

GROUP 0

GENERAL

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HOW TO USE THIS MANUAL

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

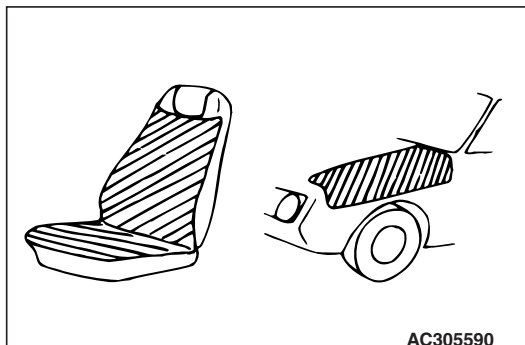
Group 0 and 1 have the contents for all vehicle models, and Group 2 has contents for the relevant vehicle models.

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PRECAUTIONS BEFORE SERVICE

PROTECTING THE VEHICLE

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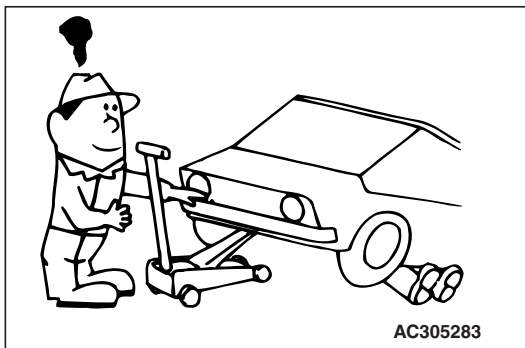


AC305590

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.

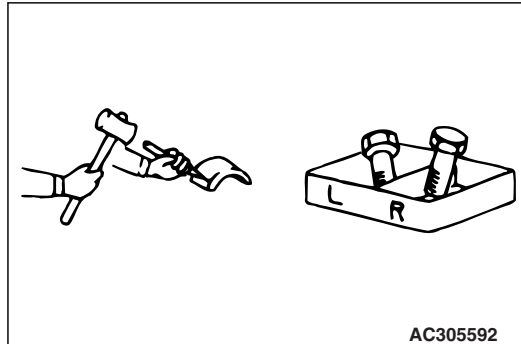
REMOVAL AND DISASSEMBLY

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AC305591

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.



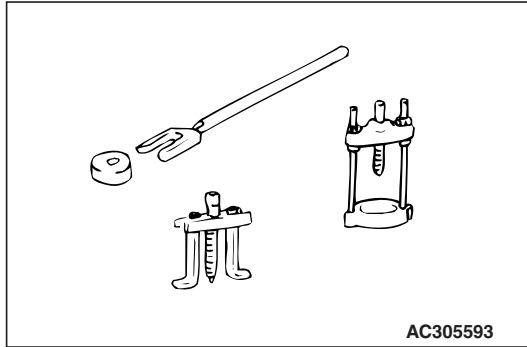
AC305592

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

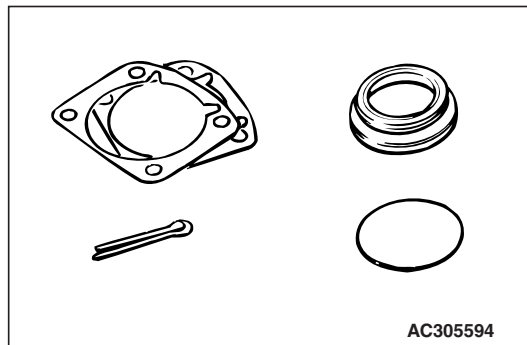
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If other tools are substituted for the special tools to do service of repair work, there is the danger that vehicle parts might be damaged, or the technician might be injured; therefore, be sure to use the special tool whenever doing any work for which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

PARTS TO BE REPLACED

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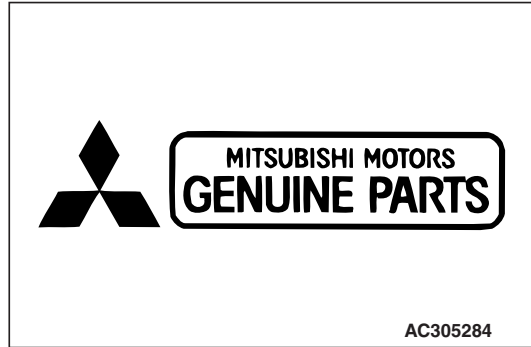


If any of the following parts are removed, they must be replaced with new parts.

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

PARTS

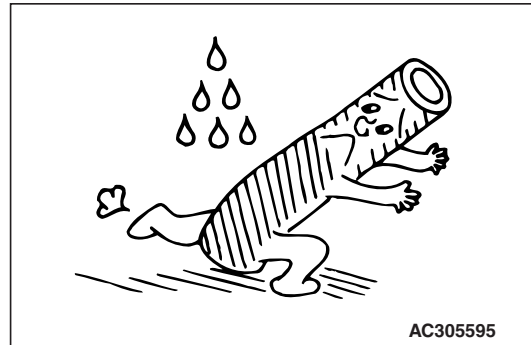
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When replacing parts, use MITSUBISHI genuine parts.

TUBES AND OTHER RUBBER PARTS

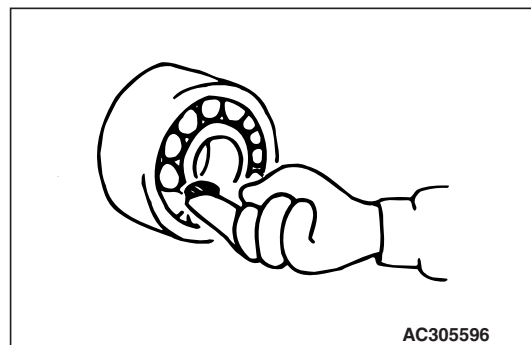
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Be careful to avoid spilling any petrol, oil, etc., because if it adheres to any tubes or other rubber parts, they might be adversely affected.

LUBRICANTS

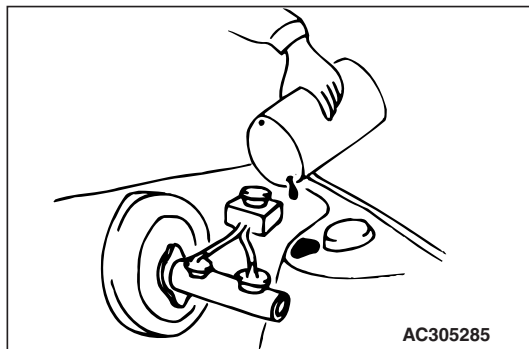
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In accordance with the instructions in this manual, apply the specified lubricants in the specified locations during assembly and installation.

BRAKE FLUID

M6001000900025



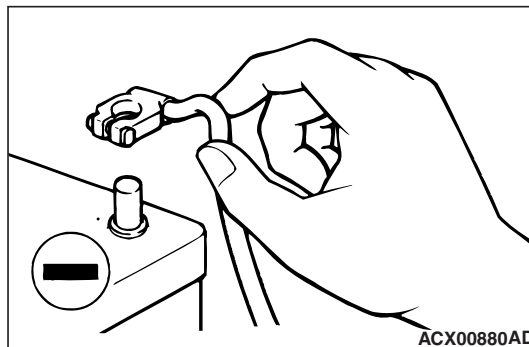
Be careful to avoid spilling any brake fluid, because if it adheres to the vehicle body, the paint coat might be discoloured.

SERVICING THE ELECTRICAL SYSTEM

M6001001000070

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

M6001001100022

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

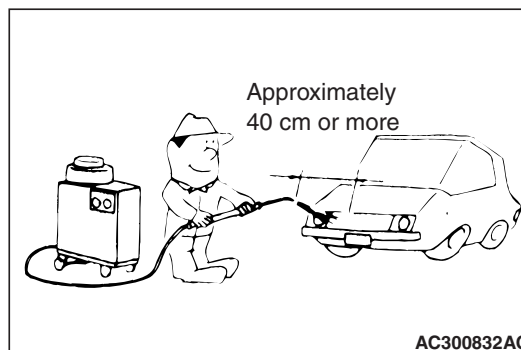
M6001001200115

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

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

VEHICLE WASHING

M6001001300112



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.

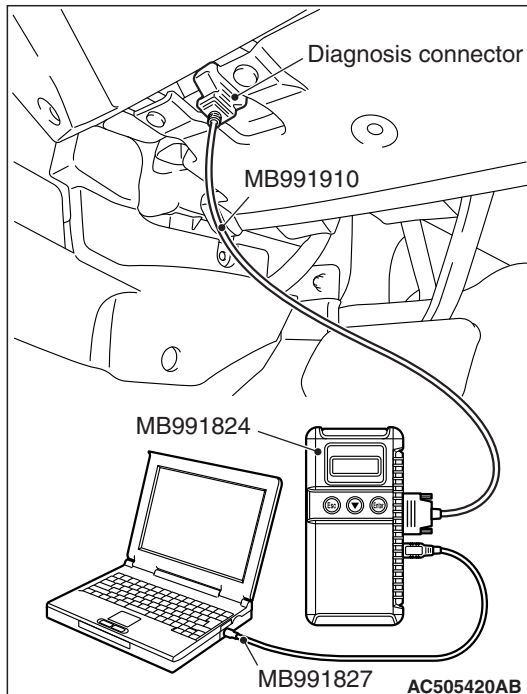
MULTI USE TESTER (M.U.T.-III) SUB ASSEMBLY

M6001001900158

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

M6001001500064

"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

M6001001600180

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

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

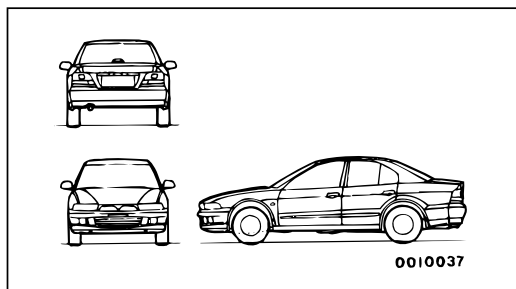
The inspection should be conducted according to the sequence described in the TABLE OF PRE-DELIVERY INSPECTION.

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

NOTE: 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					
✓	Good	A	Needs adjustment	T	Needs retightening
C	Needs cleaning	L	Needs replenishment of lubricant, water, etc.	X	Needs replenishment of repair

INSPECTION PROCEDURE**First Step**

1. ☐ Connection of the dark current connector

Body

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

Under Hood

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

Under Vehicle

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

Before Road Test

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

Road Test

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

After Road Test

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

Final Steps

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

PAINTWORK TERMS

M6010200100139

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

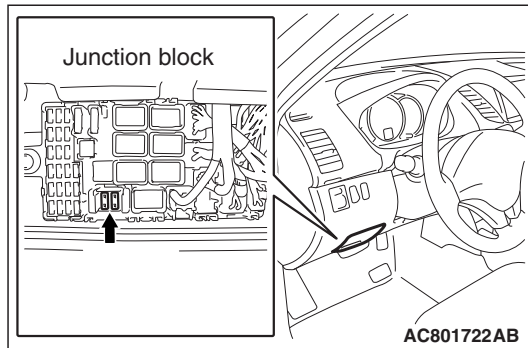
1. CONNECTION OF DARK CURRENT CONNECTOR

M6010300100471

CONNECTING PROCEDURE

CAUTION

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

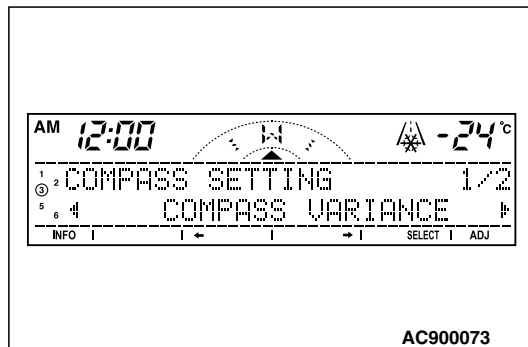


The fuse (2 pieces) in the junction block as shown is removed at shipping. The removed fuse is housed in the ashtray. Install it in the location shown in the figure again.

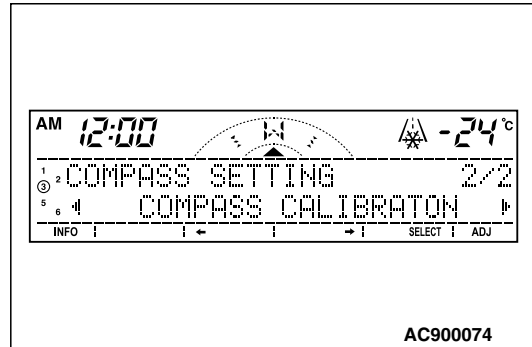
HOW TO SET THE COMPASS CALIBRATION

NOTE: Perform compass calibration in a space where the vehicle can turn around, with the engine running.

1. The "COMPASS SETTING" screen is displayed with the user customisation function in the RV meter.



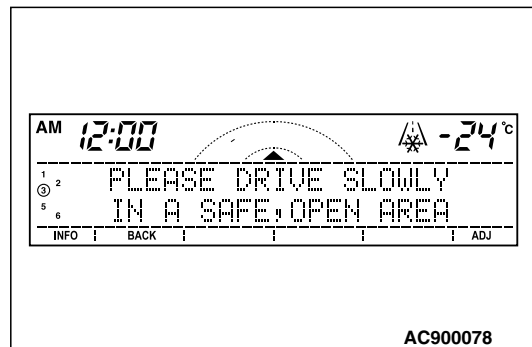
2. When the "COMPASS VARIANCE" screen is displayed, press the [SELECT] button.
3. Press the [←] button or the [→] button.



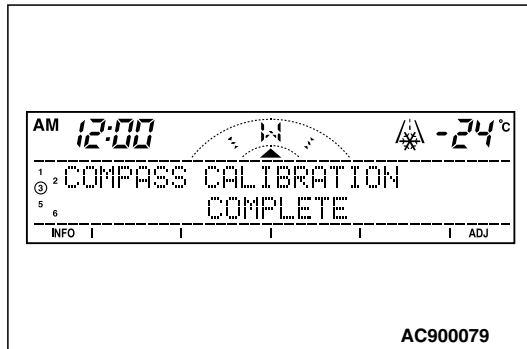
4. When the "COMPASS CALIBRATION" screen is displayed, press the [SELECT] button.



5. When "CALIBRATION READY?" is indicated, press the [SELECT] button.



6. When "PLEASE DRIVE SLOWLY IN A SAFE, OPEN AREA" is indicated, turn the vehicle 360° in a safe and open area.

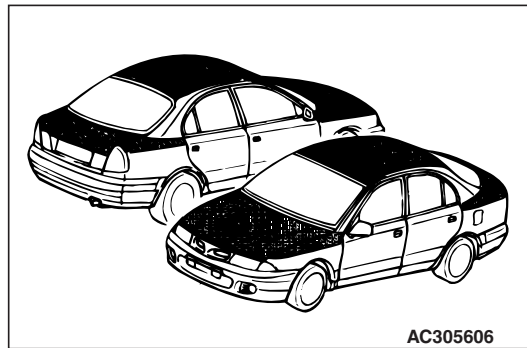


7. "COMPASS CALIBRATION COMPLETE" is indicated with a blip, and the compass calibration is completed. When three seconds have elapsed after completion, the information screen is displayed.

BODY

2. WRAP FILM

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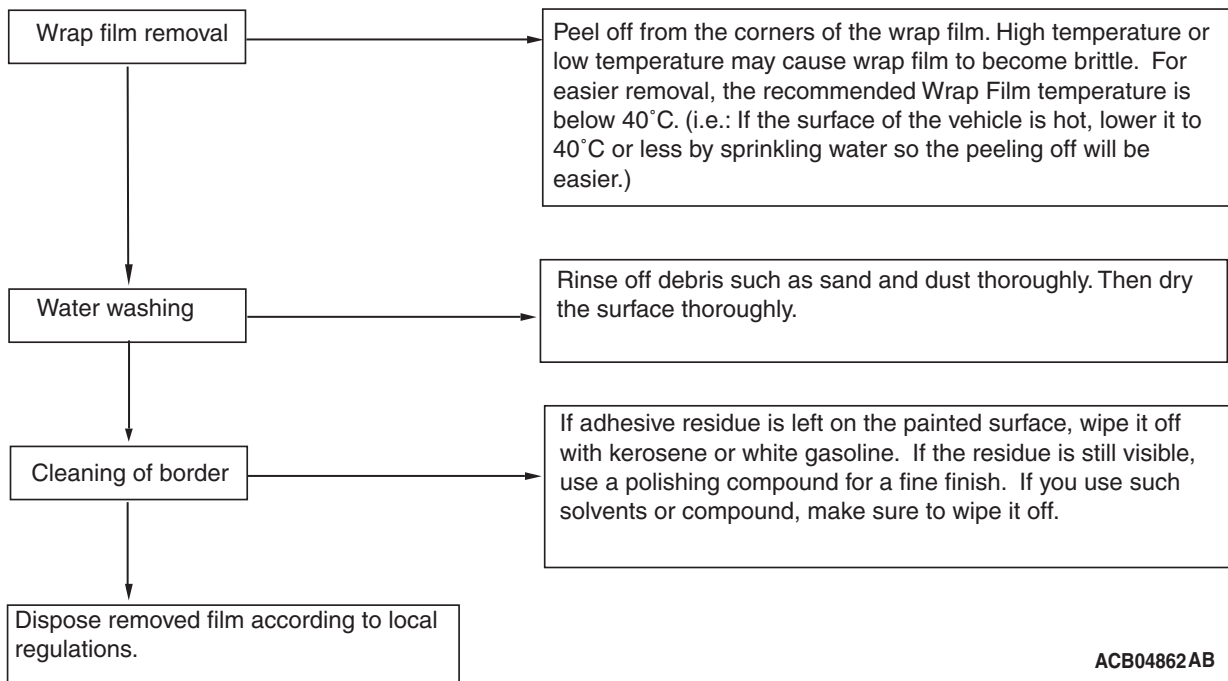


Vehicles may be shipped from the assembly plant to the distributors with a white plastic film or coating (wrap film) applied for the purpose of protecting the painted exterior from environmental elements where the assembly plant and point of embarkation is located.

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.

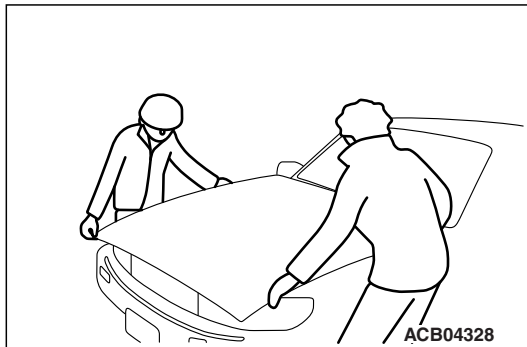
REMOVAL PROCEDURE

Flow Chart of Wrap Film Removal



ACB04862AB

The procedures to re-apply the wrap film



ACB04328

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	Prepare the surface to adhere the wrap 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.
3	Re-apply the wrap film	<p>The area to re-apply the wrap film is the same area where the original wrap film was applied.</p> <ol style="list-style-type: none"> 1. Begin adhering the wrap film from the low part of the vehicle and move upward. Maintain some tension on the wrap film so it will not get wrinkled or trap air bubbles. Although air bubbles it self will not damage the paint, you can avoid trapping air by adhering the wrap film from the centre to the out side of the vehicle. Use a tool such as a squeezer to adhere the wrap film firmly to the vehicle. 2. For moving panels such as the hood and trunk lid, or portion where parts such as windshield washer nozzles are pointing out, cut the wrap film accordingly, so it will adhere to the paint surface firmly. 3. If the top side of the film (the side without the adhesive) is left to contact the painted surface, it may damage the paint surface. (for example, become lusterless). The edges of the wrap film and overlapping portions should be firmly adhered to prevent entry of rain under the wrap film. 4. To prevent colour difference to be recognised between the areas wrapped and unwrapped due to exposure to sunlight etc. during storage, we recommend the boundary of wrapped and unwrapped 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 ²)	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

from

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

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
Width; <input type="text"/> Length; <input type="text"/>	(Cartons)		CPT US Dollar
Delivery charges			
Country of origin; Japan			
Customs Tariff No. 3919.90 Self-adhesive film	(1)		
Total;G.W.(kg) cartons			

O-WELL Corporation

ACB04863



RAPGARD-F; Ordering information

Width mm	Length Meter	Weight per roll Kg	Quantity per carton rolls	Carton		Ordering quantity carton
				Dimension W x D x H mm	Weight kg	
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 μ + adhesive 10 μ = Total 45 μ (43g/M2)

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

Attention;

1) Distributors have to fill in

2) O-WELL to fill out in

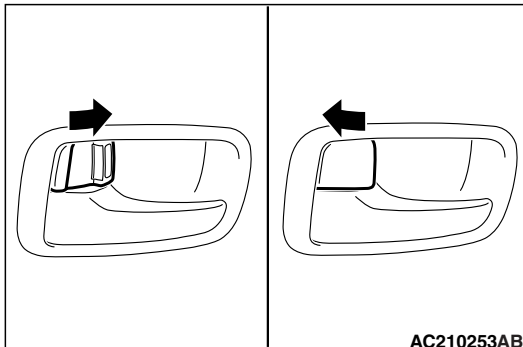
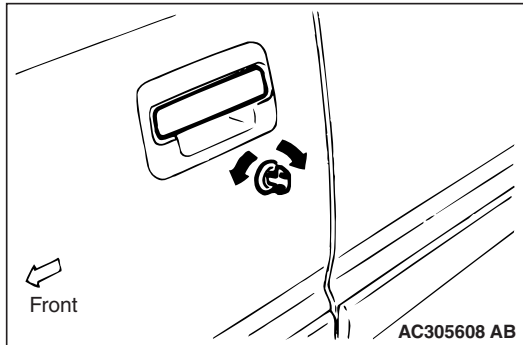
3. EXTERIOR

M6010400200215

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

4. OPERATION OF DOOR LOCKING SYSTEMS AND DOOR HINGES

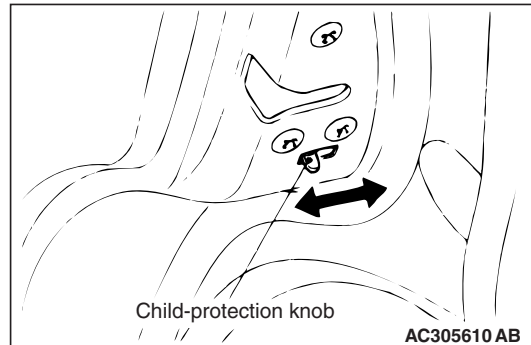
M6010400300126



1. Open each door to check the release mechanism and ease of operation.
2. Close the door to check the latch and striker.
3. Open the door, operate the lock lever and close the door to check the lock.
4. Partially close the door to check the open-door detent.
5. Unlock each door with the key to check lock operation.

6. Verify that all doors can be locked by the lock buttons.

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



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

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

M6010400400101

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.

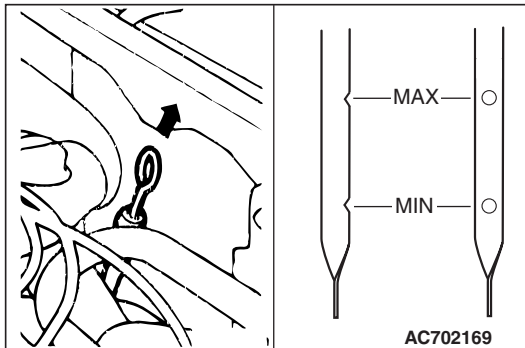
5. Sunroof

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

UNDER HOOD

6. ENGINE OIL LEVEL

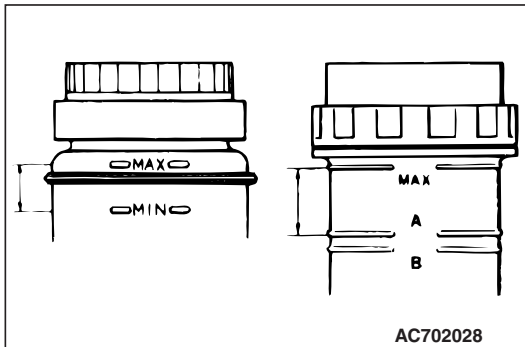
M6010500100271



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

M6010500200137

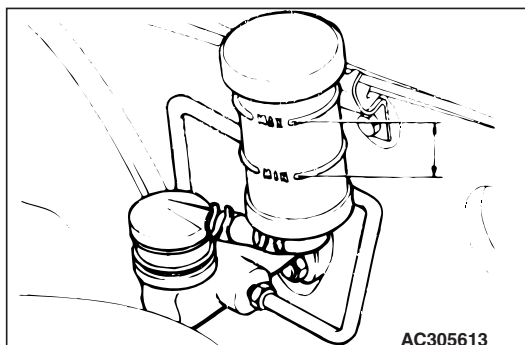


Check the fluid level. If it is below the "MIN" mark, replenish fresh brake fluid up to the "MAX" mark.

Specified Brake Fluid: DOT3 or DOT4

8. CLUTCH MASTER CYLINDER FLUID LEVEL

M6010500300026



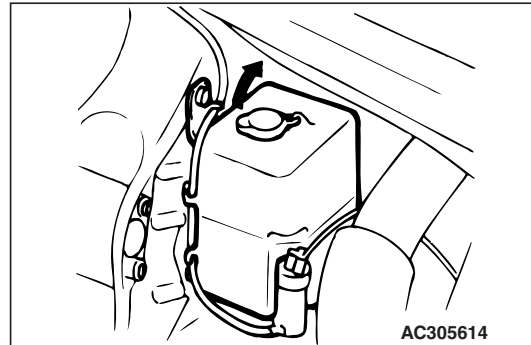
Check the fluid level.

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

Specified Brake Fluid: DOT3 or DOT4

9. WASHER FLUID LEVEL

M6010500400090

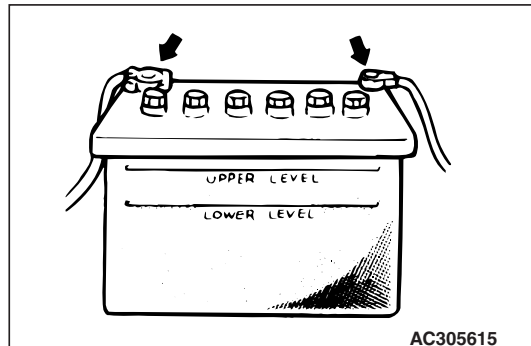


Check the fluid level; if it is low, replenish the washer fluid.

1. Windshield washer reservoir
2. Rear window washer reservoir

10. BATTERY CONDITION AND CONNECTIONS

M6010500500042

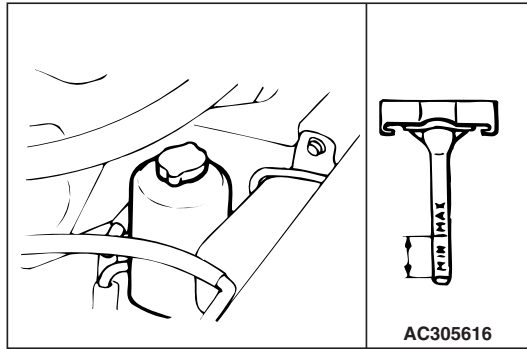


Inspect the battery connections. Verify that they are tightened.

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

11. POWER STEERING FLUID LEVEL

M6010500600072

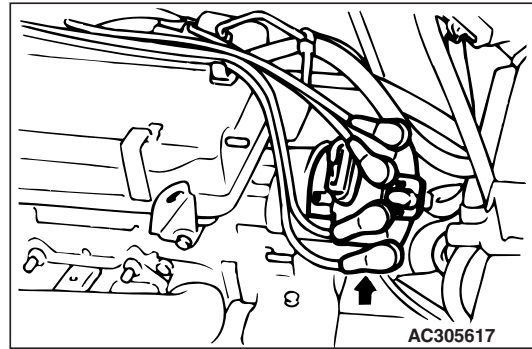


1. Check that the fluid level is between "MAX" and "MIN".
2. If the fluid is added, start the engine and turn the steering wheel from stop to stop several times to expel air from the system.

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

12. ELECTRICAL WIRING

M6010500700024



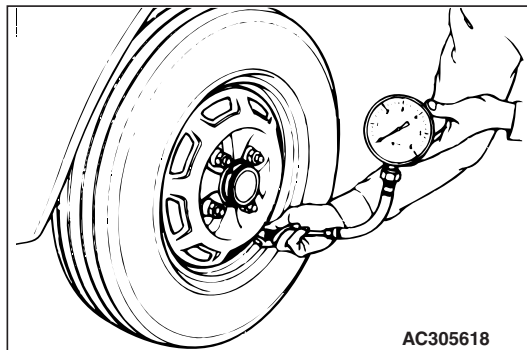
1. Each electrical wiring harness and connector
 - (1) Check each harness to be correctly routed and securely clipped.
 - (2) Confirm that all connections are tight.
2. Ignition cable

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

M6010600100041



1. Tyre specification

Check the correct tyre specification.
2. Tyre pressures

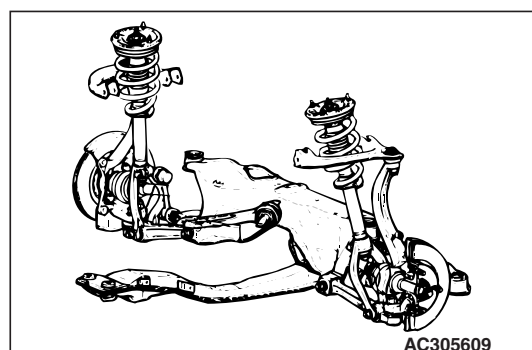
Adjust each tyre pressure.

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

M6010600200156



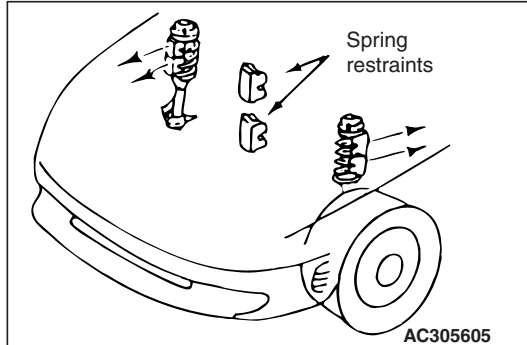
Check to be sure that each installation bolt and nut is tightened. If split pins are used, make sure that they are properly installed.

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

REMOVE FRONT SPRING RESTRAINTS

⚠ CAUTION

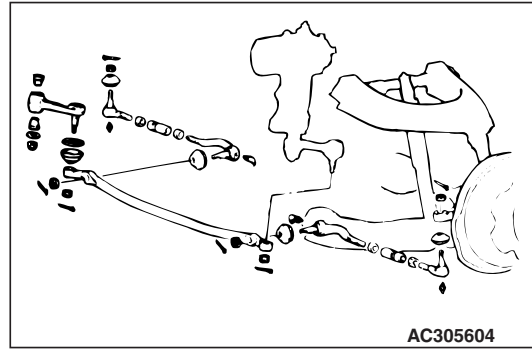
It is very important that these restraints must be removed during pre-delivery inspection. Failure to do so could cause ride and handling complaints.



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

M6010600300023



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

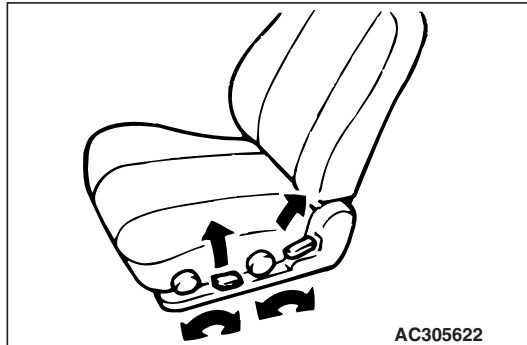
16. UNDER BODY

M6010600400020

Check under body and under body coating for damage.

BEFORE ROAD TEST**17. SEAT ADJUSTERS AND SEATBACK LATCHES**

M6010700100082



Check the operation of the various parts of the seats.

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

18. INHIBITOR SWITCH

M6010701100029

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

19. IDLE CONTROL KNOB

M6010700300020

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

20. INSTRUMENT PANEL CONTROLS

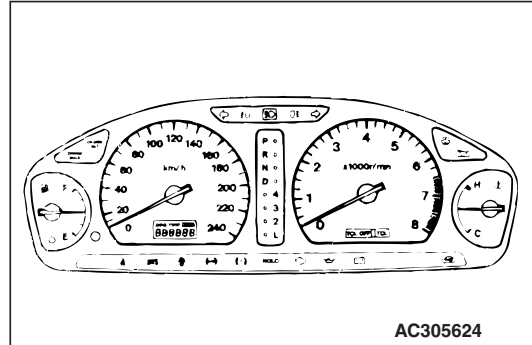
M6010700400083

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

M6010700500024

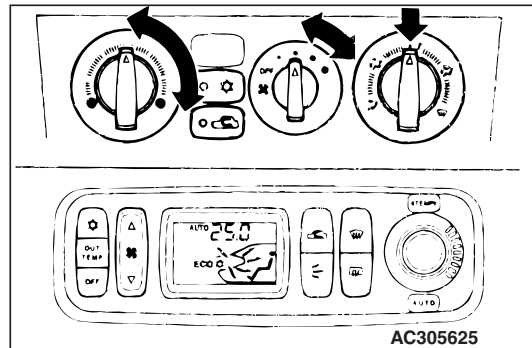


1. Check the meters and gauges are functioning properly.
2. Check each indicator lamp and warning lamp functions properly.

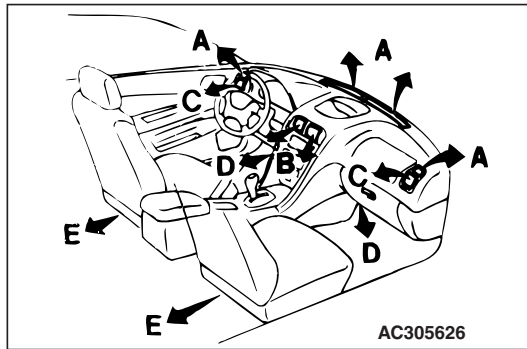
22. AIR CONDITIONER, HEATER AND DEFROSTER SYSTEM

M6010700600106

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.

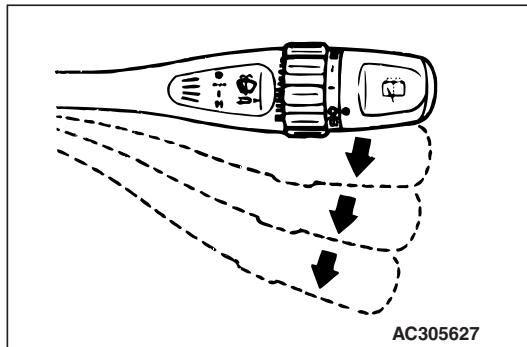


2. Heater and defroster

- (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

M6010700700028



1. Front wiper and washer

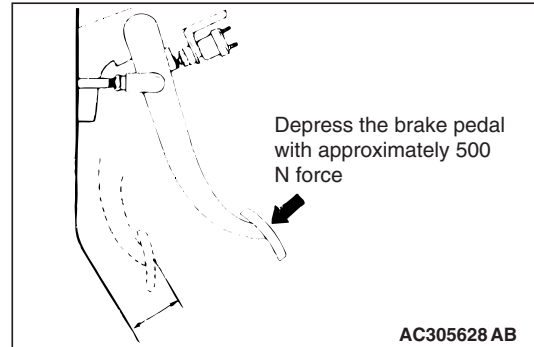
- (1) Check operation of the front wipers in all ranges.
- (2) Check the aim of the front washer stream.
- (3) Check the wiper blade-stop positions.
- (4) Verify that the interval between cycles of wiping is shifted when timer knob is turned to any position.
- (5) Verify that the front wipers function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

2. Rear wiper and washer

- (1) Check the operation of the rear wiper.
- (2) Check the aim of the rear washer stream.
- (3) Check the wiper blade-stop positions.

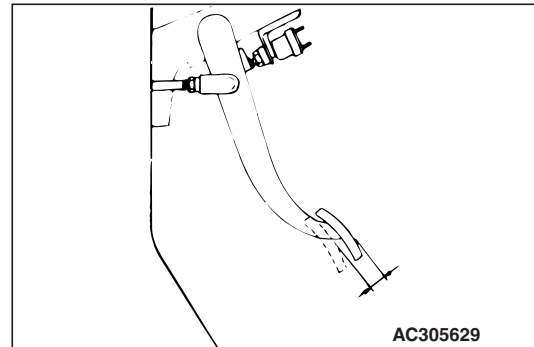
24. OPERATION OF SERVICE BRAKES AND PARKING BRAKES

M6010700800360



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.

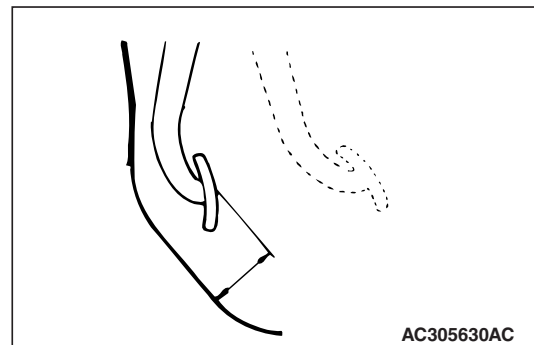
2. Parking brake

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.

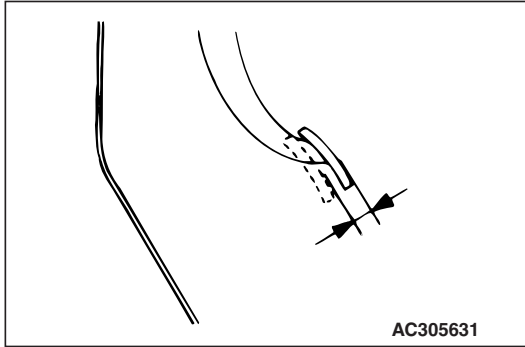
25. CLUTCH OPERATION

M6010700900367



1. Check the clutch operation in all driving ranges.

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

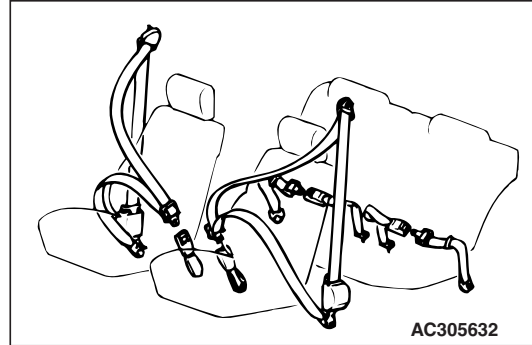


3. Verify correct clutch pedal free play.

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

M6010701000022

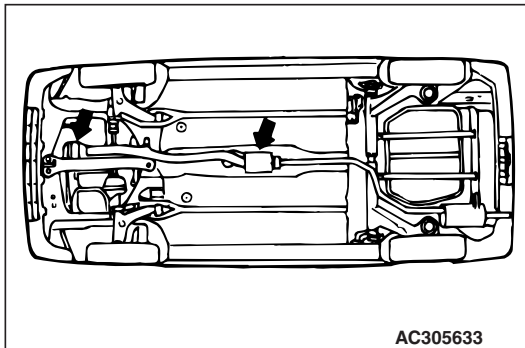


1. Verify that the seat belt warning lamp operates properly.
2. Check all seat belts and harnesses to assure that they connect and hold properly.
3. Lean forward to check that the shoulder harnesses allow movement.
4. Check the condition of the belts and anchors.
5. Check for proper seat belt retraction.

ROAD TEST

27. ENGINE PERFORMANCE AND EXHAUST GAS

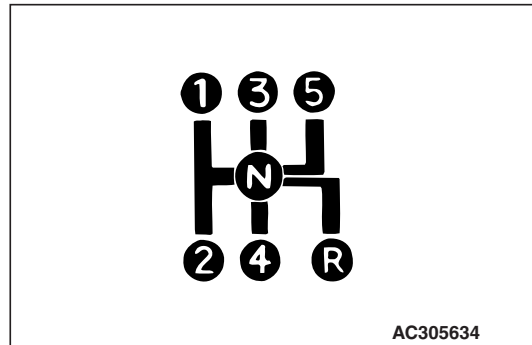
M6010800100023



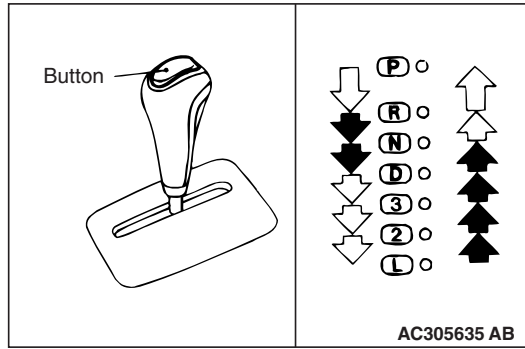
1. Engine performance
Check the engine for proper performance and accelerator pedal for smooth operation.
2. Exhaust system
 - (1) Check the exhaust system components for gas leaks.
 - (2) Verify that no black smoking is emitted from the end of the exhaust pipe (diesel-powered vehicles).

28. TRANSMISSION IN ALL RANGES

M6010800200020



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



2. Automatic transmission

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

29. BRAKES

M6010800300027

1. Service Brake

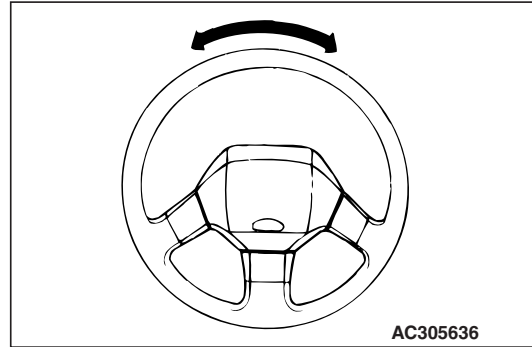
Put the vehicle in gear and apply the brakes while the vehicle is in motion. Be sure brake operation is smooth and positive.

2. Parking Brake

- (1) Stop the vehicle on a steep incline. With the service brakes firmly applied, place the transmission in "N" position, and set the parking brakes.
- (2) Slowly release the service brakes to see if the parking brakes will hold.

30. STEERING CONTROL

M6010800400024



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

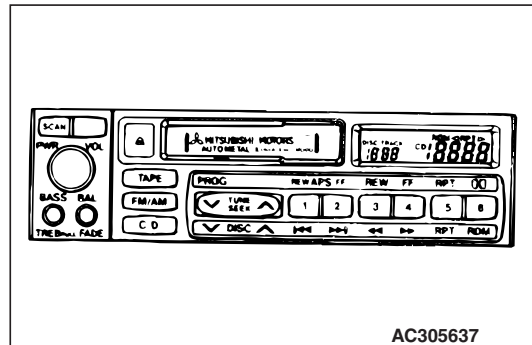
31. VIBRATION AND RATTLES

M6010800500021

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

32. ELECTRICAL EQUIPMENT

M6010800600028



1. Radio

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

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

2. Tape player

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

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

AFTER ROAD TEST

33. IDLE SPEED

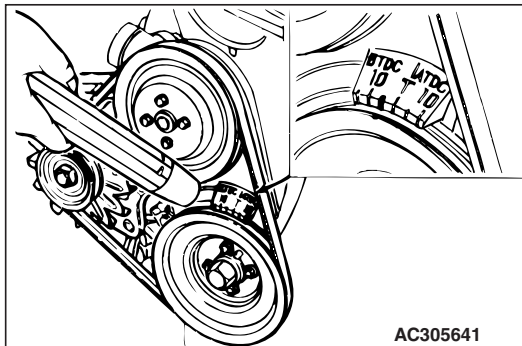
M6010900100149

Check the engine idle speed.

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

34. IGNITION TIMING

M6010900200146



AC305641

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.

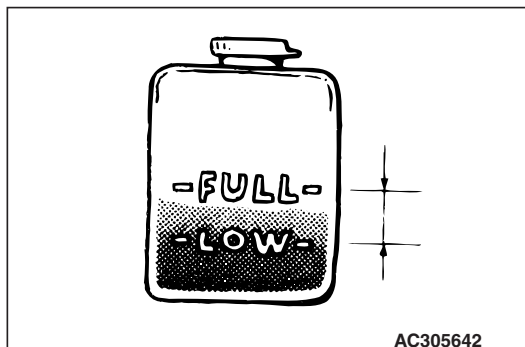
35. RADIATOR COOLANT LEVEL

M6010900300143

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.



AC305642

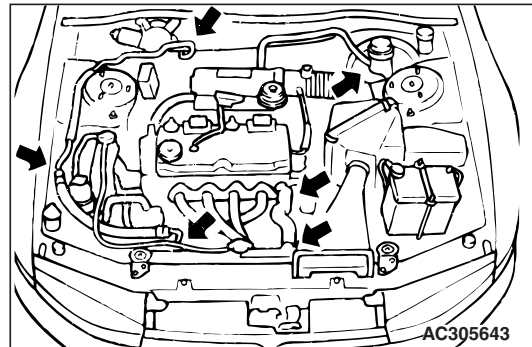
1. Check that the coolant level in the reserve tank is at or above "LOW" mark at normal engine operating temperature. And check cooling system for leaks.
2. Check that the coolant concentration is 30% to 60%.

36. HOSES, FLUID LINES AND CONNECTIONS LOCATED UNDER HOOD

M6010900400195

CAUTION

Remember that the air conditioner system is under pressure.



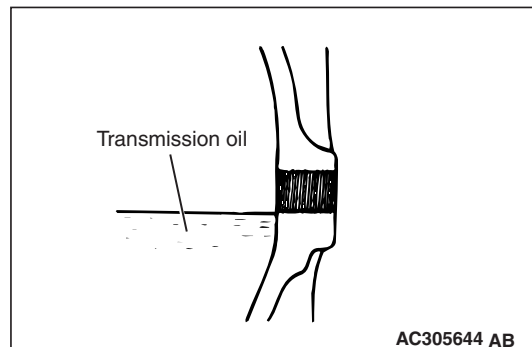
AC305643

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

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

M6010900500181



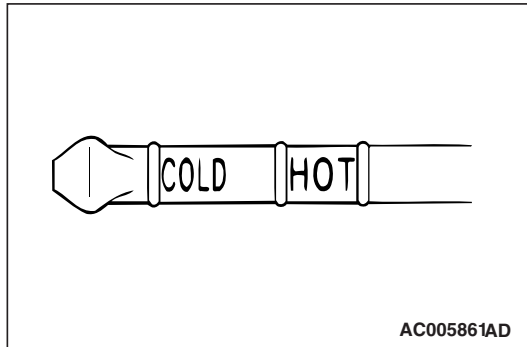
AC305644 AB

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

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

38. AUTOMATIC TRANSMISSION FLUID LEVEL

M6010900600207



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

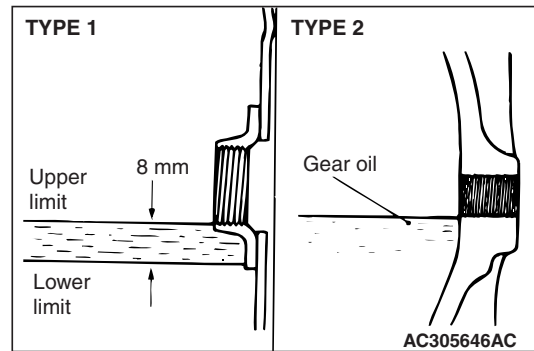
M6010900700055

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

40. FRONT AND REAR DIFFERENTIAL OIL LEVELS

M6010900800320

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.



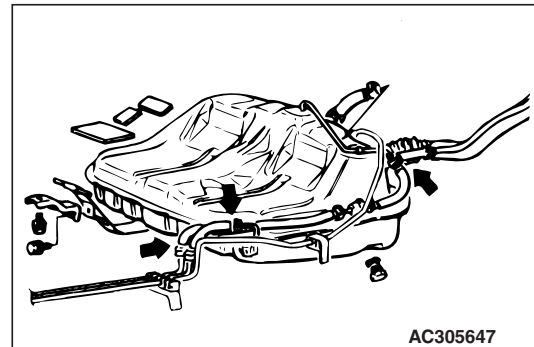
Type 1 only: Remove the filler plug, and check the gear oil level. Check that gear oil level is not 8 mm below the bottom of filler plug hole.

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

M6010901000059

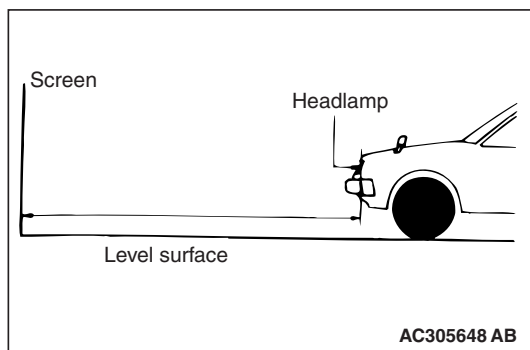


1. Check all hoses, fluid lines and connections for leaks.
2. Check all hoses and fluid lines for proper routing away from sharp edges and moving components.

FINAL STEPS

42. HEADLAMP AIMING

M6011000100116

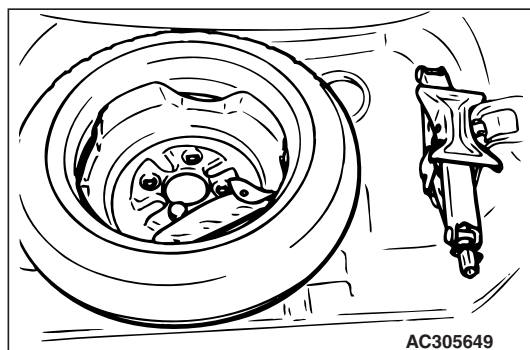


Check condition for headlamp aiming.

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

43. EQUIPMENT

M6011000200180



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

M6011000300176

Finally check and clean the exterior and interior.

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

45. OWNER INSTRUCTIONS

M6011000400054

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

GROUP 2

PERIODIC
INSPECTION AND
MAINTENANCE

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PERIODIC INSPECTION AND MAINTENANCE SCHEDULE

M6020100102054

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

FOR GENERAL EXPORT

Maintenance item			Maintenance operation	Maintenance interval	
OPERATIONS INSIDE THE ENGINE COMPARTMENT					
A1	Check drive belt for cracks, fraying, wear, and adjust its tension		Inspection	Every 20,000 km or every 12 months	
A2	Check vacuum pump oil hose for damage		Inspection	Every 20,000 km or every 12 months	
A3	Check intake air hose and turbocharger oil hose for damage (vehicles with turbocharger)		Inspection	Every 40,000 km or every 2 years (Over 100,000 km, every 20,000 km for turbocharger oil hose)	
A4	Replace engine timing belt [Including timing belt B with 4D56 engine] (except vehicles with timing chain)		Replace	Every 100,000 km	
A5	Check operation of crankcase emission control system		Inspection	Every 40,000 km or every 2 years	
A6	Replace spark plugs (Iridium-tipped type)	Standard type (Leaded petrol-powered vehicles)	Replace	Every 20,000 km	
		Standard type (Unleaded petrol-powered vehicles)	Replace	Every 40,000 km	
		3 Earth electrodes semi-surface discharge type, iridium-tipped type	Replace	Every 100,000 km	
A7	Check valve clearance*1 (except vehicles with auto-lash adjuster)	Vehicles with 4M41-DOHC engine	Inspection	Every 20,000 km or every 12 months	
		Vehicles with 4D56-DOHC engine	Inspection	Every 40,000 km or every 2 years (including noise check for every 20,000 km)	
		Vehicles with 6B3 engine	Inspection	Every 40,000 km	
A8	Check radiator hoses for damage and proper connection		Inspection	Every 40,000 km or every 2 years	
A9	Check engine coolant level in reservoir		Inspection	Every 20,000 km or every 12 months	
A10	Change engine coolant		Change	Every 40,000 km or every 2 years	
A11	Check air cleaner element for clogging and damage		Inspection	Normal usage	Every 20,000 km or every 12 months
				Severe usage	Every 10,000 km or every 6 months

Maintenance item			Maintenance operation	Maintenance interval	
A12	Replace air cleaner element		Replace	Normal usage	Every 40,000 km or every 2 years
				Severe usage	More frequently
A13	Check fluid level in brake reservoir and clutch reservoir		Inspection	Every 10,000 km or every 6 months	
A14	Change brake fluid		Change	Every 40,000 km or every 2 years	
A15	Check battery condition		Inspection	Every 10,000 km or every 6 months	
A16	Replace fuel filter	Petrol-powered vehicles	Replace	Every 60,000 km or every 3 years	
		Diesel-powered vehicles	Replace	Every 20,000 km or every 12 months	
OPERATIONS UNDER THE VEHICLE					
B1	Check suspension system for damage and looseness		Inspection	Every 20,000 km or every 12 months	
B2	Check suspension arm ball joints for play, and dust covers for damage		Inspection	Every 20,000 km or every 12 months	
B3	Lubricate propeller shaft with grease fitting		Lubrication	Every 20,000 km or every 12 months	
B4	Check driveshaft boots for damage		Inspection	Normal usage	Every 20,000 km or every 12 months
				Severe usage	Every 10,000 km or every 6 months
B5	Check steering linkage for damage and loose connections (including seals and boots)		Inspection	Every 20,000 km or every 12 months	
B6	Check manual transmission for oil leakage (In case of leakage, check the oil level)		Inspection	Every 20,000 km or every 12 months	
B7	Check transfer for oil leakage (In case of leakage, check the oil level)		Inspection	Every 20,000 km or every 12 months	
B8	Change gear oil in manual transmission		Change	Normal 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 differential for oil leakage (In case of leakage, check the oil level)		Inspection	Every 20,000 km or every 12 months	

Maintenance item			Maintenance operation	Maintenance interval	
B11	Change gear oil in front and rear differential	Conventional differential	Change	Normal usage	Every 80,000 km
				Severe usage	Every 40,000 km
		Hybrid type LSD	Change	Normal usage	Every 40,000 km
				Severe usage	Every 20,000 km
B12	Check exhaust pipe connections for gas leakage, and check pipe installation		Inspection	Every 20,000 km or every 12 months	
OPERATIONS INSIDE THE VEHICLE					
C1	Check brake pedal and clutch pedal for free play		Inspection	Every 10,000 km or every 6 months	
C2	Check parking brake lever stroke and play		Inspection	Every 20,000 km or every 12 months	
C3	Replace air purifier filter		Replace	Every 15,000km or every 12 months	
OPERATIONS OUTSIDE THE VEHICLE					
D1	Check wheel alignment		Inspection	Every 20,000 km or every 12 months	
D2	Check front and rear wheel bearings for play		Inspection	Every 60,000 km or every 3 years	
D3	Check brake hoses and pipes for leakage		Inspection	Every 20,000 km or every 12 months	
D4	Check brake pads and discs for wear		Inspection	Normal usage	Every 20,000 km or every 12 months
				Severe usage	Every 5,000 km or every 6 months
D5	Check brake shoe linings and drums (drum-in-disc) for wear		Inspection	Normal usage	Every 40,000 km or every 2 years
				Severe usage	Every 10,000 km or every 6 months
D6	Check fuel hoses and pipes for leakage or deterioration		Inspection	Every 40,000 km or every 2 years	
OPERATIONS AFTER ENGINE IS WARMED UP					
E1	Check fluid level in automatic transmission		Inspection	Every 20,000 km or every 12 months	
E2	Change automatic transmission fluid		Change	Severe usage	Every 40,000 km
E3	Change engine oil	Petrol-powered vehicles	Change	Normal usage	Every 15,000 km or every 12 months
				Severe usage	Every 5,000 km
		Diesel-powered vehicles	Change	Normal usage	Every 10,000 km or every 12 months
				Severe usage	Every 5,000 km

Maintenance item			Maintenance operation	Maintenance interval	
E4	Replace engine oil filter	Petrol-powered vehicles	Replace	Normal usage	Every 15,000 km or every 12 months
				Severe usage	Every 5,000 km
		Diesel-powered vehicles	Replace	Normal usage	Every 10,000 km or every 12 months
				Severe usage	Every 5,000 km
E5	Check engine idling speed		Inspection	Every 20,000 km or every 12 months	
E6	Check CO concentration (Petrol-powered vehicles)		Inspection	Every 20,000 km or every 12 months	
E7	Check exhaust gas recirculation (EGR) system		Inspection	Every 20,000 km or every 12 months	
OTHERS					
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	

FOR EUROPE

Maintenance item			Maintenance operation	Maintenance interval
OPERATIONS INSIDE THE ENGINE COMPARTMENT				
A1	Check drive belt for cracks, fraying, wear, and adjust its tension	Petrol-powered vehicles	Inspection	Every 40,000 km or every 2 years
		Diesel-powered vehicles	Inspection	Every 20,000 km or every 12 months
A2	Check vacuum pump oil hose for damage		Inspection	Every 20,000 km or every 12 months
A3	Check intake air hose and turbocharger oil hose for damage (vehicles with a turbocharger)		Inspection	Every 40,000 km or every 2 years
A4	Replace engine timing belt [including timing belt B with 4D56 engine]		Replace	Every 100,000 km
A6	Replace spark plugs	Iridium tipped type	Replace	Every 100,000 km
A7	Check valve clearance*1 (except vehicles with auto-lash adjuster)	Petrol-powered vehicles	Inspection	Every 40,000 km
		Diesel-powered vehicles	Inspection	Every 40,000 km or every 2 years (including noise check for every 20,000 km)
A8	Check radiator hoses for damage and proper connection	Petrol-powered vehicles	Inspection	Every 40,000 km or every 2 years
		Diesel-powered vehicles	Inspection	Every 20,000 km or every 12 months

Maintenance item			Maintenance operation	Maintenance interval	
A9	Check engine coolant level in reservoir	Petrol-powered vehicles	Inspection	Every 40,000 km or every 2 years	
		Diesel-powered vehicles	Inspection	Every 20,000 km or every 12 months	
A10	Change engine coolant	Petrol-powered vehicles	Change	Every 60,000 km or every 4 years	
		Diesel-powered vehicles	Change	Every 60,000 km or every 4 years	
A11	Check air cleaner element for clogging and damage		Inspection	Normal usage	Every 20,000 km or every 12 months
				Severe usage	Every 10,000 km or every 6 months
A12	Replace air cleaner element	Petrol-powered vehicles	Replace	Normal usage	Every 60,000 km or every 3 years
			Replace	Severe usage	More frequently
		Diesel-powered vehicles	Replace	Normal usage	Every 40,000 km or every 2 years
			Replace	Severe usage	More frequently
A13	Check fluid level in brake reservoir and clutch reservoir		Inspection	Every 20,000 km or every 12 months	
A14	Change brake fluid		Change	Every 40,000 km or every 2 years	
A15	Check battery condition		Inspection	Every 20,000 km or every 12 months	
A16	Replace fuel filter	Petrol-powered vehicles	Replace	Every 160,000 km or every 10 years	
		Diesel-powered vehicles	Replace	Every 40,000 km or every 2 years	
OPERATIONS UNDER THE VEHICLE					
B1	Check suspension system for damage and looseness		Inspection	Every 20,000 km or every 12 months	
B2	Check suspension arm ball joints for play, and dust covers for damage		Inspection	Every 20,000 km or every 12 months	
B3	Lubricate propeller shaft with grease fitting		Lubrication	Every 20,000 km or every 12 months	
B4	Check driveshaft boots for damage		Inspection	Normal usage	Every 20,000 km or every 12 months
				Severe usage	Every 10,000 km
B5	Check steering linkage for damage and loose connections (including seals and boots)		Inspection	Every 20,000 km or every 12 months	
B6	Check manual transmission for oil leakage (In case of leakage, check the oil level)		Inspection	Every 20,000 km or every 12 months	

Maintenance item			Maintenance operation	Maintenance interval	
B7	Check transfer for oil leakage (In case of leakage, check the oil level)		Inspection	Every 20,000 km or every 12 months	
B8	Change gear oil in manual transmission		Change	Normal 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 differential for oil leakage (In case of leakage, check the oil level)		Inspection	Every 20,000 km or every 12 months	
B11	Change gear oil in front and rear differential	Conventional differential	Change	Normal usage	Every 80,000 km
				Severe usage	Every 40,000 km
		Hybrid type LSD	Change	Normal usage	Every 60,000 km
				Severe usage	Every 20,000 km
B12	Check exhaust pipe connections for gas leakage, and check pipe installation		Inspection	Every 40,000 km or every 2 years	
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 20,000 km or every 12 months	
C3	Replace air purifier filter		Replace	Every 15,000 km or every 12 months	
OPERATIONS OUTSIDE THE VEHICLE					
D1	Check wheel alignment		Inspection	Every 20,000 km or every 12 months	
D2	Check front and rear wheel bearings for play		Inspection	Every 60,000 km or every 3 years	
D3	Check brake hoses and pipes for leakage		Inspection	Every 20,000 km or every 12 months	
D4	Check brake pads and discs for wear		Inspection	Normal usage	Every 20,000 km or every 12 months
				Severe usage	Every 10,000 km or every 6 months
D5	Check brake shoe linings and drums (drum-in-disc) for wear		Inspection	Normal 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 for leakage or deterioration		Inspection	Every 40,000 km or every 2 years	

Maintenance item		Maintenance operation	Maintenance interval	
OPERATIONS AFTER ENGINE IS WARMED UP				
E1	Check fluid level in automatic transmission	Inspection	Every 20,000 km or every 12 months	
E2	Change automatic transmission fluid	Change	Normal usage	Every 80,000 km
			Severe usage	Every 40,000 km
E3	Change engine oil	Change	Normal usage	Every 20,000 km or every 12 months
			Severe usage	Every 10,000 km
E4	Replace engine oil filter	Replace	Normal usage	Every 20,000 km or every 12 months
			Severe usage	Every 10,000 km
E7	Check exhaust gas recirculation (EGR) system	Inspection	Every 20,000 km or every 12 months	
OTHERS				
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: "Severe usage" specifications apply to only vehicles used under severe operating conditions. Severe operating conditions include the following cases:

*1: If found any noise from the valve any time, please check the valve clearance.

1. Driving in a dusty area or in an area in which the vehicle is likely to be exposed to salty air or brine.
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. More than 50% of operation time in heavy city traffic in hot temperatures of 32 °C or higher.
9. More than 50% of operation time at speeds of 120 km/h or higher in hot temperatures of 30 °C or higher.
10. Operation under excessive load.

OPERATIONS INSIDE THE ENGINE COMPARTMENT

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

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DRIVE BELT CONDITION

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

DRIVE BELT TENSION CHECK AND ADJUSTMENT <4M41>

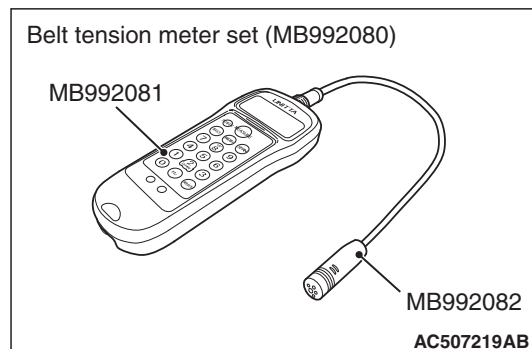
Check the drive belt tension in the following procedure.

Standard value:

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

<WHEN THE VIBRATION FREQUENCY IS MEASURED {SPECIAL TOOL (MB992080) IS USED}: RECOMMENDATION>

NOTE: The vibration frequency measuring method is recommended for check and adjustment of the drive belt tension.



1. 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.
3. 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.

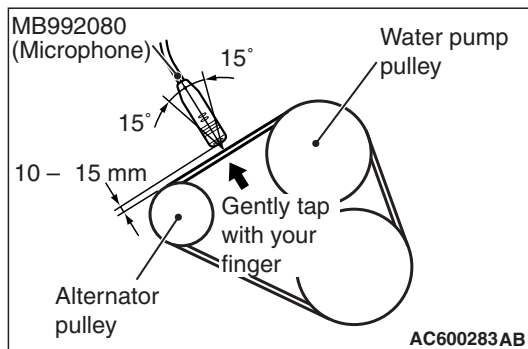
NOTE: This operation is to temporarily set the preset data such as the belt specifications, because if the measurement is taken without input of the belt specifications, conversion to tension value (N) cannot be made, resulting in judgement of error.

<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 are 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.

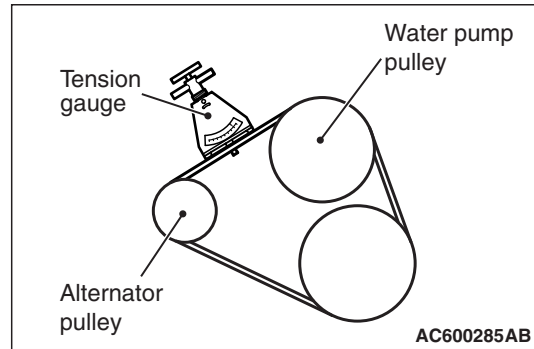


5. Hold the microphone to the middle of the drive belt between the pulleys (at the place indicated by the arrow), about 10 – 15 mm away from the rear surface of the belt and so that it is perpendicular to the belt (within an angle of $\pm 15^\circ$).
6. Press the "MEASURE" button.
7. Gently tap the middle 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, flip the belt again.

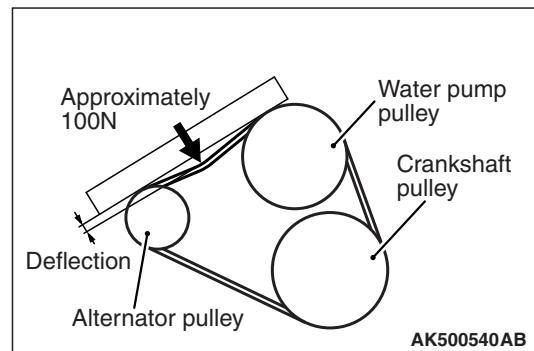
8. After the completion of the measurement, press and hold the "POWER" button to turn off the power supply.

<WHEN USING THE TENSION GAUGE>



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

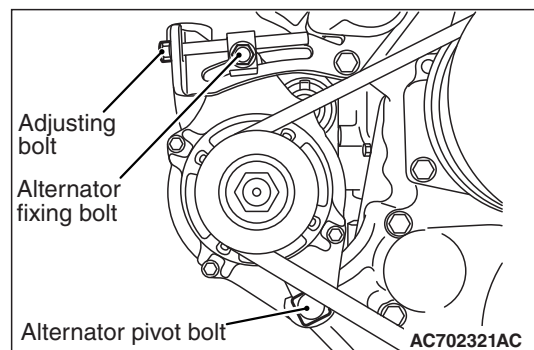
<BELT DEFLECTION CHECK>



Apply approx. 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 belt 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: $47 \pm 9 \text{ N}\cdot\text{m}$

5. Tighten the alternator fixing bolt.

Tightening torque: $24 \pm 4 \text{ N}\cdot\text{m}$

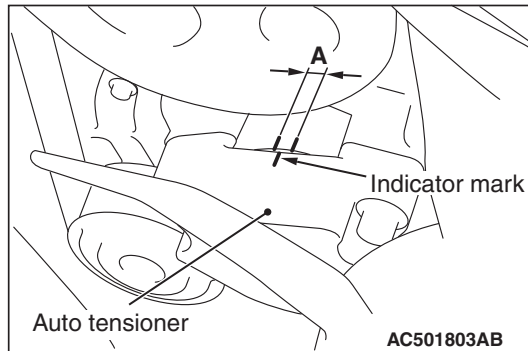
6. Tighten the adjusting bolt.

Tightening torque: $5.0 \pm 1.0 \text{ N}\cdot\text{m}$

DRIVE BELT TENSION CHECK <4D56>

CAUTION

Check the alternator 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.

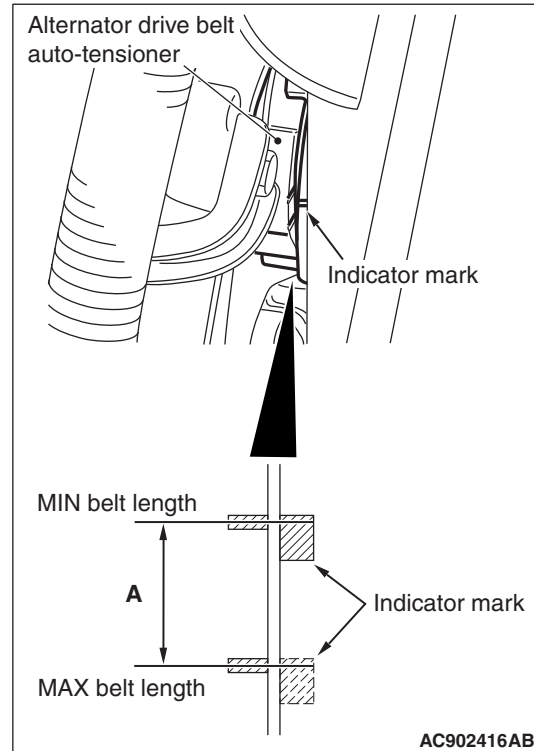
NOTE: The drive belt tension check is not necessary as auto tensioner is adopted.

DRIVE BELT TENSION CHECK

<6G74, 6B31>

CAUTION

Check the alternator 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 alternator drive belt.

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

DRIVE BELT TENSION CHECK AND ADJUSTMENT<4G64> ALTERNATOR DRIVE BELT TENSION 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.

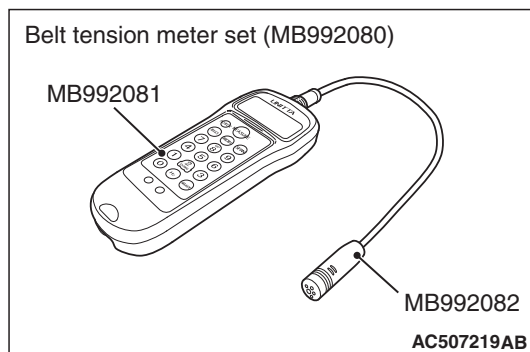
Check the alternator drive belt tension in the following procedure.

Standard value:

Item	When checked	When adjusted	When replaced
Vibration frequency Hz	149 – 192	161 – 182	210 – 243
Tension N	294 – 490	343 – 441	588 – 784
Deflection mm (Reference)	10.4 – 14	11.2 – 13	7.1 – 9.1

<When the vibration frequency is measured {Special tool (MB992080) is used}: Recommendation>

NOTE: The vibration frequency measuring method is recommended for check and adjustment of the drive belt tension.



1. 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.
3. 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.

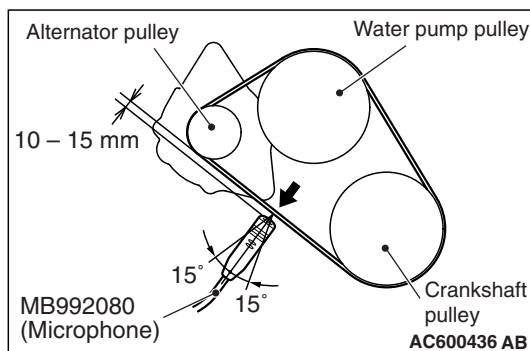
NOTE: This operation is to temporarily set the preset data such as the belt specifications, because if the measurement is taken without input of the belt specifications, conversion to tension value (N) cannot be made, resulting in judgement of error.

<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).

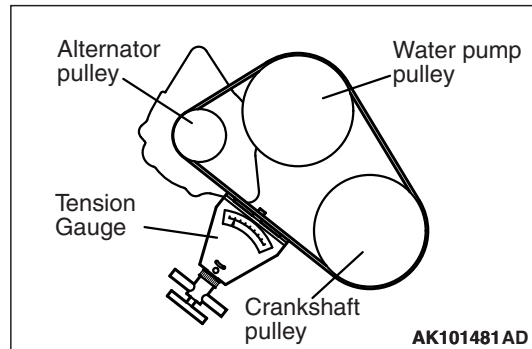
CAUTION

- 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.



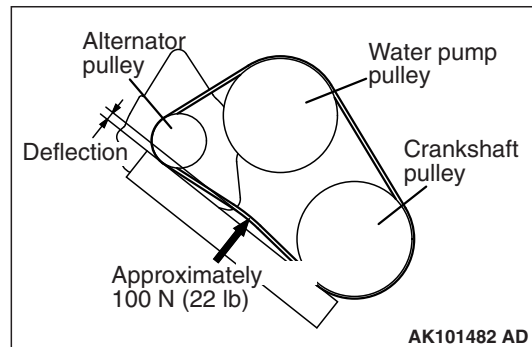
5. Hold the microphone to the middle of the alternator drive belt between the pulleys (at the place indicated by the arrow), about 10 – 15 mm away from the rear surface of the alternator drive belt and so that it is perpendicular to the alternator drive belt (within an angle of ± 15 degree).
6. Press the "MEASURE" button.
7. Gently tap the middle of the alternator drive 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 alternator drive belt is within the standard value.
NOTE: To take the measurement repeatedly, flip the alternator drive belt again.
8. 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 alternator drive belt tension is within the standard value.

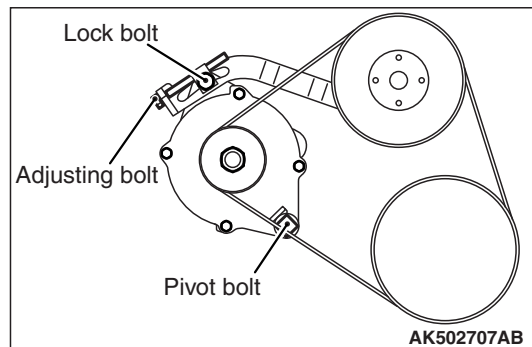
<Belt deflection check>



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

ALTERNATOR DRIVE BELT TENSION ADJUSTMENT

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



1. Loosen the nut of the alternator pivot bolt.
2. Loosen the lock bolt.
3. Use the adjusting bolt to adjust the alternator drive belt tension or alternator drive belt deflection to the standard values.

4. Tighten the nut of the pivot bolt.

Tightening torque: 22 ± 2 N·m

5. Tighten the lock bolt.

Tightening torque: 22 ± 2 N·m

6. Tighten the adjusting bolt.

Tightening torque: 5.0 ± 1.0 N·m

⚠ CAUTION

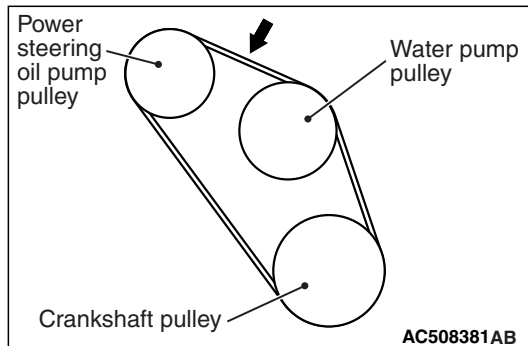
When checking the alternator drive belt tension, turn the crankshaft clockwise one turn or more.

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

POWER STEERING OIL PUMP DRIVE BELT TENSION 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 power steering oil pump drive belt tension in the following procedure.

<When the vibration frequency is measured: Recommendation>

With your finger tip lightly tap the middle of the drive belt between the pulleys in the location shown by the arrow in the illustration and check that the vibration frequency is within the standard value.

Standard value: 199 – 257 Hz

NOTE: Refer to Alternator Drive Belt Tension Check, for information regarding the vibration frequency measurement method using special tool belt tension meter set (MB992080).

<When the tension is measured>

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

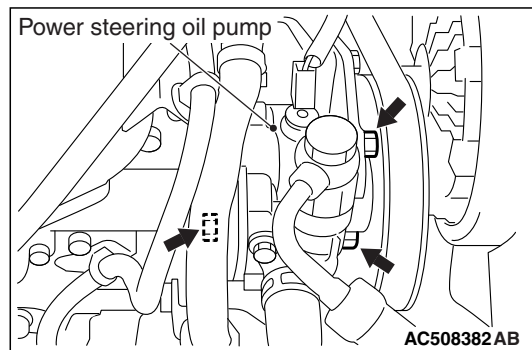
Standard value: 294 – 490 N

<When the deflection is measured>

Apply approximately 100 N of force to the middle of the middle 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.

Standard value (Reference): 8.1 – 11.2 mm

POWER STEERING OIL PUMP DRIVE BELT TENSION ADJUSTMENT



1. Loosen the power steering oil pump mounting bolts shown in the figure.
2. Move the power steering oil pump gently and adjust the power steering oil pump drive belt tension or power steering oil pump drive belt deflection to the standard values.

Standard value:

Item	When adjusted	When replaced
Vibration frequency Hz	215 – 244	257 – 304
Tension N	343 – 441	490 – 686
Deflection mm (Reference)	8.7 – 10.3	6.1 – 8.1

3. Tighten the power steering oil pump mounting bolts.

Tightening torque: 23 ± 3 N·m

⚠ CAUTION

When checking the power steering oil pump drive belt tension, turn the crankshaft clockwise one turn or more.

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

A/C COMPRESSOR DRIVE BELT TENSION CHECK

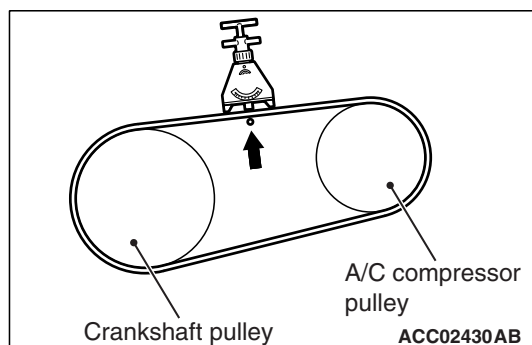
NOTE:

- An elastic stretch-type belt is used for the A/C compressor drive belt, therefore, the tension adjustment is not necessary.
- Perform the A/C compressor drive belt tension check according to the following procedures.

<When the tension is measured>

⚠ CAUTION

- When measuring the tension, make sure that the engine is cold.
- Measure the tension after turning the crankshaft clockwise one turn or more.



1. Use a belt tension gauge in the middle of the A/C compressor drive belt between the pulleys shown in the figure (at the place indicated by the arrow) to check that the drive belt tension is within the standard value.

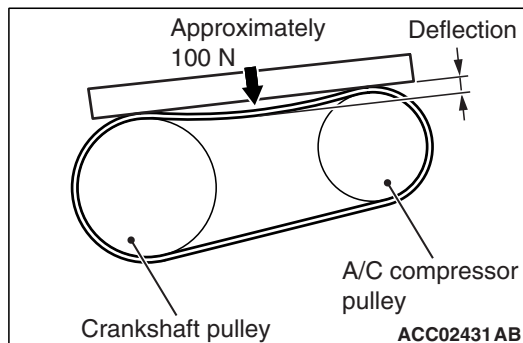
Standard value (Reference): 257 – 923 N

2. If not within the standard value, replace the A/C compressor drive belt.

<When the deflection is measured>

⚠ CAUTION

- When measuring the deflection, make sure that the engine is cold.
- Measure the deflection after turning the crankshaft clockwise one turn or more.



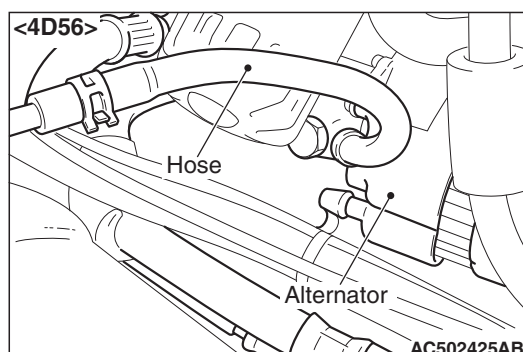
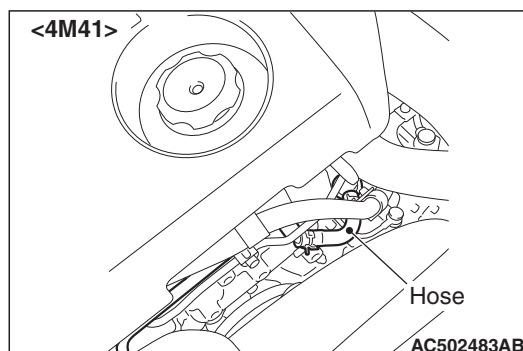
1. Apply approximately 100 N of force to the middle of the A/C compressor drive belt between the pulleys (at the place indicated by the arrow) and check that the amount of deflection is within the standard value.

Standard value (Reference): 14.6 mm or less

2. If not within the standard value, replace the A/C compressor drive belt.

A2. CHECK VACUUM PUMP OIL HOSE FOR DAMAGE

M6020200400250

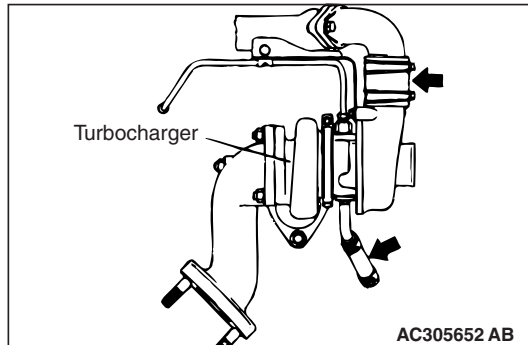


1. Inspect the surface of hose for evidence of heat and mechanical damage.

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

(Vehicles with turbocharger)

M6020200500581



1. 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)

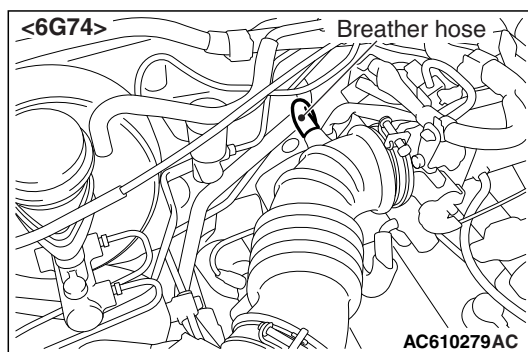
M6020200600566

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

A5. CHECK OPERATION OF CRANKCASE EMISSION CONTROL SYSTEM

M6020200700938

BREATHER HOSE

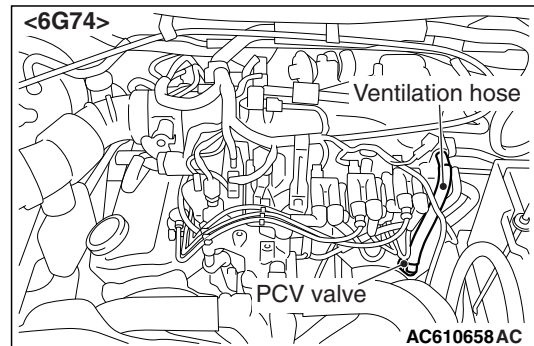


1. Inspect the breather hose for cracks or damage.
2. Clean the inside of the breather hose if necessary.
3. Inspect the ventilation filter for clogging.

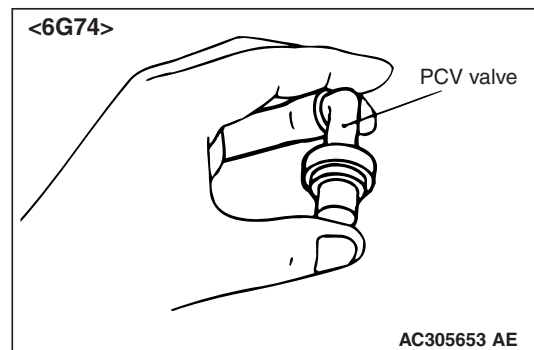
VENTILATION HOSE

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

POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

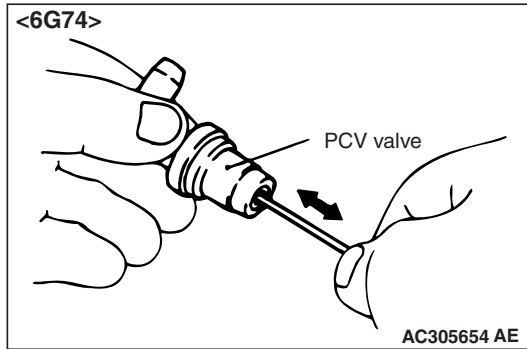


1. Remove the ventilation hose from the PCV (Positive crankcase ventilation) valve.
2. Remove the PCV valve from the rocker cover.
3. Reinstall the PCV valve at the ventilation hose.
4. Start the engine and run at idle.



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

PCV VALVE CHECK



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

A6. REPLACE SPARK PLUGS

M6020200800656

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

A7. CHECK VALVE CLEARANCE

(Except vehicles with auto-lash adjuster)

M6020202400870

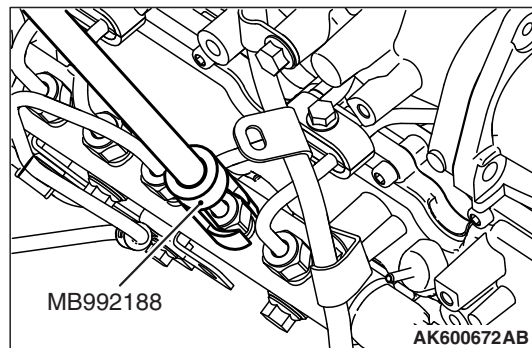
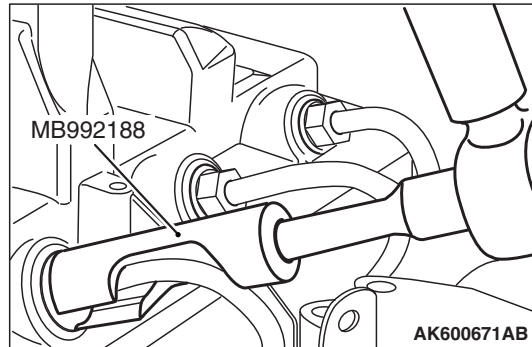
<4M41>

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

1. Remove the EGR pipe.

CAUTION

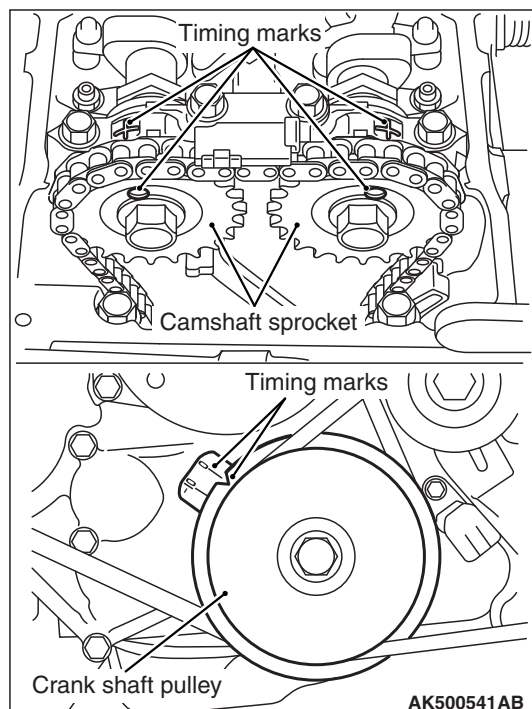
Leaked fuel on parts causes a decrease in function and burning. Therefore, place waste to absorb leaked fuel.



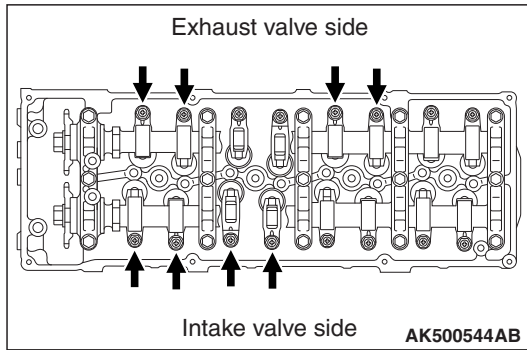
2. Use the special tool fuel injection pipe wrench (MB992188) to remove the fuel injection pipe.
3. Remove the rocker cover.

CAUTION

The crankshaft should always be turned in a clockwise direction.



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



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.

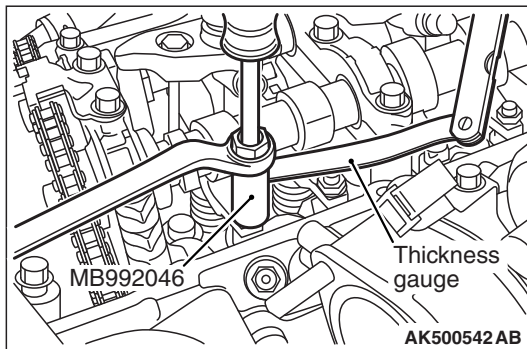
Standard value (cold engine):

Intake valve: 0.10 mm

Exhaust valve: 0.15 mm

⚠ CAUTION

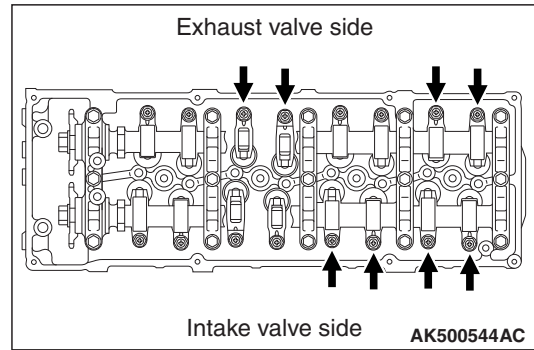
Pay special attention that the tightening torque is not beyond this value. If the tightening torque is beyond the value, the valve stem would possibly bend.



6. 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)

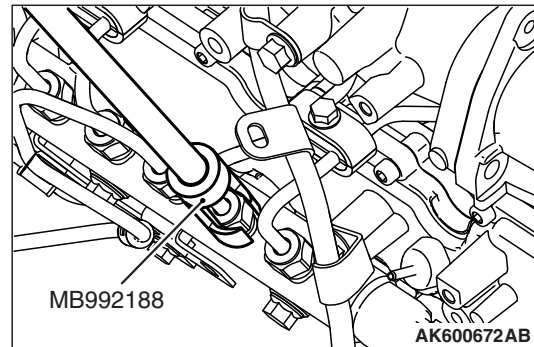
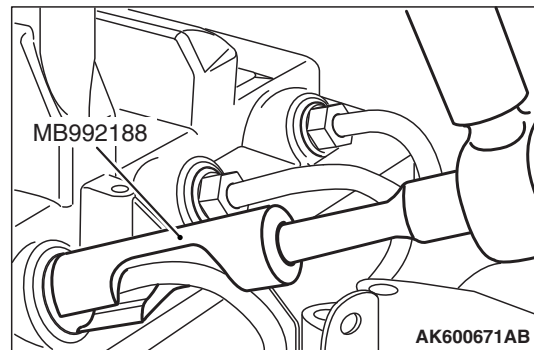
Tightening torque: $9.8 \pm 1 \text{ N}\cdot\text{m}$

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: $35 \pm 5 \text{ N}\cdot\text{m}$

⚠ 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.

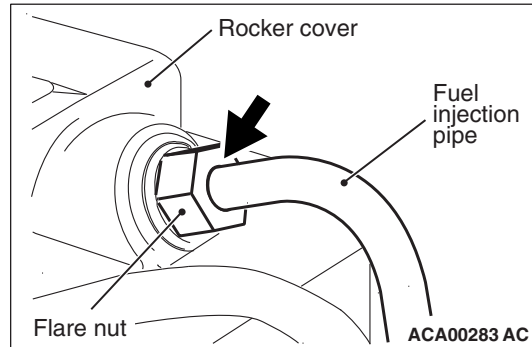
11. Install the EGR pipe.

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.



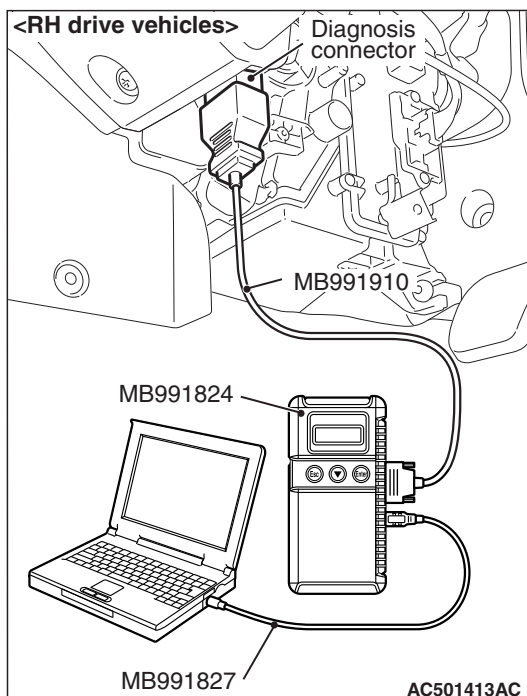
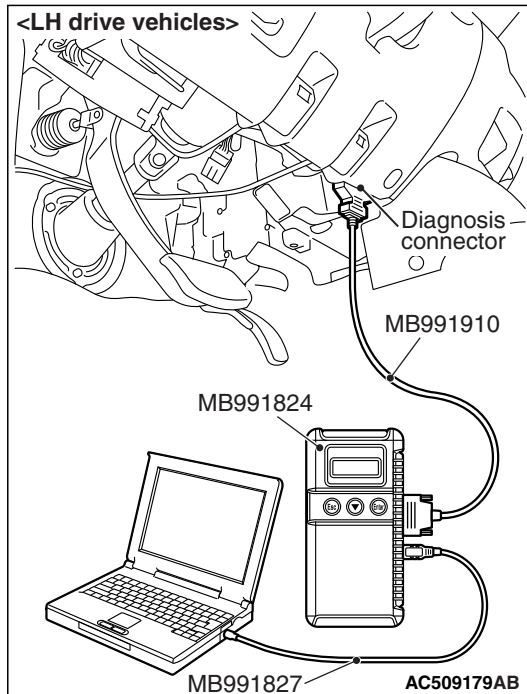
12. Carefully degrease the flare nut at the fuel injector assembly side of the fuel injection pipe with the parts cleaner (MZ100387) or equivalent.
13. If the parts cleaner remains in the area between the flare nut for connection and the fuel injection pipe, the oil leak detection agent detects that 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.

NOTE: Since the fuel injection pipe connection on the fuel injector assembly side is hard to check for fuel leak. 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.

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 \times 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 with the parts cleaner (MZ100387 or equivalent) completely.

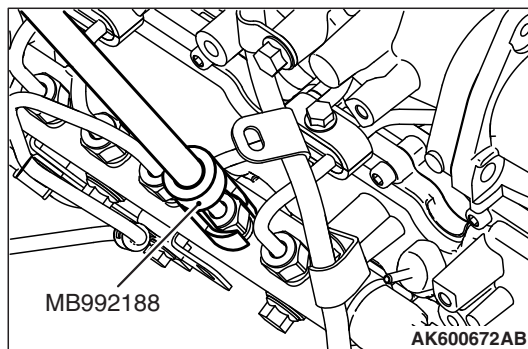
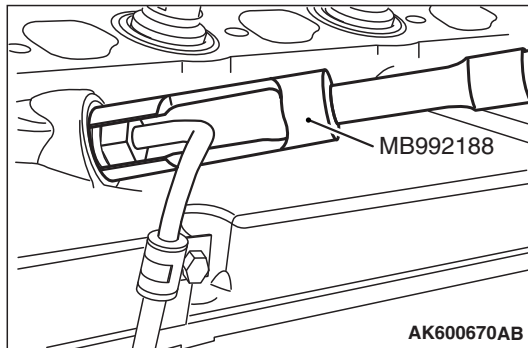
<4D56>

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

1. Remove the engine air intake pipe.
2. Remove the inlet manifold.

⚠ CAUTION

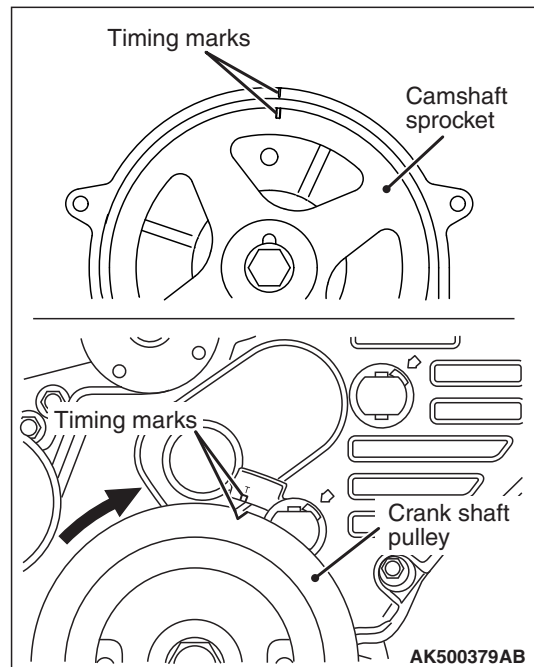
Leaked fuel on parts causes a decrease in function and burning. Therefore, place waste to absorb leaked fuel.



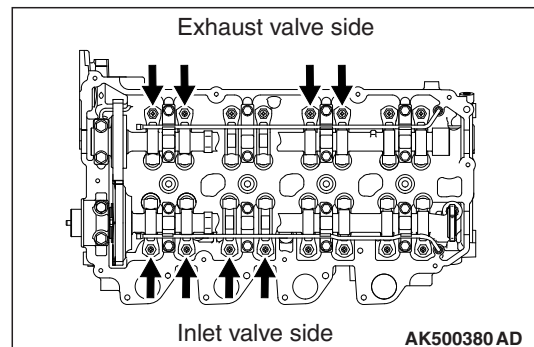
3. Use the special tool fuel injection pipe wrench (MB992188) to remove the fuel injection pipe.
4. Remove the timing belt cover.
5. Remove the rocker cover.

⚠ CAUTION

The crankshaft should always be turned in a clockwise direction.



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



7. 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.

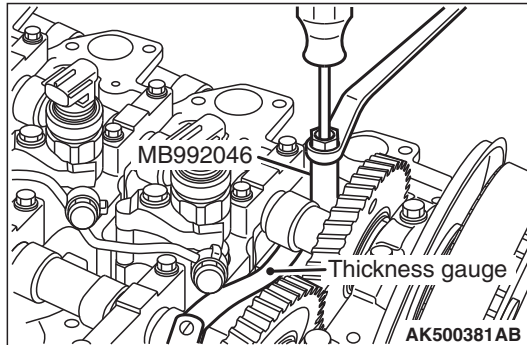
Standard value (cold engine):

Inlet valve: 0.09 mm

Exhaust valve: 0.14 mm

CAUTION

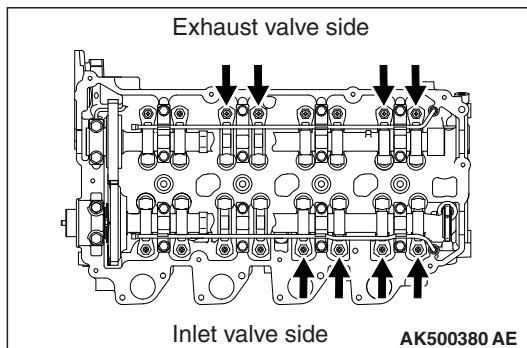
Pay special attention that the tightening torque is not beyond this valve. If the tightening torque is beyond the valve, the valve stem would possibly bend.



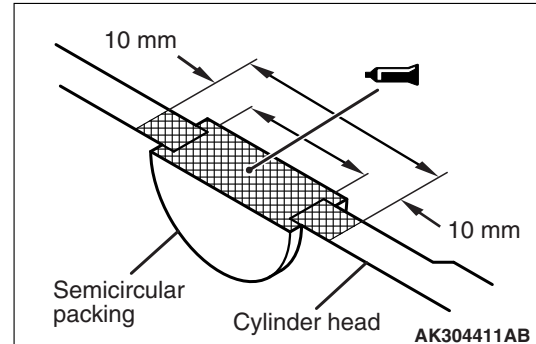
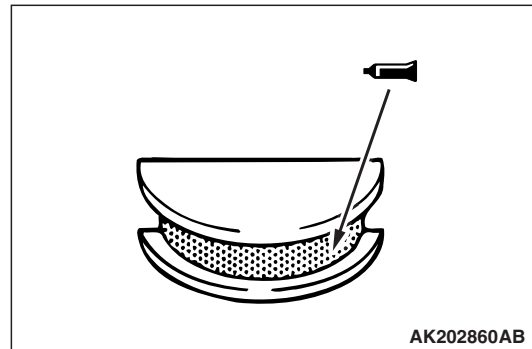
8. While holding the adjusting screw with a screwdriver to prevent it from turning, tighten the lock nut to the specified torque using a valve adjusting socket. (MB992046)

Tightening torque: 15 ± 3 N·m

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



10. Measure the valve clearances at the places indicated by arrows in the illustration. If the clearance is not within the standard value, repeat steps 7 and 8 above.

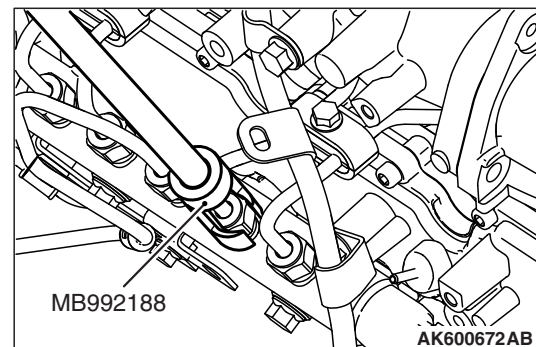
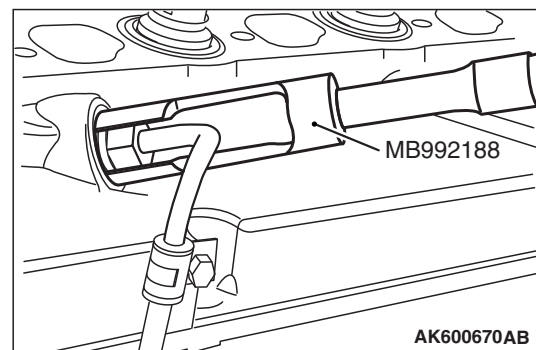


11. Apply specified sealant to the section of the semi-circular packing shown in the illustration.

Specified sealant: Three bond 1217G or equivalent

12. Install the rocker cover.

13. Install the timing belt cover.



14. 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.

15. Install the inlet manifold.

NOTE: Install a new gasket

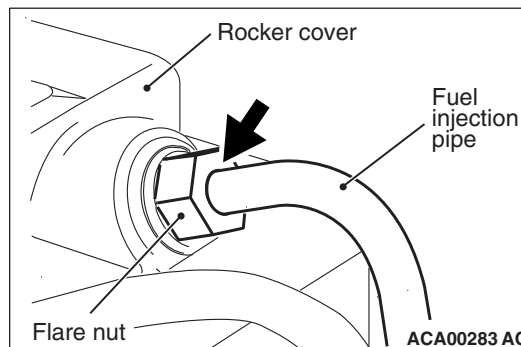
16. Install the engine air intake pipe.

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.



17. Carefully degrease the flare nut at the fuel injector assembly side of the fuel injection pipe with the parts cleaner (MZ100387) or equivalent.

18. 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.

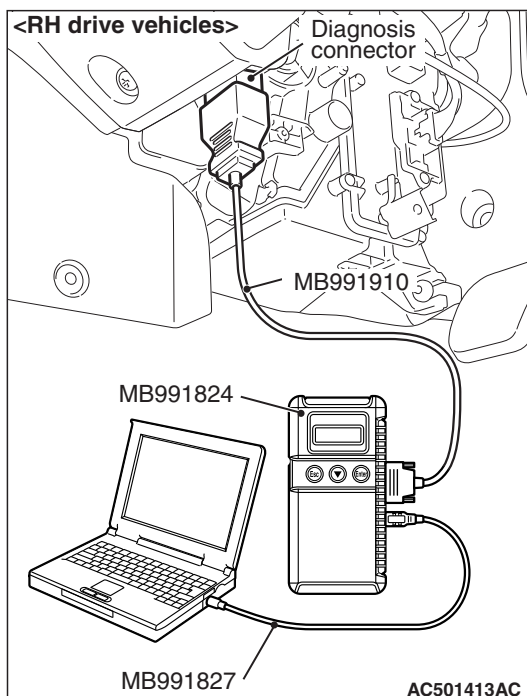
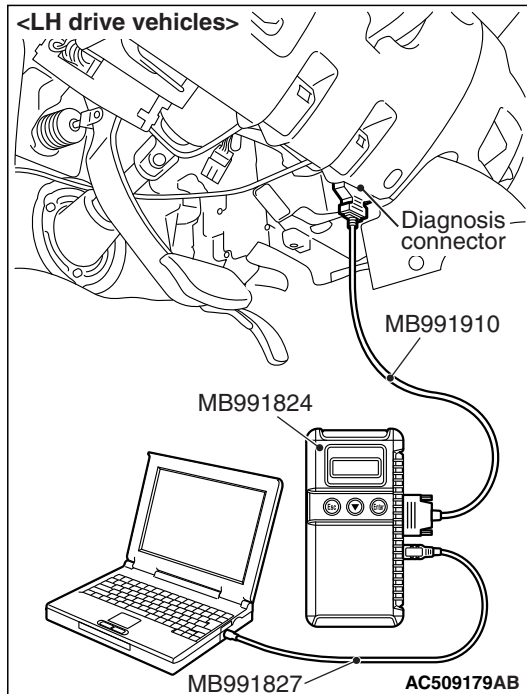
19. Apply the oil leak detection agent to the flare nut and the pipe of the fuel injection pipe.

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.

NOTE: Since the fuel injection pipe connection on the fuel injector assembly side is hard to check for fuel leak. 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.

CAUTION

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



20. Ensure that the ignition switch is at the "LOCK" (OFF) position.

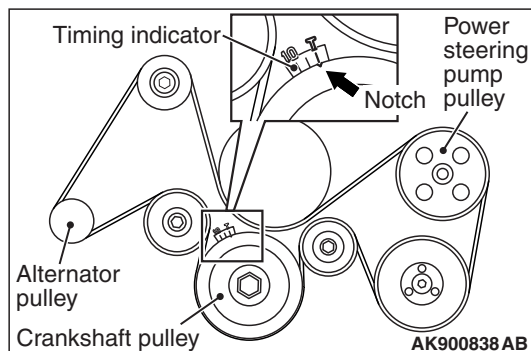
21. Start up the personal computer.
22. Connect special tool M.U.T.-III USB cable (MB991827) to V.C.I. (MB991824) and the personal computer.
23. Connect special tool M.U.T.-III main harness A (MB991910) to the V.C.I.
24. Connect the M.U.T.-III main harness A to the diagnosis connector of the vehicle.
25. 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.
26. Start the M.U.T.-III system on the personal computer and turn the ignition switch to the "ON" position.
27. Start the engine, and let it run at idle.
28. Select "MPI/GDI/DIESEL" from System select Screen of the M.U.T.-III.
29. Select "SPECIAL FUNCTION" from MPI/GDI/DIESEL Screen.
30. 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 \times 5 times = 100 seconds).
31. Turn the ignition switch to the "LOCK" (OFF) position, and stop the engine.
32. Disconnecting the M.U.T.-III is the reverse of the connecting sequence.
33. 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.
34. Visually check other fuel line connections for fuel leak.
35. If the fuel is leaking, replace the fuel injection pipe and the fuel supply pump pipe.
36. If the fuel is not leaking, wipe off the oil leak detection agent with the parts cleaner (MZ100387 or equivalent) completely.

<6B31 (intake side)>

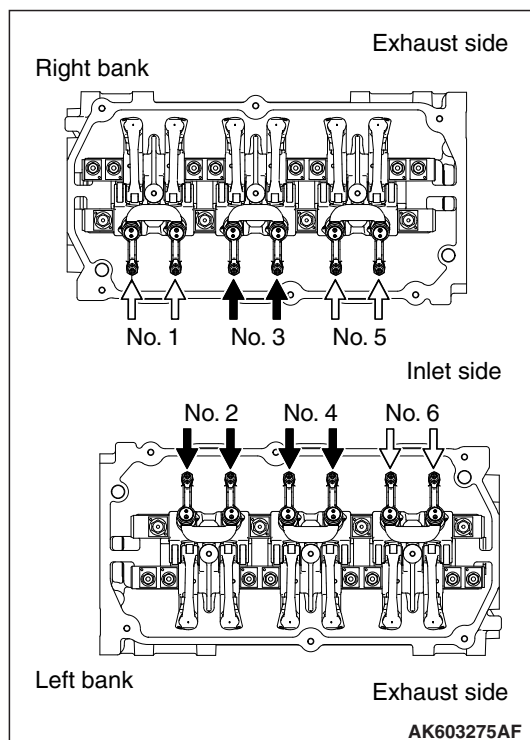
NOTE: Perform the valve clearance check and adjustment at the engine cold state.

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

1. Remove all ignition coils.
2. Remove the rocker cover.



3. Turn the crankshaft clockwise until the notch on the crankshaft pulley is lined up with the "T" mark on the timing indicator.



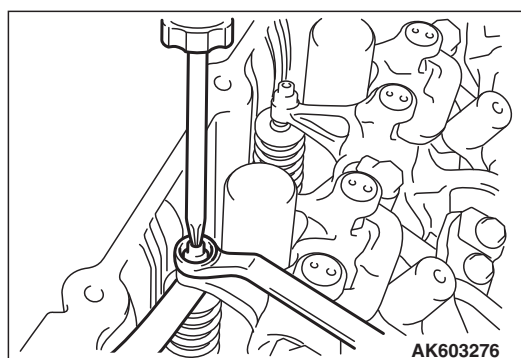
4. Valve clearance inspection and adjustment can be performed on rocker arms indicated by white arrow mark when the No. 1 cylinder piston is at the top dead centre on the compression stroke, and on rocker arms indicated by black arrow mark when the No. 4 cylinder piston is at the top dead centre on the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

5. Measure the valve clearance for inlet 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):
Inlet valve: 0.10 mm



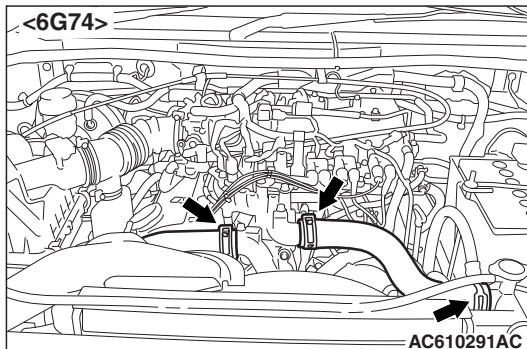
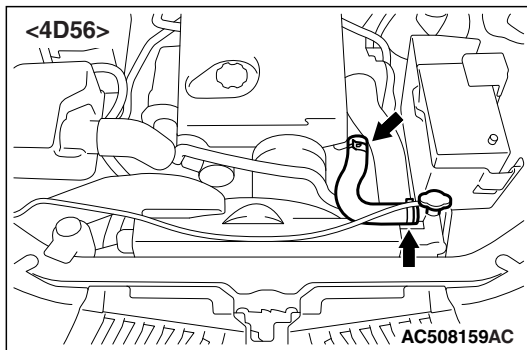
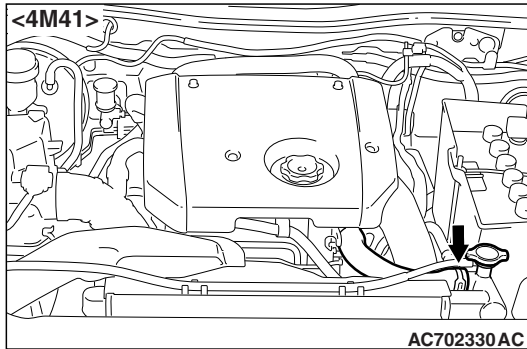
6. While holding the adjusting screw with a screwdriver to prevent it from turning, tighten the lock nut to the specified torque.

Tightening torque: 9 ± 1 N·m

7. Turn the crankshaft through 360 degree angle to line up the notch on the crankshaft pulley with the "T" mark on the timing indicator.
8. Repeat steps 5 and 6 on other valves for clearance adjustment.
9. Install the rocker cover.
10. Install the ignition coils.

A8. CHECK RADIATOR HOSES FOR DAMAGE AND PROPER CONNECTION

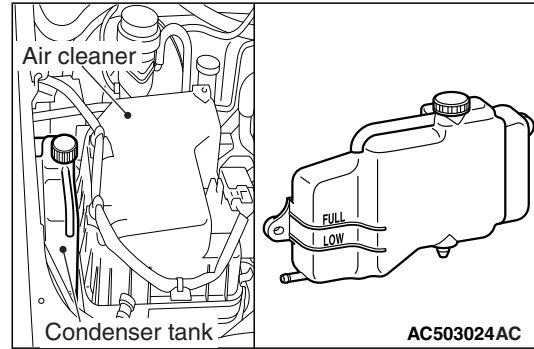
M6020200901140



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.

A9. CHECK ENGINE COOLANT LEVEL IN RESERVOIR

M6020201001098

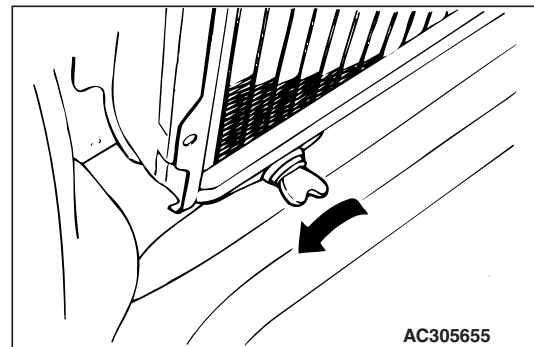


Check that the coolant level is between the "FULL" and "LOW" lines when the engine is at the normal operating temperature.

A10. CHANGE ENGINE COOLANT

M6020201101761

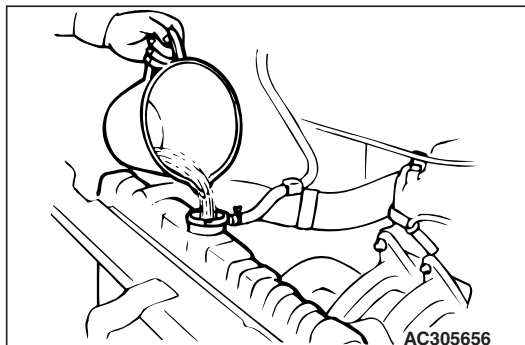
1. Stop the engine after it is fully warmed up.
2. Add detergent to the engine coolant in order to flush the cooling system, and start the engine.



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.



7. 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.

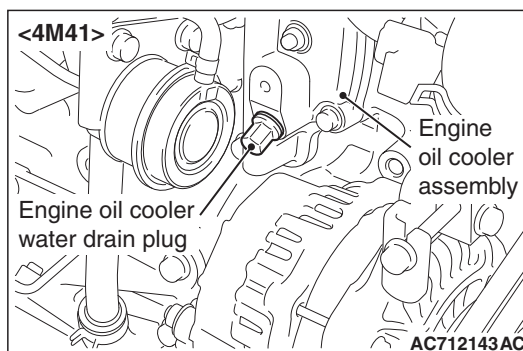
⚠ CAUTION

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

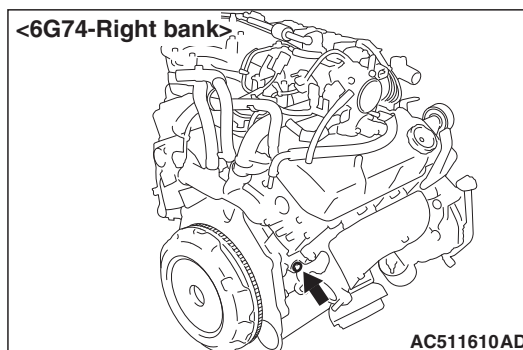
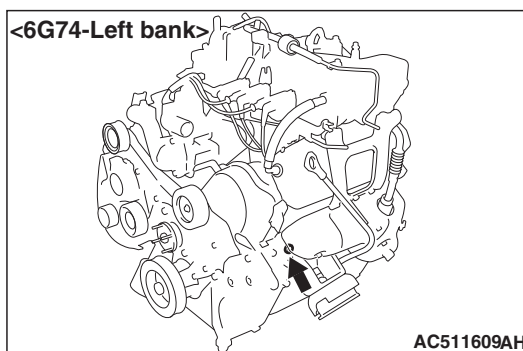
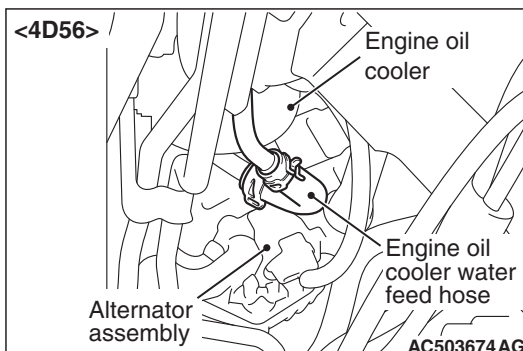
11. Recheck the engine coolant level after a road test.

REMOVAL OF ENGINE COOLANT FROM THE CYLINDER BLOCK DRAIN PLUG

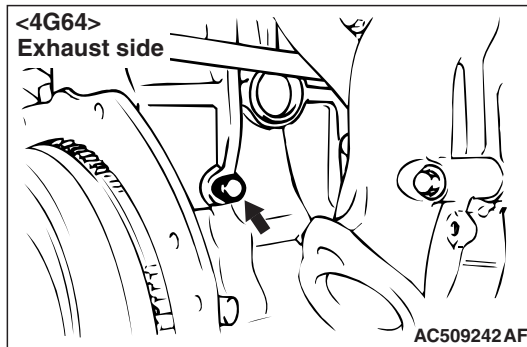
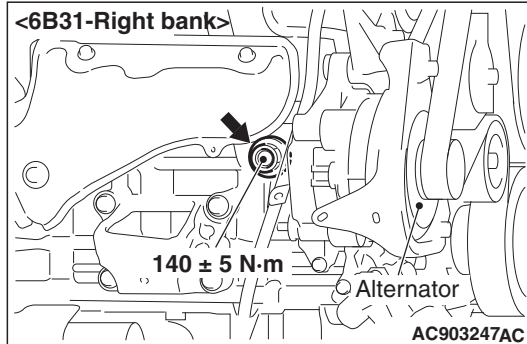
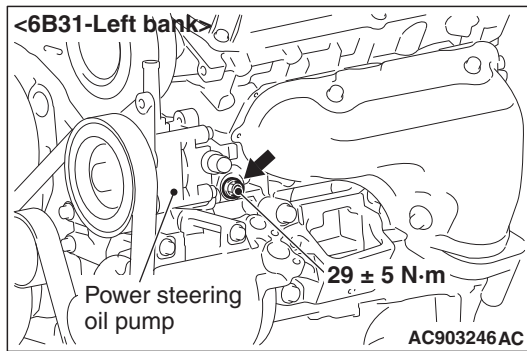
Drain the water from the radiator, heater core and engine after unplugging the radiator drain plug and removing the radiator cap.



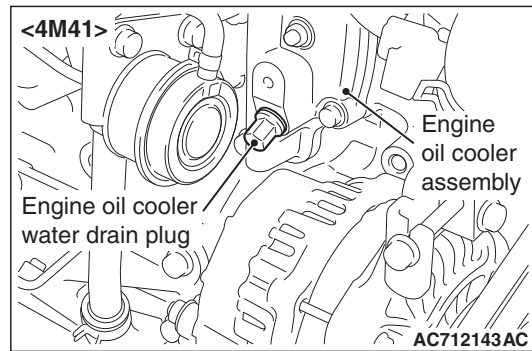
1. Drain the engine coolant in the water jacket by unplugging the engine oil cooler assembly water drain plug <4M41>.



2. Drain the engine coolant in the water jacket by disconnect the engine oil cooler water feed hose of the engine oil cooler <4D56>.

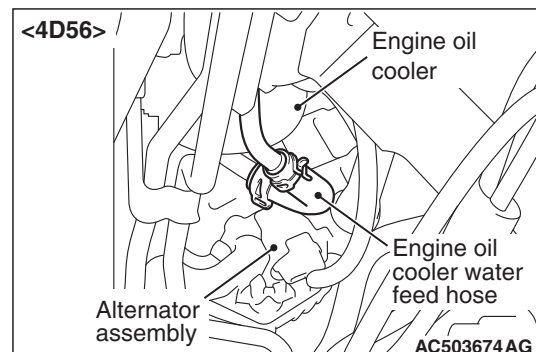


3. Drain the engine coolant in the water jacket by unplugging the cylinder block drain plug <6G74, 6B31, 4G64>
4. Remove the radiator condenser tank and drain the coolant.
5. Drain the coolant then clean the path of the coolant by injecting water into the radiator from the radiator cap area.

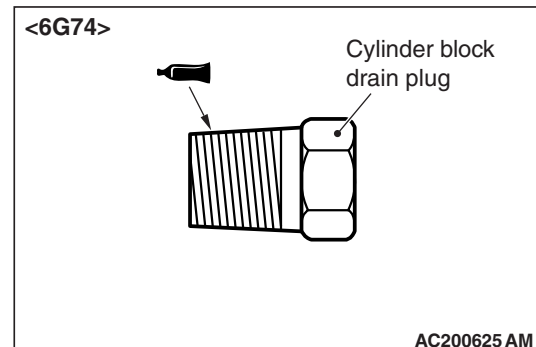


6. Install the engine oil cooler water drain plug and new gasket, and then tighten the engine oil cooler water drain plug to the specified torque. <4M41>

Tightening torque: $31 \pm 2 \text{ N}\cdot\text{m}$



7. Connect the engine oil cooler water feed hose of the engine oil cooler <4D56>.

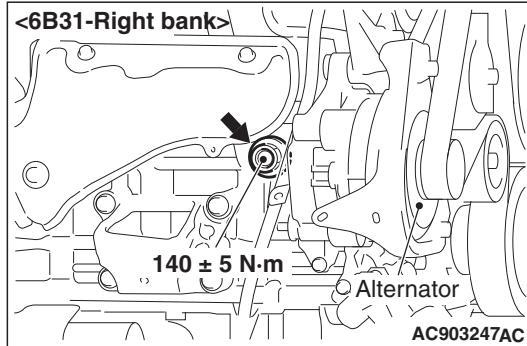
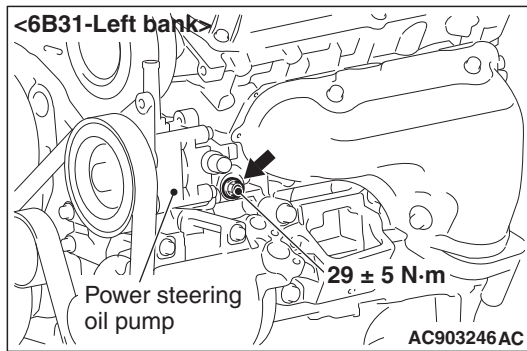


8. Apply the designated sealant to the screw area of the cylinder block drain plug, and then tighten to the specified torque. <6G74, 4G64>

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

Tightening torque: $39 \pm 5 \text{ N}\cdot\text{m}$ <6G74>

Tightening torque: $44 \pm 5 \text{ N}\cdot\text{m}$ <4G64>



9. Install the cylinder block drain plug and new gasket, and then tighten the cylinder block drain plug to the specified torque.

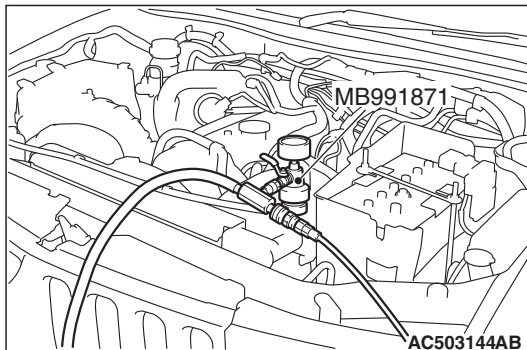
Tightening torque:

<Left bank> $29 \pm 5 \text{ N}\cdot\text{m}$
<Right bank> $140 \pm 5 \text{ N}\cdot\text{m}$

10. Securely tighten the drain plug of the radiator.
11. 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.



12. 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):

<4M41> 8.5 L
<4D56> 8.2 L
<6G74> 8.8 L
<6B31> 11.0 L
<4G64> 7.5 L

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

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

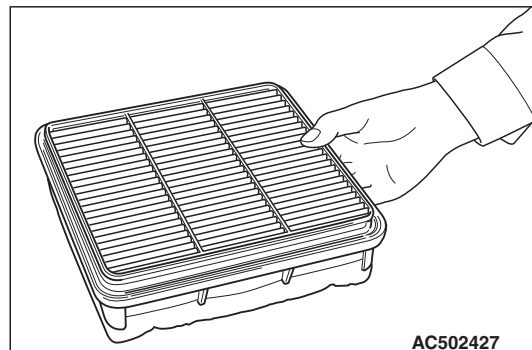
CAUTION

Do not overfill the radiator condenser tank.

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

A11. CHECK AIR CLEANER ELEMENT FOR CLOGGING AND DAMAGE

M6020201200851

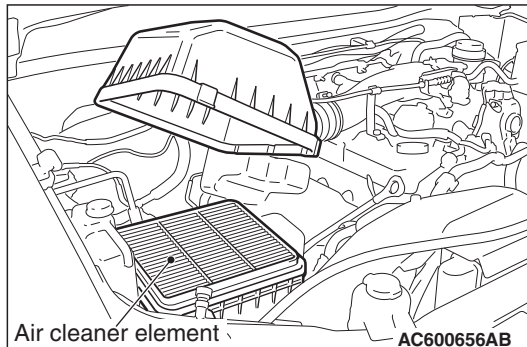


1. Check air cleaner element for clogging and damage.
2. Clean deposited dust from the element in the following manner.
 - (1) Lightly tap the element against the top of a bench.
 - (2) Blow compressed air from inside the element.
3. Wipe off dust on the air cleaner interior.
4. Install the air cleaner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

A12. REPLACE AIR CLEANER ELEMENT

M6020201301011

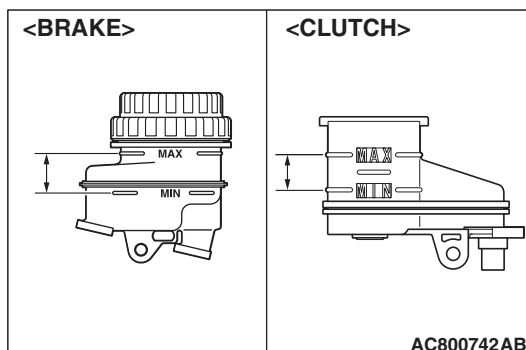
The air cleaner element will become dirty and loaded with dust during use, and the filtering effect will be substantially reduced. Replace it with a new one.



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.

A13. CHECK FLUID LEVEL IN BRAKE RESERVOIR AND CLUTCH RESERVOIR

M6020203000369

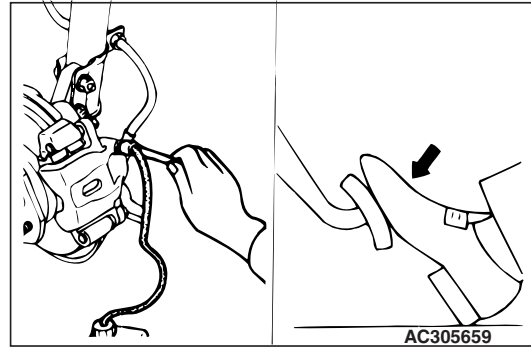


1. Check that the fluid level is between the "MAX" and "MIN" mark.
2. If it is below the "MIN" marks, replenish with fresh brake fluid up to the "MAX" mark.

Specified brake fluid: DOT 3 or DOT 4

A14. CHANGE BRAKE FLUID

M6020201601119



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.

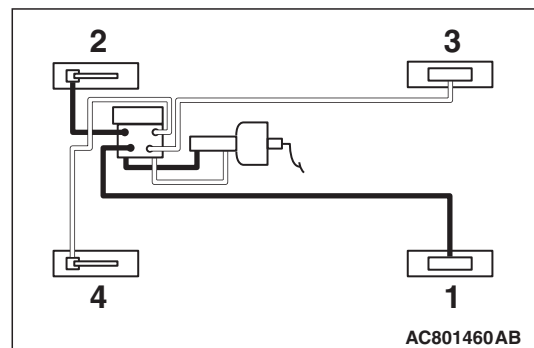
Specified brake fluid: DOT3 or DOT4

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.

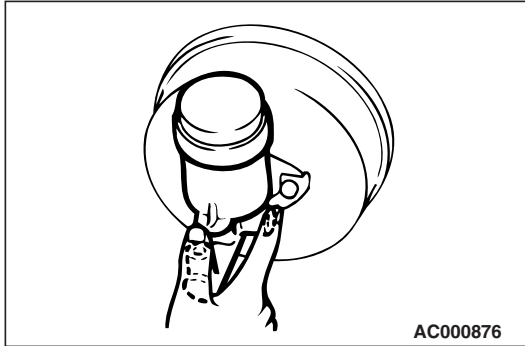


4. Repeat above steps for other bleeder screws.

MASTER CYLINDER BLEEDING

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

1. Fill the brake fluid reservoir with the brake fluid.
2. Depress and hold the brake pedal.



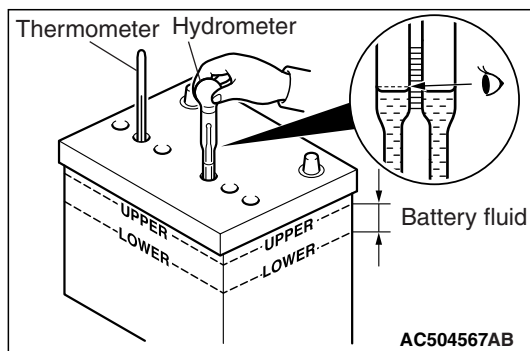
3. Another operator closes the master cylinder outlets with his fingers.
4. In this condition, release the brake pedal.
5. Repeat Steps 2 to 4 for 3 or 4 times to fill the master cylinder with the brake fluid.

A15. CHECK BATTERY CONDITION

M6020203100355

CAUTION

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



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

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

Standard value: 1.220 – 1.290 [20°C]

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

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

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

t: Actually measured temperature

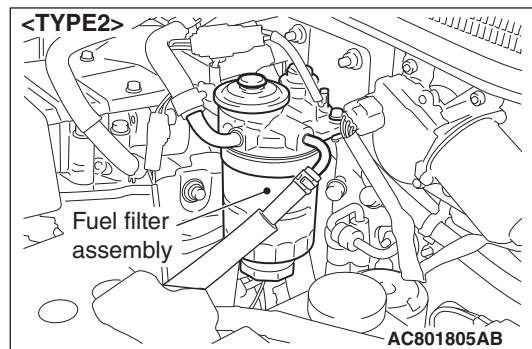
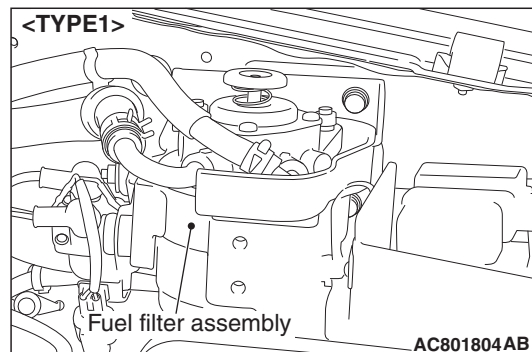
Dt: Actually measured specific gravity

A16. REPLACE FUEL FILTER

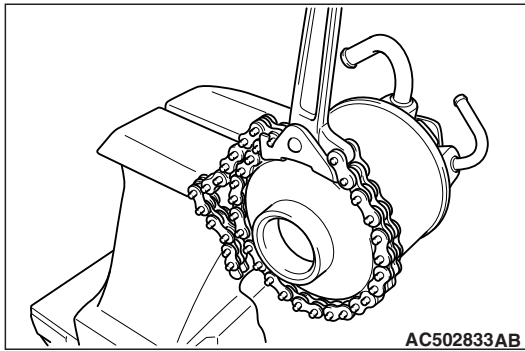
M6020201901176

<Diesel-powered vehicles with steel fuel filter case>

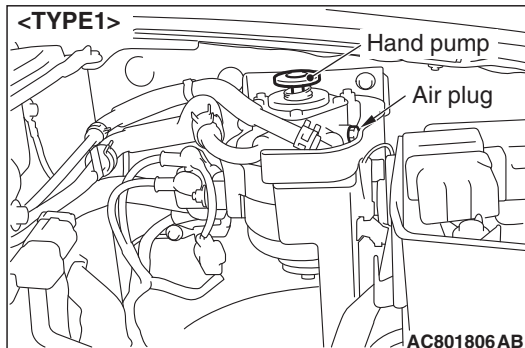
1. Remove the fuel tank cap to release the pressure inside the fuel tank.



2. 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.

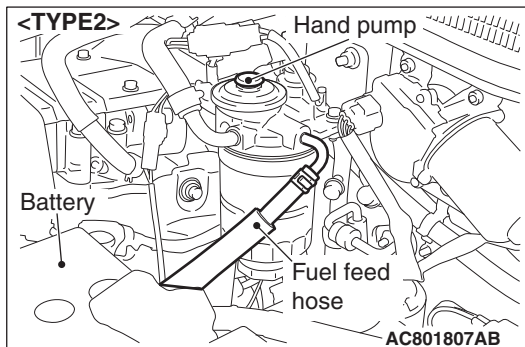


5. Install a new filter, and bleed the air from fuel line.
<TYPE1>

- (1) Remove the fuel filter air plug and O-ring.
- (2) Cover the circumference of the air plug hole with cloth and use a hand pump repeatedly until no bubbles come out of the air plug hole.
- (3) Replace the air plug and O-ring with a new one. Tighten the air plug to the specified torque.

Tightening torque: 5.0 ± 1.0 N·m

- (4) Repeat until the hand pump operation becomes stiff.



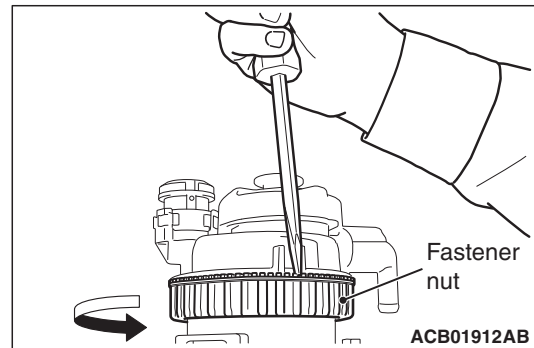
6. Install a new filter, and bleed the air from fuel line.
<TYPE2>

- (1) Connect the all fuel hose to the fuel filter, and pump the hand pump until the hand pump becomes stiff.

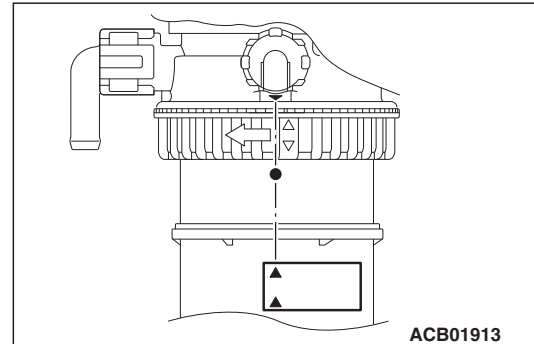
<Diesel powered vehicles with plastic fuel filter case>

1. Remove the fuel tank cap to release the pressure inside the fuel tank.
2. Remove the fuel filter protector B.
3. Loosen the drain plug to drain the fuel. Then, tighten the drain plug.

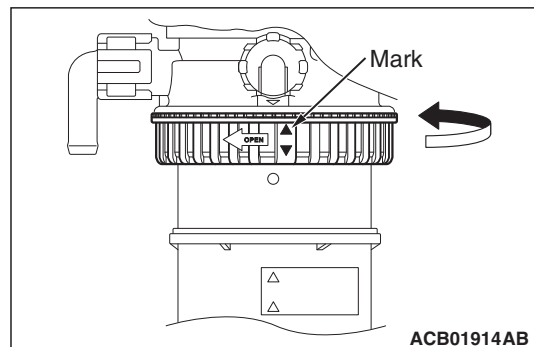
Tightening torque: 0.6 ± 0.2 N·m



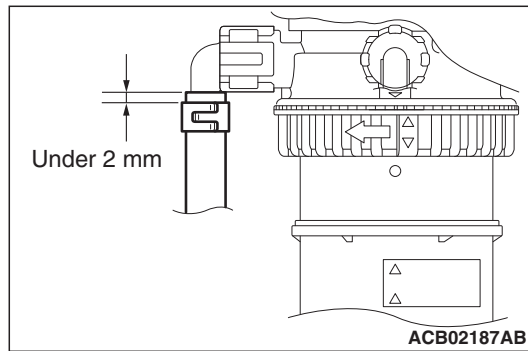
4. Insert a flat-tipped screwdriver into the groove of the fastener nut.
5. Loosen the fastener nut using the flat-tipped screwdriver until it can be loosened by hand.
6. Remove the fuel filter plug and O-ring.



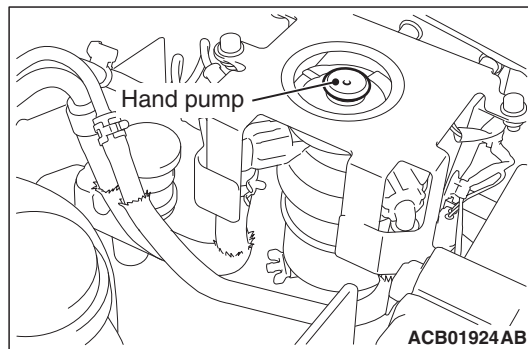
7. Install the fuel filter cap by aligning the marks on the fuel filter cap and the fuel filter case.



8. Securely tighten the fastener nut until the mark is in the position shown in the figure (until it clicks in place).



9. Securely insert the fuel line hose to the fuel filter and install the hose clip in the position shown in the figure.
10. Install the fuel filter protector B.

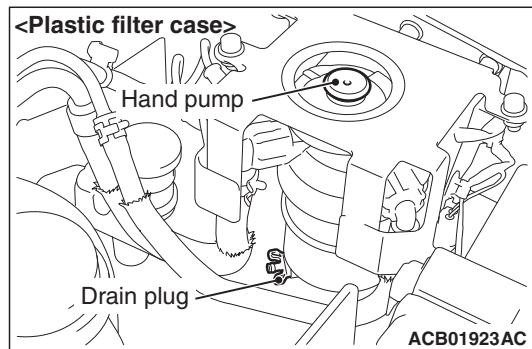
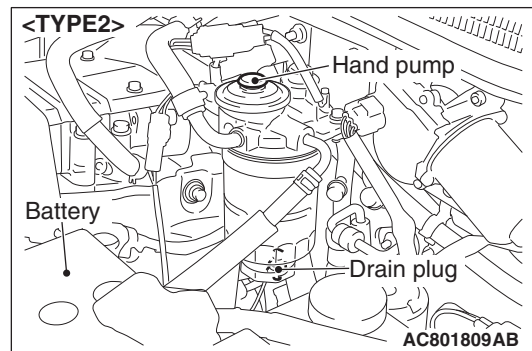
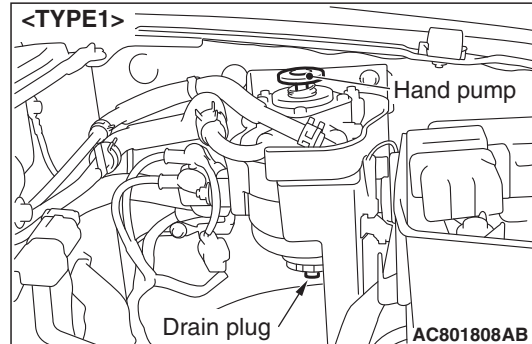


11. Repeat until the hand pump operation becomes stiff.

REMOVAL OF WATER FROM THE FUEL FILTER

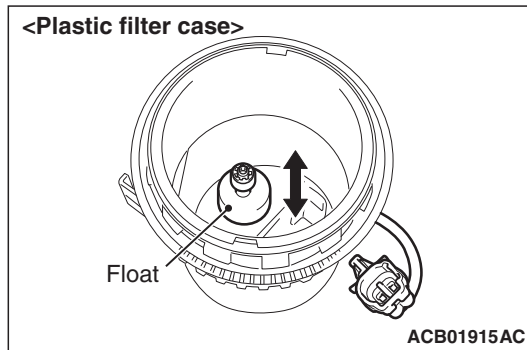
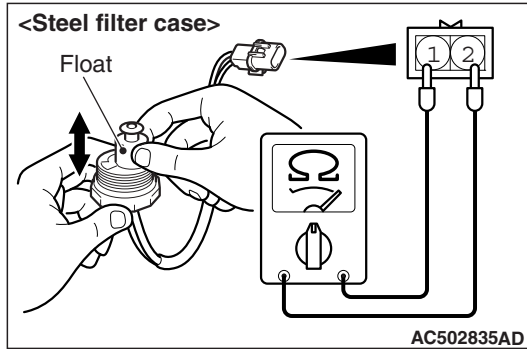
Water is in the fuel filter cartridge when fuel filter indicator lamp illuminates.

Remove water by the following procedures.



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

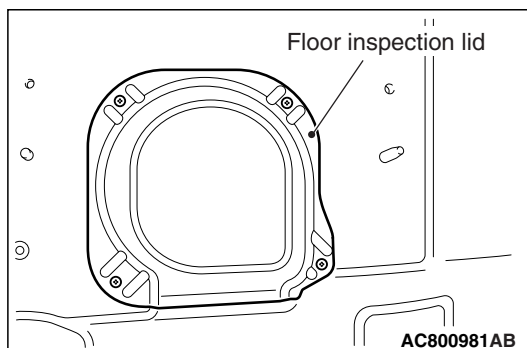
WATER LEVEL SENSOR CHECK



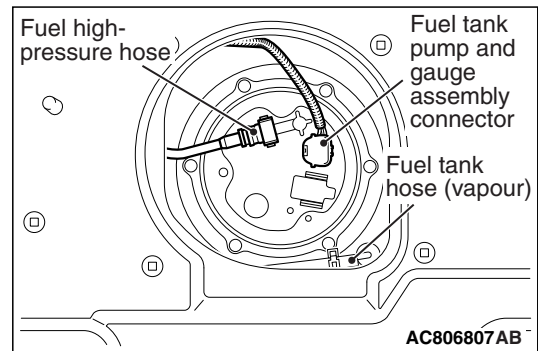
1. Connect the circuit tester to the water level sensor.
2. There should be continuity when the float is raised, while there is no continuity when it is lowered.
3. Replace the water level sensor if it is faulty.

<Petrol-powered vehicles>

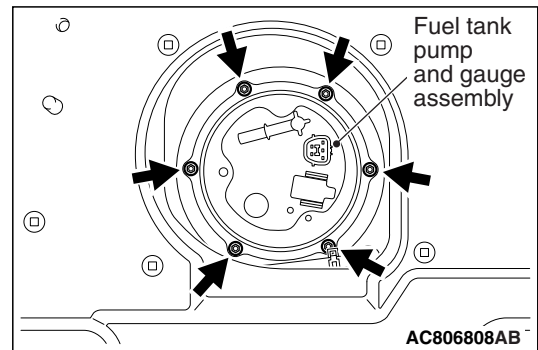
1. Reduce pressurized fuel lines.
2. Remove the second seat assembly (LH), rear scuff plate (LH) and turn up the floor carpet.



3. Remove the floor inspection lid.



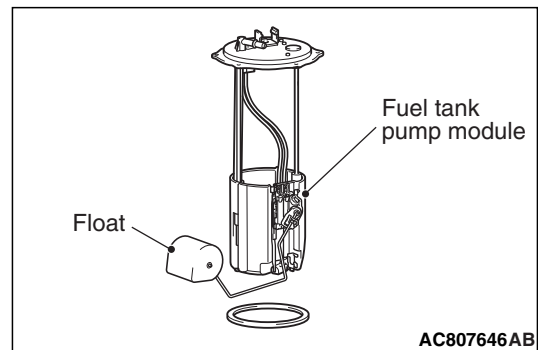
4. Disconnect the fuel tank pump and gauge assembly connector and fuel high-pressure hose.



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

CAUTION

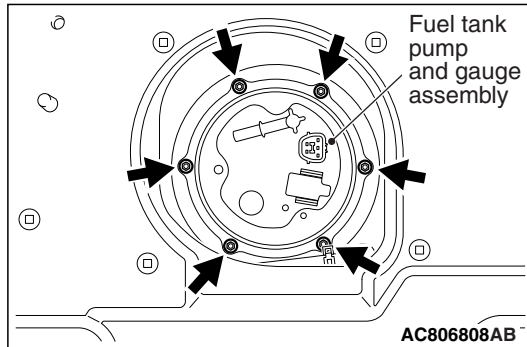
Pay attention not to damage float of the fuel tank gauge unit when removing the fuel tank pump and gauge assembly from the fuel tank.



6. Replace the fuel tank pump and gauge gasket with a new one.

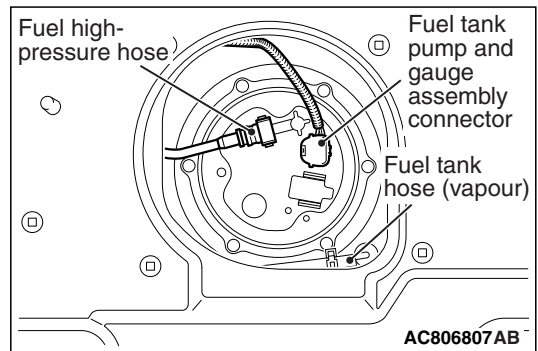
CAUTION

- Pay attention not to damage and the float of the fuel tank gauge unit when installing it to the fuel tank.
- When installing the fuel tank pump and gauge assembly to the fuel tank, check that the gauge moving area moves smoothly.

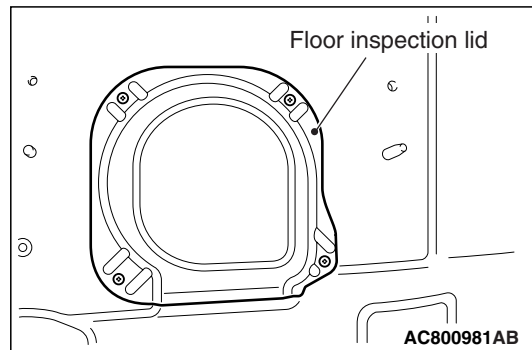


7. Tighten the fuel tank pump and gauge assembly mounting nuts to the specified torque.

Tightening torque: 2.5 ± 0.5 N·m



8. Connect the fuel tank pump and gauge assembly connector and fuel high-pressure hose.



9. Install the floor inspection lid.
10. Return the floor carpet to the original condition and install the second seat assembly.

OPERATIONS UNDER THE VEHICLE

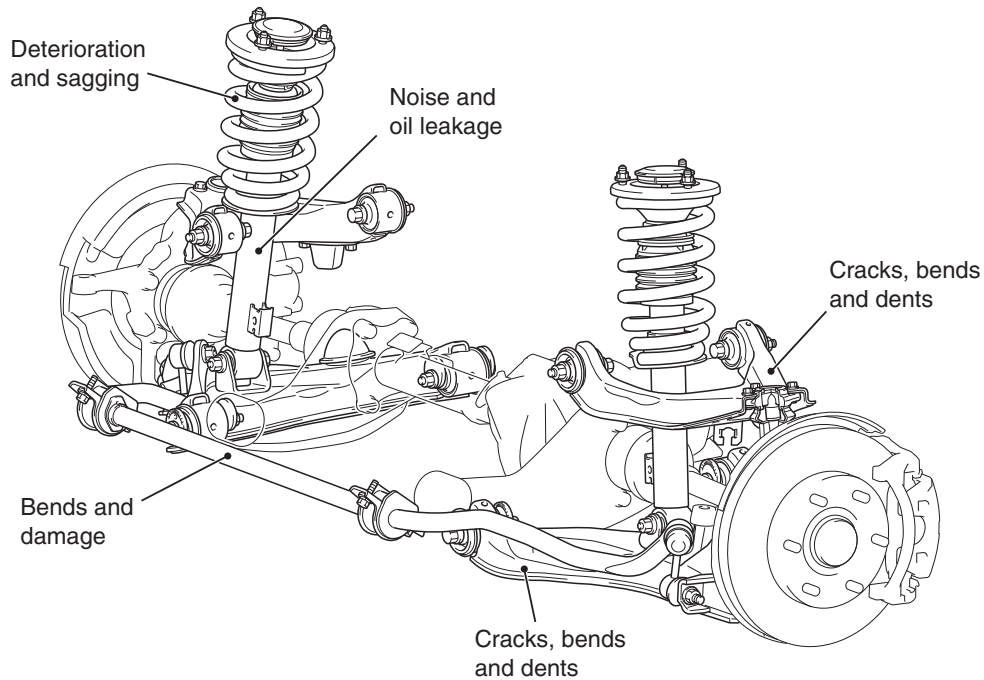
B1. CHECK SUSPENSION SYSTEM FOR DAMAGE AND LOOSENESS

M6020300100579

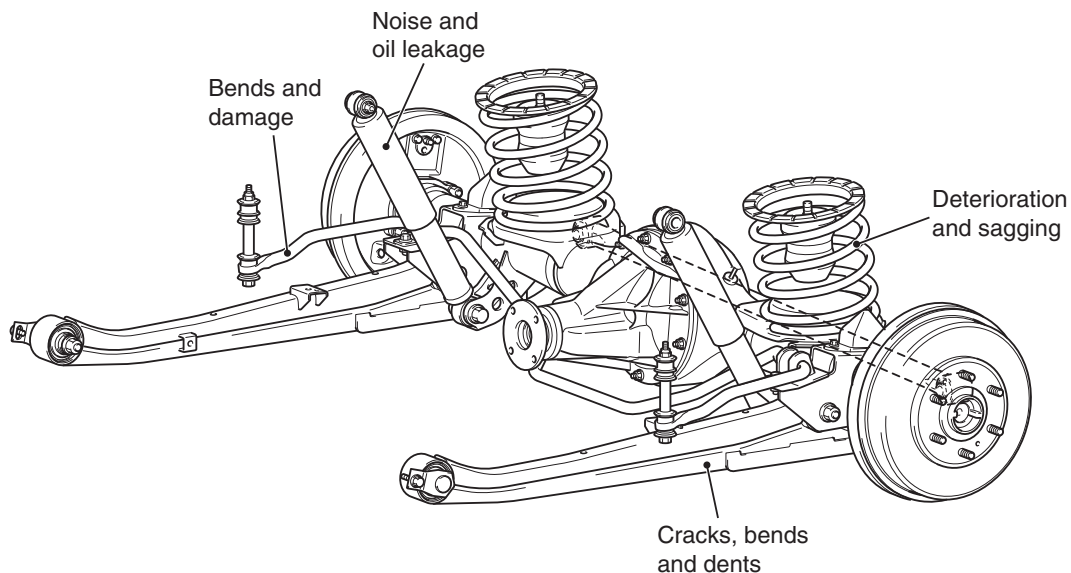
1. Check each portion of suspension for damage visually.

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

FRONT SUSPENSION

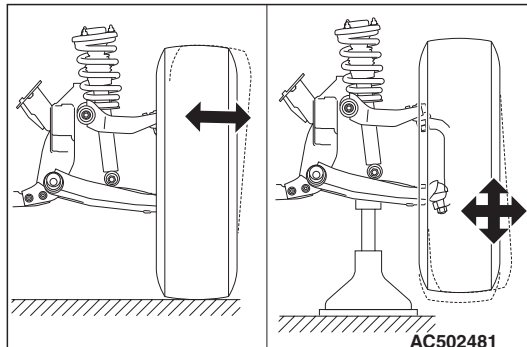


REAR SUSPENSION

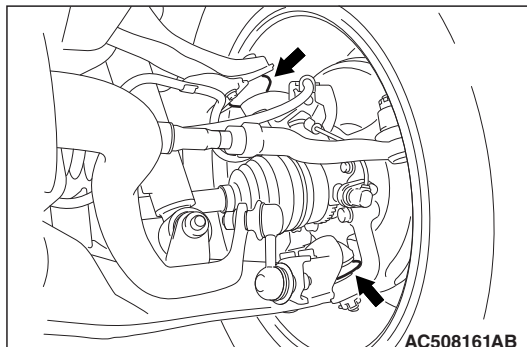


B2. CHECK SUSPENSION ARM BALL JOINTS FOR PLAY, AND DUST COVERS FOR DAMAGE

M6020300200554

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 COVERS FOR DAMAGE

1. 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.
2. If the lower arm ball joint cover is cracked or damaged, replace the lower arm ball joint assembly.

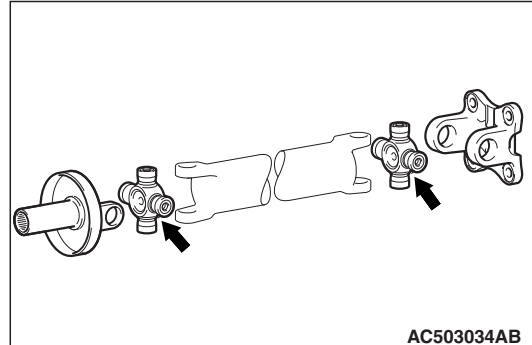
NOTE: If the lower arm ball joint cover is cracked or damaged, it is possible that there may also be damage to the ball joint.

3. 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.
4. 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

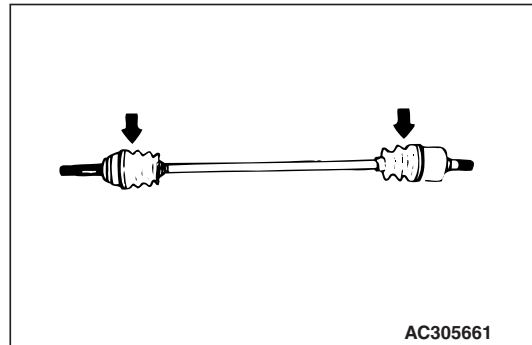
M6020301300082



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

B4. CHECK DRIVESHAFT BOOTS FOR DAMAGE

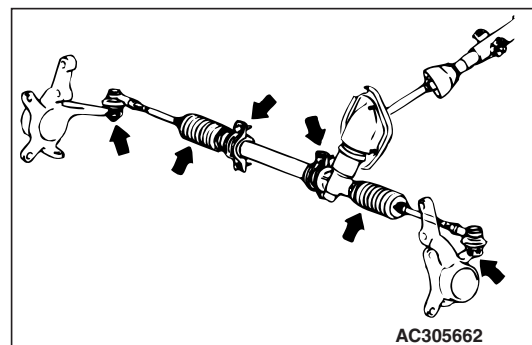
M6020300400451



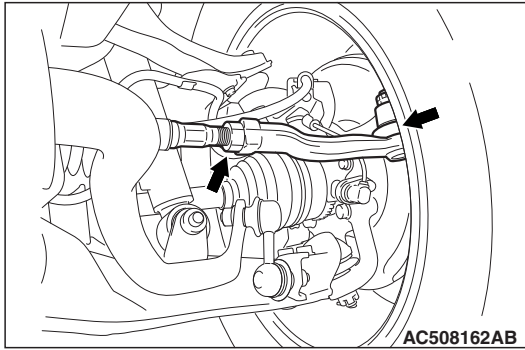
Check the driveshaft boots for damage.

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

M6020300500599



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



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

Tightening torque: 93 ± 15 N·m

B6. CHECK MANUAL TRANSMISSION FOR OIL LEAKAGE

(In case of leakage, check the oil level)

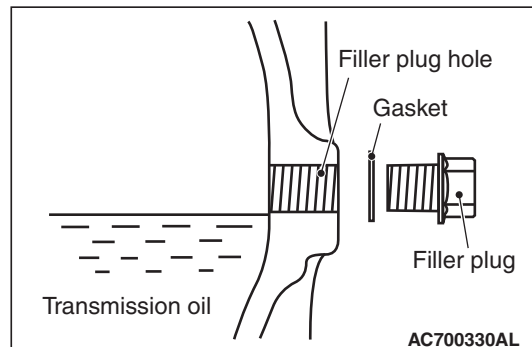
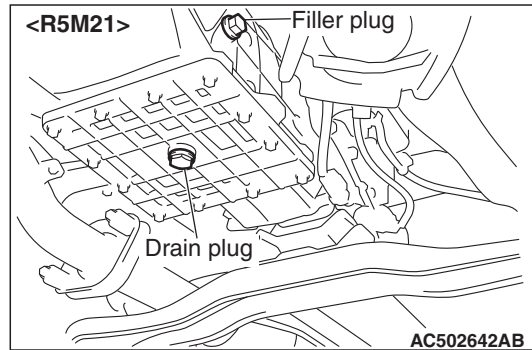
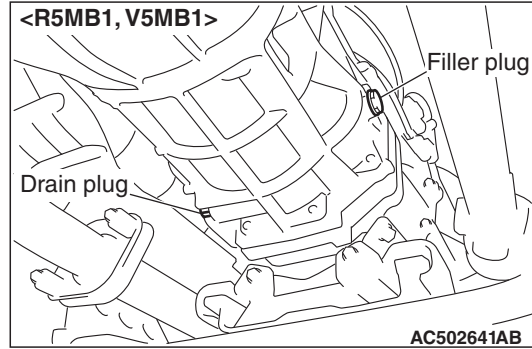
M6020302300449

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: 37 ± 11 N·m <R5MB, V5MB>, 32 ± 2 N·m <R5M2>

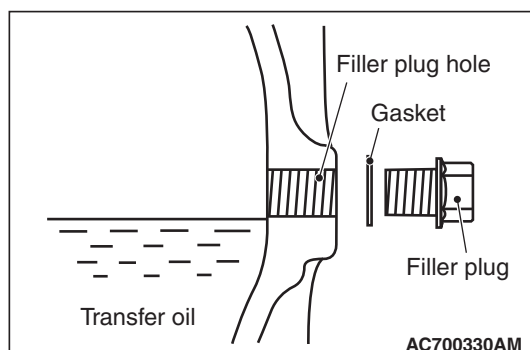
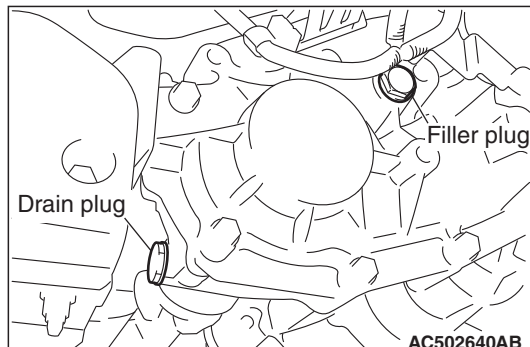
B7. CHECK TRANSFER FOR OIL LEAKAGE**(In case of leakage, check the oil level)**

M6020302400167

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.

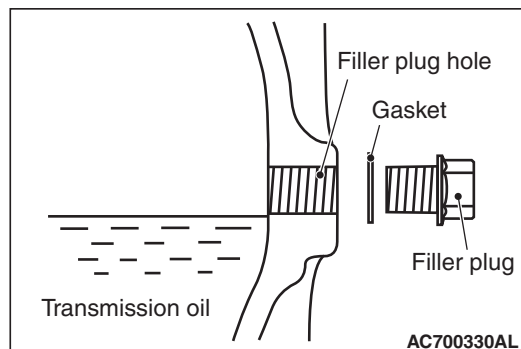
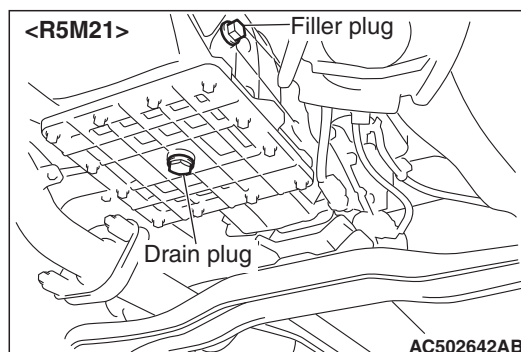
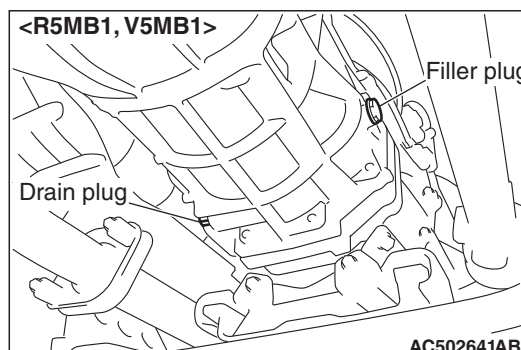
Check oil level

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

M6020300801117



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: 37 ± 11 N·m <R5MB and V5MB> or 32 ± 2 N·m <R5M2>

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

Specified transmission oil:

mitsubishi Motors GENUINE MTF API classification GL-3 SAE 75W-85 <R5MB, V5MB and R5M2> or mitsubishi Motors GENUINE Multi Gear oil API classification GL-4 SAE 75W-85 <R5M2 only>

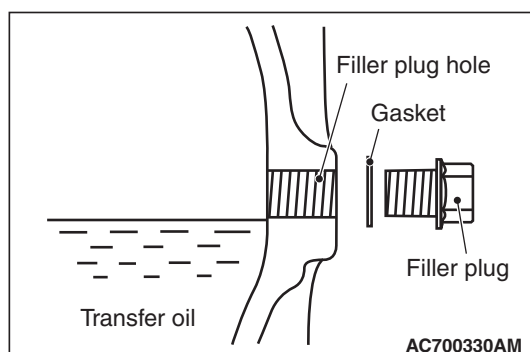
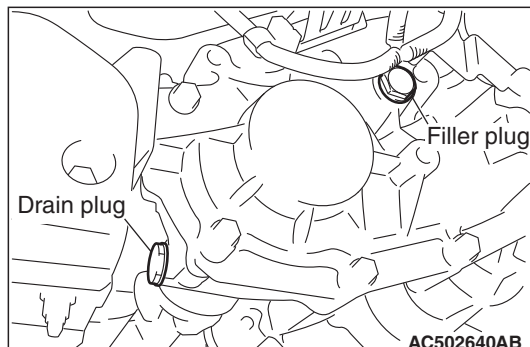
Quantity: 3.4 L <V5MB1> or 2.3L <R5MB1 and R5M21>

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

Tightening torque: $37 \pm 11 \text{ N}\cdot\text{m}$ <R5MB1 and V5MB1> or $32 \pm 2 \text{ N}\cdot\text{m}$ <R5M21>

B9. CHANGE GEAR OIL IN TRANSFER

M6020302600570



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

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

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

Specified transfer oil:

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

Quantity: 2.5L <Super Select 4WD>, 2.3L <Easy Select 4WD>

- 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)

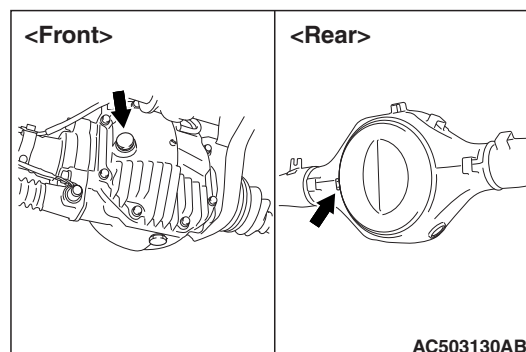
M6020301000542

CHECK OIL LEAKAGE

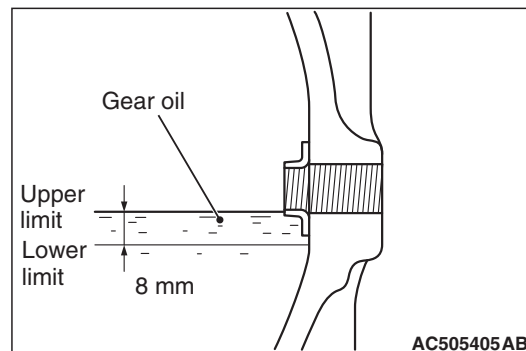
Check the area around the differential for oil leakage visually or by touching it with hand.

NOTE: If an oil leakage is detected, the oil level check is necessary.

CHECK OIL LEVEL FRONT DIFFERENTIAL



- Remove the under cover and filler plug.



- Check that gear oil level is not 8 mm below the bottom of filler plug hole.
- If the gear oil level is lower than the lower limit, add the specified gear oil until the level comes to the lower portion of the filler plug hole.

Specified gear oil:

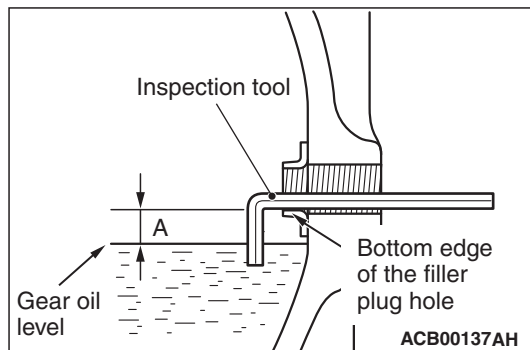
MITSUBISHI MOTORS GENUINE Super Hypoid Gear Oil API classification GL-5 SAE 80

- Tighten the filler plug to the specified torque.

Tightening torque: $50 \pm 10 \text{ N}\cdot\text{m}$

REAR DIFFERENTIAL**⚠ CAUTION**

Be careful not to drop the inspection tool into the differential.



1. Insert an inspection tool as shown so that it touches the bottom of the filler plug. The inspection tool: 6 mm-diameter L shaped bar (e.g. 6 mm-diameter angled hexagon wrench).
2. Pull out the wrench, and then check that the dimension to the gear oil level is within 24 mm.

Specified gear oil:

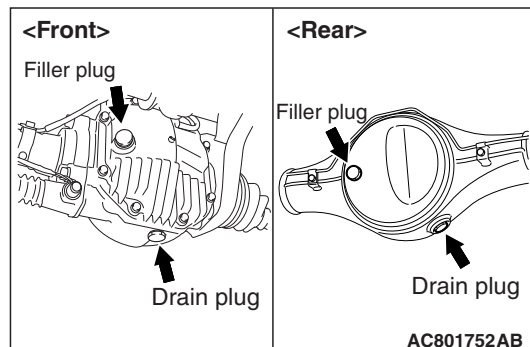
MITSUBISHI MOTORS GENUINE Super Hypoid Gear Oil API classification GL-5 SAE 80

3. Tighten the filler plug to the specified torque.

Tightening torque: $50 \pm 10 \text{ N}\cdot\text{m}$

B11. CHANGE GEAR OIL IN FRONT AND REAR DIFFERENTIAL

M6020301100798

Front 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: $65 \pm 5 \text{ N}\cdot\text{m}$

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

Specified gear oil:

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

Amount to use: 1.2 L

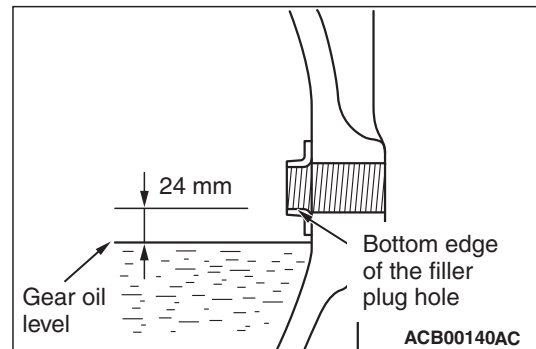
5. Tighten the filler plug to the specified torque.

Tightening torque: $50 \pm 10 \text{ N}\cdot\text{m}$

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: $60 \pm 10 \text{ N}\cdot\text{m}$



4. Refill the gear oil until the level satisfies the specification.

Specified gear oil:

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

Amount to use: 2.1 L

5. Tighten the filler plug to the specified torque.

Tightening torque: $50 \pm 10 \text{ N}\cdot\text{m}$

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

M6020301200535

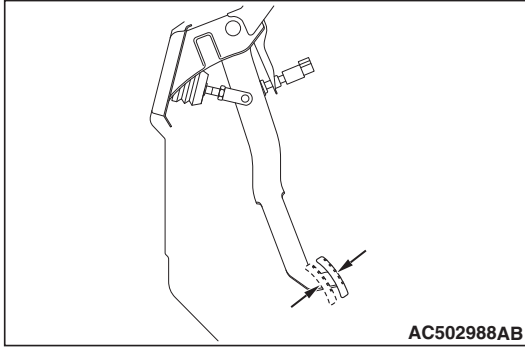
1. Confirm that the exhaust pipe does not interfere with any body components.
2. Check the exhaust pipe for damage by stones, etc.
3. Start the engine and check for gas leaks from the exhaust pipe connections.

OPERATIONS INSIDE THE VEHICLE

C1. CHECK BRAKE PEDAL AND CLUTCH PEDAL FOR FREE PLAY

M6020400100800

BRAKE PEDAL FREE PLAY



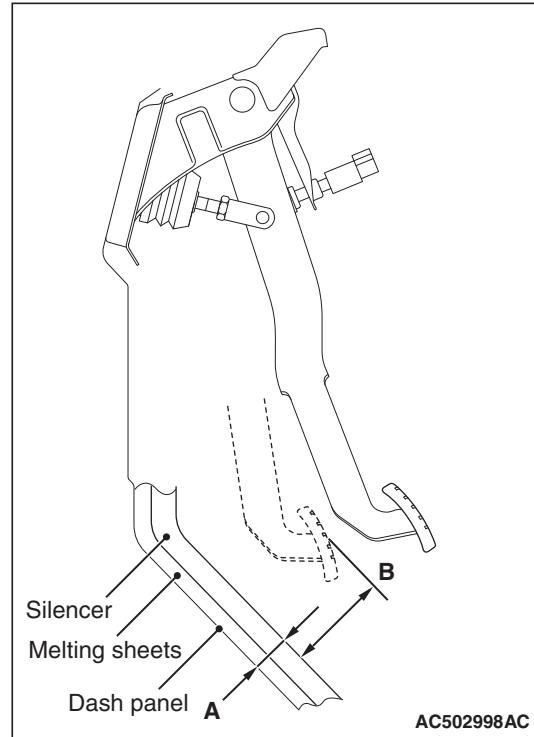
1. Turn the ignition switch to the "LOCK" (OFF) position, depress the brake pedal two or three times. After eliminating the vacuum in the brake booster, press the pedal down by hand, and confirm that the amount of movement before resistance is met (free play) is within the standard value range.

Standard value: 3 – 8 mm

2. If the brake pedal play is not within the standard value, check the following, and adjust or replace if necessary:
 - Excessive play between the brake pedal and the clevis pin, or between the clevis pin and the brake booster operating rod
 - Brake pedal height
 - Installation position of the stop lamp switch, etc.

CLEARANCE BETWEEN BRAKE PEDAL AND DASH PANEL

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



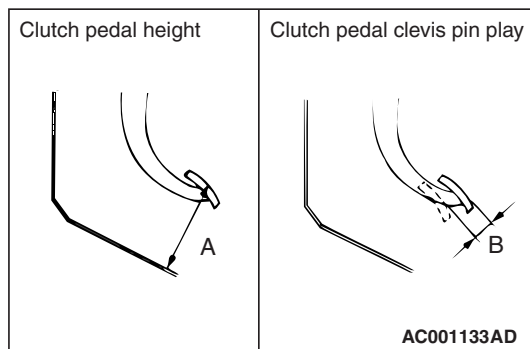
2. Pierce a needle or similar material to the silencer and melting sheets, and measure the thickness of "A" shown in the figure.
3. Start the engine, depress the brake pedal with approximately 490 N of force, and measure the distance "B" between the silencer and brake pedal shown in the figure.
4. Check that the total value of "A" and "B" measured in the previous items 2 and 3 is within the standard value.

Standard value (A + B): 75 mm or more
[From the surface of dash panel to the face of pedal pad]

5. If the clearance is outside the standard value, check for air trapped in the brake line, thickness of the disc brake pad, clearance between the lining and the drum and dragging in the parking brake. And then adjust and replace defective parts as required.
6. Return the carpet etc. to its original position.

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):

<LHD> 183.5 – 186.5 mm

<RHD> 178.5 – 181.5 mm

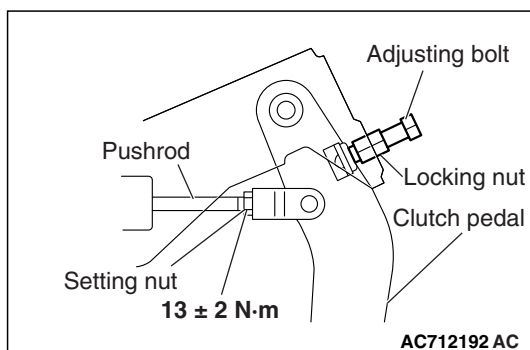
3. Measure the clutch pedal clevis pin play. If the play is outside the standard value, go to Step 5.

Standard value (B): 1 – 3 mm

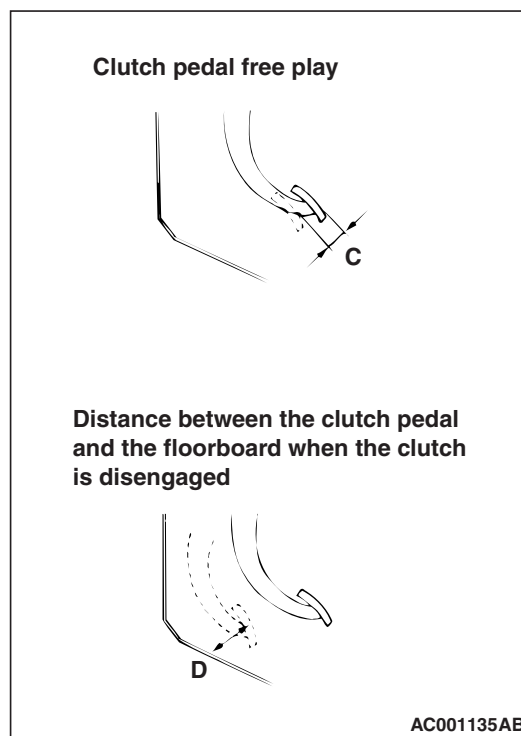
4. Remove the clutch switch. <Vehicles with cruise control>

⚠ 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 and the locking nut <Vehicles without auto-cruise control> to adjust the clutch pedal height to the standard value and move the pushrod and the adjusting bolt <Vehicles without auto-cruise control>.
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):**

<LHD> 74 mm or more

<RHD> 76 mm or more

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

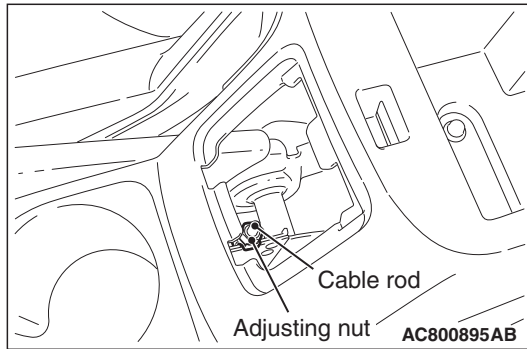
M6020400200744

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

Standard value: 8 – 9 notches**<Vehicles with rear drum brake>**

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

1. Remove the floor console panel.



2. Loosen the adjuster to move it to the cable rod end so that the cable will be free.
3. Depress the brake pedal repeatedly until the brake pedal has no change in its stroke.

NOTE: Depressing the brake pedal repeatedly adjusts shoe clearance correctly.

CAUTION

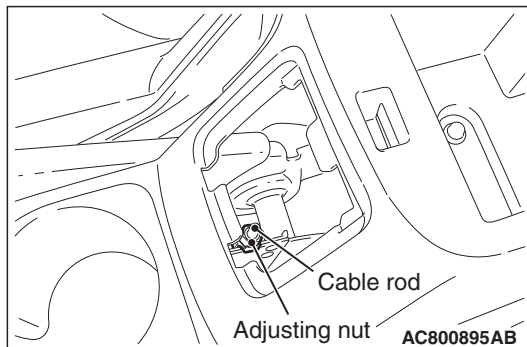
If the parking brake lever stroke is below the standard value and the braking is too firm, the rear brakes may drag.

4. Turn the adjuster to adjust the parking brake lever stroke to the standard value. After adjusting, check that there is no space between the adjuster and the parking brake lever. Check that the adjuster is secured with the adjuster holder.
5. After adjusting the parking brake lever stroke, jack up the rear end of the vehicle, and then release the parking brake and turn the rear wheels to check that the rear brakes are not dragging.

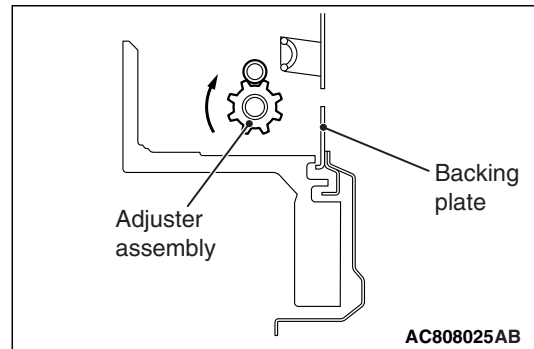
<Vehicles with rear drum in disc brake>

If the parking brake lever stroke is out of the standard range, adjust as described below:

1. Remove the floor console panel.



2. Loosen the adjuster to move it to the cable rod end so that the cable will be free.
3. Raise the vehicle, and remove the rear wheels.



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

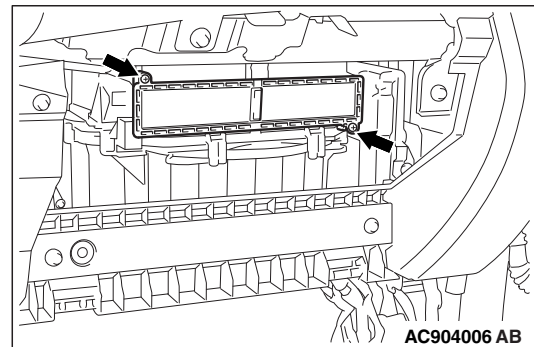
CAUTION

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

6. Turn the adjuster to adjust the parking brake lever stroke to the standard value. After adjusting, check that there is no space between the adjuster and the parking brake lever. Check that the adjuster is secured with the adjuster holder.
7. After adjusting the parking brake lever stroke, jack up the rear end of the vehicle, and then release the parking brake and turn the rear wheels to check that the rear brakes are not dragging.

C3. REPLACE AIR PURIFIER FILTER

M6020400300406



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

OPERATIONS OUTSIDE THE VEHICLE

D1. CHECK WHEEL ALIGNMENT

M6020500100937

FRONT WHEEL ALIGNMENT

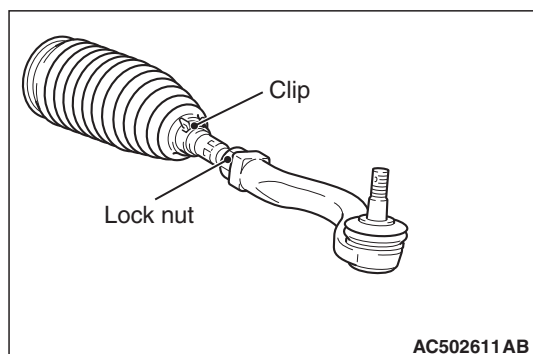
Measure wheel alignment with alignment equipment on a level surface. The front suspension, steering system, wheels, and tires should be serviced to normal condition before measuring wheel alignment.

TOE-IN

Standard value:

At the centre of tyre tread: 0 – 5 mm

Toe-angle (per wheel): 0° 00' – 0° 12'



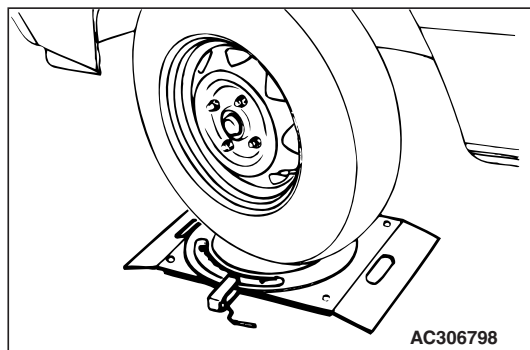
1. Adjust the toe-in by undoing the clip and lock nut, and turning the left and right tie rod turnbuckles by the same amount (in opposite directions).

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 ± 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:

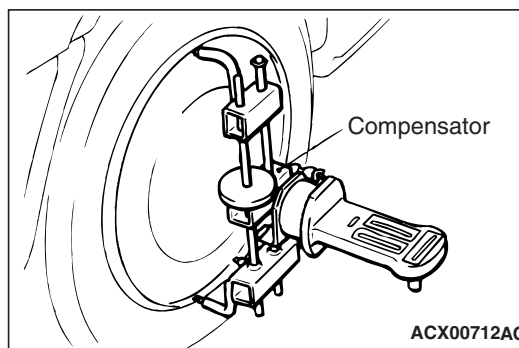
Inner wheels	36°50' ± 2°00' (Left/right deviation within 2°00')
Outer wheels (reference value)	32°40'

CAMBER, CASTER AND KINGPIN INCLINATION

Standard value:

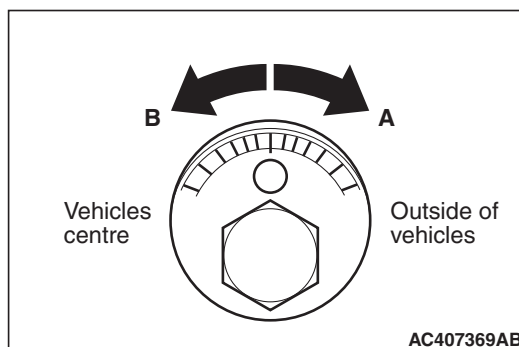
Camber	0°00' ± 0°30'*
Caster	4°18' ± 1°00'*
Kingpin inclination	12°45'

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



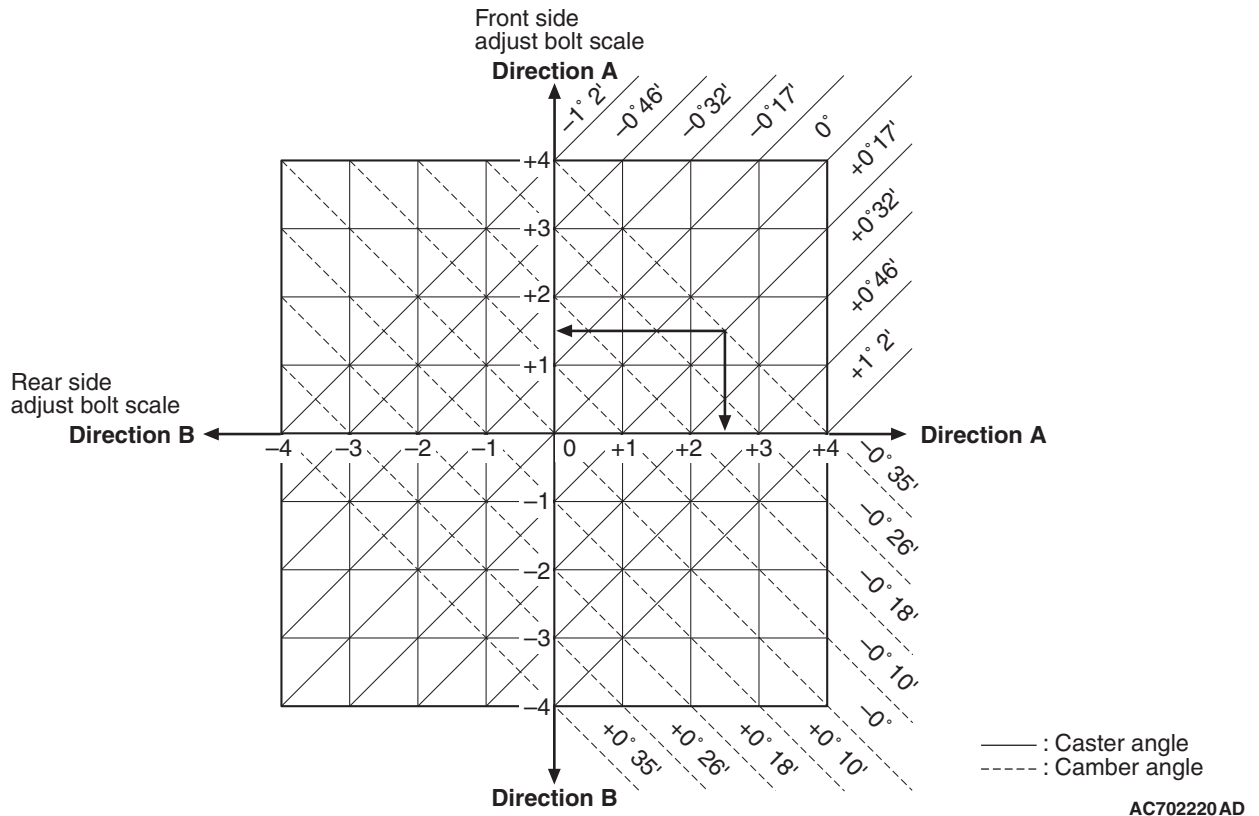
NOTE: For vehicles with aluminium wheels, attach the camber/caster/kingpin gauge by using a compensator.

CAMBER AND CASTER ADJUSTMENT



1. Adjust the camber and caster until they meet the standard value by turning the lower arm camber adjusting bolt.

- How to read this table (example). If the camber difference $-0^{\circ}35'$ and the caster difference is $0^{\circ}17'$ by comparing the measurement value with the standard value, rotate the front adjusting cam by 1.5 graduations and the rear adjusting cam by 2.5 graduations to the opposite direction against the "A" direction.



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

REAR WHEEL ALIGNMENT

- Before the wheel alignment measurement, adjust the rear suspension, wheel, and tyres in good condition.

- Park the vehicle on a level surface to measure the wheel alignment.

Standard value:

- **Toe-in: 0 mm**
- **Camber: 0°**

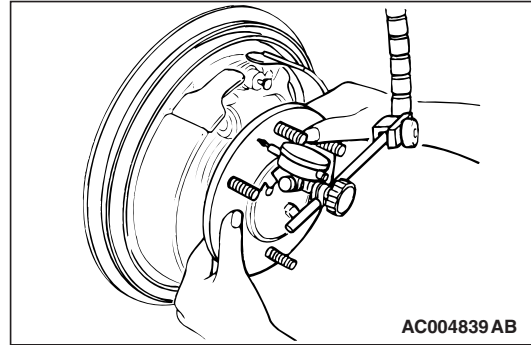
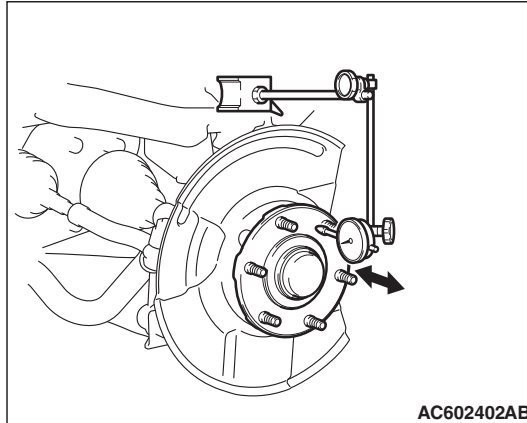
NOTE: Toe-in and camber are set at the factory and cannot be adjusted. If toe-in or camber is not within the standard value, check and replace bent or damaged parts.

D2. CHECK FRONT AND REAR WHEEL BEARINGS FOR PLAY**<Rear wheel>**

M6020500200354

<Front wheel>

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



1. Measure the axle shaft axial play by using a dial indicator.

Standard value: 0 – 0.30 mm

2. If not within specifications, replace the axle shaft assembly.

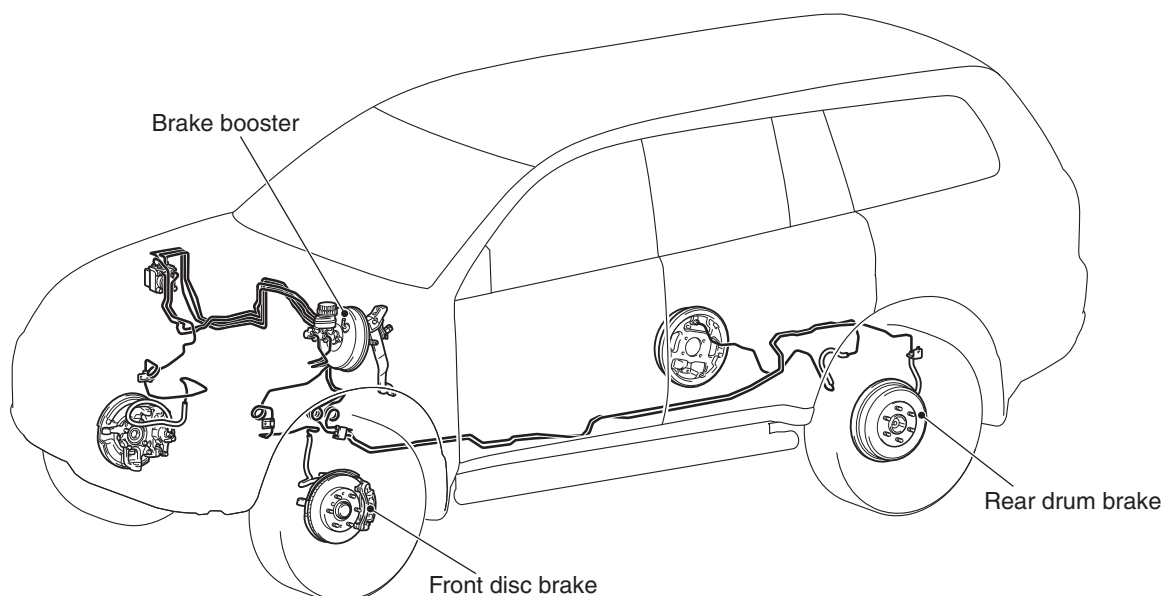
2. Attach a dial gauge as shown in the illustration, and then measure the axial play while moving the hub in the axial direction.

Limit: 0 mm

3. If the play exceeds the limit value, check the front hub assembly. If the wheel bearing is faulty, replace the front hub assembly.

D3. CHECK BRAKE HOSES AND PIPES FOR LEAKAGE

M6020500300544

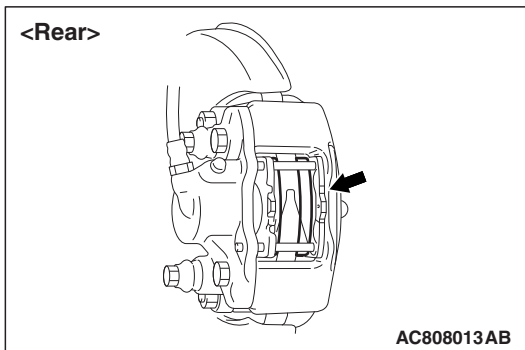
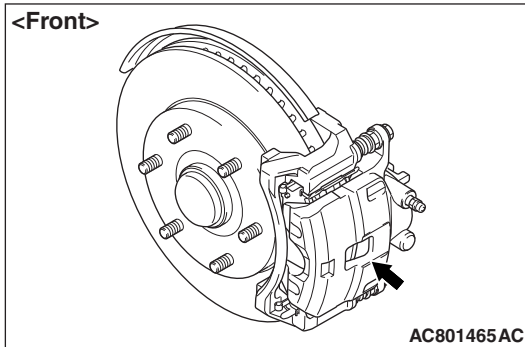


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1. Check entire circumference and length of hoses and pipes.
2. Check all clamps for tightness and connections for leakage.

D4. CHECK BRAKE PADS AND DISCS FOR WEAR

M6020500400767



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

Standard value:

9.5 mm <Front>

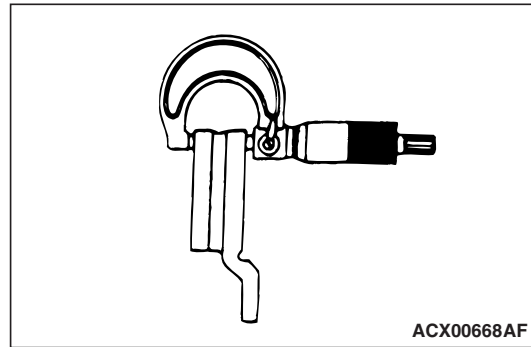
10.0 mm <Rear>

Limit:

1.5 mm <Front>

2.0 mm <Rear>

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



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

Standard value:

28.0 mm <Front>

18.0 mm <Rear>

Limit:

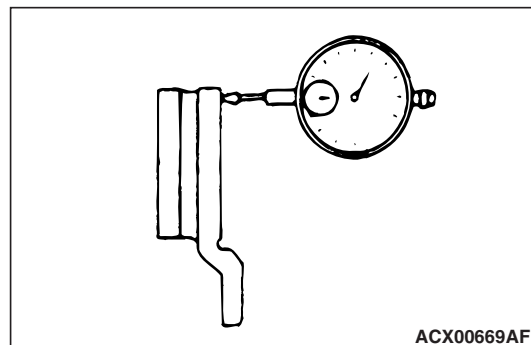
26.4 mm <Front>

16.4 mm <Rear>

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

BRAKE DISC RUN-OUT CHECK

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



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

Limit:

0.06 mm <Front>

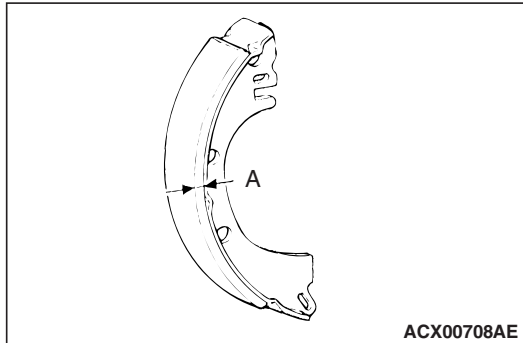
0.08 mm <Rear>

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

M6020500500678

BRAKE LINING THICKNESS CHECK

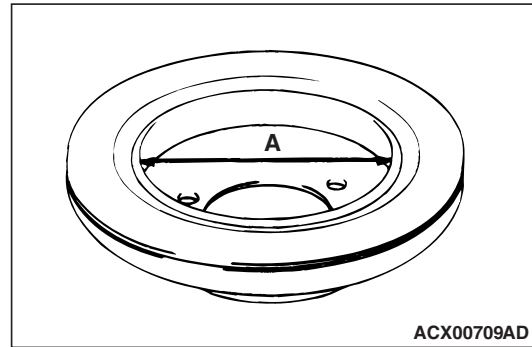
1. Remove the brake drum (drum in disc).



2. Measure the thickness of the brake lining at the place worn the most.
 <Vehicles with rear drum in disc brake>
 Standard value (A): 2.8 mm
 Limit (A): 1.0 mm
 <Vehicles with rear drum brake>
 Standard value (A): 5.0 mm
 Limit (A): 1.0 mm
3. Replace the shoe and lining assembly if the brake lining thickness is less than the limit or if it is not worn evenly.

BRAKE DRUM (DRUM IN DISC) INSIDE DIAMETER CHECK

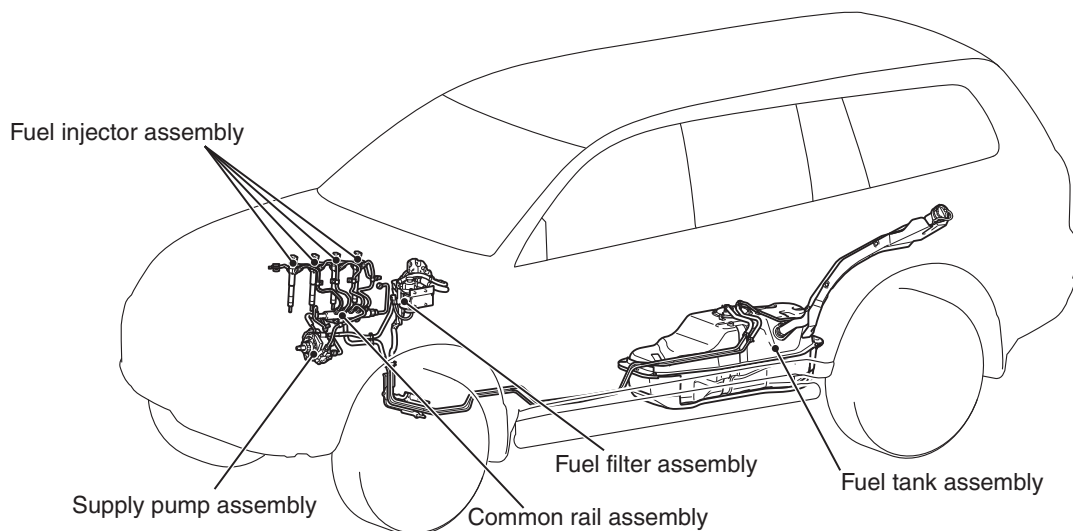
1. Remove the brake drum (drum in disc).



2. Measure the inside diameter of the brake drum (drum in disc) at two or more locations.
 <Vehicles with rear drum in disc brake>
 Standard value (A): 197.0 mm
 Limit (A): 198.0 mm
 <Vehicles with rear drum brake>
 Standard value (A): 295.0 mm
 Limit (A): 297.0 mm
3. Replace the brake drum (drum in disc), shoe and lining assembly when wear exceeds the limit value or is badly imbalanced.

D6. CHECK FUEL HOSES AND PIPES FOR LEAKAGE OR DETERIORATION

M6020500600545



AC801759AB

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

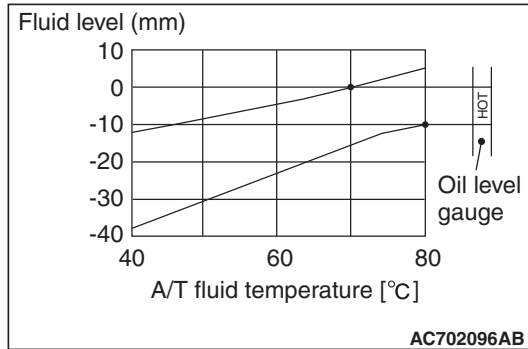
OPERATIONS AFTER ENGINE IS WARMED UP

E1. CHECK FLUID LEVEL IN AUTOMATIC TRANSMISSION

M6020600100707

1. Drive the vehicle until the A/T fluid temperature reaches the normal temperature (70 – 80°C).

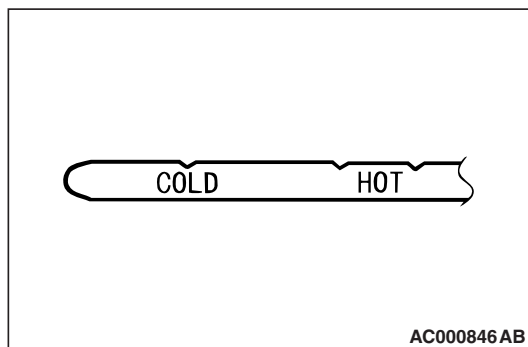
NOTE: Use M.U.T.-III. to measure the A/T fluid temperature.



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.
3. 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 from 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.



5. 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.

Automatic transmission 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 form in the fluid circuit. This will cause a drop in fluid pressure and cause the shift points to change and the clutches and brakes to slip. If the 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. CHANGE AUTOMATIC TRANSMISSION FLUID

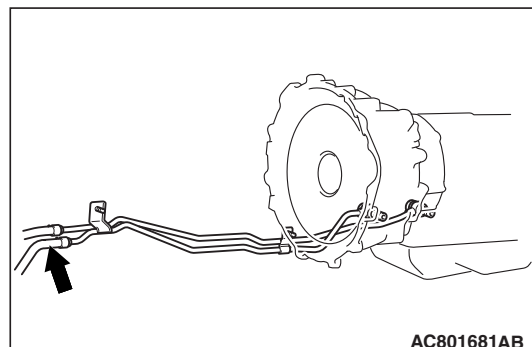
M6020600200856

Specifications

Automatic transmission fluid	Quantity	Remark
MITSUBISHI MOTORS GENUINE ATF SP III	9.7 L	V4A5A R4A5A 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.

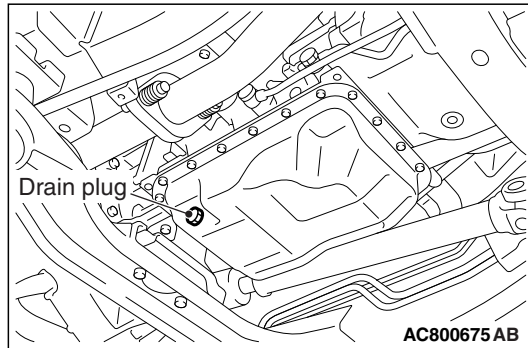
⚠ CAUTION

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



3. 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 ± 2 N·m

⚠ CAUTION

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

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

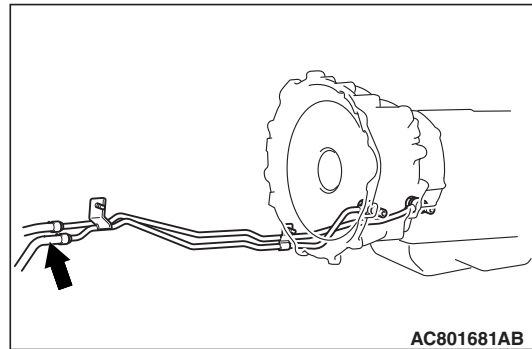
Amount to add: Approx. 5.5 L

6. Repeat the operation in step 2.

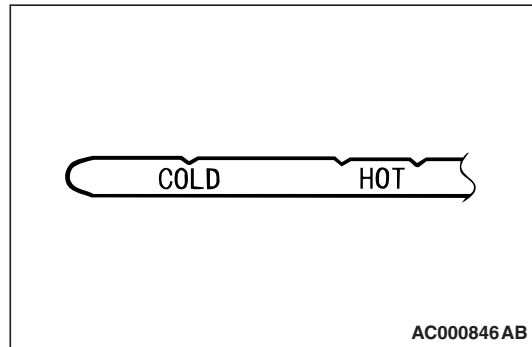
7. Pour in new A/T fluid through the oil filler tube.

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.



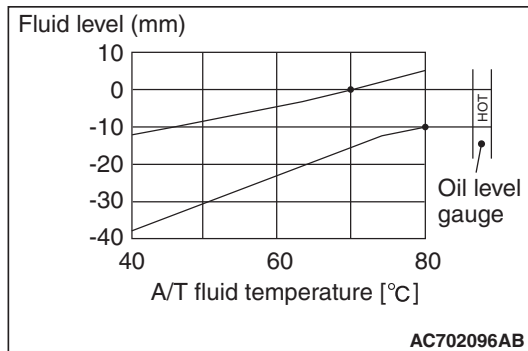
8. Connect the hose which was disconnected in step 1, and then securely re-insert the oil level gauge.
9. Start the engine, and let it run at idle for 1 – 2 minutes.
10. Move the selector lever to all positions once, and then return it to the P position.



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 judgement.

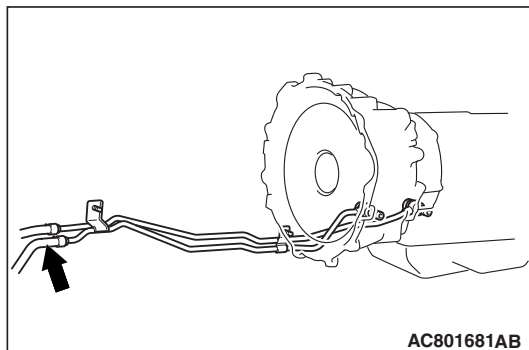
NOTE: Use M.U.T.-III. to measure the A/T fluid temperature.



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).

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



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

⚠ CAUTION

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

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

Amount to add: Approx. 3.5 L

4. Repeat the operation in steps 2 and 3.

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

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

E3. CHANGE ENGINE OIL

M6020600301522

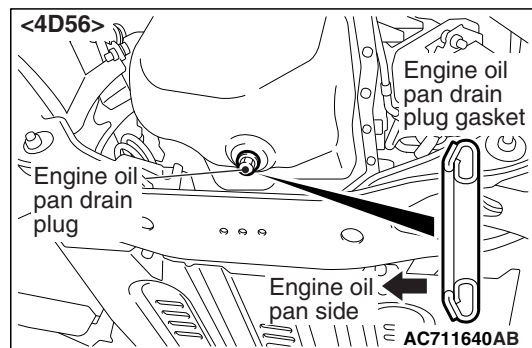
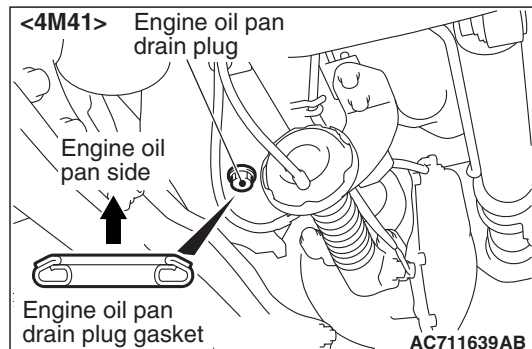
<4D56, 4M41>

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

⚠ CAUTION

Use care as engine oil could be hot.

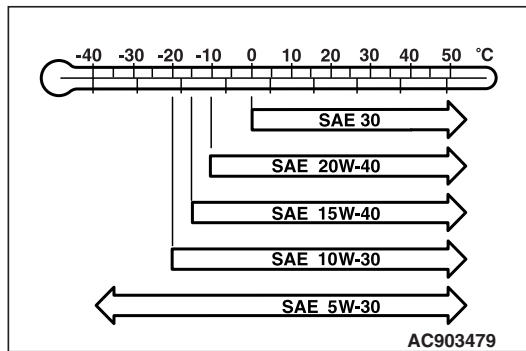
2. Remove the engine oil filler cap.
3. Remove the under skid plate and engine room under cover.
4. Remove the engine oil pan drain plug to drain engine oil.



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

Tightening torque: 39 ± 5 N·m

6. Install the under skid plate and engine room under cover.



7. Refill with specified quantity of engine oil.

<FOR GENERAL EXPORT>

Specified Engine Oil

- ACEA classification: "For service A1/B1, A3/B3, A3/B4 or A5/B5"
- API classification: "For service CD" or higher

Total quantity (includes volume inside oil filter and oil cooler): 9.3 L (4M41), 6.4 L (4D56)

<FOR EUROPE>

Specified Engine Oil

- ACEA classification: "For service A3/B3, A3/B4 or A5/B5"
- API classification: "For service CF-4"

Total quantity (includes volume inside oil filter and oil cooler): 6.4 L

8. Install the engine oil filler cap.
9. Check oil level.

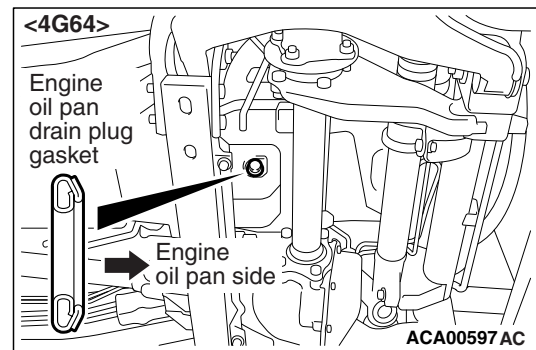
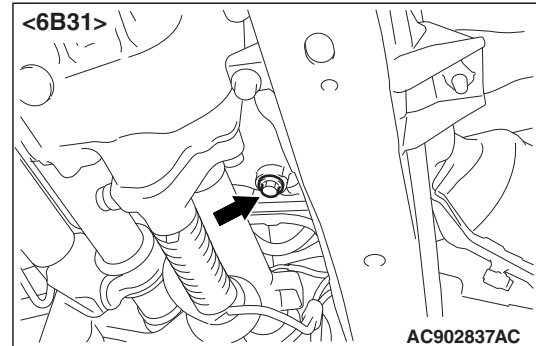
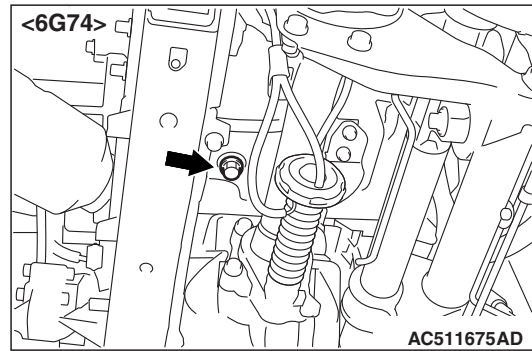
<6G74, 6B31, 4G64>

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

⚠ CAUTION

Use care as engine oil could be hot.

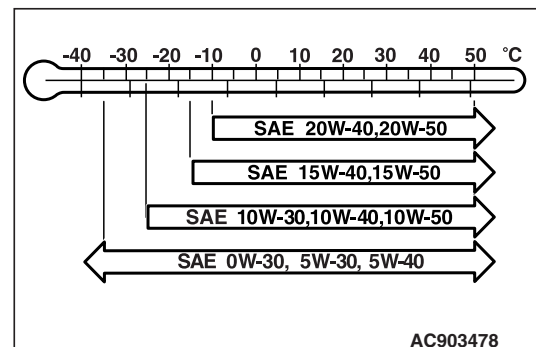
2. Remove the engine oil filler cap.
3. Remove the under skid plate and engine room under cover.
4. Remove the engine oil pan drain plug to drain engine oil.



5. Install a new engine oil pan drain plug gasket, and then tighten the engine oil pan drain plug to the specified torque.

Tightening torque: 39 ± 5 N·m

6. Install the under skid plate and engine room under cover.



7. Refill with specified quantity of engine oil.

Specified Engine Oil

- ACEA classification : "For service A1/B1, A3/B3, A3/B4 or A5/B5"
- API classification: "For service SG" or higher

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

<6G74> 4.6 L

<6B31, 4G64> 4.3 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 SG (or higher) specification.

8. Install the engine oil filler cap.
9. Check engine oil level.

E4. REPLACE ENGINE OIL FILTER

M6020600401198

<4D56, 4M41>

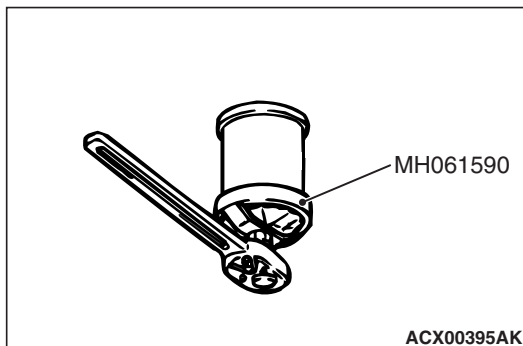
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.



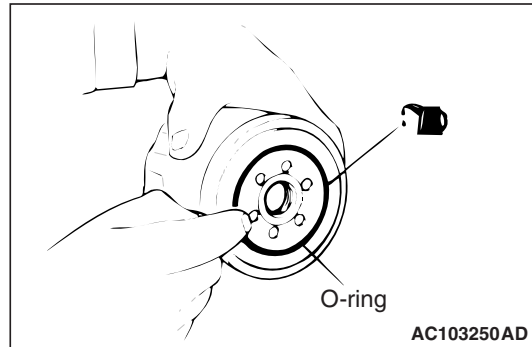
WARNING

Use care as oil could be hot.

2. Remove the engine oil filler cap.
3. Remove the under skid plate and engine room under cover.
4. Remove the engine oil pan drain plug to drain engine oil.



5. Use 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.

Oil filter number:

<4M41> 1230A046

<4D56> 1230A045

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 (22 ± 2 N·m)

9. Install the engine oil pan drain plug and refill the engine oil.
10. Install the engine oil filler cap.
11. Race the engine 2–3 times, and check to be sure that no engine oil leaks from installation section of the engine oil filter.
12. Install the under skid plate and engine room under cover.

<6G74>

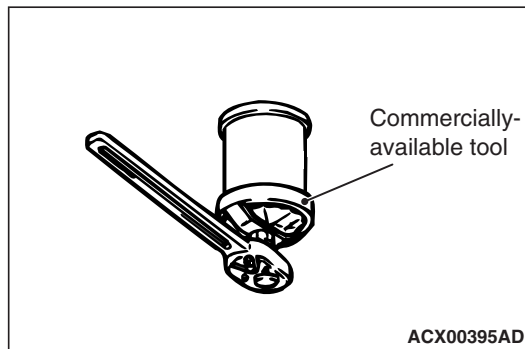
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80 °C to 90 °C.
2. Remove the engine oil filler cap.
3. Remove the under skid plate and engine room under cover.



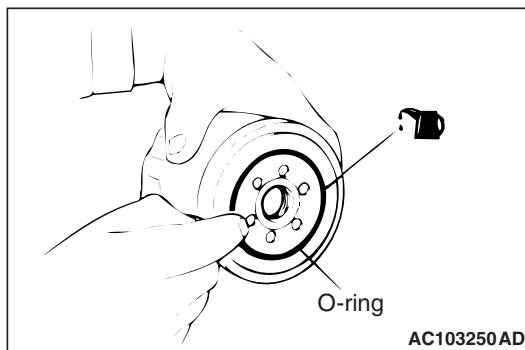
WARNING

Use care as engine oil could be hot.

4. Remove the engine oil pan drain plug to drain engine oil.



5. Use the commercially-available tool to remove the engine oil filter.
6. Clean the engine oil filter bracket side mounting surface.



7. Apply a small amount of engine oil to the O-ring of the new engine oil filter.

Oil filter number: MD352626

8. Once the O-ring of the engine oil filter is touching the flange, use the commercially-available tool to tighten to the specified torque.

**Tightening torque: approximately 3/4 turn
(14 ± 2 N·m)**

9. Install the engine oil pan drain plug and refill the engine oil.
10. Install the engine oil filler cap.
11. Race the engine 2–3 times, and check to be sure that no engine oil leaks from installation section of the engine oil filter.
12. Install the under skid plate and engine room under cover.

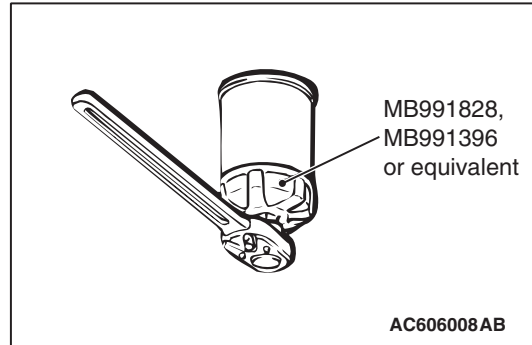
<6B31>

1. 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 oil could be hot.

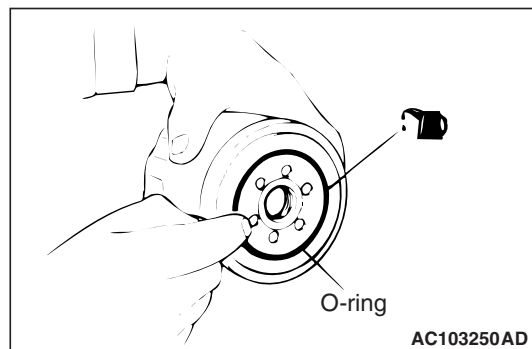
2. Remove the engine oil filler cap.
3. Remove the engine oil pan drain plug to drain engine oil.



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

Number	Special tool
MD332687 or MD365876	Oil filter wrench (MB991828) or equivalent
MD360935	Oil filter wrench (MB991396) or equivalent

5. Clean the engine oil filter bracket side mounting surface and ensure the old O-ring has been removed.



6. Apply a small amount of engine oil to the O-ring of the new engine oil filter.
7. Where the engine oil filter O-ring touches the engine oil filter bracket side mounting surface, tighten the engine oil filter to the specified torque using the special tool.

Number	Special tool	Tightening torque
MD332687 or MD365876	MB991828 or equivalent	Approximately 3/4 turn (16 ± 4 N·m)
MD360935	MB991396 or equivalent	Approximately one turn (14 ± 2 N·m)

- Install the engine oil pan drain plug and refill the engine oil .
- Rev the engine a few times, and check to be sure that no engine oil leaks from the installation section of the engine oil filter.

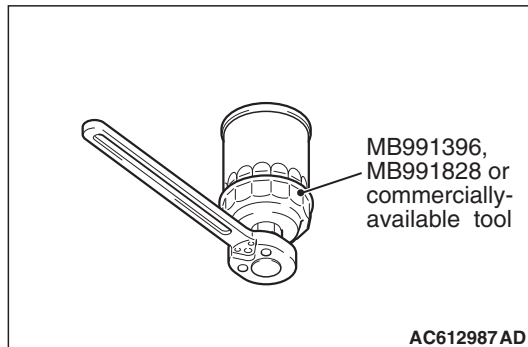
<4G64>

- Start the engine and allow it to warm up until the temperature of the engine coolant reaches 80 °C to 90 °C.
- Remove the engine oil filler cap.
- Remove the under skid plate and engine room under cover.

⚠ WARNING

Use care as engine oil could be hot.

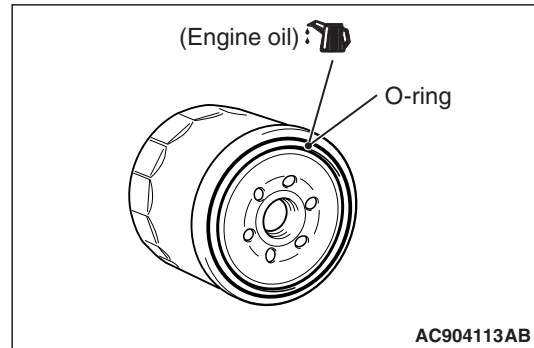
- Remove the engine oil pan drain plug to drain engine oil.



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

Number	Special tool
MD136466	Commercially- available tool
MD322508	
MD325714	Oil filter wrench (MB991828) or equivalent
MD332687	
MD365876	
MD360935	Oil filter wrench (MB991396) or equivalent

- Clean the engine oil filter bracket side mounting surface.



- Apply a small amount of engine oil to the O-ring of the new engine oil filter.
- Once the O-ring of the engine oil filter is touching the flange, use the respective tool in the following table to tighten to the specified torque.

Number	Special tool	Tightening torque
MD136466	Commercially-available tool	Approximately 3/4 turn (17 ± 3 N·m)
MD322508		
MD325714	Oil filter wrench (MB991828) or equivalent	Approximately 3/4 turn (16 ± 4 N·m)
MD332687		
MD365876		
MD360935	Oil filter wrench (MB991396) or equivalent	Approximately 1 turn (14 ± 2 N·m)

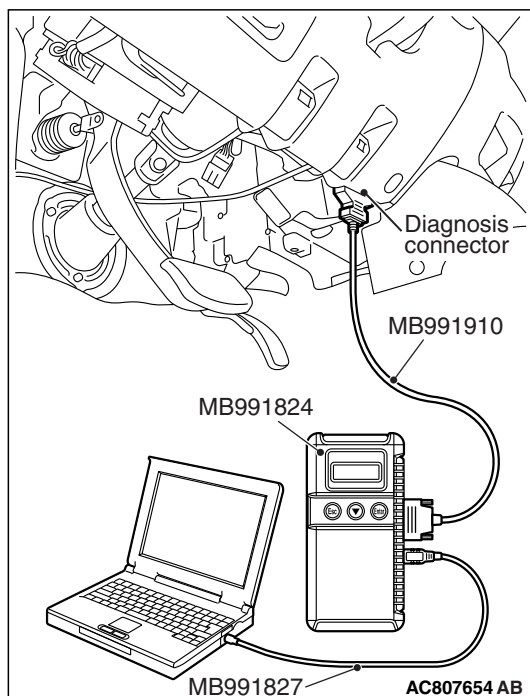
- Install the engine oil pan drain plug and refill the engine oil.
- Install the engine oil filler cap.
- Race the engine 2–3 times, and check to be sure that no engine oil leaks from installation section of the engine oil filter.
- Install the under skid plate and engine room under cover.

E5. CHECK ENGINE IDLING SPEED

M6020601300641

<4D56, 4M41>

1. Before inspection, set the vehicle to the pre-inspection condition.



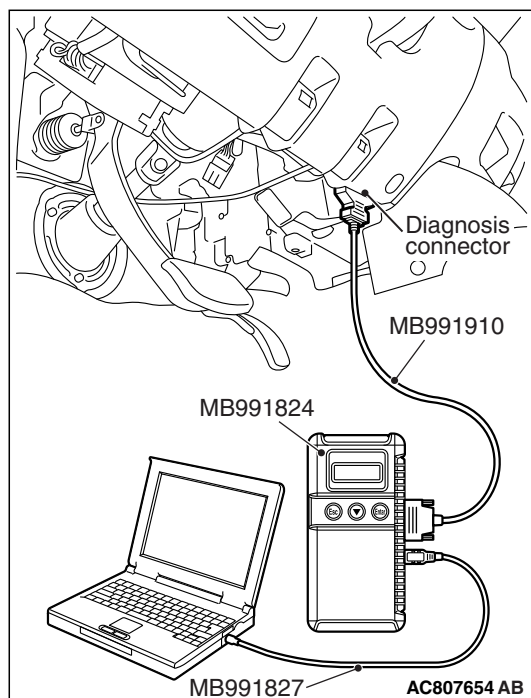
2. Turn the ignition switch to the "LOOK" (OFF) position, and connect the M.U.T.-III to the diagnosis connector.
3. Start the engine, and let it run at idle.
4. Check the idle speed.

Standard value: 650 ± 50 r/min

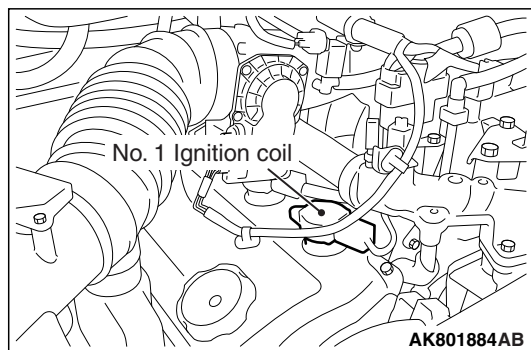
5. If the idle speed is not within the standard value, inspect the diesel system (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting).
6. Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T.-III.

<6G74>

1. Before inspection, set the vehicle to the pre-inspection condition.



2. Turn the ignition switch to the "LOOK" (OFF) position, and connect the M.U.T.-III to the diagnosis connector.



3. Set the timing light to the terminal No.3 power supply line (white) of the ignition coil No.1.
4. Start the engine and let it run at idle.
5. Check that ignition timing is at the standard value.

Standard value: approximately 10° BTDC

NOTE: The ignition timing may fluctuate within ± 7° BTDC. This is normal.

NOTE: In higher altitude, the ignition timing is more advanced than the standard value by approximately 5°.

NOTE: Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.

6. Check the idle speed.

Standard value: 700 ± 100 r/min

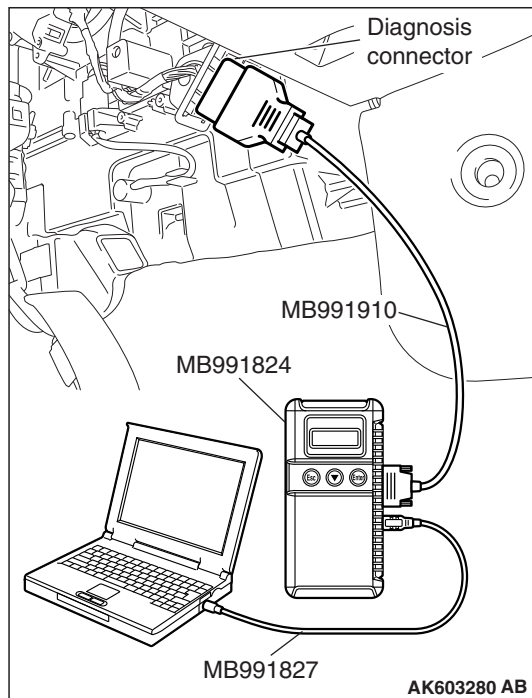
NOTE: The idle speed is controlled automatically by the idle speed control system.

NOTE: When using the M.U.T.-III, select item No.2 and take a reading of the idle speed.

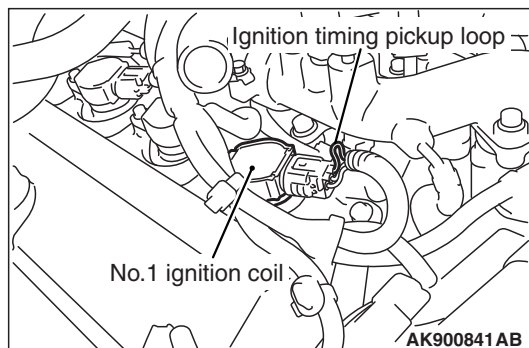
7. If the idle speed is outside the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP13-Troubleshooting.)
8. Remove the timing light.
9. Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T.-III.

<6B31>

1. Before inspection, set the vehicle to the pre-inspection condition.



2. Turn the ignition switch to the "LOCK" (OFF) position and then connect the M.U.T.-III to the diagnosis connector.



3. Set the timing light to the timing pick-up loop (white) of No. 1 ignition coil.
4. Start the engine and let it run at idle.
5. Check that ignition timing is at the standard value.

Standard value: approximately 10° BTDC

NOTE: The ignition timing may fluctuate within ±7°. This is normal.

NOTE: In higher altitude, the ignition timing is more advanced than the standard value by approximately 5°.

NOTE: Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.

6. Check the idle speed.

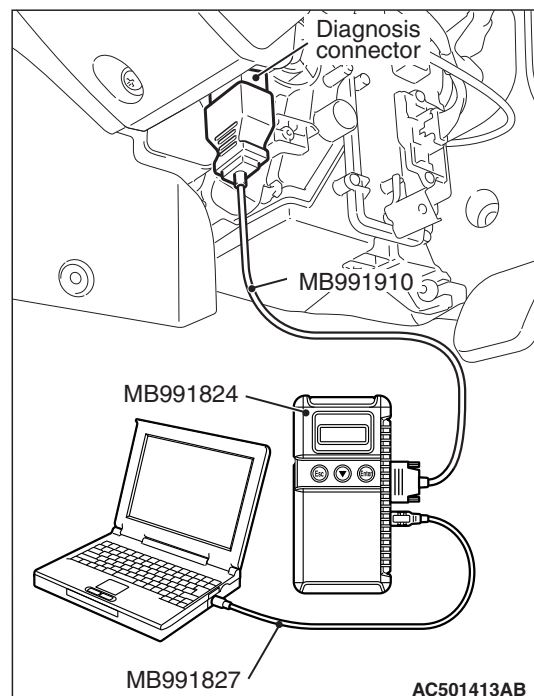
Standard value: 650 ± 100 r/min

NOTE: The idle speed is controlled automatically by the idle speed control system.

NOTE: When using the M.U.T.-III, select item No. 2 and take a reading of the idle speed.

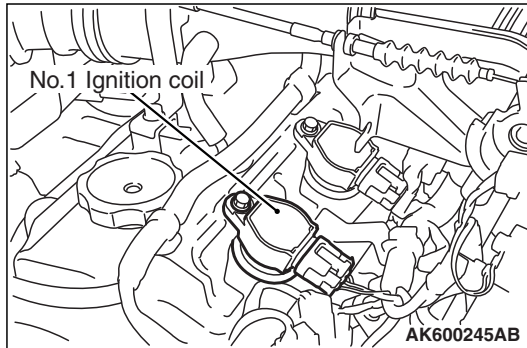
7. If the idle speed is outside the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting).
8. Remove the timing light.
9. Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T.-III.

<4G64>



1. Before inspection, set the vehicle to the pre-inspection condition.

- Turn the ignition switch to the "LOCK" (OFF) position and then connect the M.U.T.-III to the diagnosis connector.



- Set the timing light to the terminal No. 3 power supply line (white) of the ignition coil No. 1.
- Start the engine and let it run at idle.
- Check that ignition timing is at the standard value.

Standard value: approximately 10° BTDC

NOTE:

- The ignition timing may fluctuate within $\pm 7^\circ$. This is normal.
- In higher altitude, the ignition timing is more advanced than the standard value by approximately 5° .
- Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.

- Check the idle speed.

Standard value: 720 \pm 100 r/min

NOTE:

- The idle speed is controlled automatically by the idle speed control system.
- When using the M.U.T.-III, select item No. 2 and take a reading of the idle speed.

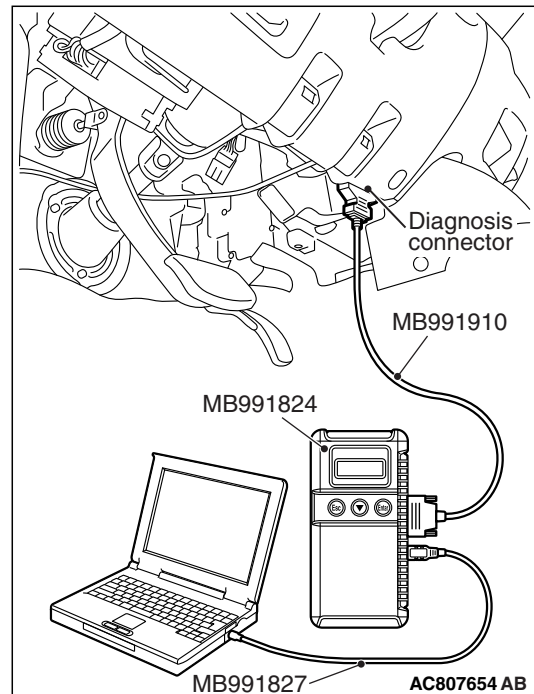
- If the idle speed is outside the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting).
- Remove the timing light.
- Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T.-III.

E6. CHECK CO CONCENTRATION (PETROL-POWERED VEHICLES)

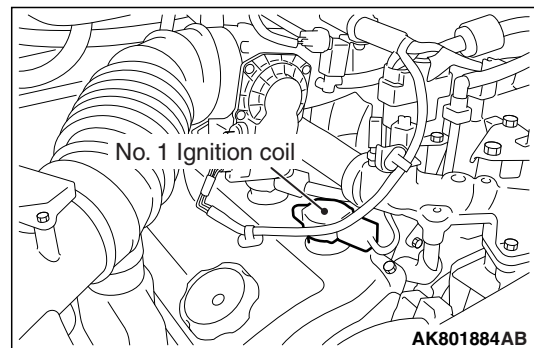
M6020601000769

<6G74>

- Before inspection, set the vehicle to the pre-inspection condition.



- Turn the ignition switch to the "LOCK" (OFF) position and then connect the M.U.T.-III to the diagnosis connector.



- Set the timing light to the terminal No. 3 power supply line (white) of the ignition coil No. 1.
- Start the engine and let it run at idle.
- Check that ignition timing is at the standard value.

Standard value: approximately 10° BTDC

NOTE: The ignition timing may fluctuate within $\pm 7^\circ$ BTDC. This is normal.

NOTE: In higher altitude, the ignition timing is more advanced than the standard value by approximately 5° .

NOTE: Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.

- Run the engine at 2,000 – 3,000 r/min for 2 minutes.
- Set the CO, HC tester.

8. Check the CO contents and the HC contents at idle.

Standard value

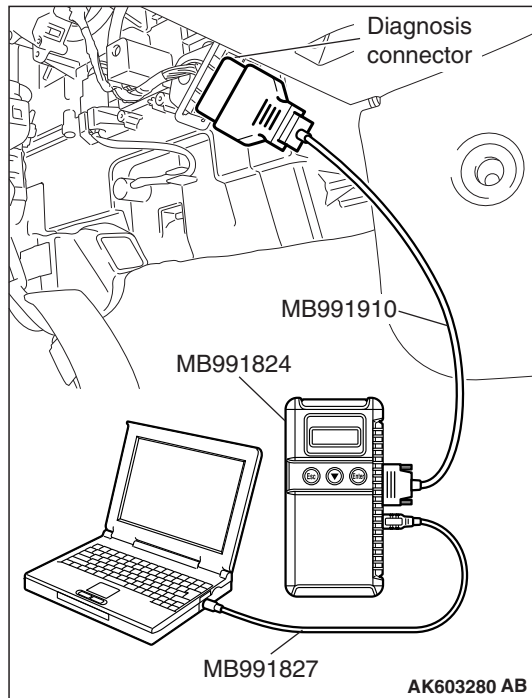
CO contents: 0.3% or less

HC contents: 200 ppm or less

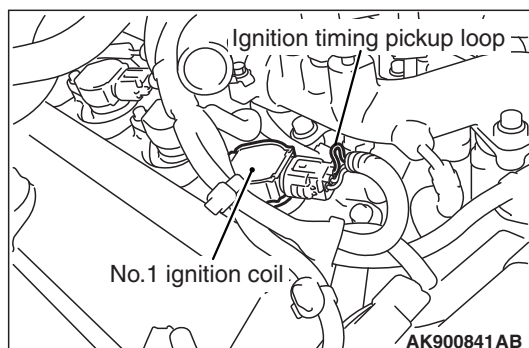
9. If there is a deviation from the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting).
10. Remove the CO, HC tester and timing light.
11. Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T.-III.

<6B31>

1. Before inspection, set the vehicle to the pre-inspection condition.



2. Turn the ignition switch to the "LOCK" (OFF) position and then connect the M.U.T.-III to the diagnosis connector.



3. Set the timing light to the timing pick-up loop (white) of No. 1 ignition coil.

4. Start the engine and let it run at idle.
5. Check that ignition timing is at the standard value.

Standard value: approximately 10° BTDC

NOTE: The ignition timing may fluctuate within $\pm 7^\circ$. This is normal.

NOTE: In higher altitude, the ignition timing is more advanced than the standard value by approximately 5°.

NOTE: Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.

6. Run the engine at 2,000 – 3,000 r/min for 2 minutes.
7. Set the CO, HC tester.
8. Check the CO contents and the HC contents at idle.

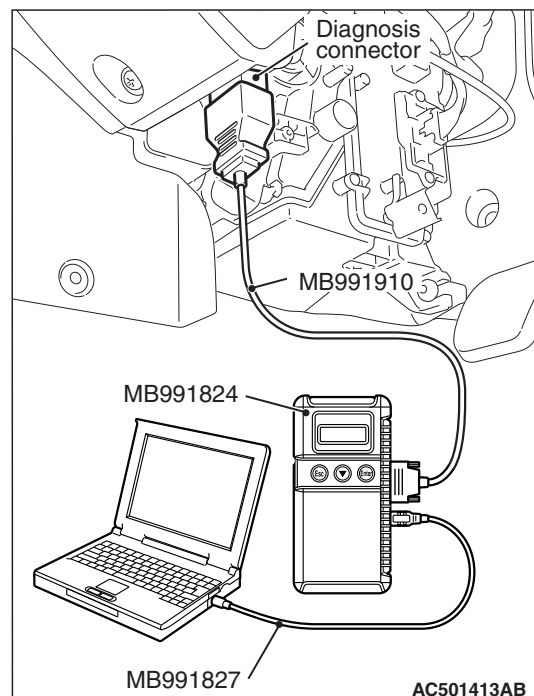
Standard value

CO contents: 0.3 % or less

HC contents: 200 ppm or less

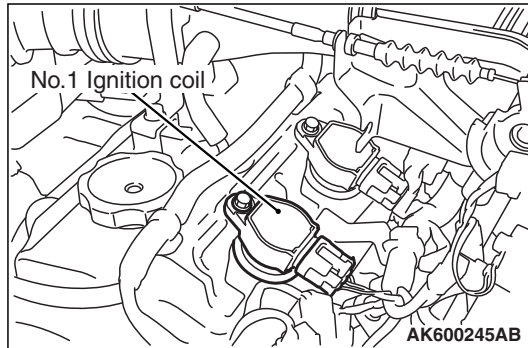
9. If there is a deviation from the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting).
10. Remove the HC, CO tester and timing light.
11. Turn the ignition switch to the "LOCK" (OFF) position and then remove the M.U.T.-III.

<4G64>



1. Before inspection, set the vehicle to the pre-inspection condition.

- Turn the ignition switch to the "LOCK" (OFF) position and then connect the M.U.T.-III to the diagnosis connector.



- Set the timing light to the terminal No. 3 power supply line (white) of the ignition coil No. 1.
- Start the engine and let it run at idle.
- Check that ignition timing is at the standard value.

Standard value: approximately 10° BTDC

NOTE:

- The ignition timing may fluctuate within $\pm 7^\circ$. This is normal.
 - In higher altitude, the ignition timing is more advanced than the standard value by approximately 5° .
 - Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.
- Run the engine at 2,000 – 3,000 r/min for 2 minutes.
 - Set the CO, HC tester.
 - Check the CO contents and the HC contents at idle.
- Standard value**
CO contents: 0.3% or less
HC contents: 200 ppm or less
- If there is a deviation from the standard value, inspect the MPI system (Refer to WORKSHOP MANUAL GROUP 13 – Troubleshooting).
 - Remove the timing light.
 - Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T.-III.

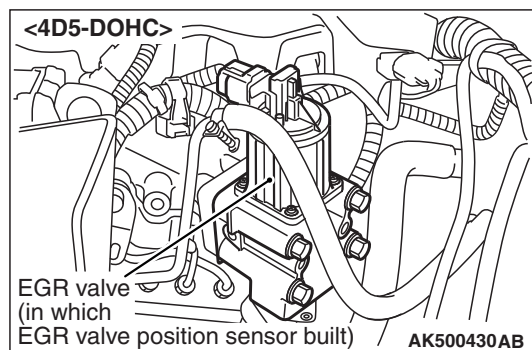
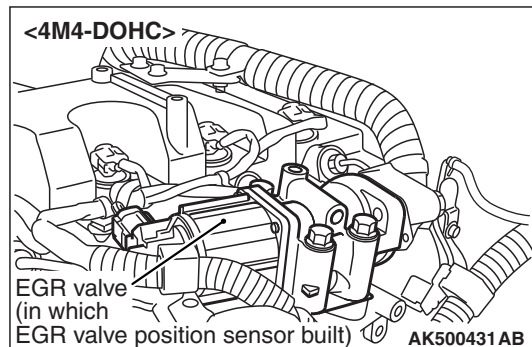
E7. CHECK EXHAUST GAS RECIRCULATION (EGR) SYSTEM

M6020600800999

<4D56, 4M41>

CHECK ON OPERATING SOUND

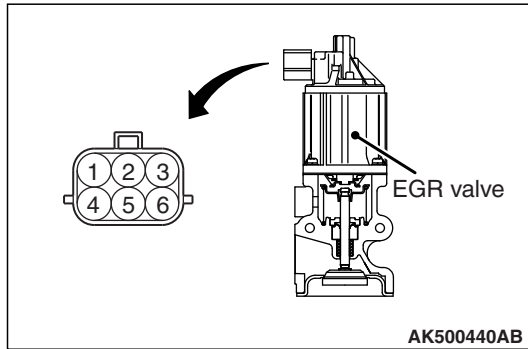
Carry out this check after checking that the diagnosis code is not stored. If the diagnosis code is stored, the EGR valve (DC motor) could possibly not be checked correctly.



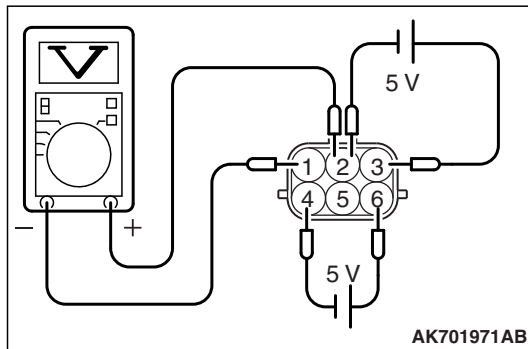
- Start up the engine and run on at idle speed to allow the engine coolant temperature to reach at least 70°C.
- When turning the ignition switch to the LOCK (OFF) position and stopping the engine, check that the operating sound "clicking noise" is heard from the EGR valve three times.
- If the operating 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.

OPERATION CHECK

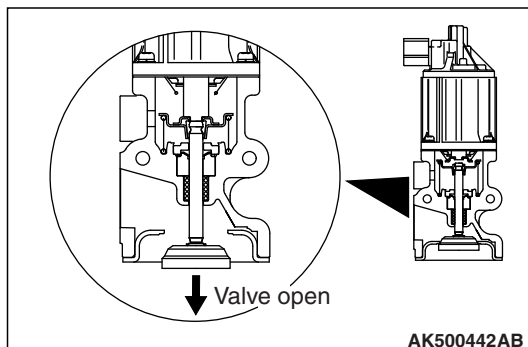


1. Remove the EGR valve.



2. Connect the terminal (+) of the sensor power supply (5V) with the terminal No.3 of the EGR valve connector, and connect the terminal (-) of the sensor power supply (5V) 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 EGR valve connector, and connect the terminal (-) of the power supply with the terminal No. 4. Confirm the EGR valve is opened.

NOTE: At this time, the power supply voltage is to be 5V. When the valve is not opened, increase the voltage 1V by 1V. 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.



5. Confirm the voltage is changed between the terminal No. 1 and No. 2 together with the EGR 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.

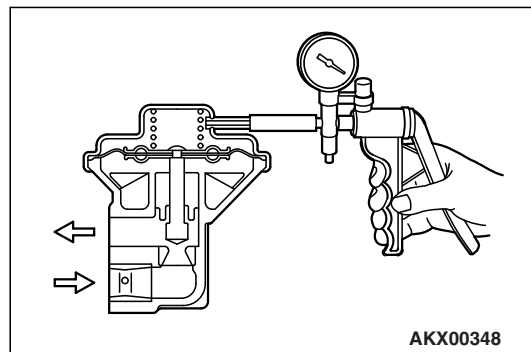
1. Remove the EGR valve and check that the EGR valve is not stuck or clogged with carbon deposits. Use a wire brush to clean the valve if necessary.
2. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

Tightening torque: 48 ± 6 N·m

<6G74>

EGR valve check

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



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

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

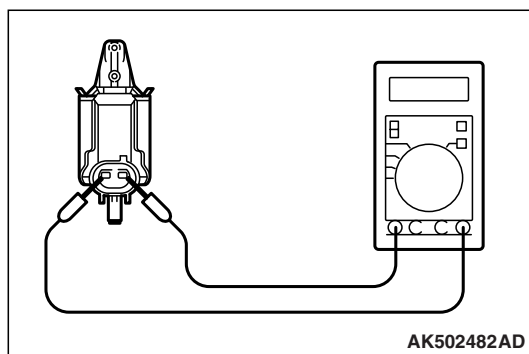
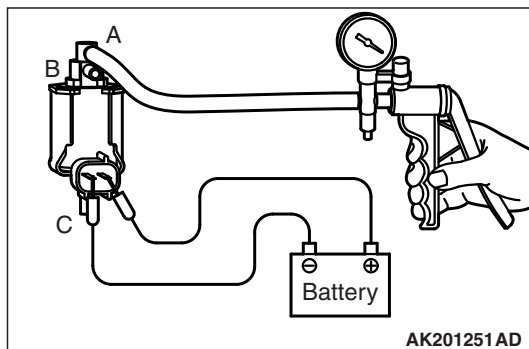
5. Replace the gasket, and tighten to the specified torque.

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.

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



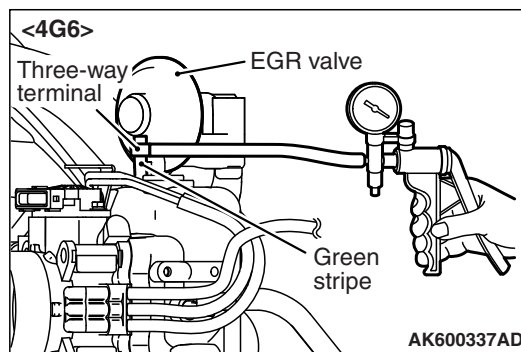
3. Connect a hand vacuum pump to nipple (A) of the solenoid valve.
4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the EGR control solenoid valve and without applying voltage.

Battery voltage	Normal condition
Not applied	Vacuum leaks
Applied	Vacuum maintained

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

Standard value: 29 – 35 Ω (at 20°C)

<4G64>

EGR SYSTEM CHECK

1. Disconnect the vacuum hose (Green stripe) from the EGR valve, and then connect a hand vacuum pump via the three-way terminal.
2. When the engine is hot or cold, check the condition of vacuum by racing the engine.

When engine is cold

(Engine coolant temperature: 20°C or less)

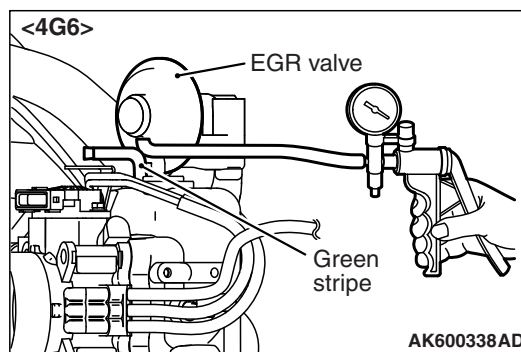
Throttle valve	Normal vacuum condition
Open quickly	No vacuum will generate (the same as barometric pressure.)

When engine is hot

(Engine coolant temperature: 80°C or higher)

Throttle valve	Normal vacuum condition
Open quickly	It will momentarily rise over 13 kPa

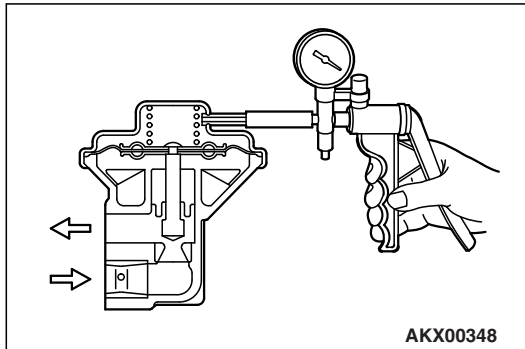
3. Disconnect the three-way terminal.



4. Connect the hand vacuum pump to the EGR valve nipple.
5. Check whether the engine stalls or the idling is unstable when a vacuum of 29 kPa or higher is applied during idling.

EGR VALVE CHECK

1. Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found, clean with a suitable solvent so that the valve seats correctly.
2. Connect a hand vacuum pump to the EGR valve.
3. Apply 67 kPa of vacuum, and check that the vacuum is maintained.



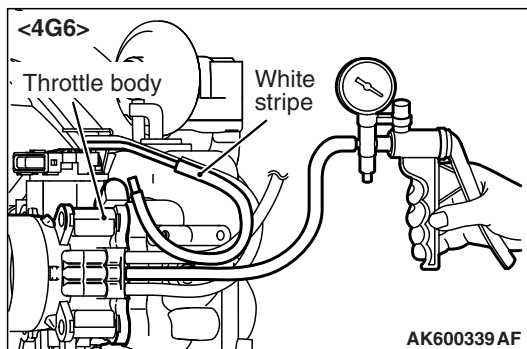
4. Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

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

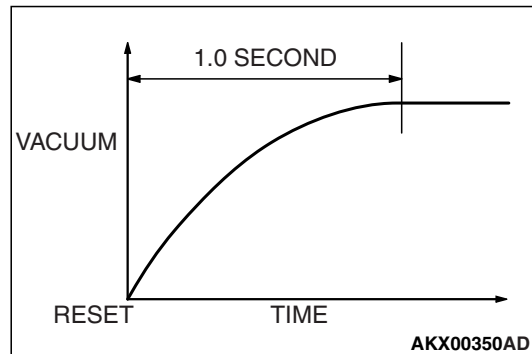
5. Replace the gasket, and tighten to the specified torque.

Tightening torque: 22 ± 4 N·m

EGR PORT VACUUM CHECK



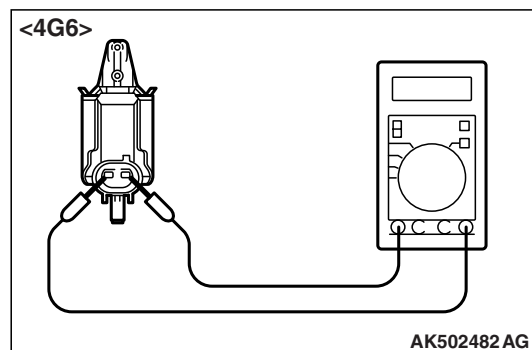
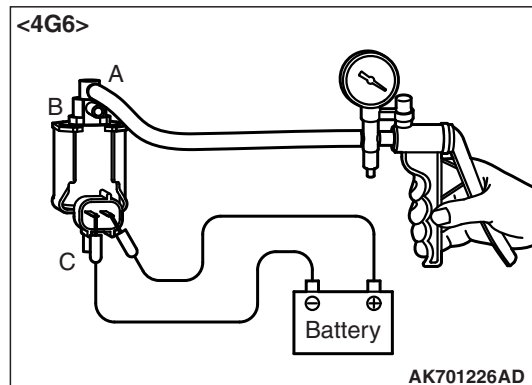
1. Disconnect the vacuum hose (white stripe) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.



2. Start the engine.
3. Measure engine vacuum at 2 500 r/min.
Standard value: 51 kPa or more
4. Reset the vacuum pump to "0" (Release vacuum).
5. Using a stop watch, measure how long it takes for the vacuum gauge to reach 51 kPa.
Standard value: 1.0 second or less
6. If it takes more than 1.0 second for the gauge to reach 51 kPa, the EGR may be restricted and should be cleaned.

EGR CONTROL SOLENOID VALVE CHECK

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



1. Disconnect the vacuum hose from the solenoid valve.

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

Battery voltage	B nipple condition	Normal condition
Not applied	Open	Vacuum maintained
Applied	Open	Vacuum leaks
	Closed	Vacuum maintained

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

Standard value: 29 – 35 Ω (at 20°C)

OTHERS

F1. CHECK BODY CONDITION FOR DAMAGE

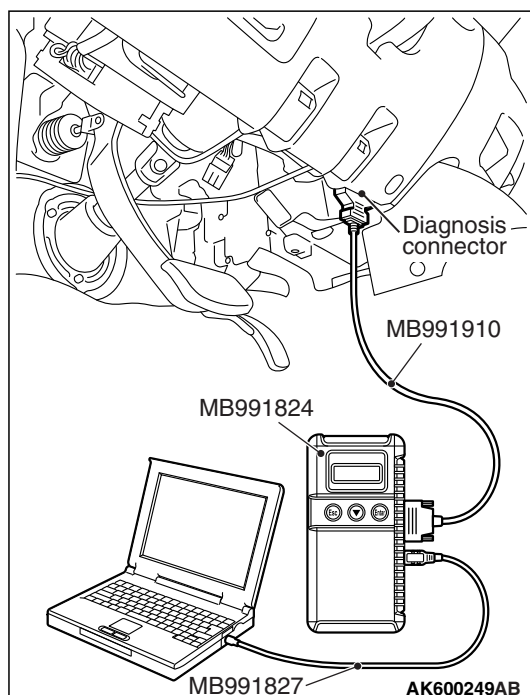
M6020700100384

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

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

M6020700400103

LEARNING PROCEDURE



1. 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

M6020700200637

Drive the vehicle and check for conditions.

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