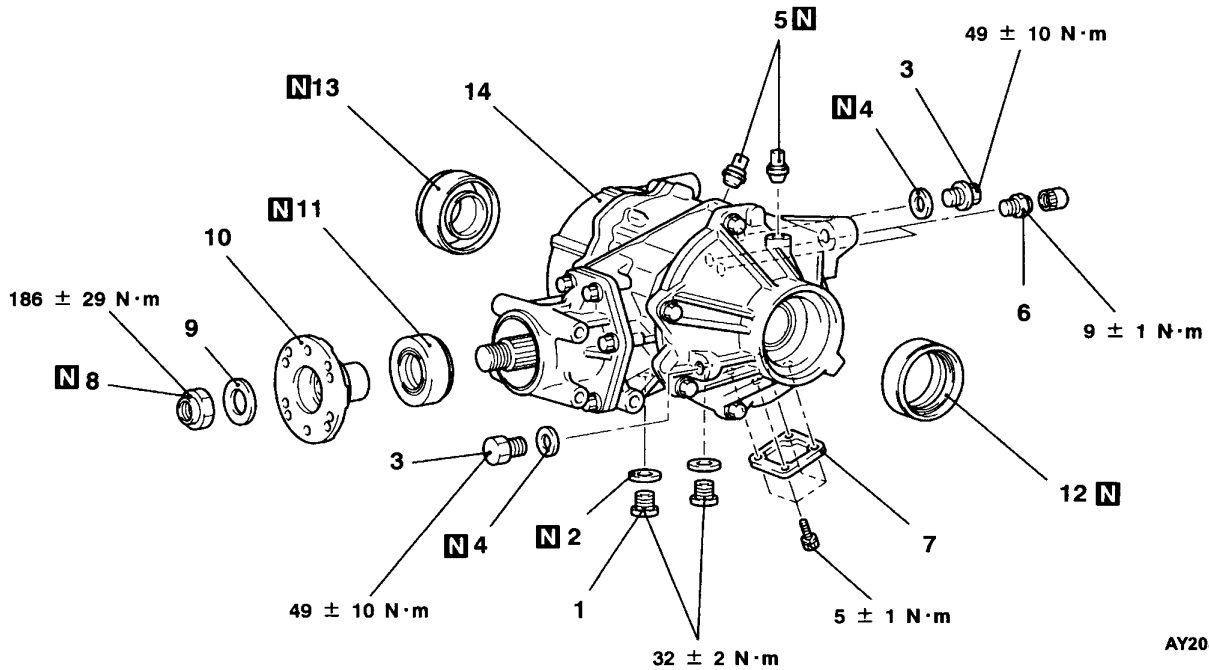
BUSHING REPLACEMENT

1. Remove and press fit the bush with special tool.
2. Press fit th bush so that the hollow of the bush is on the position shown as the illustration.
3. Press fill the bush until the surface of the outer sleeve of the bush,differential support member or differential support arm contact.

TORQUE TRANSFER DIFFERENTIAL <VEHICLES WITH AYC> DISASSEMBLY AND REASSEMBLY

Caution

1. The differential carrier assembly is non-maintainable.
2. No foreign matter should be allowed inside and at the joints of the differential carrier assembly.



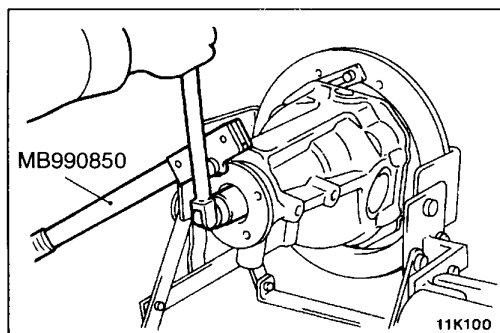
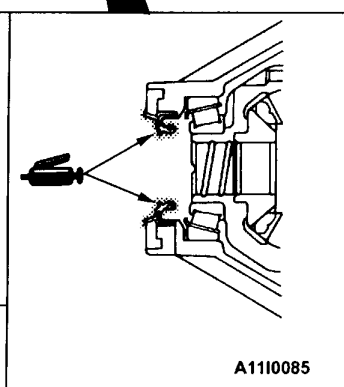
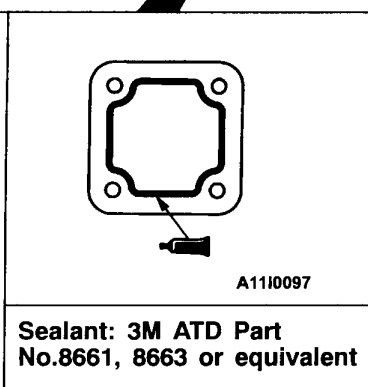
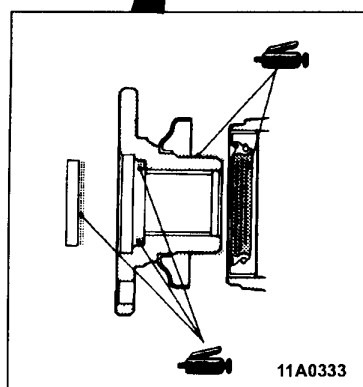
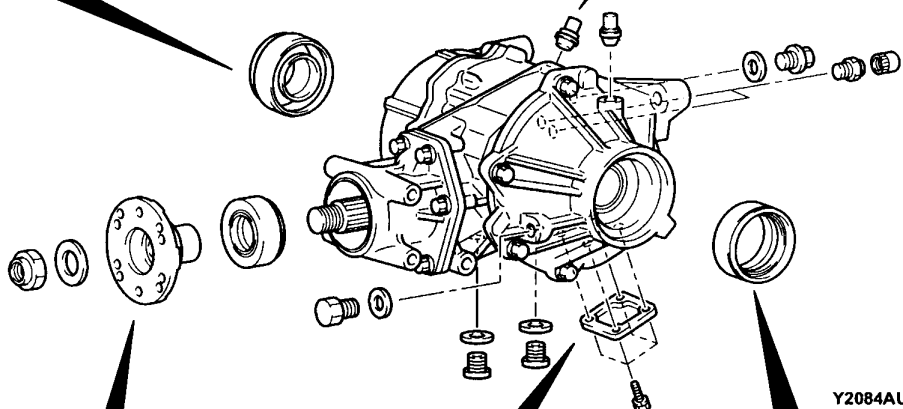
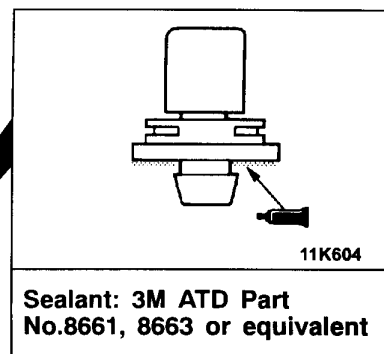
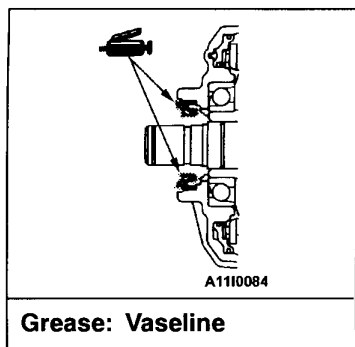
Disassembly steps

1. Drain plug
2. Packing
3. Filler plug
4. Gasket
5. Vent plug
6. Bleeder screw
7. Cover



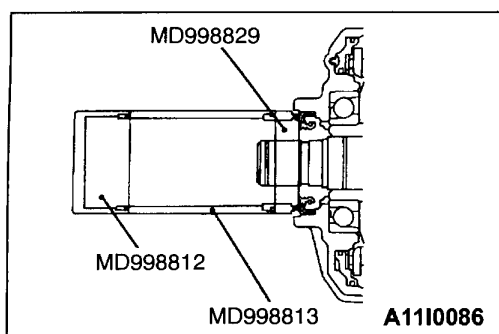
8. Self-locking nut
9. Washer
10. Companion flange
11. Oil seal
12. Oil seal
13. Oil seal
14. Differential carrier assembly

Lubrication and Adhesive Points



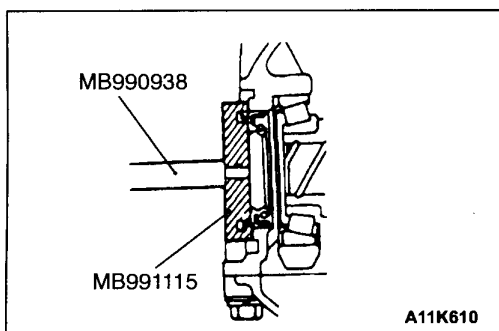
DISASSEMBLY SERVICE POINT

◀A▶ SELF-LOCKING NUT REMOVAL

**ASSEMBLY SERVICE POINTS****►A◄ OIL SEAL PRESS-FITTING**

1. Using the special tool, pressfit the oil seal as far as it will go.
2. Apply the specified grease to the oil seal lip.

Specified grease: Vaseline

**►B◄ DRIVE PINION REAR BEARING OUTER RACE PRESS-FITTING**

1. Using the special tool, pressfit the oil seal as far as the oil seal will go.
2. Apply the multipurpose grease to the oil seal lip.

HYDRAULIC UNIT <VEHICLES WITH ACD+AYC>

REMOVAL AND INSTALLATION

Caution

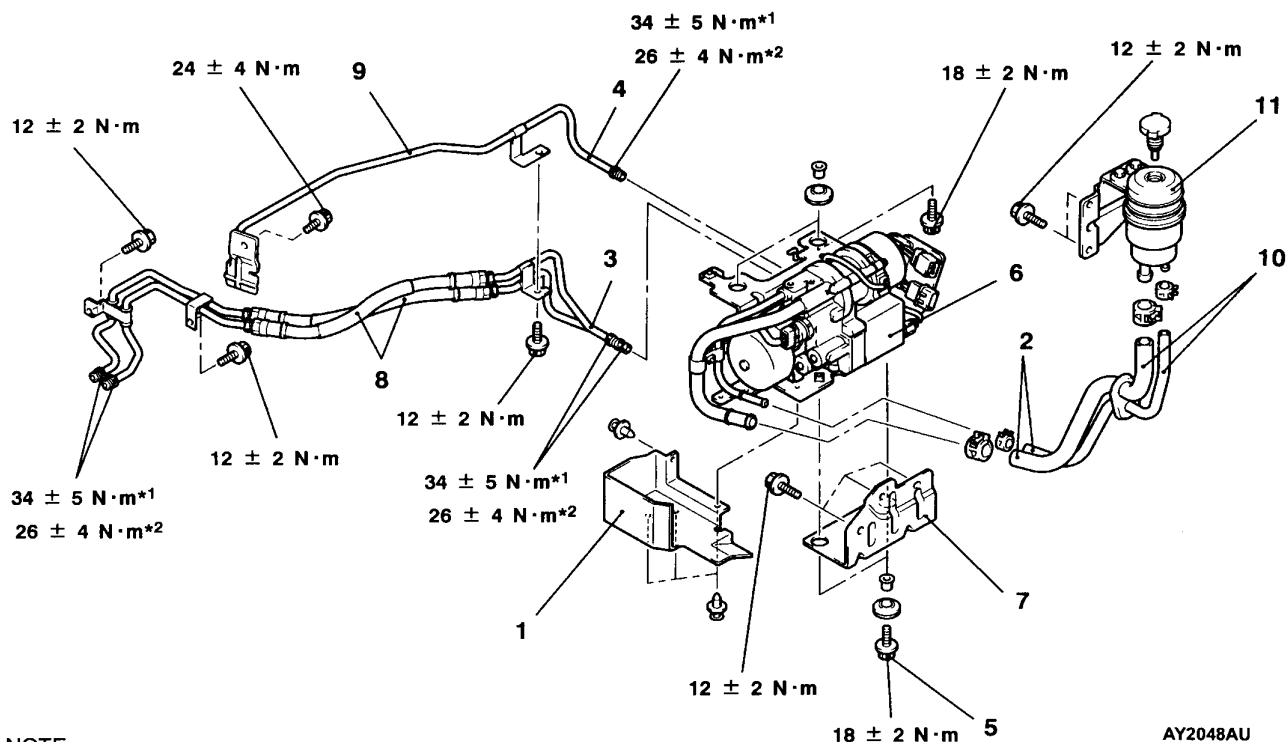
- (1) When connecting the return hose and suction hose, do not apply lubricant.
- (2) No foreign matter should be allowed in the hydraulic piping and joints.

Pre-removal Operation

- Trunk Side Trim Removal (Refer to GROUP 52A.)
- Hydraulic Piping Fluid Draining

Post-Installation Operation

- Hydraulic Piping Fluid Filling and Bleeding (Refer to P.27B-17 and P.27B-19.)
- Trunk Side Trim Installation (Refer to GROUP 52A.)



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NOTE:

*1: Thread is not lubricated

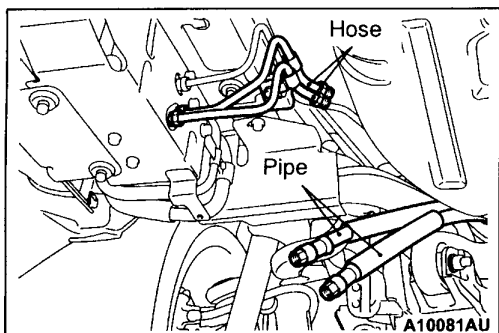
*2: Thread is lubricated

Removal steps

1. Dust guard
2. Reservoir hose assembly and hydraulic unit connection
3. Hydraulic unit hose assembly and hydraulic unit connection
4. Transfer connector assembly and hydraulic unit connection
5. Hydraulic unit bracket assembly mounting bolt
6. Hydraulic unit assembly



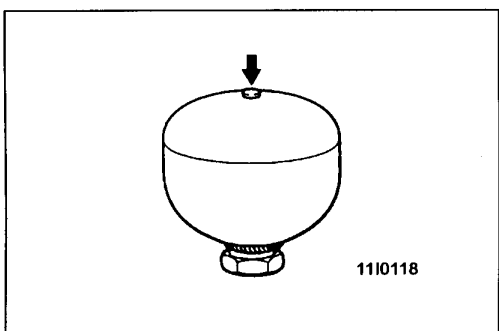
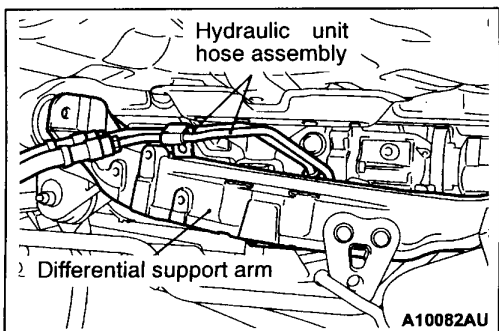
7. Hydraulic unit bracket
 - Stabilizer bar to differential support arm connection (Refer to GROUP 34.)
 - Differential support arm (Refer to P. 27B-55.)
8. Hydraulic unit hose assembly <vehicles with ACD+AYC>
9. Transfer connector assembly
10. Reservoir hose assembly
11. Oil reserve



REMOVAL SERVICE POINTS

◀A▶ HYDRAULIC UNIT HOSE ASSEMBLY REMOVAL

1. Disconnect the hydraulic unit side pipe and hose.
2. Put down the differential support arm, remove the hydraulic unit hose assembly.



HYDRAULIC UNIT DISPOSAL

Should the hydraulic unit be discarded, drill a hole in the accumulator at the illustrated position beforehand in order to release the inside gas.

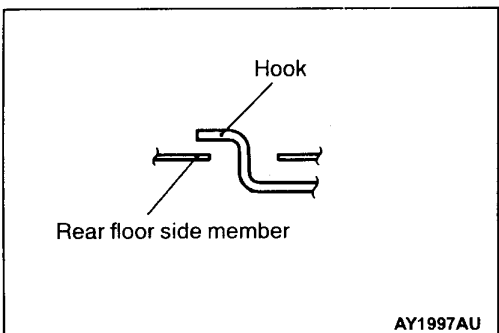
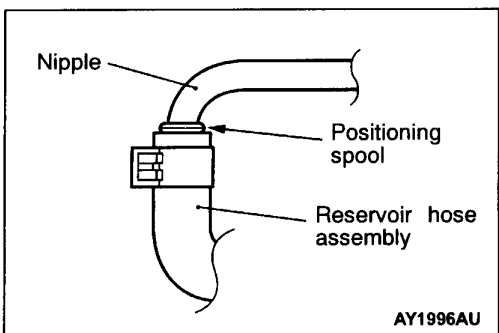
Caution

- (1) The hydraulic unit has its accumulator filled with a high pressure gas. Never throw it into a fire. Also, never attempt to disassemble, press, weld or melt it.
- (2) When drilling a hole in the accumulator, be sure to wear safety goggles since drill chips may blow out together with the gas.

INSTALLATION SERVICE POINTS

▶A◀ RESERVOIR HOSE ASSEMBLY INSTALLATION

Insert the reservoir hose assembly to the positioning spool.



▶C◀ HYDRAULIC UNIT ASSEMBLY INSTALLATION

Hook the hydraulic unit assembly hook to the rear floor side member and tighten the hydraulic unit assembly mounting bolt.