### **GROUP 0**

## **GENERAL**

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#### **HOW TO USE THIS MANUAL**

M600000100101

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

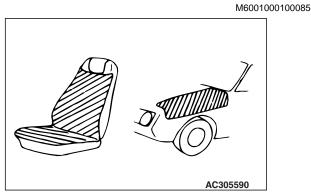
Group 0 and 1 have the contents for all vehicle models, and Group 2 has contents for the relevant vehicle models.

#### PRECAUTIONS BEFORE SERVICE

#### PROTECTING THE VEHICLE

#### REMOVAL AND DISASSEMBLY

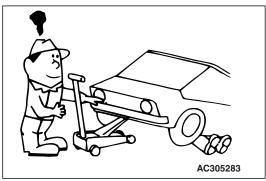
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If there is a likelihood of damaging interior or exterior parts during service operations, protect them with suitable covers (such as seat covers, fender covers, etc.).

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

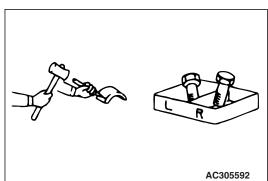
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If the service work is to be done by two or more mechanics working together, all the mechanics involved should take safety into consideration while they work.



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.

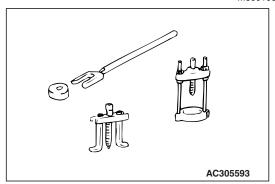


If punch marks or mating marks are made to avoid error in assembly and facilitate the assembly work, be sure to make them in locations which will have no detrimental effect on performance and/or appearance. If an area having many parts, similar parts, and/or parts which are symmetrical right and left 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**

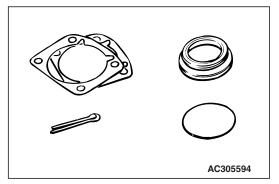
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If other tools are substituted for the special tools to do service of repair work, there is the danger that vehicle parts might be damaged, or the technician might be injured; therefore, be sure to use the special tool whenever doing any work for which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

#### PARTS TO BE REPLACED

M6001000500083

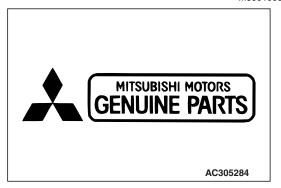


If any of the following parts are removed, they must be replaced with new parts.

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

#### **PARTS**

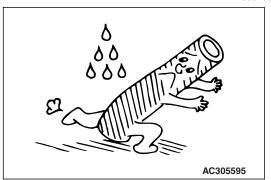
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When replacing parts, use MITSUBISHI genuine parts.

#### **TUBES AND OTHER RUBBER PARTS**

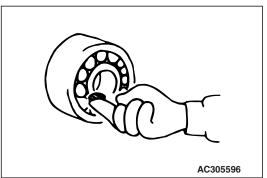
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Be careful to avoid spilling any petrol, oil, etc., because if it adheres to any tubes or other rubber parts, they might be adversely affected.

#### **LUBRICANTS**

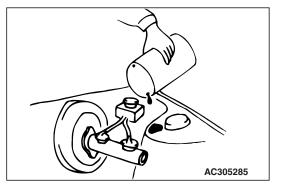
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In accordance with the instructions in this manual, apply the specified lubricants in the specified locations during assembly and installation.

#### **BRAKE FLUID**

M6001000900081



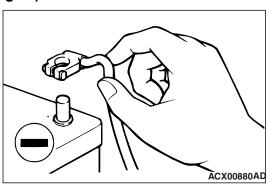
Be careful to avoid spilling any brake fluid, because if it adheres to the vehicle body, the paint coat might be discoloured.

#### SERVICING THE ELECTRICAL SYSTEM

M6001001000122

#### **⚠** 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.)



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.

### APPLICATION OF ANTI-CORROSION AGENTS AND UNDERCOATS

M6001001100099

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

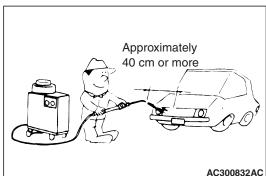
M6001001200085

"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: NeutralA/T, CVT: P range

#### **VEHICLE WASHING**

M6001001300189



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: Approximately 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.

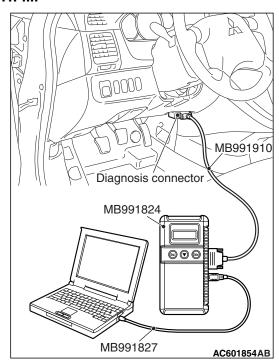
### MULTI USE TESTER (M.U.T.-III) SUB ASSEMBLY

M6001001900200

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

#### **⚠** CAUTION

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



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

### IN ORDER TO PREVENT VEHICLES FROM FIRE

M6001001500149

"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**

M6001001600221

#### **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 underpants, 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.

**NOTES** 

### **GROUP 1**

# PRE-DELIVERY INSPECTION

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#### NOTES CONCERNING ENTRIES

M6010100100251

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

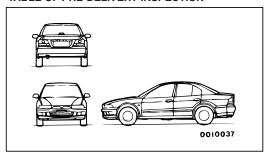
The inspection should be conducted according to the sequence described in the TABLE OF PRE-DELIVERY INSPECTION.

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

NOTE: 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.

NOTE: 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 |   |  |   |                                     |
|----------|--------------------|---|--|---|-------------------------------------|
| <b>√</b> | Good               | Α | Needs<br>adjustment                                    | Т | Needs<br>retightening               |
| С        | Needs<br>cleaning  | L | Needs<br>replenishment<br>of lubricant,<br>water, etc. | х | Needs<br>replenishment<br>of repair |

#### INSPECTION PROCEDURE

#### First Step

1. Connection of the dark current connector

#### Body

- 2. Wrap film
- 3. Exterior
- 4. Departion of door locking systems and door hinges
- 5. Departion 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. Wibration 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

AC401525

### **PAINTWORK TERMS**

M6010200100195

| Term                          | Definition   | Remark   |
|-------------------------------|--|--|
| 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 decolouration. |
| 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**

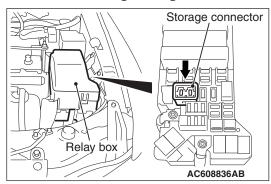
### 1. CONNECTION OF DARK CURRENT CONNECTOR

M6010300100404

#### **CONNECTING PROCEDURE**

#### **⚠** CAUTION

Turn the ignition switch to the LOCK (OFF) position before connecting storage connector.

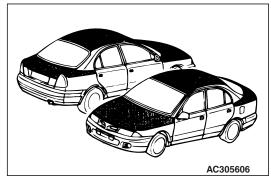


Press down the storage connector.

#### **BODY**

#### 2. WRAP FILM

M6010400100241

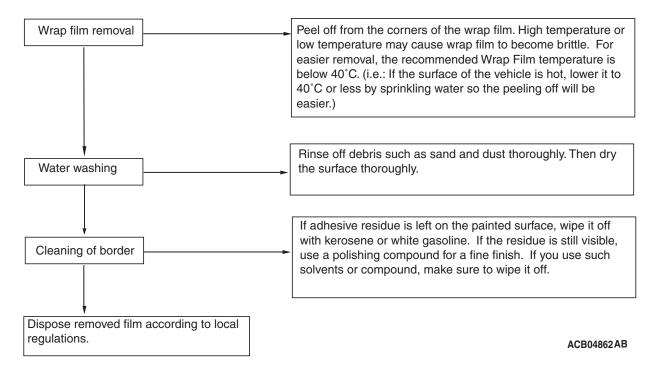


Vehicles may be shipped from the assembly plant to the distributors with a white plastic film or coating (wrap film) applied for the purpose of protecting the painted exterior from environmental elements where the assembly plant and point of embarkation is located.

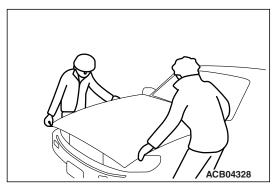
Distributors are required to remove the wrap film immediately after receiving vehicles, which is necessary for PDI operations. Please refer to the following chart for the procedures.

#### REMOVAL PROCEDURE

#### Flow Chart of Wrap Film Removal



#### The procedures to re-apply the wrap film



If there is an environment that the vehicles in stock may be exposed to elements such as acid rain, dust particles, it may be recommendable to re-apply the wrap film for the purpose of protecting the painted exterior from the environment. Please refer to the following chart for the procedures to re-apply the wrap film.

| Steps. | Process              | Tips  |
|--------|----------------------|---|
| 1      | Remove old wrap film | Follow the "flow chart of removing the wrap film"   |
| 2      | film                 | Make sure there is no debris such as sand or dust. Dry the surface thoroughly. The temperature of the area to apply the wrap film should be below 40°C for workability. |

| Steps. Process Tips  |   |
|--|---|
| Re-apply the wrap film  The are where  1. Beg vehi the bub the wra vehi wra  2. For port noz: acce firm 3. If th adh dam luste ove prev  4. To p betv expe | ea to re-apply the wrap film is the same area the original wrap film was applied. In adhering the wrap film from the low part of the icle and move upward. Maintain some tension on wrap film so it will not get wrinkled or trap air bles. Although air bubbles it self will not damage paint, you can avoid trapping air by adhering the p film from the centre to the out side of the icle. Use a tool such as a squeezer to adhere the p film firmly to the vehicle.  moving panels such as the hood and trunk lid, or ion where parts such as windshield washer zles are pointing out, cut the wrap film ordingly, so it will adhere to the paint surface ly.  e top side of the film (the side without the esive) is left to contact the painted surface, it may hage the paint surface. (for example, become erless). The edges of the wrap film and rlapping portions should be firmly adhered to vent entry of rain under the wrap film.  orevent colour difference to be recognised ween the areas wrapped and unwrapped due to osure to sunlight etc. during storage, we |
|  | ommend the boundary of wrapped and rapped areas be on a vertical location.  |

#### **⚠** CAUTION

- Be careful not to damage the paint surface while cutting the wrap film.
- Once the wrap film is adhered to the vehicle, it should remain on the vehicle for no more than 6 months. If it is necessary, a new wrap film should be adhered to the vehicle following the steps above, based on your inventory management schedule.

### Guidelines to give you an estimate of the labour costs

Approximate labour time to adhere wrap film

| area to apply wrap film (m <sup>2</sup> ) | labour time (min) |
|---|-------------------|
| 3.5 - 5.5                                 | 10 - 15           |
| 5.5 - 7.0                                 | 15 - 20           |

#### How to acquire the wrap film

It will be a direct transaction between O-WELL. Fill the necessary information, contact information;\*1 and ordering quantity;\*2 in the specified portion of the document attached below and send to O-WELL Corporation. The necessary information is stated in the document attached below. O-WELL will give you a quotation in return.



#### To

O-WELL CORPORATION

3-6-17, Kitashinagawa, Shinagawa-ku, Tokyo 140-0001 Japan Phone:81-3-6812-8607 Telefax:81-3-6812-8614 E-Mail:y-honda@owell.co.jp o-kagami@owell.co.jp n-kosaka@owell.co.jp please quote us as follows;

| *1   | Quotation request No. |
|------|-----------------------|
|      | Date                  |
| fror | m                     |
|      | name of company       |
|      |                       |
|      | address               |
|      | Tel;                  |
|      | Fax;                  |
|      | a person in charge    |
|      | e-mail address        |
|      |                       |

#### **Conditions**

(1) Payment; All amount (100%) should be paid by T/T remittance in advance is required. Our banking information;

> The bank of Tokyo Mitsubishi UFJ, Ltd Kamata Branch 5-12-6 kamata, Ota-Ku, Tokyo 144-0052 Japan SWIFT; BOTKJPJT, Account # 117-1059643 Accountee; O-WELL Corporation

| (2) Delivery; | By DHL or any other way by air.     |               |  |
|---------------|-------------------------------------|---------------|--|
| Lead time     | to delivery; within 10 working days | 3             |  |
| Expected      | delivery by;                        | to (air-port) |  |

- (3) Trade Term; CPT(C&F) destination air-port in US Dollar
- (4) Validity of quotation; by the end of next month
- (5) Manufacturer and Specification;

Kansai Paint Co., Ltd. Japan

RAPGARD-F (Guard Film) with adhesive, thickness 45 micron polyolefin resin over 90%

| Description                                   | Required quantity | Unit Price | Amount    |
|---|-------------------|------------|-----------|
|   | (Cartons)         |            | CPT       |
|   |                   |            | US Dollar |
| Width; Length;                                |                   |            |           |
| Delivery charges                              |                   |            |           |
| Country of origin; Japan                      |                   |            |           |
| Customs Tariff No. 3919.90 Self-adhesive film | (1)               |            |           |
| Total;G.W.(kg) cartons                        |                   |            |           |
| O-  | WELL Corporation  |            |           |



#### RAPGARD-F; Ordering information

| * | $^{\circ}$ |
|---|------------|
|   | _          |

| Width | Length | Weight per | Quantity   | Carton       |        | Ordering  |
|-------|--------|------------|------------|--------------|--------|-----------|
|       |        | roll       | per carton | Dimension    | Weight | quantity  |
|       | Motor  | l/a        | rollo      | WxDxH        |        | a a wta n |
| mm    | Meter  | Kg         | rolls      | mm           | kg     | carton    |
|       |        |            |            |              |        |           |
| 50    | 100    | 0.3        | 48         | 390x347x325  | 16.2   |           |
| 70    | 100    | 0.4        | 32         | 390x347x325  | 13.5   |           |
| 100   | 100    | 0.6        | 24         | 390x347x325  | 16.2   |           |
| 150   | 100    | 0.8        | 16         | 380x337x305  | 14.8   |           |
| 200   | 100    | 1.1        | 8          | 380x337x205  | 9.4    |           |
| 250   | 100    | 1.4        | 8          | 380x337x255  | 11.8   |           |
| 300   | 100    | 1.7        | 8          | 380x337x305  | 14.3   |           |
| 600   | 100    | 3.3        | 4          | 1300x265x135 | 14.8   |           |
| 720   | 100    | 4.0        | 2          | 740x250x125  | 9.5    |           |
| 900   | 200    | 8.9        | 1          | 940x160x160  | 10.4   |           |
| 1100  | 200    | 10.8       | 1          | 1140x160x160 | 12.3   |           |
| 1200  | 200    | 11.8       | 1          | 1240x160x160 | 13.3   |           |
| 1300  | 200    | 12.8       | 1          | 1340x160x160 | 13.9   |           |

Film Thickness (micron);

film 35  $\mu$  + adhessive10  $\mu$  = Total 45  $\mu$  (43g/M2)

\*2

| RAPGARD Cutter | 10 pcs/ctn | 230x120x10 | 75 g/pcs  |  |
|----------------|------------|------------|-----------|--|
| Squeezer       | 10 pcs/ctn | 400x250x80 | 150 g/pcs |  |

#### Attention;

Distributors have to fill in

2) O-WELL to fill out in

ACB04864

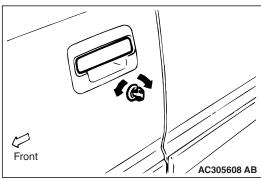
#### 3. EXTERIOR

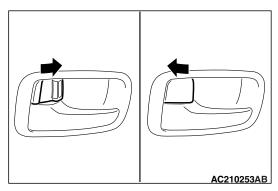
M6010400200260

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

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

M6010400300193





- 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.

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.

NOTE: 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

M6010400400156

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.

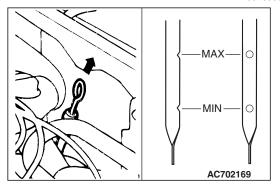
5. Sunroof

Close the sunroof to the fully closed position to check operation.

#### **UNDER HOOD**

#### 6. ENGINE OIL LEVEL

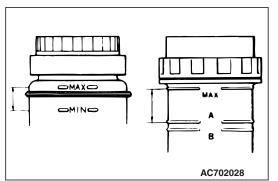
M6010500100312



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.

### 7. BRAKE MASTER CYLINDER FLUID LEVEL

M6010500200193



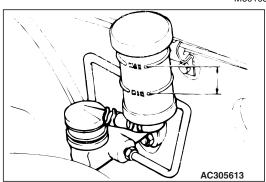
Check the fluid level.

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

M6010500300112



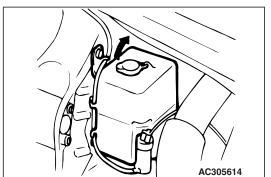
Check the fluid level.

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

M6010500400153

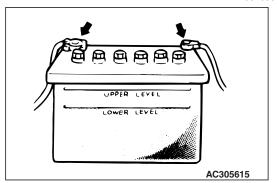


Check the fluid level; if it is low, replenish the washer fluid

- 1. Windshield washer reservoir
- 2. Rear window washer reservoir

### 10. BATTERY CONDITION AND CONNECTIONS

M6010500500150

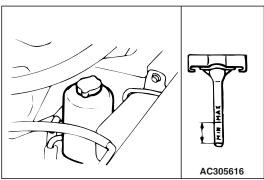


Inspect the battery connections. Verify that they are tightened.

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

#### 11. POWER STEERING FLUID LEVEL

M6010500600180

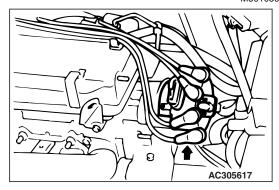


- Check that the fluid level is between "MAX" and "MIN".
- 2. If the fluid is added, start the engine and turn the steering wheel from stop to stop several times to expel air from the system.

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

#### 12. ELECTRICAL WIRING

M6010500700080



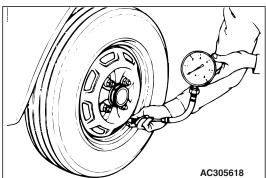
- 1. Each electrical wiring harness and connector
  - (1) Check each harness to be correctly routed and securely clipped.
  - (2) Confirm that all connections are tight.
- 2. Ignition cable

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

M6010600100159



- Tyre specification
   Check the correct tyre specification.
- 2. Tyre pressures
  Adjust each tyre pressure.

NOTE: Recommended pressure is shown on the tyre pressure label.

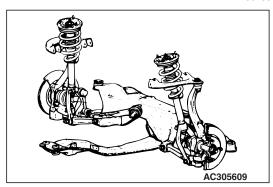
3. Valve stem extensions

Verify that the valve stem extensions are installed where necessary.

4. Install the wheel covers, wheel rings and hub caps.

#### 14. SUSPENSION SYSTEM

M6010600200190



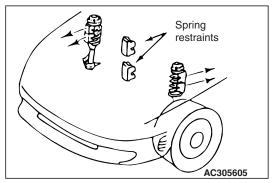
Check to be sure that each installation bolt and nut is tightened. If split pins are used, make sure that they are properly installed.

- 1. Lower arm, Upper arm
- 2. Stabilizer bar
- 3. Strut assembly

#### **REMOVE FRONT SPRING RESTRAINTS**

#### **⚠** CAUTION

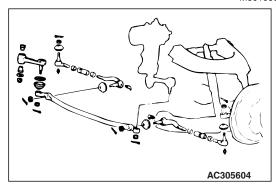
It is very important that these restraints must be removed during pre-delivery inspection. Failure to do so could cause ride and handling complaints.



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

#### 15. STEERING LINKAGE AND SPLIT PINS

M6010600300089



- 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.
- 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

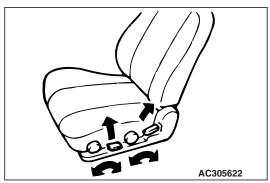
M6010600400086

Check under body and under body coating for damage.

#### **BEFORE ROAD TEST**

### 17. SEAT ADJUSTERS AND SEATBACK LATCHES

M6010700100167



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

M6010701100085

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

M6010700300086

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

#### 20. INSTRUMENT PANEL CONTROLS

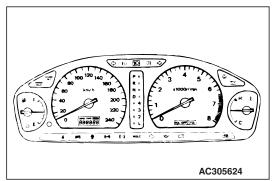
M6010700400168

Check the operation of the following

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

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

M6010700500080

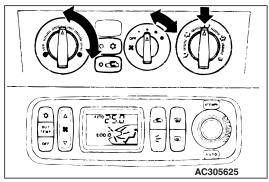


- 1. Check the meters and gauges are functioning properly.
- 2. Check each indicator lamp and warning lamp functions properly.

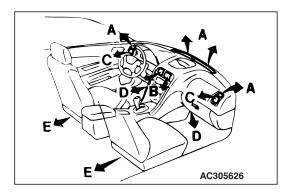
### 22. AIR CONDITIONER, HEATER AND DEFROSTER SYSTEM

M6010700600140

Check the systems for proper operation.



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

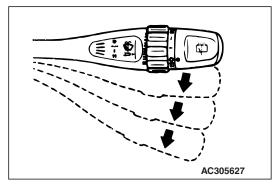


#### 2. Heater and defroster

- (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

M6010700700084

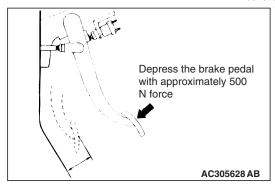


#### 1. Front wiper and washer

- (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.

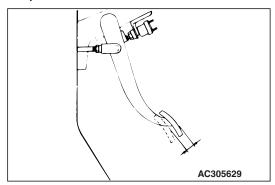
### 24. OPERATION OF SERVICE BRAKES AND PARKING BRAKES

M6010700800348



#### 1. Service brakes

(1) Check the clearance between the brake pedal and the floorboard when the brake pedal is depressed.



(2) Verify correct brake pedal free play.

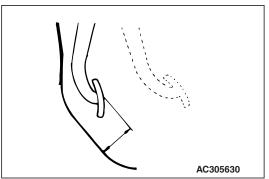
NOTE: For inspection and adjustment of the service brake, refer to GROUP 2, Periodic Inspection and Maintenance.

#### 2. Parking brake

Check the parking brake drag and lever travel. NOTE: For inspection and adjustment of the parking brake, refer to GROUP 2, Periodic Inspection and Maintenance.

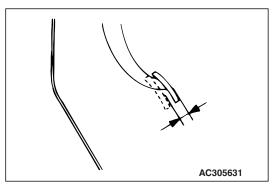
#### 25. CLUTCH OPERATION

M6010700900345



1. Check the clutch operation in all driving ranges.

2. Check the pedal to floorboard clearance when the clutch is just disengaged.

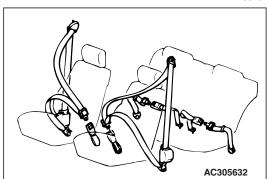


3. Verify correct clutch pedal free play.

NOTE: For inspection and adjustment of the clutch pedal, refer to GROUP 2, Periodic Inspection and Maintenance.

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

M6010701000088

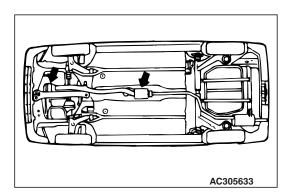


- 1. Verify that the seat belt warning lamp operates properly.
- 2. Check all seat belts and harnesses to assure that they connect and hold properly.
- 3. Lean forward to check that the shoulder harnesses allow movement.
- 4. Check the condition of the belts and anchors.
- 5. Check for proper seat belt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

#### **ROAD TEST**

### 27. ENGINE PERFORMANCE AND EXHAUST GAS

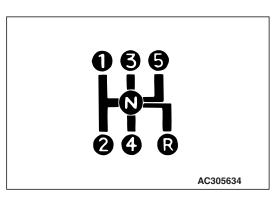
M6010800100089



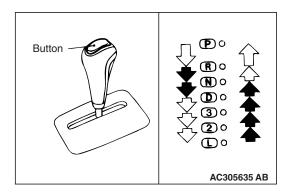
- Engine performance
   Check the engine for proper performance and accelerator pedal for smooth operation.
- 2. Exhaust system
  - (1) Check the exhaust system components for gas leaks.
  - (2) Verify that no black smoking is emitted from the end of the exhaust pipe (diesel-powered vehicles).

#### 28. TRANSMISSION IN ALL RANGES

M6010800200086



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

M6010800300083

#### 1. Service Brake

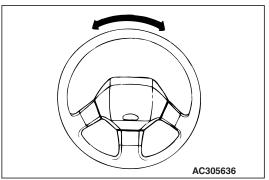
Put the vehicle in gear and apply the brakes while the vehicle is in motion. Be sure brake operation is smooth and positive.

#### 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

M6010800400080



- 1. Check for excessive play or looseness.
- 2. Check the steering wheel centre.

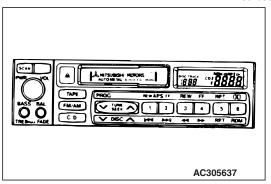
#### 31. VIBRATION AND RATTLES

M6010800500087

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

#### 32. ELECTRICAL EQUIPMENT

M6010800600084



#### 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

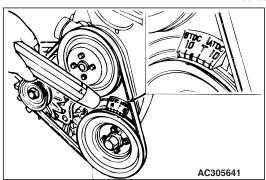
Check the engine idle speed.

M6010900100246

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

#### 34. IGNITION TIMING

M6010900200243



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.

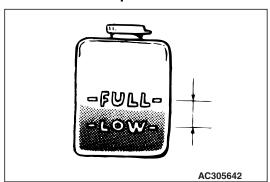
#### 35. RADIATOR COOLANT LEVEL

M6010900300198

#### **⚠** 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.



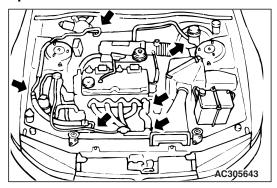
- Check that the coolant level in the reserve tank is at or above "LOW" mark at normal engine operating temperature. And check cooling system for leaks.
- 2. Check that the coolant concentration is 30% to 60%.

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

M6010900400258

#### **⚠** CAUTION

Remember that the air conditioner system is under pressure.

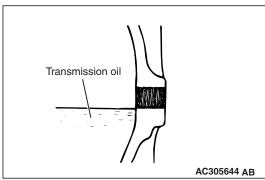


- Check all brake, fuel, power steering and air conditioner lines and connections; verify proper routing, check connections for leaks, tighten loose connector as required.
- 2. Inspect routing and connections of all vacuum, and radiator and heater houses.

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

M6010900500277

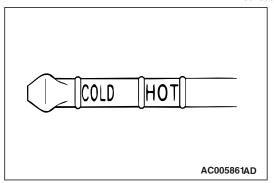


- 1. Remove the filler plug.
- 2. Check the oil level. If the oil level is at or slightly below the filler hole, it is in satisfactory condition.
- If the level is low, replenish the transmission and transfer case with fresh oil by using a lubricator.
   NOTE: For the specified oil, refer to GROUP 2,

Periodic Inspection and Maintenance.

### 38. AUTOMATIC TRANSMISSION FLUID LEVEL

M6010900600296



- 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.

NOTE: For the specified automatic transmission fluid, refer to GROUP 2, Periodic Inspection and Maintenance.

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

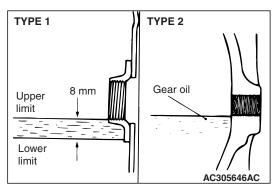
M6010900700152

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

### 40. FRONT AND REAR DIFFERENTIAL OIL LEVELS

M6010900800364

- 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.



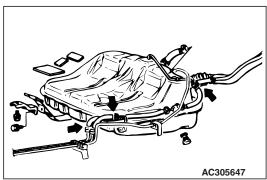
Type 1 only: Remove the filler plug, and check the gear oil level. Check that gear oil level is not 8 mm below the bottom of filler plug hole.

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.

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

M6010901000167

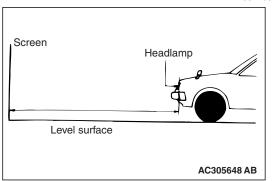


- Check all hoses, fluid lines and connections for leaks.
- 2. Check all hoses and fluid lines for proper routing away from sharp edges and moving components.

#### **FINAL STEPS**

#### 42. HEADLAMP AIMING

M6011000100224

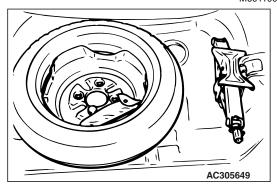


Check condition for headlamp aiming.

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

#### 43. EQUIPMENT

M6011000200221



Check the installation of the various equipment.

- 1. Trunk room floor mats
- 2. Spare tyre
- 3. Jack, jack handle and tool set

#### **44. EXTERIOR AND INTERIOR**

M6011000300228

Finally check and clean the exterior and interior.

- 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

M6011000400151

- 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.

**NOTES** 

### **GROUP 2**

# PERIODIC INSPECTION AND MAINTENANCE

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| (In case of leakage, check the oil level)        | 2-26 |  | 2-30 |
| B8. CHANGE GEAR OIL IN MANUAL                    | 2 20 | D5. CHECK BRAKE SHOE LININGS AND DRUMS (DRUM IN DISC) FOR WEAR   | 2-41 |
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| BEARINGS FOR PLAY                                | 2-36 |  |      |

#### PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

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

| Mair | ntenance item   | Maintenance operation     | Mainte     | nance interval   |                                    |
|------|---|---------------------------|------------|--|------------------------------------|
| OPE  | RATIONS INSIDE THE EN   | GINE COMPART              | MENT       | <u> </u>   |                                    |
| A1   | Check drive belt for cracks, fraying, wear, and                   | Petrol-powered vehicles   | Inspection | Every 40,000 km or every 2 month                                     |                                    |
|      | adjust its tension  | Diesel-powered vehicles   | Inspection | Every 2  | 0,000 km or every 12 months        |
| A2   | Check vacuum pump oil ho  | se for damage             | Inspection | Every 2  | 0,000 km or every 12 months        |
| A3   | Check intake air hose and hose for damage (vehicles turbocharger) | •                         | Inspection | Every 4  | 0,000 km or every 2 years          |
| A4   | Replace engine timing belt  |                           | Replace    | Every 1  | 00,000 km                          |
| A5   | Replace spark plugs   | Iridium-tipped type       | Replace    | Every 1  | 00,000 km                          |
| A6   | Check valve clearance*1 (except vehicles with                     | 6G75 engine (intake side) | Inspection | Every 4  | 0,000 km                           |
|      | auto-lash adjuster)   | 4M41 engine               | Inspection | Every 2  | 0,000 km or every 12 months        |
| A7   | Check radiator hoses for damage and proper                        | Petrol-powered vehicles   | Inspection | Every 4  | 0,000 km or every 2 years          |
|      | connection  | Diesel-powered vehicles   | Inspection | Every 20,000 km or every 12 months                                   |                                    |
| A8   | Check engine coolant level in reservoir                           | Petrol-powered vehicles   | Inspection | Every 40,000 km or every 2 years  Every 20,000 km or every 12 months |                                    |
|      |   | Diesel-powered vehicles   | Inspection |  |                                    |
| A9   | Change engine coolant   | Petrol-powered vehicles   | Change     | Every 6  | 0,000 km or every 4 years          |
|      |   | Diesel-powered vehicles   | Change     | Every 6  | 0,000 km or every 4 years          |
| A10  | Check air cleaner element damage                                  | for clogging and          | Inspection | Normal<br>usage  | Every 20,000 km or every 12 months |
|      |   |                           |            | Severe usage   | Every 10,000 km or every 6 months  |
| A11  | Replace air cleaner element                                       | Petrol-powered vehicles   | Replace    | Normal<br>usage  | Every 60,000 km or every 3 years   |
|      |   |                           |            | Severe usage   | More frequently                    |
|      |   | Diesel-powered vehicles   | Replace    | Normal<br>usage  | Every 40,000 km or every 2 years   |
|      |   |                           |            | Severe usage   | More frequently                    |

### PERIODIC INSPECTION AND MAINTENANCE PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

| Mair | ntenance item  |                         | Maintenance operation | Mainter                            | nance interval                     |
|------|--|-------------------------|-----------------------|------------------------------------|------------------------------------|
| A12  | Check fluid level in brake reclutch reservoir                      | eservoir and            | Inspection            | Every 2                            | 0,000 km or every 12 months        |
| A13  | Change brake fluid   |                         | Change                | Every 4                            | 0,000 km or every 2 years          |
| A14  | Check battery condition  |                         | Inspection            | Every 2                            | 0,000 km or every 12 months        |
| A15  | Replace fuel filter  | Petrol-powered vehicles | Replace               | Every 1                            | 60,000 km or every 10 years        |
|      |  | Diesel-powered vehicles | Replace               | Every 4                            | 0,000 km or every 2 years          |
| OPE  | RATIONS UNDER THE VE   | HICLE                   |                       |                                    |                                    |
| B1   | Check suspension system looseness                                  | for damage and          | Inspection            | Every 2                            | 0,000 km or every 12 months        |
| B2   | Check suspension arm bal and dust covers for damag                 |                         | Inspection            | Every 2                            | 0,000 km or every 12 months        |
| В3   | Lubricate propeller shaft wi                                       | th grease fitting       | Lubrication           | Every 2                            | 0,000 km or every 12 months        |
| B4   | Check driveshaft boots for   | damage                  | Inspection            | Normal<br>usage                    | Every 20,000 km or every 12 months |
|      |  |                         |                       | Severe usage                       | Every 10,000 km                    |
| B5   | Check steering linkage for loose connections (includin boots)      | •                       | Inspection            | Every 20,000 km or every 12 months |                                    |
| B6   | Check manual transmission (In case of leakage, check               | •                       | Inspection            | Every 20,000 km or every 12 months |                                    |
| B7   | Check transfer for oil leaka (In case of leakage, check            |                         | Inspection            | Every 20,000 km or every 12 months |                                    |
| B8   | Change gear oil in manual  | transmission            | Change                | Normal<br>usage                    | Every 100,000 km                   |
|      |  |                         |                       | Severe usage                       | Every 40,000 km                    |
| B9   | Change gear oil in transfer  |                         | Change                | Normal usage                       | Every 100,000 km                   |
|      |  |                         |                       | Severe usage                       | Every 40,000 km                    |
| B10  | Check front and rear difference leakage (In case of leakage, check |                         | Inspection            | Every 2                            | 0,000 km or every 12 months        |
| B11  | Change gear oil in front an  | <u> </u>                | Change                | Normal                             | Every 80,000 km                    |
| ١١٠  | John Straing God on in Home dir                                    | a .oa. amoronia         | Juliango              | usage                              | 2.3.7 33,333 1011                  |
|      |  |                         |                       | Severe usage                       | Every 40,000 km                    |
| B12  | Check exhaust pipe conneleakage, and check pipe in                 |                         | Inspection            | Every 4                            | 0,000 km or every 2 years          |

| Mair | ntenance item  |                  | Maintenance operation | Mainte                             | nance interval                     |  |  |  |
|------|--|------------------|-----------------------|------------------------------------|------------------------------------|--|--|--|
| OPE  | OPERATIONS INSIDE THE VEHICLE  |                  |                       |                                    |                                    |  |  |  |
| C1   | Check brake pedal and clutch pedal for free play   |                  | Inspection            | Every 20,000 km or every 12 months |                                    |  |  |  |
| C2   | Check parking brake lever  | stroke and play  | Inspection            | Every 2                            | 0,000 km or every 12 months        |  |  |  |
| C3   | Replace air purifier filter  |                  | Replace               | Every 1                            | 5,000 km or every 12 months        |  |  |  |
| OPE  | RATIONS OUTSIDE THE V  | EHICLE           | 1                     | 1                                  |                                    |  |  |  |
| D1   | Check wheel alignment  |                  | Inspection            | Every 2                            | 0,000 km or every 12 months        |  |  |  |
| D2   | Check front and rear wheel play  | bearings for     | Inspection            | Every 6                            | 0,000 km or every 3 years          |  |  |  |
| D3   | Check brake hoses and pip  | es for leakage   | Inspection            | Every 2                            | 0,000 km or every 12 months        |  |  |  |
| D4   | Check brake pads and disc  | s for wear       | Inspection            | Normal<br>usage                    | Every 20,000 km or every 12 months |  |  |  |
|      |  |                  |                       | Severe usage                       | Every 10,000 km or every 6 months  |  |  |  |
| D5   | Check brake shoe linings a in disc) for wear   | nd drums (drum   | Inspection            | Normal<br>usage                    | Every 40,000 km or every 2 years   |  |  |  |
|      |  |                  |                       | Severe usage                       | Every 20,000 km or every 12 months |  |  |  |
| D6   | Check fuel hoses and pipes deterioration   | s for leakage or | Inspection            | Every 40,000 km or every 2 years   |                                    |  |  |  |
| OPE  | RATIONS AFTER ENGINE   | IS WARMED UP     |                       | <u> </u>                           |                                    |  |  |  |
| E1   | Check fluid level in automatic transmission  | V5A5A model      | Inspection            | Every 2                            | 0,000 km or every 12 months        |  |  |  |
| E2   | Check automatic<br>transmission for fluid<br>leakage<br>(In case of leakage, check<br>the fluid level) | V5AWF model      | Inspection            | Every 20,000 km or every 12 months |                                    |  |  |  |
| E3   | Change automatic transmission fluid  | V5A5A model      | Change                | Normal<br>usage                    | Every 80,000 km                    |  |  |  |
|      |  |                  |                       | Severe usage                       | Every 40,000 km                    |  |  |  |
|      |  | V5AWF model      | Change                | Severe usage                       | Every 100,000 km                   |  |  |  |
| E4   | Change engine oil  |                  | Change                | Normal usage                       | Every 20,000 km or every 12 months |  |  |  |
|      |  |                  |                       | Severe usage                       | Every 10,000 km                    |  |  |  |
| E5   | Replace engine oil filter  |                  | Replace               | Normal usage                       | Every 20,000 km or every 12 months |  |  |  |
|      |  |                  |                       | Severe usage                       | Every 10,000 km                    |  |  |  |

### PERIODIC INSPECTION AND MAINTENANCE PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

| Maiı | ntenance item  | Maintenance operation | Maintenance interval               |
|------|--|-----------------------|------------------------------------|
| E8   | Check exhaust gas recirculation (EGR) system                     | Inspection            | Every 20,000 km or every 12 months |
| OTH  | IERS   |                       |                                    |
| F1   | Check body condition for damage                                  | Inspection            | Every year                         |
| F2   | Check the common rail engine (small injection quantity learning) | Inspection            | Every 20,000 km or every 12 months |
| F3   | Road test  | Inspection            | Every 20,000 km or every 12 months |

NOTE: \*: If found any noise from the valve anytime, please check the valve clearance.

- 1. Driving in 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 ℃ or more.

<sup>&</sup>quot;Severe usage" specifications apply to only vehicles used under severe operating conditions. Severe operating conditions include the followings cases:

#### **OPERATIONS INSIDE THE ENGINE COMPARTMENT**

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

M6020202900325

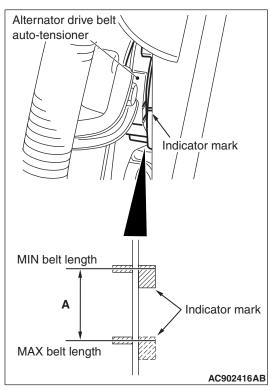
#### **DRIVE BELT CONDITION**

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

#### DRIVE BELT TENSION CHECK <6G7>

#### **⚠** CAUTION

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



- 1. Make sure that the indicator mark is within the area marked with A in the illustration.
- 2. If the mark is out of the area A, replace the drive belt.

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

### DRIVE BELT TENSION CHECK AND ADJUSTMENT <4M41>

#### **↑** CAUTION

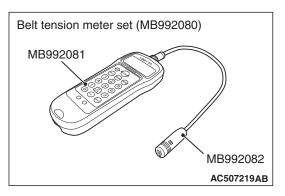
- When checking the drive belt tension, make sure that the engine is cold.
- Check the drive belt tension after turning the crankshaft clockwise one turn or more.

Check the drive belt tension in the following procedure.

#### Standard value:

| Item                            | When checked | When adjusted | When replaced |
|---------------------------------|--------------|---------------|---------------|
| Vibration<br>frequency<br>Hz    | 149 – 199    | 163 – 188     | 188 – 230     |
| Tension N                       | 245 – 441    | 294 – 392     | 392 – 588     |
| Deflection<br>mm<br>(Reference) | 9.1 – 12.7   | 9.8 – 11.7    | 7.2 – 9.8     |

### <When the vibration frequency is measured : Recommendation>



- Connect the Special tool microphone assembly (MB992082) to the Special tool belt tension meter (MB992081) of the Special tool belt tension meter set (MB992080).
- 2. Press the "POWER" button to turn on the power supply.

 Press number key 1. Check to ensure that "No. 01" appears on the upper left of the display and that the following numeric values are displayed for individual items (M, W, and S):

M 000.9 g/m

W 010.0 mm/R

S 0100 mm

If numeric values have not been entered (new tool), set them according to the belt specifications as shown below. Once you set them, you do not have to set them again. The settings remain undeleted even after battery replacement.

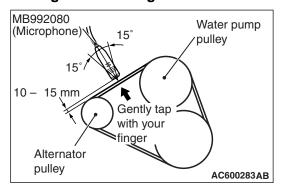
NOTE: This operation is to temporarily set the preset data such as the belt specifications, because if the measurement is taken without input of the belt specifications, conversion to tension value (N) cannot be made, resulting in judgement of error.

#### <Setting procedure>

- (1) Press down the "MASS" button till the belt mass select display appears.
- (2) Press the "UP" or "DOWN" button to select "01 1.5GT 0.9" and press the "MEASURE" button to decide it.
  - Check to ensure that "M 000.9 g/m" is displayed.
- (3) Press the "WIDTH" button to change to the belt width input display.
- (4) Press number keys 0, 1, 0, and 0 sequentially, and press the "SELECT" button to apply them. Check to ensure that "W 010.0 mm/R" appears on the display.
- (5) Press the "SPAN" button to change to the span length input display.
- (6) Press number keys 0, 1, 0, and 0 sequentially, and press the "SELECT" button to apply them. Check to ensure that "S 0100 mm" appears on the display.
- 4. Press "Hz" button twice to change the display to the frequency display (Hz).

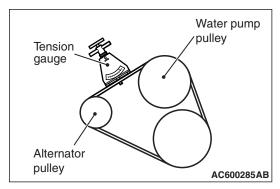
#### **⚠** CAUTION

- The temperature of the surface of the belt should be as close as possible to normal temperature.
- Do not let any contaminants such as water or oil get onto the microphone.
- If strong gusts of wind blow against the microphone or if there is loud sources of noise nearby, the values measured by the microphone may not correspond to actual values.
- If the microphone is touching the belt while the measurement is being made, the values measured by the microphone may not correspond to actual values.
- Do not take the measurement while the vehicle's engine is running.



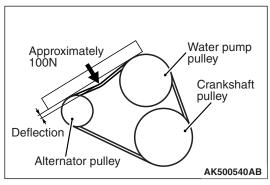
- 5. Hold the microphone to the middle of the drive belt between the pulleys (at the place indicated by the arrow), about 10 15 mm away from the rear surface of the belt and so that it is perpendicular to the belt (within an angle of  $\pm$  15 °).
- 6. Press the "MEASURE" button.
- 7. Gently tap the middle of the belt between the pulleys (the place indicated by the arrow) with your finger as shown in the illustration, and check that the vibration frequency of the belt is within the standard value.
  - NOTE: To take the measurement repeatedly, fillip the belt again.
- After the completion of the measurement, press and hold the "POWER" button to turn off the power supply.

### <When using the tension gauge>



Use a belt tension gauge to check that the belt tension is within the standard value.

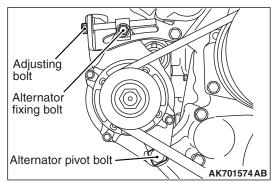
#### <Belt deflection check>



Apply approximately 100 N of force to the middle of the drive belt between the pulleys (at the place indicated by the arrow) and check that the amount of deflection is within the standard value.

When the belt tension is adjusted by measuring the deflection, adjust it with a tool for vibration frequency measurement or tension measurement afterward.

If not within the standard value, adjust the belt tension by the following procedure.



- 1. Loosen the nut of the alternator pivot bolt.
- 2. Loosen the alternator fixing bolt.
- 3. Use the adjusting bolt to adjust the belt tension and belt deflection to the standard values.

4. Tighten the nut for alternator pivot bolt.

Tightening torque: 75 ± 19 N·m

5. Tighten the alternator fixing bolt.

Tightening torque: 23 ± 4 N·m

6. Tighten the adjusting bolt.

Tightening torque: 5.0 ± 1.0 N·m

### **⚠** CAUTION

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

- 7. Check the belt tension, and readjust if necessary.
- 8. When the belt tension is adjusted by measuring the deflection, adjust it with a tool for vibration frequency measurement or tension measurement afterward.

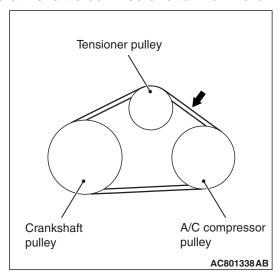
#### **⚠** CAUTION

Always replace the two V-belts together as a set, and do not apply any oil to the belts.

### A/C COMPRESSOR DRIVE BELT TEN-SION CHECK

#### **⚠** CAUTION

- When checking the drive belt tension, make sure that the engine is cold.
- Check the drive belt tension after turning the crankshaft clockwise one turn or more.



Check the drive belt tension by the following procedures.

#### Standard value:

| Vibration frequency Hz       | 169 – 189 |
|------------------------------|-----------|
| Tension N                    | 285 – 355 |
| Deflection mm<br>(Reference) | 7.0 – 8.0 |

# <When the vibration frequency is measured: Recommendation>

With your finger tip lightly tap the centre of the drive belt between the pulleys in the location shown by the arrow in the illustration and then measure the belt vibration frequency.

NOTE: Refer to alternator drive belt tension check, for information regarding the vibration frequency measurement method using the special tool (MB992080).

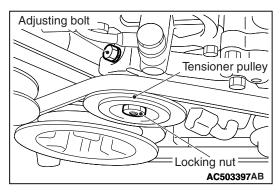
#### <When tension is measured>

Use a belt tension gauge to check that the belt tension is within the standard value at the centre of the drive belt between the pulleys in the location shown by the arrow in the illustration.

#### <When deflection is measured>

Apply approx. 100 N of force to the middle of the centre of the drive belt between the pulleys in the location shown by the arrow in the illustration and check that the amount of deflection is within the standard value.

### A/C COMPRESSOR DRIVE BELT TEN-SION ADJUSTMENT



- 1. Loosen the locking nut of the tensioner pulley.
- 2. Use the adjusting bolt to adjust the belt tension and belt deflection to the standard values.

#### Standard value:

| Item                         | When adjusted | When replaced |
|------------------------------|---------------|---------------|
| Vibration frequency<br>Hz    | 169 – 189     | 207 – 223     |
| Tension N                    | 285 – 355     | 425 – 500     |
| Deflection mm<br>(Reference) | 7.0 – 8.0     | 6.0 – 6.5     |

- 3. Tighten the locking nut.
- 4. Tighten the adjusting bolt.

#### **⚠** CAUTION

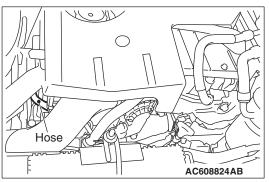
Check the drive belt tension after turning the crankshaft clockwise one turn or more.

- 5. Check the belt tension, and readjust if necessary.
- When the belt tension is adjusted by measuring the deflection, adjust it with a tool for vibration frequency measurement or tension measurement afterward.

## A2. CHECK VACUUM PUMP OIL HOSE FOR DAMAGE

(diesel-powered vehicles)

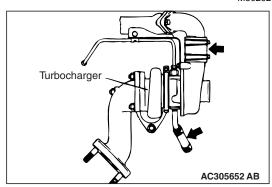
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1. Inspect the surface of hose for evidence of heat and mechanical damage.

# A3. CHECK INTAKE AIR HOSE AND TURBOCHARGER OIL HOSE FOR DAMAGE (vehicles with a turbocharger)

M6020200500417



- Inspect the intake air hoses for cracks or damage.
- 2. Inspect the turbocharger oil hoses for cracks or damage.

# A4. REPLACE ENGINE TIMING BELT (except vehicles with timing chain)

M602020060039

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

#### **A5. REPLACE SPARK PLUGS**

M6020200800645

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

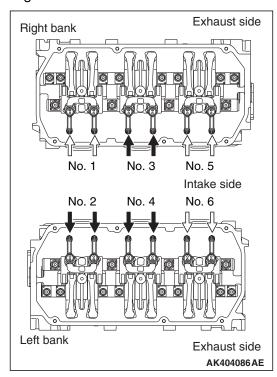
# A6. CHECK VALVE CLEARANCE (except vehicles with auto-lash adjuster)

M6020202400836

### <6G75 (intake side)>

NOTE: Perform the valve clearance check and adjustment at the engine cold state.

- 1. Turn the ignition switch to the "LOCK" (OFF) position.
- 2. Remove all ignition coils.
- 3. Remove the rocker cover.
- Turn the crankshaft clockwise until the notch on the pulley is lined up with the "T" mark on the timing indicator.

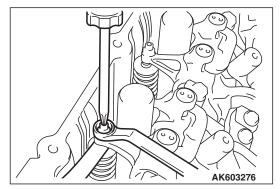


5. Valve clearance inspection and adjustment can be performed on rocker arms indicated by white arrow mark when the No. 1 cylinder piston is at the top dead centre on the compression stroke, and on rocker arms indicated by black arrow mark when the No. 4 cylinder piston is at the top dead centre on the compression stroke. NOTE: If the rocker arm of No. 6 cylinder at the inlet side is moved up and down and the rocker arm is moved, No. 1 cylinder is at top dead centre on compression stroke. If the rocker arm of No. 6 cylinder at the inlet side is moved up and down and the rocker arm is not moved, No. 4 cylinder is at top dead centre on compression stroke.

 Measure the valve clearance for intake side.
 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 (cold engine): Intake valve: 0.10 mm

NOTE: Valve clearance check and adjustment is unnecessary for exhaust side due to auto lash adjuster installed.



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

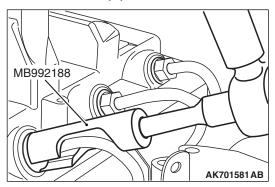
#### Tightening torque: 9 ± 1 N·m

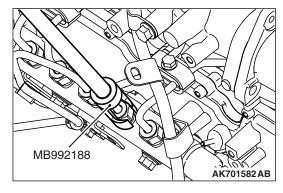
- 8. Turn the crankshaft through 360 degree angle to line up the notch on the crankshaft pulley with the "T" mark on the timing indicator.
- 9. Repeat steps 6 and 7 on other valves for clearance adjustment.
- 10.Install the rocker cover.
- 11.Install the ignition coils.

#### <4M41>

NOTE: The valve clearance check and adjustment should be done when the engine is cold.

1. Remove the EGR pipe.



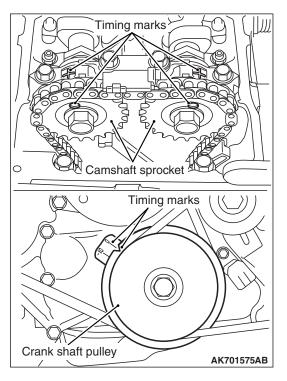


2. Use the special tool fuel injection pipe wrench (MB992188) to remove the fuel injection pipe.

#### **⚠** CAUTION

Leaked fuel on parts causes a decrease in function and burning. Therefore, place waste to absorb leaked fuel.

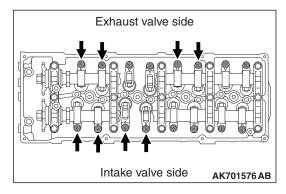
3. Remove the rocker cover.



4. Align the camshaft sprocket timing marks and set the No. 1 cylinder at top dead centre.

#### **⚠** CAUTION

The crankshaft should always be turned in a clockwise direction.

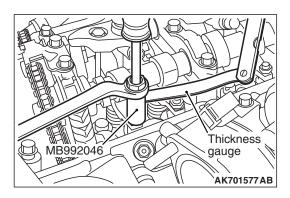


5. Measure the valve clearance.

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

Standard value (cold engine):

Intake valve: 0.10 mm Exhaust valve: 0.15 mm



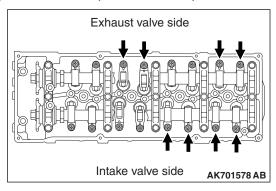
 While holding the adjusting screw with a screwdriver to prevent it from turning, tighten the lock nut to the specified torque using a valve adjusting socket. (MB992046)

Tightening torque: 9.8 ± 1 N·m

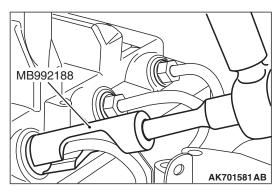
#### **⚠** CAUTION

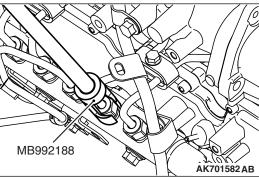
Pay special attention that the tightening torque is not beyond this value. If the tightening torque is beyond the value, the value stem would possibly bend.

7. Turn the crankshaft 360° clockwise to bring No. 4 cylinder to the top dead centre position.



- 8. Measure the valve clearances at the places indicated by arrows in the illustration. If the clearance is not within the standard value, repeat steps 5 and 6 above.
- 9. Install the rocker cover.





10.Use the special tool fuel injection pipe wrench (MB992188) to tighten the fuel injection pipe to the specified torque.

Tightening torque: 35 ± 5 N·m

### **⚠** CAUTION

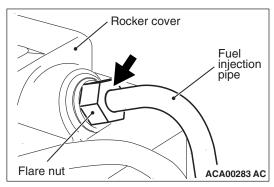
- The reinstallation histories of the removed injection pipe are up to five times. To count how many times the injection pipe is reinstalled, record the number of the reinstallation histories on the service booklet by adding this latest number of the histories, which is usually "1", to the previous one. Use a new injection pipe when the total reinstallation history numbers reach five times, or when the injector or common rail is replaced. In this case, record "a new injection pipe, the number of the reinstallation histories is zero" on the service booklet.
- When the injection pipe is reinstalled, confirm there is no foreign material on the seal surface or in the pipe and then install it not to deviate from the axis, fitting the seal surface.

11.Install the EGR pipe.

NOTE: Since the fuel injection pipe connection on the fuel injector assembly side is located inside the engine (rocker cover), visual check for fuel leak cannot be performed. Due to this, use the oil leak detection agent to check for fuel leak. As for other fuel injection pipe and the fuel supply pump pipe connection, visually check for fuel leak. NOTE: The oil leak detection agent detects oil leak by colour change when it is applied to the area to be checked. For details on how to use the product, refer to the instruction manual.

#### **⚠** CAUTION

Degrease the area between the flare nut and the pipe of the fuel injection pipe by fully spraying the parts cleaner.

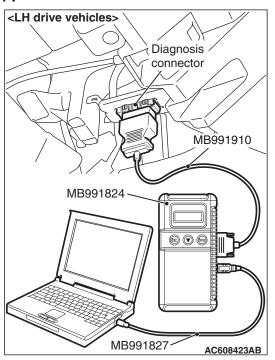


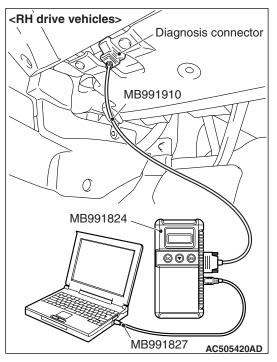
- 12. Carefully degrease the flare nut at the fuel injector assembly side of the fuel injection pipe with parts cleaner (MZ100387) or equivalent.
- 13.If the parts cleaner remains in the area between the flare nut for connection and the fuel injection pipe, the oil leak detection agent detects that there is a fuel leak. Therefore, use an air gun to blow off the remaining parts cleaner and fully dry the degreased area.
- 14. Apply the oil leak detection agent to the flare nut and the pipe of the fuel injection pipe.

NOTE: It is easy to detect the oil leak when the oil leak detection agent is dry enough because the colour changes clearly. Use a dryer to dry the oil leak detection agent when it is hard to dry.

#### **⚠** CAUTION

Before connecting or disconnecting the M.U.T.-III, turn the ignition switch to the "LOCK" (OFF) position.



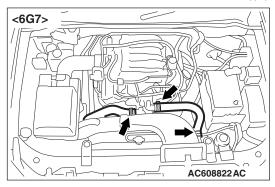


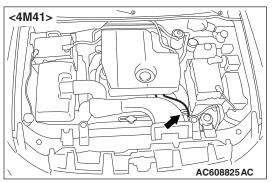
- 15.Ensure that the ignition switch is at the "LOCK" (OFF) position.
- 16.Start up the personal computer.

- 17.Connect special tool M.U.T.-III USB cable (MB991827) to V.C.I. (MB991824) and the personal computer.
- 18.Connect special tool M.U.T.-III main harness A (MB991910) to the V.C.I.
- 19.Connect the M.U.T.-III main harness A to the diagnosis connector of the vehicle.
- 20.Turn the V.C.I. power switch to the "ON" position. NOTE: When the V.C.I. is energized, the V.C.I. indicator lamp will be illuminated in a green colour.
- 21.Start the M.U.T.-III system on the personal computer and turn the ignition switch to the "ON" position.
- 22. Start the engine, and let it run at idle.
- 23.Select "MPI/GDI/DIESEL" from System select Screen of the M.U.T.-III.
- 24.Select "SPECIAL FUNCTION" from MPI/GDI/DIESEL Screen.
- 25.Select "FUEL LEAKAGE CHECK" from Test Screen. Carry out the fuel leakage check (during the test, the engine speed and the fuel pressure is 2,000 r/min and 180 MPa for 20 seconds respectively) five times in a row (20 seconds × 5 times = 100 seconds).
- 26. Turn the ignition switch to the "LOCK" (OFF) position, and stop the engine.
- 27.Disconnecting the M.U.T.-III is the reverse of the connecting sequence.
- 28. Check the colour change of the oil leak detection agent at the flare nut and pipe of the fuel injection pipe to check if the fuel is leaking from the fuel injection pipe connection at the fuel injector assembly side.
- 29. Visually check other fuel line connections for fuel leak.
- 30.If the fuel is leaking, replace the fuel injection pipe and the fuel supply pump pipe.
- 31.If the fuel is not leaking, wipe off the oil leak detection agent using parts cleaner (MZ100387) or equivalent completely.

# A7. CHECK RADIATOR HOSES FOR DAMAGE AND PROPER CONNECTION

M6020200901117

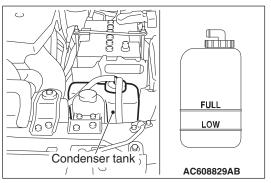




- 1. Check entire circumference and length of hoses, using a mirror as required.
- 2. Check that hoses installed in grommets pass through the centre of the grommets.
- 3. Check all clamps for tightness and connections for leakage.

# A8. CHECK ENGINE COOLANT LEVEL IN RESERVOIR

M6020201001054



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

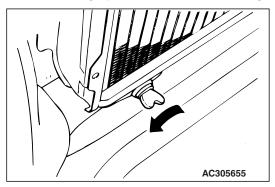
#### **A9. CHANGE ENGINE COOLANT**

M6020201101697

#### **⚠ WARNING**

When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and turn the cap anti-clockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it anti-clockwise.

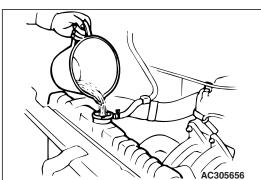
- 1. Stop the engine after it is fully warmed up.
- 2. Add detergent to the engine coolant in order to flush the cooling system, and start the engine.



- 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 radiator condenser tank.
- 6. Install the radiator condenser tank.

#### **⚠** 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.



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

# Recommended antifreeze: MITSUBISHI MOTORS GENUINE SUPER LONG LIFE COOLANT or equivalent

- 8. Fill the cooling system with soft water through the filler port, and add long life coolant, if necessary.
- 9. Fill the radiator condenser tank with coolant.
- 10.Install the radiator cap and the radiator condenser tank cap.

#### **⚠** CAUTION

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

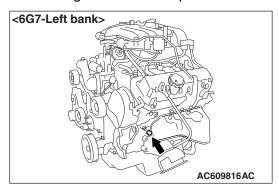
11. Recheck the engine coolant level after a road test.

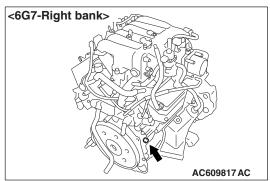
## REMOVAL OF ENGINE COOLANT FROM THE CYLINDER BLOCK DRAIN PLUG

### **⚠ WARNING**

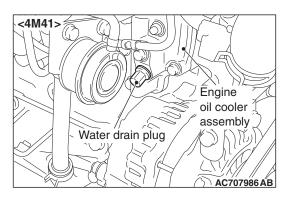
When removing the radiator cap, use care to avoid contact with hot coolant or steam. Place a shop towel over the cap and turn the cap anti-clockwise a little to let the pressure escape through the vinyl tube. After relieving the steam pressure, remove the cap by slowly turning it anti-clockwise.

1. Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.

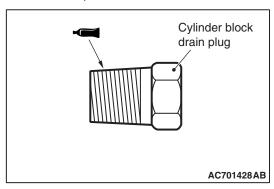




2. Drain the water in the water jacket by unplugging the drain plug of the cylinder block. <6G75>



- Remove the water drain plug of engine oil cooler to drain the coolant inside the water jacket.
   <4M41>
- 4. Remove the radiator condenser tank and drain the coolant.
- 5. Drain the coolant then clean the path of the coolant by injecting water into the radiator from the radiator cap area.



6. Apply the designated sealant to the screw area of the cylinder block drain plug, and then tighten to the standard torque. <6G7>

Specified sealant: 3M Nut Locking Part No.4171 or equivalent Tightening torque: 39 ± 5 N·m

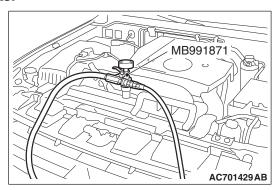
7. Replace the gasket and tighten the water drain plug to the specified torque. <4M41>

Tightening torque: 31 ± 2 N·m

- 8. Securely tighten the drain plug of the radiator.
- 9. Reinstall the radiator condenser tank.

#### **⚠** 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 corrosion of the aluminium components.



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

Recommended antifreeze: MITSUBISHI MOTORS GENUINE SUPER LONG LIFE COOLANT or equivalent

Quantity (includes 0.65 L in the radiator condenser tank):

<Vehicles without rear heater> 9.0 L
<Vehicles with rear heater)> 10.5 L

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

- 11. Reinstall the radiator cap.
- 12. Start the engine and let it warm up until the thermostat opens.
- 13.After repeatedly revving the engine up to 3,000 r/min several times, then stop the engine.
- 14.Remove the radiator cap after the engine has become cold, and pour in coolant up to the brim. Reinstall the cap.

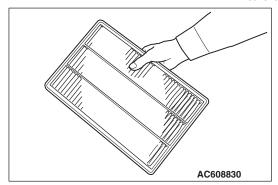
#### **⚠** CAUTION

Do not overfill the radiator condenser tank.

15.Add coolant to the radiator condenser tank between the "FULL" and "LOW" mark if necessary.

# A10. CHECK AIR CLEANER ELEMENT FOR CLOGGING AND DAMAGE

M6020201200840

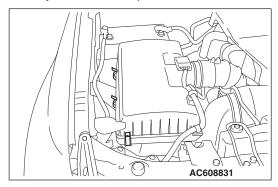


- 1. Check air cleaner element for clogging and damage.
- 2. Clean deposited dust from the element in the following manner.
  - (1) Lightly tap the element against the top of a bench.
  - (2) Blow compressed air from inside the element.
- 3. Wipe off dust on the air cleaner interior.
- 4. Install the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

#### A11. REPLACE AIR CLEANER ELEMENT

M6020201301000

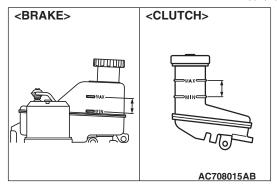
The air cleaner element will become dirty and loaded with dust during use, and the filtering effect will be substantially reduced. Replace it with a new one.



- 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.

# A12. CHECK FLUID LEVEL IN BRAKE RESERVOIR AND CLUTCH RESERVOIR

M6020203000347



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

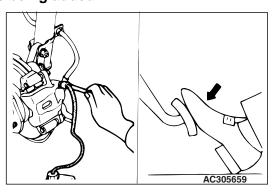
#### A13. CHANGE BRAKE FLUID

M6020201601089

#### **⚠** CAUTION

Specified brake fluid: DOT 3 or DOT 4

- Always use the specified brake fluid. Avoid using a mixture of the specified brake fluid and other fluid.
- Maintain the fluid reservoir level between the MIN and MAX marks during the air bleeding.
- Do not depress the brake pedal hard during the air bleeding (normal air bleeding) to prevent the pump motor from operating frequently.
- After the air bleeding, check that the brake dragging does not become stronger.
- If the pedal is depressed with the reservoir cap removed, the brake fluid may overflow.
   Do not depress the brake pedal while the fluid is being added.



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

#### **⚠** 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.

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.

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 L or 0.5 L 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 colour of fluid that flows out.
- 4. Repeat above steps for other bleeder screws.

#### **HBB SYSTEM AIR BLEEDING**

If all the brake fluid inside the reservoir is drained due to the removal and installation of the HBB, bleed air as follows:

- <Air bleeding from front brake system>
   Turn the ignition switch to the LOCK (OFF)
   position. Bleed air from the front brake calipers
   (right and left) by pumping the brake pedal.
- 2. <Pump motor operation>

Turn the ignition switch ON, and operate the pump motor. If the pump motor is running free, supply the brake fluid into the pump motor by depressing the brake pedal three or four times.

- 3. <Air bleeding from accumulator system>
  - (1) After the pump motor stopped, depress the brake pedal three or four times with the ignition switch ON. Then observe the brake fluid in the reservoir. If the brake fluid looks whitish, wait for a few minutes until it becomes clear
  - (2) Repeat step (1) until the brake fluid becomes clear.

4. <Air bleeding from rear brake system>

#### **⚠** CAUTION

- If too much brake fluid is drained at a time, the accumulator pressure may be dropped abnormally. So limit drain amount at a time to 100 cm<sup>3</sup> or less, and check that the pump motor stops per one air-bleeding.
- If the brake fluid level in the reservoir has been dropped, air may enter the pump motor accidentally. To avoid this, always maintain the brake fluid between the MIN and MAX marks.

While the ignition switch is turned ON and the brake pedal is depressed, bleed air from the right and left rear brake calipers.

- 5. <Air bleeding from power supply system>
  - (1) Turn the ignition switch to the LOCK (OFF) position. Depressurise the HBB power supply system by depressing the brake pedal several times until the braking effort becomes high.
  - (2) Turn the ignition switch ON, and depress the brake pedal quickly twenty times. Then check that the pump motor stops.
  - (3) Turn the ignition switch to the LOCK (OFF) position. Depressurise the power supply system of the hydraulic brake booster (HBB) by depressing the brake pedal until the pedal effort becomes high.
  - (4) Then turn the ignition switch ON, and then operate the pump motor. The pump motor should stop within 25 seconds. If the pump motor does not stop, bleed air from the power supply system again [see steps (1) (4)].
- 6. <Air bleeding from ABS system>

### **⚠** CAUTION

Turn the ignition switch to the LOCK (OFF) position when connecting and disconnecting the M.U.T.-III.

- (1) Turn the ignition switch to the LOCK (OFF) position, and connect the M.U.T.-III to the diagnosis connector.
- (2) Turn the ignition switch ON, and then select the menu display on the M.U.T.-III as follows: "ABS/ASC" to "ACTUATOR TEST" to "AIR BLEEDING (1)."

#### **⚠** CAUTION

If you carry out the "AIR BLEEDING (1)" repeatedly, wait for at least twenty seconds before the second operation.

- (3) While the ignition switch is turned ON and the brake pedal is depressed, carry out the actuator test "AIR BLEEDING (1)."
- (4) Then select "AIR BLEEDING (2)" on the M.U.T.-III menu display, and carry out the "AIR BLEEDING(2)" while the ignition switch is turned ON and the brake pedal is depressed.
- <Air bleeding from rear brake system (final stage)>

#### **⚠** CAUTION

- If too much brake fluid is drained at a time, the accumulator pressure may be dropped abnormally. So limit drain amount at a time to 100 cm3 or less, and check that the pump motor stops per one air-bleeding.
- If the brake fluid level in the reservoir has been dropped, air may enter the pump motor accidentally. To avoid this, always maintain the brake fluid between the MIN and MAX marks.

Bleed air from the rear brake calipers completely while the ignition switch is turned ON and the brake pedal is depressed.

8. <Air bleeding from front brake system (final stage)>

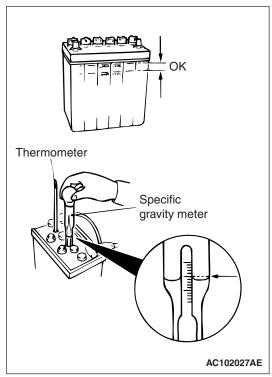
Operate the pump motor while the ignition switch is turned ON. Bleed air from the front brake calipers completely by pumping the brake pedal.

- 9. <Adding brake fluid>
  - (1) Turn the ignition switch to the LOCK (OFF) position. Depressurise the power supply system of the hydraulic brake booster (HBB) by depressing the brake pedal at least forty times until the pedal effort becomes high.
  - (2) Add the brake fluid up to the MAX mark on the reservoir.

#### **A14. CHECK BATTERY CONDITION**

M6020203100333

### **⚠** CAUTION



- If the battery is used with the electrolyte level below the LOWER LEVEL indicator, there is the danger that explosions may occur, so add water to the battery until the electrolyte level is between the LOWER LEVEL and UPPER LEVEL indications.
- If too much water is added to make the level rise above the UPPER LEVEL indication, the electrolyte may leak out, so adjust so that the electrolyte level is between the LOWER LEVEL and UPPER LEVEL indications.
- Check that the battery electrolyte level is between the UPPER LEVEL and LOWER LEVEL indications.
- 2. Use a specific gravity meter and a thermometer to measure the specific gravity.

Standard value: 1.220 – 1.290 (electrolyte temperature 20°C)

3. The specific gravity of the battery electrolyte changes according to the temperature, so the specific gravity when the electrolyte is at a temperature of 20°C can be calculated using the following formula. Use the converted value to judge whether the electrolyte is okay or not.

$$D_{20} = (t - 20) \times 0.0007 + Dt$$

D<sub>20</sub>: Specific gravity converted to a value for electrolyte temperature of 20°C

t: Electrolyte temperature at the time of measurement

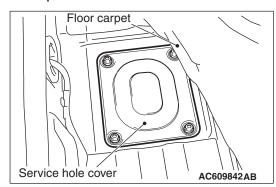
Dt: Actual specific gravity

#### A15. REPLACE FUEL FILTER

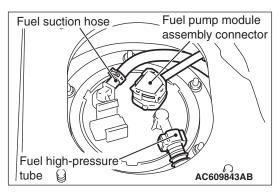
M6020201901154

# <Petrol-powered vehicles> Short wheelbase

 Remove the front scuff plate (RH) and outer seat belt (front) anchor bolt (RH), and then turn the floor carpet.

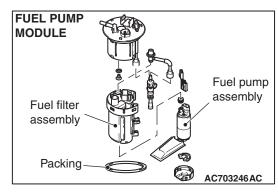


2. Remove the service hole cover.



3. Disconnect the fuel pump module assembly connector, fuel suction hose, fuel high-pressure tube.

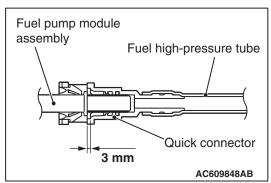
4. Remove the mounting nuts and retainer plate, and remove the fuel pump module assembly from the service hole.



- 5. Replace the fuel filter assembly and packing with a new one.
- 6. Install the fuel pump module assembly to the fuel tank through the service hole.
- 7. Install the retainer plate to the fuel tank and tighten the mounting nuts.

### **⚠** CAUTION

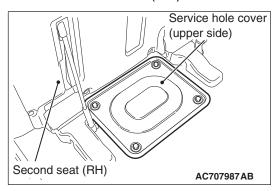
After connecting the fuel high-pressure tube, slightly pull it to ensure that it is installed securely. Also confirm that there is a play approximately 3 mm.



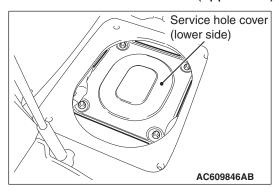
- 8. Connect the fuel pump module assembly connector, fuel tank suction hose, fuel high-pressure tube.
- 9. Install the service hole cover.
- 10.Spread the floor carpet, ant then install the front scuff plate (RH) and outer seat belt (front) anchor bolt (RH).

### Long wheelbase

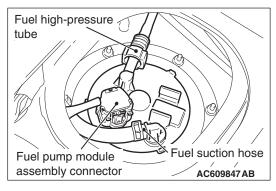
1. Tumble the second seat (RH).



2. Remove the service hole cover (upper side).

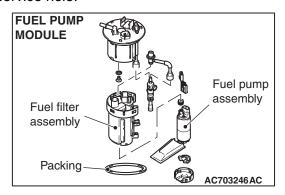


3. Remove the service hole cover (lower side).



4. Disconnect the fuel pump module assembly connector, fuel suction hose, fuel high-pressure tube.

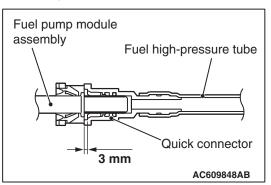
5. Remove the mounting nuts and retainer plate, and remove the fuel pump module assembly from the service hole.



- 6. Replace the fuel filter assembly and packing with a new one.
- 7. Install the fuel pump module assembly to the fuel tank through the service hole.
- 8. Install the retainer plate to the fuel tank and tighten the mounting nuts.

#### **⚠** CAUTION

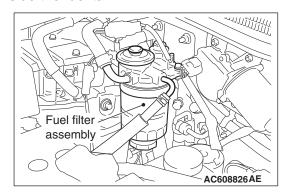
After connecting the fuel high-pressure tube, slightly pull it to ensure that it is installed securely. Also confirm that there is a play approximately 3 mm.



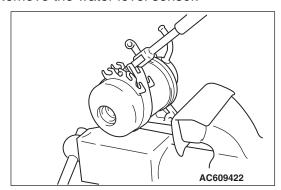
- 9. Connect the fuel pump module assembly connector, fuel tank suction hose, fuel high-pressure tube.
- 10.Install the service hole cover (lower side).
- 11.Install the service hole cover (upper side).
- 12. Restore the second seat (RH).

### <Diesel-powered vehicles>

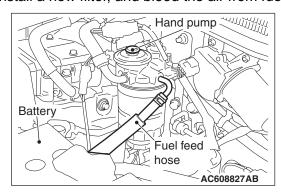
1. Remove the fuel tank cap to release the pressure inside the fuel tank.



- Disconnect the connector and the fuel hose, and then remove the fuel filter assembly from the bracket.
- 3. Remove the water level sensor.



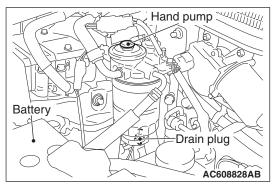
- 4. Use an oil filter wrench to remove the fuel filter cartridge from the fuel filter pump body.
- 5. Install a new filter, and bleed the air from fuel line.



Connect the all fuel hose to the fuel filter, and pump the hand pump until the hand pump becomes stiff.

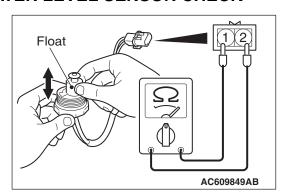
# REMOVAL OF WATER FROM THE FUEL FILTER

Water is in the fuel filter cartridge when fuel filter indicator lamp illuminates. Evacuate water by the following procedures.



- 1. Loosen the drain plug.
- 2. After water is evacuated by using an hand pump, tighten the drain plug.

#### WATER LEVEL SENSOR CHECK



- 1. Connect the circuit tester to the water level sensor.
- 2. There should be continuity when the float is raised, while there is no continuity when it is lowered.
- 3. Replace the water level sensor if it is faulty.

### **OPERATIONS UNDER THE VEHICLE**

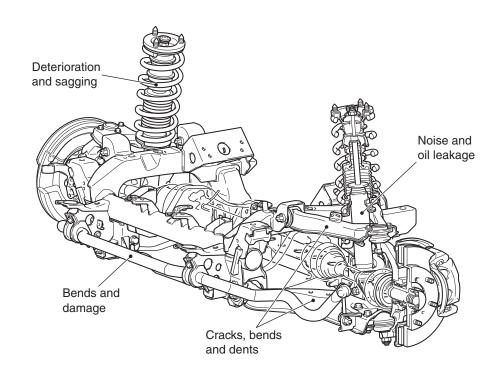
# B1. CHECK SUSPENSION SYSTEM FOR DAMAGE AND LOOSENESS

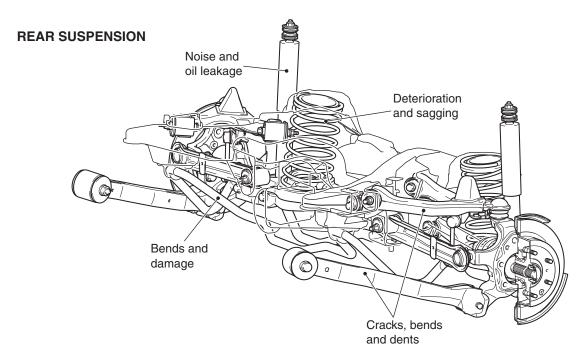
M6020300100580

1. Check each portion of suspension for damage visually.

### 2. Check each installation bolt and nut for looseness by spanner or similar tool.

#### **FRONT SUSPENSION**

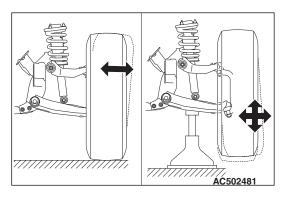




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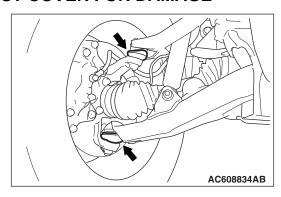
# B2. CHECK SUSPENSION ARM BALL JOINTS FOR PLAY, AND DUST COVERS FOR DAMAGE

#### **BALL JOINTS FOR PLAY**



- 1. With the vehicle unladen, check the top end of tyre for the amount of movement.
- 2. Remove the stabilizer link from the lower arm.
- 3. Jack up the lower arm and move the bottom of tyre to check the amount of movement.

#### **DUST COVER FOR DAMAGE**



- Press the lower arm ball joint cover with your finger to check that there are no cracks or damage in the lower arm ball joint cover.
- If the lower arm ball joint cover is cracked or damaged, replace the lower arm ball joint assembly.

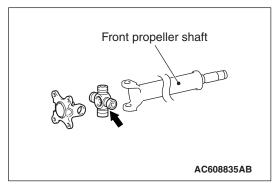
NOTE: If the lower arm ball joint cover is cracked or damaged, it is possible that there may also be damage to the ball joint.

- Press the upper arm ball joint cover with your finger to check that there are no cracks or damage in the upper arm ball joint cover.
- If the upper arm ball joint cover is cracked or damaged, replace the upper arm ball joint assembly.

NOTE: If the upper arm ball joint cover is cracked or damaged, it is possible that there may also be damage to the ball joint.

# B3. LUBRICATE PROPELLER SHAFT WITH GREASE FITTING

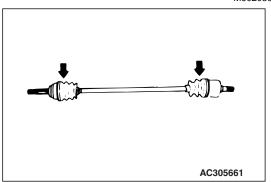
M6020300300023



Fill the multi-purpose grease fitting of the propeller shaft joints.

# **B4. CHECK DRIVESHAFT BOOTS FOR DAMAGE**

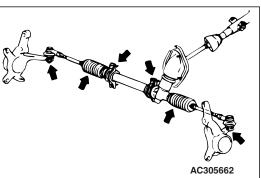
M6020300400343



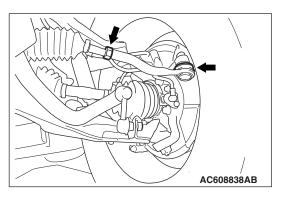
Check the driveshaft boots for damage.

# B5. CHECK STEERING LINKAGE FOR DAMAGE AND LOOSE CONNECTIONS (Including seals and boots)

M6020300500351



 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.



- 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.
- 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: 93 ± 15 N·m

# B6. CHECK MANUAL TRANSMISSION FOR OIL LEAKAGE

(In case of leakage, check the oil level)

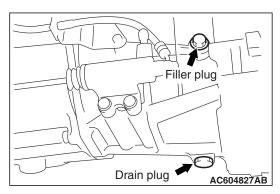
M6020302300290

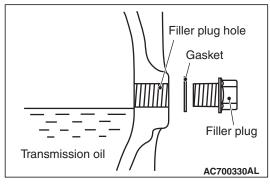
### Check oil leakage

Check the transmission case for oil leakage visually or by touching it with hand.

NOTE: If an oil leakage is not detected, the oil level check is necessary.

#### Check oil level





- 1. Remove the filler plug and gasket.
- 2. Check that the oil level is up to the lower edge of the filler plug hole.
- 3. Check that the oil is not noticeably dirty.
- 4. Install the filler plug and new gasket, then tighten them to the specified torque.

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

# B7. CHECK TRANSFER FOR OIL LEAKAGE

(In case of leakage, check the oil level)

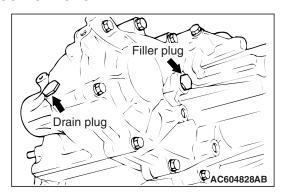
M6020302400297

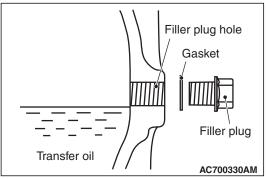
#### Check oil leakage

Check the transfer case for oil leakage visually or by touching it with hand.

NOTE: If an oil leakage is not detected, the oil level check is necessary.

#### Check oil level

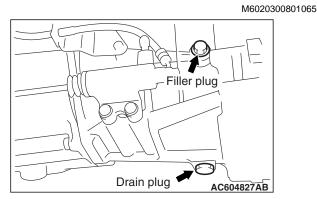


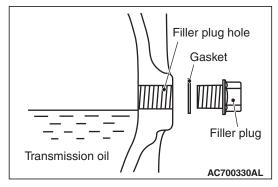


- 1. Remove the filler plug and gasket.
- 2. Check that the oil level is up to the lower edge of the filler plug hole.
- 3. Check that the oil is not noticeably dirty.
- 4. Install the filler plug and new gasket, then tighten them to the specified torque.

Tightening torque: 32 ± 2 N·m

# B8. CHANGE GEAR OIL IN MANUAL TRANSMISSION





- 1. Remove the filler plug and gasket.
- 2. Remove the drain plug and gasket, and then drain the oil.
- 3. Install the drain plug and new gasket, then tighten them to the specified torque.

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

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

#### Specified transmission oil:

MITSUBISHI MOTORS GENUINE Gear Oil API classification GL-3 SAE 75W-85 or MITSUBISHI MOTORS GENUINE Multi Gear Oil API classification GL-4 SAE 75W-85

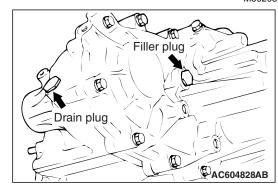
Quantity: 3.2 L

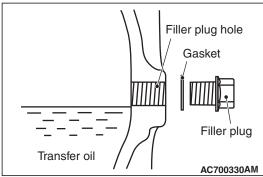
5. Install the filler plug and new gasket, then tighten them to the specified torque.

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

### **B9. CHANGE GEAR OIL IN TRANSFER**

M6020302600514





- 1. Remove the filler plug and gasket.
- 2. Remove the drain plug and gasket, and then drain the oil.
- 3. Install the drain plug and new gasket, then tighten them to the specified torque.

Tightening torque: 32 ± 2 N·m

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

#### Specified transfer oil:

MITSUBISHI MOTORS GENUINE Gear Oil API classification GL-3 SAE 75W-85 or MITSUBISHI MOTORS GENUINE Multi Gear Oil API classification GL-4 SAE 75W-85

Quantity: 2.8 L

5. Install the filler plug and new gasket, then tighten them to the specified torque.

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

### B10. CHECK FRONT AND REAR DIFFERENTIAL FOR OIL LEAKAGE (In case of leakage, check the oil level)

M6020302500045

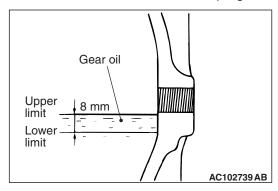
### Check oil leakage

Check the area around the differential for oil leakage visually or by touching it with hand.

NOTE: If an oil leakage is not detected, the oil level check is necessary.

### 

1. Remove the under cover and filler plug.

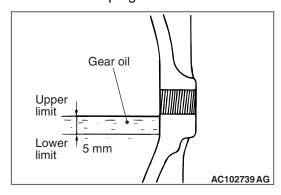


- 2. Check that gear oil level is not 8 mm below the bottom of filler plug hole
- 3. Tighten the filler plug to the specified torque.

Tightening torque: 50 ± 10 N·m

#### <Rear differential>

1. Remove the filler plug.

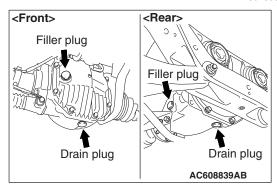


- 2. Check that gear oil level is not 5 mm below the bottom of filler plug hole.
- 3. Tighten the filler plug to the specified torque.

Tightening torque: 50 ± 10 N·m

# B11. CHANGE GEAR OIL IN FRONT AND REAR DIFFERENTIAL

M6020301100776



#### <Front differential>

- 1. Remove the under cover and filler plug.
- 2. Remove the drain plug and drain oil.
- 3. Tighten the drain plug to the specified torque

Tightening torque : 65  $\pm$  5 N·m

4. Add the oil until the level comes to the lower portion of the filler plug hole.

Specified gear oil:

MITSUBISHI MOTORS GENUINE Super Hypoid Gear Oil API classification GL-5 SAE 80 or SAE 90

Quantity: 1.15 L

5. Tighten the filler plug to the specified torque.

Tightening torque : 50  $\pm$  10 N·m

#### <Rear differential>

- 1. Remove the filler plug.
- 2. Remove the drain plug and drain oil.
- 3. Tighten the drain plug to the specified torque.

Tightening torque: 65 ± 5 N·m

4. Add the oil until the level comes to the lower portion of the filler plug hole.

Specified gear oil:

MITSUBISHI MOTORS GENUINE Super Hypoid Gear Oil API classification GL-5 SAE 80 or SAE 90

Quantity: 1.6 L

5. Tighten the filler plug to the specified torque.

Tightening torque : 50  $\pm$  10 N m

### B12. CHECK EXHAUST PIPE CONNECTIONS FOR GAS LEAKAGE, AND CHECK PIPE INSTALLATION

M6020301200331

- 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.

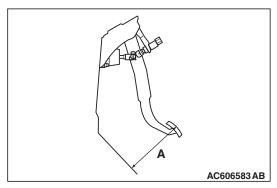
### **OPERATIONS INSIDE THE VEHICLE**

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

M6020400100725

#### **BRAKE PEDAL HEIGHT**

1. Turn up the carpet, etc. under the brake pedal.



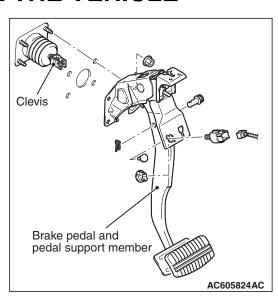
2. Measure the brake pedal height as illustrated.

Standard value (A):

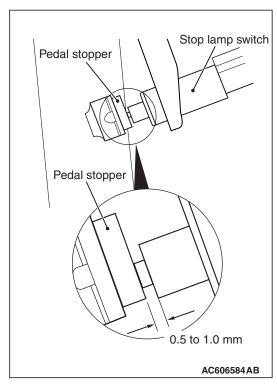
192 - 195 mm <LHD>

187 - 190 mm < RHD>

- 3. If the brake pedal height is not within the standard value, follow the procedure below.
  - (1) Disconnect the stop lamp switch connector.
  - (2) Loosen the stop lamp switch by turning it approx. 1/4 turns anticlockwise.
  - (3) Remove the brake pedal and pedal support member.



- (4) Adjust the brake pedal height by turning the clevis.
- (5) Install the brake pedal and pedal support member.



- (6) Push the stop lamp switch until its thread touches the stopper. Then secure the switch by turning it clockwise approximately 1/4 turns. During this work, pull the brake pedal towards you to hold.
- (7) Connect the connector at the stop lamp switch.

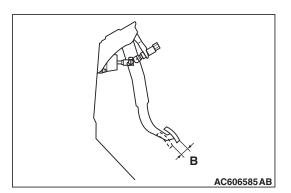
NOTE: Check that the stop lamp does not illuminate when the brake pedal is not depressed.

4. Return the carpet, etc.

#### **BRAKE PEDAL FREE PLAY**

1. Turn the ignition switch ON, and fully accumulate the brake fluid in the HBB accumulator.

NOTE: If the brake fluid is not fully accumulated in the accumulator, the pump motor will start to run. When the accumulator is fully accumulated, the pump motor stops. When the brake fluid is accumulated in the accumulator, the pump motor does not run.



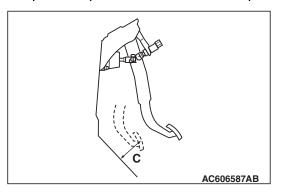
2. Operate the pedal by hand, and check that the pedal stroke (free play) meets the standard value at the point where resistance is felt.

#### Standard value (B): 3 mm or less

- 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.

# CLEARANCE BETWEEN BRAKE PEDAL AND FLOORBOARD

1. Turn up the carpet etc. under the brake pedal.



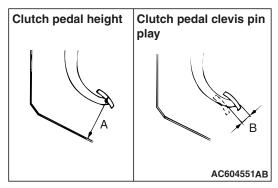
2. Start the engine, depress the brake pedal with approximately 490 N of force, and measure the clearance between the brake pedal and the floorboard.

Standard value (C): <Short wheelbase> 85 mm or more <Long wheelbase> 80 mm or more

- 3. If the clearance is outside the standard value, check for air trapped in the brake line and thickness of the disc brake pad.
- 4. Return the carpet, etc.

# CLUTCH PEDAL CHECK AND ADJUSTMENT

1. Turn back the carpet etc. under the clutch pedal.



2. Measure the clutch pedal height. If the height is outside the standard value, go to step 4.

Standard value (A):

202.7 - 205.7 mm <LHD>

195.7 - 198.7 mm < RHD>

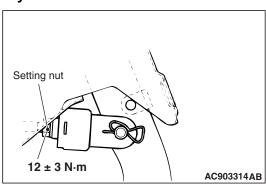
3. Measure the clutch pedal clevis pin play. If the play is outside the standard value, go to Step 5.

#### Standard value (B): 1 - 3 mm

4. Remove the clutch switch. <Vehicles with cruise control>

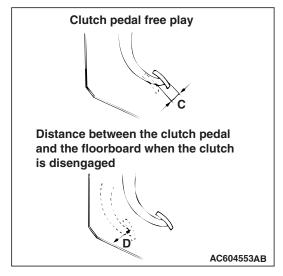
### **⚠** CAUTION

Do not push in the master cylinder pushrod at this time, otherwise the clutch will not operate properly.



5. If the clutch pedal height is not within the standard value, loosen the setting nut to adjust the clutch pedal height to the standard value and move the pushrod.

- 6. Install the clutch switch. <Vehicles with cruise control>
- 7. If the clutch pedal clevis pin play is not within the standard value, loosen the setting nut and move the pushrod to adjust.



8. After the adjustments, confirm that the clutch pedal free play (measured at the face of the pedal pad) and the distance between the clutch pedal (the face of the pedal pad) and the floorboard when the clutch is disengaged are within the standard value ranges.

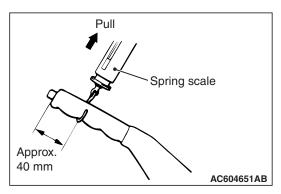
Standard value (C): 4 – 13 mm Standard value (D): 125 mm or more <LHD> 120 mm or more <RHD>

- 9. If the measured free play and distance do not agree with the standard value ranges, it is probably the result of either air in the hydraulic system or a faulty master cylinder or clutch. Bleed the air, or disassemble and inspect the master cylinder or clutch.
- 10.Reinstall the carpet, etc.

# C2. CHECK PARKING BRAKE LEVER STROKE AND PLAY

#### STROKE CHECK

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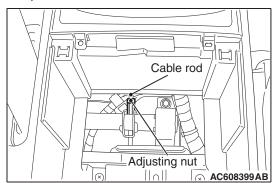


Attach the spring scale to the centre of the parking brake lever grip. Then, check that the stroke is within the standard value when the parking brake lever is pulled to the vertical direction of the lever with a force of approximately 200 N.

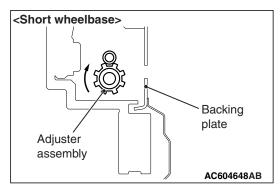
Standard value: 6 – 7 notches

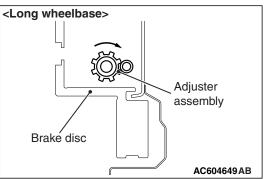
#### STROKE ADJUSTMENT

If the parking brake lever stroke is not the standard value, adjust as described below:



- 1. Remove the cup holder, and then loosen the adjusting nut to move it to the cable rod end so that the cable will be free.
- 2. Remove the rear wheels.





- 3. Remove the adjustment hole plug of the rear brake backing plate <Short wheelbase> or the rear brake disc <Long wheelbase>, and then use a flat-tip screwdriver to turn the adjuster in the direction of the arrow (the direction which expands the shoe) so that the disc will not rotate.
- Return the adjuster six notches <Short
  wheelbase> or eight notches <Long wheelbase>
  in the direction opposite to the direction of the
  arrow.

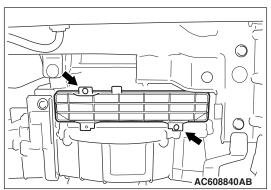
#### **♠** CAUTION

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

- Turn the adjusting nut to adjust the parking brake lever stroke to the standard value. After adjusting, check that there is no space between the adjusting nut and the parking brake lever.
- Release the parking brake and turn the rear wheels to check that the rear brakes are not dragging.

#### C3. REPLACE AIR PURIFIER FILTER

M6020400300280



- 1. Remove the glove box.
- 2. Loosen the two screw as shown to replace the air purifier filter.
- 3. Install the glove box.

### **OPERATIONS OUTSIDE THE VEHICLE**

#### D1. CHECK WHEEL ALIGNMENT

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#### FRONT WHEEL ALIGNMENT

#### **⚠** CAUTION

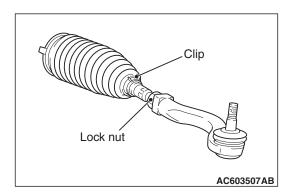
When the suspension is adjusted or replaced, the calibration of steering wheel sensor must be performed.

Measure wheel alignment with alignment equipment on a level surface. The front suspension, steering system, wheels, and tires should be serviced to normal condition before measuring wheel alignment.

#### Toe-in

Standard value:

At the centre of tyre tread: 0-5 mm Toe angle (per wheel):  $0 \circ 00' - 0 \circ 12'$ 



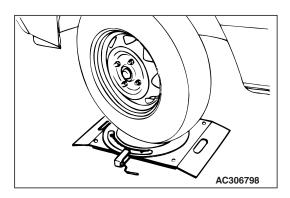
1. Adjust the toe-in by undoing the clip and lock nut, and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

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: 93  $\pm$  15 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.

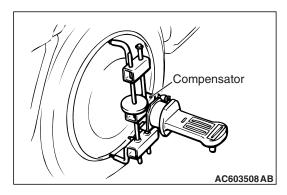
#### Standard value:

| Item              |                    | Standard suspension  | Low-down suspension  |
|-------------------|--------------------|--|--|
| Inner<br>wheel    | Short<br>wheelbase | 36°49' ±<br>1°30'<br>(Left/right<br>deviation<br>within 2°00') | 36°33' ±<br>1°30'<br>(Left/right<br>deviation<br>within 2°00') |
|                   | Long<br>wheelbase  | 36°01' ±<br>1°30'<br>(Left/right<br>deviation<br>within 2°00') | 35°44' ±<br>1°30'<br>(Left/right<br>deviation<br>within 2°00') |
| Outer<br>wheel    | Short wheelbase    | 32°06'   | 31°46'   |
| (reference value) | Long<br>wheelbase  | 32°18'   | 31°58'   |

# Camber, caster and kingpin inclination Standard value:

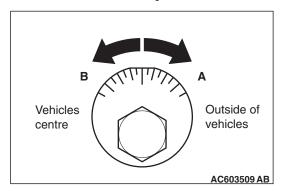
| Item    |                   | Standard suspension | Low-down suspension |
|---------|-------------------|---------------------|---------------------|
| Camber  |                   | 0°00' ± 0°30'*      |                     |
| Caster  | Short wheelbase   | 3°39' ± 1°00'*      | 3°47' ± 1°00'*      |
|         | Long<br>wheelbase | 3°31' ± 1°00'*      | 3°39' ± 1°00'*      |
| Kingpin | inclination       | 11°30'              | •                   |

NOTE: \*: Difference between right and left wheels must be less than 30'

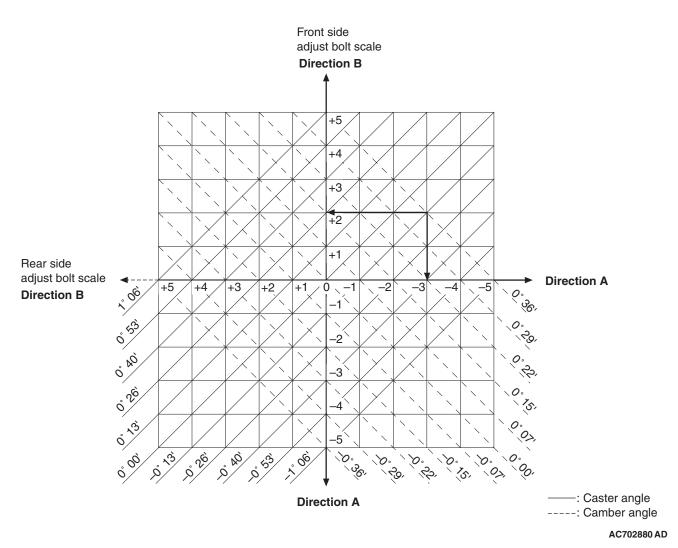


NOTE: For vehicles with aluminium wheels, attach the camber/caster/kingpin gauge by using a compensator.

### **Camber and caster adjustment**



- Adjust the camber and caster until they meets the standard value by turning the lower arm camber adjusting bolt.
- 2. How to read this table (example). If the camber difference 0°36' and the caster difference is -0°13' by comparing the measurement value with the standard value, rotate the front adjusting cam by 2 graduations to the "A" direction and the rear adjusting cam by 3 graduations to the "B" direction.



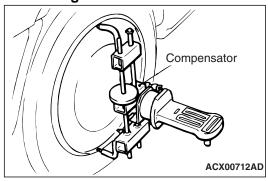
NOTE: Solid lines show caster, broken lines show camber.

#### **REAR WHEEL ALIGNMENT**

- The rear suspension, wheel and tires must be serviced to normal condition before measuring the wheel alignment.
- 2. Measure the wheel alignment with the vehicle parked on a level surface.

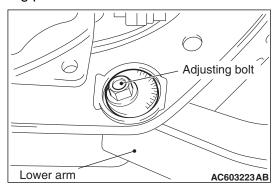
#### Camber

Standard value: 0° 00'  $\pm$  30' (difference between right and left wheels: less than 30')



NOTE: For vehicles with aluminium wheels, attach the camber/caster/kingpin gauge by using a compensator.

If camber is not within the standard value, adjust by following procedures.



 Adjust by turning the adjusting bolt of the lower arm.

Left wheel: Turning clockwise (+) camber Right wheel: Turning clockwise (-) camber

2. After adjusting the camber, the toe-in should be adjusted.

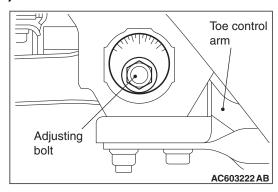
#### Toe-in

Standard value:

At the centre of tyre tread:  $3 \pm 3$  mm Toe angle (per wheel):  $0^{\circ}06' \pm 0^{\circ}06'$ 

If toe-in is not within the standard value, adjust as follows.

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



2. Adjust by turning the adjusting bolt (toe control arm mounting bolt which faces the inside of the body).

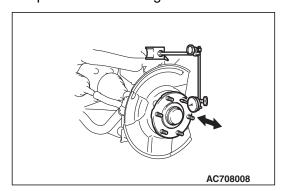
Left wheel: Turning clockwise (+) toe-in Right wheel: Turning clockwise (-) toe-in

# D2. CHECK FRONT AND REAR WHEEL BEARINGS FOR PLAY

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#### <Front wheel>

1. Remove the front caliper assembly and front brake disc, and retain them with a wire and the like to prevent from falling.



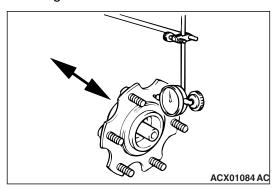
2. Attach a dial gauge as shown in the illustration, and then measure the axial play while moving the hub in the axial direction.

Limit: 0 mm

3. If the play exceeds the limit, disassemble hub knuckle to check each component. If the front hub bearing is faulty, replace the front hub assembly.

#### <Rear wheel>

 Remove the rear brake assembly and remove the brake disc while holding it with wires to prevent it from falling.



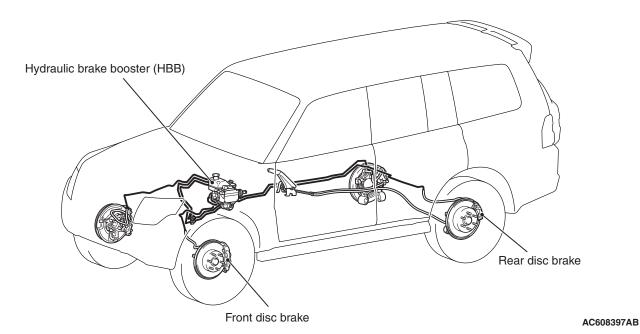
2. Fit the dial gauge as shown in the diagram and move the hub in the axial direction to measure the play.

Limit: 0 mm

3. If the play exceeds the limit, replace the rear hub assembly.

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

M6020500300618



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

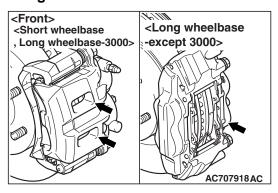
2. Check all clamps for tightness and connections for leakage.

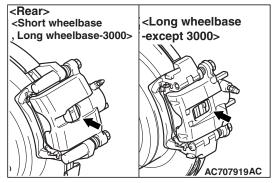
# D4. CHECK BRAKE PADS AND DISCS FOR WEAR

M6020500400875

#### **⚠** CAUTION

If there is a significant difference in thickness between the brake pads at right and left, check the sliding area and the run-out of the brake disc.





1. Visually check the thickness of brake pad from the inspection hole of the caliper body.

#### Standard value:

10.0 mm <Short wheelbase, Long wheelbase-3000, Long wheelbase-except 3000 (rear)>

11.5 mm <Long wheelbase-except 3000 (front)>

Limit: 2.0 mm

2. If the brake pad thickness is less than the limit value, replace the brake pad.

#### **DISC BRAKE ROTOR CHECK**

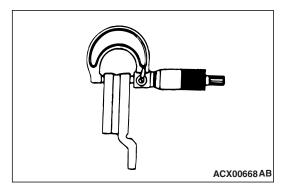
#### **⚠** CAUTION

Disc brakes must be kept within the allowable service values in order to maintain normal brake operation.

Before turning the brake disc, the following conditions should be checked.

| Inspection item                                      | Remark   |
|--|--|
| Scratches, rust, saturated lining materials and wear | <ul> <li>If the vehicle is not driven for a long period of time, sections of the discs that are not in contact with the pads will become rusty, causing noise and shuddering.</li> <li>If grooves and scratches resulting from excessive disc wear are not removed prior to installing a new pad assembly, there will be inadequate contact between the disc and the lining (pad) until the pads conform to the disc.</li> </ul> |
| Run-out  | Excessive run-out of the discs will increase the pedal depression resistance due to piston kick-back.  |
| Change in thickness (parallelism)                    | If the thickness of the disc changes, this will cause pedal pulsation, shuddering and surging.   |
| Inset or warping (flatness)                          | Overheating and improper handling while servicing will cause warping or distortion.  |

#### **BRAKE DISC THICKNESS CHECK**



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

#### Standard value:

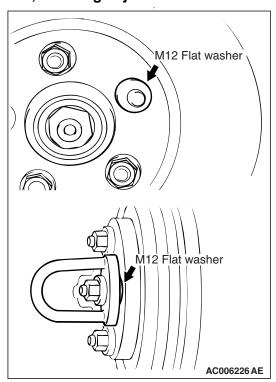
| Item  |                 | Brake disc thickness | Limit   |
|-------|-----------------|----------------------|---------|
| Front | Short wheelbase | 26.0 mm              | 24.4 mm |
|       | Long wheelbase  | 28.0 mm              | 26.0 mm |
| Rear  | Short wheelbase | 22.0 mm              | 20.4 mm |
|       | Long wheelbase  | 18.0 mm              | 16.0 mm |

NOTE: Thickness variation (at least 8 positions) should not be more than 0.015 mm.

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

#### **⚠** CAUTION

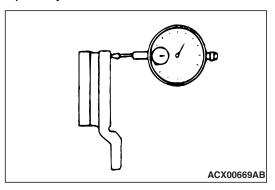
 After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.



- When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disc side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disc rotor may be deformed, resulting in inaccurate grinding.
- Grind the brake disc with all wheel nuts diagonally and equally tightened to the specified torque 100 N·m. When all numbers of wheel nuts are not used, or the tightening torque is excessive or not equal, the brake disc rotor or drum may be deformed, resulting in judder.
- 3. If the disc thickness is less than the limits, replace it with a new one. If thickness variation exceeds the specification, turn rotor with an on-the-car type brake lathe ("MAD, DL-8700PF" or equivalent). If the calculated final thickness after turning the rotor is less than the standard value, replace the disc.

# FRONT BRAKE DISC RUN-OUT CHECK AND CORRECTION

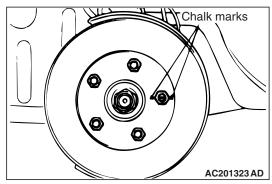
- 1. Remove the brake assembly, and then hold it with wire.
- 2. Temporarily install the disc with the hub nut.



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: 0.06 mm

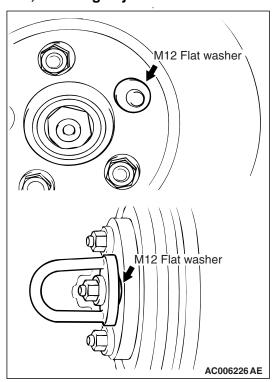
4. When the run-out exceeds the limit value, correct the brake disc run-out in the following procedure.



- (1) Before removing the brake disc, mark the stud bolt on the side of greater run-out and its both sides with a chalk.
- (2) Check for wheel bearing looseness in the axial direction.
- (3) When the looseness is within the limit value, install the brake disc after changing the phase between the hub and the brake disc, then check the run-out of the brake disc again.

#### **⚠** CAUTION |

· After a new brake disc is installed, always grind the brake disc with on-the-car type brake lathe. If this step is not carried out, the brake disc run-out exceeds the specified value, resulting in judder.



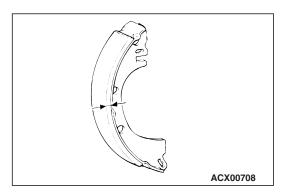
- When the on-the-car type lathe is used, first install M12 flat washer on the stud bolt in the brake disc side according to the figure, and then install the adapter. If the adapter is installed with M12 flat washer not seated, the brake disc rotor may be deformed, resulting in inaccurate grinding.
- · Grind the brake disc with all wheel nuts diagonally and equally tightened to the specified torque 100 N·m. When all numbers of wheel nuts are not used, or the tightening torque is excessive or not equal, the brake disc rotor or drum may be deformed, resulting in judder.
- 5. If the run-out cannot be corrected by changing the phase of the brake disc, replace the brake disc or grind it with the on-the-car type brake lathe ("MAD, DL-8700PF" or equivalent).

### D5. CHECK BRAKE SHOE LININGS AND DRUMS (DRUM IN DISC) FOR WEAR

M6020500500775

#### BRAKE LINING THICKNESS CHECK

Remove the brake disc.



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

<Short wheelbase and Long wheelbase-

Standard value: 3.0 mm

Limit: 1.0 mm

<Long wheelbase except 3000>

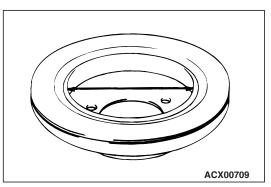
Standard value: 4.0 mm

Limit: 1.0 mm

3. If the thickness of the brake lining has worn down to the limit value or more, replace the shoe and lining assemblies on both sides of the vehicle.

### **BRAKE DRUM (DRUM IN DISC) INSIDE** DIAMETER CHECK

1. Remove the brake disc.



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

<Short wheelbase and Long wheelbase-</p> 3000 >

Standard value: 199.0 mm

Limit: 200.0 mm

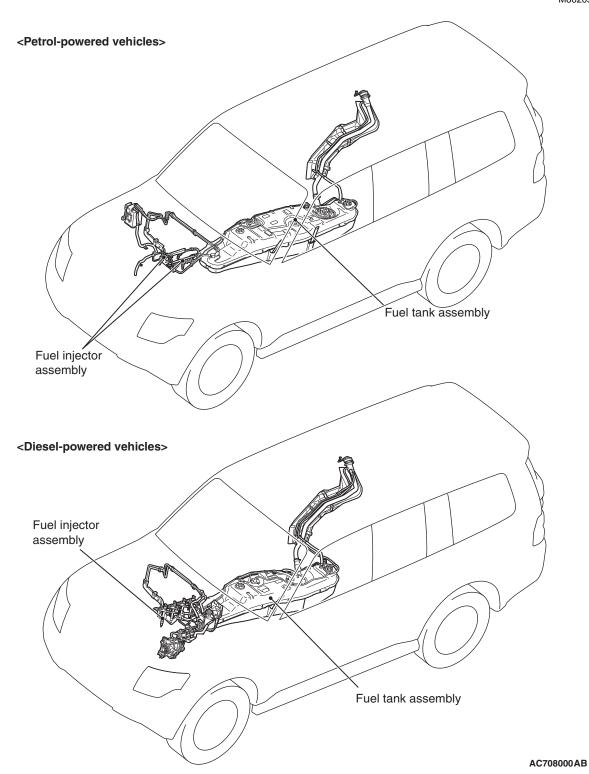
<Long wheelbase except 3000> Standard value: 210.0 mm

Limit: 211.0 mm

3. If the inside of the brake disc has worn down to the limit value or more, of if it is excessively worn on one side, replace the brake disc.

### D6. CHECK FUEL HOSES AND PIPES FOR LEAKAGE OR DETERIORATION

M6020500600448



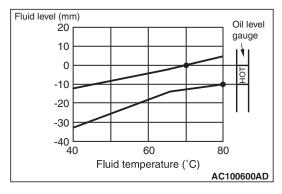
- 1. Check entire circumference and length of hoses and pipes.
- 2. Check all clamps for tightness and connections for leakage.

### **OPERATIONS AFTER ENGINE IS WARMED UP**

# E1. CHECK FLUID LEVEL IN AUTOMATIC TRANSMISSION < V5A5A>

M6020600100699

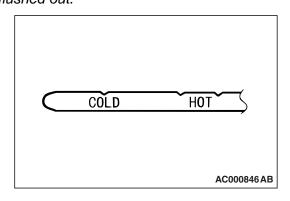
 Drive the vehicle until the A/T fluid temperature reaches the normal temperature (70 – 80°C) NOTE: Measure A/T fluid temperature using M.U.T.-III.



NOTE: Check the fluid level referring to the characteristics chart shown if it takes some time to reach the normal operation temperature of A/T fluid (70 – 80°C).

- 2. Park the vehicle on a level surface.
- Move the selector lever to all positions to fully charge the torque converter and the fluid lines with A/T fluid, and then move the selector lever to the P position.
- 4. After wiping away any dirt from around the oil level gauge, pull out the oil level gauge and check the level of A/T fluid.

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



 Check that the A/T fluid level is between the HOT marks on the oil level gauge. If the A/T fluid level is too low, add more A/T fluid until the level reaches between the HOT marks.

### A/T fluid: MITSUBISHI MOTORS GENUINE ATF SP III

NOTE: If the A/T fluid level is too low, the oil pump draws air into the system along with the A/T fluid, and air bubbles will thus from 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 A/T fluid level is too high, the gear will churn the A/T fluid and cause bubbles to develop, which can then cause the same problems as when the A/T fluid is too low. In either case, the air bubbles can cause overheating and oxidation of the A/T fluid, and also prevent the valves, clutches and brakes from operating normally. In addition, if bubbles develop in the A/T fluid, the A/T fluid can overflow from the transmission vent holes and be mistaken for leaks.

6. Securely re-insert the oil level gauge.

# E2. CHECK AUTOMATIC TRANSMISSION FOR FLUID LEAKAGE (In case of leakage, shock the fluid level)

(In case of leakage, check the fluid level) < V5AWF>

M6020601600051

### Check fluid leakage

After cleaning the lower side of transmission check visually or by touching that there is no oozing or leaking of fluid from the transmission.

#### Check fluid level

### **♠** CAUTION

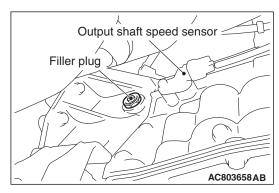
During the fluid level check, the fluid temperature must be between 38 and 46°C. If the temperature is outside this range, set the fluid temperature to the suitable temperature, and then check the fluid level.

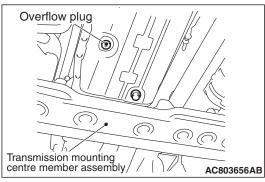
#### <When the M.U.T.-III is used>

- 1. Connect the M.U.T.-III.
- 2. Pull the parking brake lever, and start the engine.
- Depress the brake pedal, move the selector lever from the P to D range, and then move it to every position by holding 2 seconds or more at each range. Repeat this cycle twice, and then return the lever to the P range.

4. Using the M.U.T.-III, check that the fluid temperature is between 39 to 46°C.

NOTE: When the ambient temperature is low (10°C or lower), move the selector lever to the P range, warm up the engine for 15 minutes with the engine speed of 2,000 to 2,500 r/min. Then, the fluid temperature becomes approximately 40°C. In such case, after the fluid temperature increased, leave the engine idling for 5 minutes, and then check the fluid level.





- 5. Remove the filler plug and the overflow plug, and drain the fluid from the overflow plug hole.
- 6. <When the fluid is drained>

Wait until the fluid becomes oil drops, and then tighten the overflow plug and the filler plug to the specified torque.

<When the fluid is not drained>

Pour in the fluid through the filler plug hole until the fluid is drained from the overflow plug hole. Wait until the fluid becomes oil drops, and then tighten the overflow plug and the filler plug to the specified torque.

**Tightening torque:** 

20  $\pm$  2 N·m (overflow plug)

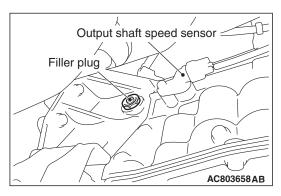
39 ± 15 N·m (Filler plug)

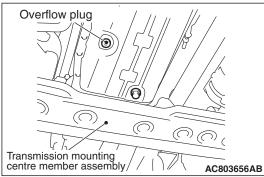
#### <When the M.U.T.-III is not used>

- 1. Earth the diagnosis connector terminal No. 1.
- 2. Pull the parking brake lever, and start the engine.
- Depress the brake pedal, move the selector lever from the P to D range, and then move it to every position by holding 2 seconds or more at each range. Repeat this cycle twice, and then return the lever to the P range.
- 4. Move the selector lever (P → D → P) within 1.5 seconds, and continue the operation until the A/T fluid temperature warning lamp illuminates. After the A/T fluid temperature warning lamp illuminated, return the selector lever to the P range. The warning lamp goes out within a few seconds.

#### NOTE:

- The status of A/T fluid temperature warning lamp shows if the fluid temperature is suitable for the fluid level check.
  - Warning lamp is off: The fluid temperature is 39°C or less, thus checking is impossible.
  - Warning lamp is on: The fluid temperature is between 39 to 46°C, thus checking is possible.
  - Warning lamp is blinking: The fluid temperature is 46°C or higher, thus checking is impossible.
- When the ambient temperature is low (10°C or lower), move the selector lever to the P range, warm up the engine for 15 minutes with the engine speed of 2,000 to 2,500 r/min. Then, the fluid temperature becomes approximately 40°C. In such case, after the fluid temperature increased, leave the engine idling for 5 minutes, and then check the fluid level.





- 5. Remove the filler plug and the overflow plug, and drain the fluid from the overflow plug hole.
- 6. <When the fluid is drained>

Wait until the fluid becomes oil drops, and then tighten the overflow plug and the filler plug to the specified torque.

<When the fluid is not drained>

Fill the fluid from the filler plug until the fluid is drained from the overflow plug hole, and wait until the fluid becomes oil drops. Then, tighten the overflow plug and the filler plug to the specified torque.

#### **Tightening torque:**

20  $\pm$  2 N·m (overflow plug)

39 ± 15 N·m (Filler plug)

### E3. CHANGE AUTOMATIC TRANSMISSION FLUID

M6020600200834

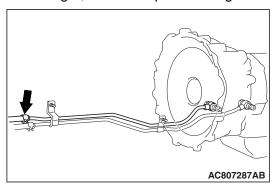
#### <V5A5A>

### **Specifications**

| Automatic transmission fluid            | Quantity | Remark |
|---|----------|--------|
| MITSUBISHI MOTORS<br>GENUINE ATF SP III | 9.7 L    | V5A5A  |

#### **CHANGE PROCEDURE**

If you have an A/T fluid changer, use the A/T fluid changer to flush the A/T fluid. If you do not have an A/T fluid changer, follow the procedure given below.



1. Remove the hose shown in the illustration which allows the A/T fluid to flow from the A/T fluid cooler to the transmission.

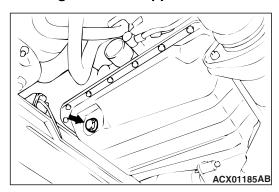
#### **↑** CAUTION

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

2. Start the engine and discharge the A/T fluid.

Driving conditions: N range, idling

Discharge amount: Approx. 3.5 L



Remove the drain plug at the bottom of the transmission case to drain out the remaining A/T fluid.

#### Discharge amount: Approx. 2.0 L

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

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

#### **⚠** CAUTION

Stop pouring in the A/T fluid once 5.5 L has been poured in.

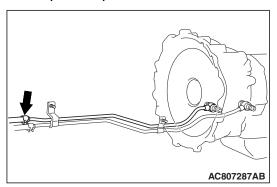
5. Pour the new A/T fluid in through the oil filler tube.

Amount to add: Approx. 5.5 L

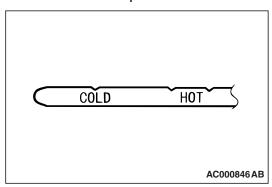
- 6. Repeat the operation in step 2.
- 7. Pour in new A/T fluid through the oil filler tube.

#### 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 A/T fluid and check for contamination. If the A/T fluid is contaminated, repeat steps 6 and 7.



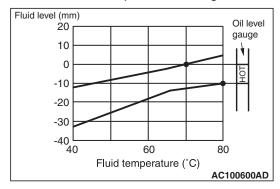
- 8. Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
- 9. Start the engine, and let it run at idle for 1 − 2 minutes.
- 10. Move the selector lever to all positions once, and then return it to the P position.



- 11. Check that the A/T fluid level on the oil level gauge is at the COLD mark. if it is not up to this mark, add more A/T fluid.
- 12.Drive the vehicle until the A/T fluid temperature reaches the normal temperature (70 80°C), and then re check the A/T fluid level.

NOTE: The COLD mark is for reference only; the HOT marks should be used as the standard for judgment.

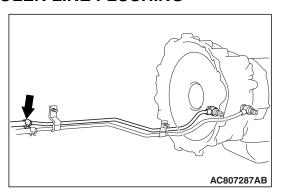
NOTE: A/T fluid temperature using M.U.T.-III.



NOTE: Check the fluid level referring to the characteristics chart shown if it takes some time until reaching the normal operation temperature of A/T fluid  $(70 - 80^{\circ}\text{C.})$ 

- 13.When A/T fluid is under the specified level, top up A/T fluid. When A/T fluid is over the specified level, drain the excessive A/T fluid from the drain plug to adjust A/T fluid level to the specified level.
- 14. Securely insert the oil level gauge into the oil filler tube.

# AUTOMATIC TRANSMISSION FLUID COOLER LINE FLUSHING



 Remove the hose shown in the illustration which allows the A/T fluid to flow from the A/T fluid cooler to the transmission.

#### **⚠** CAUTION

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

2. Start the engine and discharge the A/T fluid.

Driving conditions: N range, idling

Discharge amount: Approx. 3.5 L

#### **⚠** CAUTION

### Stop pouring in the A/T fluid once 3.5 L has been poured in.

Pour in new A/T fluid through the oil filler tube.
 Amount to add: Approx. 3.5 L

- 4. Repeat the operation in step 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 A/T fluid and check for contamination. If the A/T fluid is contaminated, repeat steps 2 and 3.
- Carry out the procedure in "CHANGE PROCEDURE" from step 2 onwards.

#### <V5AWF>

### **Specifications**

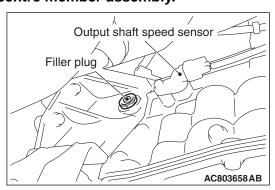
| Automatic transmission fluid        | Quantity | Remark |
|-------------------------------------|----------|--------|
| MITSUBISHI MOTORS<br>GENUINE ATF-PA | 10.9 L   | V5AWF  |

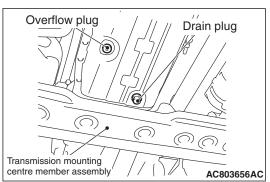
#### CHANGE PROCEDURE

If there is an ATF changer, use it. If there is no ATF changer, replace the fluid as described below.

### **⚠** CAUTION

When draining the fluid from the drain plug hole, use a plate to prevent the fluid from dripping on the centre member assembly.





1. Remove the filler plug and the drain plug, and drain the fluid from the drain plug hole.

Discharge volume: Approx. 3.0 L

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

Tightening torque: 20 ± 2 N·m

- 3. Remove the overflow plug.
- 4. Pour in the fluid through the filler plug hole until the fluid is drained from the overflow plug hole. Wait until the fluid becomes oil drops, and then tighten the overflow plug and the filler plug to the specified torque.

**Tightening torque:** 

20  $\pm$  2 N·m (overflow plug) 39  $\pm$  15 N·m (Filler plug)

- 5. Check the fluid level.
- 6. During the fluid level check, check the drained fluid for contamination. If the fluid is contaminated, perform steps 1 to 5 again.

#### **E4. CHANGE ENGINE OIL**

M6020600301447

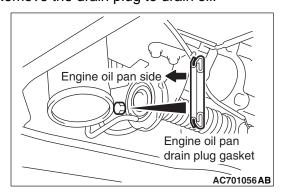
#### <6G7>

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C to 90°C.

#### **MARNING**

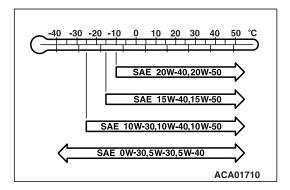
#### Use care as oil could be hot.

- 2. Remove the engine oil filler cap.
- 3. Remove the drain plug to drain oil.



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 ± 5 N⋅m



5. Refill with specified quantity of oil.

#### **Specified Engine Oil**

- ACEA classification: A1/B1, A3/B3, A3/B4 or A5/B5
- ILSAC classification: ILSAC certificated oil
- API classification: SM

Total quantity (Includes volume inside oil filter and oil cooler): 4.9 L

NOTE: SAE 0W-30, 5W-30, and 5W-40 engine oils can only be used if they meet ACEA A3/B3, A3/B4 or A5/B5 and API SM specification.

- 6. Install the engine oil filler cap.
- 7. Check oil level.

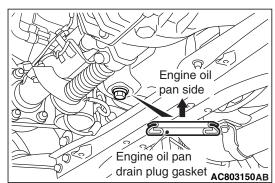
#### <4M41>

 Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.

#### **MARNING**

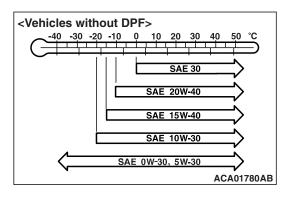
### Use care as engine oil could be hot.

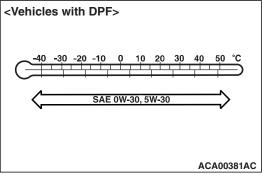
- 2. Remove the engine oil filler cap.
- 3. Remove the engine oil pan drain plug to drain engine oil.



4. Install a new engine oil pan 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 ± 5 N·m





Refill with specified quantity of engine oil.

#### Specified Engine Oil <Vehicles without DPF>

- ACEA classification: "For service A1/B1, A3/B3, A3/B4, A5/B5, C1, C2, C3 or C4"
- API classification: "For service CD" or higher
- JASO classification: "For service DL-1"

#### <Vehicles with DPF>

- ACEA classification: "For service C1, C2, C3 or C4"
- JASO classification: "For service DL-1"

Total quantity (Includes volume inside oil filter and oil cooler): 9.8 L

- 6. Install the engine oil filler cap.
- 7. Check oil level.

#### **E5. REPLACE ENGINE OIL FILTER**

M6020600401295

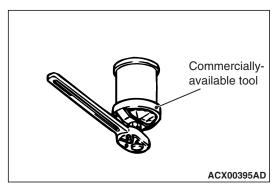
#### <6G7>

 Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.

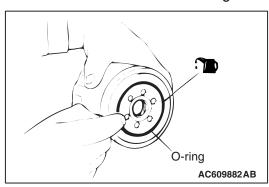
#### **↑** WARNING

### Use care as engine oil could be hot.

- 2. Remove the engine oil filler cap.
- 3. Remove the engine oil pan drain plug to drain engine oil.
- 4. Remove the under cover.



- 5. Use the commercially-available tool 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 commercially-available tool to tighten to the specified torque.

## Tightening torque: Approximately 3/4 turn (14 $\pm$ 2 N·m)

- 9. Install the engine oil pan 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.
- 11.Install the under cover.

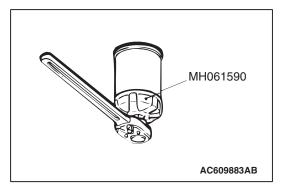
#### <4M41>

 Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.

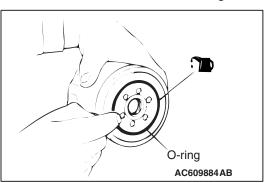
#### **MARNING**

#### Use care as engine oil could be hot.

- 2. Remove the engine oil filler cap.
- 3. Remove the engine oil pan drain plug to drain engine oil.
- 4. Remove the under cover.



- 5. Use the special tool oil filter wrench (MH061590) 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 engine oil filter.
- 8. Once the O-ring of the oil filter is touching the flange, use the special tool (MH061590) to tighten to the specified torque.

# Tightening torque: Approximately 3/4 turn (22 $\pm$ 2 N·m)

- 9. Install the engine oil pan 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.
- 11.Install the under cover.

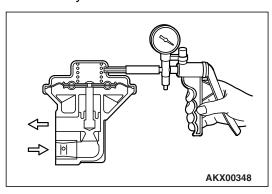
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# E8. CHECK EXHAUST GAS RECIRCULATION (EGR) SYSTEM

#### <6G72>

#### **EGR VALVE CHECK**

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



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

| Vacuum          | Passage of air       |
|-----------------|----------------------|
| 5.6 kPa or less | Air is not blown out |
| 29 kPa or more  | Air is blown out     |

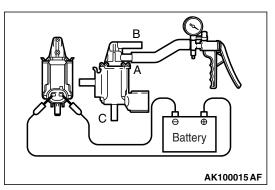
5. Replace the gasket, and tighten to the specified torque.

Tightening torque: 23 ± 6 N·m

# EGR CONTROL SOLENOID VALVE CHECK

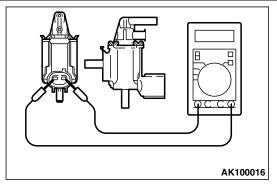
NOTE: When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

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



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

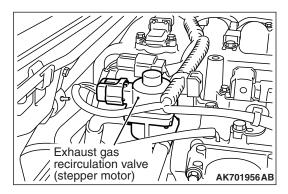
| Battery voltage | Nipple condition | Normal condition  |
|-----------------|------------------|-------------------|
| Applied         | Open             | Vacuum leaks      |
|                 | B nipple closed  | Vacuum maintained |
| Not applied     | Open             | Vacuum leaks      |
|                 | C nipple closed  | Vacuum maintained |



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

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

# <6G75> CHECKING THE OPERATION SOUND

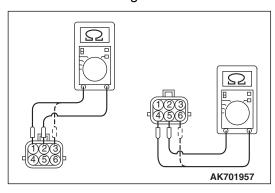


- 1. Check that the operation sound of the stepper motor can be heard from the exhaust gas recirculation valve when the ignition switch is turned ON (without starting the engine).
- 2. If the operation sound cannot be heard, inspect the drive circuit of the stepper motor.

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

#### CHECKING THE COIL RESISTANCE

1. Remove the exhaust gas recirculation valve.



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

Standard value: 20 – 24  $\Omega$  (at 20°C)

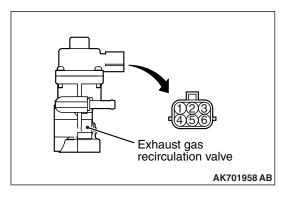
- 3. If the resistance is not within the standard, replace the exhaust gas recirculation valve.
- 4. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the exhaust gas recirculation valve.

Standard value: 20 – 24  $\Omega$  (at 20°C)

- 5. If the resistance is not within the standard, replace the exhaust gas recirculation valve.
- 6. Using a new gasket, install the exhaust gas recirculation valve by tightening its mounting bolts to the specified torque.

Tightening Torque: 23 ± 6 N·m

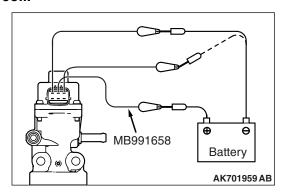
#### **OPERATION CHECK**



- 1. Remove the exhaust gas recirculation valve.
- Attach a test wiring harness (special tool MB991658) to the connector at the exhaust gas recirculation valve.

#### **⚠** CAUTION

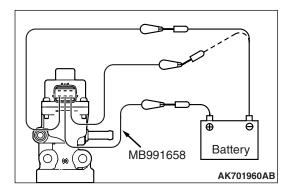
Connecting battery voltage to the exhaust gas recirculation valve for a long term could damage the coil.



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

#### **⚠** CAUTION

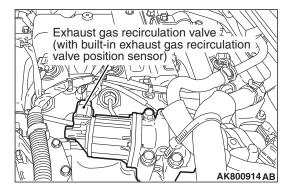
Connecting battery voltage to the exhaust gas recirculation valve for a long term could damage the coil.



- 5. Connect the positive (+) terminal of the battery to terminal No. 5.
- 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 exhaust gas recirculation valve by tightening its mounting bolts to the specified torque.

Tightening torque: 23 ± 6 N·m

# <4M41> CHECKING THE OPERATION SOUND

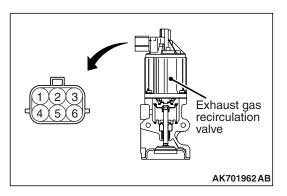


NOTE: Carry out this check after checking that the diagnosis code is not stored. If the diagnosis code is stored, the exhaust gas recirculation valve (DC motor) could possibly not be checked correctly.

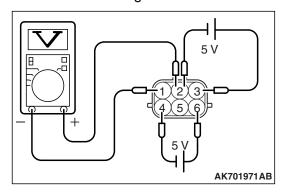
- 1. Start up the engine and run on at idle speed to allow the engine coolant temperature to reach at least 70°C.
- When turning the ignition switch to the LOCK (OFF) position and stopping the engine, check that the operating sound "clicking noise" is heard from the exhaust gas recirculation valve three times.
- 3. If the operating sound is not heard, check the drive circuit of the DC motor.

NOTE: If the circuit is normal and the operating sound is not heard, it could possibly be caused by the failed exhaust gas recirculation valve.

#### **OPERATION CHECK**



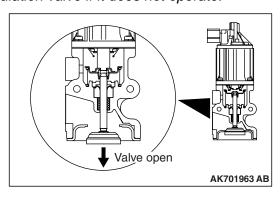
1. Remove the exhaust gas recirculation valve.



- 2. Connect the terminal (+) of the sensor power supply (5 V) with the terminal No. 3 of the exhaust gas recirculation valve connector, and connect the terminal (–) of the sensor power supply (5 V) with the terminal No. 2.
- 3. A tester is to be connected between the terminal No.1 and No. 2.

- 4. Connect the terminal (+) of the power supply with the terminal No. 6 of the exhaust gas recirculation valve connector, and connect the terminal (-) of the power supply with the terminal No. 4. Confirm the exhaust gas recirculation valve is opened.
  - NOTE: At this time, the power supply voltage is to be 5 V. When the valve is not opened, increase the voltage 1 V by 1 V. For each voltage, current is to be applied within 5 seconds. Once the valve is opened, the voltage is not to be increased any more.

If the exhaust gas recirculation valve is not opened although the voltage applied to the motor is increased to 9V, clean the exhaust gas recirculation valve and carry out the operation check again. Despite this, replace the exhaust gas recirculation valve if it does not operate.



5. Confirm the voltage is changed between the terminal No. 1 and No. 2 together with the exhaust gas recirculation valve opening movement.

- 6. By the voltage changed, the DC is recognized as being normal.
- 7. Use a new gasket and tighten the installation bolt to the tightening torque.

Tightening torque: 48 ± 6 N·m

#### **CLEANING THE EGR VALVE**

#### **↑** CAUTION

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

- Remove the exhaust gas recirculation valve and check that the exhaust gas recirculation valve is not stuck or clogged with carbon deposits. Use a wire brush to clean the valve if necessary.
- 2. Using a new gasket, install the exhaust gas recirculation valve by tightening its mounting bolts to the specified torque.

Tightening torque: 48 ± 6 N·m

### **OTHERS**

# F1. CHECK BODY CONDITION FOR DAMAGE

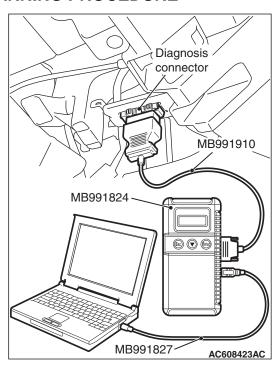
M6020700100254

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

# F2. CHECK THE COMMON RAIL ENGINE (small injection quantity learning)

M6020700400084

#### LEARNING PROCEDURE



After the ignition switch is in "LOCK" (OFF)
position, connect the M.U.T.-III to the diagnosis
connector.

- 2. Put the vehicle in the following idling stable conditions:
  - Engine coolant temperature: 80 90°C
  - Automatic transmission fluid temperature: 60°C or higher
  - Lamps, A/C condenser fan and all accessories:
     OFF
  - Transmission: Neutral <M/T>, "P" range <A/T>
  - Power steering: Static state
- 3. Select SPECIAL FUNCTION from the function menu.
- 4. Select SMALL INJECTION QUANTITY LEARNING from the SPECIAL FUNCTION menu to execute learning.

#### **⚠** CAUTION

- If the vehicle conditions go out of the learning conditions during idling, learning is interrupted.
- To reexecute learning, the ignition switch must once be turned off.
- 5. Continue idling for about 3 minutes before learning is completed.
- 6. Confirm that the engine warning lamp is off. If it still blinks, reexecute learning.

#### F3. ROAD TEST

M6020700200455

Drive the vehicle and check for conditions.

- 1. Check free play of steering wheel.
- 2. Check efficiency of service brakes and parking brakes system.
- 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.