

GROUP 0

GENERAL

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## HOW TO USE THIS MANUAL

This manual contains Pre-delivery inspection and Periodic inspection and maintenance.

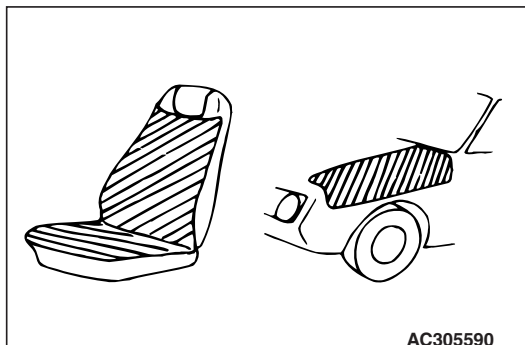
Group 0 and 1 have the contents for all vehicle models, and Group 2 has contents for the relevant vehicle models.

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## PRECAUTIONS BEFORE SERVICE

### PROTECTING THE VEHICLE

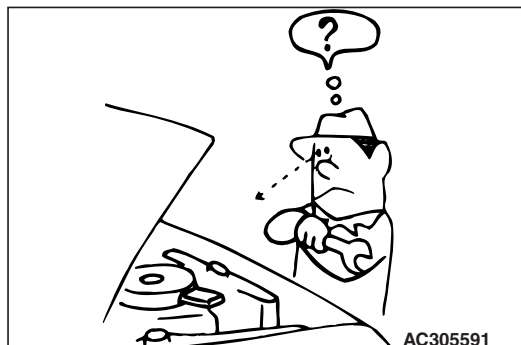
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If there is a likelihood of damaging interior or exterior parts during service operations, protect them with suitable covers (such as seat covers, fender covers, etc.).

### REMOVAL AND DISASSEMBLY

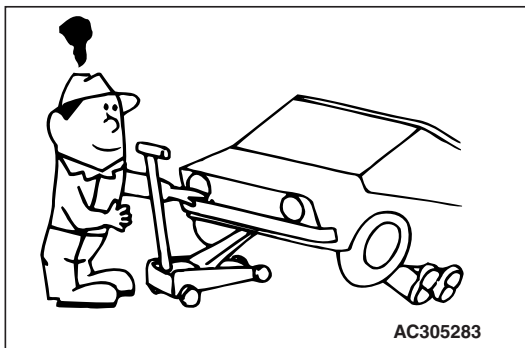
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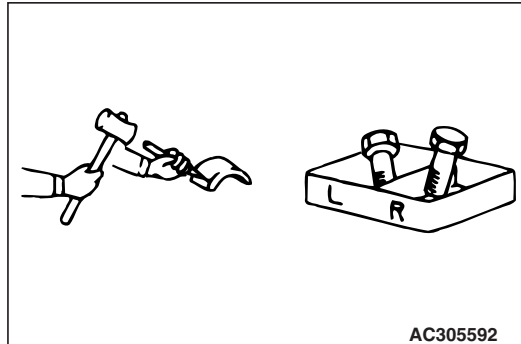
When checking a malfunction, find the cause of the problem. If it is determined that removal and/or disassembly is necessary, perform the work by following the procedures contained in this manual.

### DOING SERVICE WORK IN GROUPS OF TWO OR MORE MECHANICS

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If the service work is to be done by two or more mechanics working together, all the mechanics involved should take safety into consideration while they work.

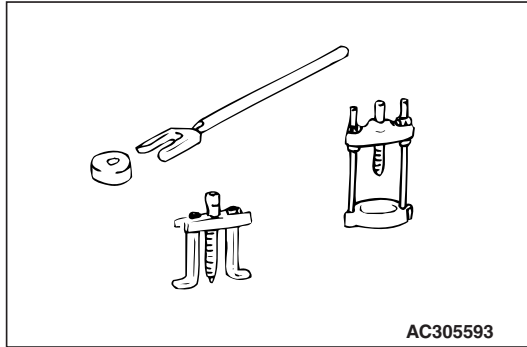


If punch marks or mating marks are made to avoid error in assembly and facilitate the assembly work, be sure to make them in locations which will have no detrimental effect on performance and/or appearance. If an area having many parts, similar parts, and/or parts which are symmetrical right and left is disassembled, be sure to arrange the parts so that they do not become mixed during the assembly process.

1. Arrange the parts removed in the proper order.
2. Determine which parts are to be reused and which are to be replaced.
3. If bolts, nuts, etc., are to be replaced, be sure to use only the exact size specified.

## SPECIAL TOOLS

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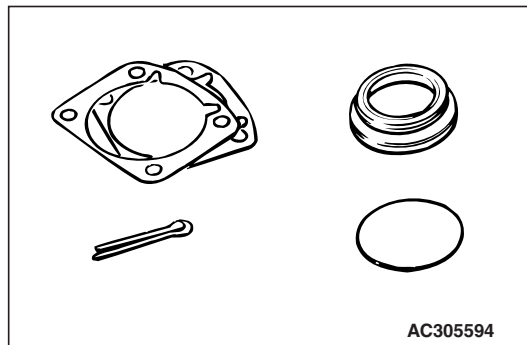


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If other tools are substituted for the special tools to do service of repair work, there is the danger that vehicle parts might be damaged, or the technician might be injured; therefore, be sure to use the special tool whenever doing any work for which the use of one is specified.

## PARTS TO BE REPLACED

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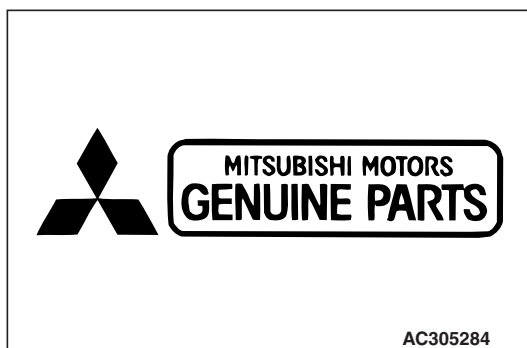
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If any of the following parts are removed, they must be replaced with new parts.

- Oil seals
- Gaskets (except rocker cover gasket)
- Packings
- O-rings
- Lock washers
- Split pins
- Self-locking nuts

## PARTS

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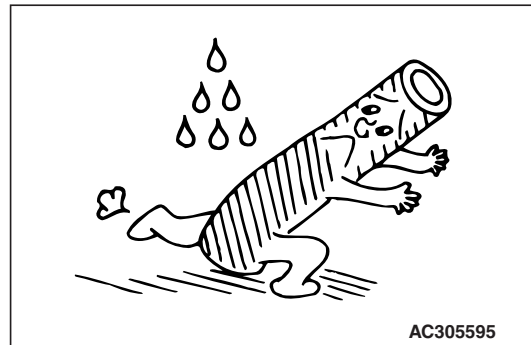


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When replacing parts, use MITSUBISHI genuine parts.

## TUBES AND OTHER RUBBER PARTS

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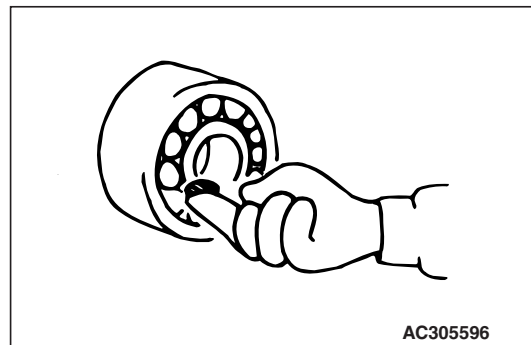


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Be careful to avoid spilling any petrol, oil, etc., because if it adheres to any tubes or other rubber parts, they might be adversely affected.

## LUBRICANTS

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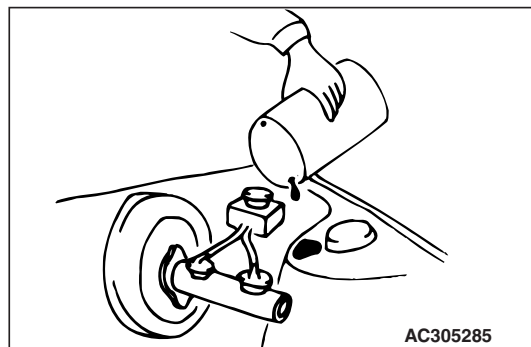


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In accordance with the instructions in this manual, apply the specified lubricants in the specified locations during assembly and installation.

## BRAKE FLUID

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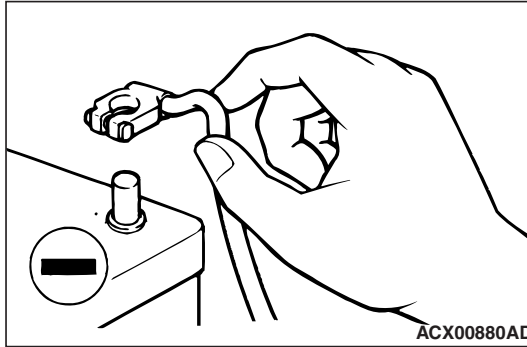


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Be careful to avoid spilling any brake fluid, because if it adheres to the vehicle body, the paint coat might be discoloured.

## SERVICING THE ELECTRICAL SYSTEM

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ACX00880AD

Before replacing a component related to the electrical system and before undertaking any repair procedures involving the electrical system, be sure to first disconnect the negative (-) cable from the battery in order to avoid damage caused by short-circuiting.

**CAUTION**

**Before connecting or disconnecting the negative (-) cable, be sure to turn off the ignition switch and the lighting switch. (If this is not done, there is the possibility of semiconductor parts being damaged.)**

## APPLICATION OF ANTI-CORROSION AGENTS AND UNDERCOATS

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If oil or grease gets onto the oxygen sensor, it will cause a drop in the performance of the sensor. Cover the oxygen sensor with a protective cover when applying anti-corrosion agents and undercoats.

## PRE-INSPECTION CONDITION

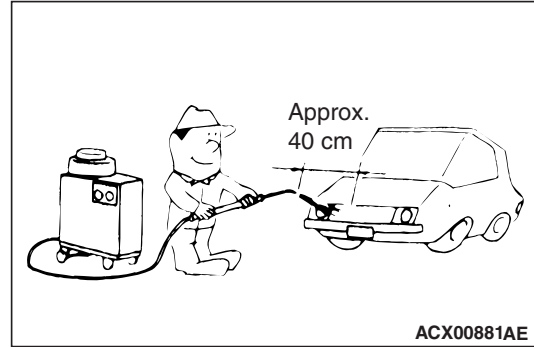
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"Pre-inspection condition" refers to the condition that the vehicle must be in before proper engine inspection can be carried out. If you see the words "Set the vehicle to the pre-inspection condition" in this manual, it means to set the vehicle to the following condition.

- Engine coolant temperature: 80 to 90°C
- Lamps, electric cooling fan and all accessories: OFF
- M/T: Neutral
- A/T: P range

## VEHICLE WASHING

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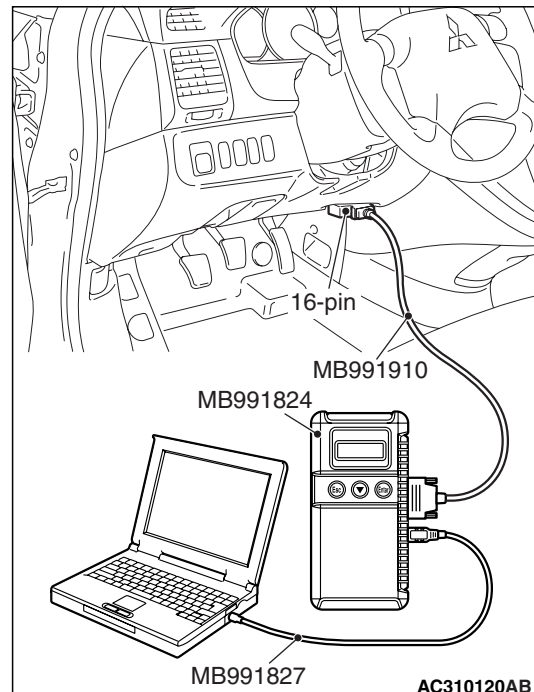
If high-pressure car-washing equipment or steam car-washing equipment is used to wash the vehicle, be sure to note the following information in order to avoid damage to plastic components, etc.

- Spray nozzle distance: Approx. 40 cm or more
- Spray pressure: 3,900 kPa or less
- Spray temperature: 82°C or less
- Time of concentrated spray to one point: within 30 sec.

## MULTI USE TESTER (M.U.T.-III) SUB ASSEMBLY

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Refer to the "M.U.T.-III OPERATING INSTRUCTIONS" for instructions on handling the M.U.T.-III.



AC310120AB

Connect the M.U.T.-III to the diagnosis connector as shown in the illustration.

**CAUTION**

**Turn the ignition switch to the LOCK (OFF) position before connecting or disconnecting the M.U.T.-III.**

## **IN ORDER TO PREVENT VEHICLES FROM FIRE**

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"Improper installation of electrical or fuel related parts could cause a fire. In order to retain the high quality and safety of the vehicle, it is important that any accessories that may be fitted or modifications/repairs that may be carried out which involve the electrical or fuel systems, **MUST** be carried out in accordance with MMC's information/Instructions".

## **ENGINE OILS**

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### **Health Warning**

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

### **Recommended Precautions**

The most effective precaution is to adapt working practices which prevent, as far as practicable, the risk of skin contact with mineral oils, for example by using enclosed systems for handling used engine oil and by degreasing components, where practicable, before handling them.

### **Other precautions:**

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Avoid contaminating clothes, particularly under-pants, with oil.
- Do not put oily rags in pockets, the use of overalls without pockets will avoid this.
- Do not wear heavily soiled clothing and oil-impregnated foot-wear. Overalls must be cleaned regularly and kept separately from personal clothing.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.
- Obtain First Aid treatment immediately for open cuts and wounds.
- Wash regularly with soap and water to ensure all oil is removed, especially before meals (skin cleansers and nail brushes will help). After cleaning, the application of preparations containing lanolin to replace the natural skin oils is advised.
- Do not use petrol, kerosine, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin after work.
- If skin disorders develop, obtain medical advice without delay.

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## NOTES

## GROUP 1

# PRE-DELIVERY INSPECTION

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## NOTES CONCERNING ENTRIES

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This section describes the details and the inspection methods employed for the pre-delivery inspection of vehicles.

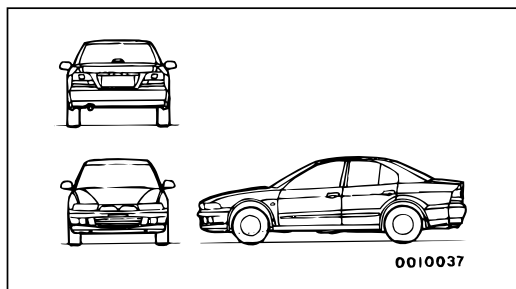
The inspection should be conducted according to the sequence described in the TABLE OF PRE-DELIVERY INSPECTION.

Inspection methods are described following the TABLE OF PRE-DELIVERY INSPECTION.

**NOTE:**

- 1. The spaces for model, C/# (Chassis number), E/# (engine number), aggregate distance travelled in kilometres (miles), date of inspection, name of person conducting the inspection, and body colour must be completed without fail.*
- 2. The spaces for place of inspection, and name of owner should be completed as required.*

TABLE OF PRE-DELIVERY INSPECTION



Model	
Chassis number	
Engine number	
Distance Travelled	km
Owner	
Date of inspection	
Place of inspection	
Inspector	
Body colour	

Symbols to be used					
✓	Good	A	Needs adjustment	T	Needs retightening
C	Needs cleaning	L	Needs replenishment of lubricant, water, etc.	X	Needs replenishment of repair

**INSPECTION PROCEDURE****First Step**

1. ☐ Connection of the dark current connector

**Body**

2. ☐ Wrap film
3. ☐ Exterior
4. ☐ Operation of door locking systems and door hinges
5. ☐ Operation of door mirrors, windows and sunroof

**Under Hood**

6. ☐ Engine oil level
7. ☐ Brake master cylinder fluid level
8. ☐ Clutch master cylinder fluid level
9. ☐ Washer fluid level
10. ☐ Battery condition and connections
11. ☐ Power steering fluid level
12. ☐ Electrical wiring

**Under Vehicle**

13. ☐ Tyre and spare tyre pressures
14. ☐ Suspension system
15. ☐ Steering linkage and split pins
16. ☐ Under body

**Before Road Test**

17. ☐ Seat adjusters and seat back latches
18. ☐ Choke system and inhibitor switch
19. ☐ Idle control knob
20. ☐ Instrument panel controls
21. ☐ Meters, gauges, warning lamps and indication lamps
22. ☐ Air conditioning, heater and defroster systems
23. ☐ Wipers and washers
24. ☐ Operation of service brakes and parking brakes
25. ☐ Clutch operation
26. ☐ Operation of seat belts, shoulder belts and retractors

**Road Test**

27. ☐ Engine performance and exhaust gas
28. ☐ Transmission in all ranges
29. ☐ Brakes
30. ☐ Steering control
31. ☐ Vibration and rattles
32. ☐ Electrical equipment

**After Road Test**

33. ☐ Idle speed
34. ☐ Ignition timing
35. ☐ Radiator coolant level
36. ☐ Hoses, fluid lines and connections located under hood
37. ☐ Manual transmission and transfer (4WD) oil level
38. ☐ Automatic transmission fluid level
39. ☐ Engine, transmission, steering gear box and differential for leaks
40. ☐ Front and rear differential oil levels
41. ☐ Hoses, fluid lines and connections located under vehicle

**Final Steps**

42. ☐ Headlamp aiming
43. ☐ Equipment
44. ☐ Exterior and interior
45. ☐ Owner instructions

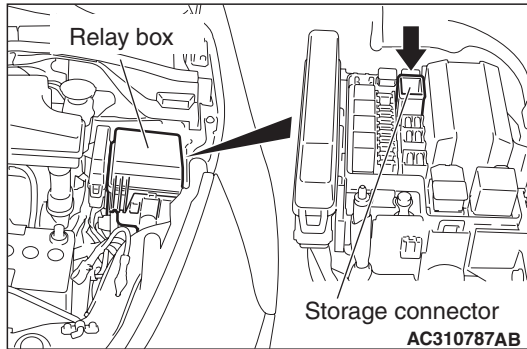
## PAINTWORK TERMS

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Term	Definition	Remarks
Blister	A raised bubble in the paint (from the base or the undercoat) caused by abnormal moisture. The bubble may contain either water or air.	
Change in tone	The colour tone of the painted surface is not uniform.	Including wrong colour, discoloration and decoloration.
Contact mark	A mark on the painted surface as a result of contact by hands or clothing at the time of paint application.	
Crack	A crack in the painted surface.	Cracks may be either shallow or deep.
Dirt in paintwork	Rough surface resulting from foreign material in the paint or from dust deposited on wet paint during painting or storage.	
Filed or ground traces	Deep scratches in sheet metal surface, resulting from improper use of buffer or sander, are not completely covered, and are visible through paint coating.	
Orange peel	The painted surface has the appearance of an orange peel.	
Peeling	The paint flakes off (partly or over a wide area).	The peeling may be minor, medium, or major.
Pin holes	Tiny holes in the painted surface.	
Runs	A visible trickle of dried paint on the surface.	Either undercoat or top-coat.
Scratches	Scratches on the painted surface.	
Shrink	The painted surface "shrinks", causing wrinkles.	
Smears	Spots of soot or other material deposited on the painted surface.	Including stains and water spots.
Spray mist	The painted surface includes fine particles of other paint.	
Uneven lustre	The lustre of the painted surface is not uniform.	
Uneven metallic dispersion	The metallic dispersion of the painted surface is not uniform.	
Visibly incomplete topcoating	A part of the undercoating visible.	

**FIRST STEP****1. CONNECTION OF DARK CURRENT CONNECTOR**

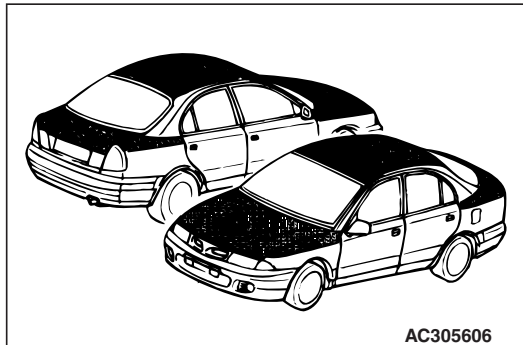
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**Connecting Procedure**

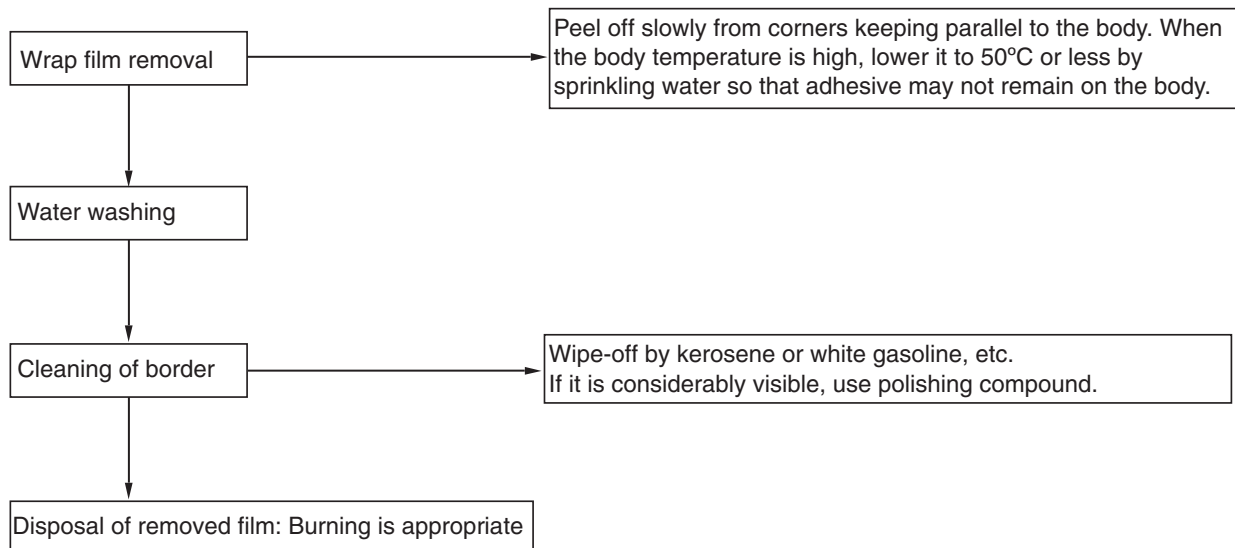
Press down the storage connector.

**BODY****2. WRAP FILM**

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To protect the exterior finish of vehicles prior to dealer delivery, a protective coating is used. The coating is a thin white resin film. It is applied to all painted exterior horizontal surfaces of the vehicle and is held in place with a tacky adhesive backing.

**Removal procedure**

### Wrapping work

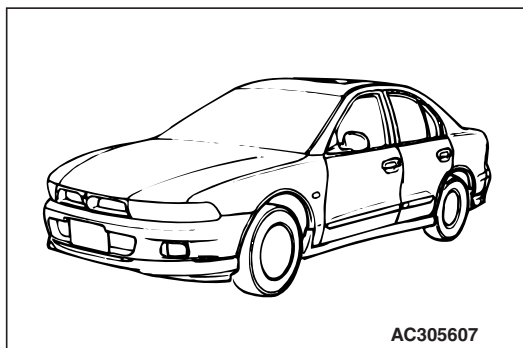
No.	Process	Operation Content
1	Continuous peeling of film	The film is peeled off.
2	Water rinse	Sand and dust are removed from the vehicle body and it is dried thoroughly.
3	Parts where the film is to be reapplied are checked.	There should be no leftover adhesive, swelling or discoloration of the paint film, or other defects.
4	Treatment of parts where film is to be reapplied.	Treat the defects on the parts where film is to be reapplied. If a solvent is used to remove leftover adhesive, wipe off the solvent thoroughly.
5	Reapplication	<ol style="list-style-type: none"> <li>1. Basically, the parts where the film is to be applied should be the same as the film that is to be applied.</li> <li>2. Apply the film from the lower portion of the body, working upward progressively. Apply pressure using a plastic squeegee or similar tool.</li> <li>3. As necessary, cut the film at the various parts such as windshield washer nozzles, hood and trunk lid.</li> </ol>

#### **⚠ CAUTION**

1. Apply the film with the body at a temperature of 10 – 40° C. (Workability is good in this temperature range.)
2. If the outside surface of the film (the side with no adhesive) is brought into direct contact with the paint film and left in that state, it may result in loss of paint gloss, so make sure the film does not get folded under or otherwise make contact with the paint film.
3. Air bubbles and wrinkles do not have a particularly bad influence on the paint film, but every effort should be made to prevent air bubbles from being trapped under the film by applying pressure from the centre of the film outward toward the edges during application.
4. To prevent intrusion of rainwater, be sure to press down the overlapping portions and cut ends of the film securely.

### 3. EXTERIOR

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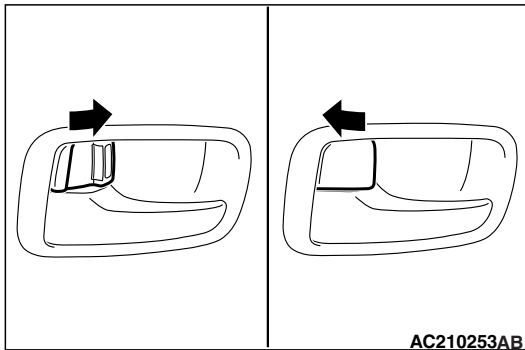
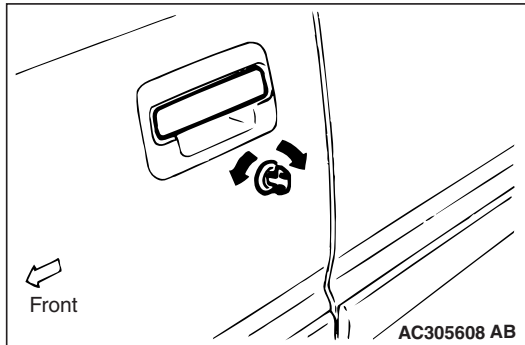
1. Visually inspect the entire exterior.
  - (1) Paint condition
  - (2) Corrosion, scratches
  - (3) Bent edges, dented panels
2. Coated surfaces maintenance
  - Touch up minor paint chips and flaws.

#### **NOTE:**

For terms of paintwork, refer to [P.1-5](#).

#### 4. OPERATION OF DOOR LOCKING SYSTEMS AND DOOR HINGES

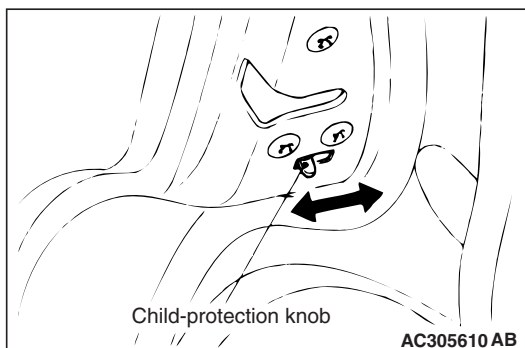
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1. Open each door to check the release mechanism and ease of operation.
2. Close the door to check the latch and striker.
3. Open the door, operate the lock lever and close the door to check the lock.
4. Partially close the door to check the open-door detent.
5. Unlock each door with the key to check lock operation.
6. Verify that all doors can be locked by the lock buttons.

**NOTE:**

*Adjust and lubricate the door latches, strikers and locks as required.*



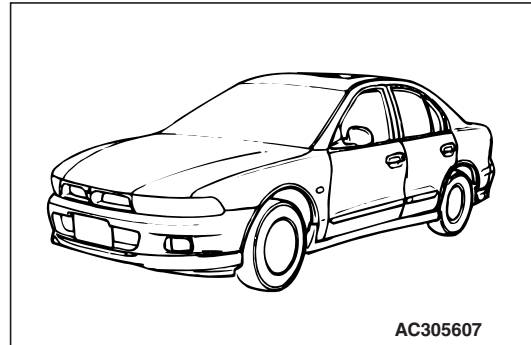
7. Verify that the rear doors can't be opened by the inner door handle when the child protection knob at the end of the door is shifted to the "LOCK" position with the inside lock plunger raised.

**CAUTION**

Set the lock to the "FREE" position on child protection of both rear doors. (For four door models)

#### 5. OPERATION OF DOOR MIRRORS, WINDOWS AND SUNROOF

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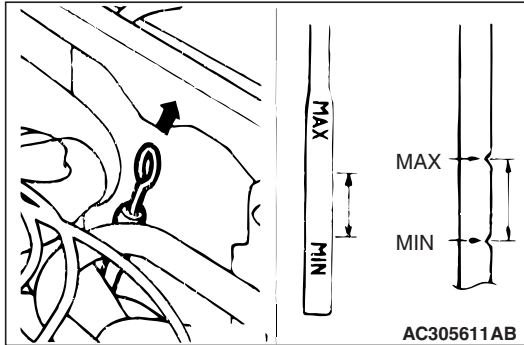


1. Door mirrors  
Check that the mirror operate properly.
2. Door windows  
Close all door windows to the fully closed position to check ease of operation.
3. Power windows  
Check that the door windows operate when the respective switches are operated. Check that when the lock switches are depressed, the respective door windows can no more be opened or closed.
4. Slide window  
Close the slide window to the fully closed position to check operation.
5. Sunroof  
Close the sunroof to the fully closed position to check operation.

## UNDER HOOD

### 6. ENGINE OIL LEVEL

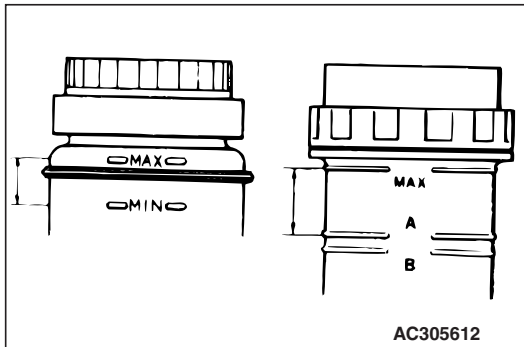
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Check that the oil level is between "MAX" and "MIN". If it is at or below MIN, add the necessary amount of the specified engine oil referring to GROUP 2, Periodic Inspection and Maintenance P.2-3.

### 7. BRAKE MASTER CYLINDER FLUID LEVEL

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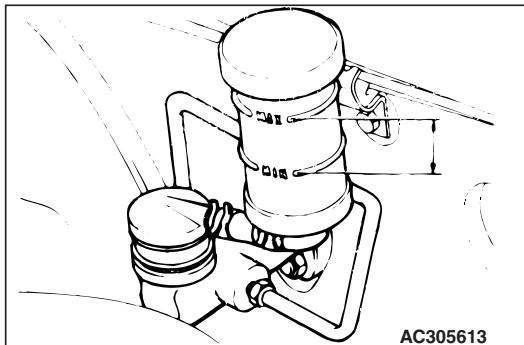


Check the fluid level. If it is below the "MIN" mark, replenish fresh brake fluid up to the "MAX" mark.

**Specified Brake Fluid: DOT3 or DOT4**

### 8. CLUTCH MASTER CYLINDER FLUID LEVEL

M6010500300026

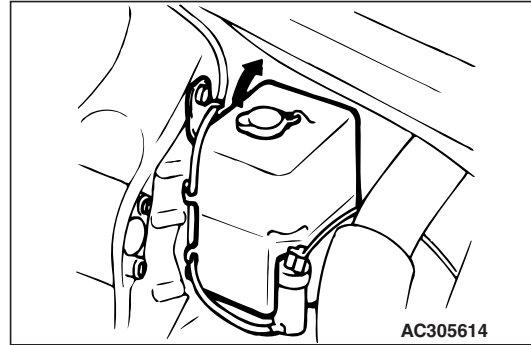


Check the fluid level. If it is below the "MIN" mark, replenish fresh brake fluid up to the "MAX" mark.

**Specified Brake Fluid: DOT3 or DOT4**

### 9. WASHER FLUID LEVEL

M6010500400023

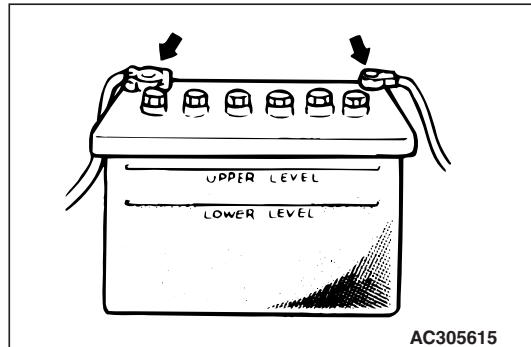


Check the fluid level; if it is low, replenish the washer fluid at the up to MAX mark.

1. Windshield washer reservoir
2. Rear window washer reservoir

### 10. BATTERY CONDITION AND CONNECTIONS

M6010500500020



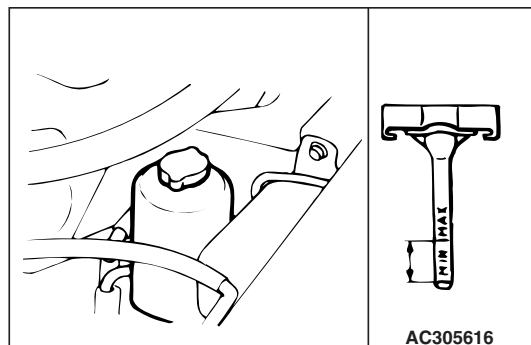
Inspect the battery connections. Verify that they are tightened.

**NOTE:**

*Do not wipe the lubricant from the battery posts and cable clamps.*

### 11. POWER STEERING FLUID LEVEL

M6010500600083



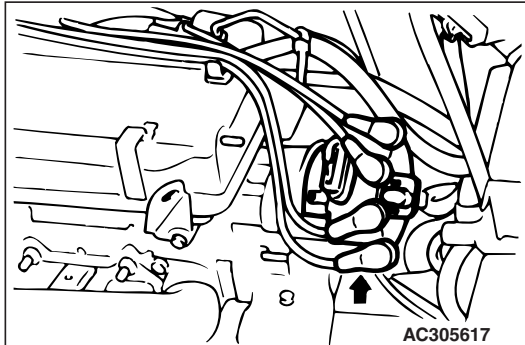
1. Check that the fluid level is between "MAX" and "MIN".

- If the fluid is added, start the engine and turn the steering wheel from stop to stop several times to expel air from the system.

**Specified gear oil: Automatic transmission fluid DEXRON III or DEXRON II**

## 12. ELECTRICAL WIRING

M6010500700024



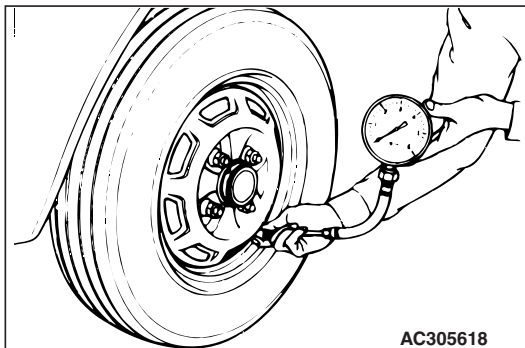
- Each electrical wiring harness and connector
  - Check each harness to be correctly routed and securely clipped.
  - Confirm that all connections are tight.
- Ignition cable
 

Be sure that all ignition cables are firmly attached to the spark plugs, distributor cap (or crank angle sensor) and ignition coil.

## UNDER VEHICLE

### 13. TYRE AND SPARE TYRE PRESSURES

M6010600100029



- Tyre specification
 

Check the correct tyre specification.
- Tyre pressures
 

Adjust each tyre pressure.

**NOTE:**

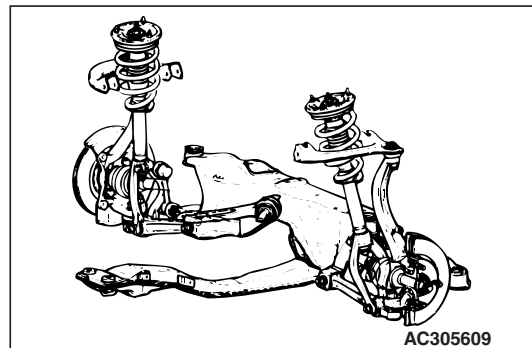
*Recommended pressure is shown on the tyre pressure label.*

- Valve stem extensions
 

Verify that the valve stem extensions are installed where necessary.
- Install the wheel covers, wheel rings and hub caps.

### 14. SUSPENSION SYSTEM

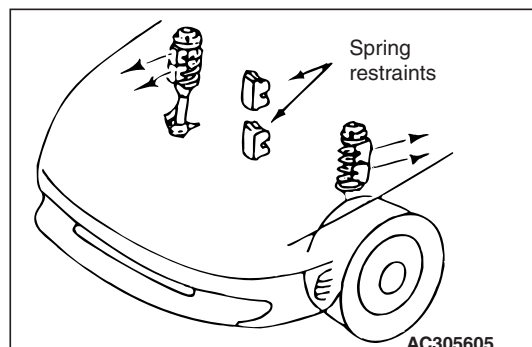
M6010600200026



Check to be sure that each installation bolt and nut is tightened. If split pins are used, make sure that they are properly installed.

- Lower arm, Upper arm
- Stabilizer bar
- Strut assembly

### REMOVE FRONT SPRING RESTRAINTS





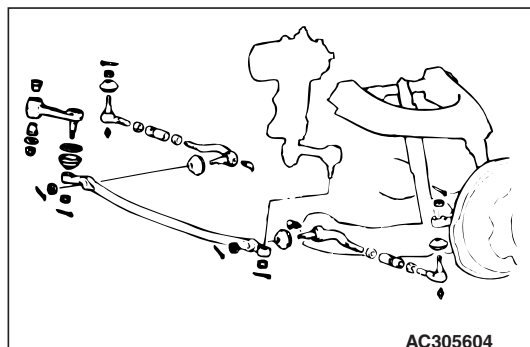
With the vehicle correctly positioned on the sub-frame contact points, and the suspension fully extended, remove the rubber restraints from the front springs.

**⚠ CAUTION**

**It is very important that these restraints must be removed during predelivery-inspection. Failure to do so could cause ride and handling complaints.**

## 15. STEERING LINKAGE AND SPLIT PINS

M6010600300023



1. Steering linkage retaining nuts and split pins  
Check visually and by feel that the steering linkage retaining nuts are correctly tightened and the split pins are correctly installed.
2. Tie rods and relay rod  
Check that the tie rods and relay rod of the steering linkage are not bent and that the tie rod end lock nuts are securely tightened.
3. Steering components
  - (1) Check that each of the steering components is tightened.
  - (2) Check the tie rod end, nuts and split pins for proper installation.
  - (3) Check the condition of bellows-type dust seals.
4. Split pins  
Check the front axle nuts and rear wheel spindle nuts for split pins.

## 16. UNDER BODY

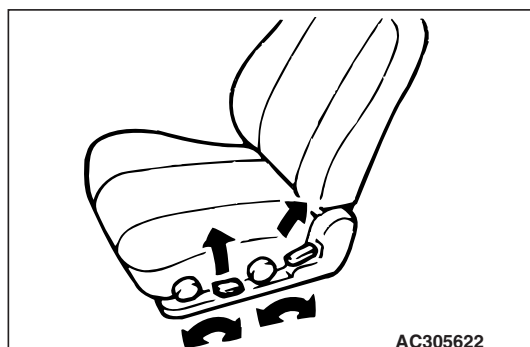
M6010600400020

Check under body and under body coating for damage.

# BEFORE ROAD TEST

## 17. SEAT ADJUSTERS AND SEAT BACK LATCHES

M6010700100026



Check the operation of the various parts of the seats.

1. Mechanical adjusters of the seats
2. Operation of the latch for tilting the seatbacks forward and backward.

## 18. INHIBITOR SWITCH

M6010701100029

On models with an automatic transmission, be sure the engine starts in both "P" and "N" position, and does not start in other positions.

## 19. IDLE CONTROL KNOB

M6010700300020

Verify that the diesel engine revolution increases when the idle control knob is pulled out.

## 20. INSTRUMENT PANEL CONTROLS

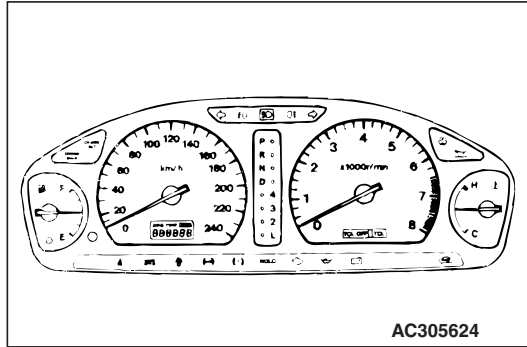
M6010700400027

Check the operation of the following

1. Horn
2. Head lamps
3. Exterior and interior lamps
4. Instrument panel lamps
5. Instrument brightness control

**21. METERS, GAUGES, WARNING LAMPS AND INDICATION LAMPS**

M6010700500024

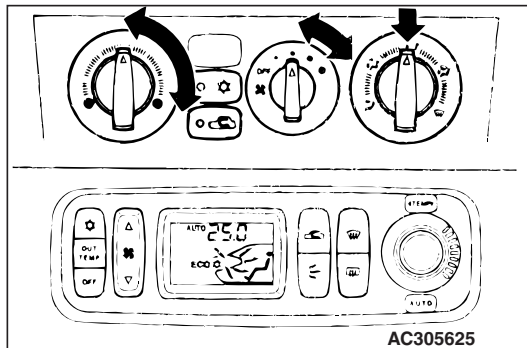


1. Check the meters and gauges are functioning properly.
2. Check each indicator lamp and warning lamp functions properly.

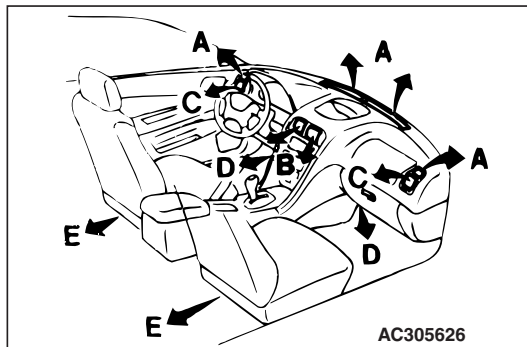
**22. AIR CONDITIONING, HEATER AND DEFROSTER SYSTEM**

M6010700600021

Check the systems for proper operation.



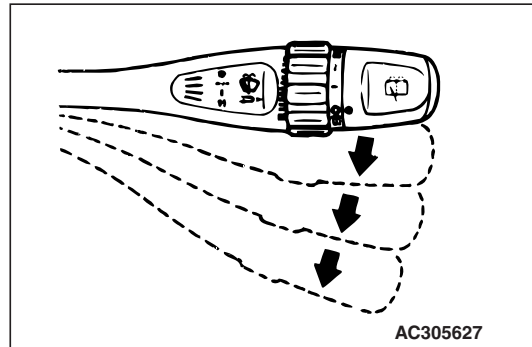
1. Air conditioning
  - (1) Operate the air conditioning system.
  - (2) Operate the air conditioning light.
  - (3) Operate the control lever in all ranges.
  - (4) Operate the blower motor switch in all ranges.



2. Heater and defroster
    - (1) After the engine has warmed up, turn on the heater.
    - (2) Operate the blower motor switch in all ranges.
    - (3) Move the control to "Defrost" position.
- A: From front and side defroster  
B: From centre ventilators  
C: From side ventilators  
D: From under the instrument panel  
E: From under the front seat (some models only)

**23. WIPERS AND WASHERS**

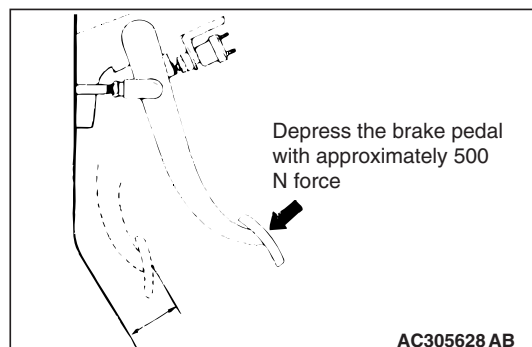
M6010700700028



1. Front wiper and washer
  - (1) Check operation of the front wipers in all ranges.
  - (2) Check the aim of the front washer stream.
  - (3) Check the wiper blade-stop positions.
  - (4) Verify that the interval between cycles of wiping is shifted when timer knob is turned to any position.
  - (5) Verify that the front wipers function by operating the washer switch.
2. Rear wiper and washer
  - (1) Check the operation of the rear wiper.
  - (2) Check the aim of the rear washer stream.
  - (3) Check the wiper blade-stop positions.

**24. OPERATION OF SERVICE BRAKES AND PARKING BRAKES**

M6010700800058

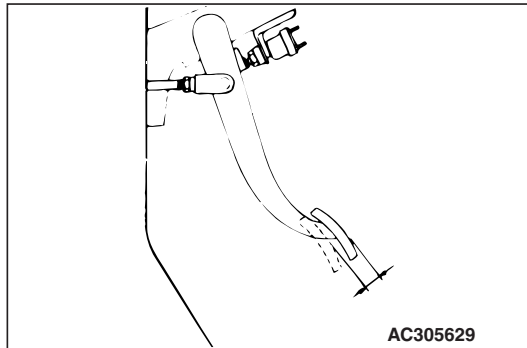


1. Service brakes

- (1) Turn up the carpet, etc under the brake pedal. Check the clearance between the brake pedal and the toeboard when the brake pedal is depressed. If the clearance does not meet the specifications, check for air in the system, brake fluid leakage, and/or a malfunction of the pedal itself.

**Clearance between the brake pedal and the toeboard:**

**Standard value: 140 mm or more**



- (2) Verify correct brake pedal free play.

*NOTE: For inspection and adjustment of the brake pedal free play, refer to GROUP 2, Periodic Inspection and Maintenance P.2-3.*

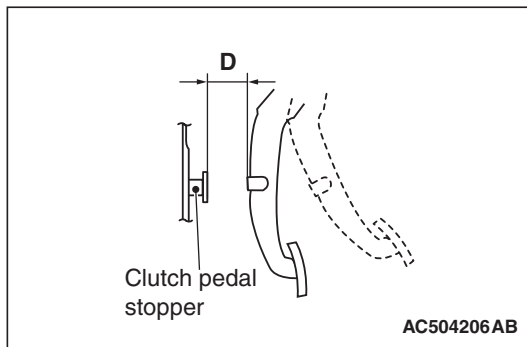
2. Parking brake

Check the parking brake drag and lever travel.

*NOTE: For inspection of the parking brake lever, refer to GROUP 2, Periodic Inspection and Maintenance P.2-3.*

## 25. CLUTCH OPERATION

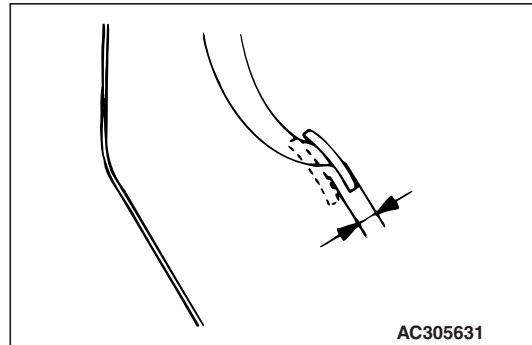
M6010700900129



1. Check the clutch operation in all driving ranges.

2. Check the distance between the clutch pedal (the face of the pedal pad) and the clutch pedal stopper when the clutch is disengaged are within the standard value.

**Standard value: 30 mm or more**



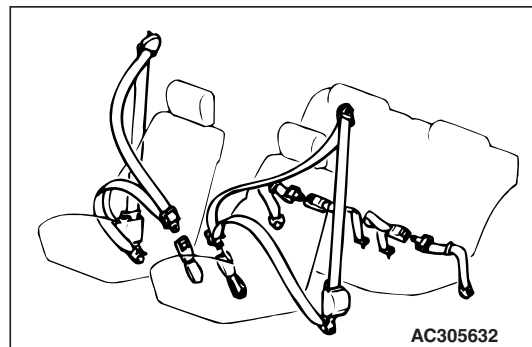
3. Verify correct clutch pedal free play.

*NOTE:*

*For inspection and adjustment of the free play of the clutch pedal, refer to GROUP 2, Periodic Inspection and Maintenance P.2-3.*

## 26. OPERATION OF SEAT BELTS, SHOULDER BELTS AND RETRACTORS

M6010701000022

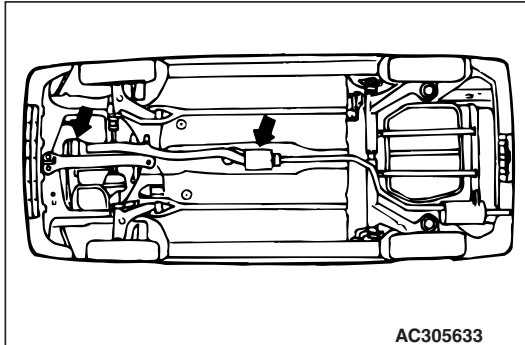


1. Verify that the seat belt warning lamp operates properly.
2. Check all seat belts and harnesses to assure that they connect and hold properly.
3. Lean forward to check that the shoulder harnesses allow movement.
4. Check the condition of the belts and anchors.
5. Check for proper seat belt retraction.

## ROAD TEST

27. ENGINE PERFORMANCE AND  
EXHAUST GAS

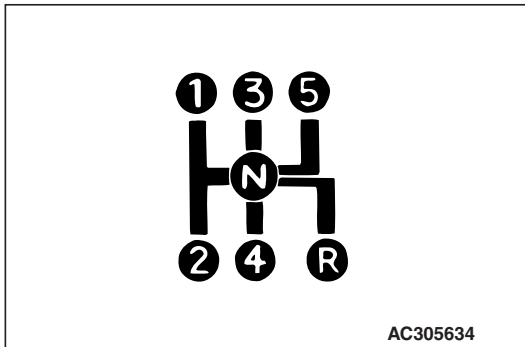
M6010800100023



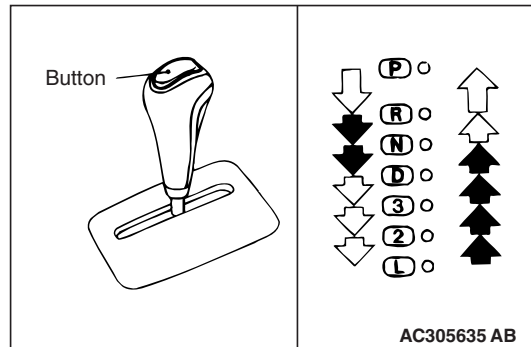
1. Engine performance  
Check the engine for proper performance and accelerator pedal for smooth operation.
2. Exhaust system
  - (1) Check the exhaust system components for gas leaks.
  - (2) Verify that no black smoking is emitted from the end of the exhaust pipe (diesel-powered vehicles).

## 28. TRANSMISSION IN ALL RANGES

M6010800200020



1. Manual transmission  
Check the transmission in all forward ranges and in reverse.



2. Automatic transmission
  - (1) Make sure shift indicator lines up properly in all ranges.
  - (2) Depress the accelerator completely to check that the manual kickdown is operating correctly.
  - (3) Stop the vehicle on a steep incline.  
Put the automatic transmission in "P" position and slowly release the service brakes to see if "P" position lock holds. If it does not hold, the transmission requires further service.

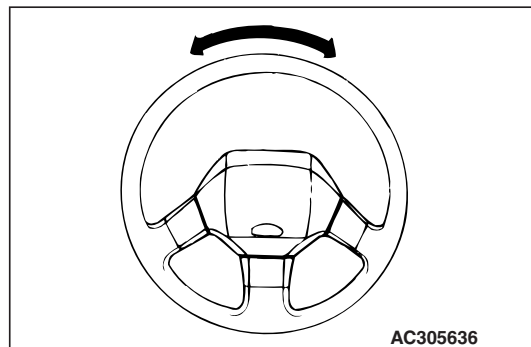
## 29. BRAKES

M6010800300027

1. Service Brake  
Put the vehicle in gear and apply the brakes while the vehicle is in motion. Be sure brake operation is smooth and positive.
2. Parking Brake
  - (1) Stop the vehicle on a steep incline.  
With the service brakes firmly applied, place the transmission in "N" position, and set the parking brakes.
  - (2) Slowly release the service brakes to see if the parking brakes will hold.

## 30. STEERING CONTROL

M6010800400024



1. Check for excessive play or looseness.

2. Check the steering wheel centre.

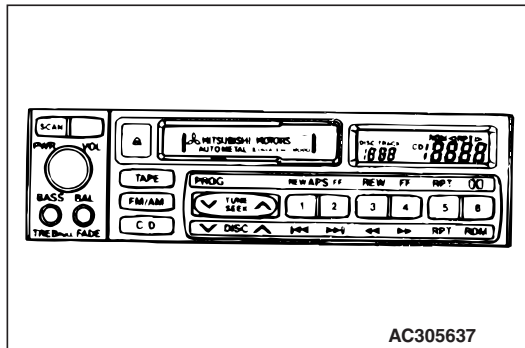
### 31. VIBRATION AND RATTLES

M6010800500021

1. Locate squeaks, rattles and unusual vibrations.
2. Verify that no noise occurs from the engine, transmission, axle and body.

### 32. ELECTRICAL EQUIPMENT

M6010800600028



#### 1. Radio

Tune the radio to a local broadcasting station and check the following:

- (1) Operate the volume, tone, balance and fader controls, etc.
- (2) Pull out the pushbuttons, dial another station and set each pushbuttons.
- (3) Operate the AM/FM switch.

#### 2. Tape player

Insert a cassette tape in the tape player and check as follows:

- (1) Check the operation of the tape feeder and rewind.
- (2) Check the ejection.
- (3) Check the operation of volume, tone, balance and fader controls, etc.

## AFTER ROAD TEST

### 33. IDLE SPEED

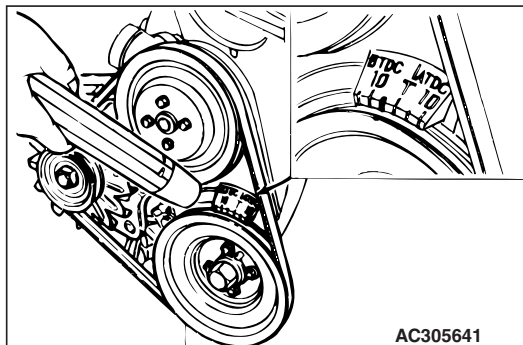
M6010900100105

Check the engine idle speed.

**NOTE:** For specific idle speed adjustment procedure, refer to GROUP 2, Periodic Inspection and Maintenance P.2-3.

### 34. IGNITION TIMING

M6010900200102

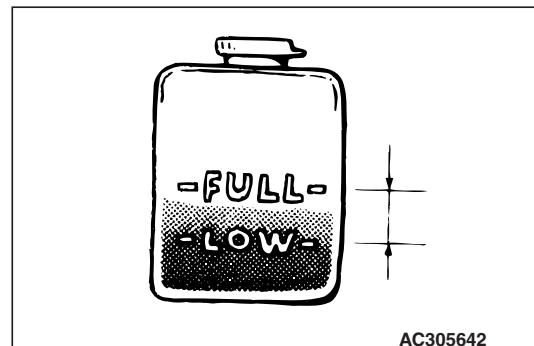


Check the ignition timing. Except MPI vehicles with crankshaft-mounted crankshaft angle sensor.

**NOTE:** For the inspection and adjustment of the ignition timing, refer to GROUP 2, Periodic Inspection and Maintenance P.2-3.

### 35. RADIATOR COOLANT LEVEL

M6010900300109



1. Check that the coolant level in the reserve tank is at or above "LOW" mark at normal engine operating temperature. And check cooling system for leaks.
2. Check that the coolant concentration is 30% to 60%.

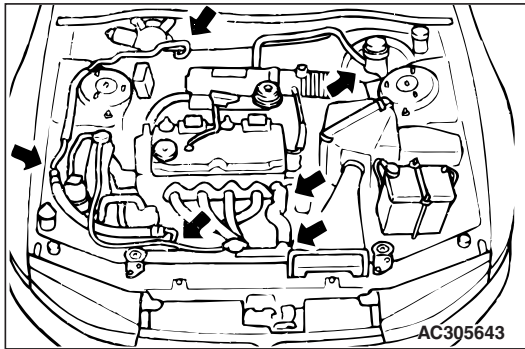
#### **CAUTION**

**Do not remove the radiator cap while the cooling system is under pressure.**

**When removing the radiator cap, be careful of steam and boiling water. Add coolant only to the reserve tank if it is required.**

**36. HOSES, FLUID LINES AND CONNECTIONS LOCATED UNDER HOOD**

M6010900400106



1. Check all brake, fuel, power steering and air conditioner lines and connections; verify proper routing, check connections for leaks, tighten loose connector as required.
2. Inspect routing and connections of all vacuum, and radiator and heater hoses.

**⚠ CAUTION**

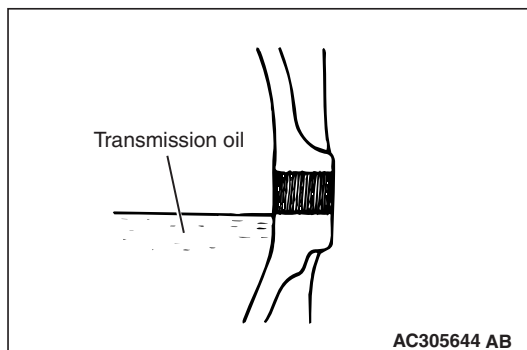
Remember that the air conditioner system is under pressure.

**NOTE:**

Keep in mind that an oily residue around an air conditioner connector does not necessarily indicate a leak. Oil is used to lubricate fittings during assembly. Be sure lines are not twisted or kinked.

**37. MANUAL TRANSMISSION AND TRANSFER (4WD) OIL LEVEL**

M6010900500136

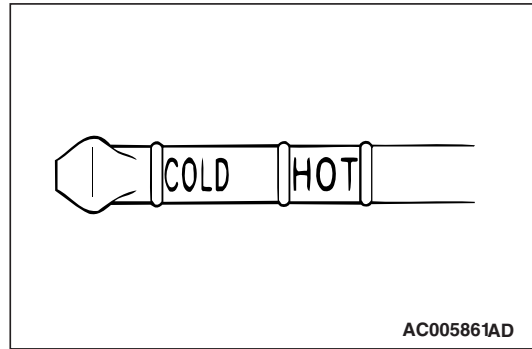


1. Remove the filler plug.
2. Check the oil level. If the oil level is at or slightly below the filler hole, it is in satisfactory condition.
3. If the level is low, replenish the transmission and transfer case with fresh oil by using a lubricator.

**NOTE:** For the specified oil, refer to GROUP 2, Periodic Inspection and Maintenance P.2-3.

**38. AUTOMATIC TRANSMISSION FLUID LEVEL**

M6010900600122



1. Remove the dipstick and check the fluid level.
2. Fluid level is okay if it is in the specified range as illustration at normal engine operating temperature.
3. If the level is below the lower notch, replenish fluid until the level reaches the upper notch.

**Automatic transmission fluid: DIA QUEEN ATF SP III**

**⚠ CAUTION**

Do not overfill.

**39. ENGINE, TRANSMISSION, STEERING GEAR BOX AND DIFFERENTIAL FOR LEAKS**

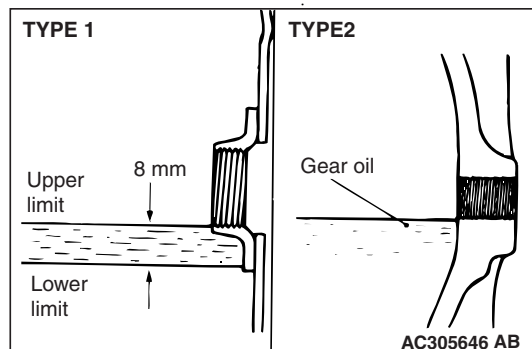
M6010900700107

Check the engine, transmission, steering gear box and differential for oil leaks.

**40. FRONT AND REAR DIFFERENTIAL OIL LEVELS**

M6010900800104

1. Remove the filler plug.
2. Check the oil level. If the oil level is at or slightly below the filler hole, it is in satisfactory condition.



Type 1 only: Remove the filler plug, and check the gear oil level. Check that gear oil level is not 8 mm below the bottom of filler plug hole.



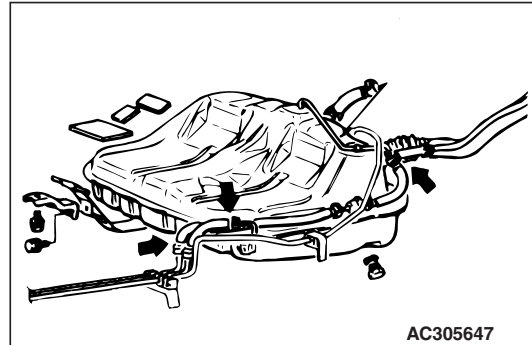
3. If the level is low, replenish the front and/or rear differential with fresh oil by using a lubricator.

**NOTE:**

For the specified oil, refer to **GROUP 2, Periodic Inspection and Maintenance P.2-3**.

## 41. HOSES, FLUID LINES AND CONNECTIONS LOCATED UNDER VEHICLE

M6010901000101

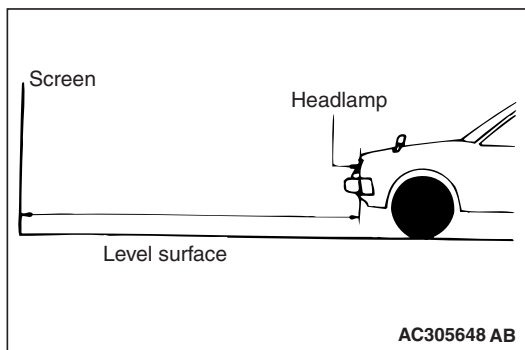


1. Check all hoses, fluid lines and connections for leaks.
2. Check all hoses and fluid lines for proper routing away from sharp edges and moving components.

## FINAL STEPS

### 42. HEADLAMP AIMING

M6011000100105



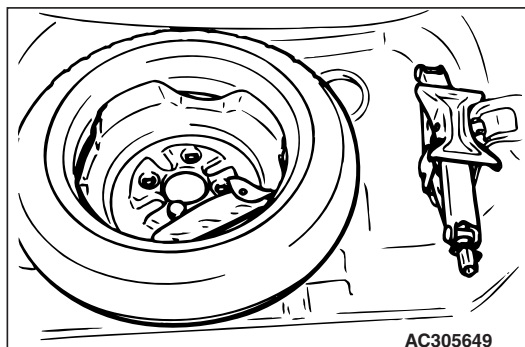
Check condition for headlamp aiming.

**NOTE:**

For headlamp aiming procedures, refer to the *Workshop Manual* for that model.

### 43. EQUIPMENT

M6011000200102

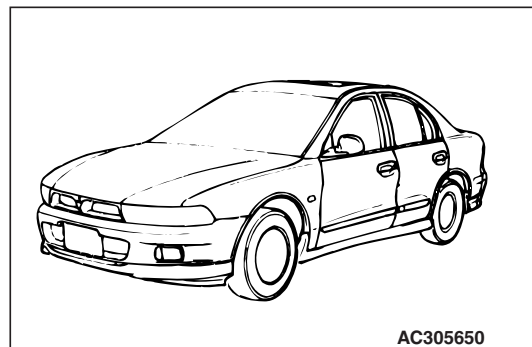


Check the installation of the various equipment.

1. Floor mats
2. Spare tyre
3. Jack, jack handle and tool set

### 44. EXTERIOR AND INTERIOR

M6011000300109



Finally check and clean the exterior and interior.

1. Wash the vehicle to remove all traces of road grime and other dirt on the vehicle as a result of new vehicle preparations.
2. Clean exterior and interior glass surface.
3. Remove all protective covers.
4. Remove undercoat overspray, excess window sealer, and excess weatherstrip adhesive.
5. Verify that the secondary key can not unlock the glove box and tailgate/boot lid (if so equipped).
6. Remove shipping and inspection stickers.

**45. OWNER INSTRUCTIONS**

M6011000400106

1. Verify that the owner's manual and service booklet is in the glove box.
2. Place the spare keys in envelope in the glove box before delivery.



GROUP 2

PERIODIC  
INSPECTION AND  
MAINTENANCE

CONTENTS

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# PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

M6020100100069

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

•: Applicable for GRANDIS

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 condition of distributor, cap and rotor		Inspection	Every 60,000 km or every 4 years		
A3	Check ignition cables for damage		Inspection	Every 30,000 km or every 2 years		
A4	Check vacuum pump oil hose for damage (diesel - powered vehicles)		Inspection	Every 15,000 km or every 12 months		
A5	Check intake air hose and turbocharger oil hose for damage (vehicles with turbocharger)		Inspection	Every 30,000 km or every 2 years		
A6	Replace engine timing belt [including timing belt B with 4G6/4D5 engine] (except vehicles with timing chain)		Replace	Every 90,000 km		•
A7	Check operation of crankcase emission control system (petrol-powered vehicles)		Inspection	Every 30,000 km or every 2 years		•
A8	Replace spark plugs	Standard type	Replace	Every 45,000 km		
		Platinum-tipped type or Iridium-tipped type	Replace	Every 90,000 km		•
A9	Check radiator hoses for damage and proper connection		Inspection	Every 30,000 km or every 2 years		•
A10	Check engine coolant level in reservoir		Inspection	Every 30,000 km or every 2 years		•
A11	Change engine coolant		Change	Every 60,000 km or every 4 years		•
A12	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	•
A13	Replace air cleaner element		Replace	Normal usage	Every 45,000 km or every 3 years	•
				Severe usage	More frequently	•
A14	Check fluid level in brake reservoir and clutch reservoir (for hydraulic type clutch)		Inspection	Every 15,000 km or every 12 months		•
A15	Change brake fluid		Change	Every 30,000 km or every 2 years		•
A16	Check battery electrolyte level		Inspection	Every 15,000 km or every 12 months		•

Maintenance item			Maintenance operation	Maintenance interval		Application
A17	Check injection nozzle [If dark smoke is exhausted or engine power is low] (diesel-powered vehicles)		Inspection	Every 60,000 km or every 4 years		
A18	Replace fuel filter	Petrol-powered vehicles	Replace	Every 150,000 km or every 10 years		•
		Diesel-powered vehicles	Replace	Every 30,000 km or every 2 years		
A19	Removal of water from the fuel filter (vehicle with F9Q engine)		Removal	Every 15,000 km		
A20	Clean brake booster vacuum nipple (PAJERO PININ with GDI engine)		Clean	Every 45,000 km or every 3 years		
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	Lubricate suspension arm, steering linkage and propeller shaft with grease fitting		Lubrication	Every 30,000 km or every 2 years		
B4	Check drive shaft boots for damage		Inspection	Normal usage	Every 30,000 km or every 2 years	•
				Severe usage	Every 7,500 km	•
B5	Check steering linkage for damage and loose connections (including seals and boots)		Inspection	Every 60,000 km or every 4 years		•
B6	Check gear oil level in manual transmission		Inspection	Every 15,000 km or every 12 months		•
B7	Check gear oil level in transfer case (4WD)		Inspection	Every 15,000 km or every 12 months		
B8	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	•
B9	Change gear oil in transfer case (4WD)		Change	Normal usage	Every 105,000 km or every 7 years	
				Severe usage	Every 45,000 km or every 3 years	
B10	Check gear oil level in front and rear differential		Inspection	Every 30,000 km or every 2 years		
B11	Check fluid level in oil reservoir tank (vehicles with ACD and AYC)		Inspection	Every 20,000 km		

Maintenance item			Maintenance operation	Maintenance interval		Application
B12	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	
		Mechanical type LSD or Hybrid type LSD	Change	Normal usage	Every 60,000 km or every 4 years	
				Severe usage	Every 30,000 km or every 2 years	
B13	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	•	
C4	Check SRS airbag system		Inspection	At 10 years	•	
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	•	
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	•	

Maintenance item			Maintenance operation	Maintenance interval		Application
E2	Change automatic transmission fluid	2WD*1	Change	Normal usage	Every 90,000 km or every 6 years	•
				Severe usage	Every 45,000 km or every 3 years	•
		4WD	Change	Normal usage	Every 90,000 km or every 6 years	
				Severe usage	Every 45,000 km or every 3 years	
		4WD	Change	Every 45,000 km or every 3 years		
E3	Change engine oil (petrol-powered vehicles)	ACEA and API classifications "ACEA A1, A2, A3" / "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 (diesel-powered vehicles)	ACEA and API classifications "ACEA B1, B2, B3, B4" / "For service CD" or higher	Change	Normal usage	Every 7,500 km or every 6 months	
				Severe usage	Every 4,000 km	
E4	Replace engine oil filter (petrol-powered vehicles)	ACEA and API classifications "ACEA A1, A2, A3" / "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 (diesel-powered vehicles)	ACEA and API classifications "ACEA B1, B2, B3, B4" / "For service CD" or higher	Replace	Normal usage	Every 15,000 km or every 12 months	
				Severe usage	Every 8,000 km	
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 ignition timing (vehicles with distributor) (except vehicles with crankshaft mounted-crankshaft angle sensor)		Inspection	Every 60,000 km or every 4 years		
E8	Check exhaust gas recirculation (EGR) system		Inspection	Every 15,000 km or every 12 months		•
E9	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:**

- ACD: Active centre differential control system
- AYC: Active yaw control system
- \*1: Replacement is not required for RWD vehicles used in normal operating conditions.
- "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

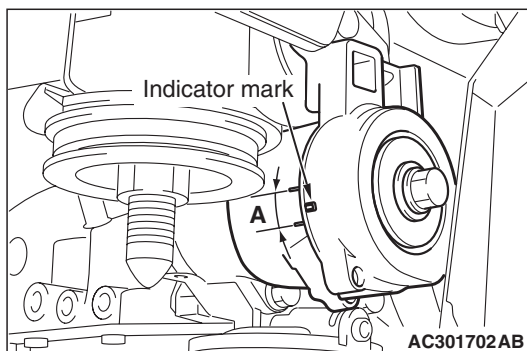
### A1. CHECK V-BELT FOR CRACKS, FRAYING, WEAR, AND ADJUST ITS TENSION

M6020200100055

#### V-BELT CONDITION

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

#### V-BELT TENSION



1. Check that the indicator marking of the auto-tensioner is within the range as shown in the illustration A of the tensioner bracket.

**CAUTION**

Inspection must be carried out after turning the crankshaft clockwise for more than once.

2. If the marking is outside the range as shown in the illustration A, replace the drive belt.

**NOTE:**

Due to the adoption of the auto-tensioner, no adjustment for belt tension is required.

### A6. REPLACE ENGINE TIMING BELT <EXCEPT VEHICLES WITH TIMING CHAIN>

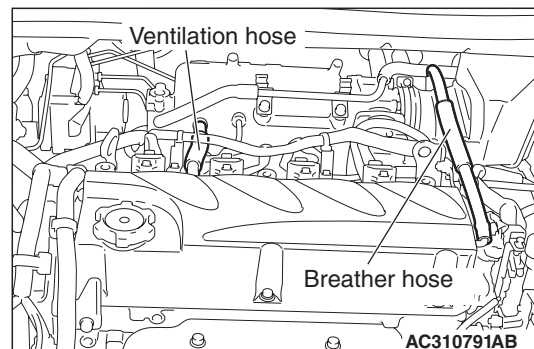
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For information concerning the replacement procedures, refer to the Workshop Manual.

### A7. CHECK OPERATION OF CRANKCASE EMISSION CONTROL SYSTEM

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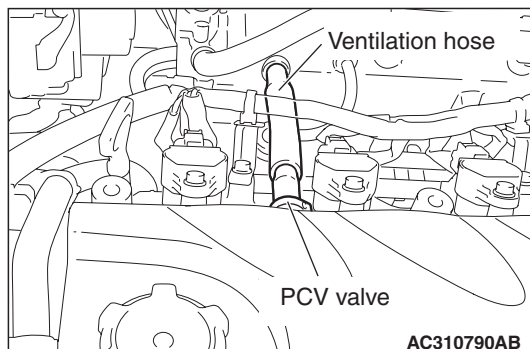
#### BREATHER HOSE



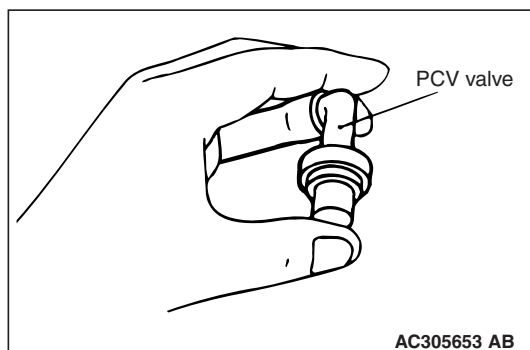
1. Inspect the breather hose for cracks or damage.
2. Clean the inside of the breather hose if necessary.
3. Inspect the ventilation filter for clogging.

**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.

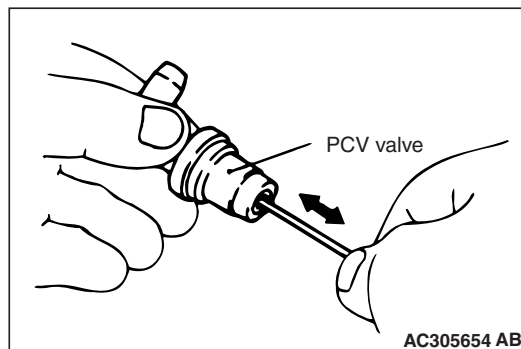


5. Place finger at the opening of the PCV valve and check that vacuum of the intake manifold is felt.

**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.

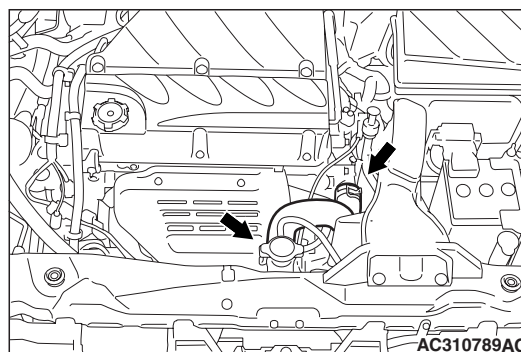
**A8. REPLACE SPARK PLUGS**

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

**A9. CHECK RADIATOR HOSES FOR DAMAGE AND PROPER CONNECTION**

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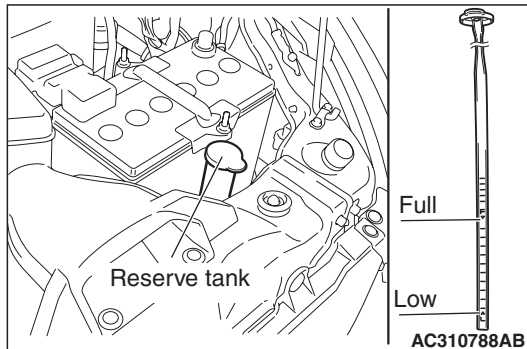


1. Check entire circumference and length of hoses, using a mirror as required.
2. Check that hoses installed in grommets pass through the centre of the grommets.
3. Check all clamps for tightness and connections for leakage.



## A10. CHECK ENGINE COOLANT LEVEL IN RESERVOIR

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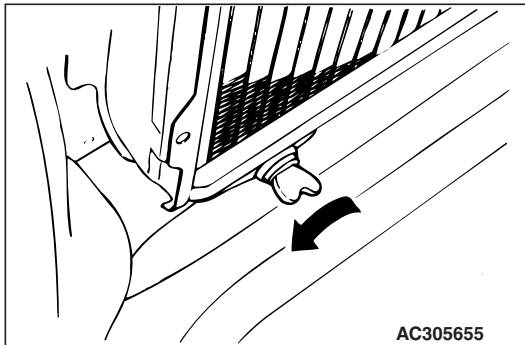


Check that the coolant level is between the "FULL" and "LOW" lines when the engine is at the normal operating temperature.

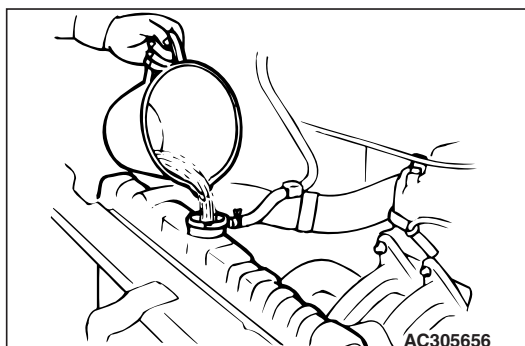
## A11. CHANGE ENGINE COOLANT

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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.**

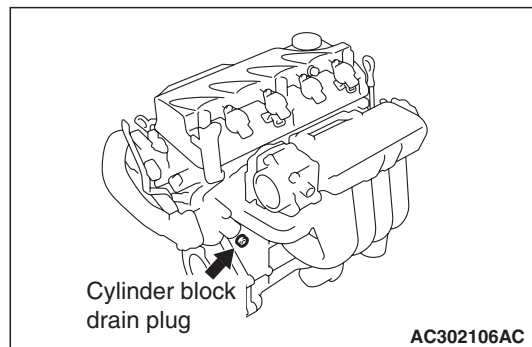
8. Fill the cooling system with soft water through the filler port, and add long life coolant, if necessary.
9. Fill the reserve tank with coolant.
10. Install the radiator cap and the reserve tank cap.
11. Recheck the engine coolant level after a road test.

### ⚠ CAUTION

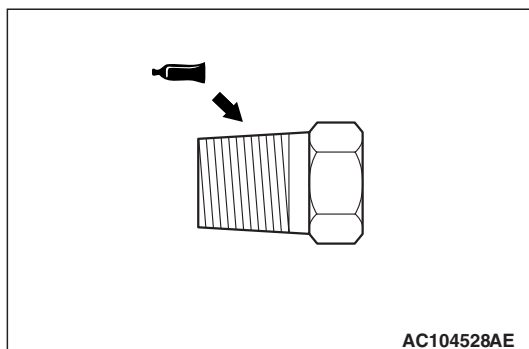
**When removing the radiator cap, be careful to blow out steam and boiling water.**

## 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.
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.

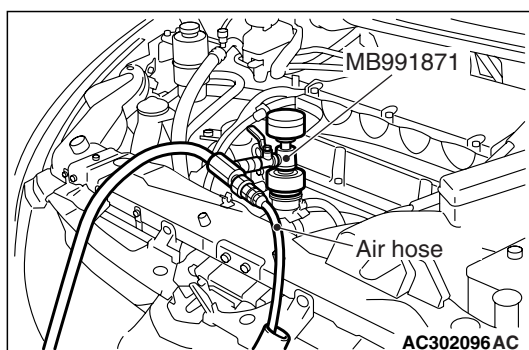


5. Coat the thread of the cylinder block drain plug with the specified sealant and tighten to the specified torque.

**Specified sealant: 3M Nut Locking Part No.4171 or equivalent**

**Tightening torque:  $44 \pm 5$  N·m**

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



8. Use special tool LLC changer (MB991871) to refill the coolant.

*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: 8.0 L <without rear heater> or 9.5L <with rear heater>**

#### **CAUTION**

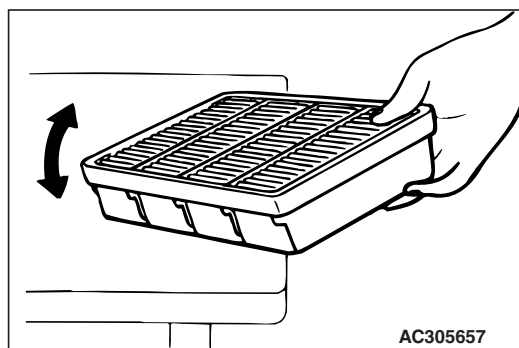
**Do not use alcohol or methanol anti-freeze or any engine coolants mixed with alcohol or methanol anti-freeze. The use of an improper anti-freeze can cause the corrosion of the aluminium components.**

9. Install the radiator cap securely.
10. 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.)
11. After the thermostat opens, race the engine several times, and then stop the engine.

12. 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.

## **A12. CHECK AIR CLEANER ELEMENT FOR CLOGGING AND DAMAGE**

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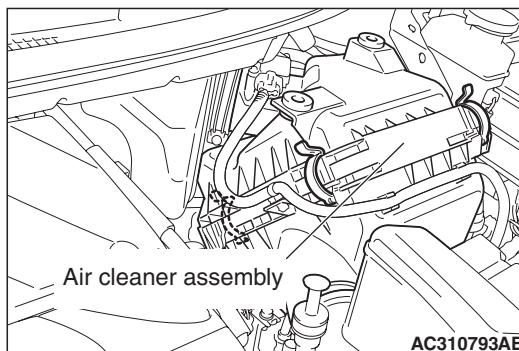


1. Check air cleaner element for clogging and damage.
2. Clean deposited dust from the element in the following manner.
  - (1) Lightly tap the element against the top of a bench.
  - (2) Blow compressed air from inside the element.
3. Wipe off dust on the air cleaner interior.
4. Install the air cleaner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

## **A13. REPLACE AIR CLEANER ELEMENT**

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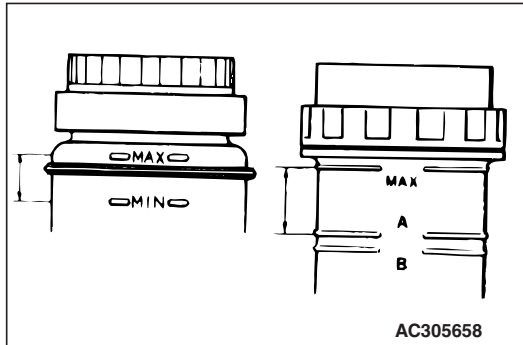
The air cleaner element will become dirty and loaded with dust during use, and the filtering effect will be substantially reduced. Replace it with a new one.



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

## A14. CHECK FLUID LEVEL IN BRAKE RESERVOIR AND CLUTCH RESERVOIR (for hydraulic-type clutch only)

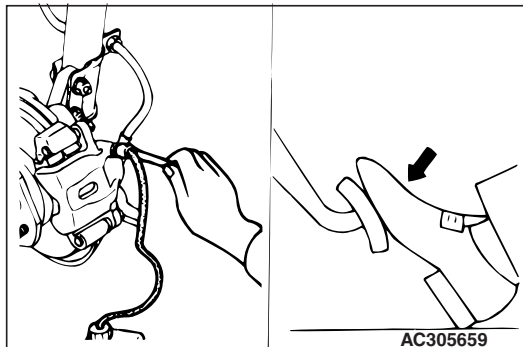
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1. Check that the fluid level is between the "MAX" and "MIN" or "A" mark.
2. If it is below the "MIN" or "A" marks, replenish with fresh brake fluid up to the "MAX" mark.

## A15. CHANGE BRAKE FLUID

M6020201600020



1. Remove the cap of the bleeder screw, connect a vinyl tube, and place its other end in a receptacle.
2. 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

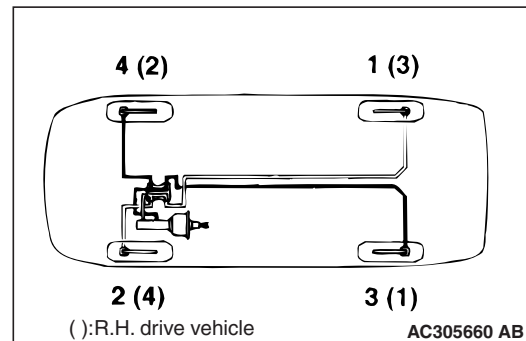
### CAUTION

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.

3. 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.



4. Repeat above steps for other bleeder screws.

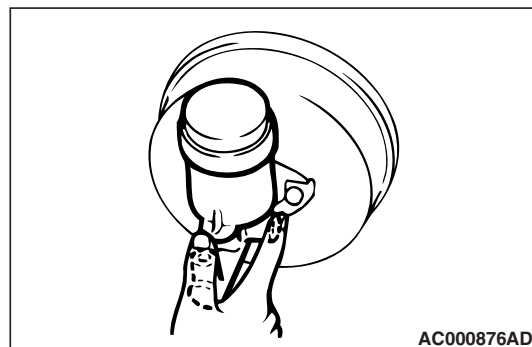
### NOTE:

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.)

1. Fill the reserve tank with brake fluid.
2. Keep the brake pedal depressed.

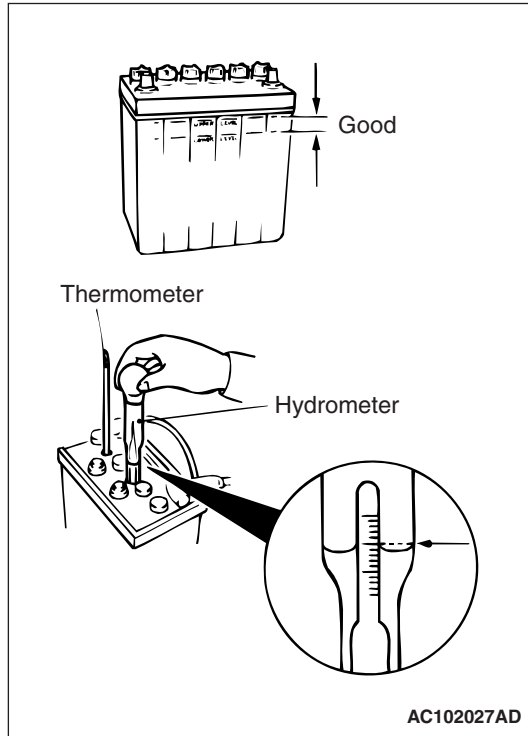


3. Have another person cover the master cylinder outlet with a finger.

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

## A16. CHECK BATTERY ELECTROLYTE LEVEL

M6020201700027



AC102027AD

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

### ⚠ CAUTION

1. If the battery fluid is below the **LOWER LEVEL**, the battery could explode in using.
2. If the battery fluid is over the **UPPER LEVEL**, leakage could result.
2. Use a hydrometer and thermometer to check the specific gravity of the battery fluid.  
**Standard value: 1.220 – 1.290 [20° C]**
3. 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.

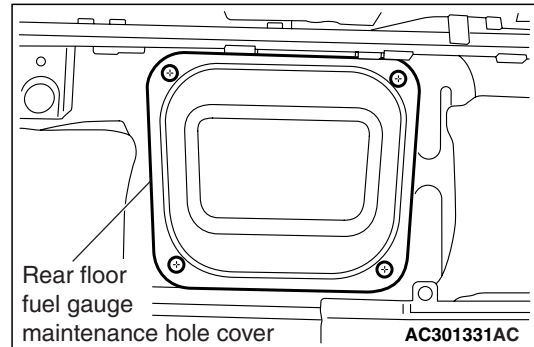
**Dt:** Actually measured specific gravity

**t:** Actually measured temperature

## A18. REPLACE FUEL FILTER

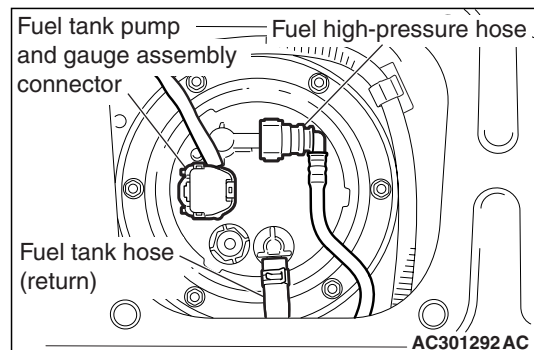
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1. Reduce fuel line pressure.
2. Remove the second seat assembly, the rail cover outer and the rail cover inner.
3. Remove the rear scuff plate, and turn up the floor mat.



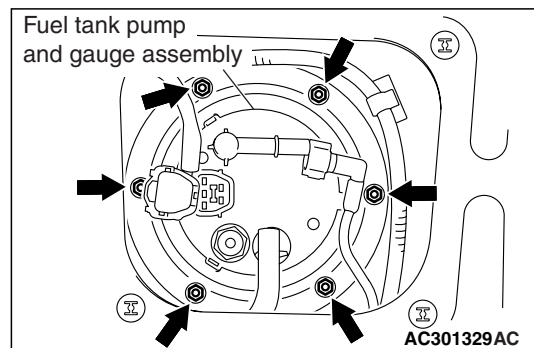
AC301331AC

4. Remove the rear floor fuel gauge maintenance hole cover (LH).



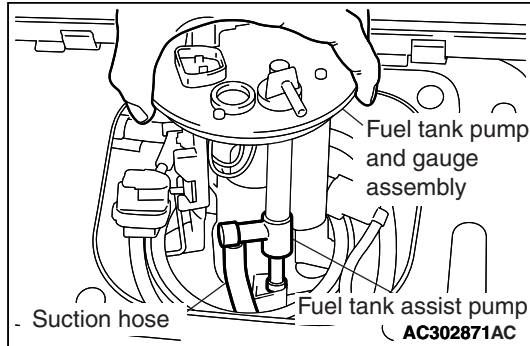
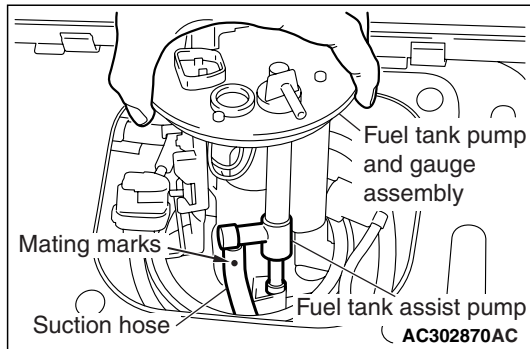
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5. Disconnect the fuel tank pump and gauge assembly connector, fuel high-pressure hose and fuel tank hose (return).



AC301329AC

6. Remove the fuel tank pump and gauge assembly mounting nuts.

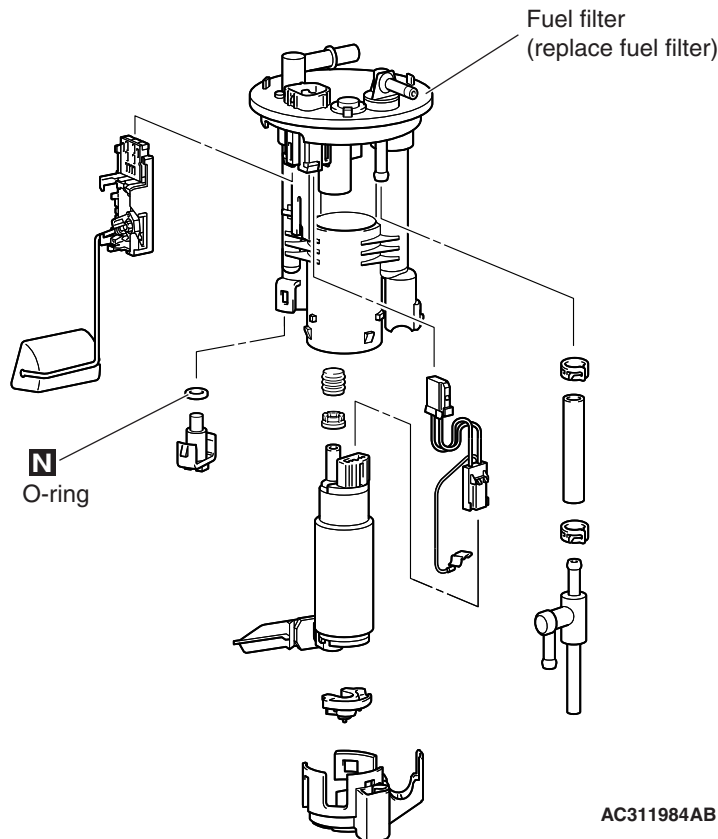


7. While removing the fuel tank pump and gauge assembly from service hole, disconnect the suction hose from fuel tank assist pump, and remove the fuel tank pump and gauge assembly from service hole completely.

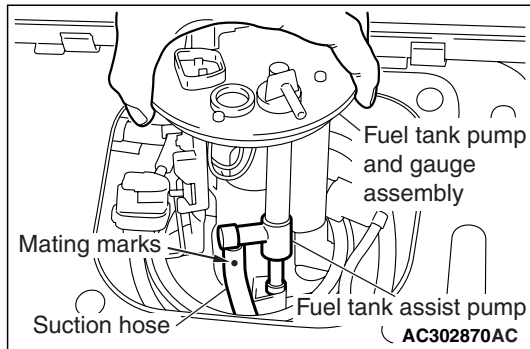
**CAUTION**

1. The suction hose connecting fuel tank assist pump has factory preset mating marks. However, if the marks have been dropped out because of gasoline adherence, make the matingmarks and remove the suction hose.
2. When withdrawing the fuel tank pump and gauge assembly via the service hole, be careful not to damage the gauge and the float.
8. Replace the fuel filter.

## FUEL PUMP MODULE



AC311984AB



9. While inserting the fuel tank pump and gauge assembly from the service hole to fuel tank, connect the suction hose to the fuel tank assist pump and install the fuel tank pump and gauge assembly to the fuel tank.

**CAUTION**

1. When installing the fuel tank pump and gauge assembly from service hole to fuel tank, install it with suction hose mating mark facing as shown in the illustration not to twist the suction hose.
2. When installing the fuel tank pump and gauge assembly from the service hole to the fuel tank, be careful not to damage the gauge of fuel tank pump and gauge assembly and the float. In addition, be careful that the float of fuel gauge does not catch the suction hose in the fuel tank.
3. When installing the fuel tank pump and gauge assembly from service hole to fuel tank, make sure that the gauge moving area can move smoothly.
10. Connect the fuel tank pump and gauge assembly connector, fuel high-pressure hose and fuel tank hose.
11. Install the rear floor fuel gauge maintenance hole cover (LH).
12. Return the floor carpet back to the original state and install the rear scuff plate.
13. Install the rail cover inner, the rail cover outer and second seat assembly.

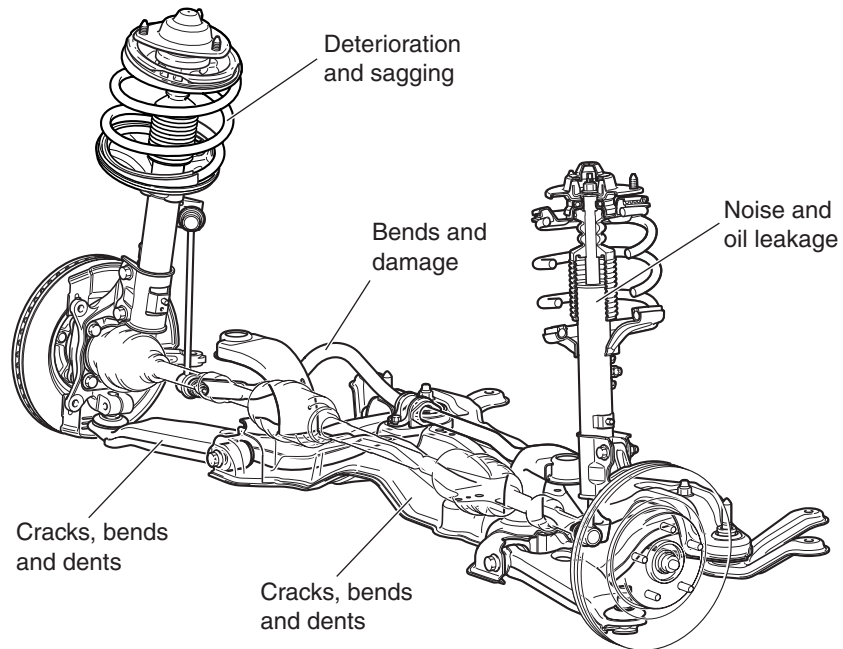


## OPERATIONS UNDER THE VEHICLE

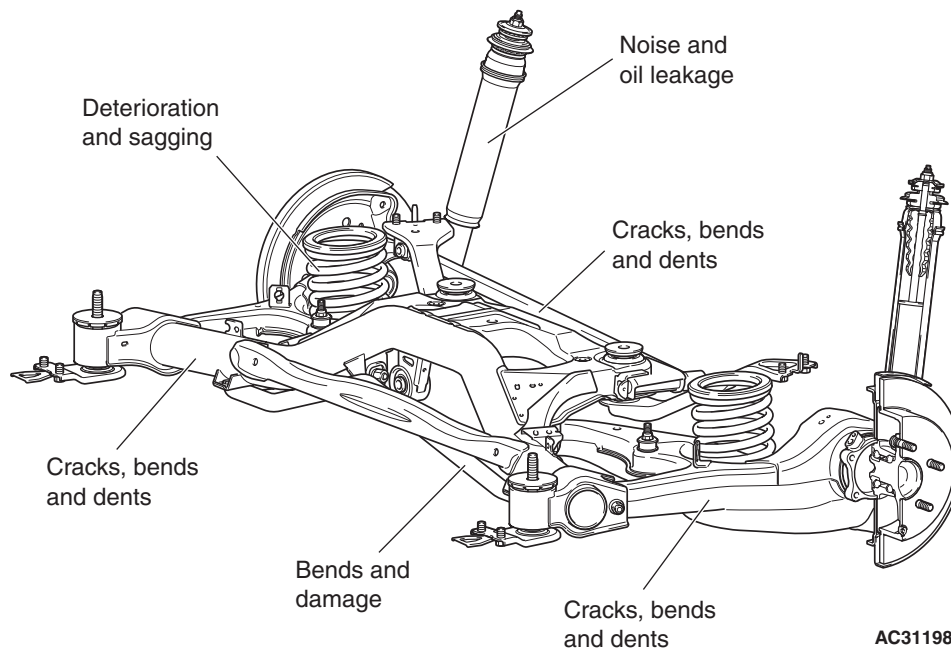
### B1. CHECK SUSPENSION SYSTEM FOR DAMAGE AND LOOSENESS

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#### FRONT SUSPENSION



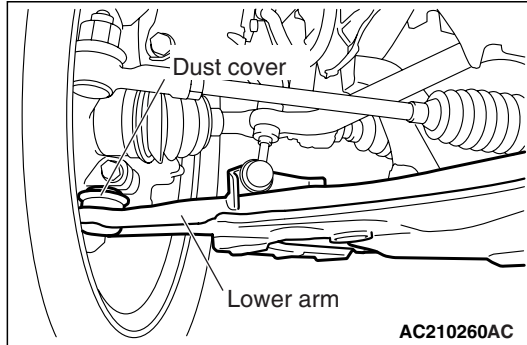
#### REAR SUSPENSION



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

M6020300200026

**LOWER ARM BALL JOINT END PLAY CHECK**

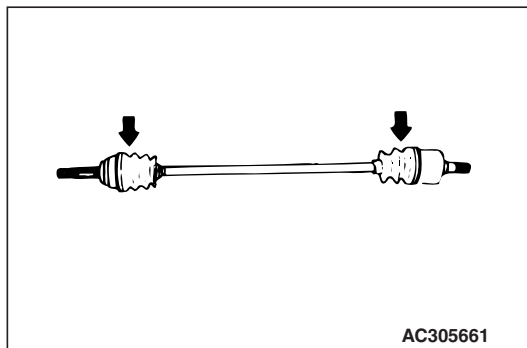
1. Raise the vehicle.
2. Remove the stabilizer bar from the lower arm assembly.
3. Move the lower arm up and down with your hands to check for an excessive play in the axial direction of the ball joint. If there is an excessive play, replace the lower arm assembly.

**DUST COVERS FOR DAMAGE**

Check dust covers for damage.

**B4. CHECK DRIVE SHAFT BOOTS FOR DAMAGE**

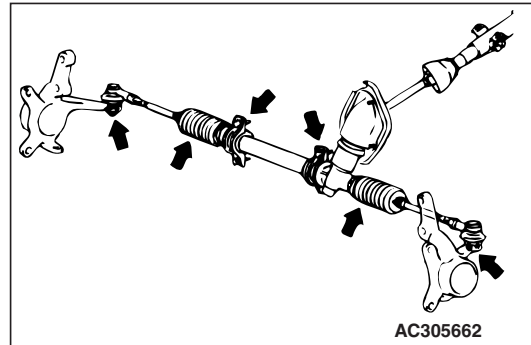
M6020300400020



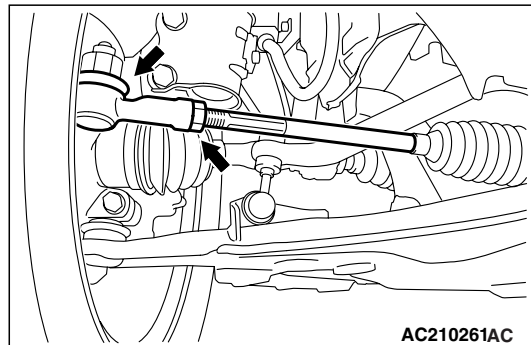
Check the drive shaft boots for damage.

**B5. CHECK STEERING LINKAGE FOR DAMAGE AND LOOSE CONNECTIONS (INCLUDING SEALS AND BOOTS)**

M6020300500027



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.



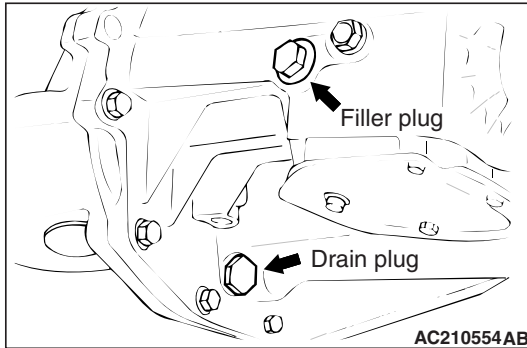
2. Check to be sure that the seal and boot of the ball joint are correctly installed (in the correct position), and that they are not damaged.
3. Check tie-rod end lock nut for looseness. If lock nut is loose, adjust toe-in and then tighten lock nut to the specified torque.

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

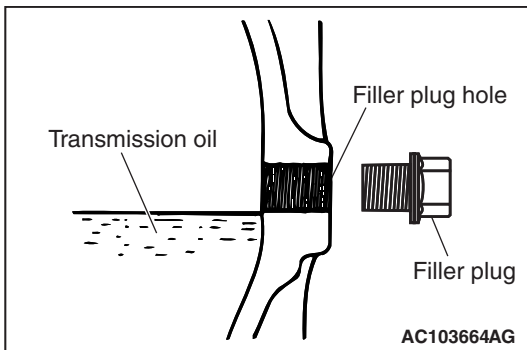


## B6. CHECK GEAR OIL LEVEL IN MANUAL TRANSMISSION

M6020300600013



1. Remove the filler plug of the transmission case.

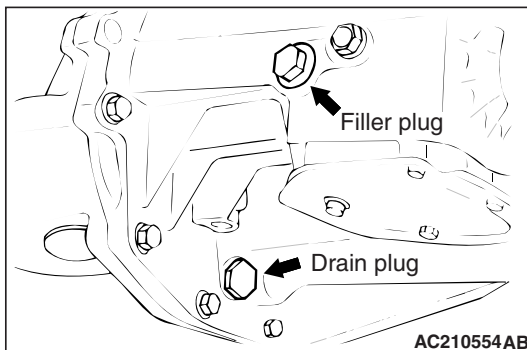


2. Oil level should be at the lower portion of the filler plug hole.
3. Check that the transmission oil is not noticeably dirty, and that it has a suitable viscosity.
4. Tighten the filler plug to the specified torque.

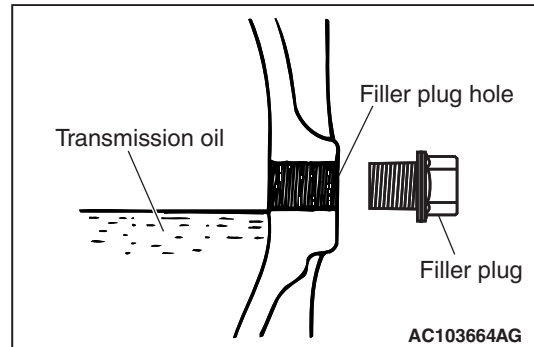
**Tightening torque:  $32 \pm 2$  N·m**

## B8. CHANGE GEAR OIL IN MANUAL TRANSMISSION

M6020300800040



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:  $32 \pm 2$  N·m**

4. Fill the transmission fresh oil by using a lubricator.
5. Fill with specified oil till the level comes to the lower portion of oil filler plug hole.

**Specified transmission oil: Gear oil API classification GL- 4 or higher SAE 75W – 85W or 75W – 90**

**Quantity: 2.2L**

6. Tighten the oil filler plug to the specified torque.

**Tightening torque:  $32 \pm 2$  N·m**

## B13. CHECK EXHAUST PIPE CONNECTIONS FOR GAS LEAKAGE, AND CHECK PIPE INSTALLATION

M6020301200052

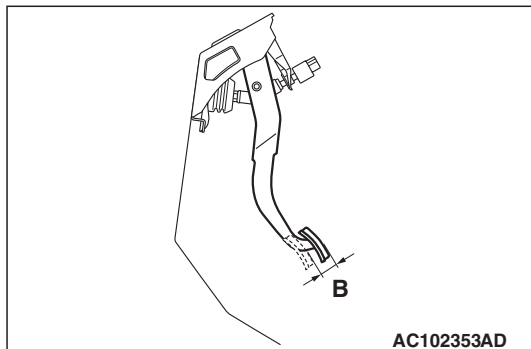
1. Confirm that the exhaust pipe does not interfere with any body components.
2. Check the exhaust pipe for damage by stones, etc.
3. Start the engine and check for gas leaks from the exhaust pipe connections.

## OPERATIONS INSIDE THE VEHICLE

### C1. CHECK BRAKE PEDAL AND CLUTCH PEDAL FOR FREE PLAY

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#### BRAKE PEDAL FREE PLAY

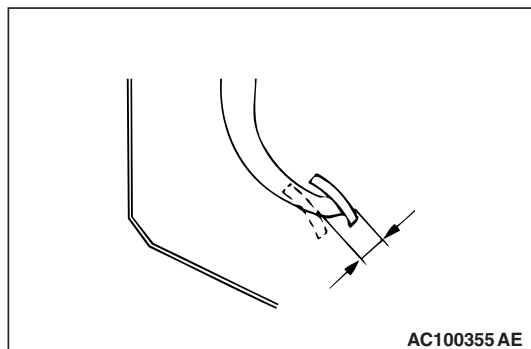


1. With the engine stopped, depress the brake pedal two or three times. After eliminating the vacuum in the power brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (the free play) is within the standard value.

**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**

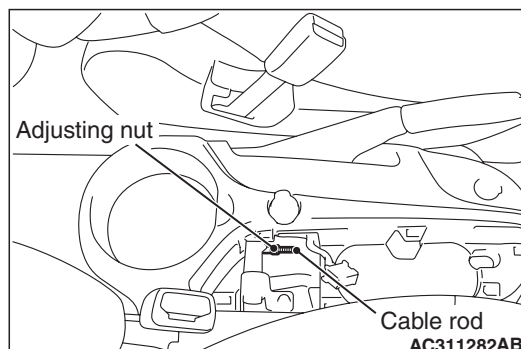
2. If the clutch pedal free play do not meet the standard value, probably there is air in the hydraulic system or a malfunction of the clutch itself, so bleed out the air or disassemble and inspect the clutch.

### C2. CHECK PARKING BRAKE LEVER STROKE AND PLAY

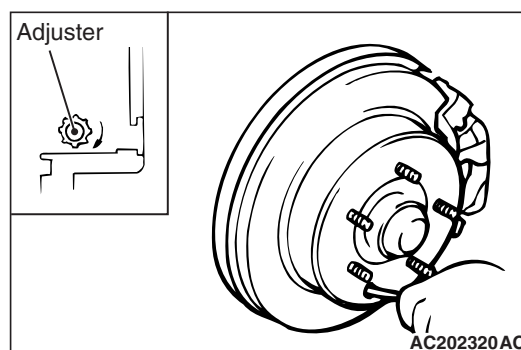
M6020400200067

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

**Standard value: 3 – 5 notches**



2. If the parking brake lever stroke is not the standard value, adjust as described below.
  - (1) Remove the floor console panel.
  - (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.

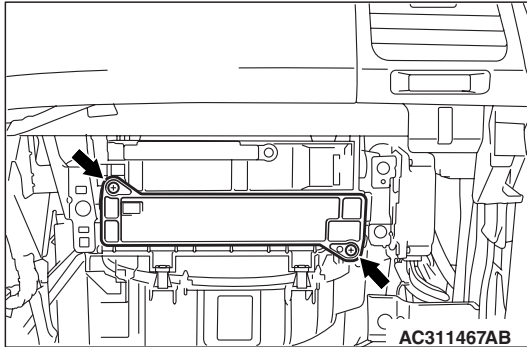
**CAUTION**

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

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

### C3. REPLACE AIR PURIFIER FILTER

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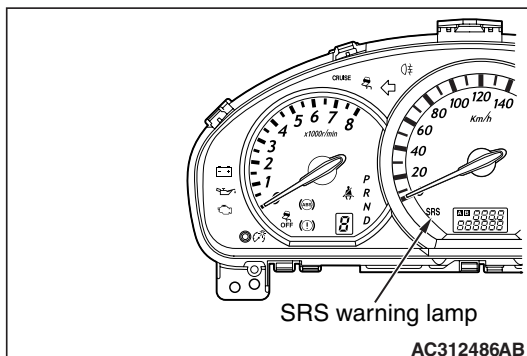


1. Remove the glove box.
2. Remove the two screws as shown, and replace the air purifier filter.
3. Install the glove box.

### C4. CHECK SRS AIR BAG SYSTEM

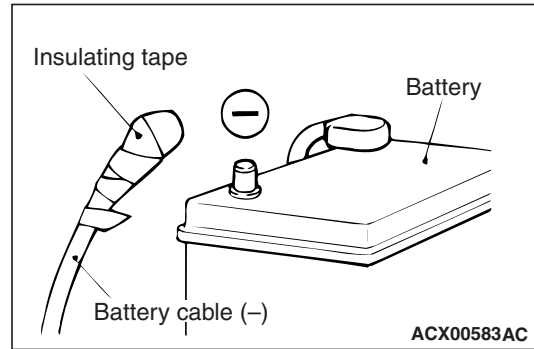
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#### SRS WARNING LAMP CHECK



Turn the ignition key to the ON position. Does the SRS warning lamp illuminate for about 7 seconds, turn off and then remain extinguished for at least 5 seconds? If yes, SRS system is functioning properly.

### SRS COMPONENT VISUAL CHECK

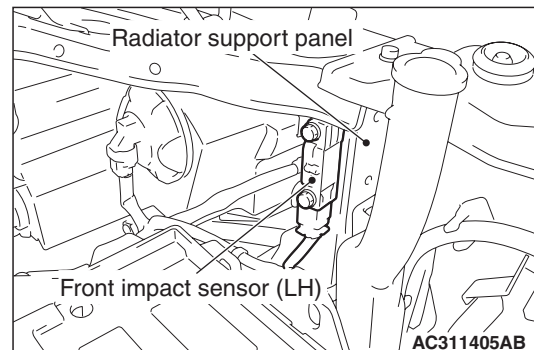


Turn the ignition key to the LOCK position, disconnect the negative battery cable and tape the terminal.

**CAUTION**

Wait at least 60 seconds after disconnecting the battery cable before doing any further work.

#### FRONT IMPACT SENSORS



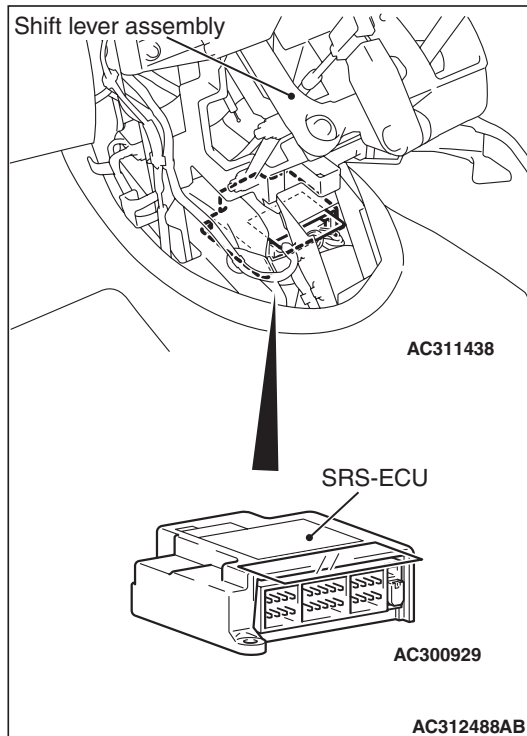
1. Check the front side member and front impact sensor for deformation or rust.

**CAUTION**

The SRS may not activate if the impact sensors are not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.

2. Check the front impact sensor for dents, cracks, deformation or rust.
3. Check the sensor harnesses for binding, the connectors for damage, and the terminals for deformation.

## SRS CONTROL UNIT (SRS-ECU)



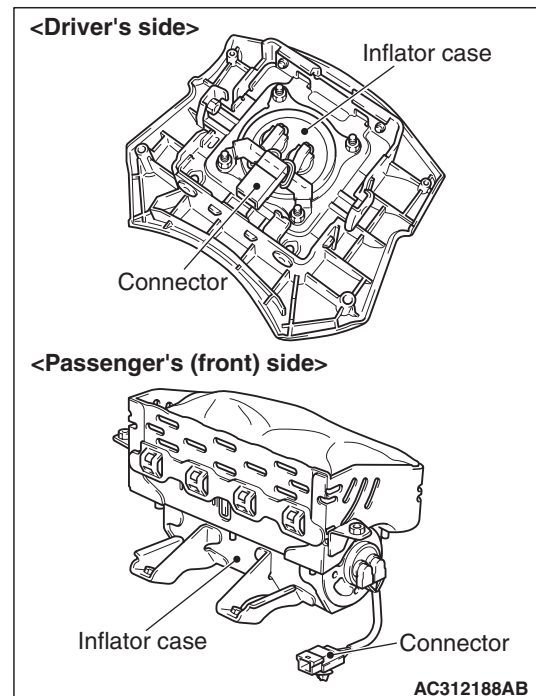
1. Check SRS-ECU case and brackets for dents, cracks, deformation or rust.

**⚠ CAUTION**

The SRS may not activate if the SRS-ECU is not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.

2. Check connector for damage, and terminals for deformation or rust.  
Replace SRS-ECU if it fails visual check.

## AIR BAG MODULES, STEERING WHEEL AND CLOCK SPRING

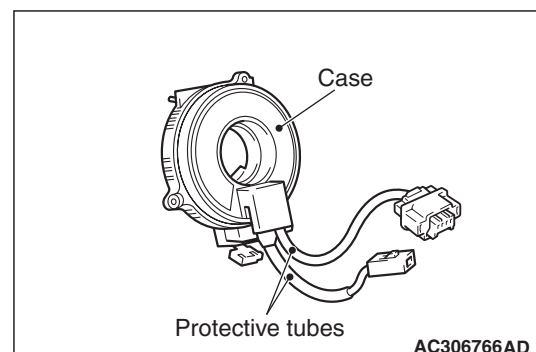


1. Remove the air bag modules, steering wheel and clock spring.

**⚠ CAUTION**

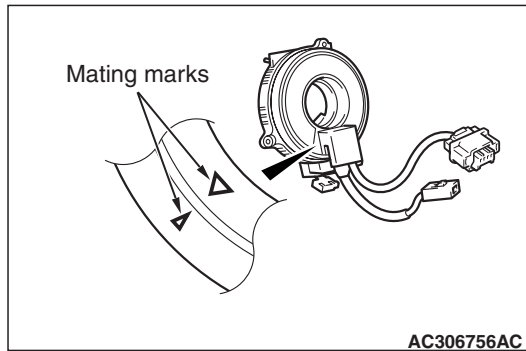
The removed air bag modules should be stored in a clean, dry place with the pad cover face up.

2. Check pad cover for dents, cracks or deformation.
3. Check connector for damage, terminals for deformation, and harness for binds.
4. Check air bag inflator case for dents, cracks or deformation.
5. Check harness and connectors for damage, and check the terminals for deformation.



6. Check clock spring connectors and protective tube for damage, and terminals for deformation.
7. Visually check the clock spring case for damage.

REPLACE ANY VISUALLY INSPECTED PART IF IT FAILS THAT INSPECTION.



8. Align the mating marks of the clock spring and, after turning the vehicle's front wheels to straight-ahead position, install the clock spring to the column switch.

#### Mating Mark Alignment

9. Turn the clock spring clockwise fully, and then turn it back approx. 3 3/4 turns anti-clockwise to align the mating marks.

#### **CAUTION**

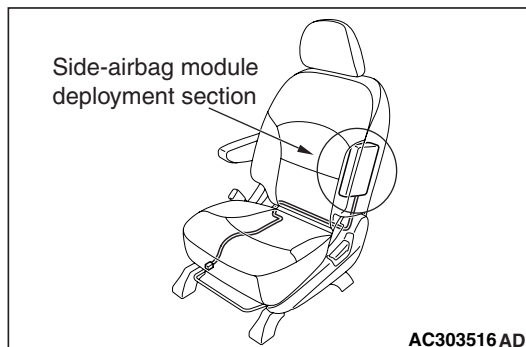
If the clock spring's mating mark is not properly aligned, the steering wheel may not be completely rotational during a turn, or the flat cable within the clock spring may be severed, obstructing normal operation of the SRS and possibly leading to serious injury to the vehicle's driver or front passenger.

10. Install the steering column covers, steering wheel and the air bag module.
11. Check steering wheel for noise, binds or difficult operation.
12. Check steering wheel for excessive free play.

#### **CAUTION**

The SRS may not activate if any of the above components is not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.

#### FRONT SEATBACK ASSEMBLY WITH SIDE-AIRBAG MODULE

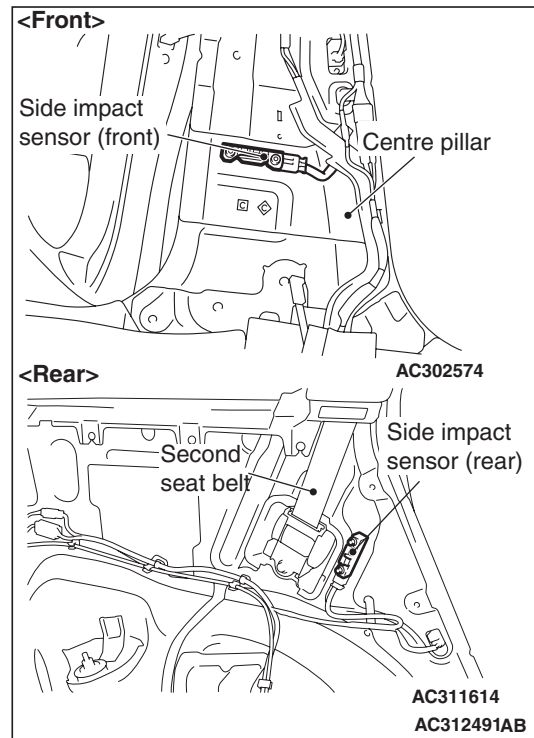


1. Check the side-airbag module deployment section in the seat for dents and deformation.
2. Check the harness for binds, the connector for damage and the terminals for deformation.

#### SEAT BELT WITH PRE-TENSIONER

1. Check the seat belt pre-tensioner for dents or deformation.
2. Check that the seat belt pre-tensioner is installed correctly to the vehicle body.

#### SIDE IMPACT SENSOR



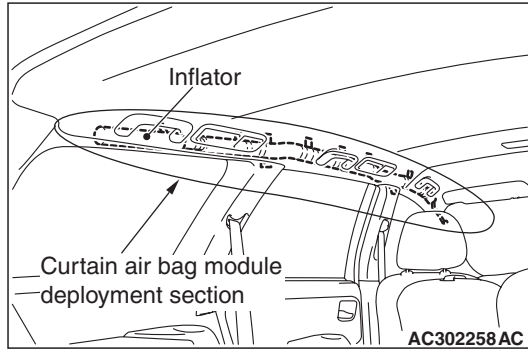
1. Check the centre pillar and quarter inner panel for deformation or rust.

#### **CAUTION**

The SRS may not activate if the impact sensors are not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.

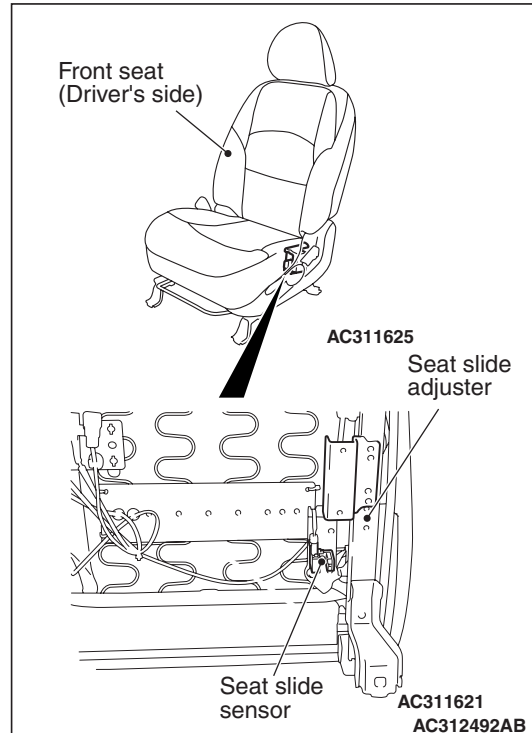
2. Check the side impact sensors for dents, cracks, deformation and rust.
3. Check the connector for damage and the terminals for deformation.

## CURTAIN AIR BAG MODULE



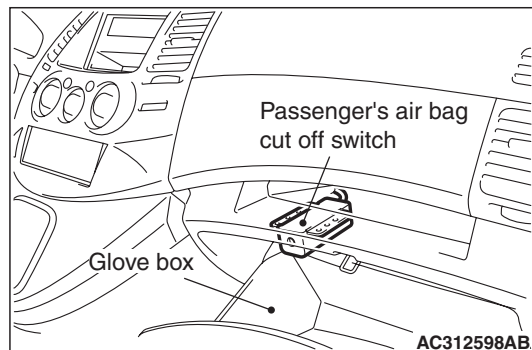
1. Check that the curtain air bag deployment part of the headlining is normal.
2. Check the inflator surface for cracks, dents or deformations.
3. Check the air bag for breakage.
4. Check the connector for damage, the terminal for deformation and the harness for binding.

## SEAT SLIDE SENSOR



1. Check that there is no connector damage, bent terminals or harness crimping.
2. Check the installation of the seat slide sensor.

## PASSENGER'S AIR BAG CUT OFF SWITCH

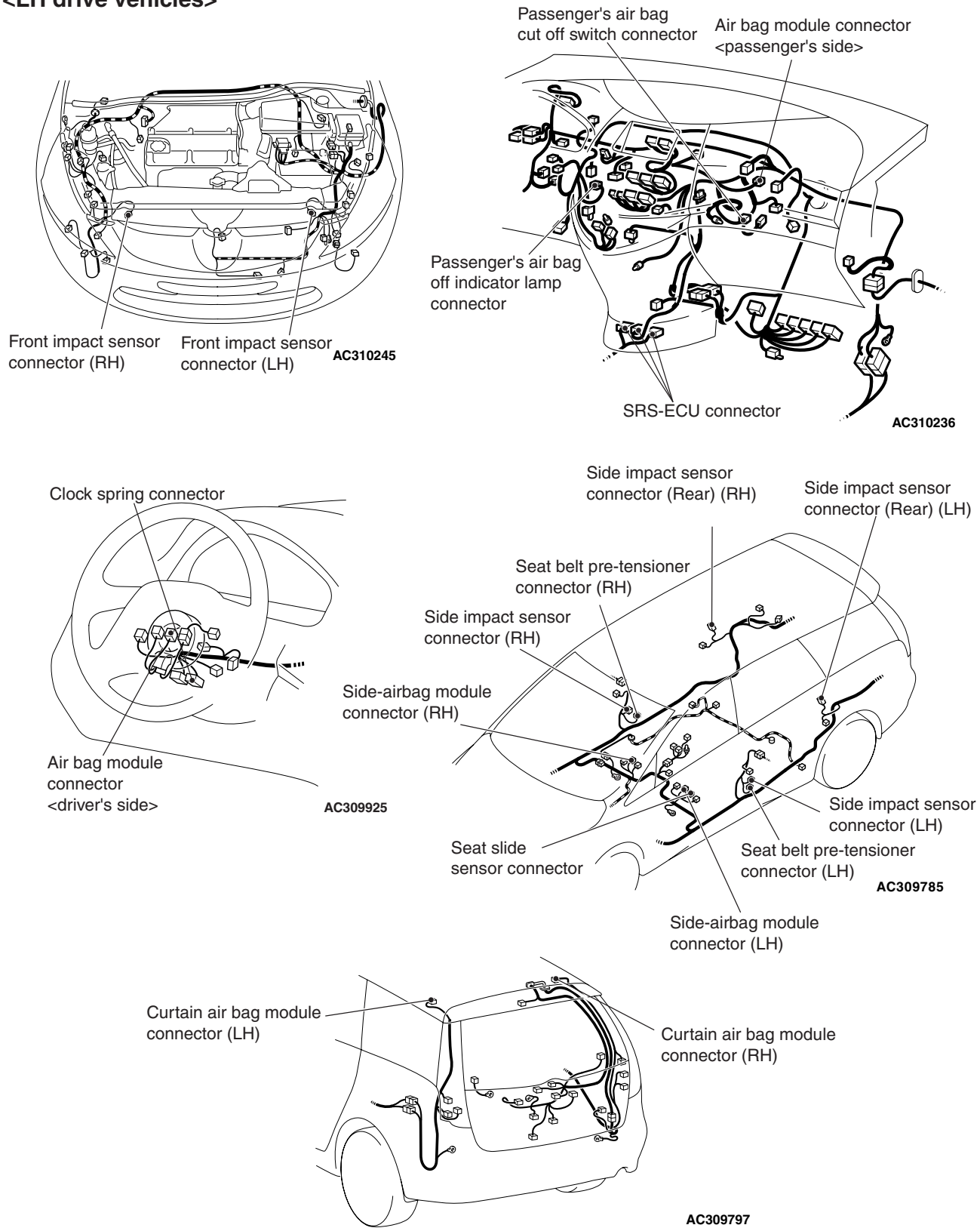


1. Check the passenger's air bag cut off switch for dents or deformation.
2. Check the installation of the passenger's air bag cut off switch.

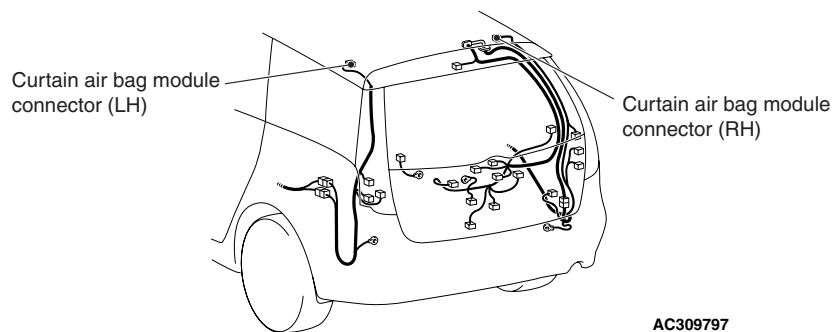
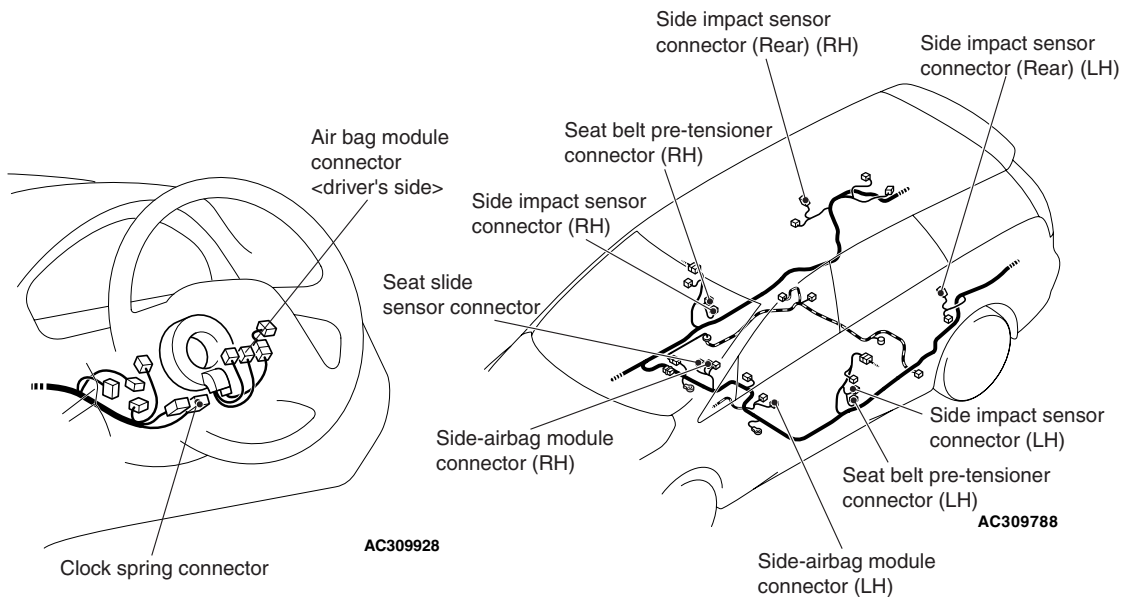
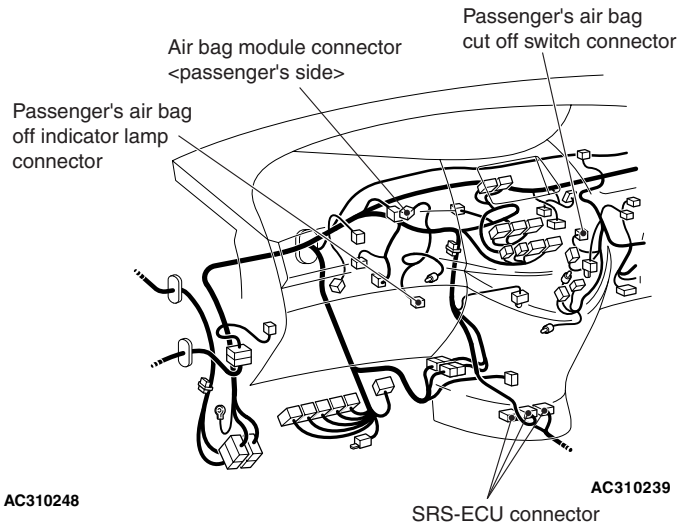
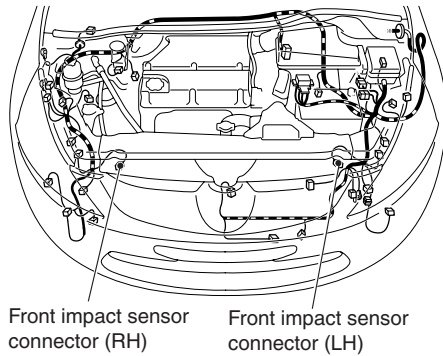


# FRONT WIRING HARNESS/INSTRUMENT PANEL WIRING HARNESS/ FLOOR WIRING HARNESS/REAR FLOOR WIRING HARNESS

<LH drive vehicles>



## &lt;RH drive vehicles&gt;

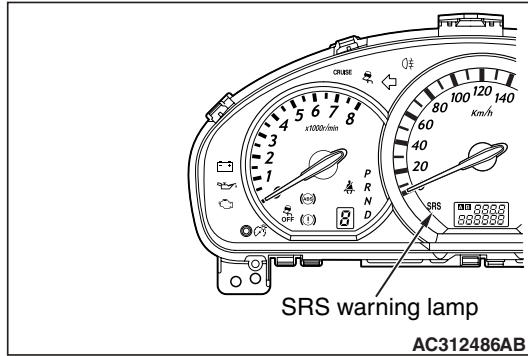


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1. Check connector for poor connection.
2. Check harnesses for binds, connectors for damage, and terminals for deformation. Replace any connectors or harness that fail the visual inspection.



## POST-INSTALLATION INSPECTION



Reconnect the negative battery terminal. Turn the ignition key to the ON position. Does the SRS warning lamp illuminate for about 7 seconds, turn off and then remain extinguished for at least 5 seconds? If yes, SRS system is functioning properly.

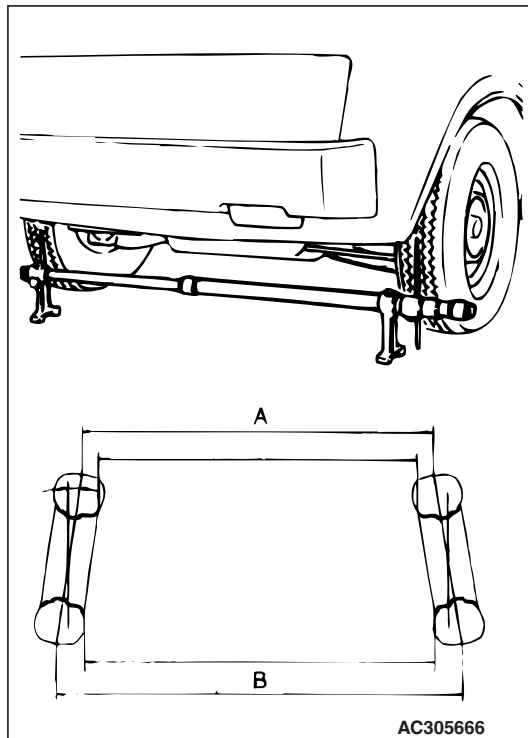
## OPERATIONS OUTSIDE THE VEHICLE

### D1. CHECK UNEVEN TYRE WEAR

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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



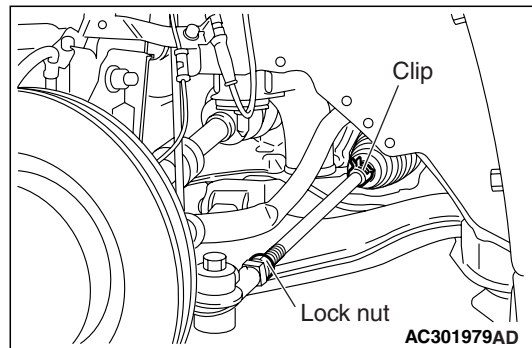
Using a toe-in gauge, measure toe-in.

Toe-in = B - A

**Standard value:**

**At the centre of tyre tread:  $0 \pm 3$  mm**

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



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).

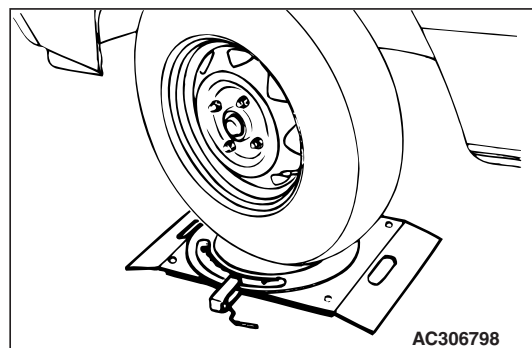
#### NOTE:

*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:  $52 \pm 2$  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:**

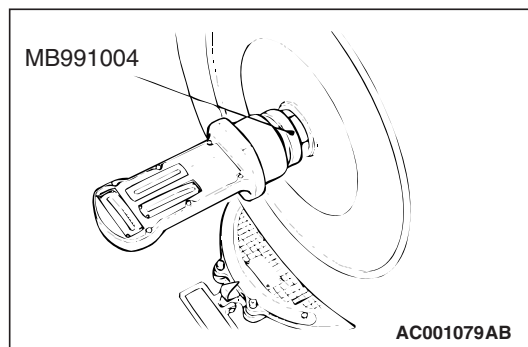
Item	Specifications	
	Vehicles with 16 inch wheel	Vehicles with 17 inch wheel
Inner wheels	39° 30' ± 2°	36° 30' ± 2°
Outer wheels (for reference)	32° 30'	30° 50'

**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°)	21° 40'

**CAMBER, CASTER AND KINGPIN INCLINATION****Standard value:**

Item	Specifications	
	Normal suspension	High ground clearance suspension
Camber	0° 00' ± 30'*	0° 00' ± 30'*
Caster	2° 46' ± 1° *	2° 54' ± 1° *
Kingpin inclination	13° 12' ± 1° 30'	12° 54' ± 1° 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  $245 \pm 29 \text{ N} \cdot \text{m}$  as the driveshaft nut.

**⚠ CAUTION**

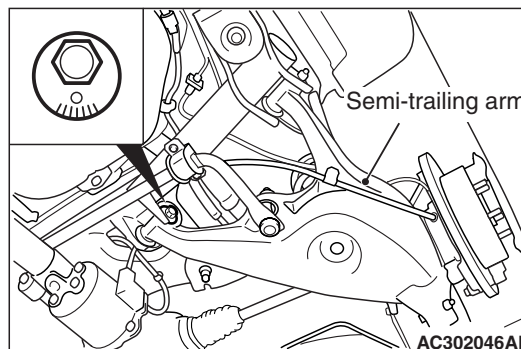
To prevent the wheel bearing from damage, never subject the wheel bearings to the vehicle load when the drive shaft nuts are loosened.

**REAR TOE-IN****Standard value:**

**At the centre of tyre tread:  $3 \pm 2 \text{ mm}$**

**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 (semi-trailing arm mounting bolt which is located on the inner side of the body).

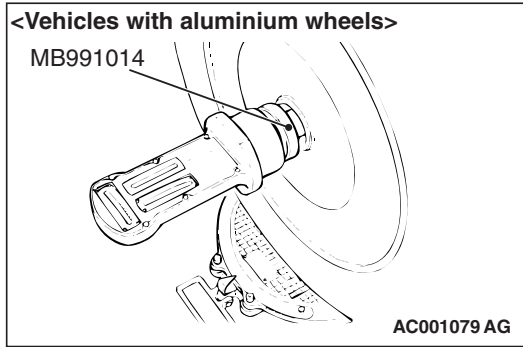
**Left wheel: Turning clockwise (+) toe-in**

**Right wheel: Turning clockwise (-) toe-in**

**NOTE:**

When the toe adjusting bolt is turned by one groove of the scale, the toe will be changed by approximately 1.8 mm (single side toe angle equivalent to  $0.16^\circ$ ).

## REAR CAMBER



### Standard value:

Item	Specification	
	Normal suspension	High ground clearance suspension
Camber	$-0^{\circ}45' + 45' / -15' *$	$-0^{\circ}05' \pm 30' *$

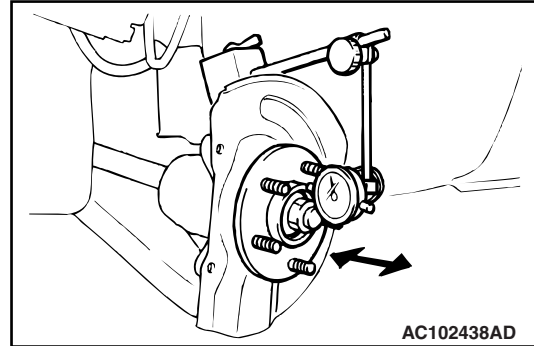
### NOTE:

1. \*: difference between right and left wheel must be less than 30'.
2. Camber is preset at the factory and cannot be adjusted.
3. For 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  $175 \pm 25 \text{ N} \cdot \text{m}$  as the trailing arm spindle self-locking nut.

## D2. CHECK FRONT WHEEL BEARINGS FOR PLAY

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



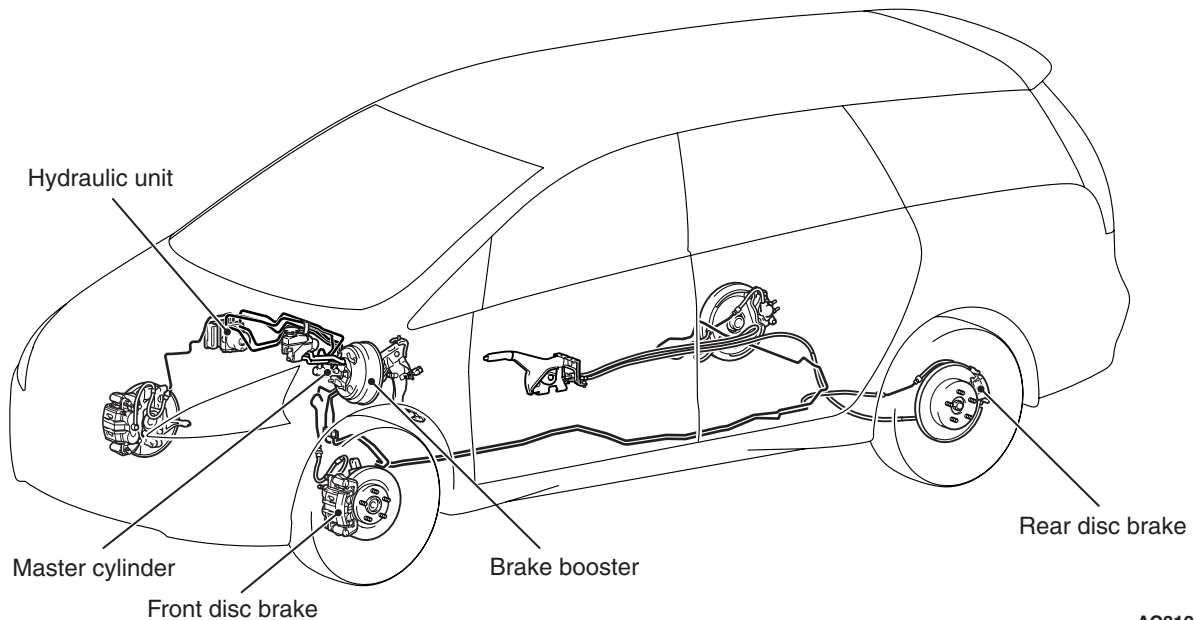
3. Attach a dial gauge as shown in the illustration, and then measure the axial play while moving the hub in the axial direction.

**Limit: 0.05 mm**

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

**D3. CHECK BRAKE HOSES AND PIPES  
FOR LEAKAGE**

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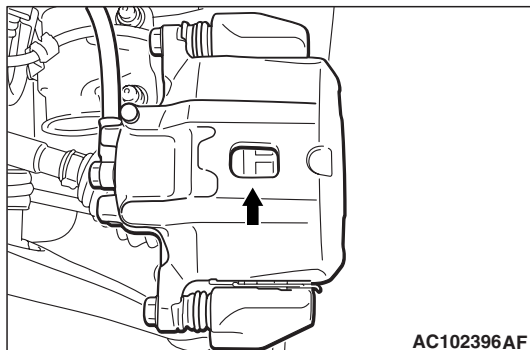


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1. Check entire circumference and length of hoses and pipes.
2. Check all clamps for tightness and connections for leakage.

**D4. CHECK BRAKE PADS AND DISCS  
FOR WEAR**

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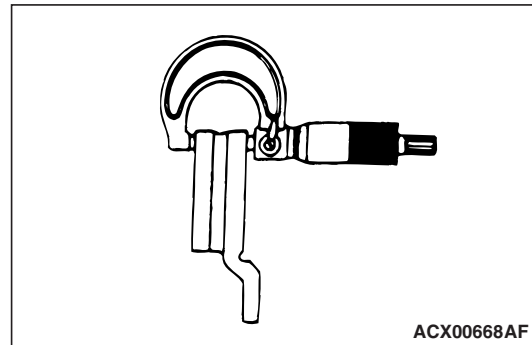


AC102396AF

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.



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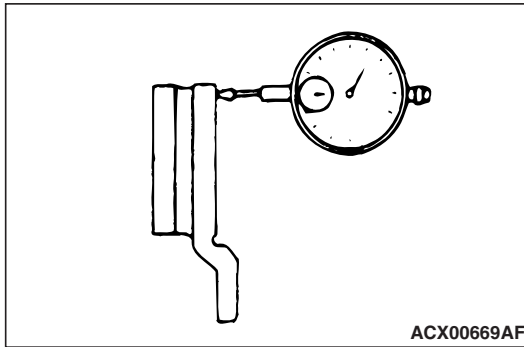
3. Using a micrometer, measure disc thickness at eight positions, approximately 45° apart and 10 mm in from the outer edge of the disc.

**Standard value:****26.0 mm <Front>****10.0 mm <Rear>****Limit:****24.4 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.

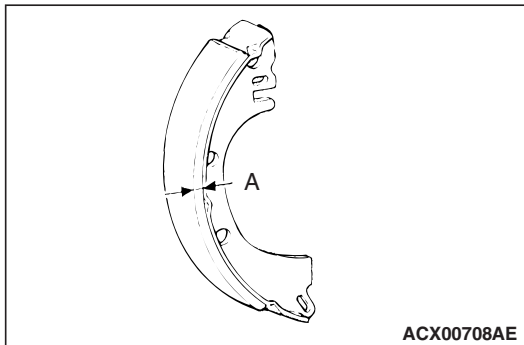
**Limit: 0.03 mm or less <Front>**  
**0.04 mm or less <Rear>**

## D5. CHECK BRAKE SHOE LININGS AND DRUMS FOR WEAR

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### BRAKE LINING THICKNESS CHECK

1. Remove the brake disc.



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

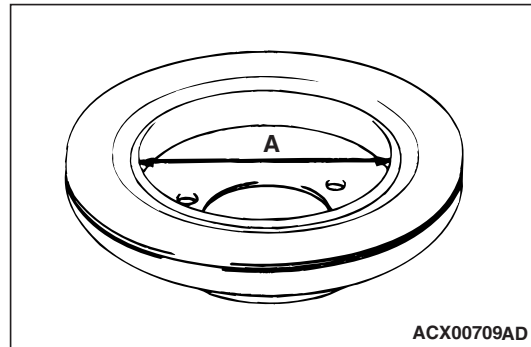
**Standard value (A): 2.8 mm**

**Limit (A): 0.8 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.

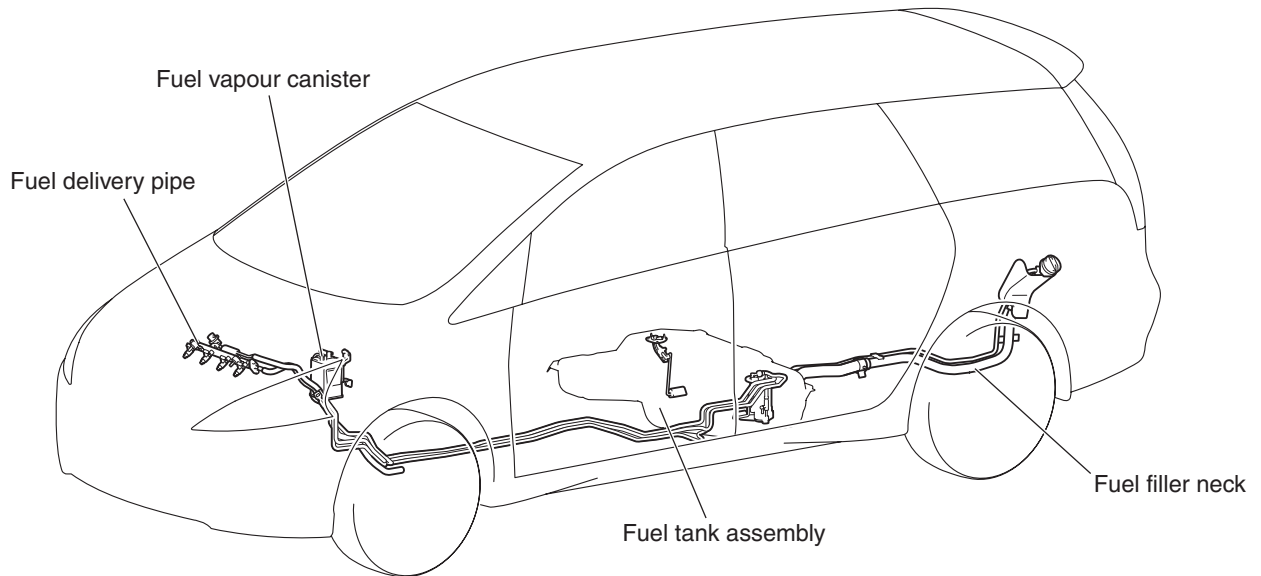
**Standard value (A): 190.0 mm**

**Limit (A): 191.0 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**

M6020500600040



AC310295AC

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

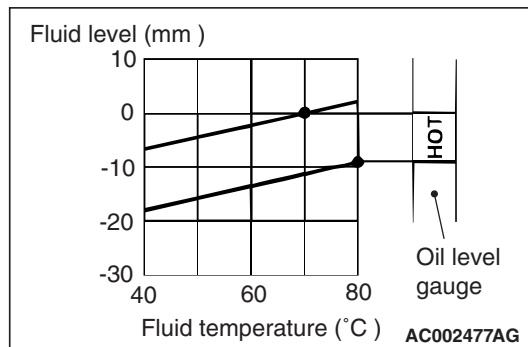
**OPERATIONS AFTER ENGINE IS WARMED UP****E1. CHECK FLUID LEVEL IN AUTOMATIC TRANSMISSION**

M6020600100183

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

**NOTE:**

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

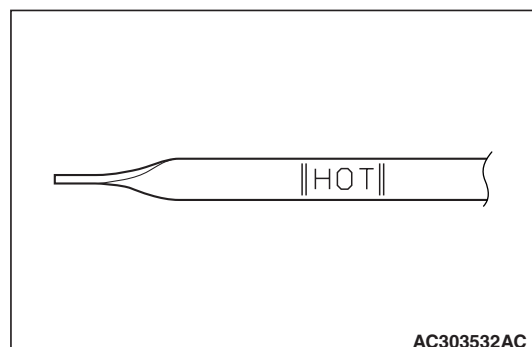


2. Check the oil level referring to the characteristics chart if it takes some time to reach the normal operation temperature of ATF (70 – 80°C.)

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.



- 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.*

- Securely re-insert the oil level gauge.

## E2. CHANGE AUTOMATIC TRANSMISSION FLUID

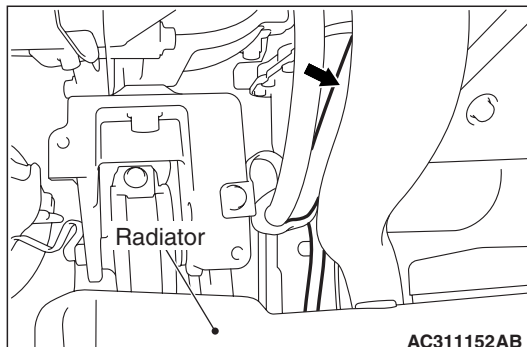
M6020600200221

### SPECIFICATIONS

Automatic transmission fluid	Quantity	Remark
DIA QUEEN ATF SP III	7.7 L	F4A4B

### 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.

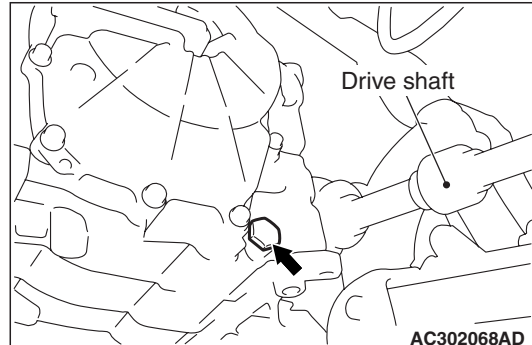


- Remove the hose shown in the illustration which allows the ATF to flow from the ATF cooler (built into the radiator) to the transmission.
- Start the engine and discharge the ATF.  
Driving conditions: N range, idling

### **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**



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

**Discharge amount: Approx. 2.0 L**

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

**Tightening torque: 32 ± 2 N·m**

- Pour in new ATF through the oil filler tube.

**Amount to add: Approx. 5.5 L**

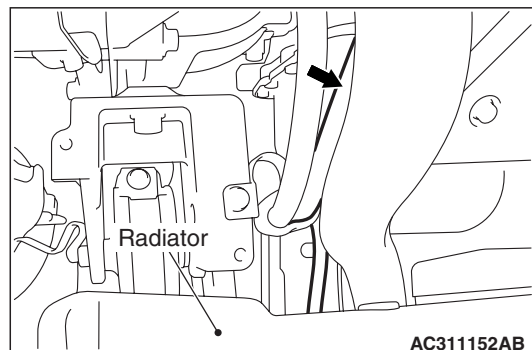
### **CAUTION**

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

- Repeat the operation in step 2.
- Pour in new ATF through the oil filler tube.

**Amount to add: Approx. 3.5 L**

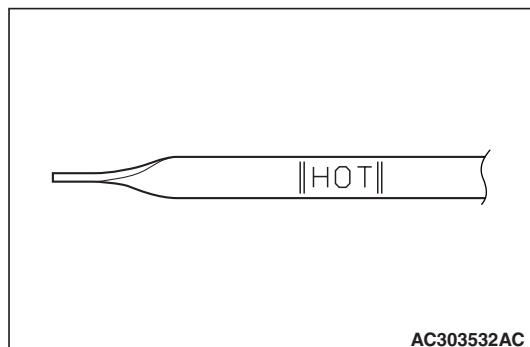
*NOTE: Carry out steps 2 and 7 so that at least 8.0 L has been discharged from the cooler hose. After this, discharge a small quantity of ATF and check for contamination. If the ATF is contaminated, repeat steps 6 and 7.*



- Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
- 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.

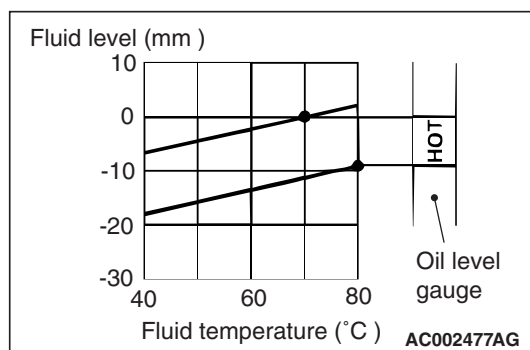


12. Drive the vehicle until the ATF temperature reaches the normal temperature (70 – 80°C), and then re-check the ATF level.

The ATF level must be between the HOT marks.

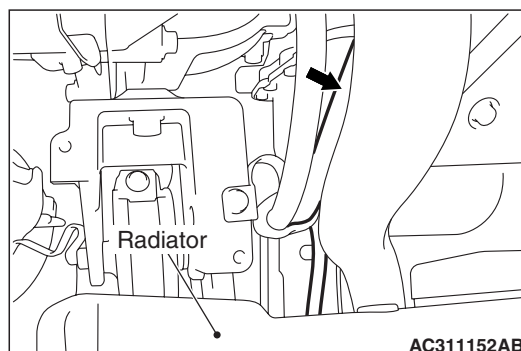
NOTE:

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.-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°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

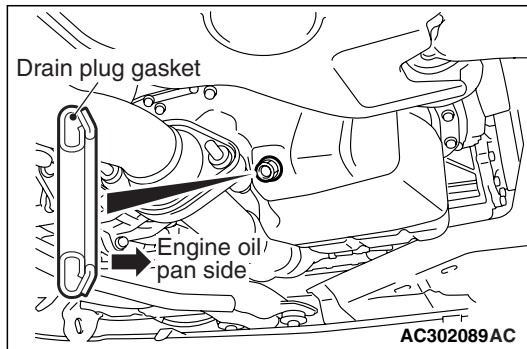
M6020600300251

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.



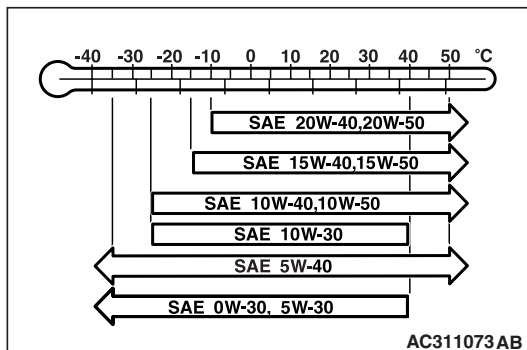
**CAUTION**

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:  $39 \pm 5$  N·m**



5. Refill with specified quantity of engine oil.

**Specified Engine Oil(ACEA and API classification): ACEA A1, A2 or A3 / API SG or higher**

**Total quantity (Includes volume inside oil filter): 4.3 L**

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

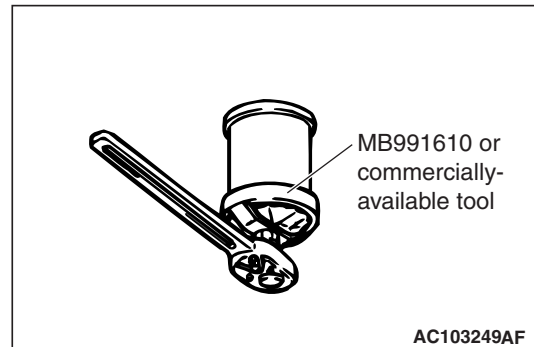
M6020600400021

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.

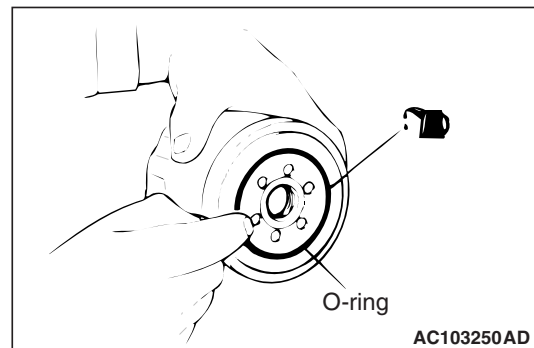
**CAUTION**

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.



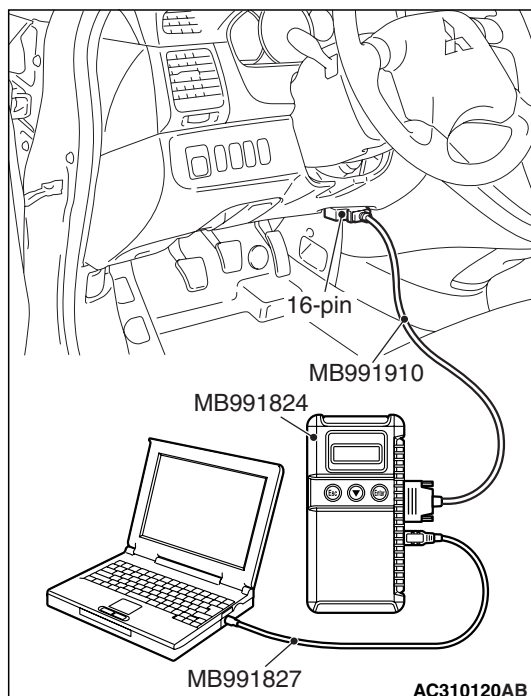
7. Apply a small amount of engine oil to the O-ring of the new oil filter.
8. Once the O-ring of the oil filter is touching the flange, use the respective tool in the following table to tighten to the specified torque.
9. Install the drain plug and refill the engine oil.
10. Race the engine 2 - 3 times, 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 ( $17 \pm 3$ N·m)
MD356000	Oil filter wrench (MB991610) or equivalent	Approx. 3/4 turn ( $14 \pm 2$ N·m)

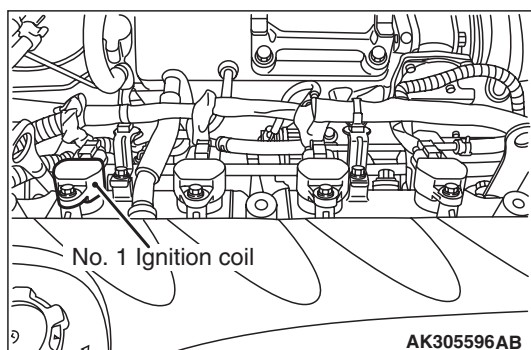
**E5. CHECK ENGINE IDLING SPEED**

M6020600500244

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. Set a timing light to the power supply line (terminal No.1) of the ignition coil No.1.  
*NOTE: The power supply line is looped and also longer than the other ones.*
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**

7. Check the idle speed.

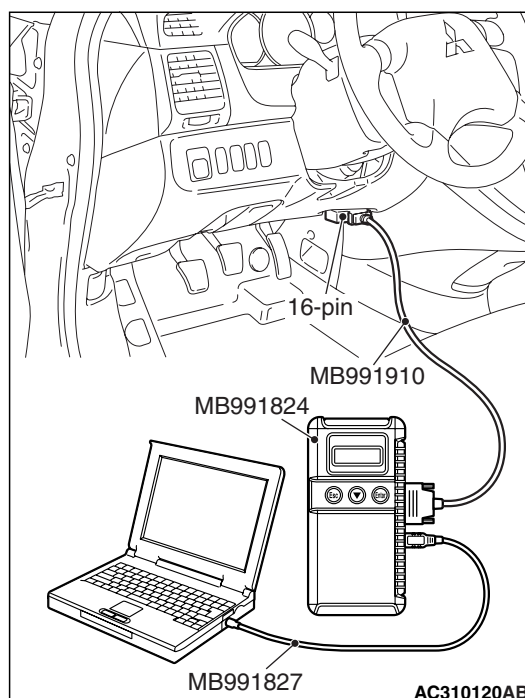
**Standard value: 700 ± 100 r/min****NOTE:**

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.

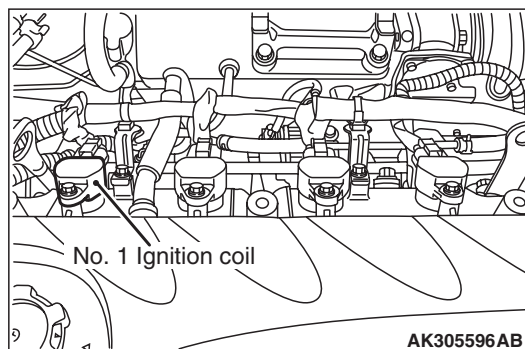
**E6. CHECK CO CONCENTRATION**

M6020601000123

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. Set a timing light to the power supply line (terminal No.1) of the ignition coil No.1.

*NOTE: The power supply line is looped and also longer than the other ones.*

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**

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**

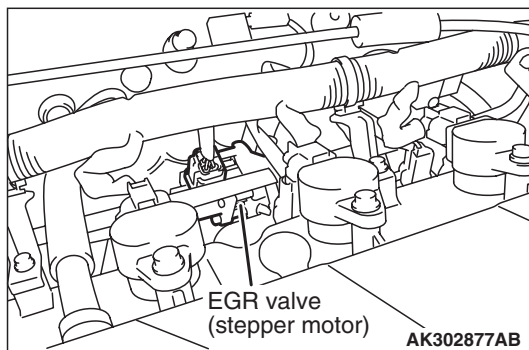
10. If there is a deviation from the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP 13 –Troubleshooting).
11. Turn the ignition switch to the "LOCK" (OFF) position and then remove the M.U.T.-III.

## **E8. CHECK EXHAUST GAS RECIRCULATION (EGR) SYSTEM**

M6020600800063

### **EGR VALVE (STEPPER MOTOR) CHECK**

#### **Checking the Operation Sound**

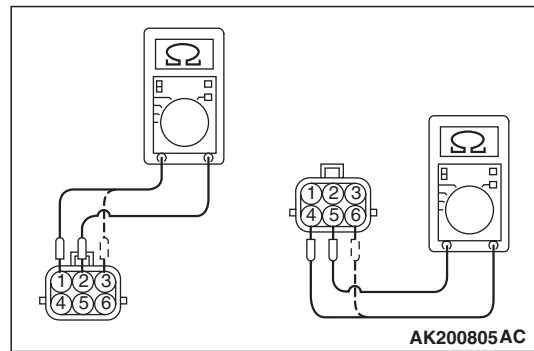


1. Check that the operation sound of the stepper motor can be heard from the EGR valve when the ignition switch is turned ON (without starting the engine).
2. If the operation sound cannot be heard, inspect the drive circuit of the stepper motor.

*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.

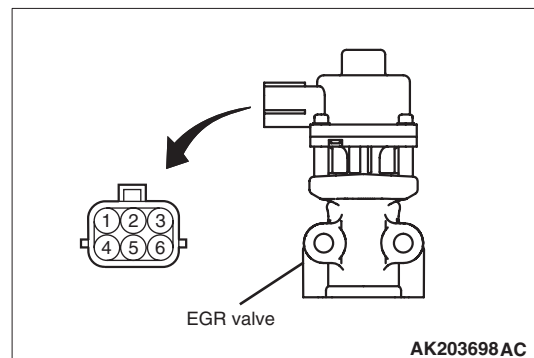
**Standard value: 20 – 24 Ω (at 20° C)**

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

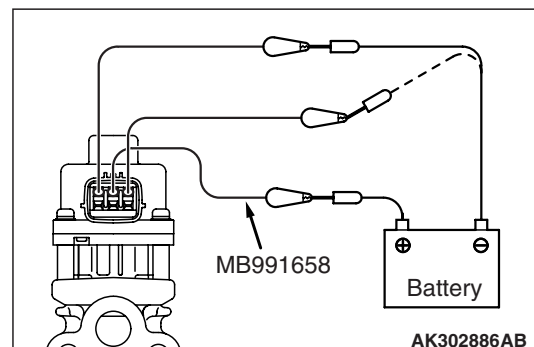
**Tightening Torque: 24 ± 4 N·m**

#### **Operation Check**

1. Remove the EGR valve.



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

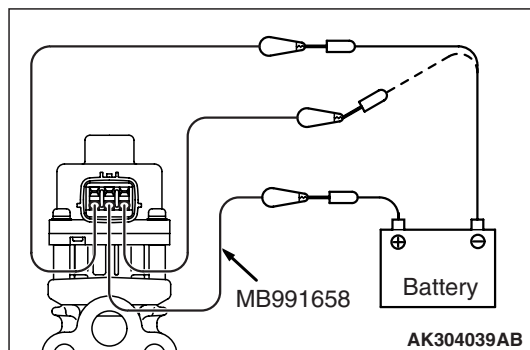


3. Connect the positive (+) terminal of the battery to terminal No. 2.

**⚠ 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.

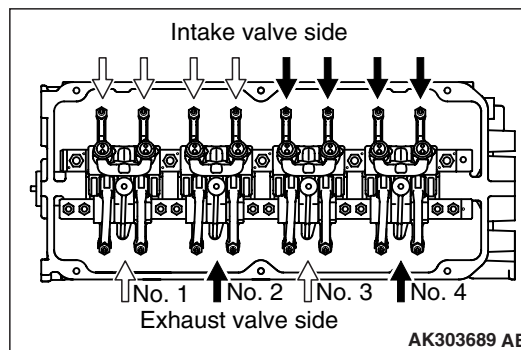
2. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

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

**E9. CHECK VALVE CLEARANCE  
(EXCEPT VEHICLES WITH AUTO-LASH  
ADJUSTER)**

M6020600900037

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Turn the ignition switch to the "LOCK" (OFF) position.
3. Remove all of the ignition coils.
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 centre 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 centre 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 ignition coils.

## OTHERS

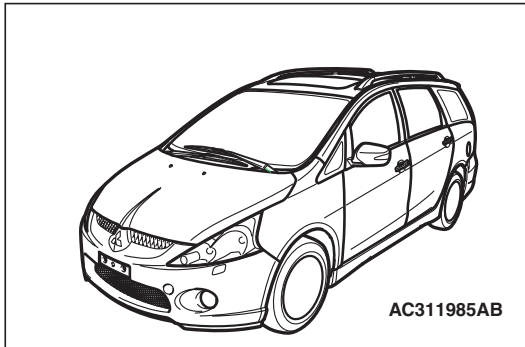
### F1. CHECK BODY CONDITION FOR DAMAGE

M6020700100027

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

### F2. ROAD TEST

M6020700200057



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.

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## NOTES