

GROUP 2

PERIODIC INSPECTION AND MAINTENANCE

CONTENTS

PERIODIC INSPECTION AND MAINTENANCE SCHEDULE	2-3	A15. REPLACE FUEL FILTER	2-13
OPERATIONS INSIDE THE ENGINE COMPARTMENT	2-7	OPERATIONS UNDER THE VEHICLE.....	2-15
A1. CHECK V-BELT FOR CRACKS, FRAYING, WEAR, AND ADJUST ITS TENSION.....	2-7	B1. CHECK SUSPENSION SYSTEM FOR DAMAGE AND LOOSENESS.....	2-15
A2. CHECK IGNITION CABLES FOR DAMAGE.....	2-7	B2. CHECK SUSPENSION ARM BALL JOINTS FOR PLAY, AND DUST COVERS FOR DAMAGE	2-16
A3. CHECK INTAKE AIR HOSE AND TURBOCHARGER OIL HOSE FOR DAMAGE.....	2-7	B3. CHECK DRIVE SHAFT BOOTS FOR DAMAGE	2-16
A4. REPLACE ENGINE TIMING BELT <EXCEPT VEHICLES WITH TIMING CHAIN>	2-7	B4. CHECK STEERING LINKAGE FOR DAMAGE AND LOOSE CONNECTIONS (INCLUDING SEALS AND BOOTS)	2-16
A5. CHECK OPERATION OF CRANKCASE EMISSION CONTROL SYSTEM	2-8	B5. CHECK GEAR OIL LEVEL IN MANUAL TRANSMISSION	2-17
A6. REPLACE SPARK PLUGS.....	2-9	B6. CHECK GEAR OIL LEVEL IN TRANSFER CASE (4WD).....	2-17
A7. CHECK RADIATOR HOSES FOR DAMAGE AND PROPER CONNECTION..	2-9	B7. CHANGE GEAR OIL IN MANUAL TRANSMISSION	2-17
A8. CHECK ENGINE COOLANT LEVEL IN RESERVOIR.....	2-9	B8. CHANGE GEAR OIL IN TRANSFER CASE (4WD)	2-18
A9. CHANGE ENGINE COOLANT.....	2-9	B9. CHECK GEAR OIL LEVEL IN FRONT AND REAR DIFFERENTIAL	2-18
A10. CHECK AIR CLEANER ELEMENT FOR CLOGGING AND DAMAGE	2-11	B10. CHANGE GEAR OIL IN FRONT AND REAR DIFFERENTIAL	2-18
A11. REPLACE AIR CLEANER ELEMENT	2-11	B11. CHECK EXHAUST PIPE CONNECTIONS FOR GAS LEAKAGE, AND CHECK PIPE INSTALLATION	2-19
A12. CHECK FLUID LEVEL IN BRAKE RESERVOIR AND CLUTCH RESERVOIR (for hydraulic-type clutch only)	2-11		
A13. CHANGE BRAKE FLUID	2-11		
A14. CHECK BATTERY ELECTROLYTE LEVEL.....	2-12		

Continued on next page

OPERATIONS INSIDE THE VEHICLE	2-19	OPERATIONS AFTER ENGINE IS WARMED UP	2-27
C1. CHECK BRAKE PEDAL AND CLUTCH PEDAL FOR FREE PLAY	2-19	E1. CHECK FLUID LEVEL IN AUTOMATIC TRANSMISSION	2-27
C2. CHECK PARKING BRAKE LEVER STROKE AND PLAY.....	2-20	E2. CHANGE AUTOMATIC TRANSMISSION FLUID	2-27
C3. REPLACE AIR PURIFIER FILTER....	2-21	E3. CHANGE ENGINE OIL	2-29
OPERATIONS OUTSIDE THE VEHICLE	2-22	E4. REPLACE ENGINE OIL FILTER	2-30
D1. CHECK UNEVEN TYRE WEAR.....	2-22	E5. CHECK ENGINE IDLING SPEED.....	2-31
D2. CHECK FRONT WHEEL BEARINGS FOR PLAY	2-24	E6. CHECK CO CONCENTRATION.....	2-31
D3. CHECK BRAKE HOSES AND PIPES FOR LEAKAGE.....	2-24	E7. CHECK EXHAUST GAS RECIRCULATION (EGR) SYSTEM.....	2-32
D4. CHECK BRAKE PADS AND DISCS FOR WEAR.....	2-25	E8. CHECK VALVE CLEARANCE (EXCEPT VEHICLES WITH AUTO-LASH ADJUSTER).....	2-34
D5. CHECK BRAKE SHOE LININGS AND DRUMS FOR WEAR	2-25	OTHERS	2-35
D6. CHECK FUEL HOSES AND PIPES FOR LEAKAGE OR DETERIORATION ...	2-26	F1. CHECK BODY CONDITION FOR DAMAGE	2-35
		F2. ROAD TEST	2-35

PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

M6020100100478

For items which indicate both distance and time (in months), the inspection should be made at whichever (distance or time) comes first.

•: Applicable for OUTLANDER

Maintenance item		Maintenance operation	Maintenance interval	Application
OPERATIONS INSIDE THE ENGINE COMPARTMENT				
A1	Check V-belt for cracks, fraying, wear, and adjust its tension	Inspection	Every 15,000 km or every 12 months	•
A2	Check ignition cables for damage	Inspection	Every 30,000 km or every 2 years	•
A3	Check intake air hose and turbocharger oil hose for damage (vehicles with turbocharger)	Inspection	Every 30,000 km or every 2 years	•
A4	Replace engine timing belt [including timing belt B with 4G6/4D5 engine] (except vehicles with timing chain)	Replace	Every 90,000 km	•
A5	Check operation of crankcase emission control system (petrol-powered vehicles)	Inspection	Every 30,000 km or every 2 years	•
A6	Replace spark plugs	Platinum-tipped type or Iridium-tipped type	Replace	Every 90,000 km
A7	Check radiator hoses for damage and proper connection	Inspection	Every 30,000 km or every 2 years	•
A8	Check engine coolant level in reservoir	Inspection	Every 30,000 km or every 2 years	•
A9	Change engine coolant	Change	Every 60,000 km or every 4 years	•
A10	Check air cleaner element for clogging and damage	Inspection	Normal usage	Every 15,000 km or every 12 months
			Severe usage	Every 7,500 km or every 6 months
A11	Replace air cleaner element	Replace	Normal usage	Every 45,000 km or every 3 years
			Severe usage	More frequently
A12	Check fluid level in brake reservoir and clutch reservoir (for hydraulic type clutch)	Inspection	Every 15,000 km or every 12 months	•
A13	Change brake fluid	Change	Every 30,000 km or every 2 years	•
A14	Check battery electrolyte level	Inspection	Every 15,000 km or every 12 months	•
A15	Replace fuel filter	Petrol-powered vehicles	Replace	Every 150,000 km or every 10 years

PERIODIC INSPECTION AND MAINTENANCE
PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

Maintenance item		Maintenance operation	Maintenance interval		Application
OPERATIONS UNDER THE VEHICLE					
B1	Check suspension system for damage and looseness	Inspection	Every 30,000 km or every 2 years		•
B2	Check suspension arm ball joints for play, and dust covers for damage	Inspection	Every 30,000 km or every 2 years		•
B3	Check drive shaft boots for damage	Inspection	Normal usage	Every 30,000 km or every 2 years	•
			Severe usage	Every 7,500 km	•
B4	Check steering linkage for damage and loose connections (including seals and boots)	Inspection	Every 60,000 km or every 4 years		•
B5	Check gear oil level in manual transmission	Inspection	Every 15,000 km or every 12 months		•
B6	Check gear oil level in transfer case (4WD)	Inspection	Every 15,000 km or every 12 months		•
B7	Change gear oil in manual transmission	Change	Normal usage	Every 105,000 km or every 7 years	•
			Severe usage	Every 45,000 km or every 3 years	•
B8	Change gear oil in transfer case (4WD)	Change	Every 75,000 km or every 5 years		•
B9	Check gear oil level in front and rear differential	Inspection	Every 30,000 km or every 2 years		•
B10	Change gear oil in front and rear differential	Conventional differential or VCU type LSD	Change	Normal usage	Every 90,000 km or every 6 years
				Severe usage	Every 45,000 km or every 3 years
B11	Check exhaust pipe connections for gas leakage, and check pipe installation	Inspection	Every 30,000 km or every 2 years		•
OPERATIONS INSIDE THE VEHICLE					
C1	Check brake pedal and clutch pedal for free play	Inspection	Every 15,000 km or every 12 months		•
C2	Check parking brake lever stroke and play	Inspection	Every 15,000 km or every 12 months		•
C3	Replace air purifier filter	Replace	Every 15,000 km or every 12 months		•
OPERATIONS OUTSIDE THE VEHICLE					
D1	Check uneven tyre wear	Inspection	Every 30,000 km or every 2 years		•
D2	Check front wheel bearings for play	Inspection	Every 60,000 km or every 4 years		•
D3	Check brake hoses and pipes for leakage	Inspection	Every 30,000 km or every 2 years		•

PERIODIC INSPECTION AND MAINTENANCE
PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

2-5

Maintenance item		Maintenance operation	Maintenance interval		Application
D4	Check brake pads and discs for wear	Inspection	Normal usage	Every 15,000 km or every 12 months	•
			Severe usage	Every 7,500 km or every 6 months	•
D5	Check brake shoe linings and drums for wear	Inspection	Normal usage	Every 30,000 km or every 2 years	•
			Severe usage	Every 15,000 km or every 12 months	•
D6	Check fuel hoses and pipes for leakage or deterioration	Inspection	Every 30,000 km or every 2 years		•
OPERATIONS AFTER ENGINE IS WARMED UP					
E1	Check fluid level in automatic transmission	Inspection	Every 15,000 km or every 12 months		•
E2	Change automatic transmission fluid	4WD	Change	Normal usage	Every 90,000 km or every 6 years
				Severe usage	Every 45,000 km or every 3 years
E3	Change engine oil (petrol-powered vehicles without a turbocharger)	ACEA and API classifications "ACEA A1/B1, A3/B3, A3/B4 or A5/B5" / "For service SG" or higher	Change	Normal usage	Every 15,000 km or every 12 months
				Severe usage	Every 7,500 km
	Change engine oil (petrol-powered vehicles with a turbocharger)	Normal usage	First 7,500km or 6 months (use engine oil ACEA: A1/B1, A3/B3, A3/B4 or A5/B5 / API: SG or higher) 2nd and thereafter: Every 15,000km or every 12 months (use engine oil: ACEA A3/B3, A3/B4 or A5/B5 / API: SG or higher)		•
		Severe usage	Every 5,000km (use engine oil ACEA: A1/B1, A3/B3, A3/B4 or A5/B5 / API: SG or higher)		•

PERIODIC INSPECTION AND MAINTENANCE
PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

Maintenance item			Maintenance operation	Maintenance interval		Application	
E4	Replace engine oil filter (petrol-powered vehicles without a turbocharger)	ACEA and API classifications "ACEA A1/B1, A3/B3, A3/B4 or A5/B5" / "For service SG" or higher	Replace	Normal usage	Every 15,000 km or every 12 months	•	
				Severe usage	Every 7,500 km	•	
	Replace engine oil filter (petrol-powered vehicles with a turbocharger)	Normal usage	First 7,500km or 6 months (use engine oil ACEA: A1/B1, A3/B3, A3/B4 or A5/B5 / API: SG or higher) 2nd and thereafter: Every 15,000km or every 12 months (use engine oil: ACEA A3/B3, A3/B4 or A5/B5 / API: SG or higher)			•	
			Severe usage	Every 5,000km (use engine oil ACEA: A1/B1, A3/B3, A3/B4 or A5/B5 / API: SG or higher)	•		
E5	Check engine idling speed		Inspection	Every 15,000 km or every 12 months		•	
E6	Check CO concentration (petrol-powered vehicles)		Inspection	Every 15,000 km or every 12 months		•	
E7	Check exhaust gas recirculation (EGR) system		Inspection	Every 15,000 km or every 12 months		•	
E8	Check valve clearance (except vehicles with auto-lash adjuster)		Inspection	Every 15,000 km or every 12 months		•	
OTHERS							
F1	Check body condition for damage		Inspection	Every year		•	
F2	Road test		Inspection	Every 15,000 km or every 12 months		•	

NOTE:

- "Severe usage" specifications apply to only vehicles used under severe operating conditions. Severe operating conditions include the followings:
 1. Driving in a dusty area.
 2. Driving on rough roads, on submerged roads, or hilly areas.
 3. Driving cold zones.
 4. Engine idling for a long time or short-distance travel during cold weather.
 5. Frequent, sudden application of brakes.
 6. Towing of a trailer.
 7. Use as a taxi or as a rent-a-car.
 8. When more than 50% of driving is in heavy city traffic and the ambient temperature is 32 °C or more.
 9. When more than 50% of driving is at 120 km/h or more and the ambient temperature is 30 °C or more.

OPERATIONS INSIDE THE ENGINE COMPARTMENT

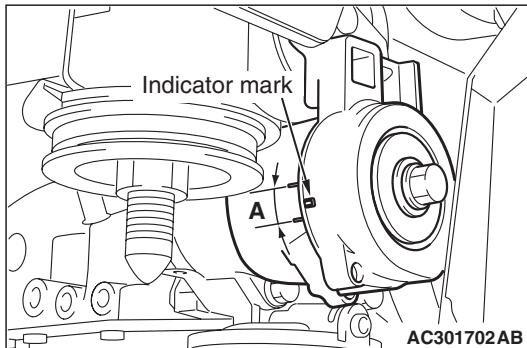
A1. CHECK V-BELT FOR CRACKS, FRAYING, WEAR, AND ADJUST ITS TENSION

M6020200100152

V-BELT CONDITION

Check the whole rounds of the V-belt for cracks, fraying and wear.

V-BELT TENSION



1. Make sure that the indicator mark is within the area marked with A in the illustration.

CAUTION

Check the drive belt tension after turning the crankshaft clockwise one turn or more.

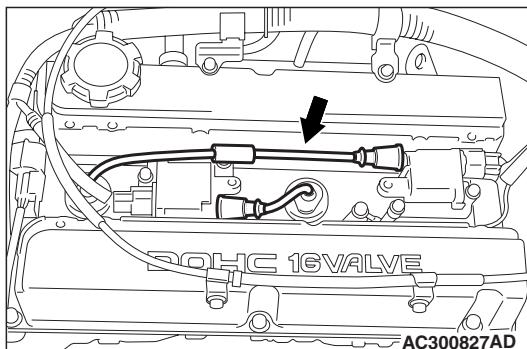
2. If the mark is out of the area, replace the drive belt.

NOTE:

The drive belt tension check is not necessary as auto-tensioner is adopted.

A2. CHECK IGNITION CABLES FOR DAMAGE

M6020200300071

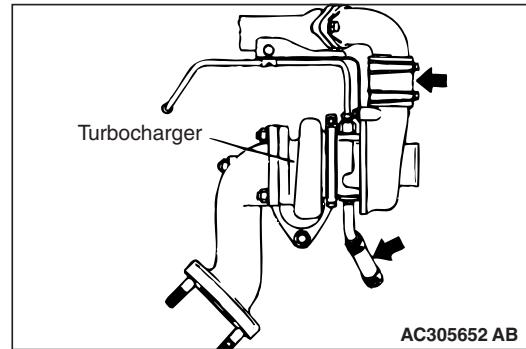


1. Check the ignition cable and rubber cap for damage or weakness, and check the installation condition.
2. Check the ignition cable and spark plug, distributor, and ignition coil connections for contamination, dirt, etc.
3. If dirty, clean it; if damaged, replace it.

A3. CHECK INTAKE AIR HOSE AND TURBOCHARGER OIL HOSE FOR DAMAGE

M6020200500105

INTAKE AIR HOSES



1. The air entered from outside the air cleaner element may make intake air dirty, resulting in engine power less than normal.
2. Inspect the intake air hoses for cracks or damage.

TURBOCHARGER OIL HOSES

1. The oil leakage from oil hose may provide insufficient lubrication in the turbocharger, resulting in engine power less than normal.
2. Inspect the turbocharger oil hoses for cracks or damage.

A4. REPLACE ENGINE TIMING BELT <EXCEPT VEHICLES WITH TIMING CHAIN>

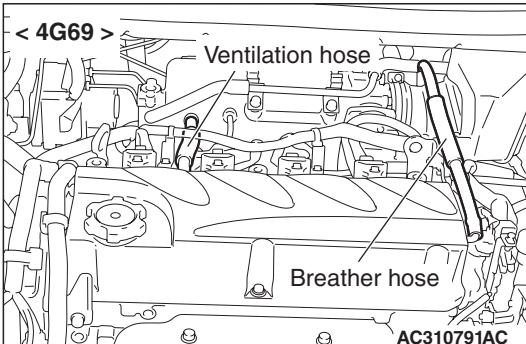
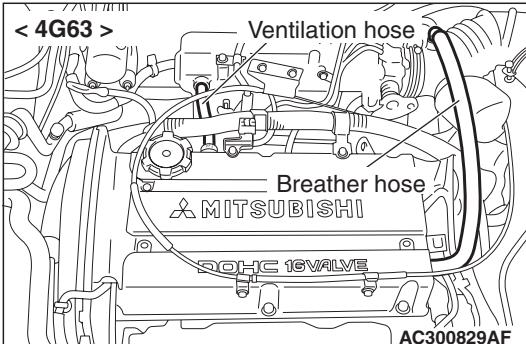
M6020200600094

For information concerning the replacement procedures, refer to the Workshop Manual.

A5. CHECK OPERATION OF CRANKCASE EMISSION CONTROL SYSTEM

BREATHER HOSE

M6020200700143

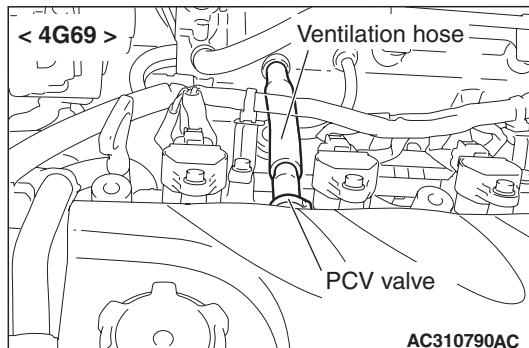
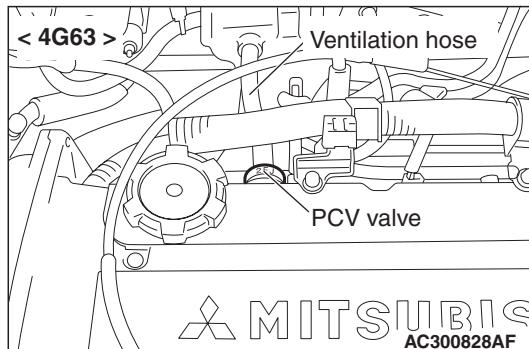


1. Inspect the breather hose for cracks or damage.
2. Clean the inside of the breather hose if necessary.
3. Inspect the ventilation filter for clogging.

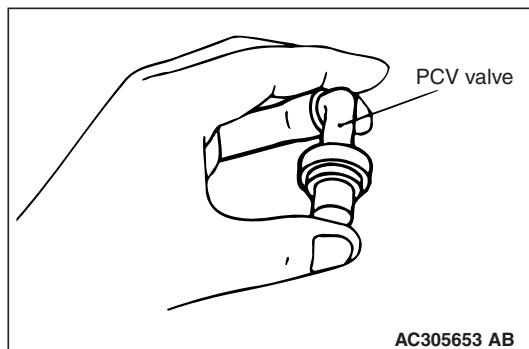
VENTILATION HOSE

1. Check entire circumference and length of hoses using a mirror as required.
2. Check all clamps for tightness and the connections for leakage.
3. Hoses should be replaced immediately if there is any evidence of deterioration or damage.

POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

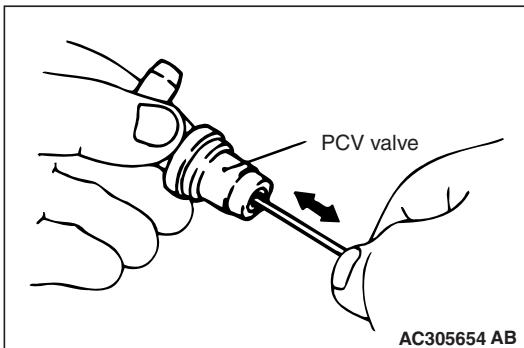


1. Remove the ventilation hose from the PCV (Positive crankcase ventilation) valve.
2. Remove the PCV valve from the rocker cover.
3. Reinstall the PCV valve at the ventilation hose.
4. Start the engine and run at idle.



5. Place finger at the opening of the PCV valve and check that vacuum of the intake manifold is felt.
NOTE:
At this moment, the plunger in the PCV valve moves back and forth.
6. If vacuum is not felt, clean the PCV valve or replace it.

PCV VALVE CHECK



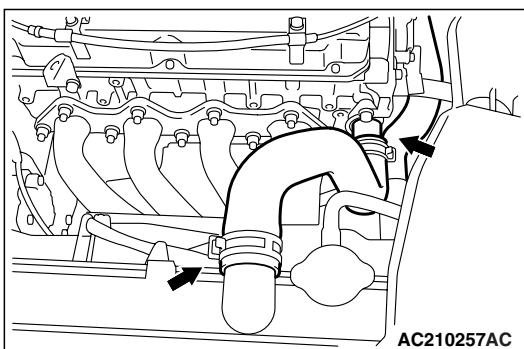
1. Insert a thin rod into the PCV valve from the side shown in the illustration (rocker cover installation side), and move the rod back and forth to check that the plunger moves.
2. If the plunger does not move, there is clogging in the PCV valve. In this case, clean or replace the PCV valve.

A6. REPLACE SPARK PLUGS

M6020200800098
After removing old spark plugs, install new ones and tighten them at the specified torque.

A7. CHECK RADIATOR HOSES FOR DAMAGE AND PROPER CONNECTION

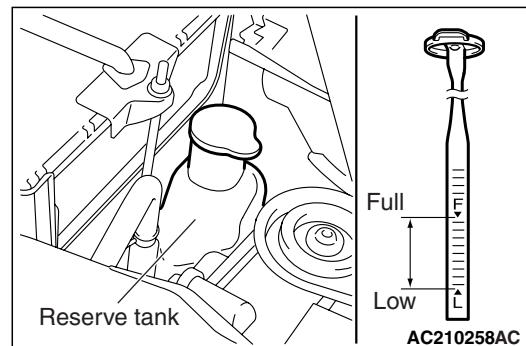
M6020200900158



1. Check entire circumference and length of hoses, using a mirror as required.
2. Check that hoses installed in grommets pass through the centre of the grommets.
3. Check all clamps for tightness and connections for leakage.

A8. CHECK ENGINE COOLANT LEVEL IN RESERVOIR

M6020201000136

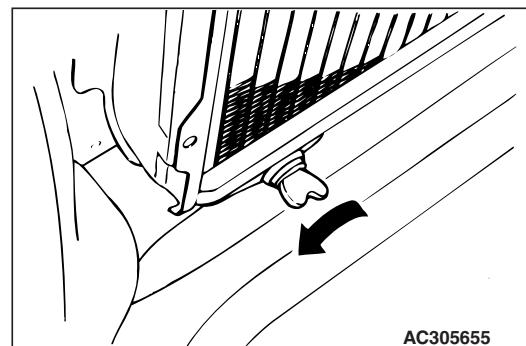


Check that the coolant level is between the "FULL" and "LOW" lines when the engine is at the normal operating temperature.

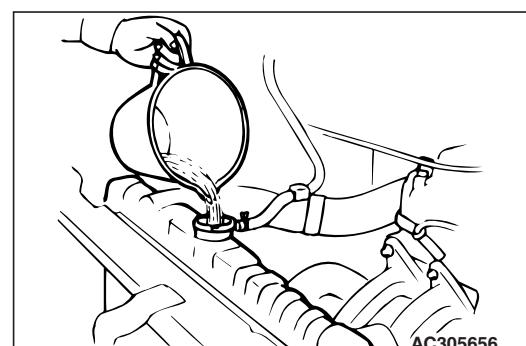
A9. CHANGE ENGINE COOLANT

M6020201100188

1. Stop the engine after it is fully warmed up.
2. Add detergent to the engine coolant in order to flush the cooling system, and start the engine.



3. Loosen the drain plug, remove the radiator can and drain the coolant.
4. Feed fresh water into the cooling system through the filler port of the radiator in order to wash the cooling system, and then tighten the drain plug.
5. Drain the coolant from the reserve tank.
6. Install the reserve tank.



7. Depending upon conditions of operation, determine the amount of long life coolant, antifreeze or antirust to be added to the coolant.

**Recommended antifreeze: DIA QUEEN
SUPER LONG LIFE COOLANT or equivalent**

⚠ CAUTION

Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause the corrosion of the aluminium components.

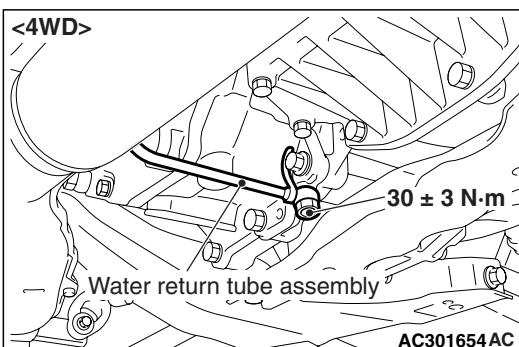
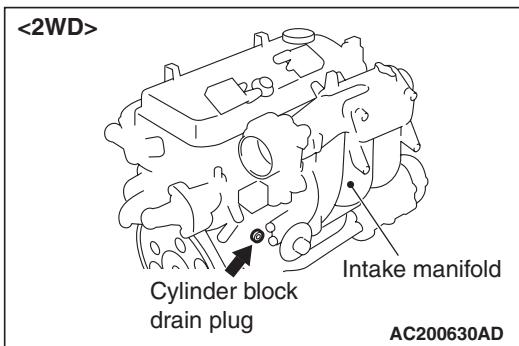
8. Fill the cooling system with soft water through the filler port, and add long life coolant, if necessary.
9. Fill the reserve tank with coolant.
10. Install the radiator cap and the reserve tank cap.
11. Recheck the engine coolant level after a road test.

⚠ CAUTION

When removing the radiator cap, be careful to blow out steam and boiling water.

REMOVAL OF ENGINE COOLANT FROM THE CYLINDER BLOCK DRAIN PLUG

1. Drain the engine coolant by removing the drain plug and then the radiator cap.

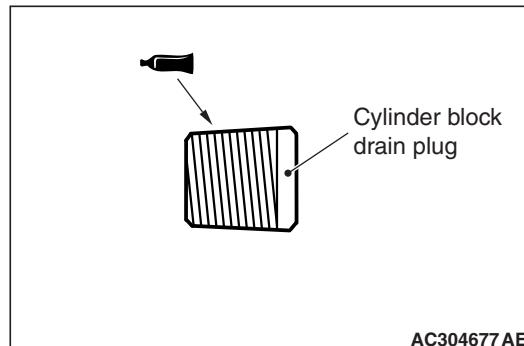


2. Remove the cylinder block drain plug from the cylinder block to drain the engine coolant.

On 4WD, drain engine coolant from the water return tube assembly of the transfer.

3. Remove the reserve tank to drain the engine coolant.

4. When the engine coolant has drained, pour in water from the radiator cap to clean the engine coolant line.



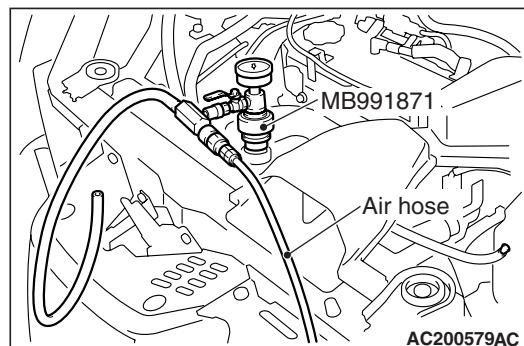
5. Coat the thread of the cylinder block drain plug with the specified sealant and tighten to the specified torque.

Specified sealant: 3M Nut Locking Part

No.4171 or equivalent

Tightening torque: $44 \pm 5 \text{ N}\cdot\text{m}$

6. Securely tighten the radiator drain plug.
7. Install the reserve tank.



8. By referring to the section on coolant, select an appropriate concentration for safe operating temperature within the range of 30 to 60%. Use special tool LLC changer (MB991871) to refill the coolant. A convenient mixture is a 50% water and 50% antifreeze solution (freezing point: -31°C)

NOTE: For How to use special tool MB991871, refer to its manufacturer's instructions.

Recommended antifreeze: DIA QUEEN

SUPER LONG LIFE COOLANT or equivalent

Quantity: 7.0 L

⚠ CAUTION

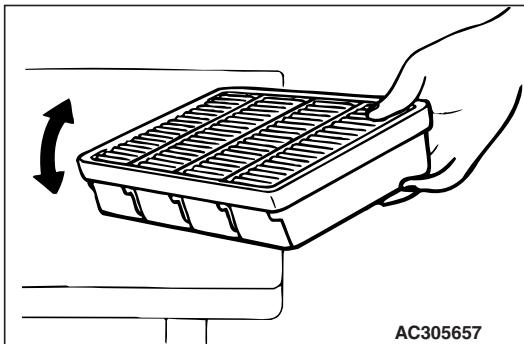
Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause the corrosion of the aluminium components.

9. Install the radiator cap securely.

- Start the engine and warm the engine until the thermostat opens. (Touch the radiator hose with your hand to check that warm water is flowing.)
- After the thermostat opens, race the engine several times, and then stop the engine.
- Cool down the engine, and then pour engine coolant into the reserve tank until the level reaches the FULL line. If the level is low, repeat the operation from step 10.

A10. CHECK AIR CLEANER ELEMENT FOR CLOGGING AND DAMAGE

M6020201200107

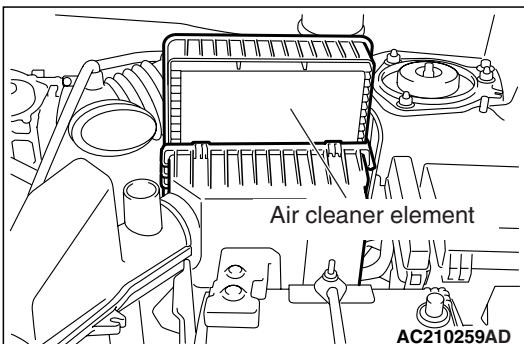


- Check air cleaner element for clogging and damage.
- Clean deposited dust from the element in the following manner.
 - Lightly tap the element against the top of a bench.
 - Blow compressed air from inside the element.
- Wipe off dust on the air cleaner interior.
- Install the air cleaner body.

A11. REPLACE AIR CLEANER ELEMENT

M6020201300137

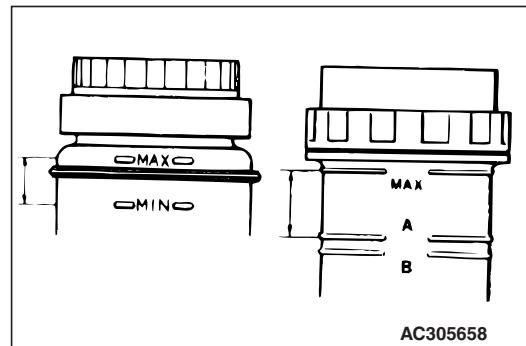
The air cleaner element will become dirty and loaded with dust during use, and the filtering effect will be substantially reduced. Replace it with a new one.



- Unclasp the air cleaner cover clip.
- Remove the air cleaner element and install a new one.
- Be sure to close the air cleaner cover completely when clamping it.

A12. CHECK FLUID LEVEL IN BRAKE RESERVOIR AND CLUTCH RESERVOIR (for hydraulic-type clutch only)

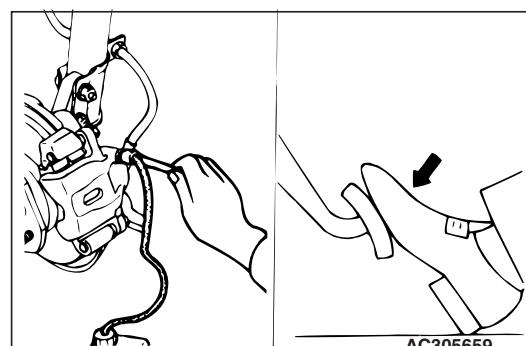
M6020201400101



- Check that the fluid level is between the "MAX" and "MIN" or "A" mark.
- If it is below the "MIN" or "A" marks, replenish with fresh brake fluid up to the "MAX" mark.

A13. CHANGE BRAKE FLUID

M6020201600138



- Remove the cap of the bleeder screw, connect a vinyl tube, and place its other end in a receptacle.
- Loosen the bleeder screw and depress the brake pedal; supply new brake fluid when the level of the fluid within the reservoir tank decreases.

CAUTION

If the reservoir tank completely runs out of fluid during operation, air will find way into the brake line. Pay attention, therefore, to the fluid level and replenish as necessary.

Specified brake fluid: DOT3 or DOT4

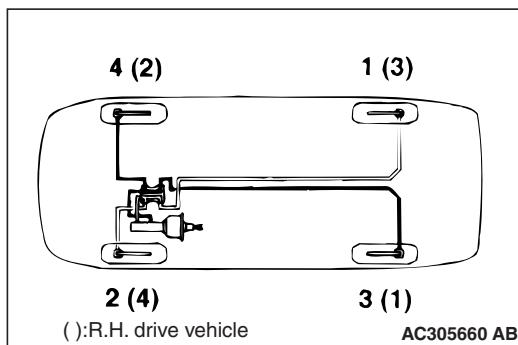
⚠ CAUTION

Use the specified brake fluid. Avoid using a mixture of the specified brake fluid and other fluid. If brake fluid is exposed to the air, it will absorb moisture; as water is absorbed from the atmosphere, the boiling point of the brake fluid will decrease and the braking performance will be seriously impaired. For this reason use a hermetically sealed 1 lit. or 0.5 lit. brake fluid container. Firmly close the cap of the brake fluid container after use.

- When fresh fluid has come to flow out from the vinyl tube, tighten the bleeder screw.

NOTE:

This change from existing to fresh fluid can be judged by change in color of fluid that flows out.



- Repeat above steps for other bleeder screws.

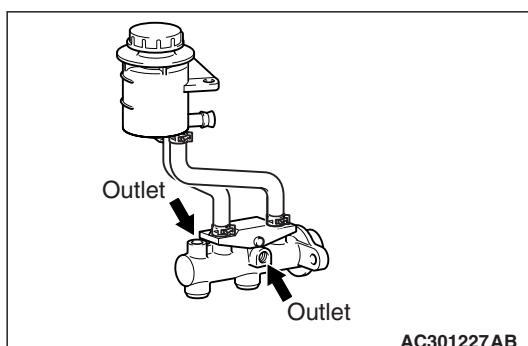
NOTE:

The operating steps for each bleeder screws are illustrated on this page.

MASTER CYLINDER BLEEDING

The master cylinder used has no check valve, so if bleeding is carried out by the following procedure, bleeding of air from the brake pipeline will become easier. (When brake fluid is not contained in the master cylinder.)

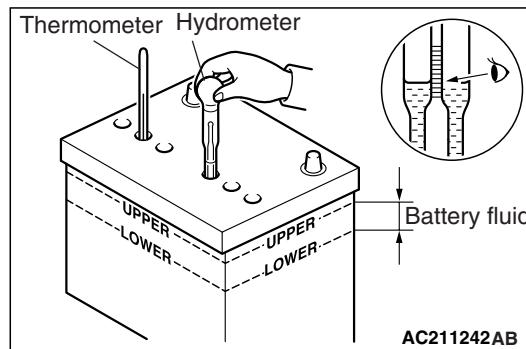
- Fill the reserve tank with brake fluid.
- Keep the brake pedal depressed.



- Have another person cover the master cylinder outlet with a finger.
- With the outlet still closed, release the brake pedal.
- Repeat steps (2) - (4) three or four times to fill the inside of the master cylinder with brake fluid.

A14. CHECK BATTERY ELECTROLYTE LEVEL

M6020201700168



- Inspect whether or not the battery fluid is between the UPPER LEVEL and LOWER LEVEL marks.

⚠ CAUTION

- If the battery fluid is below the LOWER LEVEL, the battery could explode in using.
- If the battery fluid is over the UPPER LEVEL, leakage could result.

- Use a hydrometer and thermometer to check the specific gravity of the battery fluid.

Standard value: 1.220 – 1.290 [20°C]

- The specific gravity of the battery fluid varies with the temperature, so use the following formula to calculate the specific gravity for 20°C. Use the calculated value to determine whether or not the specific gravity is satisfactory.

$$D20 = (t - 20) \times 0.0007 + Dt$$

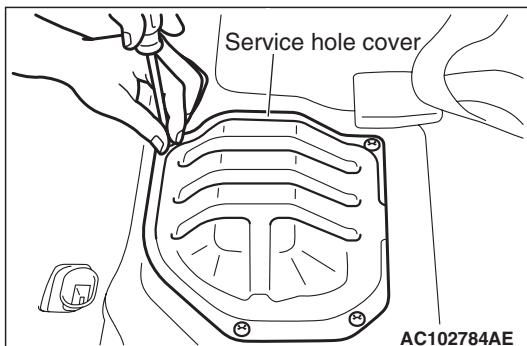
D20: Specific gravity of the battery fluid calculated for 20°C.

Dt: Actually measured specific gravity

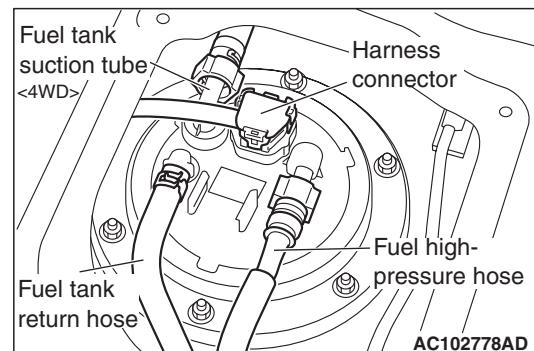
t: Actually measured temperature

A15. REPLACE FUEL FILTER

1. Remove the rear seat cushion assembly.

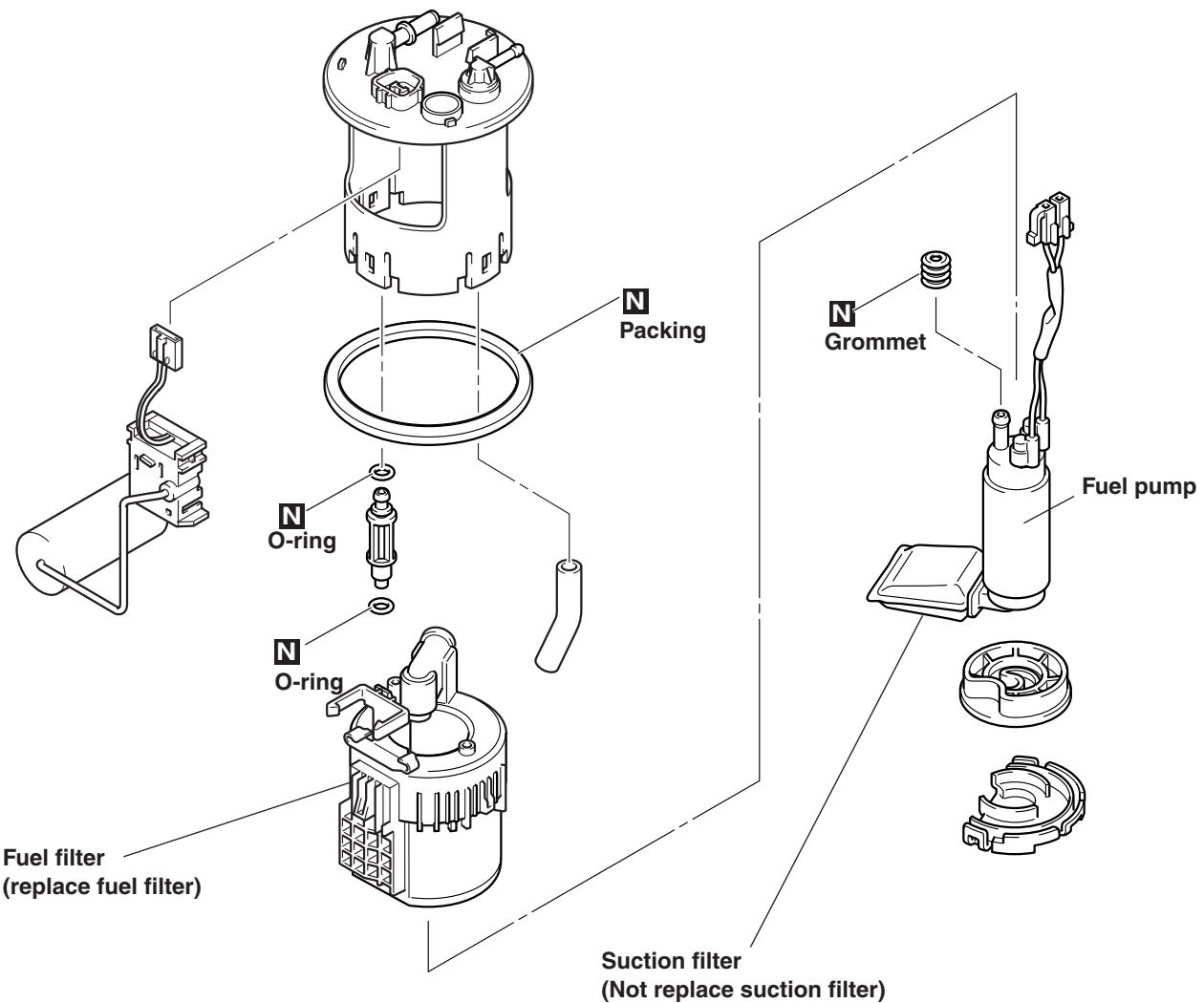


2. Remove the service hole cover mounting screws and remove the service hole cover.



3. Disconnect the harness connector, fuel hose and fuel tube.
4. Unscrew the mounting nuts to remove the fuel pump module.

FUEL PUMP MODULE

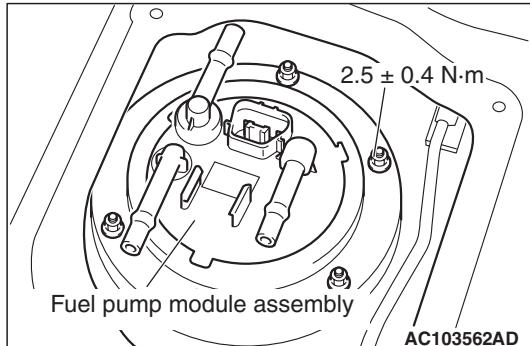


AC209435A

5. Remove the fuel filter from fuel pump module.
6. Install the new fuel filter.

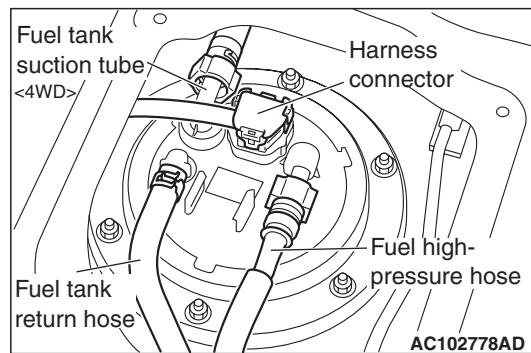
CAUTION

Apply a unleaded petrol to the grommet and O-ring before installing them in order to prevent damage.

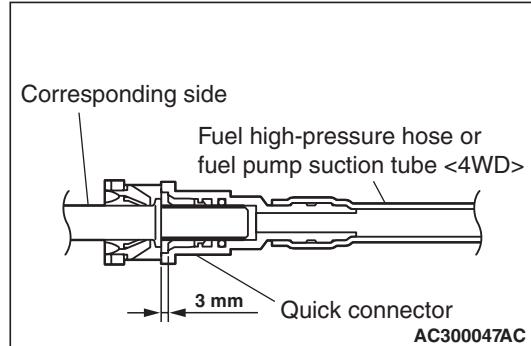


7. Install the fuel pump module. Tighten the mounting nuts to the specified torque.

Specified torque: $2.5 \pm 0.4 \text{ N}\cdot\text{m}$



8. Connect the fuel hose, fuel tube and harness connector.



CAUTION

After connecting the fuel high-pressure hose or fuel pump suction tube <4WD>, slightly pull it to ensure that it is installed securely. Also confirm that there is a play approximately 3mm.

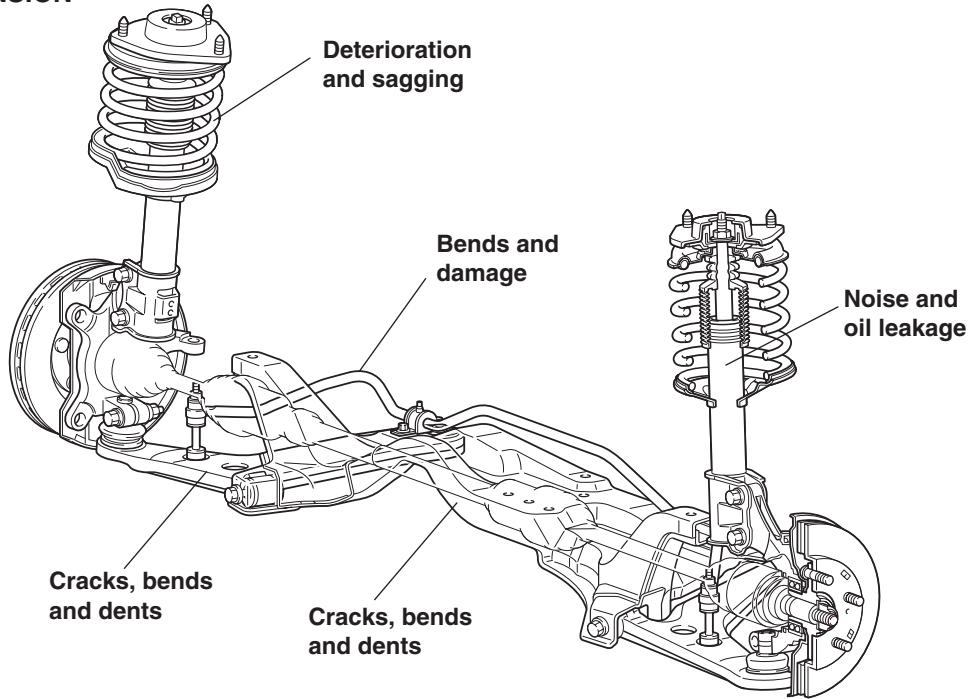
9. Install the service hole cover.
10. Install the rear seat cushion assembly.

OPERATIONS UNDER THE VEHICLE

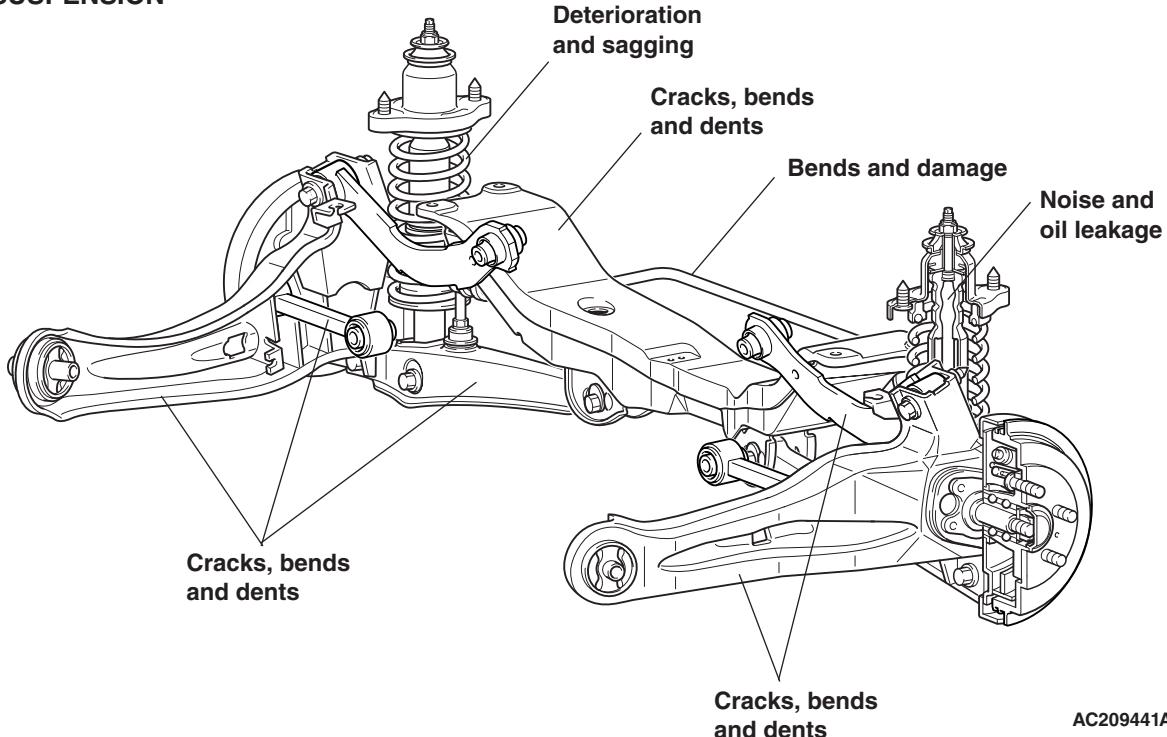
B1. CHECK SUSPENSION SYSTEM FOR DAMAGE AND LOOSENESS

M6020300100115

FRONT SUSPENSION



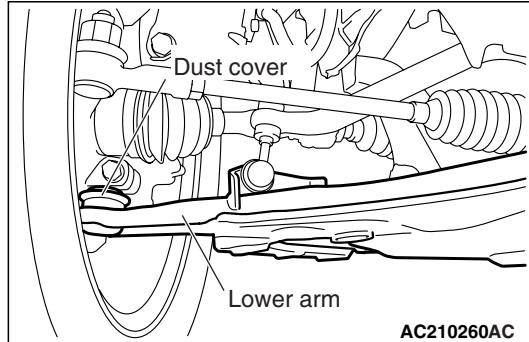
REAR SUSPENSION



AC209441AC

B2. CHECK SUSPENSION ARM BALL JOINTS FOR PLAY, AND DUST COVERS FOR DAMAGE**LOWER ARM BALL JOINT END PLAY CHECK**

M6020300200093



AC210260AC

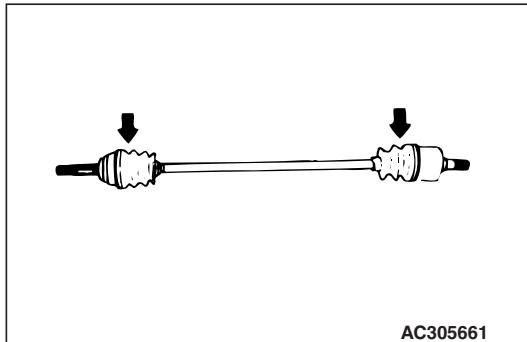
1. Raise the vehicle.
2. Remove the stabilizer bar from the lower arm assembly.
3. Move the lower arm up and down with your hands to check for an excessive play in the axial direction of the ball joint. If there is an excessive play, replace the lower arm assembly.

DUST COVERS FOR DAMAGE

Check dust covers for damage.

B3. CHECK DRIVE SHAFT BOOTS FOR DAMAGE

M6020300400075

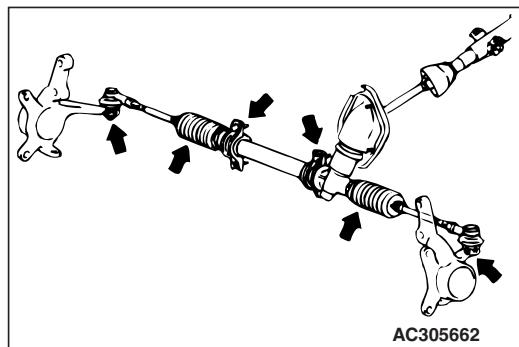


AC305661

Check the drive shaft boots for damage.

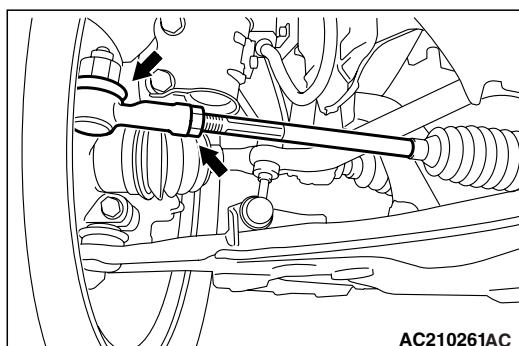
B4. CHECK STEERING LINKAGE FOR DAMAGE AND LOOSE CONNECTIONS (INCLUDING SEALS AND BOOTS)

M6020300500124



AC305662

1. Move the steering wheel bit by bit to the left or right, and check to be sure that there is no play or looseness in the linkage coupling, that the installation is not loose, and that the rod or arm is not bent or damaged.



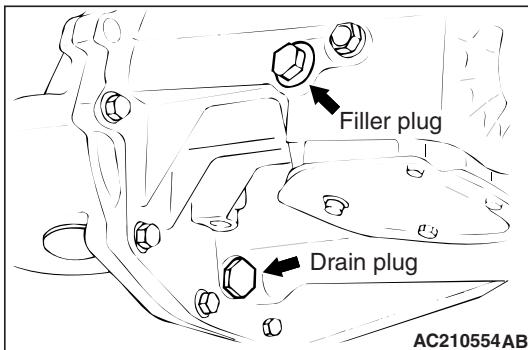
AC210261AC

2. Check to be sure that the seal and boot of the ball joint are correctly installed (in the correct position), and that they are not damaged.
3. Check tie-rod end lock nut for looseness. If lock nut is loose, adjust toe-in and then tighten lock nut to the specified torque.

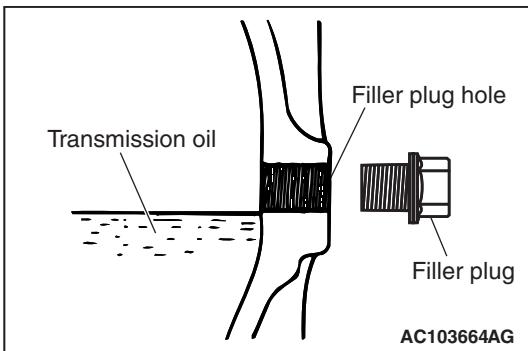
Tightening torque: $52 \pm 2 \text{ N}\cdot\text{m}$

B5. CHECK GEAR OIL LEVEL IN MANUAL TRANSMISSION

M6020300600079



1. Remove the filler plug of the transmission case.

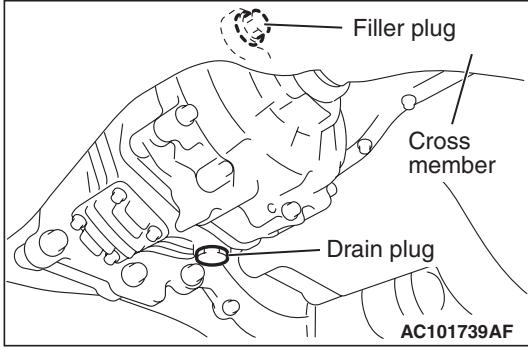


2. Oil level should be at the lower portion of the filler plug hole.
3. Check that the transmission oil is not noticeably dirty, and that it has a suitable viscosity.
4. Tighten the filler plug to the specified torque.

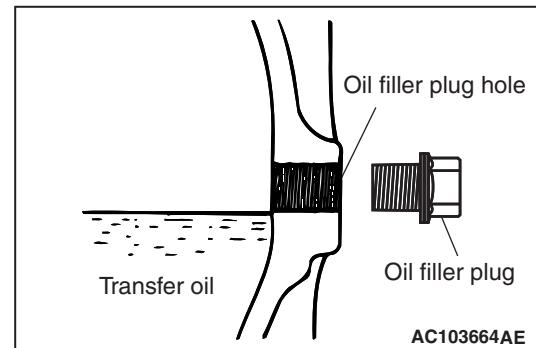
Tightening torque: $32 \pm 2 \text{ N}\cdot\text{m}$

B6. CHECK GEAR OIL LEVEL IN TRANSFER CASE (4WD)

M6020300700065



1. Remove the filler plug of the transfer case.

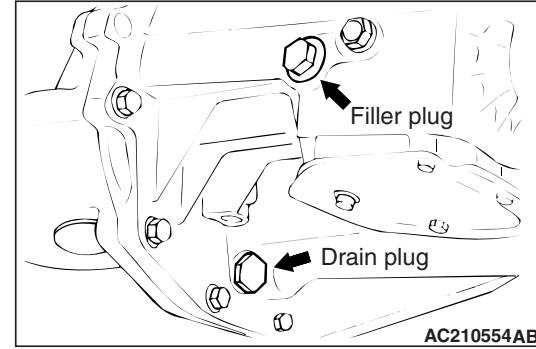


2. Oil level should be at the lower portion of the filler plug hole.
3. Check that the transfer oil is not noticeably dirty, and that it has a suitable viscosity.
4. Tighten the filler plug to the specified torque.

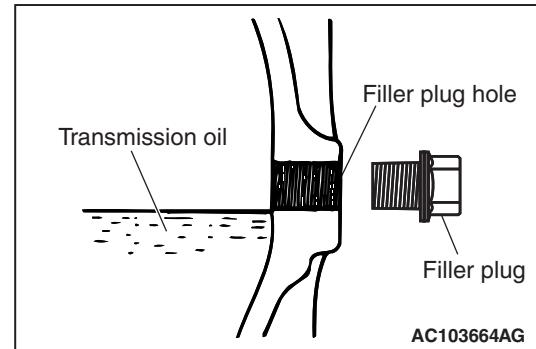
Tightening torque: $32 \pm 2 \text{ N}\cdot\text{m}$

B7. CHANGE GEAR OIL IN MANUAL TRANSMISSION

M6020300800103



1. Remove oil filler plug and oil drain plug.
2. Drain the gear oil.



3. Before installing the plug, remove iron powder attached to the magnet of the drain plug. Tighten the oil drain plug to the specified torque.

Tightening torque: $32 \pm 2 \text{ N}\cdot\text{m}$

4. Fill the transmission fresh oil by using a lubricator.

- Fill with specified oil till the level comes to the lower portion of oil filler plug hole.

Specified transmission oil: Dia Queen NEW MULTI GEAR OIL API classification GL-3, SAE 75W-80 or GEAR OIL API classification GL-4, SAE 75W-85W / 75W-90

Quantity:

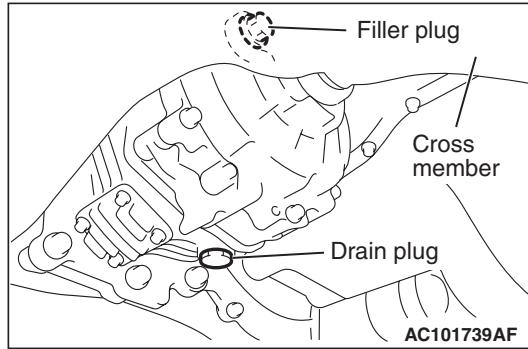
2.2L <2WD>
2.3L <4WD-N/A>
2.8L <4WD-T/C>

- Tighten the oil filler plug to the specified torque.

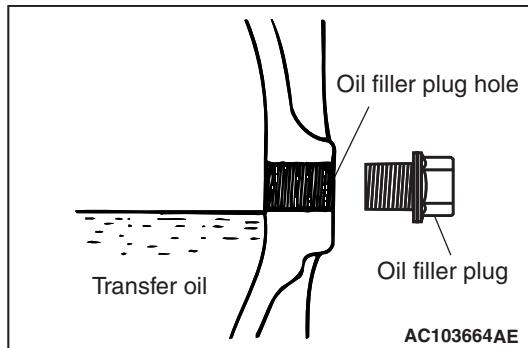
Tightening torque: $32 \pm 2 \text{ N}\cdot\text{m}$

B8. CHANGE GEAR OIL IN TRANSFER CASE (4WD)

M6020300900070



- Remove oil filler plug and oil drain plug.
- Drain the gear oil.



- Before installing the plug, remove iron powder attached to the magnet of the drain plug. Tighten the oil drain plug to the specified torque.
- Tightening torque:** $32 \pm 2 \text{ N}\cdot\text{m}$
- Fill the transfer case fresh oil by using a lubricator.
- Fill with specified oil till the level comes to the lower portion of oil filler plug hole.

Specified transfer oil: Gear oil API classification GL-5 SAE 90
Quantity: 0.55 L

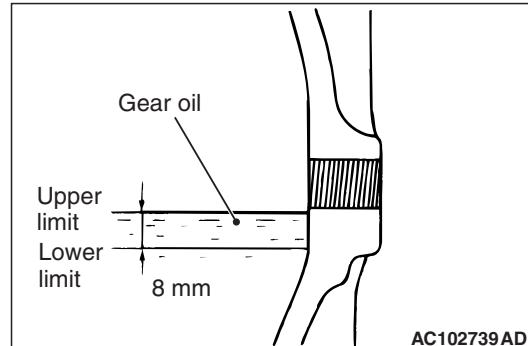
- Tighten the oil filler plug to the specified torque.

Tightening torque: $32 \pm 2 \text{ N}\cdot\text{m}$

B9. CHECK GEAR OIL LEVEL IN FRONT AND REAR DIFFERENTIAL

M6020301000092

- Remove the filler plug.



- Check that the gear oil level is within the specified range from the bottom end of the filler plug hole.
- 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: Gear oil API classification GL-5 or higher
Above 10°C SAE 90
Below 10°C SAE 80W

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

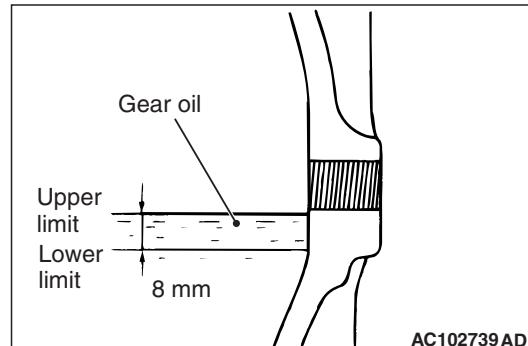
Tightening torque: $49 \pm 9 \text{ N}\cdot\text{m}$

B10. CHANGE GEAR OIL IN FRONT AND REAR DIFFERENTIAL

M6020301100107

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

Tightening torque: $64 \pm 4 \text{ N}\cdot\text{m}$



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

Specified gear oil: Gear oil API classification

GL- 5 or higher

Above 10°C SAE 90

Below 10°C SAE 80W

Quantity: 0.55 L

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

Tightening torque: $49 \pm 9 \text{ N}\cdot\text{m}$

B11. CHECK EXHAUST PIPE CONNECTIONS FOR GAS LEAKAGE, AND CHECK PIPE INSTALLATION

M6020301200115

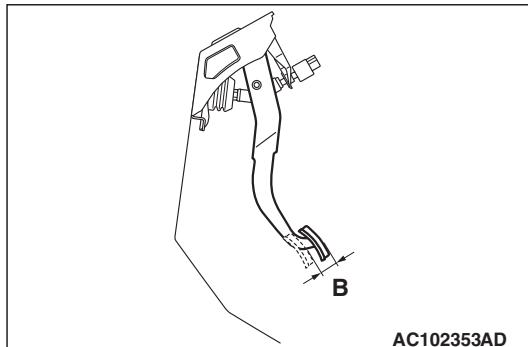
1. Confirm that the exhaust pipe does not interfere with any body components.
2. Check the exhaust pipe for damage by stones, etc.
3. Start the engine and check for gas leaks from the exhaust pipe connections.

OPERATIONS INSIDE THE VEHICLE

C1. CHECK BRAKE PEDAL AND CLUTCH PEDAL FOR FREE PLAY

M6020400100101

BRAKE PEDAL FREE PLAY



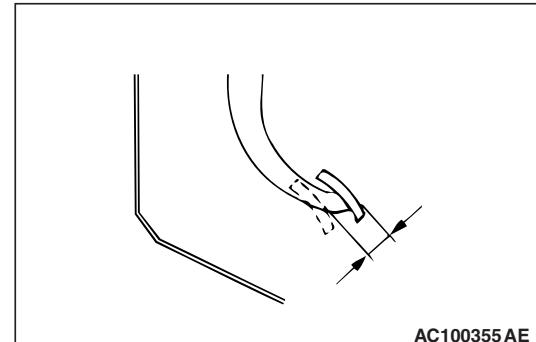
1. With the engine stopped, depress the brake pedal two or three times. After eliminating the vacuum in the power brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (the free play) is within the standard value.

Standard value (B): 3 – 8 mm

2. If the brake pedal play is not within the standard value, check the following, and adjust or replace if necessary:

- Excessive play between the brake pedal and the clevis pin, or between the clevis pin and the brake booster operating rod
- Brake pedal height
- Installation position of the stop lamp switch, etc.

CLUTCH PEDAL FREE PLAY



1. Measure the clutch pedal free play (including the play at the clutch pedal clevis pin).

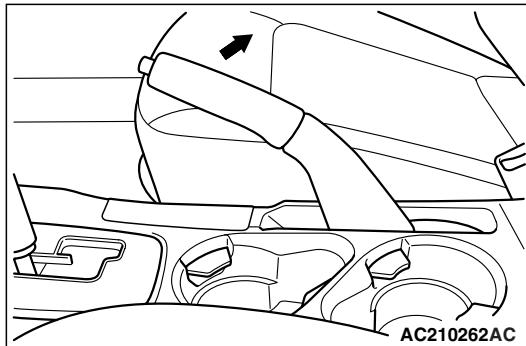
Standard value: 4 – 13 mm

2. If the clutch pedal free play do not meet the standard value, probably there is air in the hydraulic system or a malfunction of the clutch itself, so bleed out the air or disassemble and inspect the clutch.

C2. CHECK PARKING BRAKE LEVER
STROKE AND PLAY

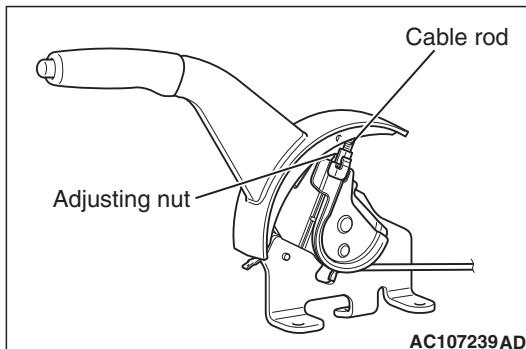
M6020400200153

Lever type

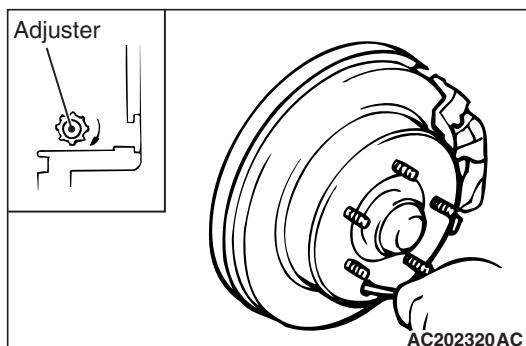


1. Pull the parking brake lever with a force of approx. 200 N and count the number of notches.

Standard value: 4 – 5 notches



2. If the parking brake lever stroke is not the standard value, adjust as described below.
 - (1) Remove the floor console assembly.
 - (2) Loosen the adjusting nut to move it to the cable rod end so that the cable will be free.



- (3) Remove the rear brake adjusting hole plug. Then insert a flat-tipped screwdriver to turn the adjuster to the arrow direction (to expand the shoe) until the parking brake shoe makes contact and the disc can no longer be turned. Back off the adjuster to the opposite direction by five notches.

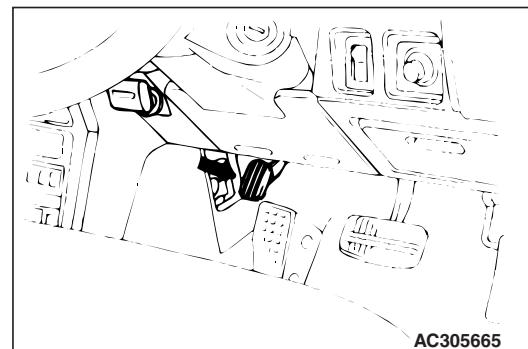
- (4) Adjust the parking brake lever stroke to the standard value by turning the adjusting nut. After the adjustment, ensure that there is no free play between the adjusting nut and the parking brake lever.

CAUTION

If the parking brake lever stroke is below the standard value and the braking is too firm, the rear brakes may drag.

- (5) After adjusting the parking brake lever stroke, jack up the rear end of the vehicle, and then release the parking brake and turn the rear wheels to check that the rear brakes are not dragging.

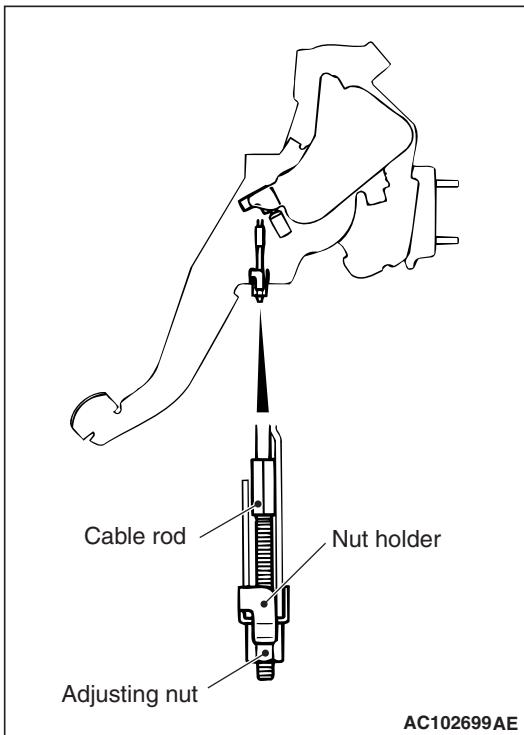
Pedal type



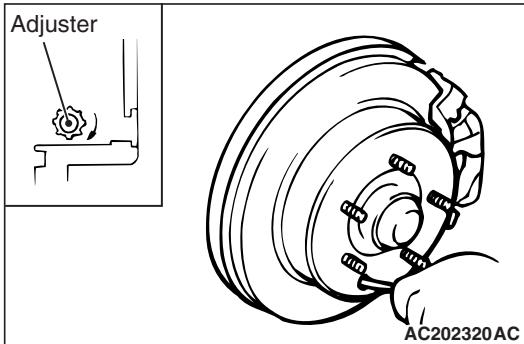
1. Depress the parking brake pedal by approximately 200 N.

Standard value: 1 – 2 notches

2. If the parking brake pedal stroke is not within the standard value, adjust as described below.



(1) Loosen the adjusting nut to the end of the cable rod, in order to allow slack in the cables.



(2) Remove the rear brake adjusting hole plug. Then insert a flat-tipped screwdriver to turn the adjuster to the allow direction (to expand the shoe) until the parking brake shoe makes contact and the disk can no longer be turned. Back off the adjuster to the opposite direction by five notches.

(3) Adjust the parking brake pedal stroke to the standard value by turning the adjusting nut. After the adjusting, ensure that there is no free play between the adjusting nut and the parking brake pedal.

In addition, check that the adjusting nut is secured by the nut holder.

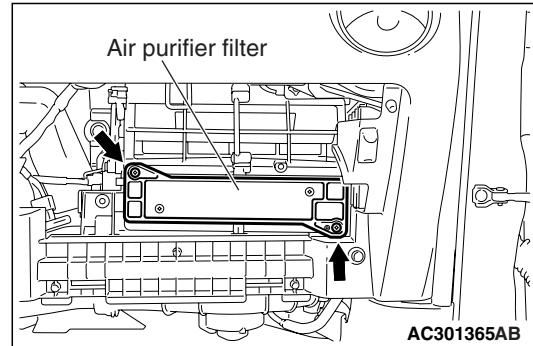
CAUTION

If the parking brake pedal stroke is below the standard value and the braking is too firm, the rear brakes may drag.

(4) After the parking brake pedal stroke is adjusted, raise the rear of the vehicle. Release the parking brake, turn the rear wheels to confirm that the rear brakes are not dragging.

C3. REPLACE AIR PURIFIER FILTER

M6020400300138



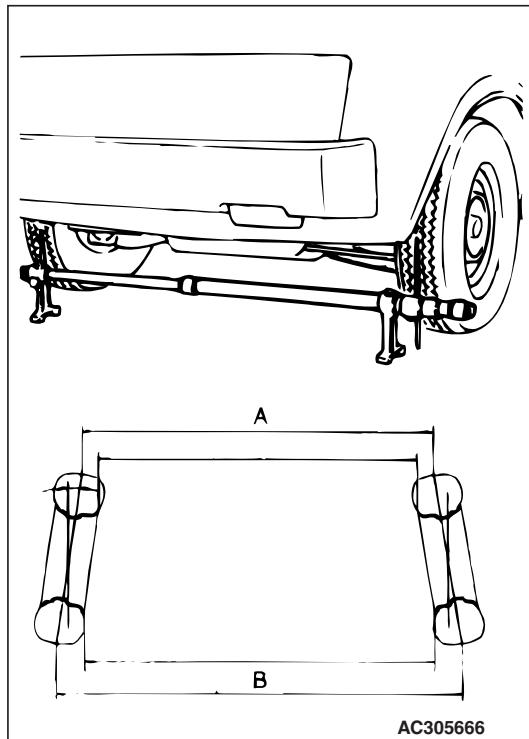
1. Remove the glove box.
2. Remove the two screws as shown, and replace the air purifier filter.
3. Install the glove box.

OPERATIONS OUTSIDE THE VEHICLE

D1. CHECK UNEVEN TYRE WEAR

Check the entire periphery of the tyres for uneven wear. If any tyre shows uneven wear, check the toe-in and toe-out, and adjust if necessary.

TOE-IN



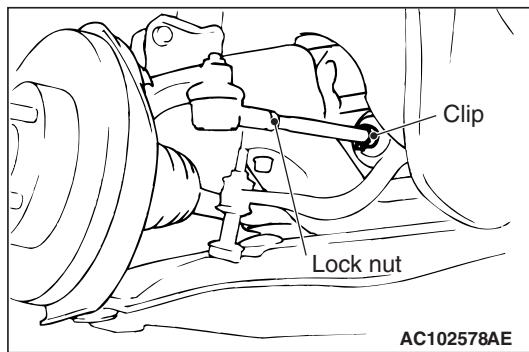
Using a toe-in gauge, measure toe-in.

Toe-in = B - A

Standard value:

At the centre of tyre tread: 1 ± 2 mm

Toe angle (per wheel): $0^{\circ}03' \pm 05'$



1. Adjust the toe-in by undoing the clip and lock nut, and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

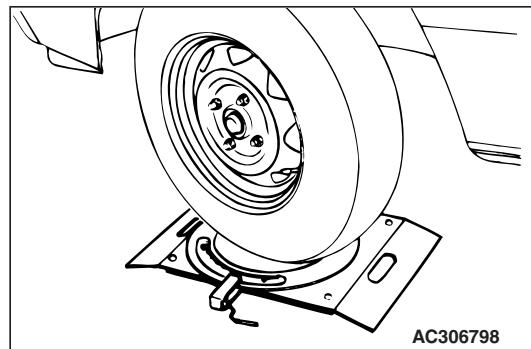
NOTE:

The toe will move out as the left turnbuckle is turned toward the front of the vehicle and the right turnbuckle is turned toward the rear of the vehicle.

2. Install the clip and tighten the lock nut to the specified torque.

Tightening torque: 52 ± 2 N·m

3. Confirm that the toe-in is at the standard value.



4. Use a turning radius gauge to check that the steering angle is at the standard value.

Standard value:

Item	Specifications
Inner wheels	$34^{\circ}50' \pm 1^{\circ}30'$
Outer wheels (for reference)	$29^{\circ}20'$

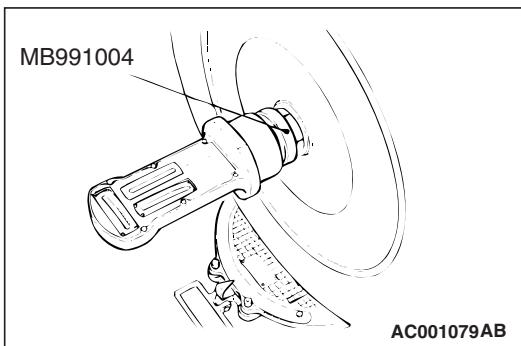
TOE-OUT ANGLE ON TURNS

To check the steering linkage, especially after the vehicle has been involved in an accident or if an accident is presumed, it is advisable to check the toe-out angle on turns in addition to the wheel alignment. Conduct this test on the left turn as well as on the right turn.

Standard value:

Item	Specifications
Toe-out angle on turns (inner wheel when outer wheel at 20°)	$22^{\circ}00' \pm 1^{\circ}30'$

CAMBER, CASTER AND KINGPIN INCLINATION



Standard value:

Item	Specifications
Camber	$-0^\circ 10' \pm 30'$ *
Caster	$3^\circ 15' \pm 30'$ *
Kingpin inclination	$12^\circ 25' \pm 1^\circ 30'$

NOTE:

1. *: difference between right and left wheels must be less than 30'
2. Camber and caster are preset at the factory and cannot be adjusted.
3. For vehicles with aluminium wheels, attach the camber/caster/kingpin gauge to the driveshaft by using special tool wheel alignment gauge attachment (MB991004). Tighten the special tool to the same torque 245 ± 29 N·m as the driveshaft nut.

CAUTION

To prevent the wheel bearing from damage, never subject the wheel bearings to the vehicle load when the drive shaft nuts are loosened.

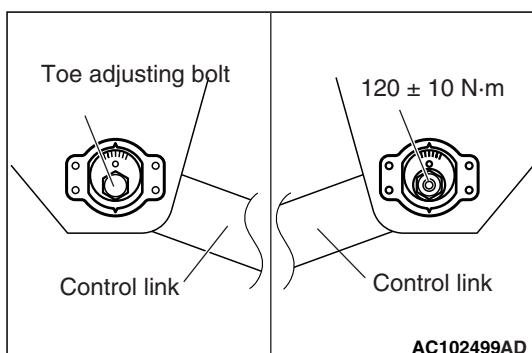
REAR TOE-IN

Standard value:

At the centre of tyre tread: 3 ± 2 mm

Toe angle (per wheel): $0^\circ 08' \pm 05'$

1. Be sure to adjust the camber before making toe adjustment.



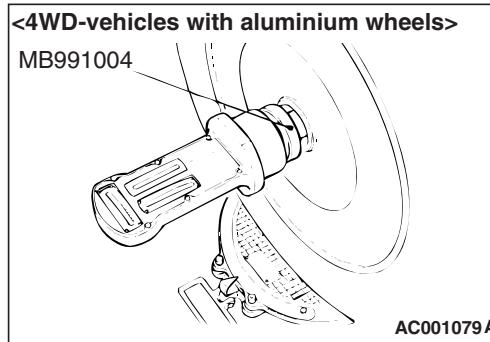
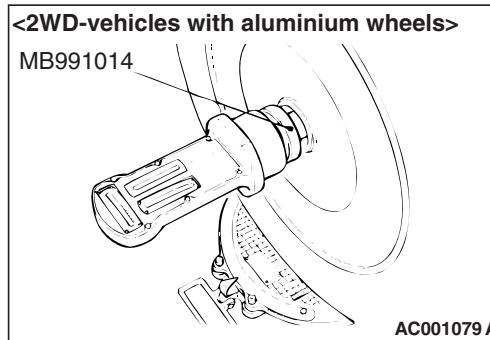
2. Carry out adjustment by turning the toe adjusting bolt (control link mounting bolt which is located on the inner side of the body).

Left wheel: Turning clockwise (+) toe-in
Right wheel: Turning clockwise (-) toe-in

NOTE:

The scale has gradations of approximately 2.6 mm (single side toe angle equivalent to 16')

REAR CAMBER



Standard value: $-0^\circ 40' \pm 30'$

(difference between right and left wheel: less than 30')

NOTE:

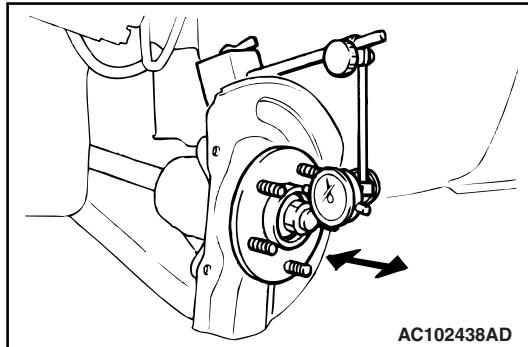
Camber is preset at the factory and cannot be adjusted. For 2WD-vehicles with aluminium wheels, attach the camber/caster/kingpin gauge to the trailing arm spindle by using special tool wheel alignment gauge attachment (MB991014). Tighten the special tool to the same torque 175 ± 25 N·m as the trailing arm spindle self-locking nut.

For 4WD-vehicles with aluminium wheels, attach the camber/caster/kingpin gauge to the drive shaft by using special tool wheel alignment gauge attachment (MB991004). Tighten the special tool to the specified torque 245 ± 29 N·m as the driveshaft nut.

**D2. CHECK FRONT WHEEL BEARINGS
FOR PLAY**

1. Remove the disc brake caliper and suspend it with a wire.
2. Remove the brake disc from the front hub.

M6020500200075



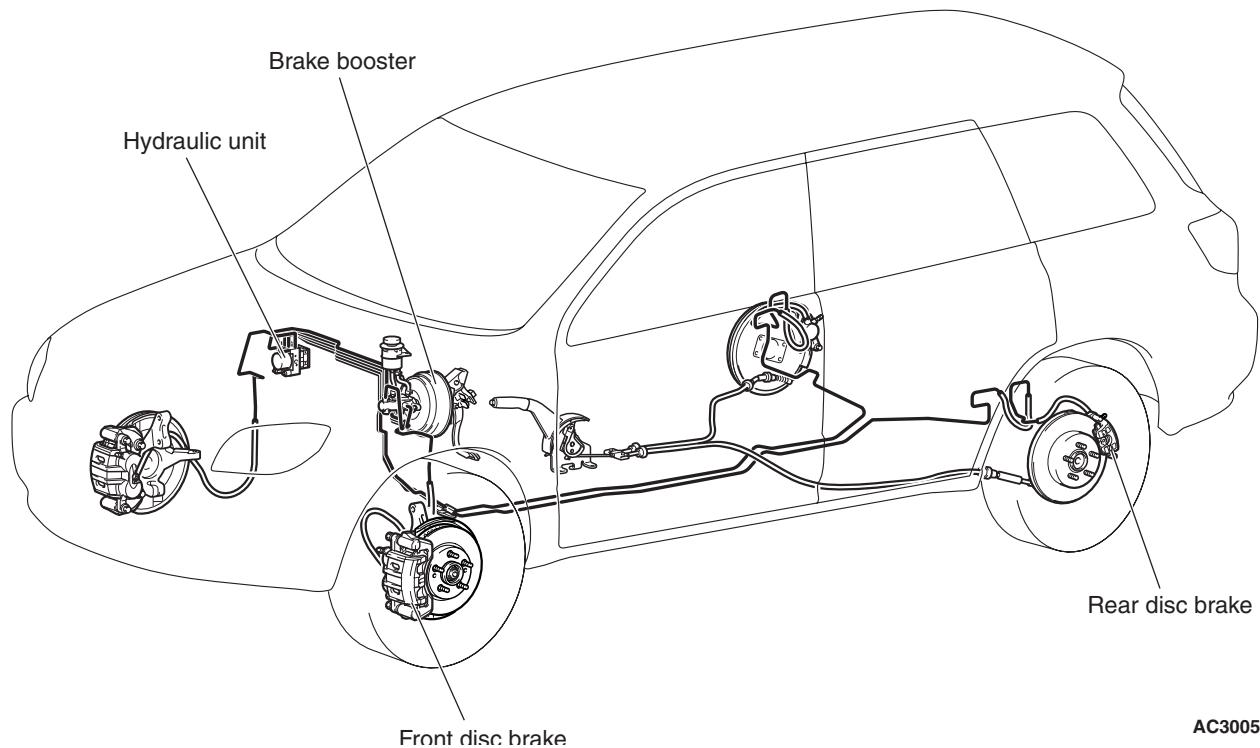
3. Attach a dial gauge as shown in the illustration, and then measure the axial play while moving the hub in the axial direction.

Limit: 0.05 mm

4. If axial play exceeds the limit, replace the front hub assembly.

D3. CHECK BRAKE HOSES AND PIPES FOR LEAKAGE

M6020500300146

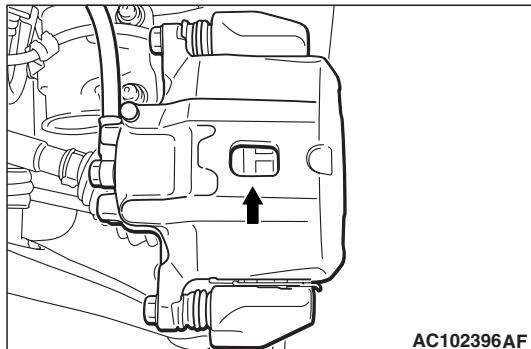


1. Check entire circumference and length of hoses and pipes.

2. Check all clamps for tightness and connections for leakage.

D4. CHECK BRAKE PADS AND DISCS FOR WEAR

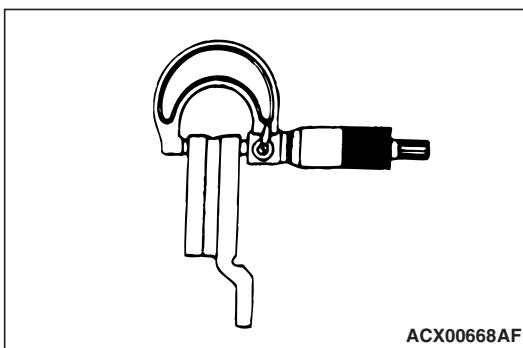
M6020500400143



1. Check the brake pad thickness through the caliper body check port.

Standard value: 10.0 mm
Limit: 2.0 mm

2. When the thickness is less than the limit, always replace the pads at an axle set.



3. Using a micrometer, measure disc thickness at eight positions, approximately 45° apart and 10 mm in from the outer edge of the disc.

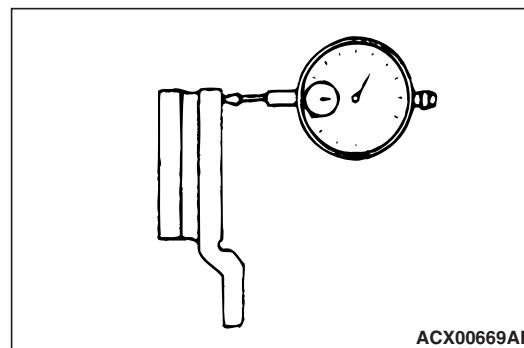
Standard value:
24.0 mm <Front>
10.0 mm <Rear>

Limit:
22.4 mm <Front>
8.4 mm <Rear>

4. If the disc thickness is less than the limits, replace it with a new one.

BRAKE DISC RUN-OUT CHECK

1. Remove the brake assembly, and then hold it with wire.
2. Temporarily install the disc with the hub nut.



3. Place a dial gauge approximately 5 mm from the outer circumference of the brake disc, and measure the run-out of the disc.

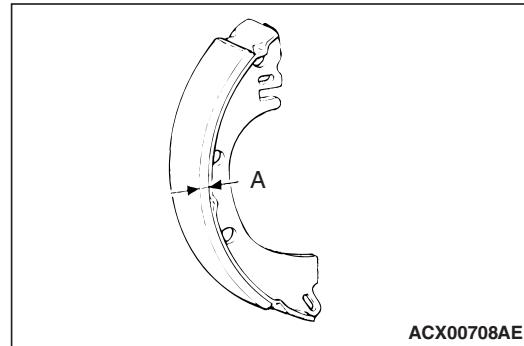
Limit: 0.04 mm <Front>
0.05 mm <Rear>

D5. CHECK BRAKE SHOE LININGS AND DRUMS FOR WEAR

M6020500500098

BRAKE LINING THICKNESS CHECK

1. Remove the brake disc.



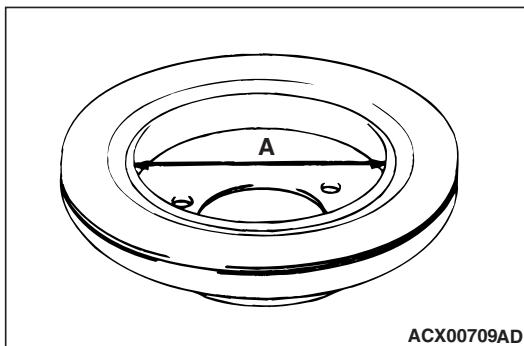
2. Measure the thickness of the brake lining at several places.

Standard value (A): 2.8 mm
Limit (A): 1.0 mm

3. If the thickness of the brake lining is below the limit, replace the shoe and lining assemblies on both sides of the vehicle. Never replace only one side.

BRAKE DRUM INSIDE DIAMETER CHECK

1. Remove the brake disc.



2. Measure the inside diameter of the brake disc in two places or more.

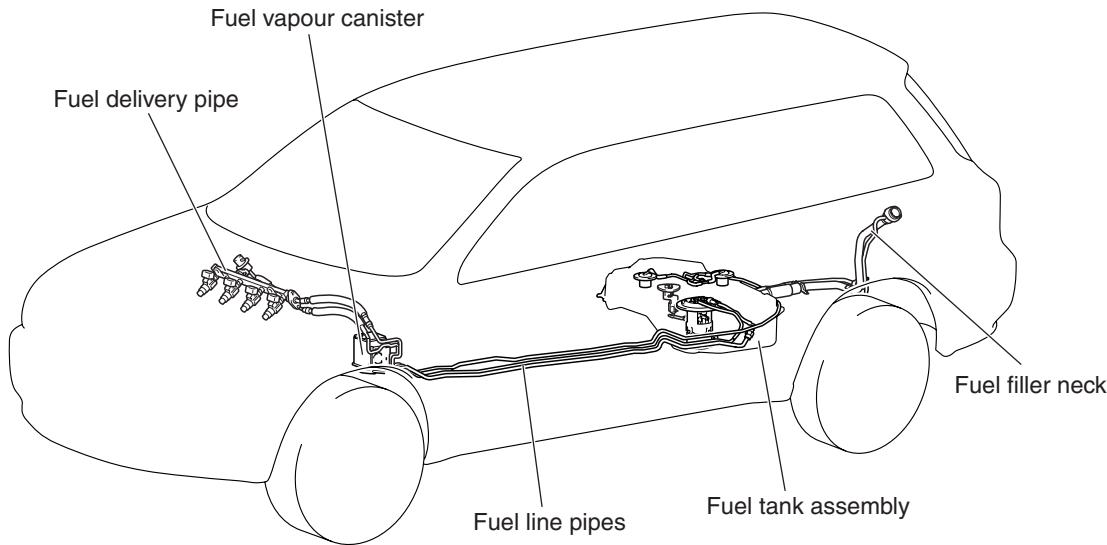
Standard value (A): 168.0 mm

Limit (A): 169.0 mm

3. If the inside diameter exceeds the limit, or if it is excessively worn or one side, replace the brake disc.

D6. CHECK FUEL HOSES AND PIPES FOR LEAKAGE OR DETERIORATION

M6020500600147



AC300450AC

1. Check entire circumference and length of hoses and pipes.
2. Check all clamps for tightness and connections for leakage.

OPERATIONS AFTER ENGINE IS WARMED UP

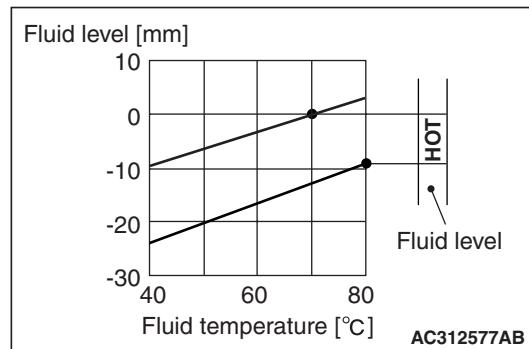
E1. CHECK FLUID LEVEL IN AUTOMATIC TRANSMISSION

M6020600100116

1. Drive the vehicle until the ATF temperature reaches the normal temperature (70 – 80°C).

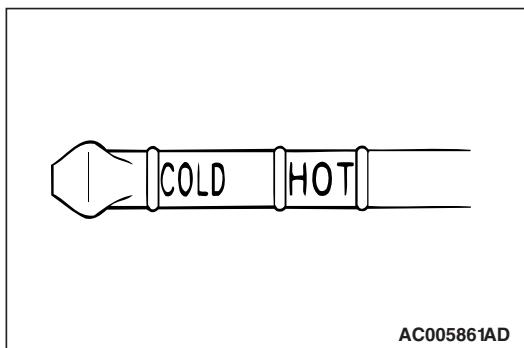
NOTE:

1. Measure ATF temperature using M.U.T.-II/III.



2. Check the oil level referring to the characteristics chart if it takes some time to reach the normal operation temperature of ATF (70 – 80 °C.)
2. Park the vehicle on a level surface.
3. Move the selector lever to all positions to fully charge the torque converter and the fluid lines with ATF, and then move the selector lever to the N position.
4. After wiping away any dirt from around the oil level gauge, pull out the oil level gauge and check the level of ATF.

NOTE: If the ATF has a burnt smell, or if it has become very contaminated or dirty, it means that the ATF has become contaminated by minute particles from bushings (metal) or worn parts. In such a case, the transmission needs to be overhauled and the ATF cooler line needs to be flushed out.



5. Check that the ATF level is between the HOT marks on the oil level gauge. If the ATF level is too low, add more ATF until the level reaches between the HOT marks.

Automatic transmission fluid:
DIA QUEEN ATF SP III

NOTE:

If the ATF level is too low, the oil pump draws air into the system along with the ATF, and air bubbles will thus form in the fluid circuit. This will cause a drop in fluid pressure and cause the shift points to change and the clutches and brakes to slip. If the ATF level is too high, the gear will churn the ATF and cause bubbles to develop, which can then cause the same problems as when the ATF is too low. In either case, the air bubbles can cause overheating and oxidation of the ATF, and also prevent the valves, clutches and brakes from operating normally. In addition, if bubbles develop in the ATF, the ATF can overflow from the transmission vent holes and be mistaken for leaks.

6. Securely re-insert the oil level gauge.

E2. CHANGE AUTOMATIC TRANSMISSION FLUID

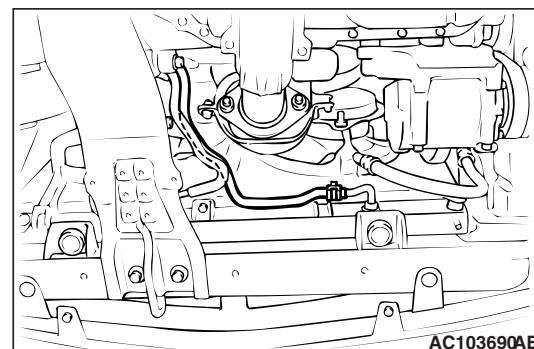
M6020600200157

SPECIFICATIONS

Automatic transmission fluid	Quantity	Remark
DIA QUEEN ATF SP III	8.1 L	W4A42

CHANGE PROCEDURE

If you have an ATF changer, use the ATF changer to flush the ATF. If you do not have an ATF changer, follow the procedure given below.

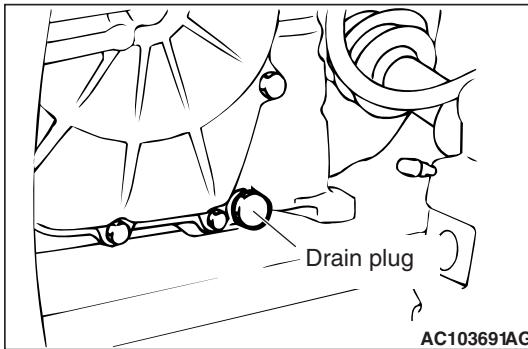


1. Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
2. Start the engine and discharge the ATF.
Driving conditions: N range, idling

⚠ CAUTION

The engine should be stopped within one minute of it being started. If the ATF has all been discharged before this, stop the engine at that point.

Discharge amount: Approx. 3.5 L



3. Remove the drain plug at the bottom of the transmission case to drain out the remaining ATF.

Discharge amount: Approx. 2.0 L

4. Install the drain plug with a gasket in between, and tighten it to the specified torque.

Tightening torque: $32 \pm 2 \text{ N}\cdot\text{m}$

5. Pour in new ATF through the oil filler tube.

Amount to add: Approx. 5.5 L

⚠ CAUTION

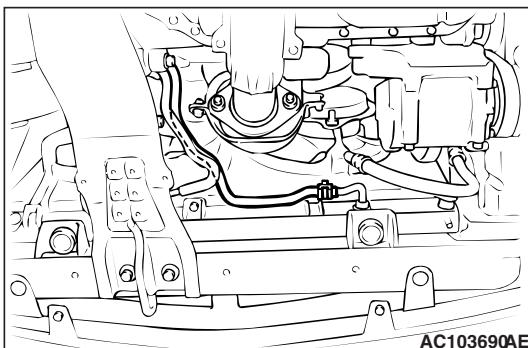
Stop pouring in the ATF once 5.5 L has been poured in.

6. Repeat the operation in step 2.

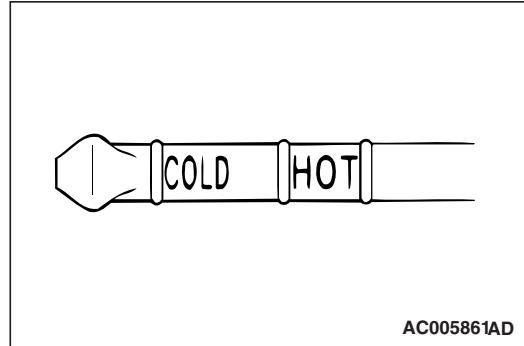
7. Pour in new ATF through the oil filler tube.

Amount to add: Approx. 3.5 L

NOTE: Carry out steps 2 and 7 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 6 and 7.



8. Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
9. Start the engine, and let it run at idle for 1 – 2 minutes.
10. Move the selector lever to all positions once, and then return it to the N position.
11. Check that the ATF level on the oil level gauge is at the COLD mark. If it is not up to this mark, add more ATF.

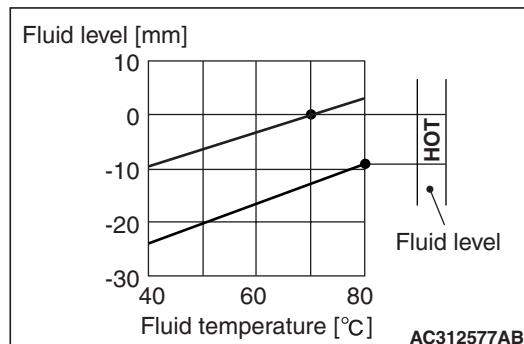


12. Drive the vehicle until the ATF temperature reaches the normal temperature ($70 - 80^\circ\text{C}$), and then re-check the ATF level.

The ATF level must be between the HOT marks.

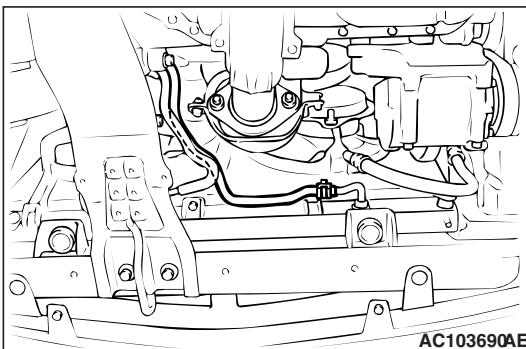
NOTE:

1. The COLD mark is for reference only; the HOT marks should be used as the standard for judgment.
2. Measure ATF temperature using M.U.T.-II/III.



3. Check the oil level referring to the characteristics chart if it takes some time until reaching the normal operation temperature of ATF ($70 - 80^\circ\text{C}$.)
13. When ATF is under the specified level, top up ATF. When ATF is over the specified level, drain the excessive ATF from the drain plug to adjust ATF level to the specified level.
14. Securely insert the oil level gauge into the oil filler tube.

AUTOMATIC TRANSMISSION FLUID COOLER LINE FLUSHING



1. Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
2. Start the engine and discharge the ATF.
Driving conditions: N range, idling

⚠ CAUTION

The engine should be stopped within one minute of it being started. If the ATF has all been discharged before this, stop the engine at that point.

Discharge amount: Approx. 3.5 L

3. Pour in new ATF through the oil filler tube.

Amount to add: Approx. 3.5 L

⚠ CAUTION

Stop pouring in the ATF once 3.5 L has been poured in.

4. Repeat the operation in steps 2 and 3.

NOTE: Carry out steps 2 and 3 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 2 and 3.

5. Carry out the procedure in "CHANGE PROCEDURE" from step 2 onwards.

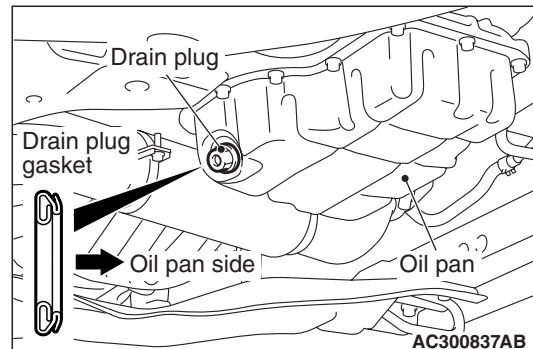
E3. CHANGE ENGINE OIL

M6020600300455

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C to 90°C.
2. Stop the engine and remove the engine oil filler cap.
3. Remove the drain plug to drain oil.

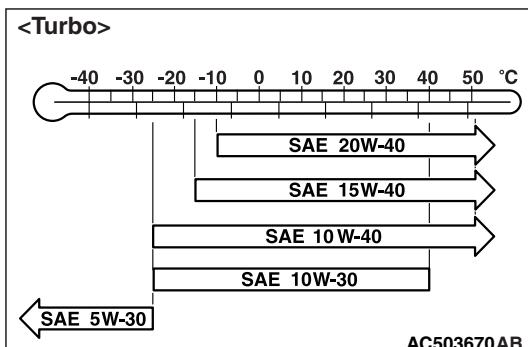
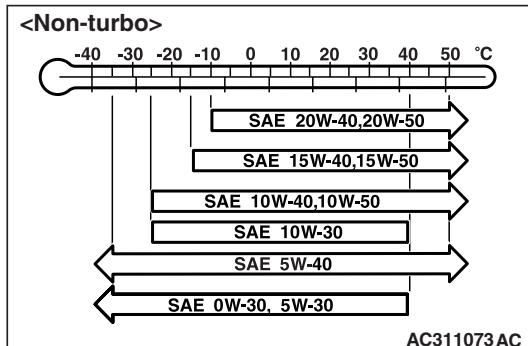
⚠ WARNING

Use care as oil could be hot.



4. Install a new drain plug gasket so that it faces in the direction shown in the illustration, and then tighten the drain plug to the specified torque.

Tightening torque: $39 \pm 5 \text{ N}\cdot\text{m}$



5. Refill with specified quantity of engine oil.

<Non-turbo>

Specified Engine Oil (ACEA and API classification): ACEA A1/B1, A3/B3, A3/B4 or A5/B5 / API SG or higher

Total quantity (Includes volume inside engine oil filter and oil cooler):

4.3 L <4G63, 4G69-A/T>

4.6 L <4G69-M/T>

<Turbo>

- First engine oil replacement
Specified Engine Oil (ACEA and API classification): ACEA A1/B1, A3/B3, A3/B4 or A5/B5 / API SG or higher
- Second and subsequent engine oil replacements
Specified Engine Oil (ACEA and API classification): ACEA A3/B3, A3/B4 or A5/B5 / API SG or higher

Total quantity (Includes volume inside engine oil filter and oil cooler): 4.6 L

NOTE:

1. Failure to use the specified type of engine oil may cause the engine to malfunction. <Turbo>
2. Use of additives is not recommended since they may reduce the effectiveness of additives already included in the engine oil. It may result in failure of the mechanical assembly.
6. Remove the dipstick from the engine, and check whether or not the engine oil level is within the range between MAX and MIN.
7. Install the engine oil filler cap.
8. Start the engine and run it for a few minutes.
9. Stop the engine and check the oil level.

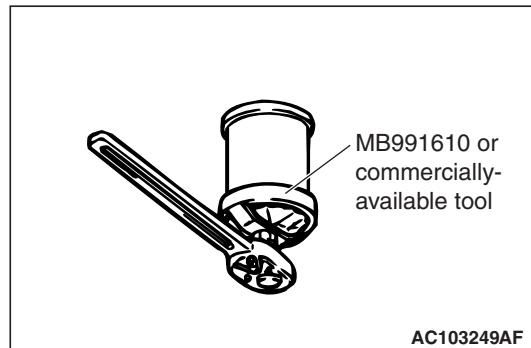
E4. REPLACE ENGINE OIL FILTER

M6020600400128

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C to 90°C.
2. Remove the engine oil filler cap.
3. Remove the drain plug to drain oil.

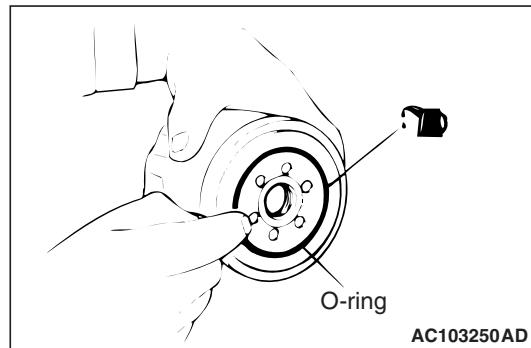
WARNING**Use care as oil could be hot.**

4. Remove the under cover.



5. Use the respective tool in the following table to remove the engine oil filter.

6. Clean the filter bracket side mounting surface.



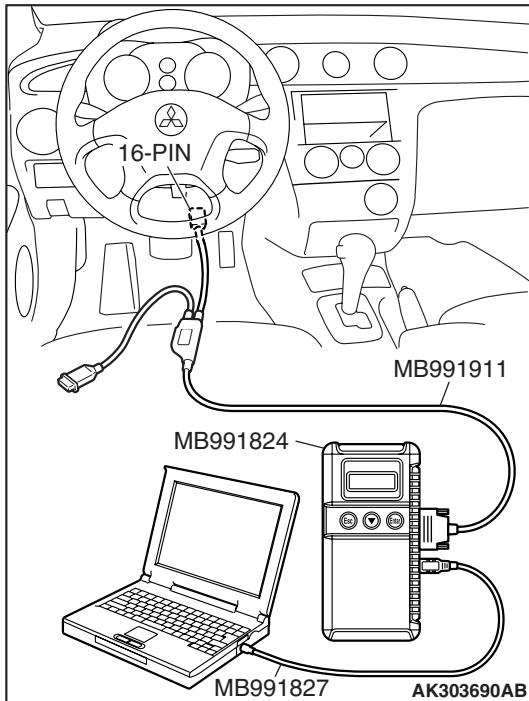
7. Apply a small amount of engine oil to the O-ring of the new oil filter.
8. Once the O-ring of the oil filter is touching the flange, use the respective tool in the following table to tighten to the specified torque.
9. Install the drain plug and refill the engine oil.
10. Race the engine 2-3 times, and check to be sure that no engine oil leaks from installation section of the oil filter.

Number	Tool	Tightening torque
MD136466, MD322508	Commercially-available tool	Approx. 3/4 turn (17 ± 3 N·m)
MD356000	Oil filter wrench (MB991610) or equivalent	Approx. 3/4 turn (14 ± 2 N·m)

E5. CHECK ENGINE IDLING SPEED

M6020600500170

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Turn the ignition switch to "LOCK" (OFF) position.



3. Connect the M.U.T.-III to the diagnosis connector.
4. Connect a timing light.
5. Start the engine and let it run at idle.
6. Check that ignition timing is at the standard value.

Standard value:

approximately 10° BTDC <4G63-N/A, 4G69>
approximately 5° BTDC <4G63-T/C>

7. Check the idle speed.

Standard value:

750 ± 100 r/min <4G63, 4G69-A/T>
 680 ± 100 r/min <4G69-M/T>

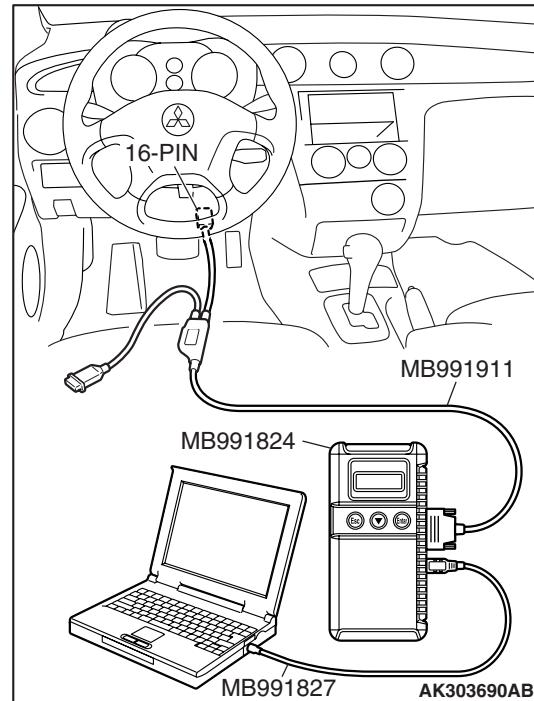
NOTE:

1. The idle speed is controlled automatically by the idle speed control system.
2. When using the M.U.T.-III, select item No.22 and take a reading of the idle speed.
8. If the idle speed is outside the standard value, inspect the MPI system. (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting)
9. Turn the ignition switch to the "LOCK" (OFF) position and then remove the M.U.T.-III.

E6. CHECK CO CONCENTRATION

M6020601000093

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Turn the ignition switch to "LOCK" (OFF) position.



3. Connect the M.U.T.-III to the diagnosis connector.
4. Connect a timing light.
5. Start the engine and let it run at idle.
6. Check that ignition timing is at the standard value.

Standard value:

approximately 10° BTDC <4G63-N/A, 4G69>
approximately 5° BTDC <4G63-T/C>

7. Run the engine at 2,500 r/min for 2 minutes.
8. Set the CO, HC tester.
9. Check the CO contents and the HC contents at idle.

Standard value

CO contents: 0.5% or less

HC contents: 100 ppm or less

10. If there is a deviation from the standard value, check the following items:
 - Diagnosis output
 - Fuel pressure
 - Injector
 - Ignition coil, spark plug cable, spark plug
 - EGR control system
 - Evaporative emission control system
 - Compression pressure

NOTE:

Replace the three way catalyst when the CO and HC contents are not within the standard value, even though the result of the inspection is normal on all items.

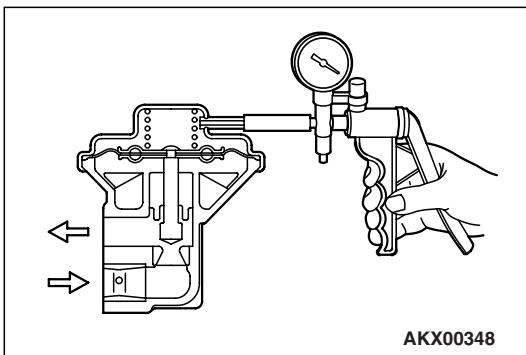
11. Turn the ignition switch to the "LOCK" (OFF) position and then remove the M.U.T.-III.

E7. CHECK EXHAUST GAS RECIRCULATION (EGR) SYSTEM

M6020600800171

EGR VALVE CHECK <4G63>

1. Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found clean with a suitable solvent so that the valve seats correctly.



2. Connect a hand vacuum pump to the EGR valve.
 3. Apply 67 kPa of vacuum, and check that the vacuum is maintained.
 4. Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

Vacuum	Passage of air
5.3 kPa or less	Air is not blown out
27 kPa or more	Air is blown out

5. Replace the gasket, and tighten to the specified torque.

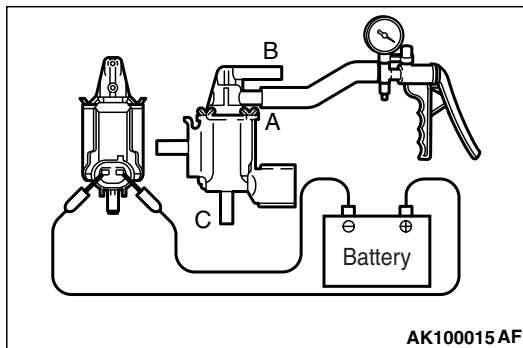
Tightening torque: $20 \pm 2 \text{ N}\cdot\text{m}$

EGR CONTROL SOLENOID VALVE CHECK <4G63>

NOTE:

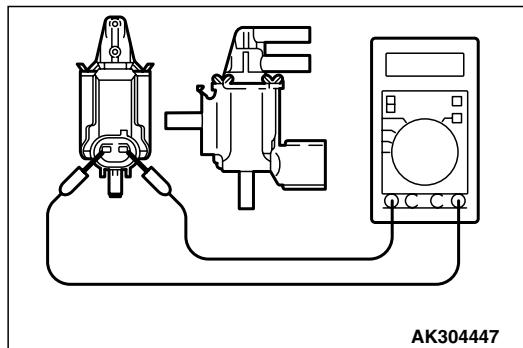
When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

1. Disconnect the vacuum hose from the solenoid valve.
2. Disconnect the harness connector.



3. Connect a hand vacuum pump to nipple (A) of the solenoid valve.
4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the EGR control solenoid valve and without applying voltage.

Battery voltage	Nipple condition	Normal condition
Applied	Both nipples opened	Vacuum leaks
	Nipple "B" closed	Vacuum maintained
Not applied	Both nipples opened	Vacuum leaks
	Nipple "C" closed	Vacuum maintained

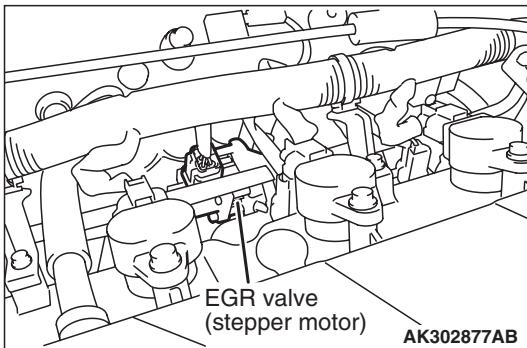


5. Measure the resistance between the terminals of the solenoid valve.

Standard value: $29 - 35 \Omega$ (at 20°C)

EGR VALVE (STEPPER MOTOR) CHECK AND CLEANING <4G69>

Checking the Operation Sound

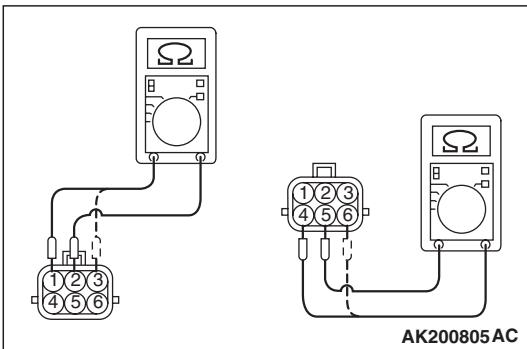


1. Check that the operation sound of the stepper motor can be heard from the EGR valve when the ignition switch is turned ON (without starting the engine).
2. If the operation sound cannot be heard, inspect the drive circuit of the stepper motor.

NOTE: If the circuit is normal, either the stepper motor or the engine-ECU <M/T> or engine-A/T-ECU <A/T> may have failed.

Checking the Coil Resistance

1. Remove the EGR valve.



2. Measure the resistance between terminal No. 2 and either terminal No. 1 or terminal No. 3 of the connector at the EGR valve.

Standard value: 20 – 24 Ω (at 20°C)

3. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the EGR valve.

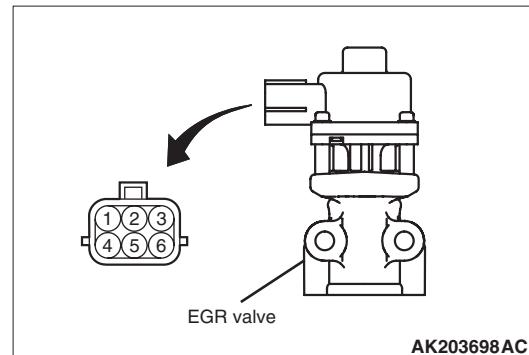
Standard value: 20 – 24 Ω (at 20°C)

4. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

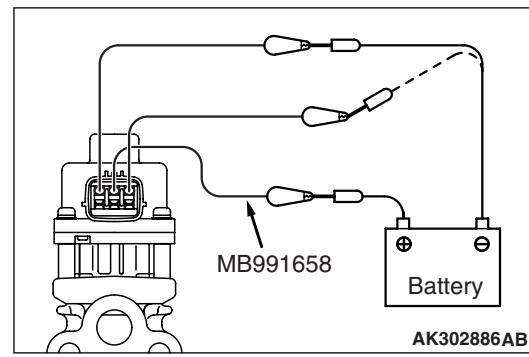
Tightening Torque: 24 ± 4 N·m

Operation Check

1. Remove the EGR valve.



2. Attach a test wiring harness (special tool MB991658) to the connector at the EGR valve.

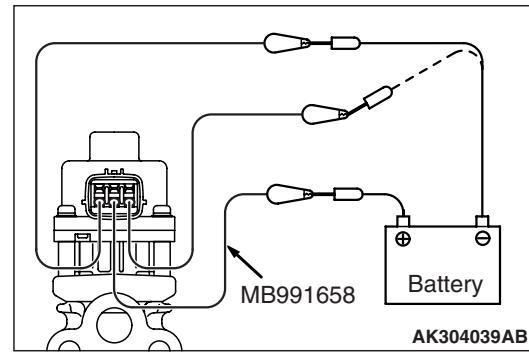


3. Connect the positive (+) terminal of the battery to terminal No. 2.

CAUTION

Connecting battery voltage to the EGR valve for a long term could damage the coil.

4. Connect terminals No. 1 and No. 3 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.



5. Connect the positive (+) terminal of the battery to terminal No. 5.

CAUTION

Connecting battery voltage to the EGR valve for a long term could damage the coil.

6. Connect terminals No. 4 and No. 6 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.
7. If a vibration can be felt during the test, the stepper motor is normal.
8. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

Tightening torque: $24 \pm 3 \text{ N}\cdot\text{m}$

Cleaning the EGR Valve

1. Remove the EGR valve and check that the EGR valve is not stuck or clogged with carbon deposits. Use a wire brush to clean the valve if necessary.

CAUTION

Do not use a solvent or detergent, which could enter the motor and cause it to malfunction.

2. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

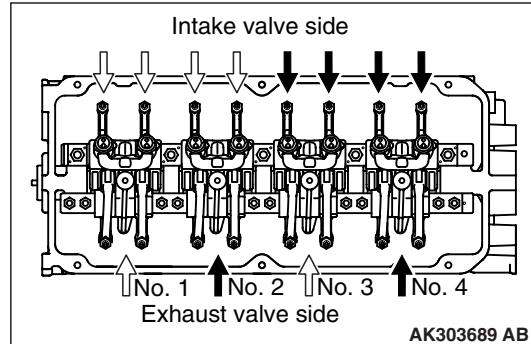
Tightening torque: $24 \pm 3 \text{ N}\cdot\text{m}$

E8. CHECK VALVE CLEARANCE (EXCEPT VEHICLES WITH AUTO-LASH ADJUSTER)

M6020600900093

1. Start the engine and allow it to warm up until the engine coolant temperature reaches $80 - 95^\circ\text{C}$.
2. Turn the ignition switch to the "LOCK" (OFF) position.
3. Remove all spark plugs from the cylinder head for easy inspection.
4. Remove the rocker cover.
5. Turn the crankshaft clockwise until the notch on the pulley is lined up with the "T" mark on the timing indicator.

6. Move the rocker arms on the No.1 and No.4 cylinders up and down by hand to determine which cylinder has its piston at the top dead center on the compression stroke. If both intake and exhaust valve rocker arms have a valve lash, the piston in the cylinder corresponding to these rocker arms is at the top dead center on the compression stroke.



7. Valve clearance inspection and adjustment can be performed on rocker arms indicated by white arrow mark when the No.1 cylinder piston is at the top dead centre on the compression stroke, and on rocker arms indicated by black arrow mark when the No.4 cylinder piston is at the top dead centre on the compression stroke.

8. Measure the valve clearance.

If the valve clearance is not as specified, loosen the rocker arm lock nut and adjust the clearance using a thickness gauge while turning the adjusting screw.

Standard value (hot engine):

Intake valve: 0.20 mm

Exhaust valve: 0.30 mm

9. While holding the adjusting screw with a screwdriver to prevent it from turning, tighten the lock nut to the specified torque.

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

10. Turn the crankshaft through 360° to line up the notch on the crankshaft pulley with the "T" mark on the timing indicator.
11. Repeat steps (8) and (9) on other valves for clearance adjustment.
12. Install the rocker cover.
13. Install the spark plugs and tighten to the specified torque.

Tightening torque: $25 \pm 4 \text{ N}\cdot\text{m}$

OTHERS

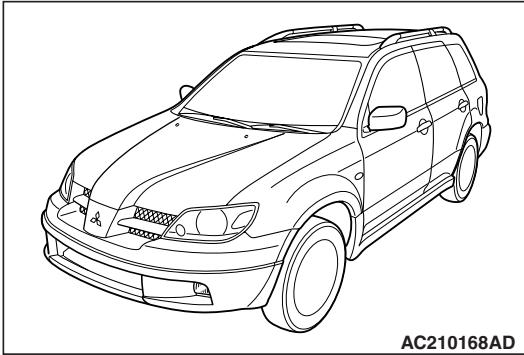
F1. CHECK BODY CONDITION FOR DAMAGE

M6020700100061

1. Check underbody coating for damage.
2. Check body painting for damage.

F2. ROAD TEST

M6020700200121



AC210168AD

Drive the vehicle and check for conditions.

1. Check free play of steering wheel.
2. Check efficiency of service brakes and parking brakes system.
3. Check driveability of engine.
4. Check condition of instruments, gauges indicators, exterior lamps, heater and ventilators.
5. Check abnormal noise of each part.
6. Check the tyres for wear and for the correct air pressure.

NOTES