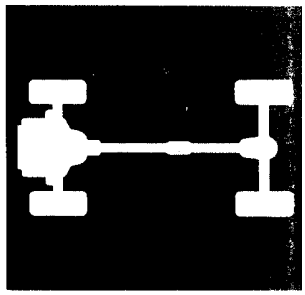
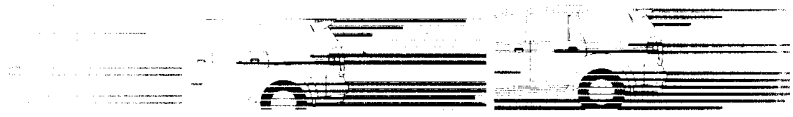
MITSUBISHI MOTORS

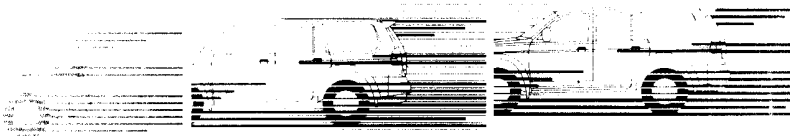
Workshop Manual

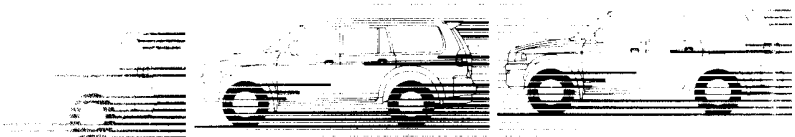
chassis

PAJERO SPORT '99

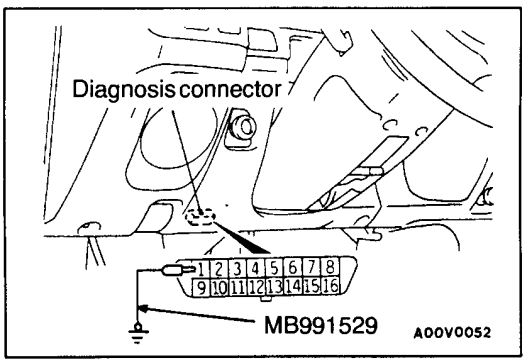








Pub. No. PWJE9812



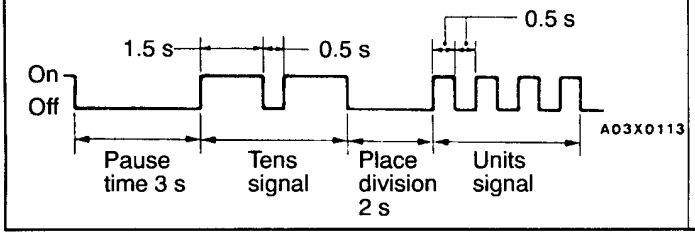
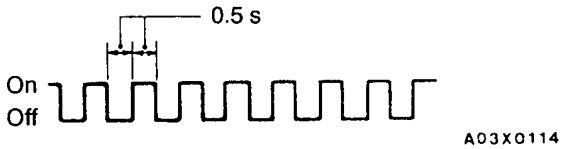
WHEN USING THE WARNING LAMP

1. Use the special tool to earth No.1 terminal (diagnosis control terminal) of the diagnosis connector.
2. Turn on the ignition switch.
3. Read out a diagnosis code by observing how the warning lamp flashes.

Applicable systems

System name	Warning lamp name
MPI	Engine warning lamp
Auto-cruise	Auto-cruise control indicator
ABS	ABS warning lamp

Indication of diagnosis code by warning lamp

When the diagnosis code No.24 is output	When no diagnosis code is output*
	

METHOD OF ERASING DIAGNOSIS CODES

WHEN USING THE MUT-II

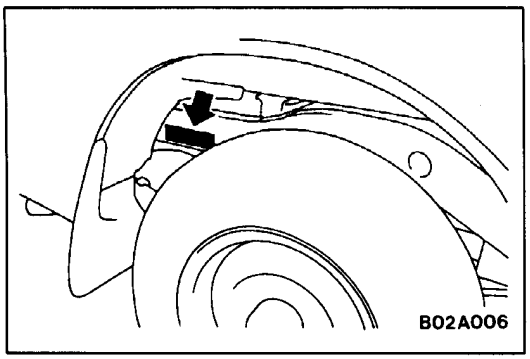
Connect the MUT-II to the diagnosis connector and erase the diagnosis code.

Caution
Turn off the ignition switch before connecting or disconnecting the MUT-II.

WHEN NOT USING THE MUT-II

1. Turn the ignition switch to OFF.
2. After disconnecting the battery cable from the battery (-) terminal for 10 seconds or more, reconnect the cable.
3. After the engine has warmed up, run it at idle for about 15 minutes.

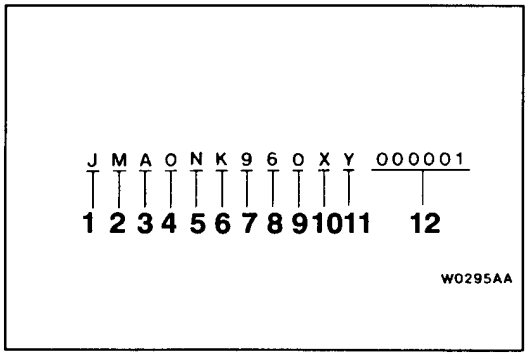
No.	Items	Contents
9	Steering wheel location	L: Left hand
		R: Right hand
10	Destination	8: For Europe



CHASSIS NUMBER

00100560142

The chassis number is stamped on the side wall of the frame near the rear wheel (R.H.).



No.	Items		Contents
1	Fixed figure	J	Asia
2	Distribution channel	M	Japan channel
3	Destination	A	Right hand drive
		B	Left hand drive
4	Body style	0	4 door tailgate
5	Transmission type	N	5-speed manual transmission
6	Vehicle line	K	Pajero sport
7	Body type	9	4WD
8	Engine type	4	4D56: 2,477 mℓ diesel engine
		6	6G72: 2,972 mℓ petrol engine
9	Body style	0	Frame
10	Model year	X	1999

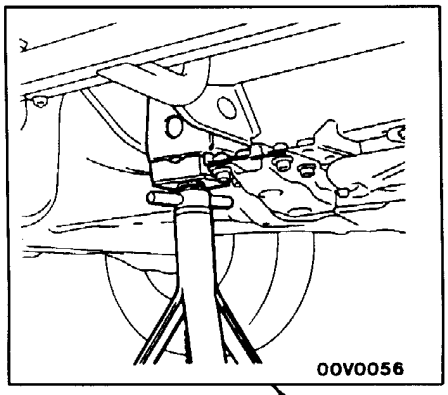
SUPPORT LOCATIONS FOR LIFTING AND JACKING

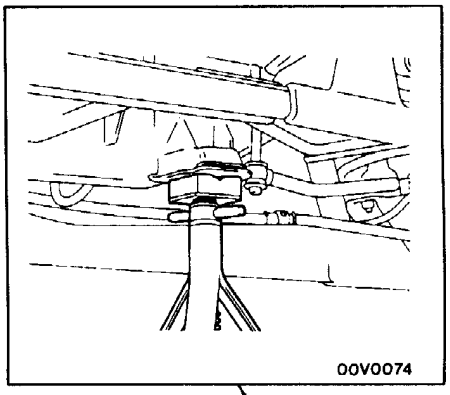
00100070096

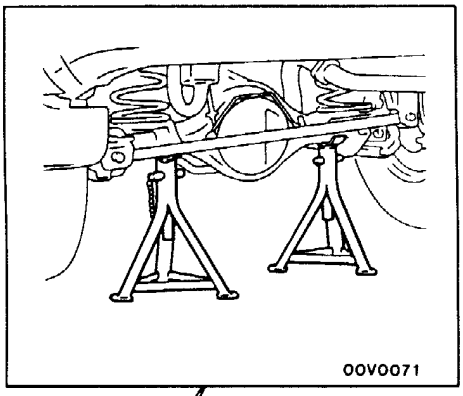
Caution
Do not support the vehicles at locations other than specified supporting points. If do so, this will cause damage, etc.

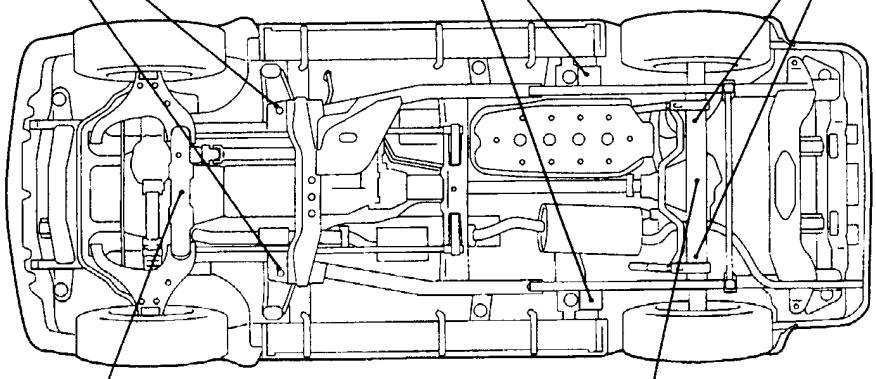
SUPPORT POSITIONS FOR A GARAGE JACK AND AXLE STANDS

AXLE STANDS

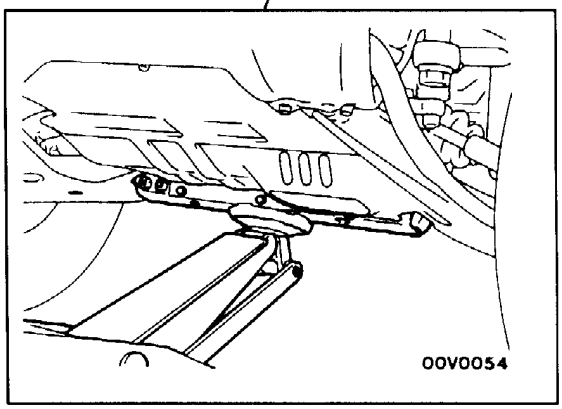


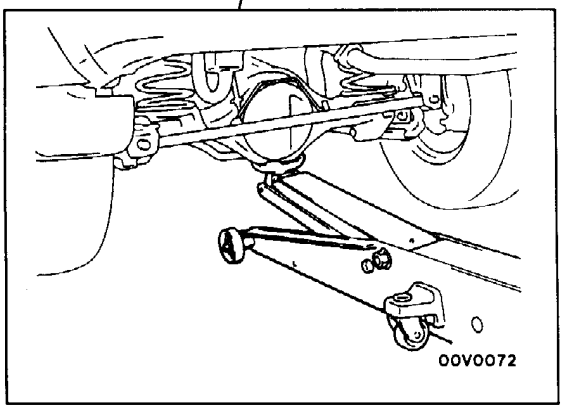






GARAGE JACK





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ON-VEHICLE SERVICE

11100090623

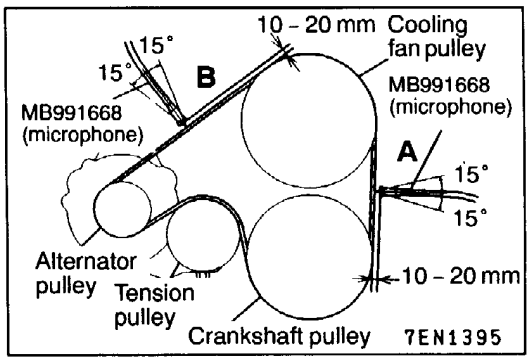
DRIVE BELT TENSION CHECK AND ADJUSTMENT

ALTERNATOR DRIVE BELT TENSION CHECK

Inspect the drive belt following the instructions below.

Standard value:

Vibration frequency Hz	At A	197 - 241
	At B	133 - 164
Tension N	At A	392 - 588
	At B	392 - 588
Deflection (Reference value) mm	At A	6.5 - 9.0
	At B	9.0 - 12.5



<When using MUT-II>

1. Connect the special tool (belt tension meter set) to the MUT-II.
2. Connect the MUT-II to the diagnosis connector.
3. Turn on the ignition switch and select "Belttension measurement" from the MUT-II menu screen.
4. As shown in the illustration, keep the microphone (MB991668) 10 to 20mm away from the back side of the belt perpendicularly (within an inclination of ± 15 degrees).
5. With your finger tip lightly tap the centre of the belt between the pulleys in the location shown by the arrow in the illustration to check whether the belt frequency is within the standard.

Caution

1. **Measure when the belt surface temperature is close to room temperature.**
2. **Make sure that water or oil, etc., does not get on the microphone.**
3. **If a strong wind blows or noise is made close to the microphone during measure, the meter will show a value that differs from the actual value.**
4. **If the measurement is taken with the microphone touching the belt, the meter will show a value that differs from the actual value.**
5. **Do not measure while the engine is running.**

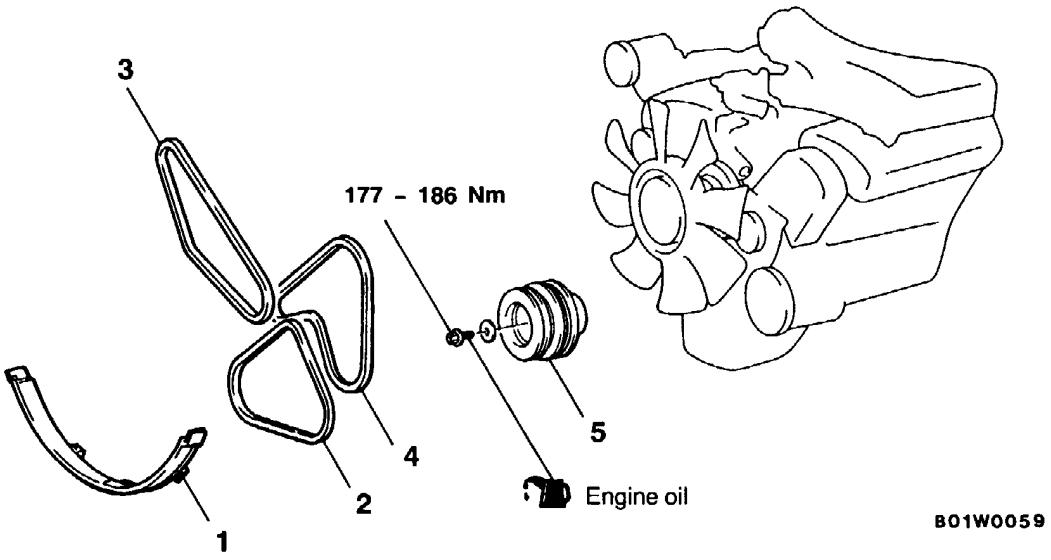
CRANKSHAFT PULLEY

11200160433

REMOVAL AND INSTALLATION

Pre-removal Operation
- Skid Plate and Under Cover Removal

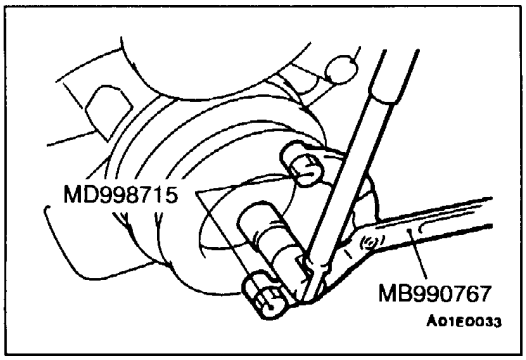
Post-installation Operation
- Drive Belt Tension Adjustment (Refer to P.11A-8.)
- Skid Plate and Under Cover Installation



Removal steps

1. Radiator shroud cover
2. Drive belt (for A/C)
3. Drive belt (for power steering oil pump)
4. Drive belt (for alternator)

◀A▶ ▶A◀ 5. Crankshaft pulley



REMOVAL SERVICE POINT

◀A▶ CRANKSHAFT PULLEY REMOVAL

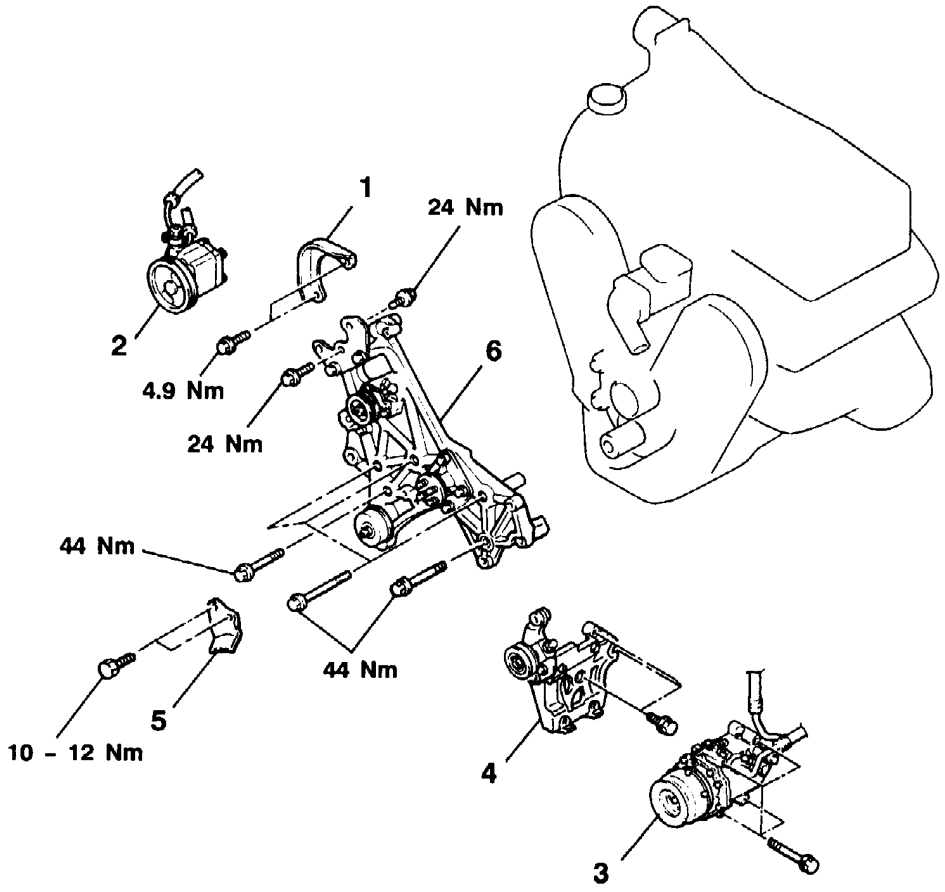
Use special tools to remove the crankshaft pulley from the crankshaft.

TIMING BELT

11200430800

REMOVAL AND INSTALLATION

Pre-removal Operation
- Engine Coolant Draining and Refilling (Refer to GROUP 14 - On-vehicle Service.)
- Cooling Fan Removal (Refer to GROUP 14 - Cooling Fan.)
- Alternator Removal and Installation (Refer to GROUP 16 - Alternator.)



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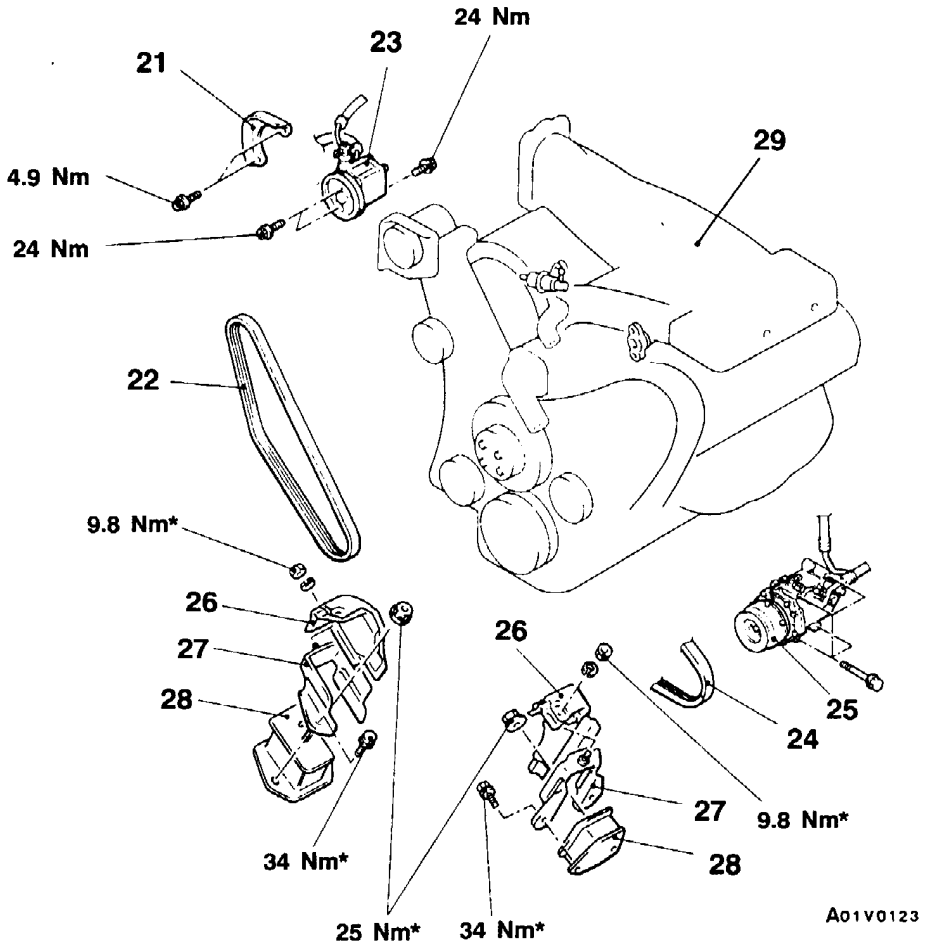
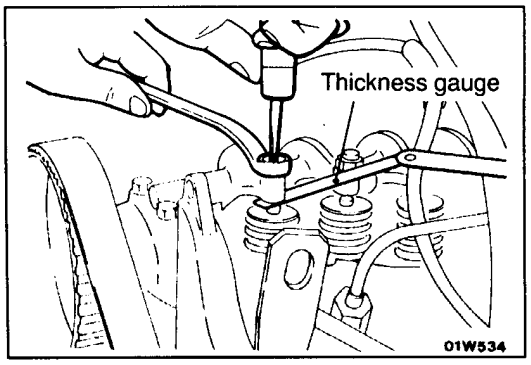
Removal steps

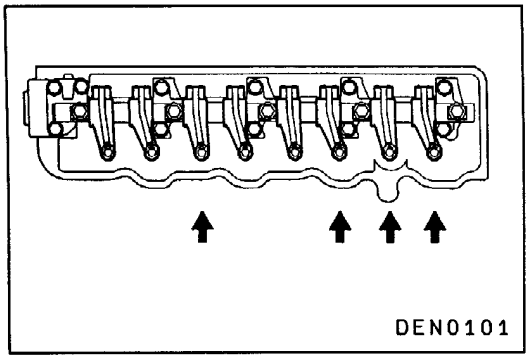
1. Cover
<◀A▶> 2. Power steering oil pump assembly
<◀A▶> 3. A/C compressor assembly
4. Compressor bracket
5. Timing indicator bracket
6. Accessory mount assembly



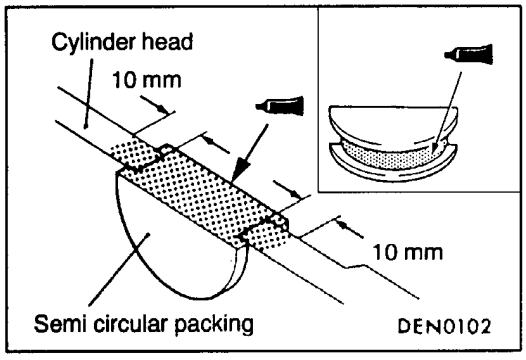
21. Power steering drive belt cover
22. Drive belt (for power steering)
◀A▶ 23. Power steering oil pump assembly
24. Drive belt (for A/C)
◀A▶ 25. A/C compressure assembly
26. Heat protector
27. Front insulator stopper
▶B◀ 28. Front engine support insulator
◀B▶ ▶A◀ 29. Engine assembly



6. If the clearance is outside the standard value, loosen the lock nut of the rocker arm and adjust by turning the adjusting screw while using a thickness gauge to measure the clearance.
7. Tighten the lock nut while holding the adjusting screw with a screwdriver so that it doesn't turn.
8. Turn the crankshaft 360° clockwise to bring No. 4 cylinder to the top dead centre position.

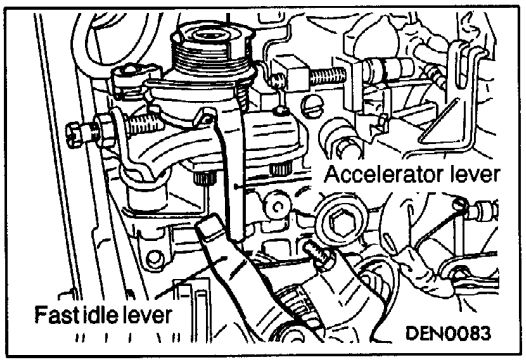


9. Measure the valve clearances at the places indicated by arrows in the illustration. If the clearance is not within the standard value, repeat steps 7 and 8 above.



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

    Specified sealant: 3M ATD Part No. 8660 or equivalent
11. Install the rocker cover.
12. Install the timing belt upper cover.



INJECTION TIMING CHECK AND ADJUSTMENT

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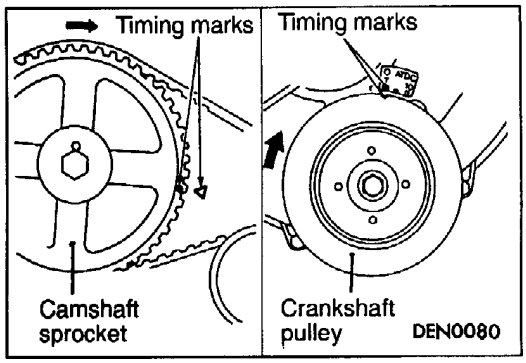
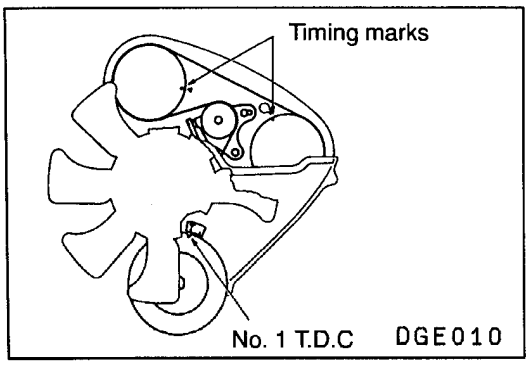
1. Warm up the engine and then check to be sure that the fast idle lever is separated from the accelerator lever.
2. Remove all of the glow plugs.
3. Remove the timing belt upper cover.



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

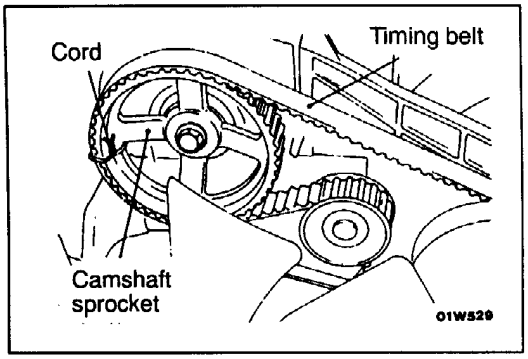


REMOVAL SERVICE POINTS

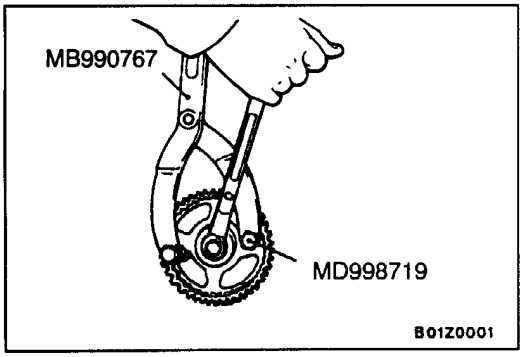
◀A▶ CAMSHAFT SPROCKET REMOVAL

1. Rotate crankshaft clockwise (to the right) and align timing marks.

   Caution
   Never turn the crankshaft anticlockwise.

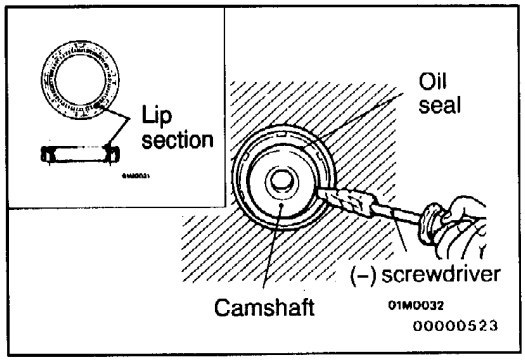


2. Tie the camshaft sprocket and timing belt together with cord so that timing mark is not maladjusted.



3. Use the special tool to stop the camshaft sprocket from turning, and then remove the camshaft sprocket with the timing belt still attached.

   Caution
   Do not rotate crankshaft after removing camshaft sprocket.



◀B▶ CAMSHAFT OIL SEAL REMOVAL

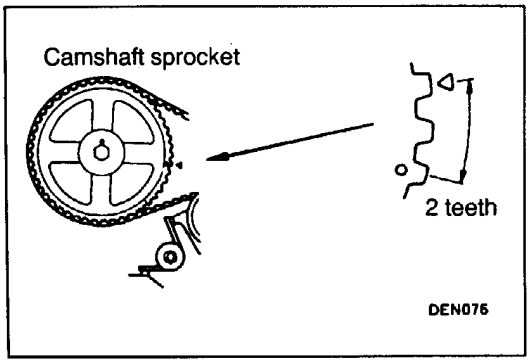
1. Make a notch in the oil seal lip section with a knife, etc.
2. Cover the end of a (–) screwdriver with a rag and insert into the notched section of the oil seal, and lever out the oil seal to remove it.

   Caution
   Be careful not to damage the camshaft and the cylinder head.

◀C▶ ROCKER ARM AND SHAFT ASSEMBLY REMOVAL

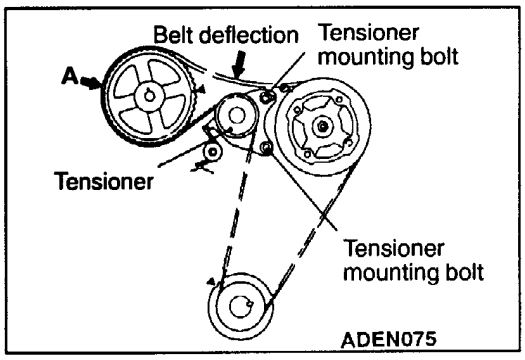
Loosen the rocker arm and shaft assembly mounting bolt, and then remove the rocker arm and shaft assembly with the bolt still attached.

Caution
Never disassemble the rocker arm and shaft assembly.

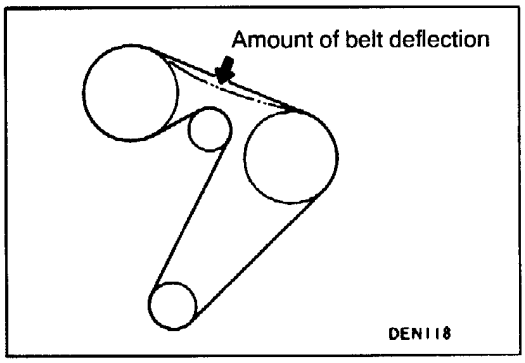


4. Loosen the tensioner mounting bolts and apply tension with the spring.
5. Turn the crankshaft clockwise and stop at the second lobe of the camshaft sprocket.

Caution
(1) When turning the crankshaft in item (5), strictly observe the specified amount of rotation (2 teeth on the camshaft sprocket) in order to apply a constant force to the tension side of the belt.
(2) Do not turn the crankshaft counterclockwise.
(3) Do not touch the belt during adjustment.



6. Make sure that the part indicated by arrow A does not float upward.
7. Tighten the tensioner mounting bolts, starting with the bolt in the elongated hole. If the lower bolt is tightened first, belt tension will become too tight.



8. Turn the crankshaft anticlockwise and align the timing mark. Next, make sure that the timing marks of all sprockets are aligned.
9. Press on the centre of the bolt with an index finger to check the amount of deflection.

Standard value: 4 - 5 mm

▶C◀ CRANKSHAFT PULLEY INSTALLATION

Using the special tool to install the crankshaft pulley as same as removal procedure.

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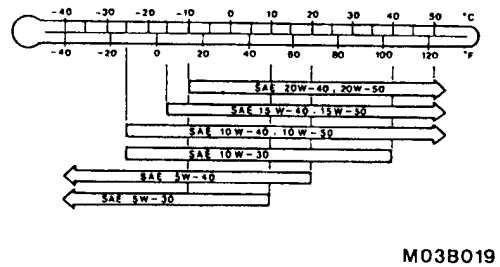

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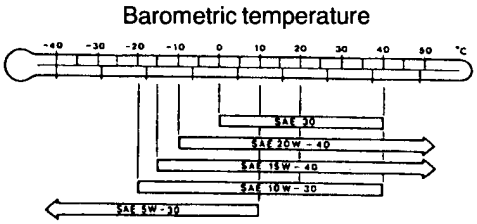

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5. Refill with specified quantity of oil.

   Specified Engine Oil (API classification):
   <6G7> SG or higher
   <4D5> CD or higher

   Total quantity (Includes volume inside oil filter and oil cooler):
   <6G7> 4.5 ℓ
   <4D5> 6.5 ℓ

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

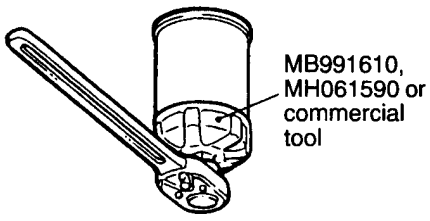
OIL FILTER REPLACEMENT

12100110272

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 cover.
4. Remove the drain plug to drain oil.

   Caution
   Use care as oil could be hot.

5. Remove the air cleaner, and cover the alternator with a rag so that oil will not get on the alternator. <4D56>



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6. Use the respective tool in the follwing table to remove the engine oil filter.
7. Clean the filter bracket side mounting surface and ensure the old O-ring has been removed.

SERVICE SPECIFICATIONS

13100030513

Items		Specifications
Basic idle speed r/min		700 ± 50
Throttle position sensor adjusting voltage mV		400 - 1,000
Throttle position sensor resistance kΩ		3.5 - 6.5
Idle speed control servo coil resistance Ω		28 - 33 (at 20°C)
Intake air temperature sensor resistance kΩ	At 20°C	2.3 - 3.0
	At 80°C	0.30 - 0.42
Engine coolant temperature sensor resistance kΩ	At 20°C	2.1 - 2.7
	At 80°C	0.26 - 0.36
Oxygen sensor output voltage V		0.6 - 1.0
Fuel pressure kPa	Vacuum hose disconnection	324 - 343 at kerb idle
	Vacuum hose connection	Approx. 265 at kerb idle
Injector coil resistance Ω		13 - 16 (at 20°C)

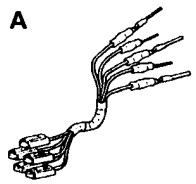
SEALANT

13100050229

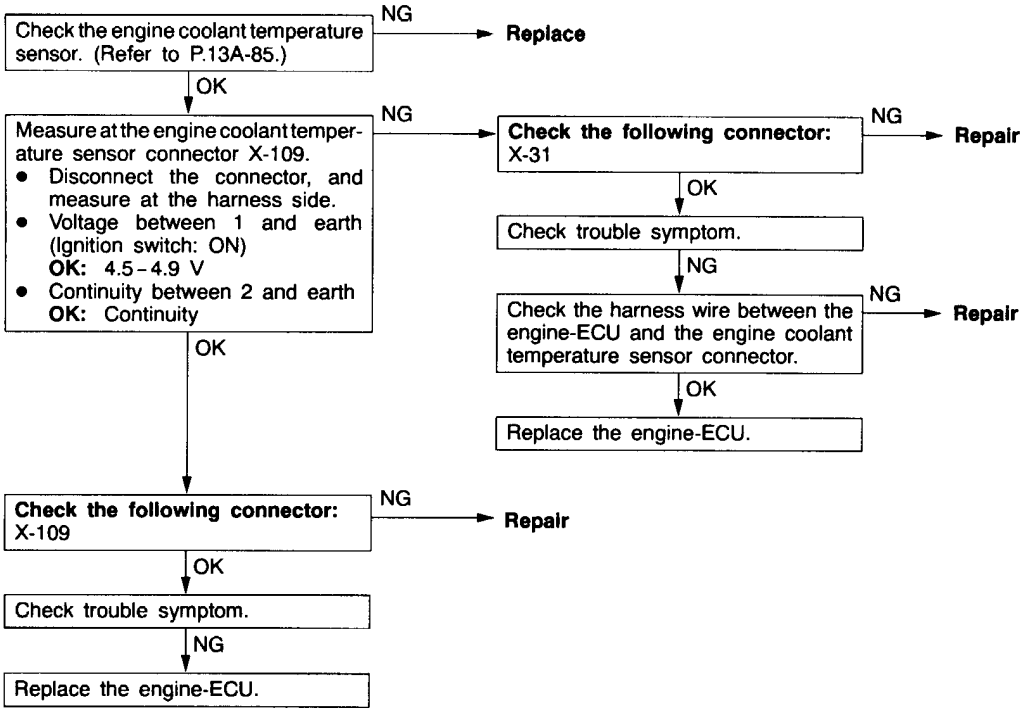
Item	Specified sealant	Remark
Engine coolant temperature sensor threaded portion	3M Nut Locking Part No. 4171 or equivalent	Drying sealant

SPECIAL TOOLS

13100060574

Tool	Number	Name	Use
A  B  C  D 	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: Probe	Measurement of terminal voltage A: Connector pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection

Code No. 21 Engine coolant temperature sensor system	Probable cause
Range of Check • Ignition switch: ON • Excluding 60 seconds after the ignition switch is turned to ON or immediately after the engine starts. Set conditions • Sensor output voltage is 4.6 V or more (corresponding to an engine coolant temperature of -45°C or less) for 4 seconds. or • Sensor output voltage is 0.1 V or less (corresponding to an engine coolant temperature of 140°C or more) for 4 seconds.	• Malfunction of the engine coolant temperature sensor • Improper connector contact, open circuit or short-circuited harness wire of the engine coolant temperature sensor circuit • Malfunction of the engine-ECU
Range of Check • Ignition switch: ON • Engine speed is approx. 50 r/min or more Set conditions • The sensor output voltage increases from 1.6 V or less (corresponding to an engine coolant temperature of 40°C or more) to 1.6 V or more (corresponding to an engine coolant temperature of 40°C or less). • After this, the sensor output voltage is 1.6 V or more for 5 minutes.	

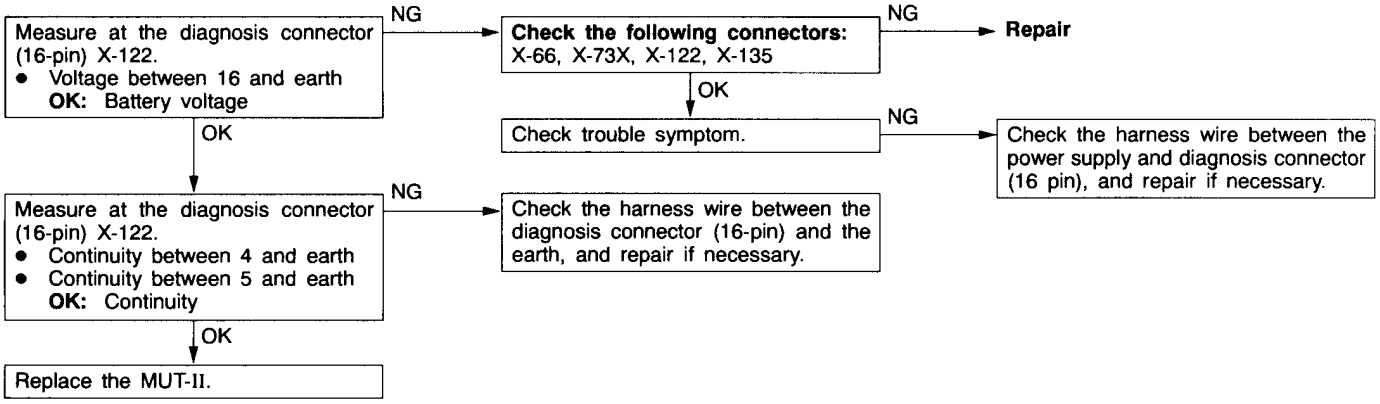


Items		Symptom
Driving	Shock	The feeling of a comparatively large impact or vibration when the engine is accelerated or decelerated.
	Surge	This is repeated surging ahead during constant speed travel or during variable speed travel.
	Knocking	A sharp sound like a hammer striking the cylinder walls during driving and which adversely affects driving.
Stopping	Run on ("Dieseling")	The condition in which the engine continues to run after the ignition switch is turned to OFF. Also called "Dieseling".

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

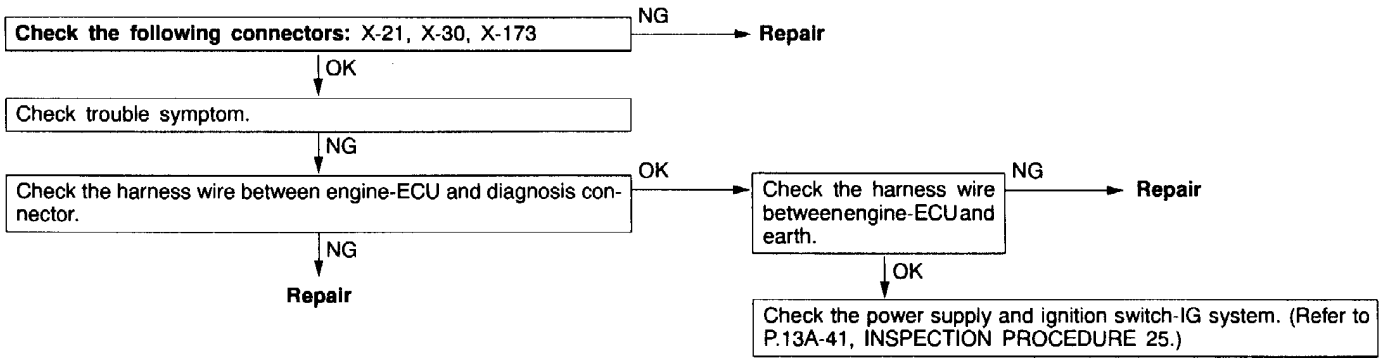
INSPECTION PROCEDURE 1

Communication with MUT-II is not possible. (Communication with all systems is not possible.)	**Probable cause**
The cause is probably a defect in the power supply system (including earth) for the diagnosis line.	• Malfunction of the connector • Malfunction of the harness wire



INSPECTION PROCEDURE 2

MUT-II communication with engine-ECU is not possible.	**Probable cause**
One of the following causes may be suspected. • No power supply to engine-ECU. • Defective earth circuit of engine-ECU. • Defective engine-ECU. • Improper communication line between engine-ECU and MUT-II	• Malfunction of engine-ECU power supply circuit • Malfunction of engine-ECU • Open circuit between engine-ECU and diagnosis connector



INSPECTION PROCEDURE 15

Hesitation, sag or stumble	Probable cause
In cases such as the above, the cause is probably that ignition system, air/fuel mixture or compression pressure is defective.	• Malfunction of the ignition system • Malfunction of air-fuel ratio control system • Malfunction of the fuel supply system • Malfunction of the EGR control solenoid valve system • Poor compression

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-12, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the injectors for operation sound.
NG → Check the injector system. (Refer to P.13A-21, INSPECTION PROCEDURE FOR DIAGNOSIS CODE 41.)
OK ↓

Check the ignition timing.
(Refer to GROUP 11 – On-vehicle Service.)
NG → Check that the crank angle sensor is installed properly.
OK ↓

MUT-II: Check if hesitation, sag, stumble or poor acceleration occur.
(Refer to P.13A-50, INSPECTION PROCEDURE 41.)
OK ↓

Check the fuel pressure. (Refer to P.13A-80.)
OK ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check the EGR control system.
- Check the compression pressure.
- Check the fuel filter or fuel line for clogging.

INSPECTION PROCEDURE 16

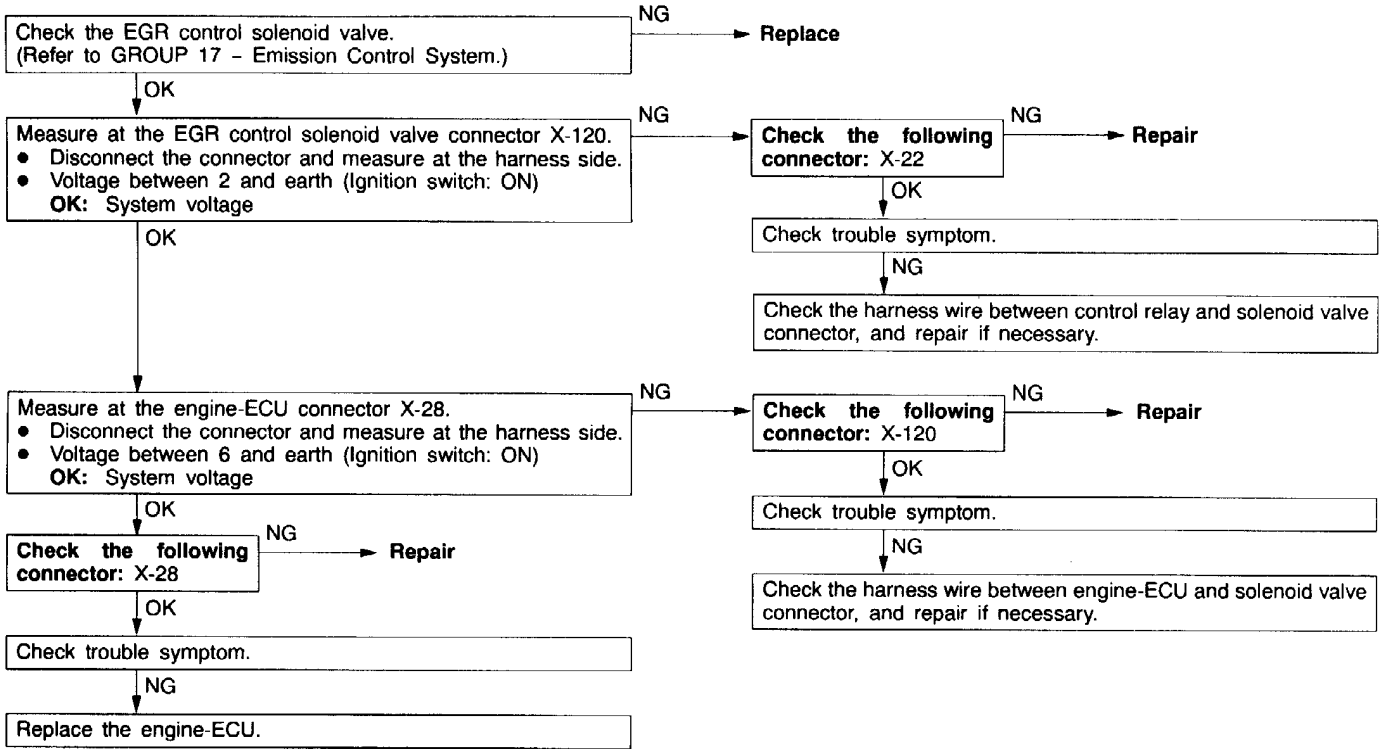
The feeling of impact or vibration when accelerating	Probable cause
In cases such as the above, the cause is probably that there is an ignition leak accompanying the increase in the spark plug demand voltage during acceleration.	• Malfunction of the ignition system

MUT-II Self-Diag code
Are diagnosis codes displayed?
Yes → Refer to P.13A-12, INSPECTION CHART FOR DIAGNOSIS CODES.
No ↓

Check the following items.
- Check the ignition coil, spark plugs, spark plug cables.
- Check for occurrence of ignition leak.

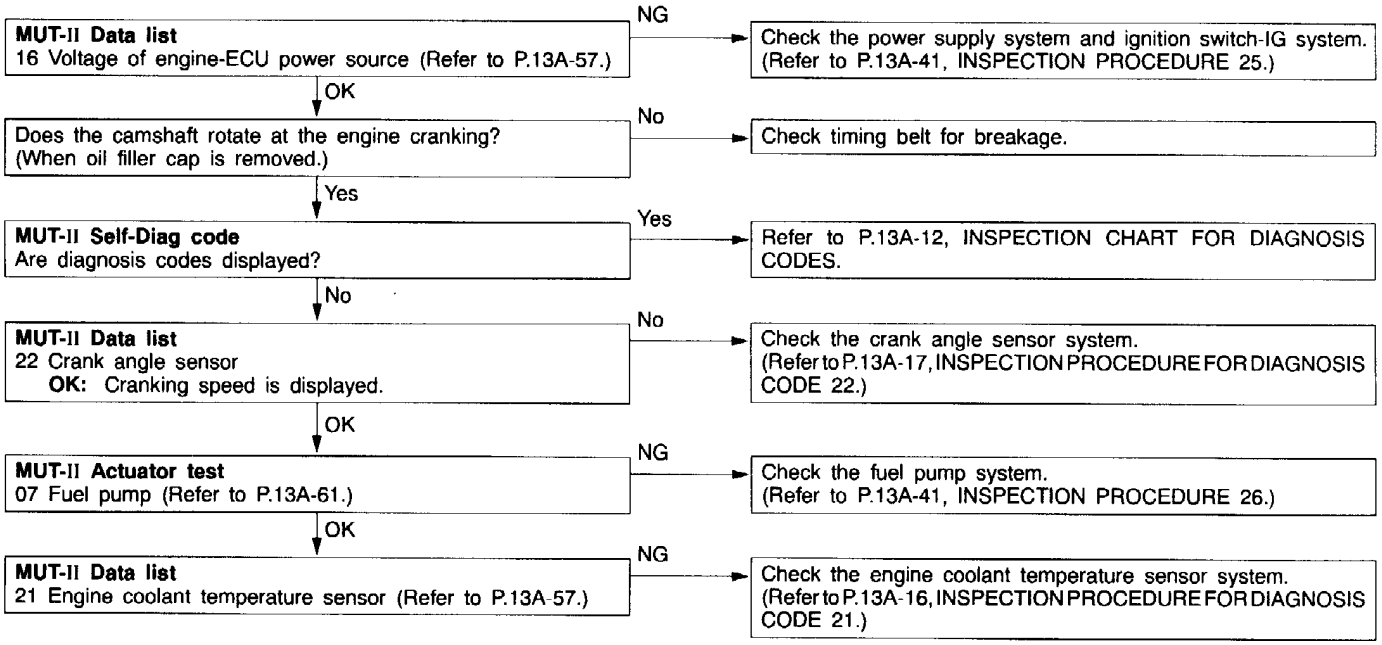
INSPECTION PROCEDURE 34

EGR control solenoid valve system	Probable cause
The EGR control solenoid valve is controlled by the negative pressure resulting from EGR operation leaking to port "A" of the throttle body.	• Malfunction of solenoid valve • Improper connector contact, open circuit or short-circuited harness wire. • Malfunction of the engine-ECU



INSPECTION PROCEDURE 35

MUT-II: Inspection of no initial combustion



DATA LIST REFERENCE TABLE

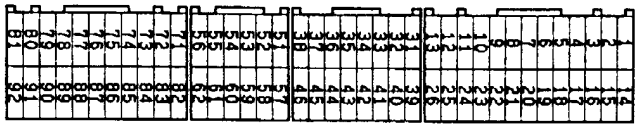
13100890593

Caution
When shifting the select lever to D range, the brakes should be applied so that the vehicle does not move forward.

NOTE
*1. In a new vehicle [driven approximately 500 km or less], the air flow sensor output frequency is sometimes 10% higher than the standard frequency.
*2. The idle position switch normally turns off when the voltage of the throttle position sensor is 50 - 100 mV higher than the voltage at the idle position. If the idle position switch turns back on after the throttle position sensor voltage has been by 100 mV and the throttle valve has been opened, the idle position switch and the throttle position sensor need to be adjusted.
*3. The injector drive time represents the time when the cranking speed is at 250 r/min or below when the power supply voltage is 11 V.
*4. In a new vehicle [driven approximately 500 km or less], the injector drive time is sometimes 10% longer than the standard time.
*5. In a new vehicle [driven approximately 500 km or less], the step of the stepper motor is sometimes 30 steps greater than the standard value.

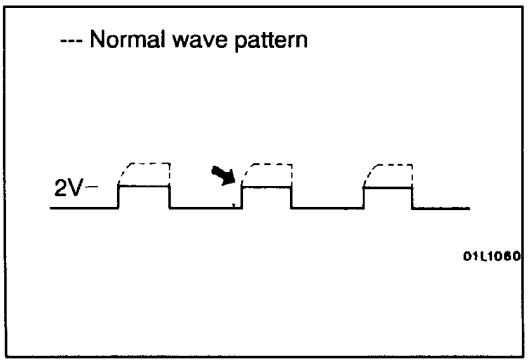
Item No.	Inspection item	Inspection contents		Normal condition	Inspection procedure No.	Reference page
11	Oxygen sensor	Engine:After having warmed up Air/fuel mixture is made leaner when decelerating, and is made richer when racing.	When at 4,000 r/min, engine is suddenly decelerated	200 mV or less	Code No. 11	13A-13
			When engine is suddenly raced	600 - 1,000 mV		
		Engine:After having warmed up The oxygen sensor signal is used to check the air/fuel mixture ratio, and control condition by the engine-ECU.	Engine is idling	400 mV or less ↑ (Changes) ↓ 600 - 1,000 mV		
			2,500 r/min	400 mV or less ↑ (Changes) ↓ 600 - 1,000 mV		
12	Air flow sensor*1	• Engine coolant temperature: 80 - 95°C • Lamps and all accessories: OFF • Transmission: Neutral (A/T: P range)	Engine is idling	25 - 51 Hz	-	-
			2,500 r/min	74 - 114 Hz		
			Engine is raced	Frequency increases in response to racing		

Engine-ECU Harness Side Connector Terminal Arrangement



9FU0392

Terminal No.	Inspection item	Normal condition (Check condition)
1 – 12	No. 1 injector	13 – 16 Ω (At 20°C)
14 – 12	No. 2 injector	
2 – 12	No. 3 injector	
15 – 12	No. 4 injector	13 – 16 Ω (At 20°C)
3 – 12	No. 5 injector	
16 – 12	No. 6 injector	
4 – 12	Stepper motor coil (A1)	28 – 33 Ω (At 20°C)
17 – 12	Stepper motor coil (A2)	
5 – 12	Stepper motor coil (B1)	
18 – 12	Stepper motor coil (B2)	
6 – 12	EGR control solenoid valve	36 – 44 Ω (At 20°C)
24 – 12	Purge control solenoid valve	36 – 44 Ω (At 20°C)
13 – Body earth	Engine-ECU earth	Continuity (0 Ω)
26 – Body earth	Engine-ECU earth	
72 – 92	Intake air temperature sensor	5.3 – 6.7 kΩ (When intake air temperature is 0°C)
		2.3 – 3.0 kΩ (When intake air temperature is 20°C)
		1.0 – 1.5 kΩ (When intake air temperature is 40°C)
		0.30 – 0.42 kΩ (When intake air temperature is 80°C)
83 – 92	Engine coolant temperature sensor	5.1 – 6.5 kΩ (When coolant temperature is 0°C)
		2.1 – 2.7 kΩ (When coolant temperature is 20°C)
		0.9 – 1.3 kΩ (When coolant temperature is 40°C)
		0.26 – 0.36 kΩ (When coolant temperature is 80°C)
87 – 92	Idle position switch	Continuity (when throttle valve is at idle position)
		No continuity (when throttle valve is slightly open)



Examples of Abnormal Wave Patterns

- Example 1

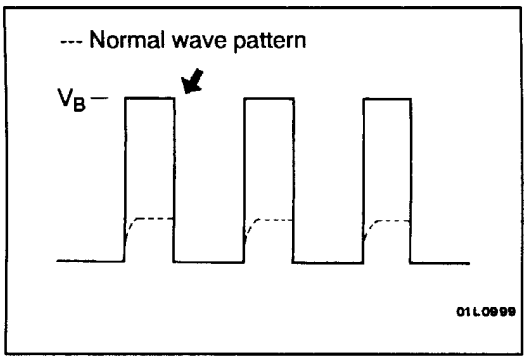
  Wave pattern during engine cranking

  Cause of problem

  Open-circuit in ignition primary circuit

  Wave pattern characteristics

  Top-right part of the build-up section cannot be seen, and voltage value is approximately 2 V too low.



- Example 2

  Wave pattern during engine cranking

  Cause of problem

  Malfunction in power transistor

  Wave pattern characteristics

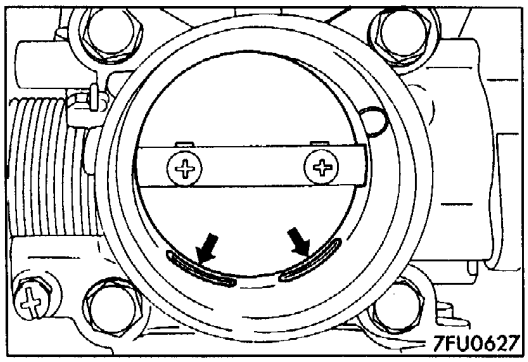
  Power voltage results when the power transistor is ON.

ON-VEHICLE SERVICE

13100100498

THROTTLE BODY (THROTTLE VALVE AREA) CLEANING

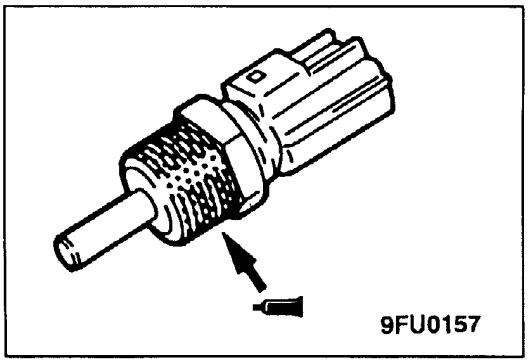
1. Start the engine and warm it up until the coolant is heated to 80°C or higher and then stop the engine.
2. Remove the air intake hose from the throttle body.



3. Plug the bypass passage inlet of the throttle body.

   Caution
   Do not allow cleaning solvent to enter the bypass passage.

4. Spray cleaning solvent into the valve through the throttle body intake port and leave it for about 5 minutes.
5. Start the engine, race it several times and idle it for about 1 minute. If the idling speed becomes unstable (or if the engine stalls) due to the bypass passage being plugged, slightly open the throttle valve to keep the engine running.
6. If the throttle valve deposits are not removed, repeat steps 4 and 5.
7. Unplug the bypass passage inlet.
8. Attach the air intake hose.
9. Use the MUT-II to erase the self-diagnosis code.

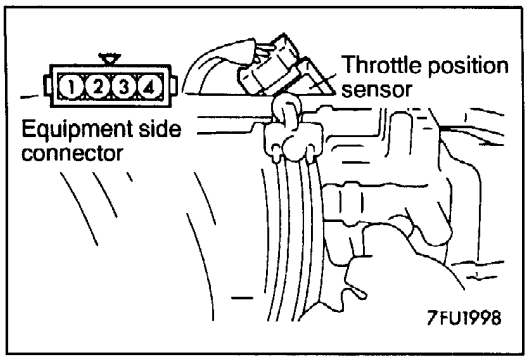


4. Apply sealant to threaded portion.

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

5. Install the engine coolant temperature sensor and tighten it to the specified torque.

   Tightening torque: 29 Nm



THROTTLE POSITION SENSOR CHECK 1310320467

1. Disconnect the throttle position sensor connector.
2. Measure the resistance between the throttle position sensor side connector terminal 1 and terminal 4.

   Standard value: 3.5 - 6.5 kΩ

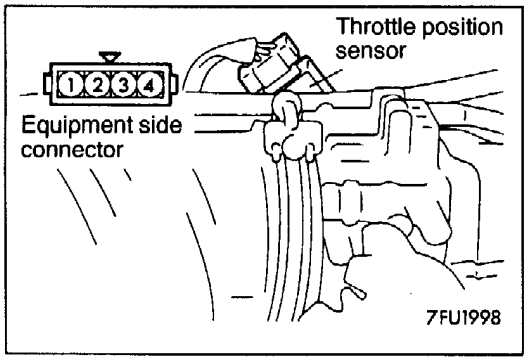
3. Measure the resistance between the throttle position sensor side connector terminal 1 and terminal 3.

   Normal condition:

Throttle valve slowly open until fully open from the idle position	Changes smoothly in proportion to the opening angle of the throttle valve

4. If the resistance is outside the standard value, or if it doesn't change smoothly, replace the throttle position sensor.

   NOTE
   For the throttle position sensor adjustment procedure, refer to P.13A-77.



IDLE POSITION SWITCH CHECK 13100330446

1. Disconnect the throttle position sensor connector.
2. Check the continuity between the throttle position sensor connector side terminal 1 and terminal 2.

   Normal condition:

Accelerator pedal	Continuity
Depressed	Non-conductive
Released	Conductive (0 Ω)

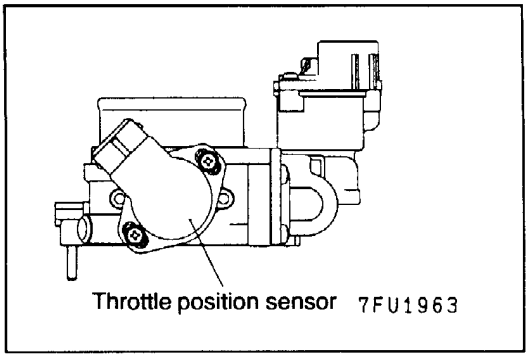
3. If out of specification, replace the throttle position sensor.

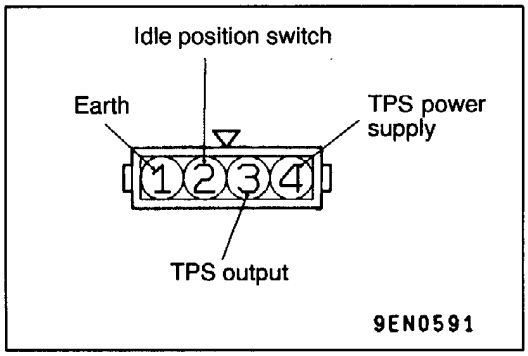
   NOTE
   After replacement, the idle position switch and throttle position sensor should be adjusted. (Refer to P.13A-77.)

CLEANING THROTTLE BODY PARTS

1. Clean all throttle body parts.
   Do not use solvent to clean the following parts:
   - Throttle position sensor
   - Accelerator pedal position sensor
   - Idle speed control body assembly

   If these parts are immersed in solvent, their insulation will deteriorate.
   Wipe them with cloth only.
2. Check if the vacuum port or passage is clogged. Use compressed air to clean the vacuum passage.





REASSEMBLY SERVICE POINT

▶A◀ THROTTLE POSITION SENSOR (TPS) INSTALLATION

1. Install the TPS so that it faces as shown in the illustration, and then tighten it with the screw.
2. Connect a multimeter between terminal (4) (TPS power supply) and terminal (3) (TPS output) of the TPS connector, and check that the resistance increases gradually as the throttle valve is opened slowly to the fully-open position.
3. Check the continuity between terminal (2) (idle position switch) and terminal (1) (earth) of the TPS connector when the throttle valve is fully closed and fully open.

   Normal condition:

Throttle valve condition	Continuity
Fully closed	Continuity
Fully open	No continuity

   If there is no continuity when the throttle valve is fully closed, turn the TPS body anti-clockwise and then check again.
4. If there is an abnormality, replace the TPS.

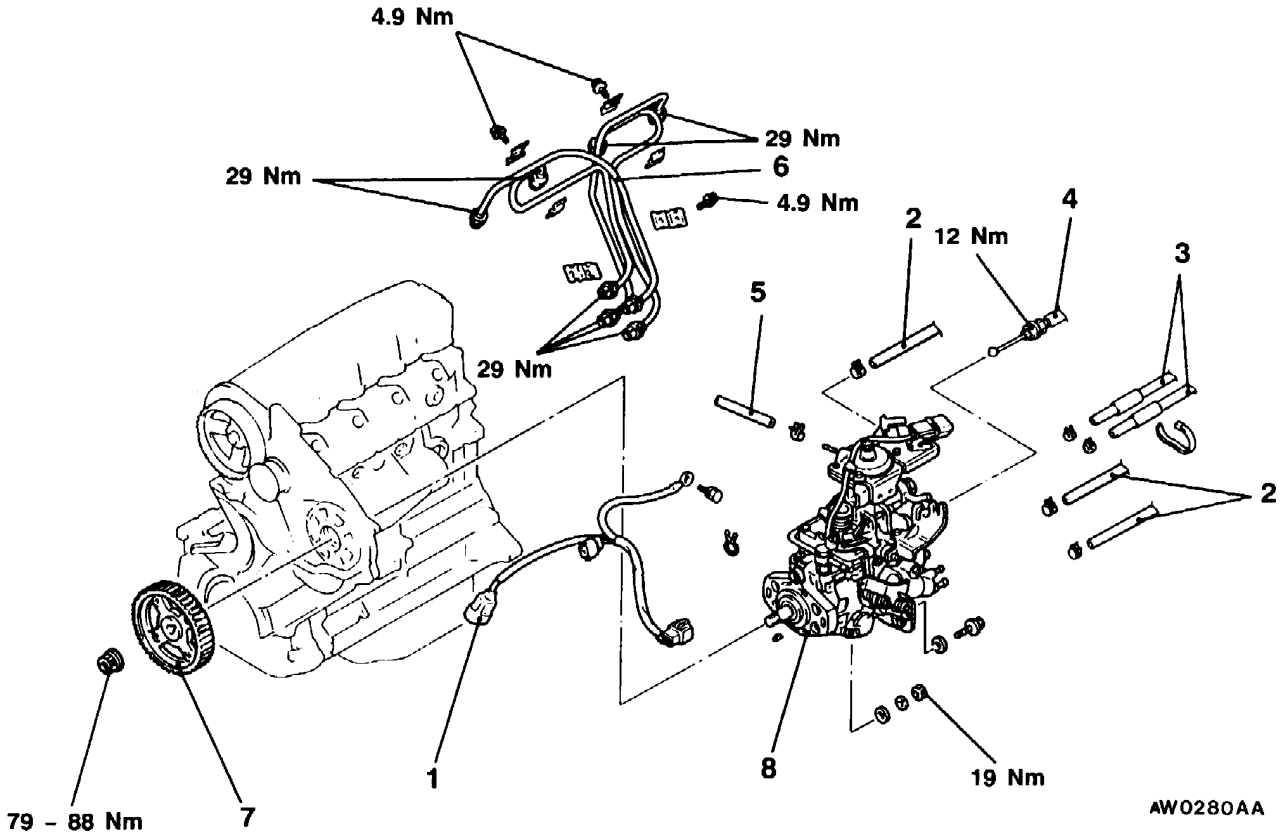
INJECTION PUMP

13300240035

REMOVAL AND INSTALLATION

Pre-removal Operation
- Engine Coolant Draining
- Intercooler Removal (Refer to GROUP 15.)
- Timing Belt Removal (Refer to GROUP 11B.)

Post-installation Operation
- Timing Belt Installation (Refer to GROUP 11B.)
- Intercooler Installation (Refer to GROUP 15.)
- Engine Coolant Supplying
- Injection Timing Adjustment (Refer to GROUP 11B – On-vehicle Service.)
- Accelerator Cable Adjustment (Refer to GROUP 17 – On-vehicle Service.)



Removal steps

1. Fuel injection pump wiring harness
2. Water hose connection <Vehicles with cold start device>
3. Fuel hoses
4. Accelerator cable connection

◀A▶ 5. Boost hose connection

◀B▶ 6. Fuel injection pipe

7. Fuel injection pump sprocket
8. Fuel injection pump

GENERAL INFORMATION

14100010286

The cooling system is designed to keep every part of the engine at appropriate temperature in whatever condition the engine may be operated. The cooling method is of the water-cooled, pressure forced circulation type in which the water pump pressurizes coolant and circulates it throughout the engine. If the coolant temperature exceeds the prescribed temperature, the thermostat opens to circulate the coolant through the radiator as well so that the heat absorbed by the coolant may be radiated into the air.

The water pump is of the centrifugal type and is driven by the drive belt from the crankshaft.
The radiator is the corrugated fin, down flow type.

Items			Specifications
Radiator	Performance kJ/h	6G7	203,000
		4D5	230,200

SERVICE SPECIFICATIONS

14100030305

Items			Standard value	Limit
High pressure valve opening pressure of radiator cap kPa			74 – 103	64
Range of coolant antifreeze concentration of radiator %			30 – 60	–
Thermostat	Valve opening temperature of thermostat °C	6G7	88 ± 2.0	–
		4D5	82 ± 1.5	–
	Full-opening temperature of thermostat °C	6G7	100	–
		4D5	95	–
	Valve lift mm	6G7	10 or more	–
		4D5	8.5 or more	–

LUBRICANT

14100040209

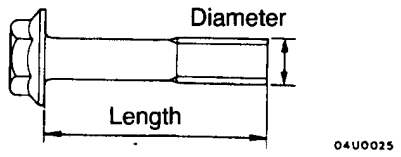
Items		Quantity ℓ
MITSUBISHI GENUINE COOLANT OR AN EQUIVALENT	6G7	9.0 (10.0)
	4D5	8.0 (9.0)

NOTE
( ) indicates figure for vehicles with rear heater.

SEALANTS

14100050226

Items	Specified sealant	Remarks
Cylinder block drain plug	3M Nut Locking Part No. 4171 or equivalent	Drying sealant



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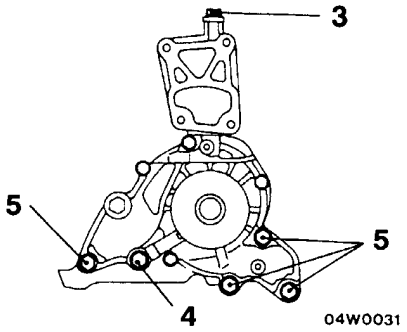

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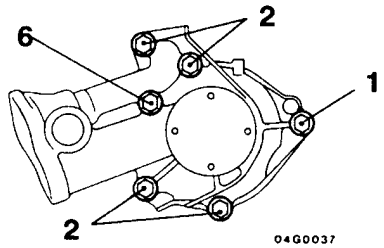

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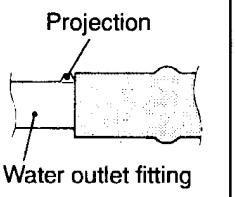
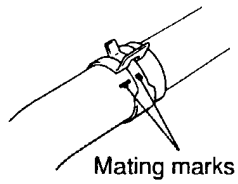
▶B◀ WATER PUMP ASSEMBLY INSTALLATION

No.	Hardness category (head mark)	Bolt diameter x length mm
1	4T	8 x 25
2		8 x 40
3	7T	8 x 14
4		8 x 20
5		8 x 25
6		8 x 70





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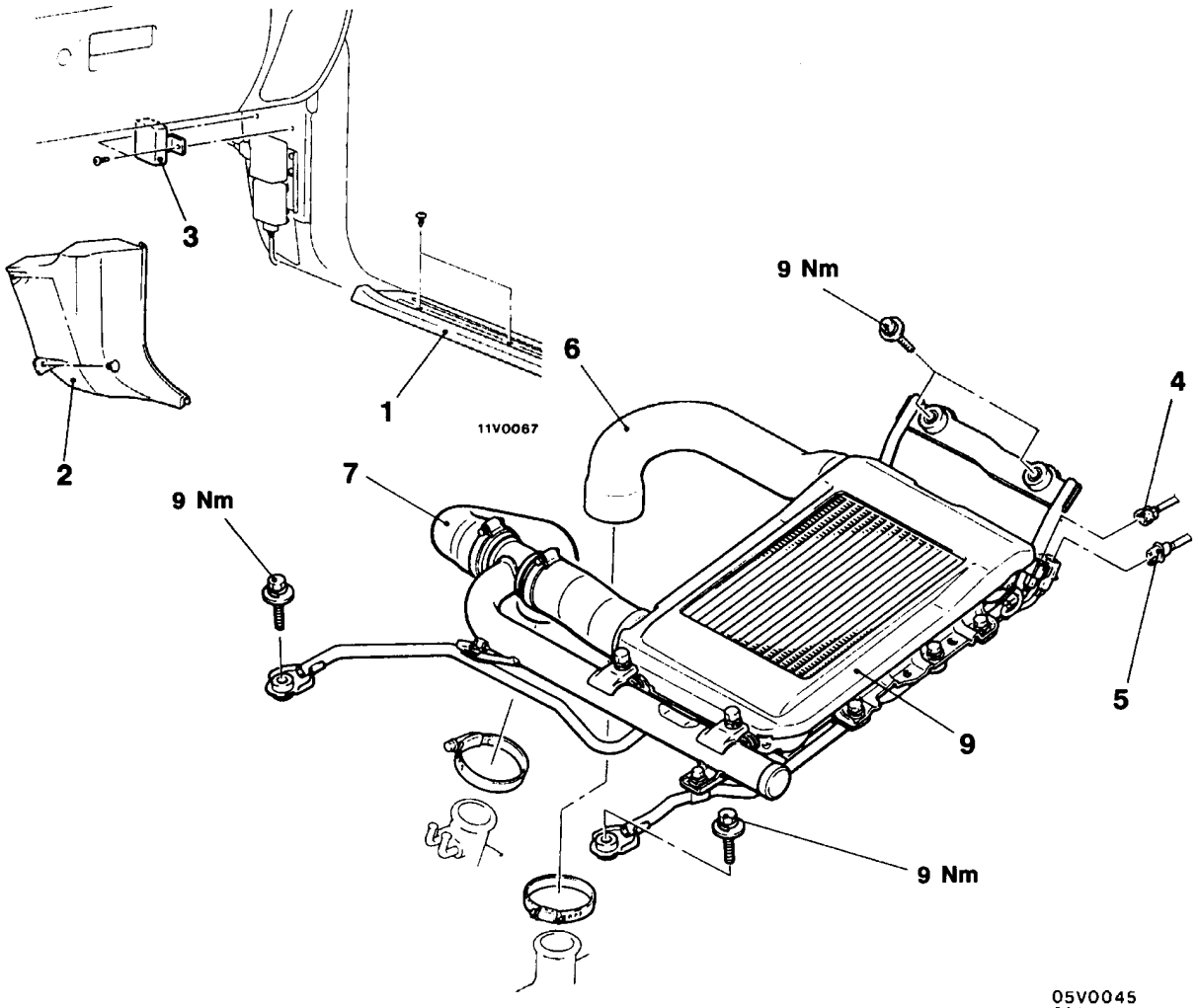
▶C◀ RADIATOR UPPER HOSE CONNECTION

1. Insert each hose as far as the projection of the water outlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

INTERCOOLER AND INTERCOOLER FAN-ECU

15100420079

REMOVAL AND INSTALLATION



Intercooler fan-ECU removal steps

1. Scuff plate
2. Cowl side trim
3. Intercooler fan-ECU

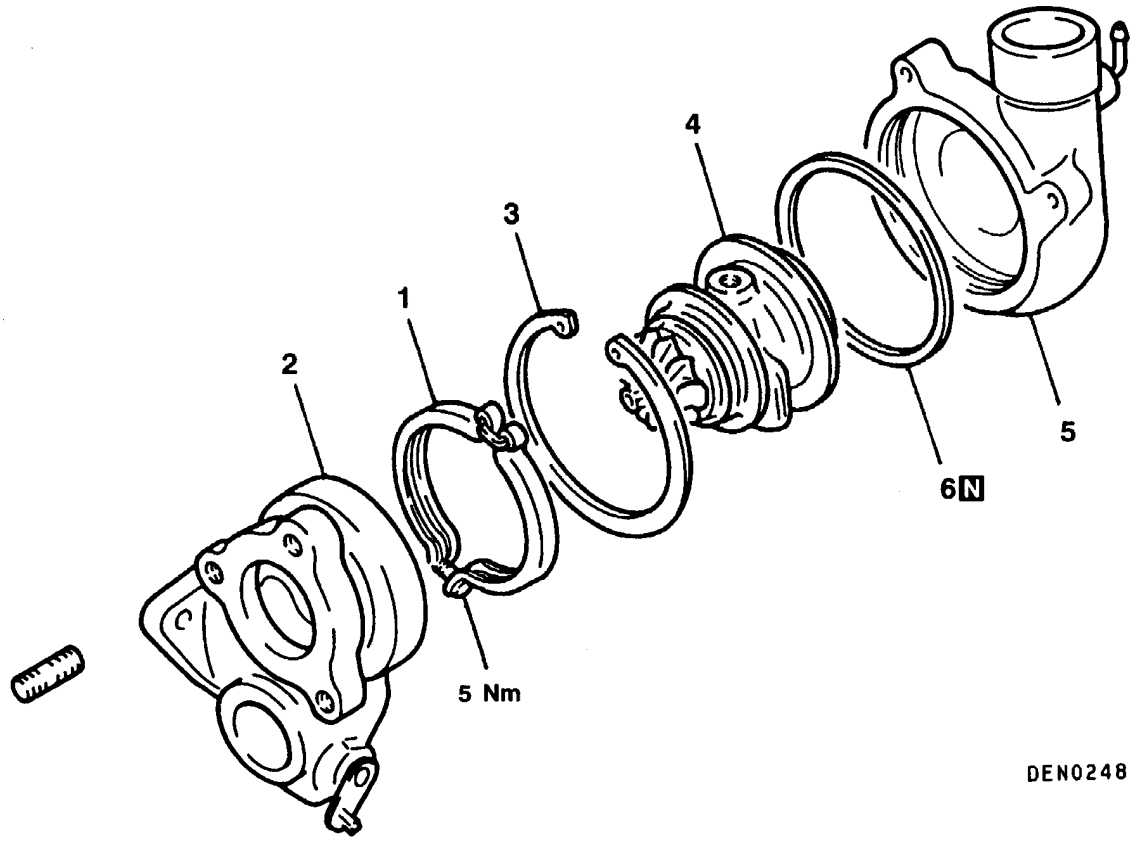
Intercooler removal steps

4. Intake air temperature switch connector
5. Intercooler fan motor connector
6. Air hose B connection (Intake manifold side)
7. Air hose A-2 connection (Turbocharger side)
8. Intercooler and bracket assembly

TURBOCHARGER

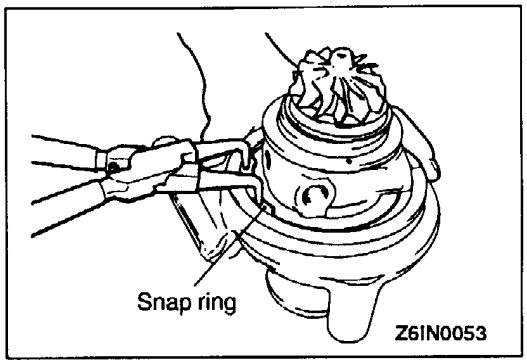
15100600039

DISASSEMBLY AND REASSEMBLY



Disassembly steps

- ▶E◀ 1. Coupling
- ▶D◀ 2. Turbine housing
- ◀A▶ ▶C◀ 3. Snap ring
- ◀B▶ ▶B◀ 4. Turbine wheel assembly
- 5. Compressor cover
- ▶A◀ 6. O-ring



DISASSEMBLY SERVICE POINTS

◀A▶ SNAP RING REMOVAL

Lay the unit with the compressor cover side facing down and using snap ring pliers, remove the compressor cover attaching snap ring.

Caution
When removing the snap ring, hold it with fingers to prevent it from springing away.

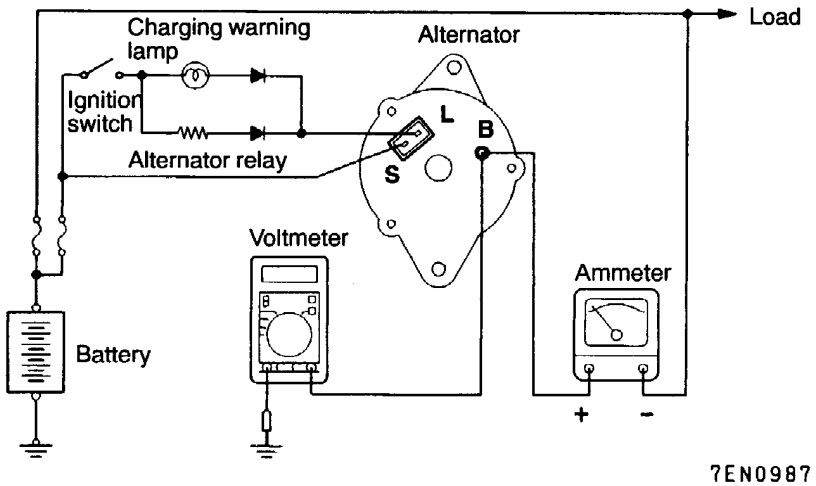
6. Reconnect the negative battery cable.
7. Connect a tachometer or the MUT-II. (Refer to GROUP 11 - On-vehicle Service.)
8. Leave the hood open.
9. Start the engine.
10. With the engine running at 2,500 r/min, turn the headlamps and other lamps on and off to adjust the alternator load so that the value displayed on the ammeter is slightly above 30 A.
    Adjust the engine speed by gradually decreasing it until the value displayed on the ammeter is 30 A. Take a reading of the value displayed on the voltmeter at this time.

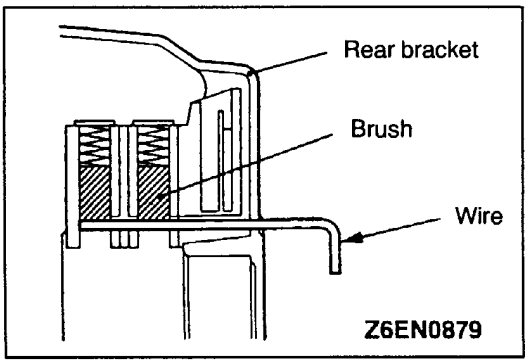
    Limit: max. 0.3 V

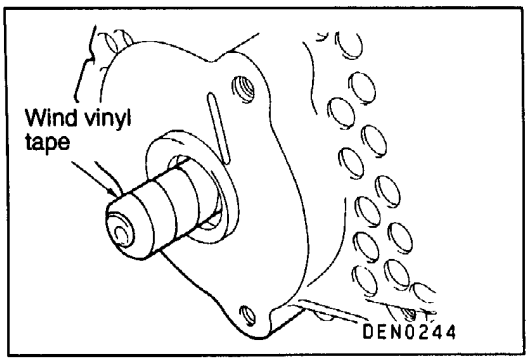
    NOTE
    When the alternator output is high and the value displayed on the ammeter does not decrease until 30 A, set the value to 40 A. Read the value displayed on the voltmeter at this time. When the value range is 40 A, the limit is max. 0.4 V.
11. If the value displayed on the voltmeter is above the limit value, there is probably a malfunction in the alternator output wire, so check the wiring between the alternator "B" terminal and the battery (+) terminal (including fusible link).
    If a terminal is not sufficiently tight or if the harness has become discolored due to overheating, repair and then test again.
12. After the test, run the engine at idle.
13. Turn off all lamps and the ignition switch.
14. Remove the tachometer or the MUT-II.
15. Disconnect the negative batter cable.
16. Disconnect the ammeter and voltmeter.
17. Connect the alternator output wire to the alternator "B" terminal.
18. Connect the negative battery cable.

OUTPUT CURRENT TEST

16100100536

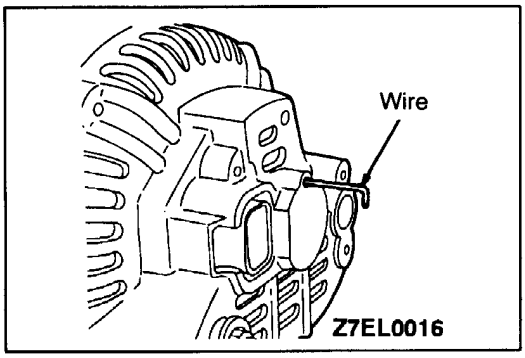




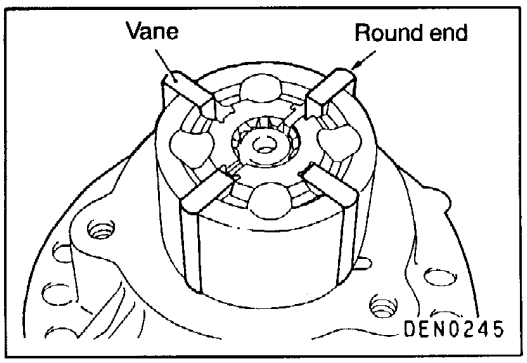


▶B◀ ROTOR INSTALLATION

1. When installing the rotor on the alternator rear bracket, wrap vinyl tape around the splined shaft to prevent damage to the oil seal. <4D5>

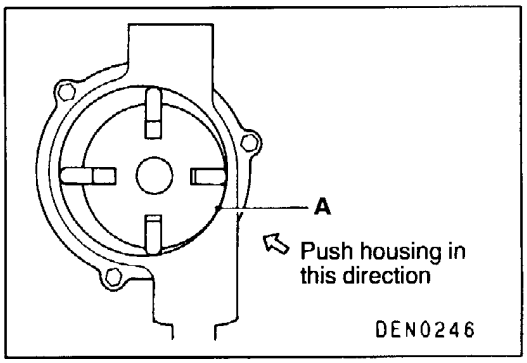


2. After rotor has been installed, remove the wire.



▶C◀ ROTOR/VANES INSTALLATION <4D5>

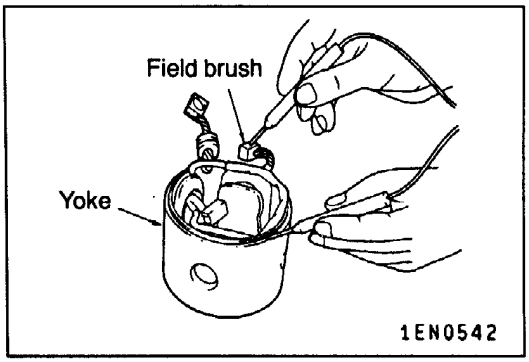
1. Carefully check the housing, rotor, etc. for chips and foreign matter. Then, apply engine oil and install.
2. Install the vanes with the round end facing outward.
3. Apply grease to the O-ring and fit in the housing groove so that it will not come out from the groove when the bolts are tightened.



4. When tightening the housing, lightly push it in the direction of arrow so as to minimize the clearance at "A" and tighten the bolts uniformly.

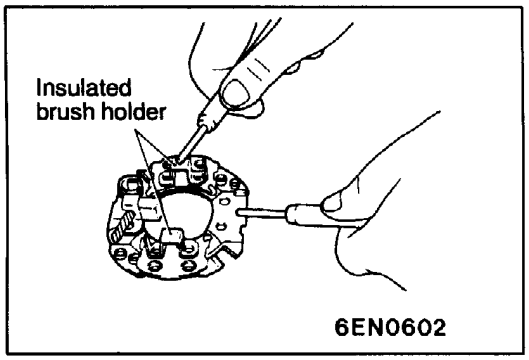
   NOTE
   After assembly, be sure to conduct a performance test to check to see that the maximum vacuum is as specified below.

   Standard value of maximum vacuum:
   80.00 kPa or greater at 3,000 r/min



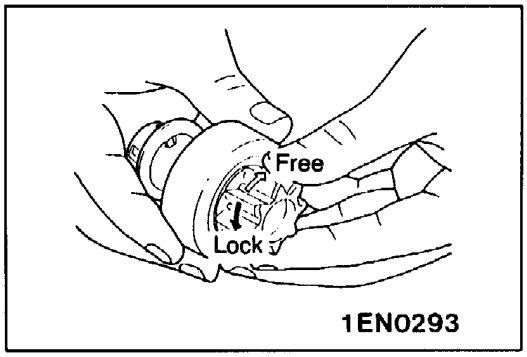
FIELD COIL GROUND TEST <4D5>

Check the continuity between field coil brush and yoke. If there is no continuity, the field coil is free from earth.



BRUSH HOLDER CHECK

Check the continuity between brush holder plate and brush holder.
If there is no continuity, the brush holder is in order.

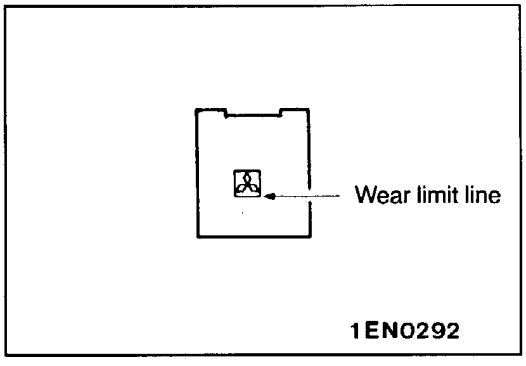


OVERRUNNING CLUTCH CHECK

1. While holding clutch housing, rotate the pinion. Drive pinion should rotate smoothly in one direction, but should not rotate in opposite direction. If clutch does not function properly, replace overrunning clutch assembly.
2. Inspect pinion for wear or burrs. If pinion is worn or burred, replace overrunning clutch assembly. If pinion is damaged, also inspect ring gear for wear or burrs.

FRONT AND REAR BRACKET BUSHING CHECK

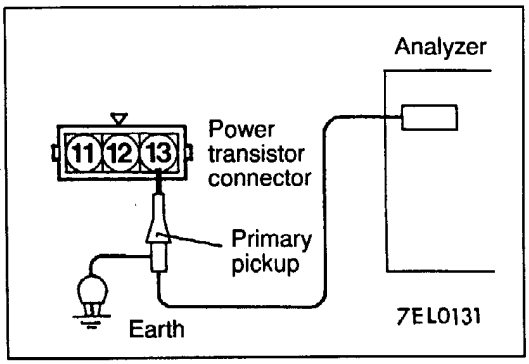
Inspect bushing for wear or burrs. If bushing is worn or burred, replace front bracket assembly or rear bracket assembly.



BRUSH AND SPRING REPLACEMENT

<6G7>

1. Brushes that are worn beyond wear limit line, or oil-soaked, should be replaced.
2. When replacing ground brush, slide the brush from brush holder by prying retaining spring back.



Ignition Primary Voltage Waveform Check

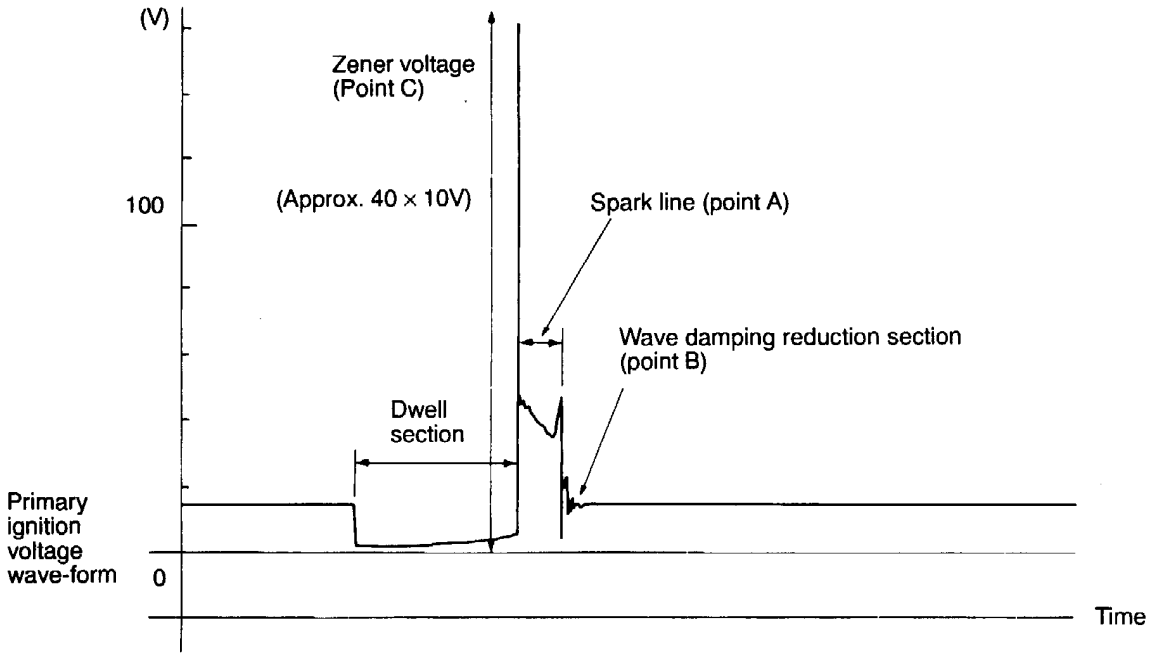
MEASUREMENT METHOD

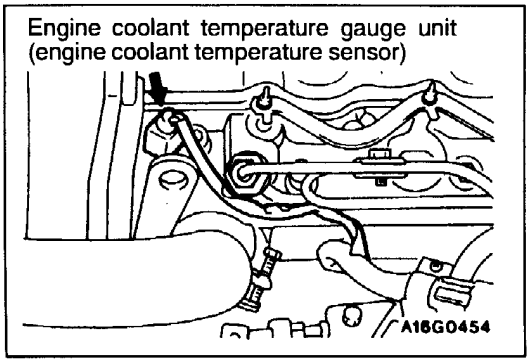
1. Disconnect the power transistor connector and connect the special tool (harness connector: MB991348) in between.
2. Connect the analyzer primary pickup to the power transistor connector terminal 13 when observing the No. 1 – No. 4 cylinder group, terminal 12 for the No. 2 – No. 5 cylinder group, and terminal 11 for the No. 3 – No. 6 cylinder group.
3. Connect the primary pickup earth terminal.
4. Clamp the spark plug cable with the trigger pickup.

NOTE
(1) Clamp the spark plug cable for No. 1, No. 3 and No. 5 cylinders of the same group with the cylinder that is connected to the primary pickup.
(2) The wave-form of either cylinder in the same group will appear at the left edge of the screen.

STANDARD WAVE-FORM
Observation Conditions

FUNCTION	SECONDARY
PATTERN HEIGHT	HIGH (or LOW)
PATTERN SELECTOR	RASTER
Engine Speed	Curb idle speed

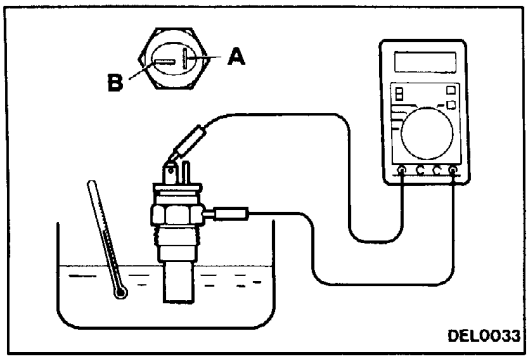




ENGINE COOLANT TEMPERATURE SENSOR CHECK

16400280031

1. Remove the engine coolant temperature sensor.



2. While the sensor section of the engine coolant temperature sensor is immersed, measure the resistance between (B) terminal and the body.

Temperature (°C)	Resistance value (kΩ)
0	8.6
20	3.25 ± 0.33
40	1.5
80	0.3

3. After applying specified sealant to the threaded portion, tighten to the specified torque.

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

Tightening torque: 35 Nm

Servise Data Output

Items No.	Servise data item		Unit
01	Auto-cruise control switch	Main	ON/OFF
02		Set	ON/OFF
03		Resume	ON/OFF
04		Cancel	ON/OFF
05	Stoplamp switch		ON/OFF
10	Vehicle speed sensor		km/h
13	TPS		mV
14	Clutch pedal position switch		ON/OFF
15	Over drive detective		ON/OFF

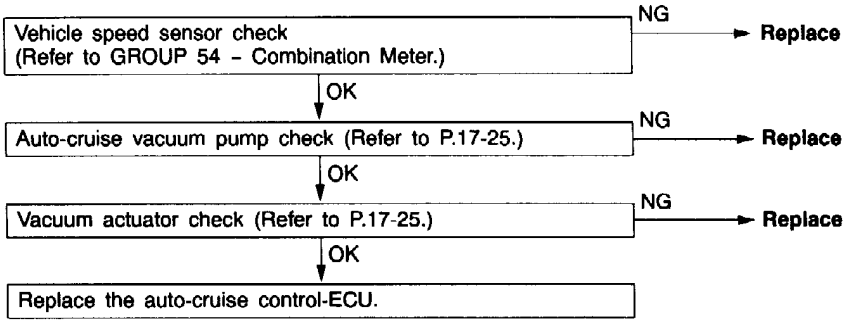
INSPECTION CHART FOR DIAGNOSIS CODES

17200220478

Code No.	Diagnosis item	Reference page
11	Auto-cruise vacuum pump drive system	17-10
12	Vehicle speed signal system	17-10
14	Auto-cruise vacuum pump power supply system	17-11
15	Auto-cruise control switch	17-11
16	Auto-cruise control-ECU	17-11
17	Throttle position sensor system	17-12

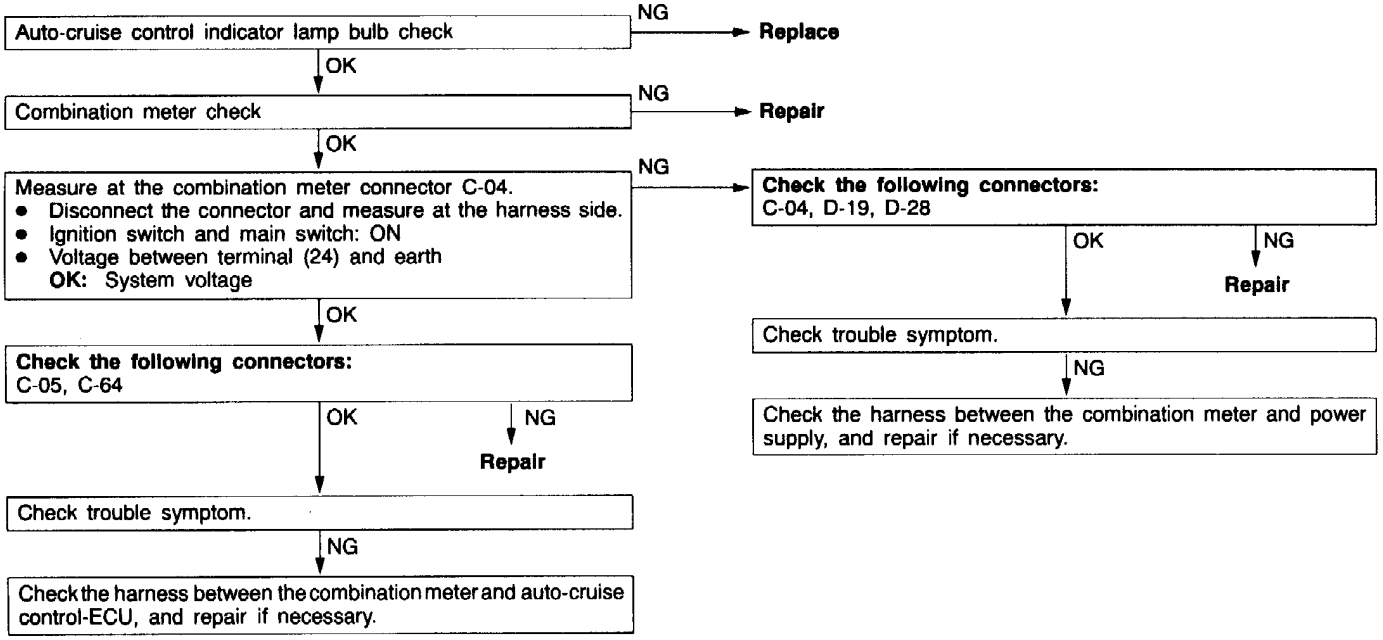
Inspection Procedure 8

Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed.	Probable cause
The cause is probably a malfunction of vehicle speed sensor or incorrect vacuum in the auto-cruise vacuum pump or vacuum actuator.	• Malfunction of the vehicle speed sensor • Malfunction of the auto-cruise vacuum pump • Malfunction of the vacuum actuator • Malfunction of the auto-cruise control-ECU



Inspection Procedure 9

Auto-cruise control indicator lamp inside combination meter does not illuminate. (However, auto-cruise control is normal.)	Probable cause
The cause is probably a malfunction of bulb or a malfunction of connector or harness.	• Malfunction of the bulb • Malfunction of the harness • Malfunction of the connector • Malfunction of the auto-cruise control-ECU



SERVICE SPECIFICATIONS

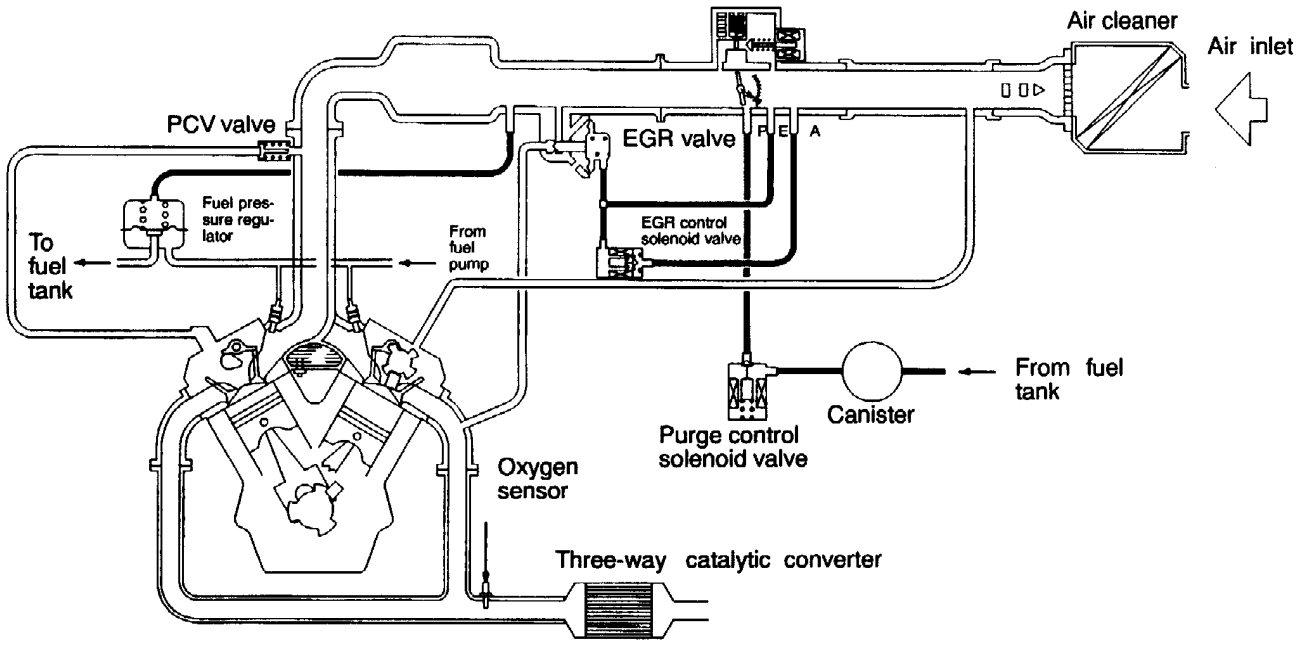
17300030371

Items	Standard value
Purge control solenoid valve coil resistance (at 20°C) Ω	28–36
EGR control solenoid valve coil resistance (at 20°C) Ω	28–36

VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM

17300090508



7EM0528

CATALYTIC CONVERTER

17300530154

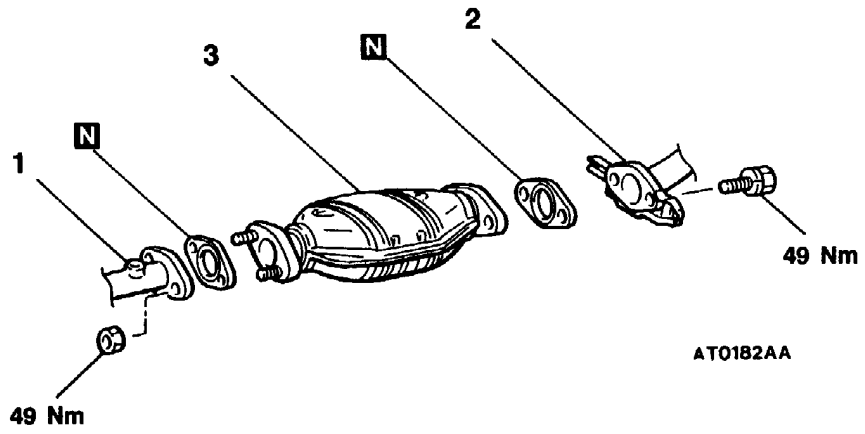
GENERAL INFORMATION

The three-way catalytic converter, together with the closed loop air-fuel ration control based on the oxygen sensor signal, oxidizes carbon monoxides (CO) and hydrocarbons (HC) and reduces nitrogen oxides (NOx).

When the mixture is controlled at stoichiometric air-fuel ratio, the three-way catalytic converter provides the highest purification against the three constituents, namely, CO, HC and Nox.

REMOVAL AND INSTALLATION

17300390325



Removal steps

1. Front exhaust pipe
2. Center exhaust pipe
3. Catalytic converter

GENERAL INFORMATION

21100010093

The clutch is a dry single-disc, diaphragm type; hydraulic pressure is used for the clutch control.

SERVICE SPECIFICATIONS

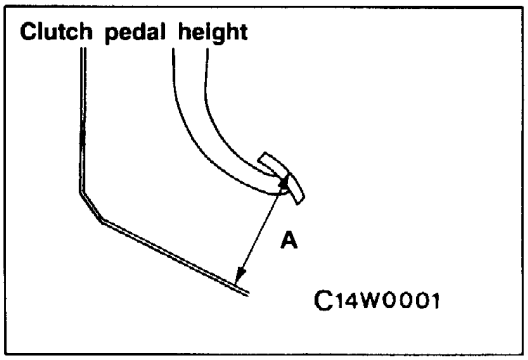
21100030136

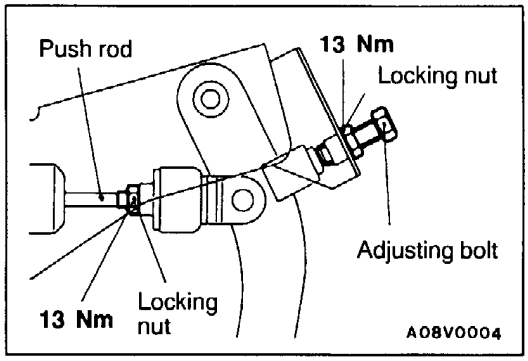
Items	Standard value
Clutch pedal height mm	176 – 181
Clutch pedal clevis pin play mm	1 – 3
Clutch pedal free play mm	6 – 13
Distance between the clutch pedal and the toeboard when the clutch is disengaged mm	56 or more

LUBRICANTS

21100040078

Items	Specified lubricants	Quantity
Clutch fluid	Brake fluid DOT 3 or DOT 4	As required
Push rod assembly	Rubber grease	
Boot		
Release cylinder push rod	MITSUBISHI genuine grease Part No. 0101011	





ON-VEHICLE SERVICE

21100090127

CLUTCH PEDAL INSPECTION AND ADJUSTMENT

1. Turn up the carpet, etc. under the clutch pedal.
2. Measure the clutch pedal height.
   Standard value (A): 176 – 181 mm
3. If the height of the clutch pedal is outside the standard value, loosen the lock nut and adjust the pedal height to the standard value using the adjusting bolt or push rod.

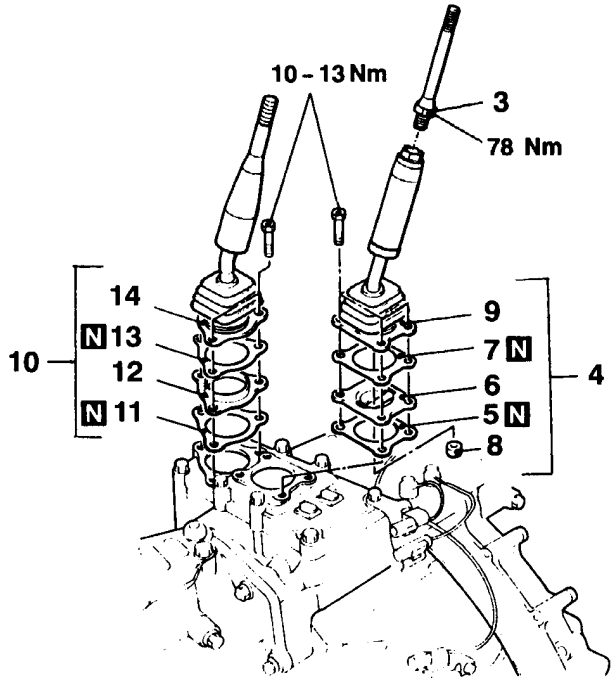
TRANSMISSION CONTROL

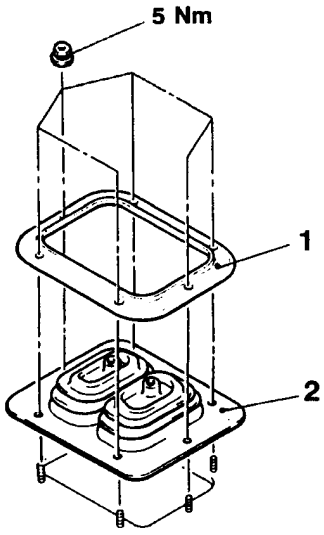
22100380306

REMOVAL AND INSTALLATION

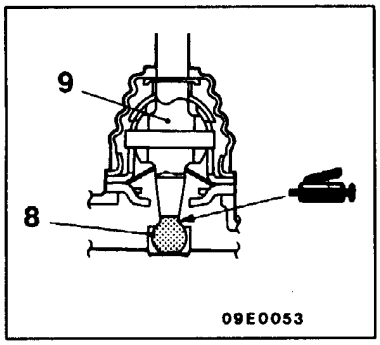
Pre-removal Operation
- Shift the Transmission Control Lever to the N Position.
- Shift the Transfer Control Lever to the 4H Position.
- Floor Consol Removal (Refer to GROUP 52A - Floor Consol.)

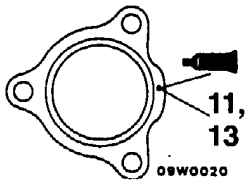
Post-installation Operation
- Floor Consol Installation (Refer to GROUP 52A - Floor Consol.)
- Check the Operation of the Transmission and Transfer Control Levers and the Movement in Each Lever Position.



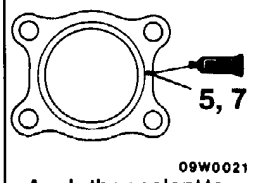


W0314AA
00009330





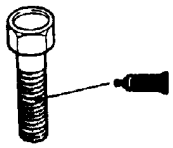
Apply the sealant to both sides of the gasket



Apply the sealant to both sides of the gasket

Sealant:
3M ATD Part No. 8661 or equivalent

Control lever assembly mounting bolt



Adhesive:
3M Stud Locking No. 4170 or equivalent

Transmission control lever assembly removal steps

1. Retainer plate
2. ▶D◀ Dust cover
3. ◀A▶ ▶C◀ Shift lever shaft
4. ▶B◀ Transmission control lever assembly
5. Gasket
6. ▶A◀ Stopper plate
7. Gasket
8. Control lever bushing
9. Transmission control lever

Transfer control lever assembly removal steps

1. Retainer plate
2. ▶D◀ Dust cover
10. ▶B◀ Transfer control lever assembly
11. Gasket
12. ▶A◀ Stopper plate
13. Gasket
14. Transfer control lever

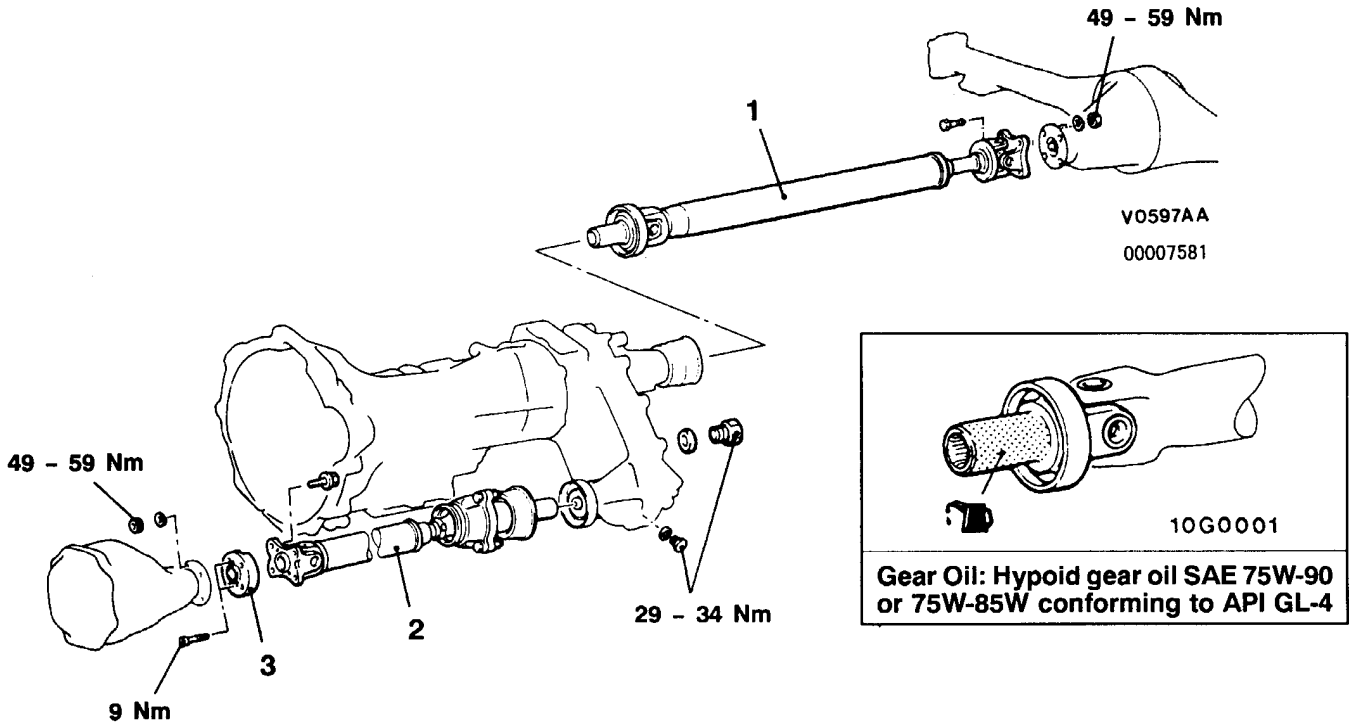
PROPELLER SHAFT

25100100163

REMOVAL AND INSTALLATION

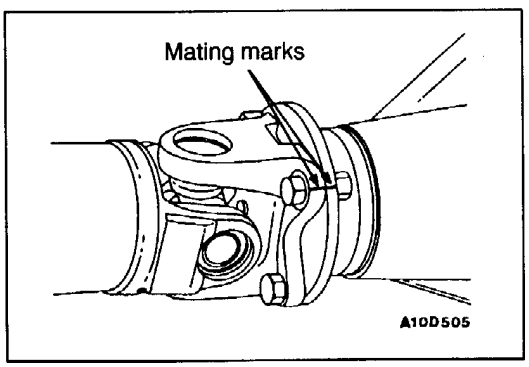
Pre-removal Operation
- Set the Transfer Shift Lever to "2H"
- Front Under Cover, Middle Under Cover and Transfer Protector Removal
- Transfer Gear Oil Draining (Refer to GROUP 22 - On-vehicle Service.)

Post-installation Operation
- Transfer Gear Oil Supplying (Refer to GROUP 22 - On-vehicle Service.)
- Front Under Cover, Middle Under Cover and Transfer Protector Installation



Removal steps

◀A▶ ▶A◀ 1. Rear propeller shaft assembly
◀A▶ ▶A◀ 2. Front propeller shaft assembly
3. Spacer <6G7>



REMOVAL SERVICE POINT

◀A▶ REAR PROPELLER SHAFT ASSEMBLY/FRONT PROPELLER SHAFT ASSEMBLY REMOVAL

1. Make mating marks on the differential companion flange and flange yoke and remove the propeller shaft.
2. Use the plug as a cover so that no foreign material gets into the transmission or transfer.

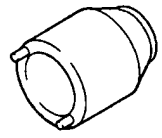
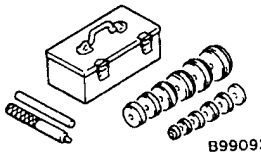
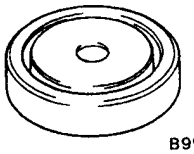
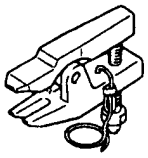
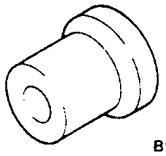
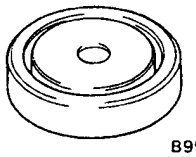
SEALANTS

26100050069

Items	Specified sealants	Remarks
Contact surface of drive flange and front hub assembly	3M ATD Part No. 8663 or equivalent	Semi-drying sealant
Contact surface of hub cap and drive flange		
Contact surface of differential cover and differential carrier		
Vent plug		
Freewheel clutch assembly		
Drive gear threaded hole	3M Stud Locking 4170 or equivalent	Anaerobic sealant

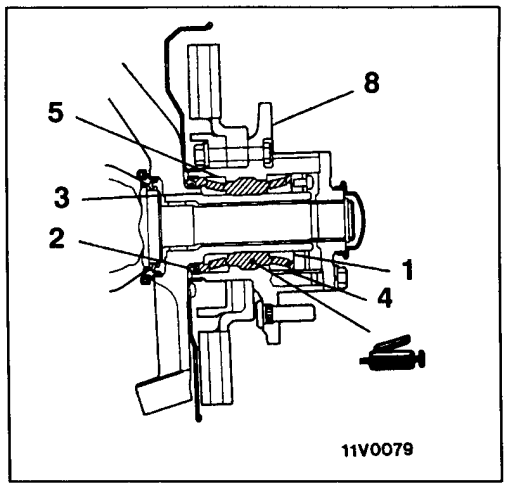
SPECIAL TOOLS

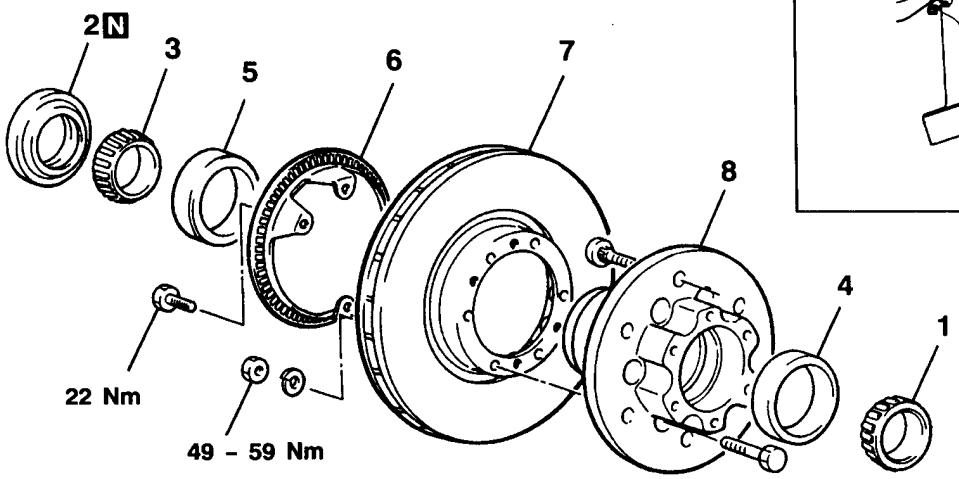
26100060253

Tool	Number	Name	Use
 B990954	MB990954	Lock nut wrench	Removal and adjustment of lock nut
 B990925	MB990925	Bearing and oil seal installer set	• Press-out and press-fitting of bearing • Press-fitting of oil seal • Press-fitting of drive shaft • Tapping in of side bearing outer race • Checking of drive gear tooth contact
 B990955	MB990955	Oil seal installer	• Press-fitting of housing tube dust seal • Press-fitting of front axle hub oil seal (Used together with MB990938)
 B991113	MB991113 or MB990635	Steering linkage puller	• Disconnection of tie rod • Disconnection of upper ball joint • Disconnection of lower ball joint
 B990956	MB990956	Needle bearing installer	Press-fitting of knuckle needle bearing (Used together with MB990938)
 B990985	MB990985	Oil seal installer	Press-fitting of knuckle oil seal (Used together with MB990938)

DISASSEMBLY AND REASSEMBLY

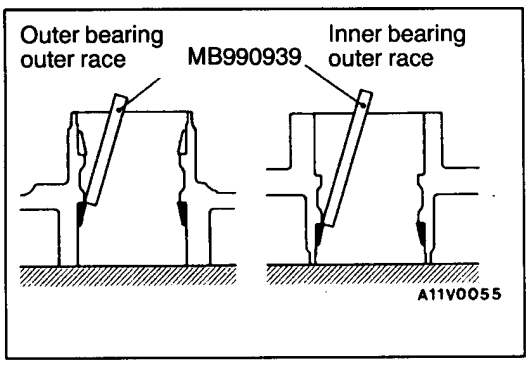
26100190143





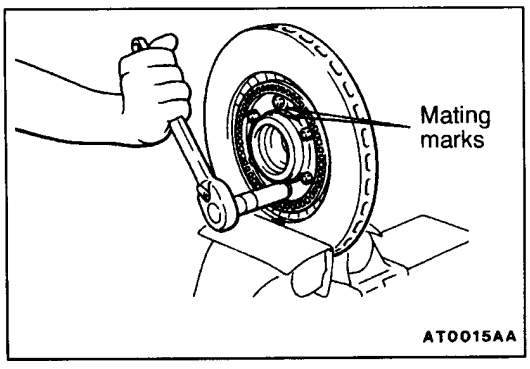
Disassembly steps

1. Outer bearing inner race
▶B◀ 2. Oil seal
3. Inner bearing inner race
◀A▶ ▶A◀ 4. Outer bearing outer race
◀A▶ ▶A◀ 5. Inner bearing outer race
6. Rotor <vehicles with ABS>
◀B▶ 7. Brake disc
8. Front hub assembly



REMOVAL SERVICE POINTS

◀A▶ OUTER BEARING OUTER RACE/INNER BEARING OUTER RACE REMOVAL



◀B▶ BRAKE DISC REMOVAL

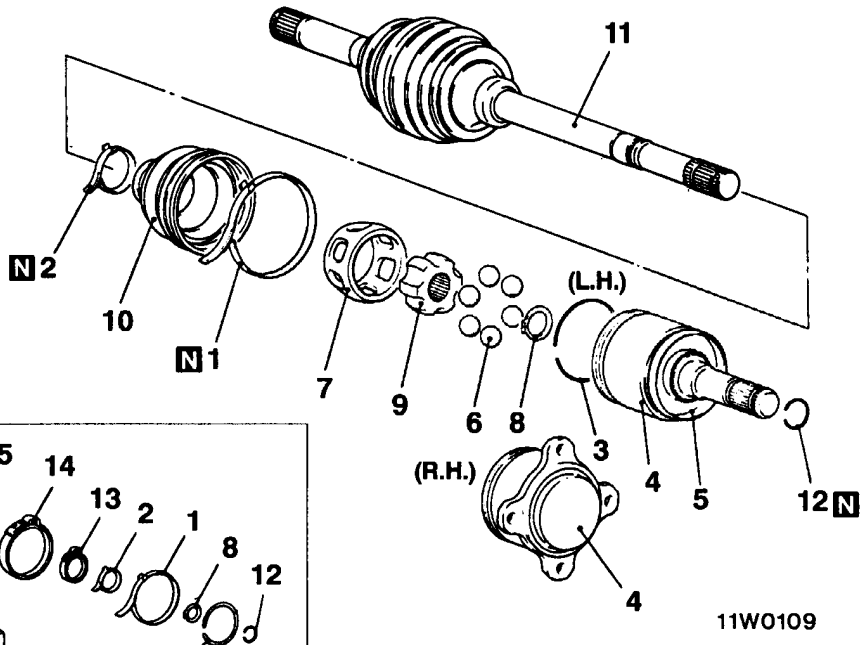
Make the mating marks on the brake disc and front hub, and then separate the front hub and brake disc, if necessary.

Caution
Lock disc in vise and grip with copper or aluminium board.

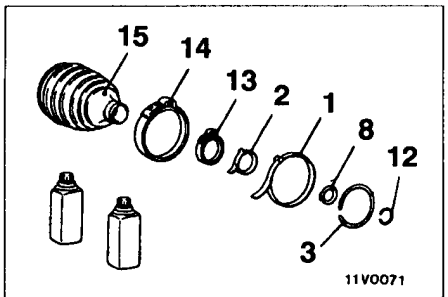
DISASSEMBLY AND REASSEMBLY

26100370332

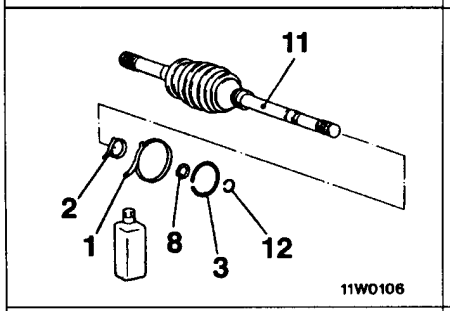
Caution
Never disassemble the B.J. assembly except when replacing the B.J. boot.



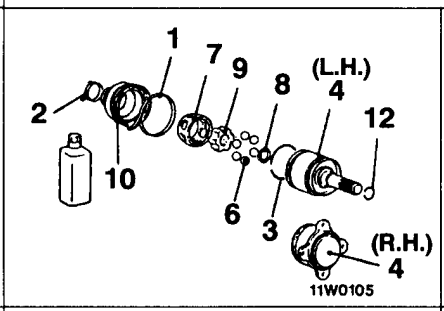
00004932



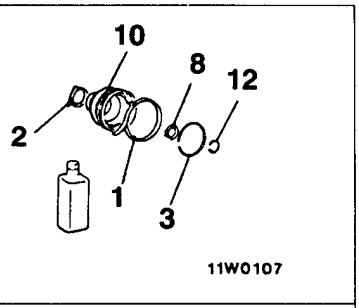
B.J. Repair Kit (B.J.)



B.J. Repair kit L.H.



D.O.J. Repair kit



Boot repair kit (D.O.J.)

Disassembly steps

1. D.O.J. boot band (large)
2. D.O.J. boot band (small)
3. Circlip
4. D.O.J. outer race
5. Dust cover
◀A▶ 6. Balls
◀B▶ 7. D.O.J. cage
8. Snap ring
9. D.O.J. inner race
◀C▶ 10. D.O.J. boot
11. B.J. assembly
12. Circlip
13. B.J. boot band (small)
14. B.J. boot band (large)
15. B.J. boot

Reassembly steps

12. Circlip
11. B.J. assembly
▶A◀ 9. D.O.J. inner race
▶A◀ 8. Snap ring
▶A◀ 7. D.O.J. cage
▶A◀ 6. Balls
▶B◀ 4. D.O.J. outer race
5. Dust cover
3. Circlip
▶C◀ 10. D.O.J. boot
▶C◀ 2. D.O.J. boot band (small)
▶C◀ 1. D.O.J. boot band (large)

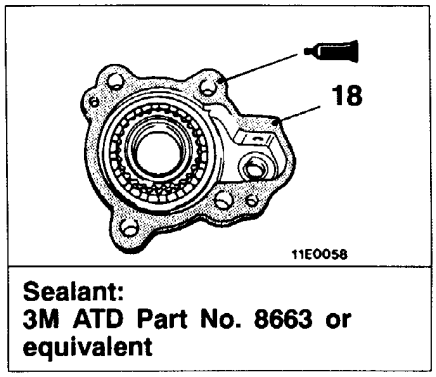
DIFFERENTIAL CARRIER

26200210064

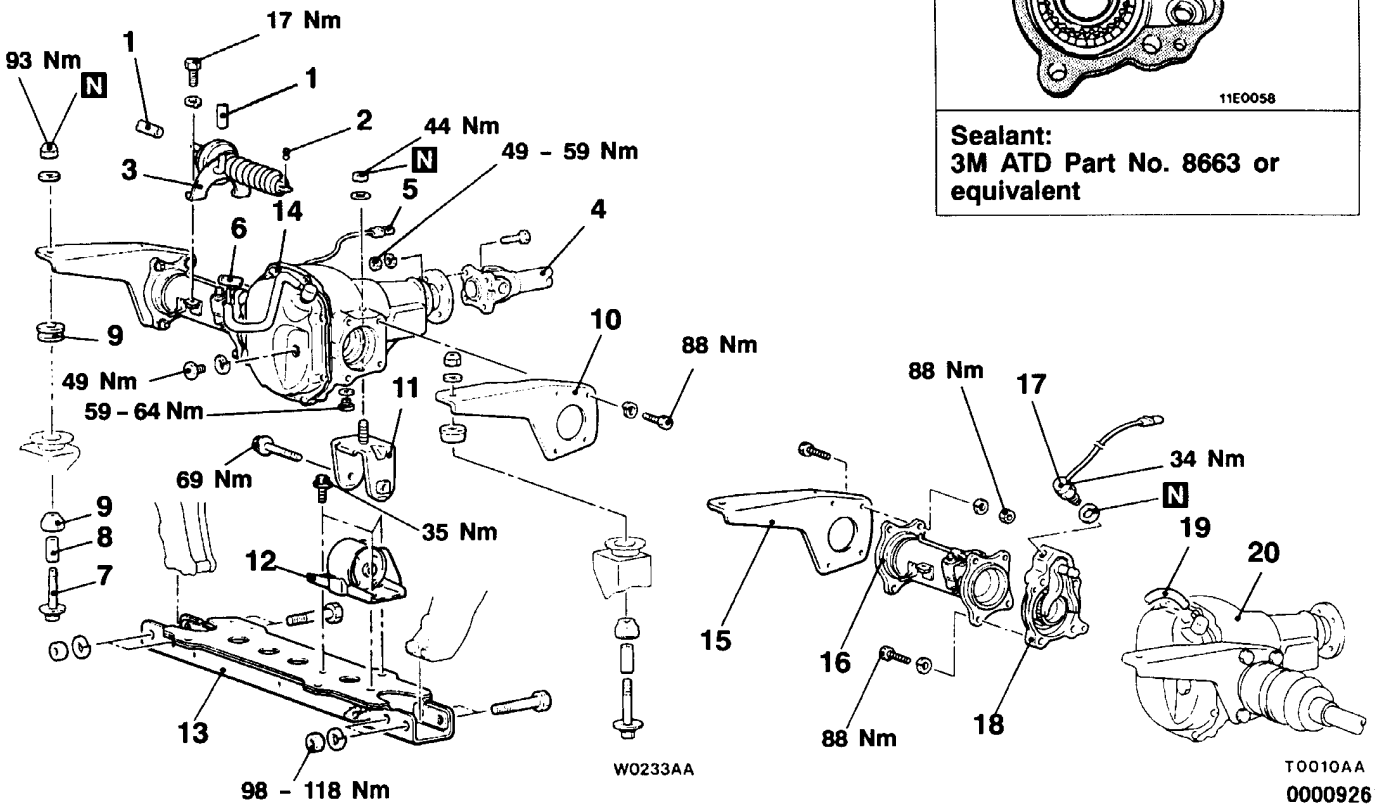
REMOVAL AND INSTALLATION

Pre-removal and Post-installation
- Under Cover Removal and Installation
- Front Axle Gear Oil Level Check (Refer to P.26-10.)
- Drive shaft Removal and Installation (Refer to P.26-21.)
- Inner Shaft Removal and Installation (Refer to P.26-31.)

<6G7>



Sealant:
3M ATD Part No. 8663 or equivalent



Removal steps

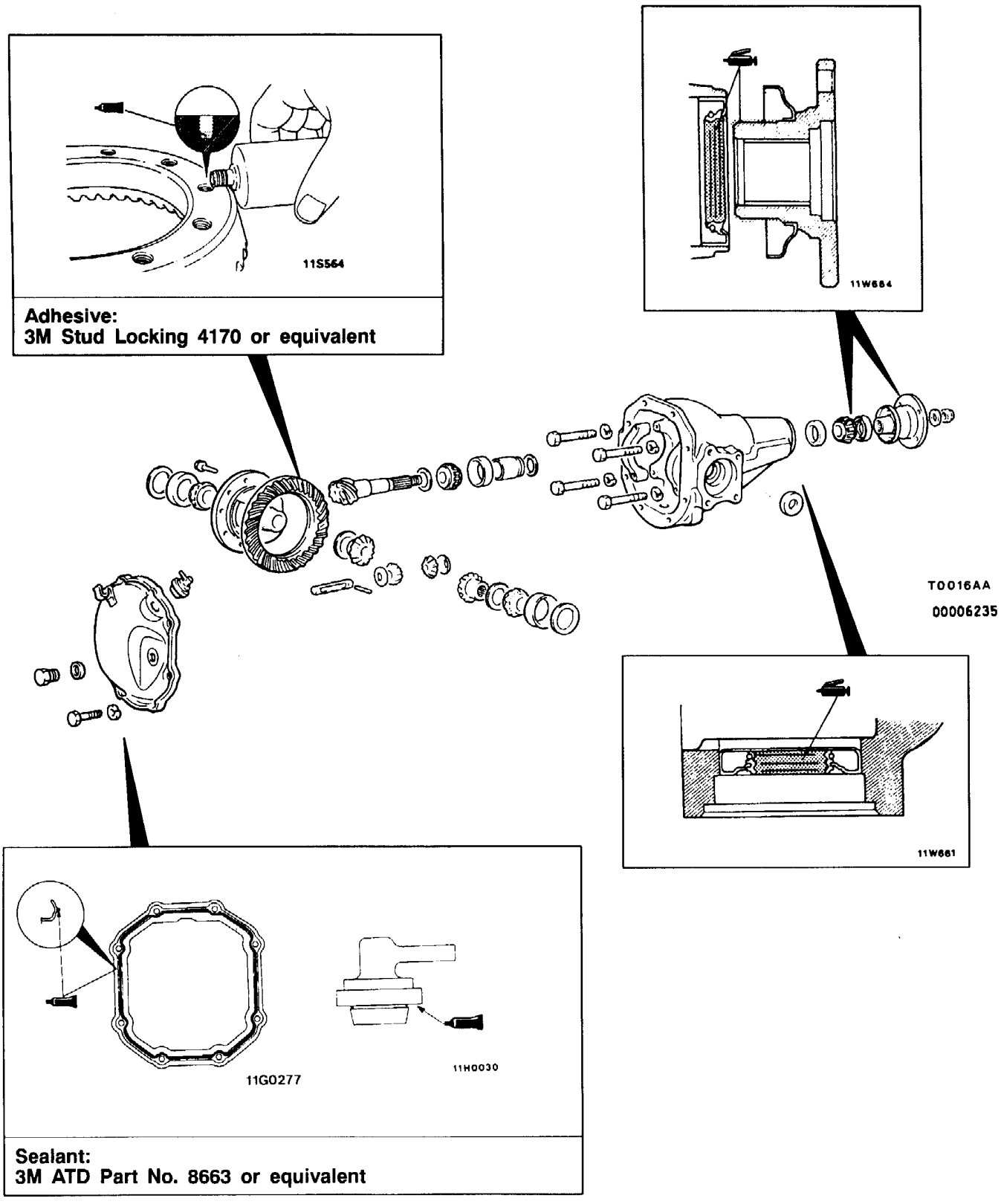
▶C◀ 1. Vacuum hose connection
2. Pin
3. Actuator assembly
◀A▶ ▶B◀ 4. Front propeller shaft connection
5. Freewheel engage switch connection
6. Vacuum hose connection
- Support the differential by a transmission jack.

7. Pin
8. Spacer
9. Differential mounting cushion
10. Differential mounting bracket <L.H.>
11. Differential support bracket
12. Differential mount insulator assembly
13. Front suspension crossmember
14. Front differential, housing tube and differential mounting bracket <R.H.>
15. Differential mounting bracket <R.H.>
16. Housing tube
17. Freewheel engage switch
18. Freewheel clutch assembly

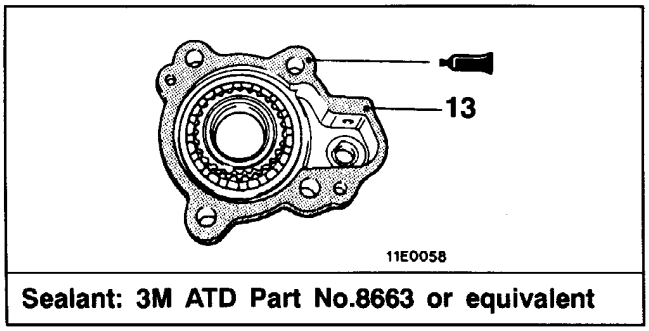
▶A◀ • Clutch gear bearing axial play inspection.

19. Vacuum hose connection
20. Front differential carrier assembly

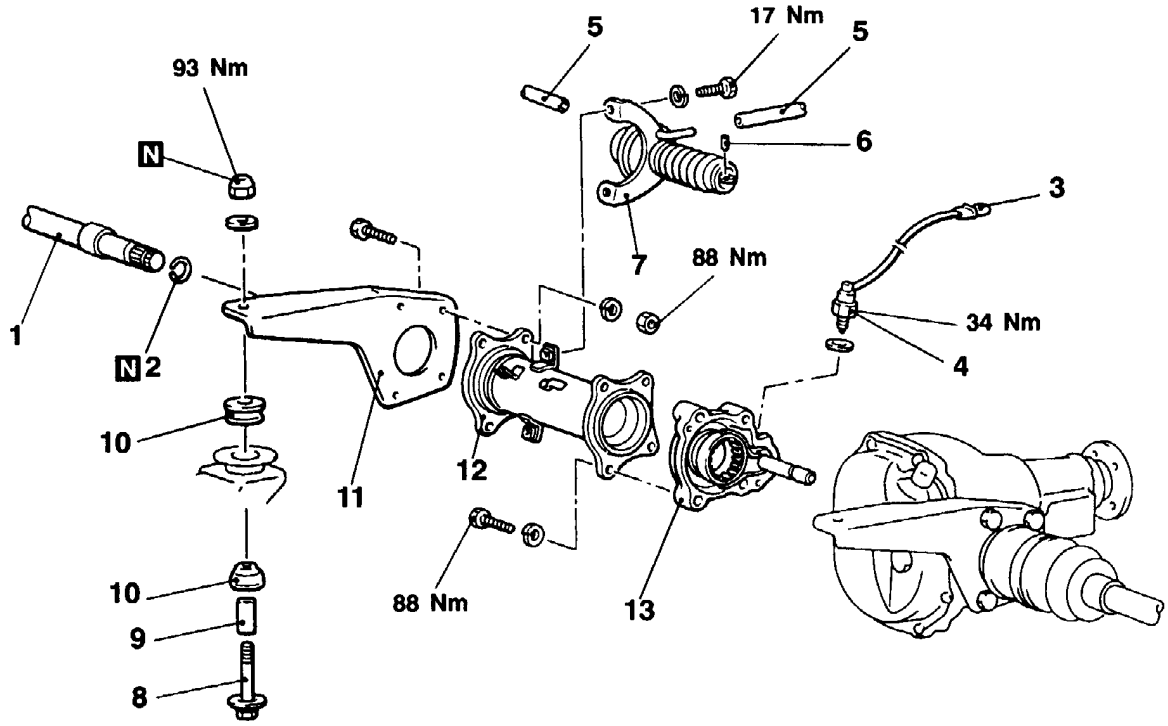
Lubrication, Sealing and Adhesive Points



<4D5>



Sealant: 3M ATD Part No.8663 or equivalent



11V0047
00009263

Freewheel clutch removal steps

1. Inner shaft (Refer to P. 26-31.)
2. Circlip
3. Freewheel engage switch connector
4. Freewheel engage switch
▶E◀ 5. Vacuum hose
6. Pin
7. Actuator assembly
   - Support the differential by a transmission jack.
8. Pin
9. Spacer
10. Differential mounting cushion
11. Differential mounting bracket (R.H.)
12. Housing tube assembly
13. Freewheel clutch assembly

▶D◀ - Clutch gear bearing axial play inspection.

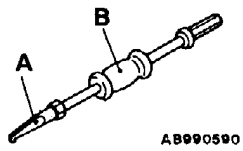
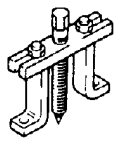
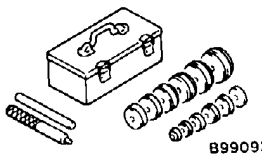
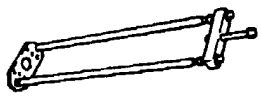
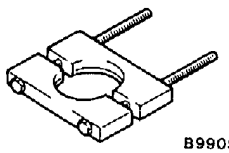
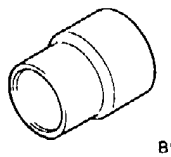
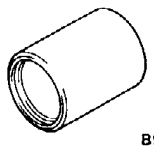
SEALANTS

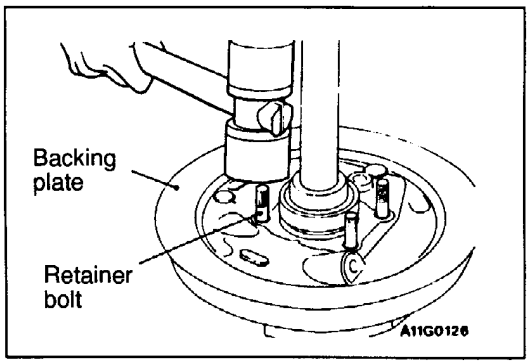
27100050110

Items	Specified sealants	Remarks
Bearing case	3M ATD Part No. 8663 or equivalent	Semi-drying sealant
Axle housing (differential carrier mounting part)		
Drive gear and differential case mounting part	3M Stud Locking 4170 or equivalent	Anaerobic sealant

SPECIAL TOOLS

27100060298

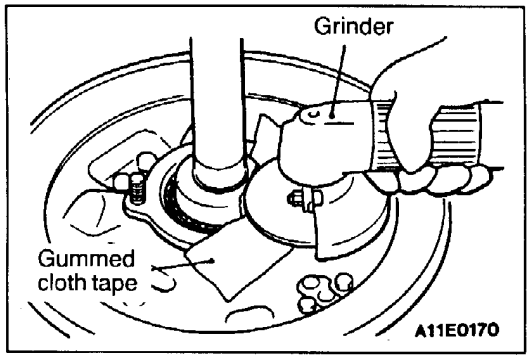
Tool	Number	Name	Use
	MB990590 A: MB990212 B: MB990211	Rear axle shaft oil seal remover A: Adapter B: Sliding hammer	• Removal of axle shaft (Use together with MB990241, MB990211) • Removal of axle housing oil seal
	MB990241	Rear axle shaft puller	Removal of axle shaft (Use together with MB990211)
	MB990925	Bearing and oil seal installer set	• Press-fitting of oil seal • Inspection of drive gear tooth contact • Removal of bearing outer race For details of each installer, refer to GROUP 26 - Special Tools.
	MB991552	Axle shaft bearing and case remover	Removal of the axle shaft bearing and bearing case
	MB990560	Bearing remover	Removal of bearing inner race
	MB990799	Bearing inner race installer	• Removal of axle shaft bearing inner race • Press-fitting of the axle shaft bearing inner race • Press-fitting of the axle shaft retainer
	MB990890 or MB990891	Rear suspension bushing base	Press-fitting of bearing outer race



DISASSEMBLY SERVICE POINTS

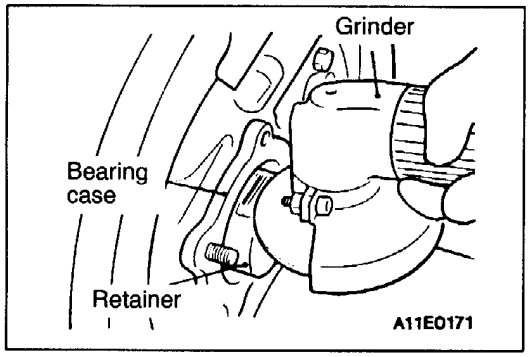
◀A▶ RETAINER RING REMOVAL

1. Remove one retainer bolt from the backing plate.



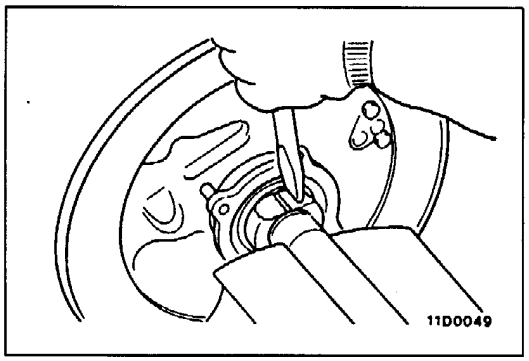
2. Apply gummed cloth tape around the edge of the bearing case for protection.
3. As shown in the figure, hold the axle shaft. Using a grinder, shave off a point of its circumference locally until the wall thickness becomes as follows:
   - 1.0 – 1.5 mm for axle shaft side
   - 2.0 mm for bearing side

   Caution
   Be careful not to damage the bearing case and the axle shaft.



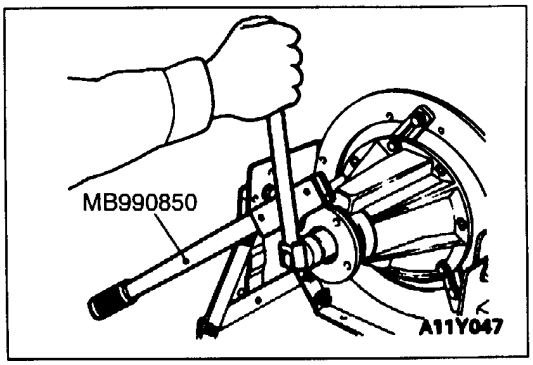
4. Fix the axle shaft and shave off the remaining 2.0 mm on the side of the retainer bearing.

   Caution
   Be careful not to damage the bearing case and the axle shaft.



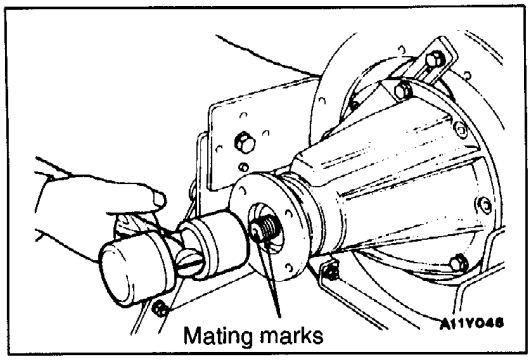
5. Cut in with a chisel the place where the retainer ring has been shaven and remove the retainer ring.

   Caution
   Be careful not to damage the axle shaft.



◀F▶ SELF-LOCKING NUT REMOVAL

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

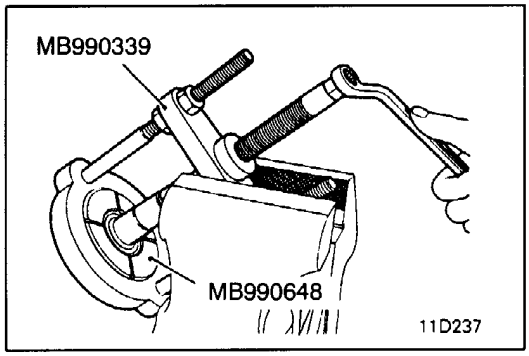


◀G▶ DRIVE PINION ASSEMBLY REMOVAL

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

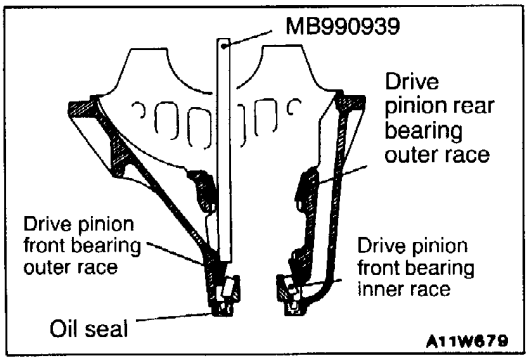
   Caution
   Do not make mating marks on the contact surfaces of the companion flange and propeller shaft.

2. Drive out the drive pinion together with the drive pinion spacer and drive pinion front shims.



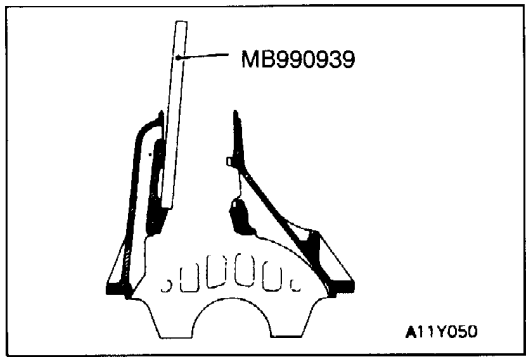
◀H▶ DRIVE PINION REAR BEARING INNER RACE REMOVAL

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



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

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



◀J▶ DRIVE PINION REAR BEARING OUTER RACE REMOVAL

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

GENERAL INFORMATION

31100010269

Both steel type and aluminium type wheels have been adopted. The type of wheel used depends on the vehicle model.

Items		Vehicles without wide fender	Vehicles with wide fender
Wheel	Type	Steel type	Aluminium type
	Size	15 x 6JJ	16 x 7JJ
	Amount of wheel offset	33	10 ± 1
	Pitch circle diameter (P.C.D.) mm	139.7	139.7
Tyre	Size	235/75 R15	245/70 R16

SERVICE SPECIFICATIONS

31100030036

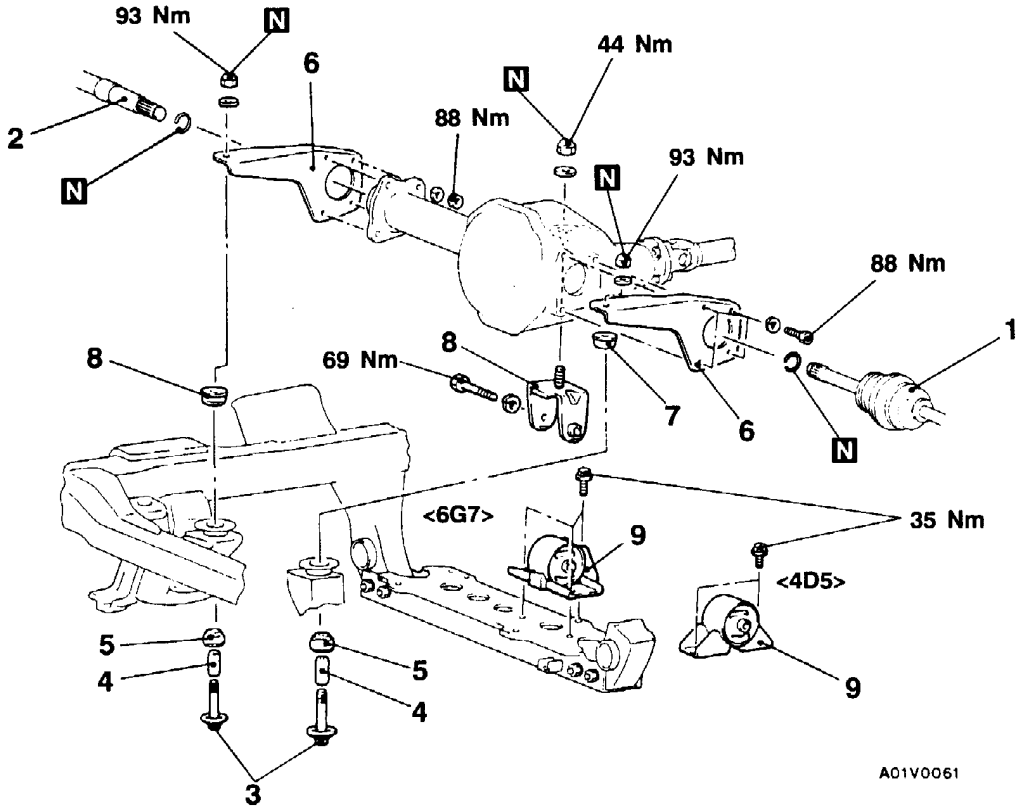
Items		Limit
Tread depth of tyre mm		1.6
Wheel runout (Radial runout) mm	Steel wheel	1.2 or less
	Aluminium wheel	1.0 or less
Wheel runout (Lateral runout) mm	Steel wheel	1.2 or less
	Aluminium wheel	1.0 or less

FRONT DIFFERENTIAL MOUNTING

32100170100

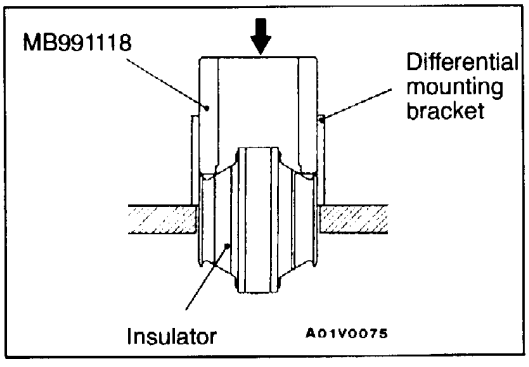
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Under Skid Plate and Under Cover Removal and Installation



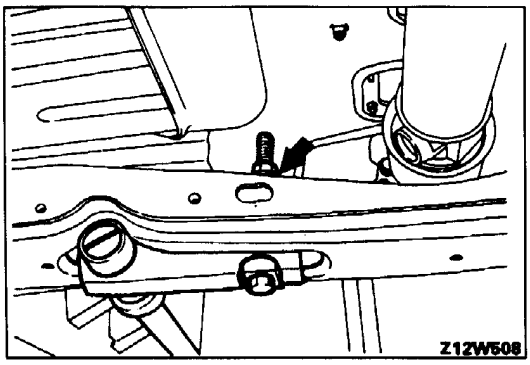
Removal steps
- Hold the front differential with a transmission jack.

1. Drive shaft (Refer to Group 26 - drive shaft.)
2. Inner shaft (Refer to Group 26 - inner shaft.)
3. Pin
4. Spacer
5. Differential mounting rubber B
6. Differential mounting bracket
7. Differential mounting rubber A
8. Differential support bracket
9. Differential mounting bracket



FRONT DIFFERENTIAL MOUNTING INSULATOR REPLACEMENT

1. Use special tool to press-fit and remove the insulator.

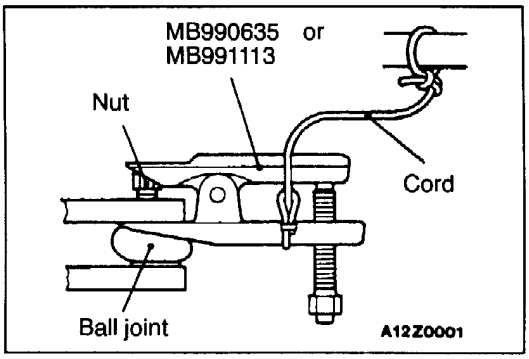


REMOVAL SERVICE POINTS

◀A▶ REAR ANCHOR ARM ADJUSTING NUT LOOSENING

Loosen the anchor arm bolt of the torsion bar all the way.

Caution
When the rear anchor arm adjusting nut is loosened, use a jack to support the lower arm of the side to be loosened.



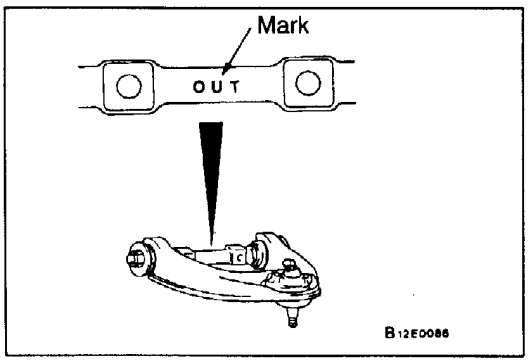
◀B▶ UPPER ARM BALL JOINT DISCONNECTION

Use special tools to disconnect the upper arm ball joint from the knuckle.

Caution
1. **Support special tool with a cord, etc. to prevent it from coming off.**
2. **Only loosen the mounting nut, do not remove it from the ball joint.**

◀C▶ SHIMS REMOVAL

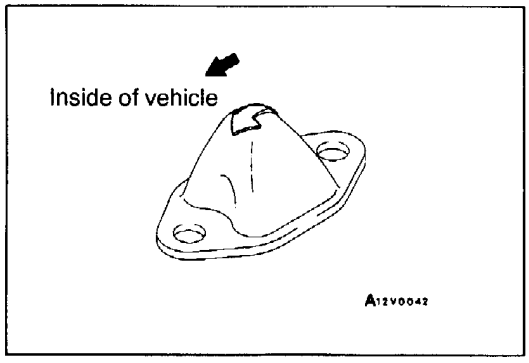
NOTE
The camber and caster adjustment shims should be kept for use during assembly.



INSTALLATION SERVICE POINTS

▶A◀ UPPER ARM INSTALLATION

Install the upper arm so that the "OUT" mark on the upper arm shaft is facing toward the outside of the vehicle.

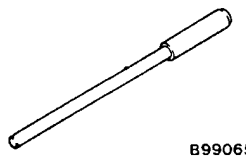
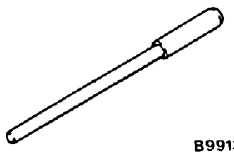
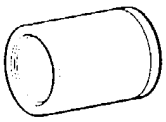
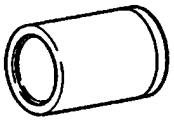
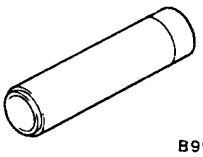


▶B◀ REBOUND STOPPER INSTALLATION

Install the rebound stopper so that its arrow faces inside of the vehicle.

SPECIAL TOOLS

34100060197

Tool	Number	Name	Use
 B990650	MB990650	Lower arm bushing arbor	• Lateral rod bushing removal and installation • Lateral rod removal and press fitting
 B991318	MB991318	Lower arm bushing arbor	• Lower arm rear bushing removal and press fitting • Lower arm bushing removal and press fitting
	MB990971	Rear wheel bearing and installer joint	
	MB990891	Bushing remover and installer base	
 B991411	MB991411	Rear wheel bearing and hub installer joint	

ON-VEHICLE SERVICE

34101100034

REAR WHEEL ALIGNMENT

The rear suspension assembly must be free of worn, loose or damaged parts prior to measurement of rear 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 or replace bent or damaged parts.

SERVICE SPECIFICATIONS

35100030386

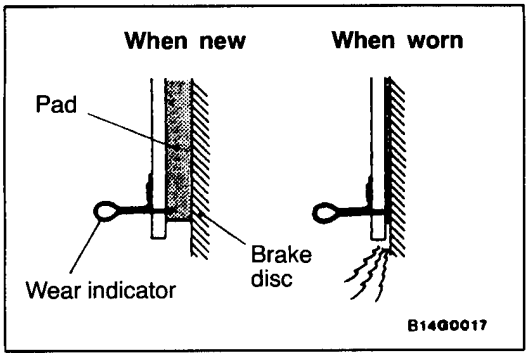
Items		Standard value	Limit
Brake pedal height mm		176 – 181	–
Brake pedal free play mm		3 – 8	–
Brake pedal to floor board clearance mm		95 or more	–
Load sensing spring length mm		164 – 168	–
Load sensing proportioning valve output pressure kPa (Input pressure kPa)	When load sensing spring length is 144 mm (when unladen)	3,633 (5,884)	–
		5,610 (13,730)	–
	When load sensing spring length is 208 mm (when laden)	11,160 (13,730)	–
Disc brake pad thickness mm		10	2.0
Brake disc run-out mm	Front	–	0.06
	Rear	–	0.08
Front hub end play mm		0.05	–
Rear axle shaft end play mm		0 – 0.25	–
Brake disc thickness mm	Front	24	22.4
	Rear	18	16.4
Brake lining thickness mm		–	4.5
Brake drum inside diameter mm		197.0	198.0
Booster push rod to master cylinder piston clearance mm	Vehicle which brake booster of power cylinder is 180 mm and 205 mm in effective diameter	0.90 – 1.30	–
	Vehicle which brake booster of power cylinder is 205 mm and 230 mm in effective diameter	0.70 – 1.10	–
Disc brake drag force (tangential force of wheel mounting bolts) N	Front	106 or less	–
	Rear	56 or less	–

Standard value:

Spring length H mm	Input fluid pressure kPa	Output fluid pressure kPa
144*1	5,884	3,633
	13,730	5,610
208*2	13,730	11,160

NOTE
*1 and *2 indicate the applicable lengths for unladen and laden vehicles respectively.

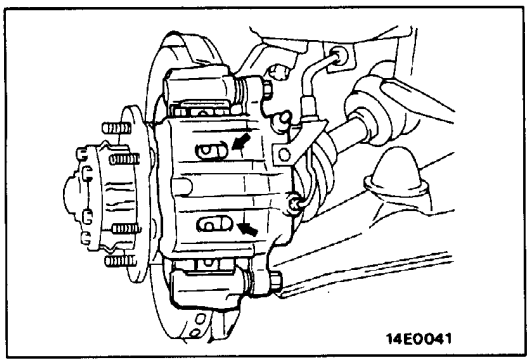
5. After making the check, install the spring. Disconnect the pressure gauges from the load sensing proportioning valve and bleed the air. (Refer to P.35A-13.)



DISC BRAKE PAD CHECK AND REPLACEMENT

35100150242

NOTE
The brake pads have indicators that contact the brake disc when the brake pad thickness becomes 2 mm, and emit a squealing sound to warn the driver.



<Front>

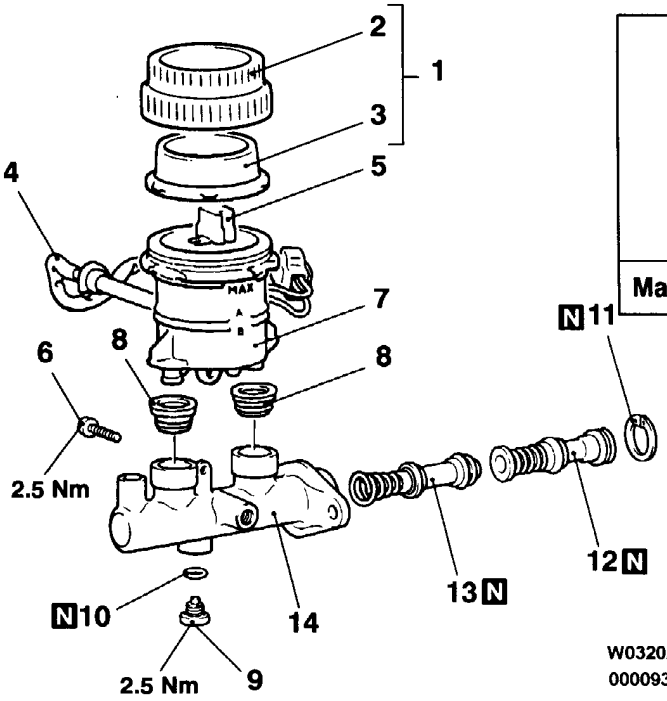
1. Check the brake pad thickness through the caliper body check port.

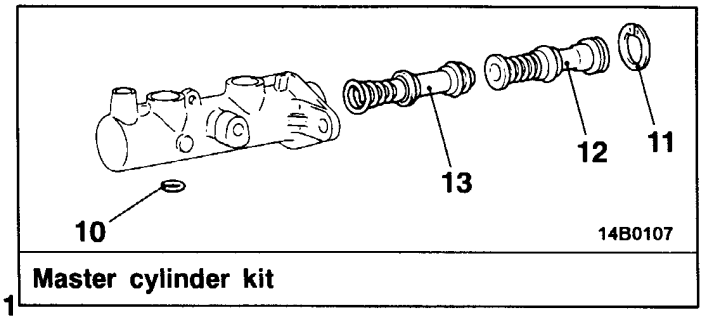
   Standard value: 10 mm
   Limit: 2.0 mm

   Caution
   (1) When the limit is exceeded, replace the pads at both sides, and also the brake pads for the wheels on the opposite side at the same time.
   (2) If there is a significant difference in the thicknesses of the pads on the left and right sides, check the sliding condition of the piston, lock pin and guide pin.

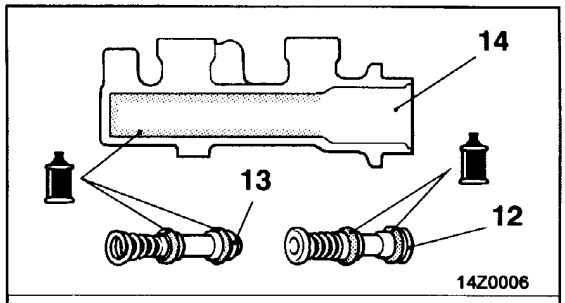
MASTER CYLINDER
35100420206

DISASSEMBLY AND REASSEMBLY





Master cylinder kit



Brake fluid: DOT3 or DOT4

Disassembly steps

1. Reservoir cap assembly
2. Reservoir cap
3. Diaphragm
4. Brake fluid level sensor
5. Float
6. Reservoir stopper bolt
7. Reservoir tank
8. Reservoir seal

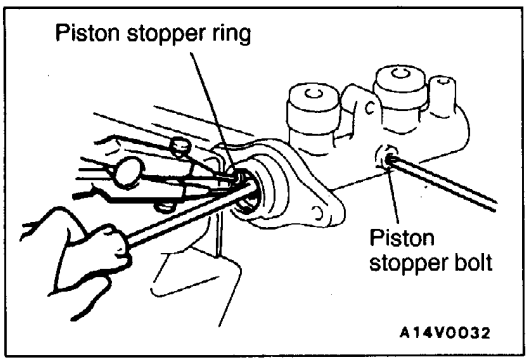
◀A▶ 9. Piston stopper bolt

10. Gasket

◀A▶ 11. Piston stopper ring

12. Primary piston assembly
13. Secondary piston assembly
14. Master cylinder body

Caution
Do not disassemble the primary piston and secondary piston assembly.



DISASSEMBLY SERVICE POINT

◀A▶ PISTON STOPPER BOLT/PISTON STOPPER RING DISASSEMBLY

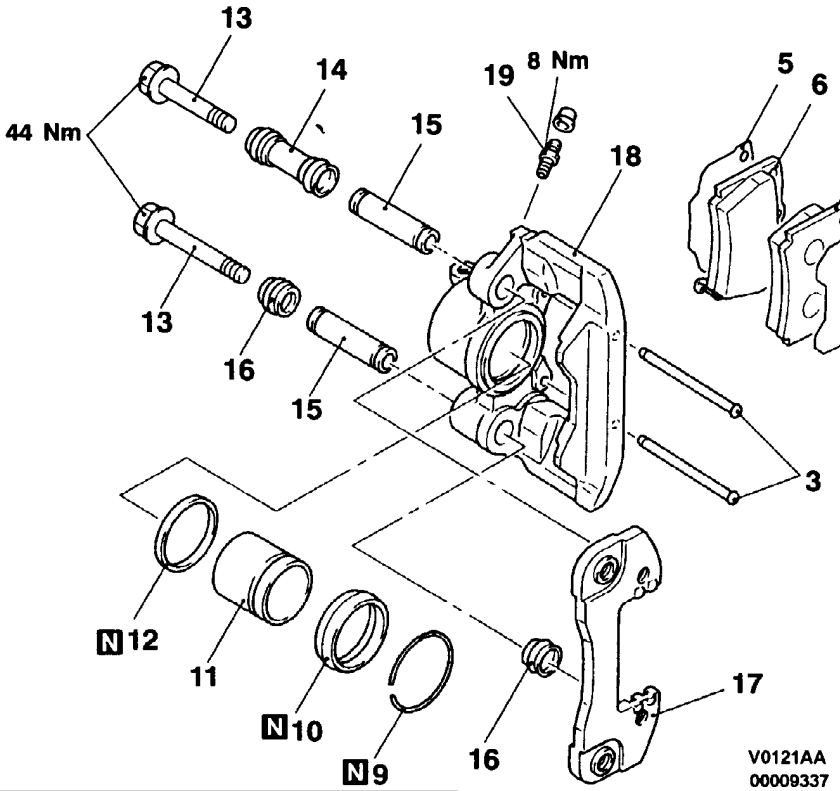
Remove the piston stopper bolt and piston stopper ring while depressing the piston.

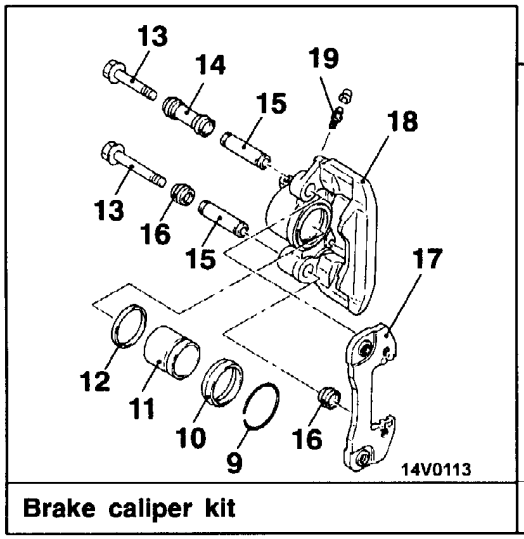
INSPECTION
35100430056

- Check the inner surface of master cylinder body for rust or pitting.
- Check the primary and secondary pistons for rust, scoring, wear or damage.
- Check the diaphragm for cracks and wear.

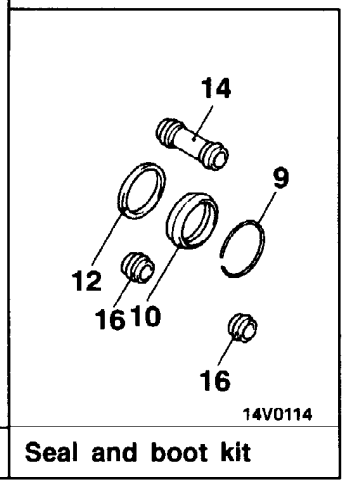
DISASSEMBLY AND REASSEMBLY

35100720184

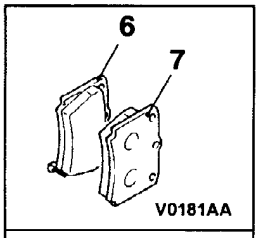




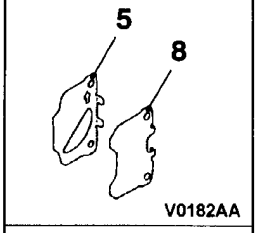
Brake caliper kit



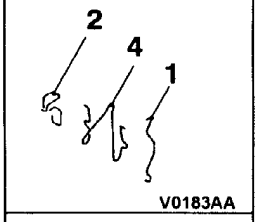
Seal and boot kit



Pad set



Shim set



Clip set

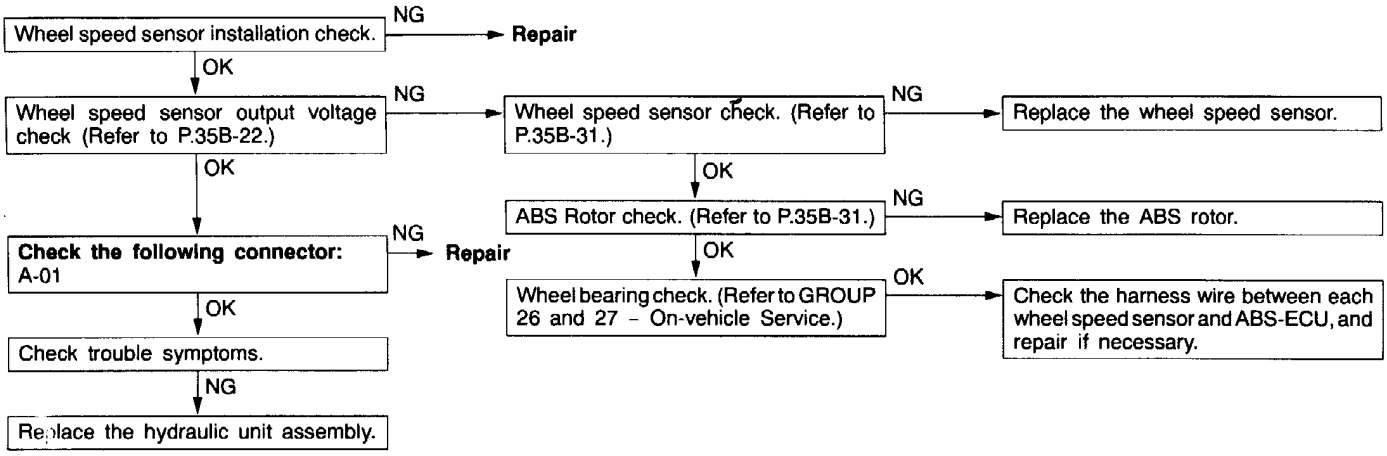
Caliper assembly disassembly steps

1. Clip
2. K-spring
3. Pad pin
4. Spring
5. Inner shim
6. Pad and wear indicator assembly ◀A▶
7. Pad assembly ◀A▶
8. Outer shim
9. Retaining ring
10. Piston boot ◀B▶
11. Piston ◀B▶
12. Piston seal ◀C▶
13. Sleeve bolt
14. Bushing
15. Sleeve
16. Pin boot
17. Inner caliper
18. Torque plate
19. Bleeder screw

Pad assembly disassembly steps

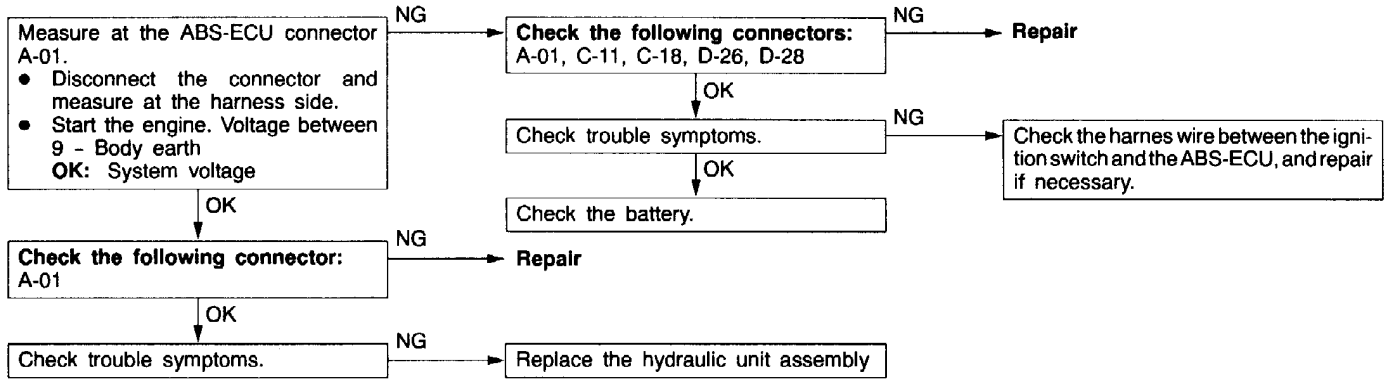
1. Clip
2. K-spring
3. Pad pin
4. Spring
5. Inner shim
6. Pad and wear indicator assembly
7. Pad assembly
8. Outer shim

Code No. 15 Wheel speed sensor (Abnormal output signal)	Probable cause
A wheel speed sensor outputs an abnormal signal (other than an open or short-circuit).	• Improper installation of wheel speed sensor • Malfunction of wheel speed sensor • Malfunction of ABS rotor • Malfunction of wheel bearing • Malfunction of wiring harness or connector • Malfunction of hydraulic unit assembly



Code No. 16 Power supply system	Probable cause
The voltage of the ABS-ECU power supply drops lower or rises higher than the specified value. If the voltage returns to the specified value, this code is no longer output.	• Malfunction of wiring harness or connector. • Malfunction of hydraulic unit assembly

Caution
If battery voltage drops or rises during inspection, this code will be output as well. If the voltage returns to standard value, this code is no longer output.
Before carrying out the following inspection, check the battery level, and refill distilled water if necessary.



DATA LIST REFERENCE TABLE

35201150299

The following items can be read by the MUT-II from the ABS-ECU input data.

1. When the system is normal

Item No.	Check item	Checking requirements	Normal value
11	Front-right wheel speed sensor	Perform a test run	Vehicle speeds displayed on the speedometer and MUT-II are identical.
12	Front-left wheel speed sensor		
13	Rear-right wheel speed sensor		
14	Rear-left wheel speed sensor		
16	ABS-ECU power supply voltage	Ignition switch power supply voltage and valve monitor voltage	9 - 16 V
25	4WD position detection switch	Place the transfer lever at 4H.	ON
		Place the transfer lever at 2H.	OFF
26	Free wheel engage switch	Engage 4WD	ON
		Engage 2WD	OFF
32	G-sensor output voltage	Stop the vehicle.	2.4 - 2.6 V
		Perform a test run.	Display value fluctuates with a mean value of 2.5 V.
33	Stop lamp switch	Depress the brake pedal.	ON
		Release the brake pedal.	OFF

2. When the ABS-ECU shut off ABS operation.

When the diagnosis system stops the ABS-ECU, the MUT-II display data will be unreliable.

ACTUATOR TEST REFERENCE TABLE

35201160209

The MUT-II activates the following actuators for testing.

NOTE

1. If the ABS-ECU runs down, actuator testing cannot be carried out.
2. Actuator testing is only possible when the vehicle is stationary. If the vehicle speed during actuator testing exceeds 10 km/h, forced actuation will be cancelled.
3. During the actuator test, the ABS warning lamp will illuminate and the anti-skid control will be cancelled.

INSPECTION

35200460027

- Check the inner surface of master cylinder body for rust or pitting.
- Check the primary and secondary pistons for rust, scoring, wear, damage or wear.
- Check the diaphragm for cracks and wear.

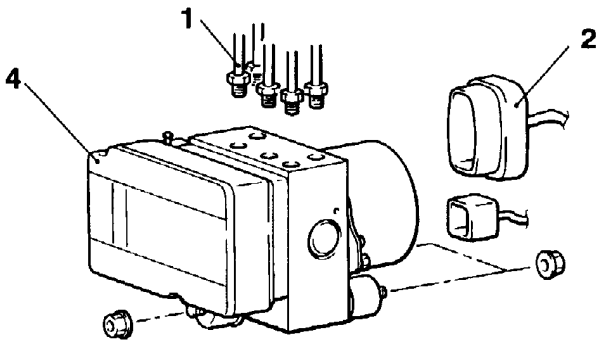
HYDRAULIC UNIT

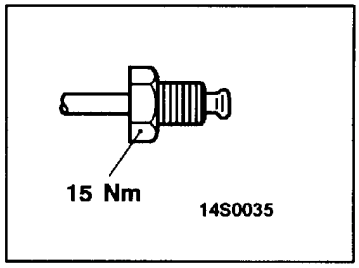
35200860391

REMOVAL AND INSTALLATION

Pre-removal Operation
- Brake Fluid Draining

Post-installation Operation
- Brake Fluid Filling
- Bake Line Bleeding (Refer to GROUP 35A - On-vehicle Service.)





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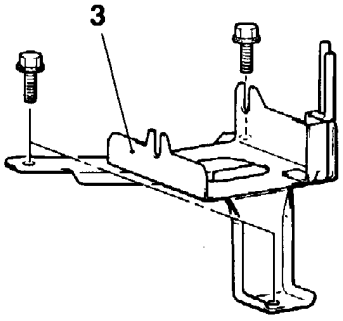
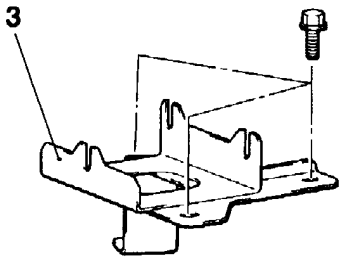


<4D5 - L.H. drive vehicles>



W0329AA

00009342

Removal steps

▶A◀ 1. Brake tube
◀A▶ 2. Harness connector
3. Bracket assembly
◀B▶ 4. Hydraulic unit assembly

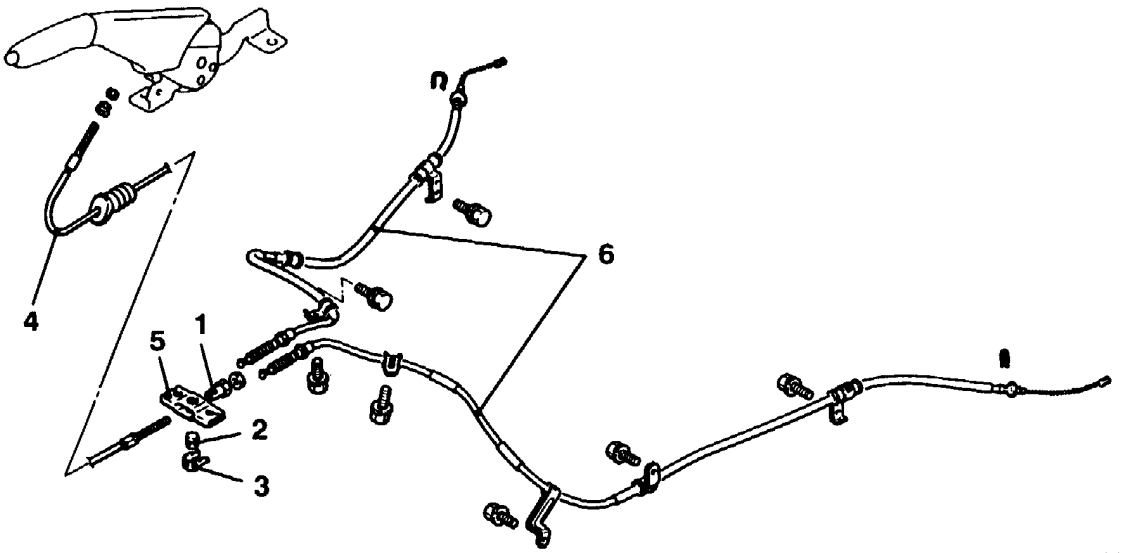
PARKING BRAKE CABLE

36100190418

REMOVAL AND INSTALLATION

Pre-removal Operation
- Floor Console Removal
  (Refer to GROUP 52A - Floor Console.)

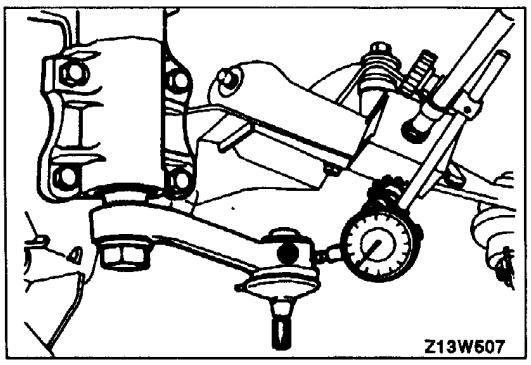
Post-installation Operation
- Floor Console Installation
  (Refer to GROUP 52A - Floor Console.)
- Parking Brake Lever Stroke Adjustment
  (Refer to P.36-3.)



AW0253AA

Removal steps
- Shoe and lining assembly (Refer to P.36-7.)

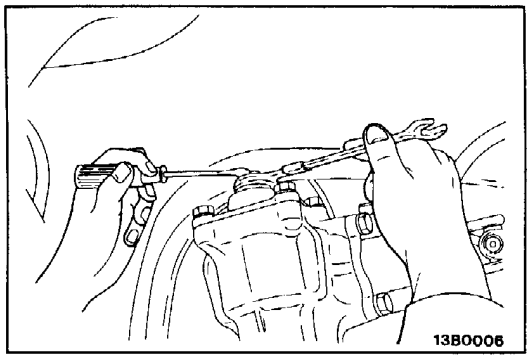
1. Cable adjuster
2. Pin
3. Nut holder
4. Front parking brake cable
5. Cable equalizer
6. Parking brake cable



STEERING GEAR BACKLASH CHECK 37100120032

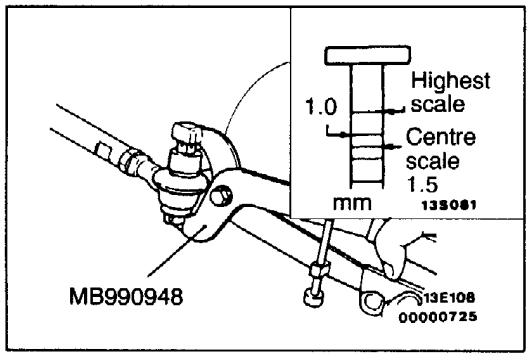
1. Jack up the vehicle front and hold the steering wheel in the straight ahead position.
2. Apart the pitman arm and the relay rod. (Refer to P.37A-41.)
3. Measure the steering gear backlash at the pitman arm top end with a dial indicator.

   Limit: 0.5 mm



4. If the measured value exceeds the limit, screw in the steering gear box adjusting bolt until steering wheel free play is within the standard value.

   Caution
   (1) Be sure to make the adjustment with the steering wheel in the straight ahead position.
   (2) If the adjusting bolt is overtightened, more steering effort will be required, and return of the wheel will be adversely affected.



TIE ROD END BALL JOINT VARIATION CHECK (SHAFT DIRECTION) 37100130011

1. Hold the ball joint with the special tool.
2. Set the special tool scale at its highest and measure variation with ball stud compressed. The variation should locate between the highest and centre scales.

   Limit: 1.5 mm
3. When the variation exceeds the centre scale, replace the tie rod end.

   Caution
   Even if the variation is within the limit, check ball joint starting torque.

POWER STEERING GEAR BOX

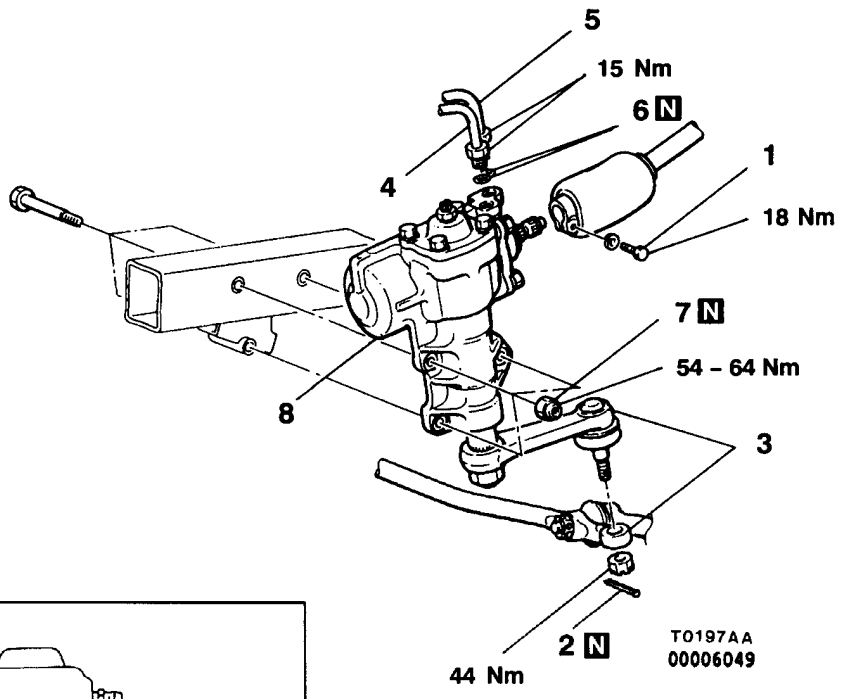
37200390375

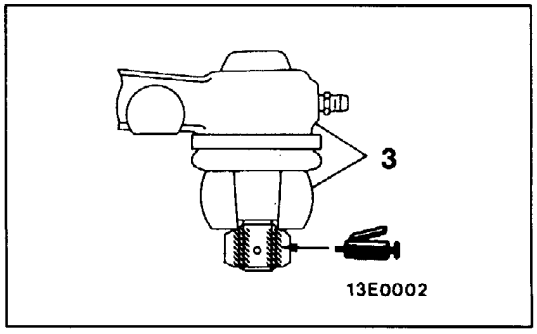
REMOVAL AND INSTALLATION

Caution: SRS
For vehicles with SRS, before removal of the steering gear box refer to GROUP 52B - Supplemental Restraint System (SRS), center the front wheels and remove the ignition key. Failure to do so may damage the SRS clock spring and render the SRS system inoperative, risking serious driver injury.

Pre-removal Operation
- Power Steering Fluid Draining (Refer to P.37A-11.)

Post-installation Operation
- Power Steering Fluid Supplying (Refer to P.37A-11.)
- Power Steering Fluid Line Bleeding (Refer to P.37A-12.)
- Checking Steering Wheel Position with Wheels Straight Ahead
- Front Wheel Alignment Adjustment (Refer to GROUP 33A - On-vehicle Service.)
- Press the dust cover with a finger to check whether the dust cover is cracked or damaged.

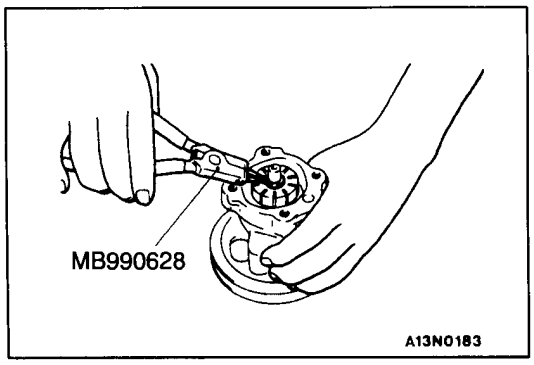




Removal steps

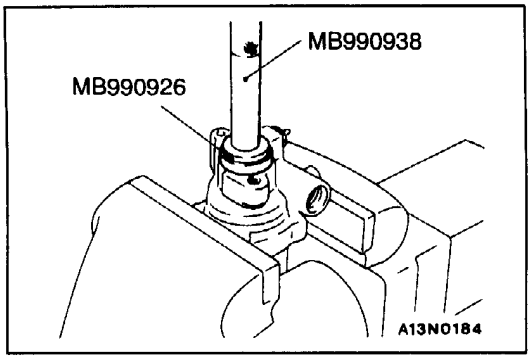
1. Connecting bolt for steering gear box and steering shaft
2. Split pin
3. Connection for pitman arm and relay rod
4. Pressure tube
5. Return tube
6. O-ring
7. Self-locking nut
8. Power steering gear box

◀A▶



DISASSEMBLY SERVICE POINT

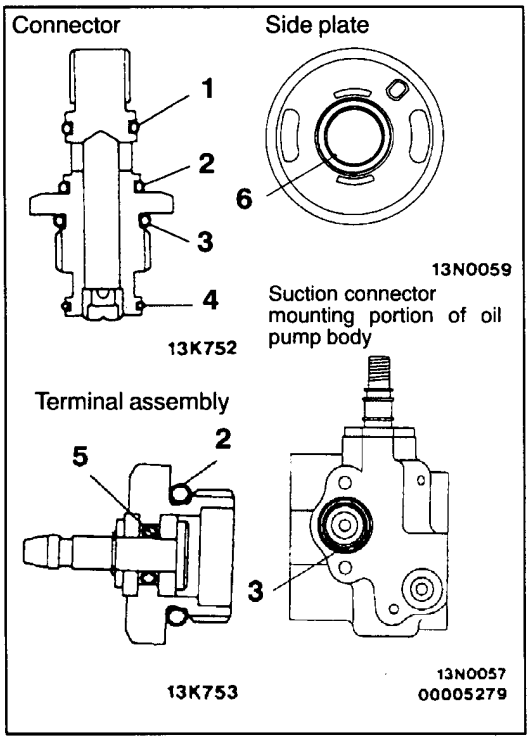
◀A▶ SNAP RING REMOVAL



REASSEMBLY SERVICE POINTS

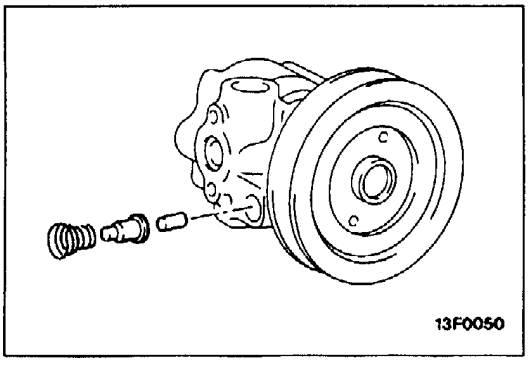
▶A◀ OIL SEAL INSTALLATION

Use special tool to install the oil seal.



▶B◀ O-RINGS INSTALLATION

No.	I.D. X Width mm
1	11 × 1.9
2	13 × 1.9
3	17.8 × 2.4
4	13.5 × 1.5
5	3.8 × 1.9
6	16.8 × 2.4



▶C◀ SPRING INSTALLATION

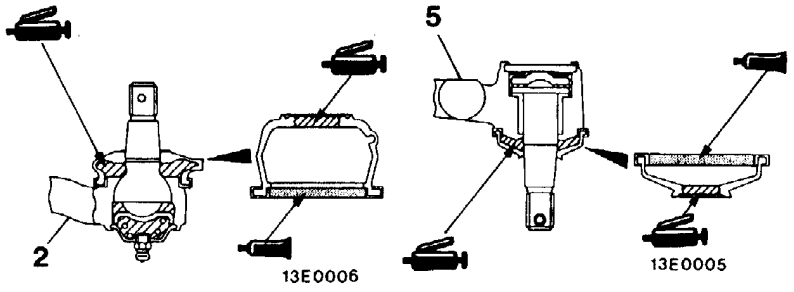
Fit the spring to the oil pump body with the larger-diameter end at the terminal assembly side.

STEERING LINKAGE

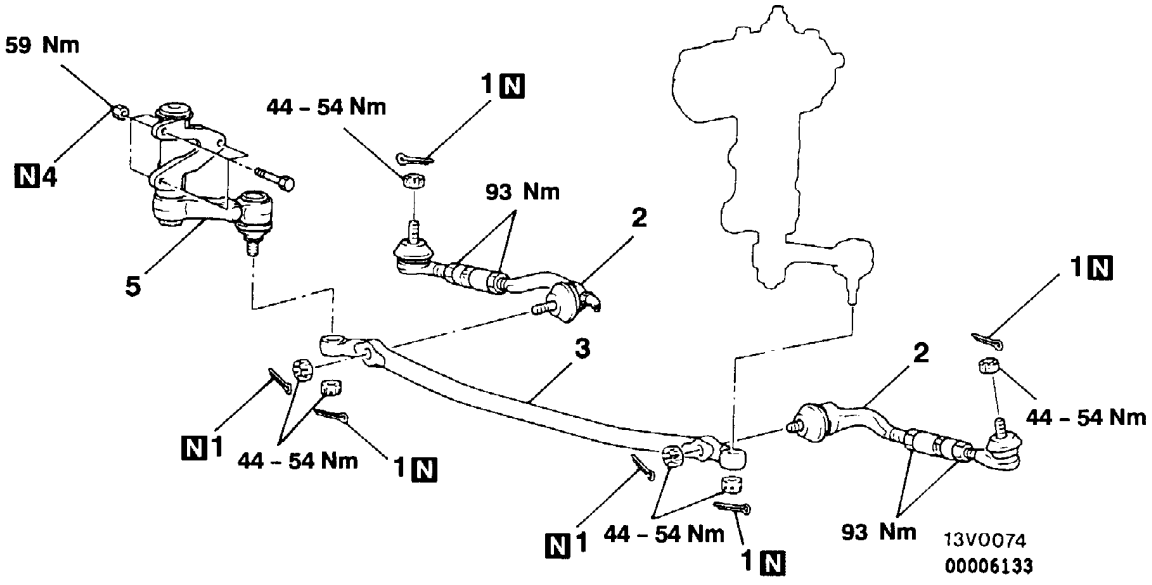
37100300078

REMOVAL AND INSTALLATION

Post-installation Operation
- Checking Steering Wheel Position with the Wheels Straight Ahead
- Front Wheel Alignment (Refer to GROUP 33A – On-vehicle Service.)
- Press the dust cover with a finger to check whether the dust cover is craked or damaged.



Sealant: 3M ATD Part No. 8663 or equivalent



Removal steps

1. Cotter pin
2. Tie rod assembly
3. Relay rod
4. Self-locking nut
5. Idler arm assembly

◀A▶ ▶A◀ ◀A▶ ◀A▶

WINDOW GLASS

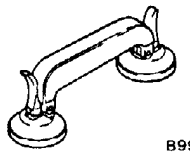
42200050154

ADHESIVES

Items	Specified adhesives
• Windshield • Quarter window glass • Tailgate window glass	3M ATD Part No. 8609 Super Fast Urethane Auto Glass Sealants or equivalent
Windshield moulding	Double-sided tape (6 mm wide and 0.125 mm thick)

SPECIAL TOOL

42200060089

Tool	Number	Name	Use
	MB990480	Glass holder	Removal and installation of windshield

WINDOW REPAIR

42200560107

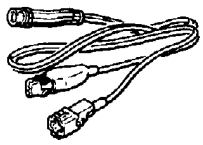
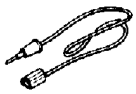
The following glass sections are installed by means of a liquid urethane adhesive method.

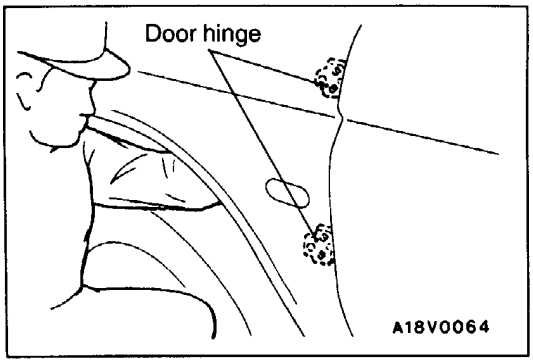
- Windshield
- Quarter window glass
- Tailgate window glass

ITEMS NEEDED

Name	Remarks
Adhesive	3M ATD Part No. 8609 Super Fast Urethane Auto Glass Sealant or equivalent
Primer	3M ATD Part No. 8608 Super Fast Urethane Primer or equivalent
Spacers	Available as service part
Dam	Available as service part
Anti-rust solvent (or Tectyl 506T...Valvoline Oil Company)	For rust prevention
Isopropyl alcohol	For grease removal from bonded surface
Steel piano wire	Dia. × length...0.6mm × 1m for cutting adhesive
Adhesive gun	For pressing-out adhesive

NOTE
The TEROSON 127.37V auto window sealer kit can also be used. If using the TEROSON 127.37V auto window sealer kit, follow the instructions in the manual included with the kit.

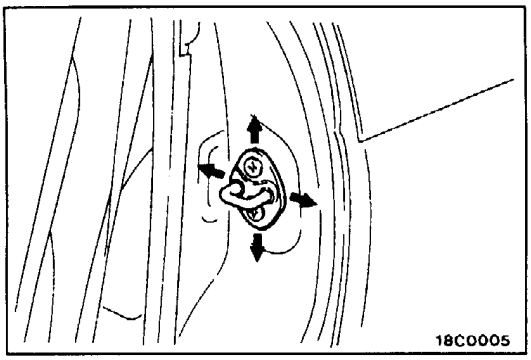
Tool	Number	Name	Use
A  B  C  D  C991223	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222	Harness set A: Test harness B: LED harness C: LED harness adapter D: probe	Measurement of terminal voltage A: Connector pin contact pressure inspection B: Power circuit inspection C: Power circuit inspection D: Commercial tester connection



ON-VEHICLE SERVICE 42300090159

DOOR FIT ADJUSTMENT

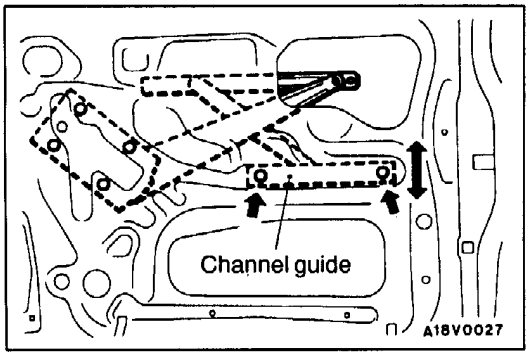
1. If the clearance between the door and body is uneven, remove the splash shield, loosen the mounting bolt of the body side door hinges from inside the fender, and then move the door to adjust so that the clearance is even.
2. If there is a step between the door and body, loosen the mounting bolts and nuts of the door hinges, and adjust the door alignment.
3. If the striker and latch do not engage properly, move the striker up and down or to the left and right.



DOOR WINDOW GLASS ADJUSTMENT 42300100272

Check that the window glass moves smoothly and touches the glass runchannel firmly when it is fully raised and fully lowered. If the window glass doesn't move properly, adjust by the following procedure.

1. Remove the door trim and waterproof film. (Refer to P.42-32.)
2. Raise the window glass, loosen the channel guide mounting bolts and adjust the vertical tilt of the glass.

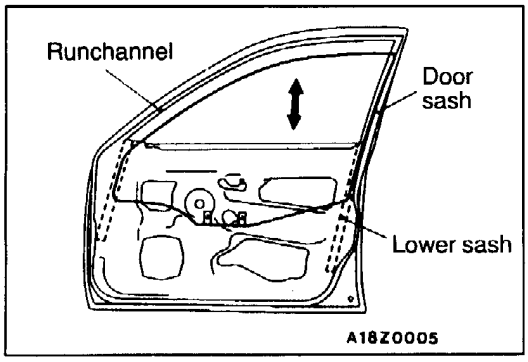


ADJUSTMENT AND REPLACEMENT WHEN THERE IS A MALFUNCTION OF THE POWER WINDOWS 42900190093

If the window glass automatically starts moving downwards at the wrong time while it is being raised, carry out the following adjustment or replacement procedures.

1. Remove the door trim and waterproof film. (Refer to P.42-32.)
2. Remove the window regulator assembly from the door window glass, and then raise and lower the door window glass by hand to check the operation force.

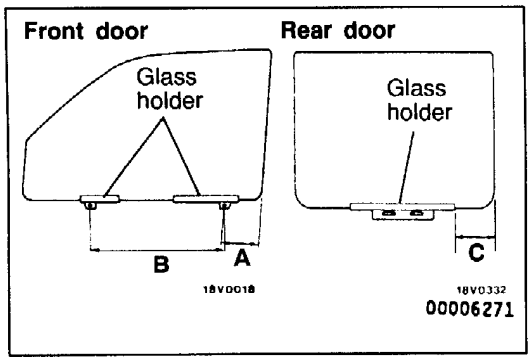
NOTE
Insert a cushion or similar object to prevent damage to the glass if it should happen to fall down.



INSTALLATION SERVICE POINTS

▶A◀ REAR LOWER SASH INSTALLATION

Securely insert the rear lower sash into the window rear sash.

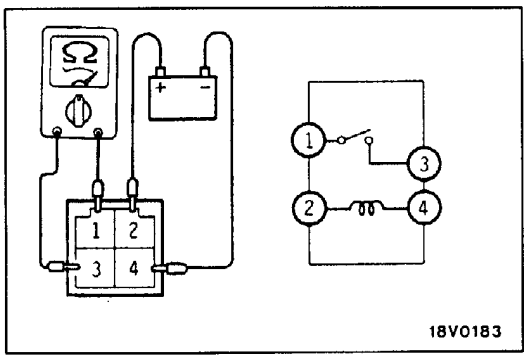


▶B◀ DOOR GLASS HOLDER INSTALLATION

Install the glass pad and the glass holders to the window glass as shown in the illustration.

Standard value:

(A) 106.7 - 108.2 mm
(B) 417.5 - 420.5 mm
(C) 127 - 131 mm



INSPECTION 42900180069

POWER WINDOW RELAY CONTINUITY CHECK

System voltage	Terminal No.			
	1	2	3	4
Not applied		○		○
Applied	○	⊕	○	⊖

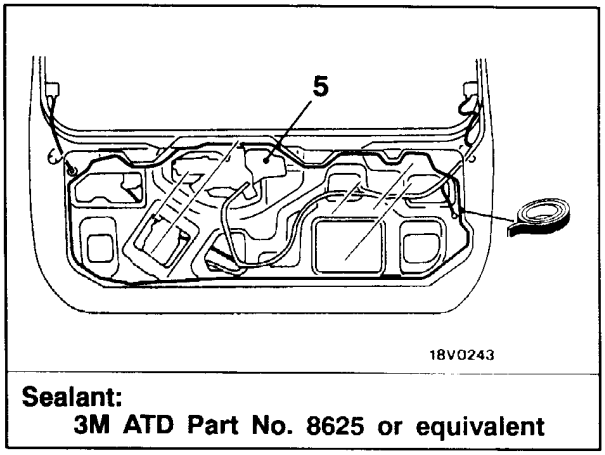
POWER WINDOW MOTOR CHECK 42900150053

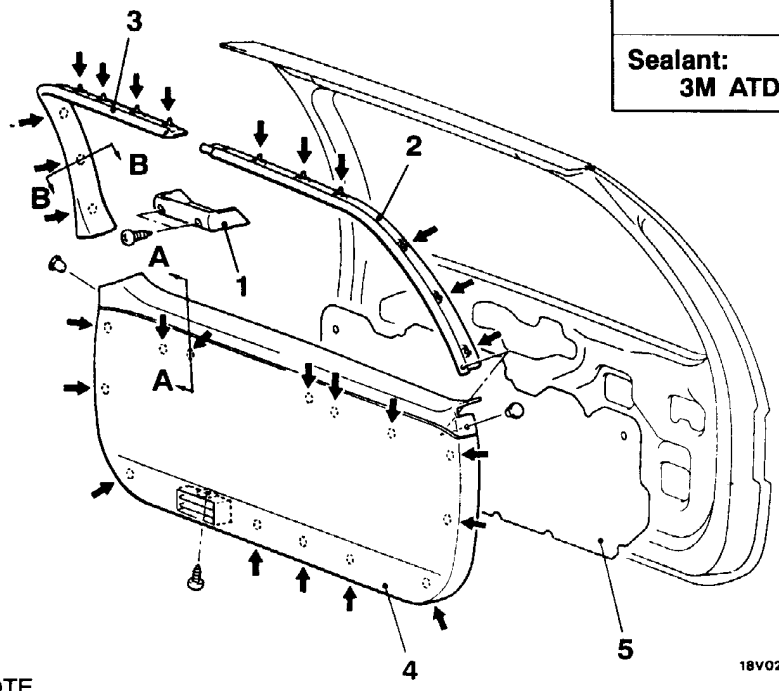
1. Connect a battery directly to the motor terminals and check that the motor runs smoothly.
2. Check that the motor runs in the opposite direction when the battery is connected with the polarity reversed.

TAILGATE TRIM AND WATERPROOF FILM

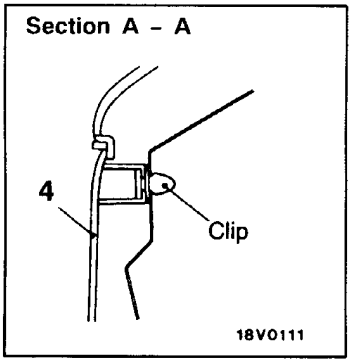
42400140062

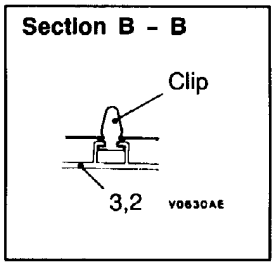
REMOVAL AND INSTALLATION





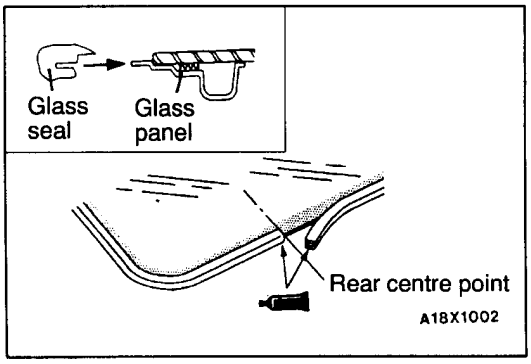
NOTE
◀ : Resin clip position





Removal steps

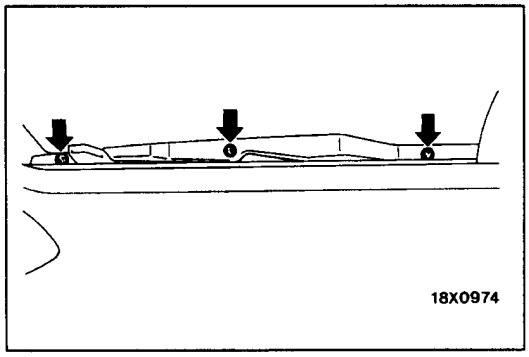
1. Cover <vehicles without roof spoiler>
2. Tailgate upper trim <L.H.>
3. Tailgate upper trim <R.H.>
4. Tailgate lower trim
5. Waterproof film



▶E◀ SUNROOF GLASS SEAL INSTALLATION

1. Starting at the rear centre of the sunroof glass, begin installing the seal by pushing it onto the edge of the glass panel and gently pulling on it while installing.
2. Approximately 102 mm before completing installation, lay the end of the seal over top of the beginning of the seal. Cut the seal so there is an extra 3.18 mm of the seal past the point where the seal lines up with the beginning of the seal.
3. Apply the specified adhesive to the splice joint area where two ends of the seal meet.

   Specified adhesive:
   3M Part No. 8155 or equivalent
4. With the approximately 102 mm of the seal unattached, push two ends of the seal together at glue joint.
5. Install remainder of the seal by pushing the seal onto the edge of the glass panel. The 3.18 mm of extra seal material should strengthen the seal at the splice joint.



▶F◀ SUNROOF GLASS INSTALLATION

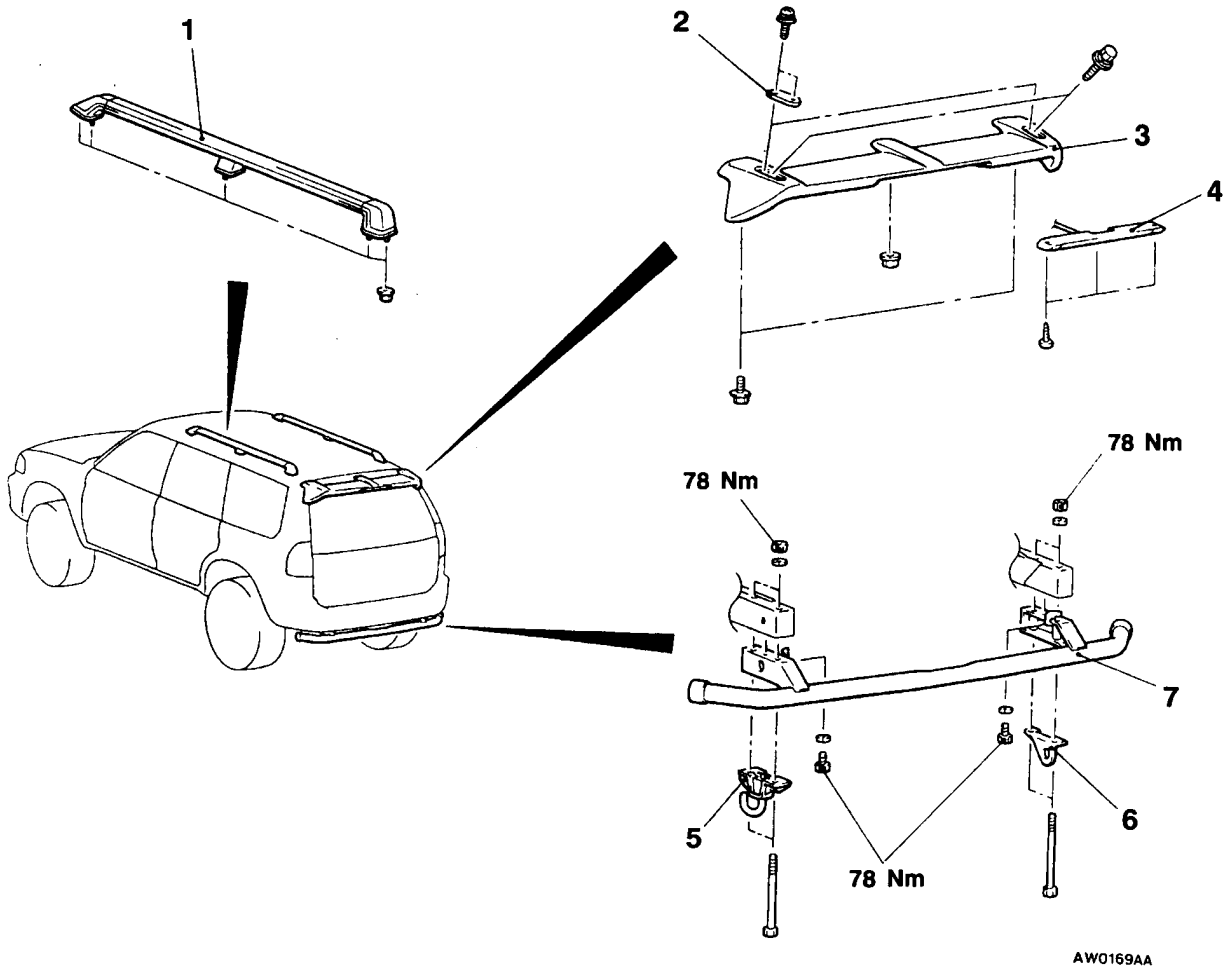
1. Position the sunroof glass onto the guide assemblies and align the mounting holes.
2. Apply the specified sealant to the sunroof glass attaching screws and install them, going to the next step before tightening.

   Specified sealant:
   3M Stud locking Part No. 4170 or equivalent

EXTERIOR PARTS

51101750014

REMOVAL AND INSTALLATION



Roof rail removal steps

- Headlining

1. Roof rail

Roof spoiler removal steps

▶A◀ 2. Spoiler cover
3. Roof spoiler
4. High-mounted stop lamp

Rear under guard bar removal steps

5. Towing hook
6. Tie down bracket
7. Rear under guard bar

INSTALLATION SERVICE POINT

▶A◀ SPOILER COVER INSTALLATION

Install with the arrow shown on the rear surface facing forward.

REAR WIPER AND WASHER

51100030249

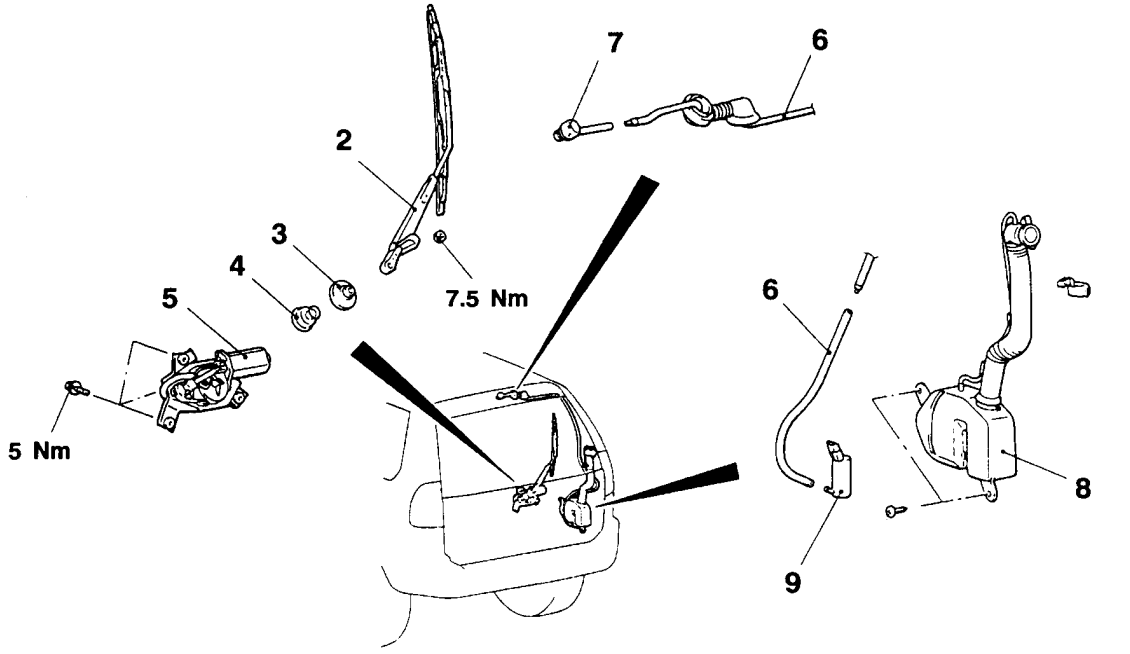
SERVICE SPECIFICATION

Item	Standard value
Rear wiper blade installation position mm	65 – 75

REAR WIPER AND WASHER

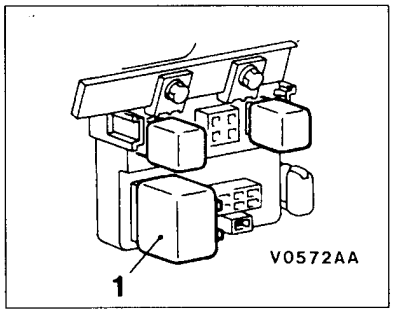
51100850210

REMOVAL AND INSTALLATION



18V0235
00007542

NOTE
For removal and installation of the column switch assembly (rear wiper and washer switch), refer to GROUP 37A – Steering Wheel and Shaft.



1. Rear intermittent wiper relay

Wiper motor removal steps

▶B◀ 2. Wiper arm and blade assembly
▶A◀ 3. Grommet
- Tailgate garnish (Refer to P.51-8.)

4. Grommet
5. Wiper motor

Washer hose removal steps

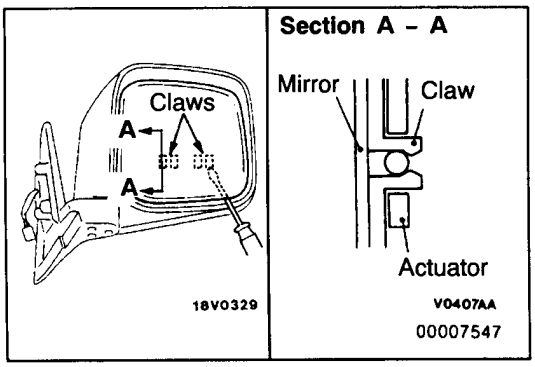
- Quarter trim, lower <R.H.> (Refer to GROUP 52A - Trims.)

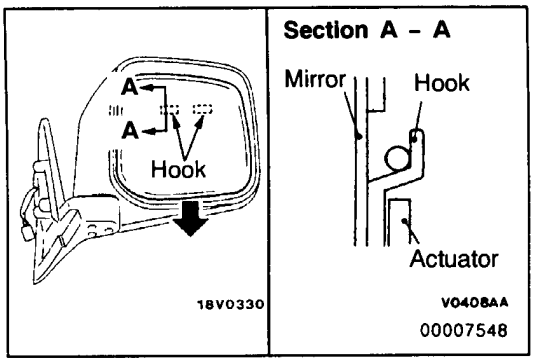
6. Washer hose
7. Washer nozzle

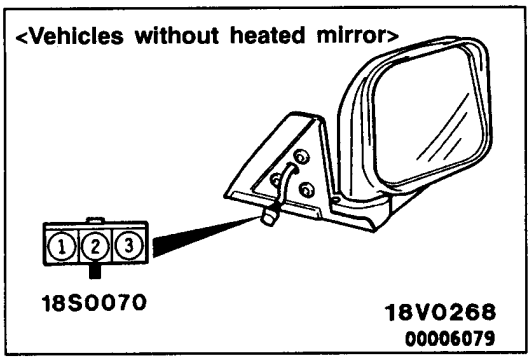
Washer tank and motor removal steps

- Quarter trim lower <R.H.> (Refer to GROUP 52A - Trims.)
- Washer fluid draining

6. Washer hose
8. Washer tank
9. Washer motor







REMOVAL SERVICE POINT

◀A▶ MIRROR REMOVAL

1. Tilt the mirror upward by hand, insert a flat-tipped screwdriver onto which protective tape has been wound, and then pry the claws off of the actuator.

2. Pull the mirror downward to release the hooks.

INSPECTION

51100650162

REMOTE CONTROLLED MIRROR ASSEMBLY CHECK

<Vehicles without heated mirror>

Check to be sure that the mirror moves as described in the table when each terminal is connected to the battery.

Battery connection terminal			Direction operation
1	2	3	
⊖		⊕	UP
⊕		⊖	DOWN
⊖	⊕		RIGHT
⊕	⊖		LEFT

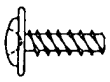
INSTRUMENT PANEL <R.H. DRIVE VEHICLES>

52100170368

Caution
For removal and installation of the passenger's side air bag module, always observe the service procedures described in GROUP 52B - Air Bag Module and Clock Spring.

REMOVAL AND INSTALLATION

The bolts and screws described below are used, for installation of the instrument panel. They are indicated by symbols in the illustration.

Name	Symbol	Size (D x L) mm	Colour	Shape
Tapping screw	a	5 × 12	-	 19Z0004
	b	5 × 14		
	c	5 × 16		
	d	5 × 20		
	e	5 × 25		
	f	5 × 12	Black	
	g	5 × 16		
	h	5 × 20		
	i	5 × 20	Black	 19Z0003
	j	5 × 12	-	 19Z0022
	k	5 x 16		
Washer assembled screw	l	5 × 12	-	 19Z0007
	m	5 × 16	-	 19Z0006
	n	5 × 20	Black	 19Z0030
Washer assembled bolt	o	6 × 16	-	 19Z0012
	p	8 × 20	-	 19Z0019
	q	6 × 16	-	 19Z0010
	r	8 × 20		

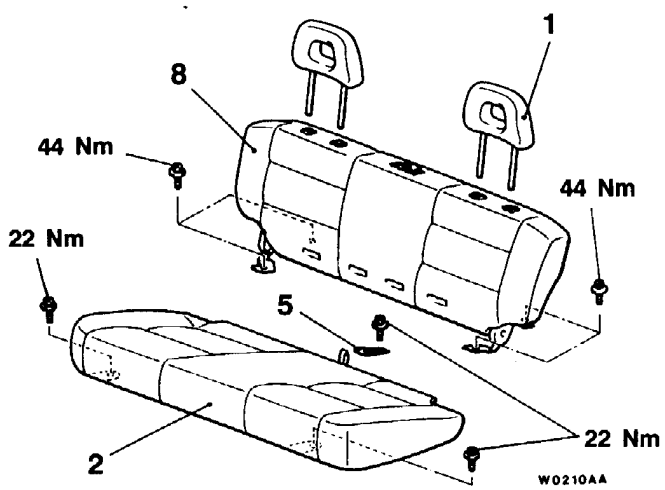
D = Thread diameter
L = Effective thread length

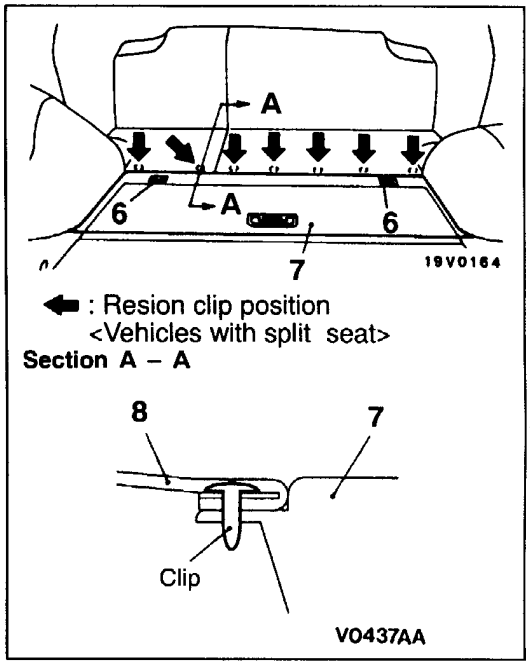
REAR SEAT

52200180302

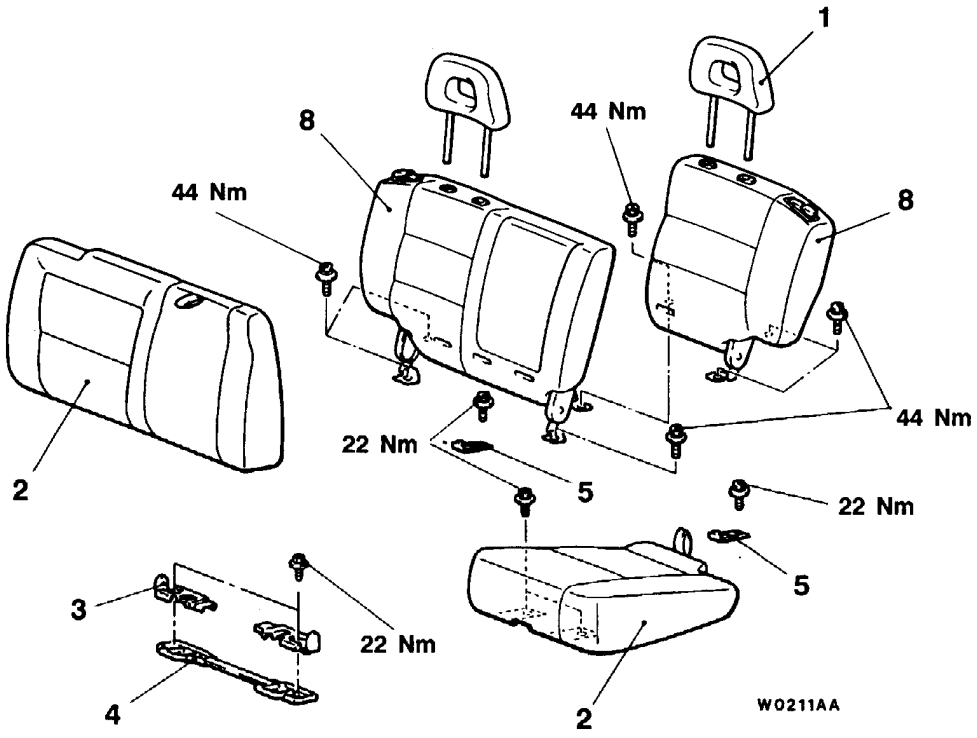
REMOVAL AND INSTALLATION

<Bench seat>





<Split seat>



00009139

1. Head restraint

Rear seat removal steps

2. Rear seat cushion assembly
3. Striker cover
4. Striker assembly
5. Catch
6. Parcel hook
7. Luggage floor box, front
8. Rear seatback assembly

TROUBLESHOOTING

52400310257

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

DIAGNOSIS FUNCTION

52400320205

DIAGNOSIS CODES CHECK

Connect the MUT-II to the diagnosis connector (16-pin) under the instrument cover, then check diagnosis codes.
(Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.)

ERASING DIAGNOSIS CODES

WHEN USING THE MUT-II

Connect the MUT-II to the diagnosis connector and erase the diagnosis code.

Caution
Turn off the ignition switch before connecting or disconnecting the MUT-II.

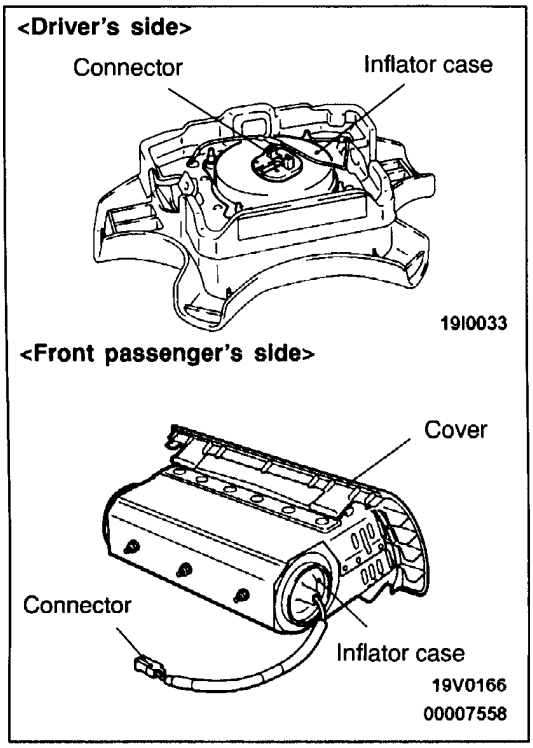
INSPECTION CHART FOR DIAGNOSIS CODES

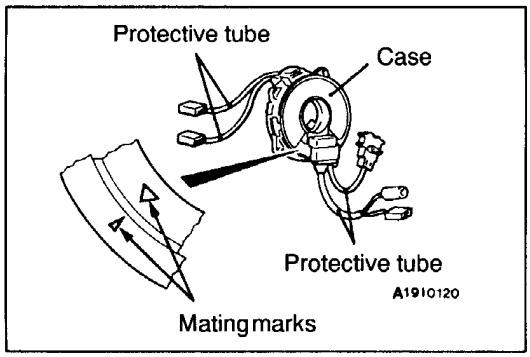
52400330369

Inspect according to the inspection chart that is appropriate for the malfunction code.

Code No.	Diagnosis item		Reference page
11, 12, 13	Front impact sensor system		52B-7
14	Analog G-sensor system in the SRS-ECU		52B-8
15,16	Safing G-sensor system in the SRS-ECU		52B-8
21, 22, 61, 62	Driver's side air bag module (squib) system		52B-9
24, 25, 64, 65	Front passenger's side air bag module (squib) system		52B-10
31, 32	SRS-ECU capacitor system		52B-8
34*	Connector lock system		52B-10
35	SRS-ECU (deployed air bag) system		52B-11
41*	Power circuit system (fuse No.10 circuit)		52B-11
42*	Power circuit system (fuse No.11 circuit)		52B-11
43	SRS warning lamp drive circuit system	Lamp does not illuminate.*	52B-12
		Lamp does not switch off.	52B-12
44	SRS warning lamp drive circuit system		52B-13
45	SRS-ECU non-volatile memory (EEPROM) and A/D converter system		52B-8
51, 52	Driver's side air bag module (squib ignition drive circuit) system		52B-8
54, 55	Front passenger's side air bag module (squib ignition drive circuit) system		52B-8

NOTE
1. *: If the vehicle condition returns to normal, the diagnosis code will be automatically erased, and the SRS warning lamp will return to normal.
2. If the vehicle has a discharged battery it will store the fault codes 41 or 42. When these diagnosis codes are displayed, check the battery.





AIR BAG MODULES, STEERING WHEEL AND CLOCK SPRING

1. Remove the air bag modules, steering wheel and clock spring. (Refer to P.52B-25.)

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

2. Check pad cover for dents, cracks or deformation.
3. Check connector for damage, terminals deformities, and harness for binds.
4. Check air bag inflator case for dents, cracks or deformities.
5. Check harness and connectors for damage, and terminals for deformation.
6. Check clock spring connectors and protective tube for damage, and terminals for deformation.
7. Visually check the clock spring case for damage.
8. Align the mating marks of the clock spring and, after turning the vehicle's front wheels to straight-ahead position, install the clock spring to the column switch.

   Mating Mark Alignment

   Turn the clock spring clockwise fully, and then turn back it approx. 3 4/5 turns counterclockwise to align the mating marks.

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

9. Install the steering column covers, steering wheel and the air bag module.
10. Check steering wheel for noise, binds of difficult operation.
11. Check steering wheel for excessive free play.
    REPLACE ANY VISUALLY INSPECTED PART IF IT FAILS THAT INSPECTION. (Refer to P.52B-25.)

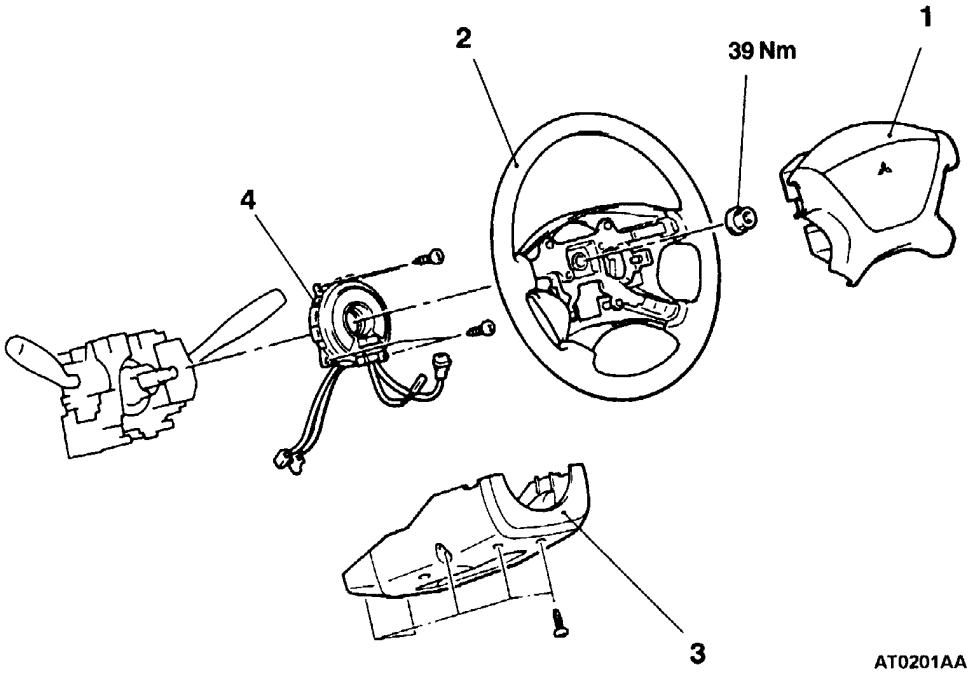
    Caution
    The SRS may not activate if any of the above components is not installed properly, which could result in serious injury or death to the vehicle's driver or front passenger.

5. **Do not expose the air bag modules to temperatures over 93°C.**
6. **After deployment of an air bag, replace the air bag modules. Check the clock spring, and if faulty, replace it with a new part.**
7. **Wear gloves and safety glasses when handling air bags that have already deployed.**
8. **An undeployed air bag module should only be disposed of in accordance with the procedures (Refer to P.52B-33.)**

REMOVAL AND INSTALLATION

<Air bag module (driver's side), clock spring>

Pre-removal Operation
- After setting the steering wheel and the front wheels to the straight ahead position, remove the ignition key.

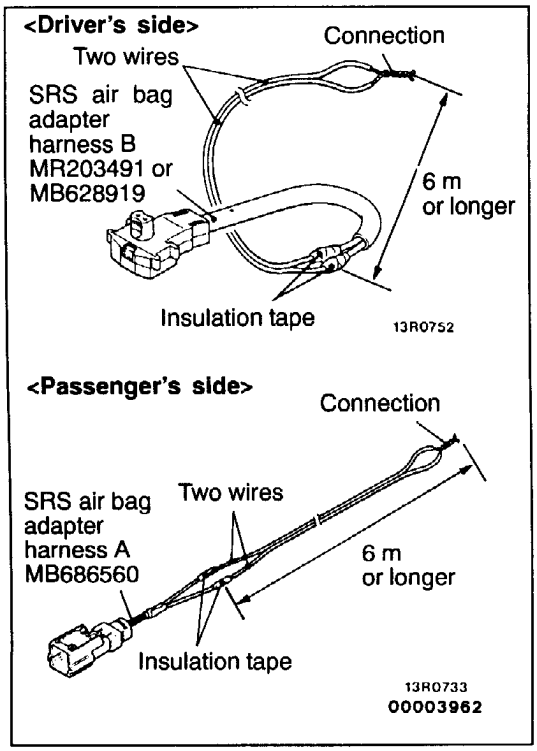


Air bag module removal steps

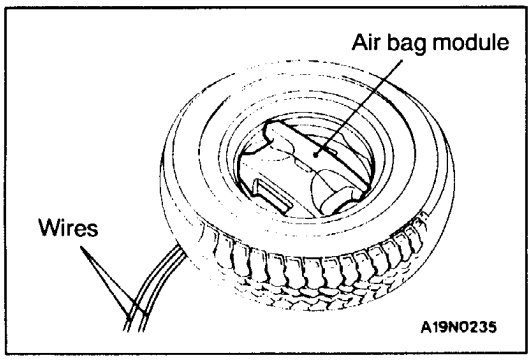
▶F◀ • Post-installation inspection
• Negative (–) battery cable connection
◀A▶ ▶E◀ 1. Air bag module
▶A◀ • Pre-installation inspection

Clock spring removal steps

▶F◀ • Post-installation inspection
• Negative (–) battery cable connection
◀A▶ ▶E◀ 1. Air bag module
◀B▶ ▶D◀ 2. Steering wheel
3. Column cover lower
◀C▶ ▶C◀ 4. Clock spring
▶A◀ • Pre-installation inspection



3. Connect two wires, each six meters or longer, to the two leads of SRS air bag adapter harness B <driver's side> or SRS air bag adapter harness A <front passenger's side>, and cover the connections with insulation tape. The other ends of the two wires should be connected to each other (short-circuited), to prevent sudden unexpected deployment of the air bag module.



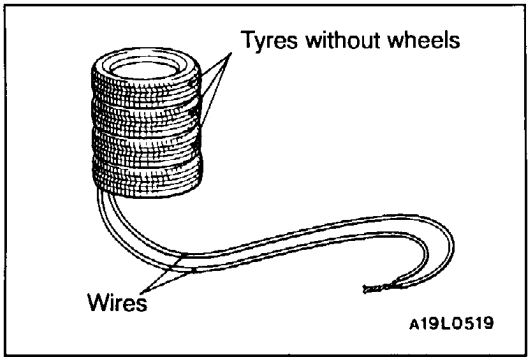
4. Set the air bag modules as follows:

<Air bag module (driver's side)>

(1) Take the SRS air bag adapter harness B that is connected to the wires, pass it beneath the old tyre wheel assembly, and connect it to the air bag module.

(2) Pass the thick wire through the air bag module mounting hole, and then secure the air bag module to an old tyre with a wheel in it so that the pad on the module is facing upwards.

Caution
Leave some space below the wheel for the adaptor harness. If there is no space, the reaction when the air bag deploys could damage the adaptor harness.

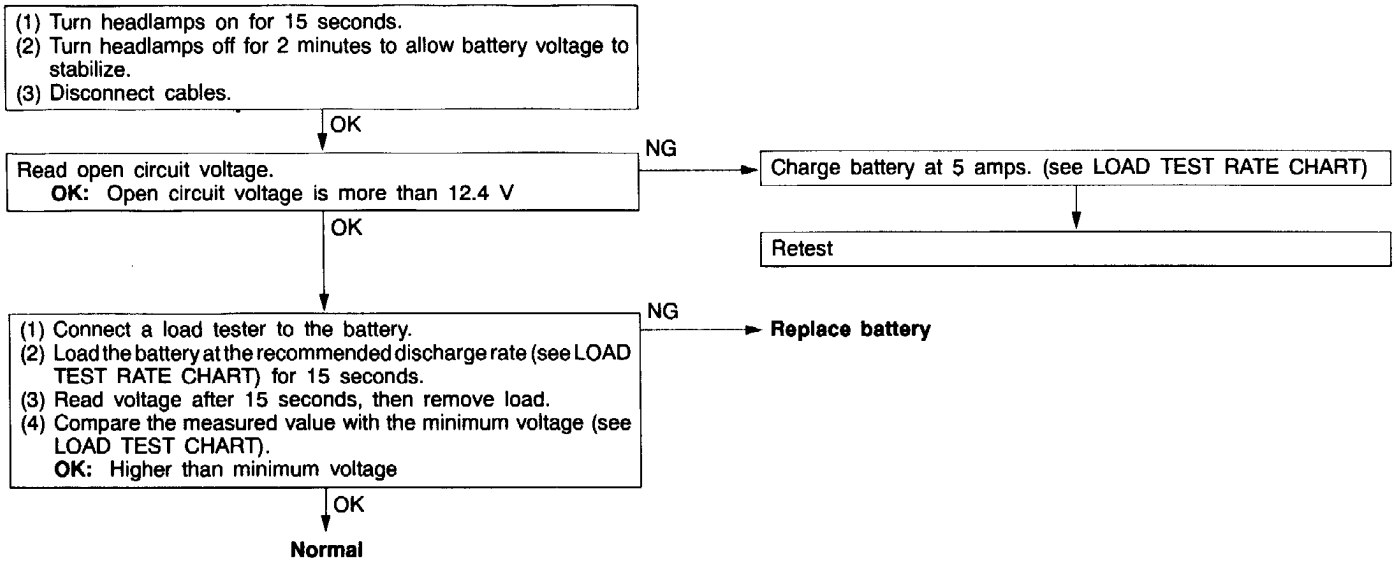


(3) Place three old tyres with no wheels on top of the tyre secured to the air bag module.

BATTERY TESTING PROCEDURE

54100120237

TEST STEP



LOAD TEST RATE CHART

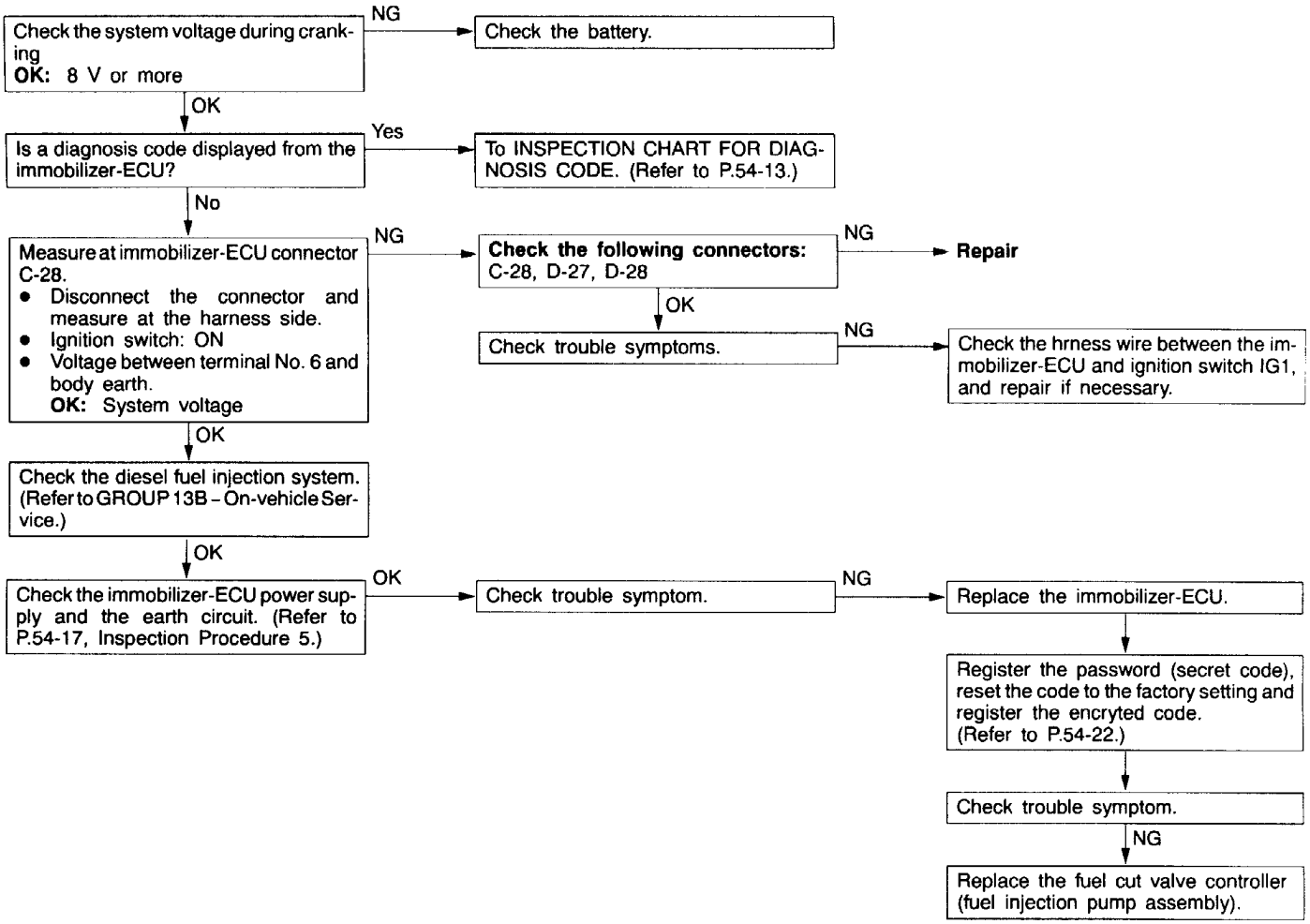
Battery type	75D26R	80D26R	95D31R
Charging time when fully discharged h [5-amp rated current charging]	12	12	14
Load test (Amps)	240	290	310

LOAD TEST CHART

Temperature °C	21 and above	16	10	4	–1	–7	–12	–18
Minimum voltage V	9.6	9.5	9.4	9.3	9.1	8.9	8.7	8.5

Inspection Procedure 4

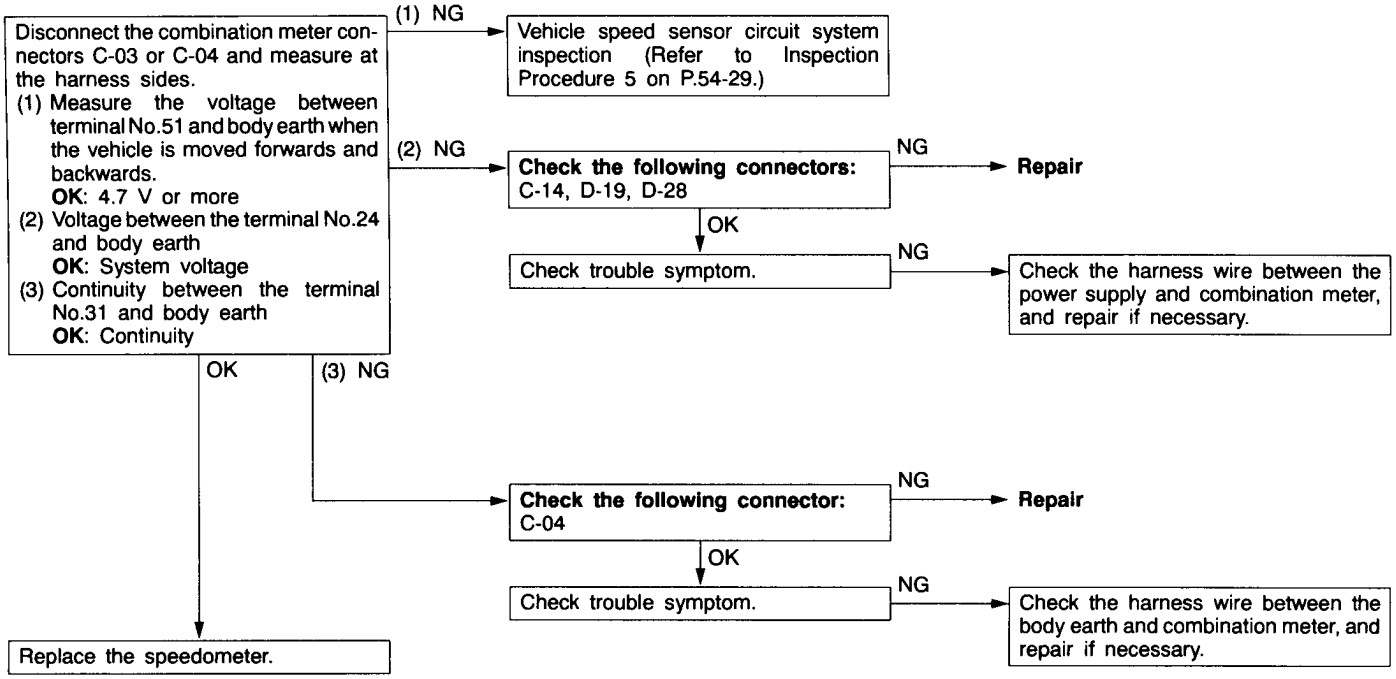
Engine does not start (Cranking but no initial combustion). <4D5>	Probable cause
If no fuel injection, there might be a problem with the fuel injection system in addition to a malfunction of the immobilizer system. It is normal for this to occur if an attempt is made to start the engine using a key that has not been properly registered.	• Malfunction of diesel fuel injection system • Malfunction of immobilizer-ECU



INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

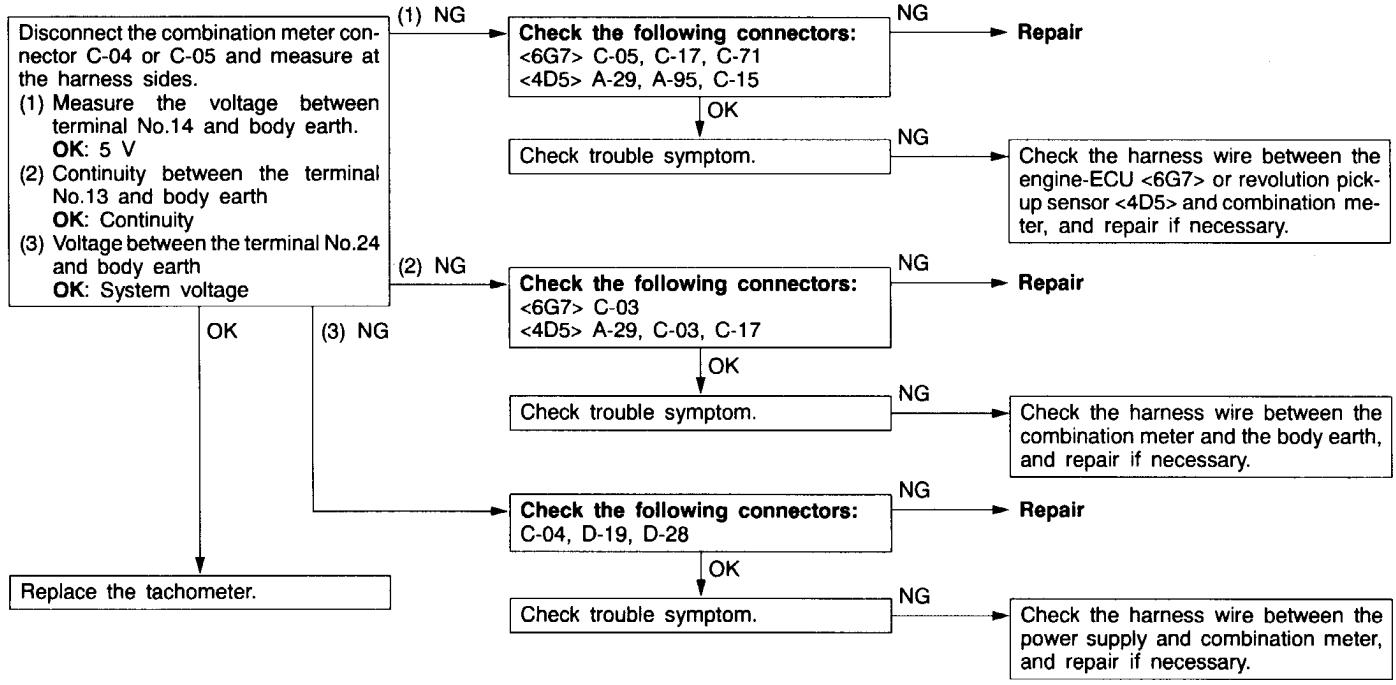
Inspection Procedure 1

Speedometer does not work.	Probable cause
The cause may be a defective vehicle speed sensor circuit system or a defective speedometer. Vehicle speed sensor is co-used among the engine-ECU and A/T-ECU.	• Malfunction of vehicle speed sensor • Malfunction of speedometer • Malfunction of harness or connector



Inspection Procedure 2

Tachometer does not work.	Probable cause
The ignition signal may not be input from the engine, or there may be a malfunction in the power supply or earth circuit.	• Malfunction of tachometer • Malfunction of harness or connector



Inspection Procedure 3

Bearing indicator is off when moving forward. (for electric compass)	Probable cause
The vehicle magnetism tends to be disturbed particularly at such places as tunnel, railway crossing, area along railway, elevated road, urban above subway, etc. if disturbed, the driving direction marker will fluctuate.	• The vehicle magneitic compensation failed

Vehicle maganetic compensation. (Refer to P.54-38)

Inspection Procedure 4

Vehicle magnetic compensation cannot be made. (for electronic compass)	Probable cause
The multi-meter (outside temperature meter of the electronic compass) may be defective.	• Malfunction of the multi-meter (outside temperature meter and electronic compass)

Move the vehicle to be checked to another place. (Move to a wide flat place where the vehicle magnetic compensation can be carried out.)
Check again that the vehicle magnetic compensation can be carried out.
→ Yes →
- Compensation is difficult due to he magnet direction and direction of the vehicle at the start of compensation.
- There is a disturbing magnetic field in the area, and compensation is difficult.

↓ No

Check trouble symptoms.

↓ NG

Replace the outside temperature meter and electronic compass assembly

Inspection Procedure 5

Discrepancy between the actual outside temperature and displayed temperature.	Probable cause
The outside thermo sensor, multi-meter (outside temperature meter and electronic compass), harness, or connector may be defective.	• Malfunction of the outside thermo sensor • Malfunction of the multi-meter (outside temperature meter and electronic compass) • Malfunction of the harness or connector

Check internal resistance of the thermo sensor. (Refer to P.54-40.)
→ NG → **Replace**

↓ OK

Measure at the multi-meter connector C-43.
- Connect the connector and measure voltage of the sensor at the following temperature.
- Voltage between terminals (5) - (13)

OK: 2.90V (when display temperature is 0°C)
1.86V (when display temperature is 20°C)
1.10V (when display temperature is 40°C)

→ NG → **Check the following connectors:** A-38, C-02, C-43, D-14
→ NG → **Repair**

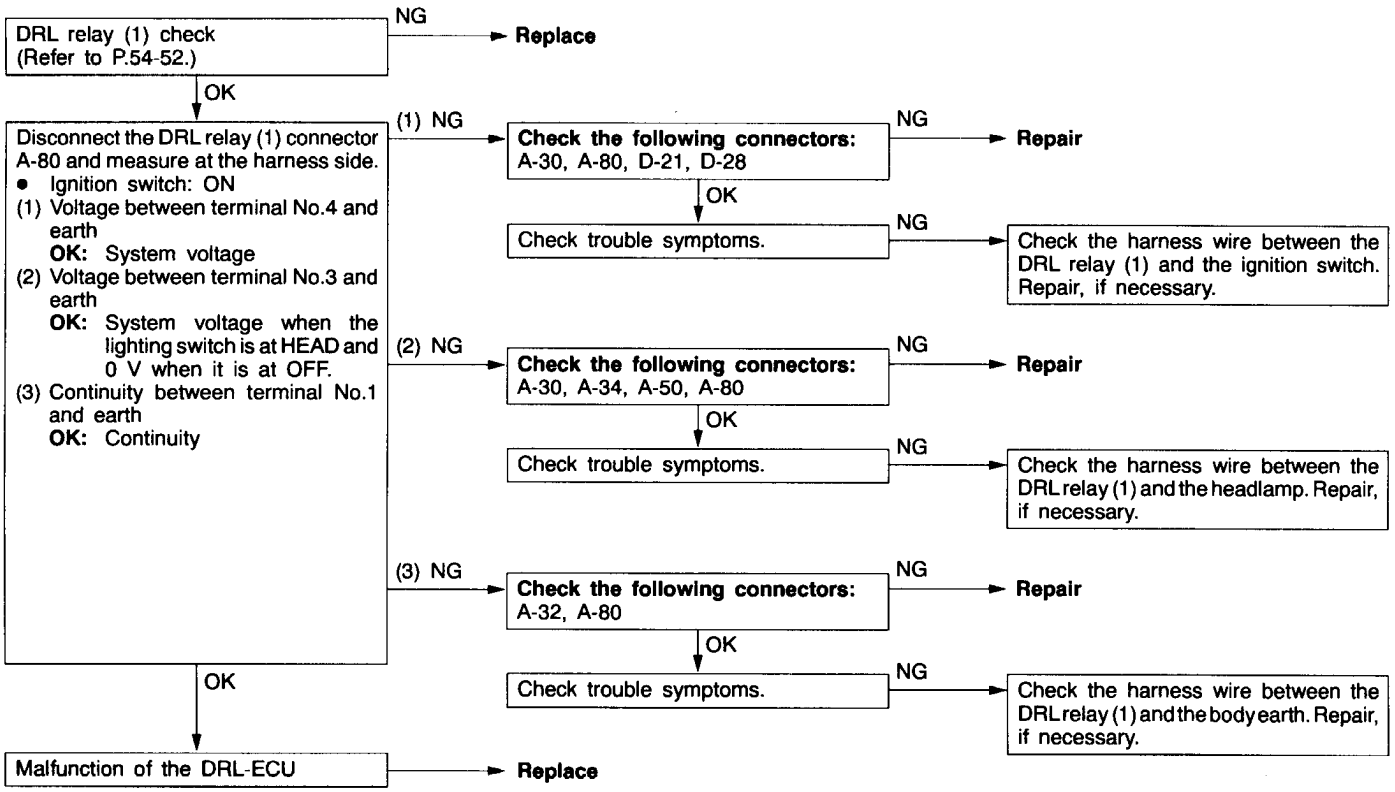
↓ OK

Check trouble symptom.
→ NG → Check the harness between outside thermo sensor and multi-meter. Repair if necessary.

→ OK → Replace the outside temperature meter and electronic compass.

Inspection procedure 6

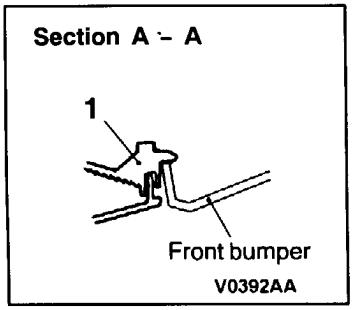
The headlamps do not illuminate when the vehicle is in the following condition and the ignition switch is moved to the ON position. However, they illuminate when the lighting switch is moved to the HEAD position. **<Vehicles with daytime running lamp>** • **Lighting switch: OFF** • **Passing switch: OFF**	**Probable cause**
The cause is probably a malfunction of the daytime running lamp control unit (DRL-ECU) circuit system. If there is a blown fuse, there may also be a short-circuit in a harness.	• Malfunction of fuse • Malfunction of connector • Malfunction of harness wire • Malfunction of the DRL relay (1) • Malfunction of the DRL-ECU

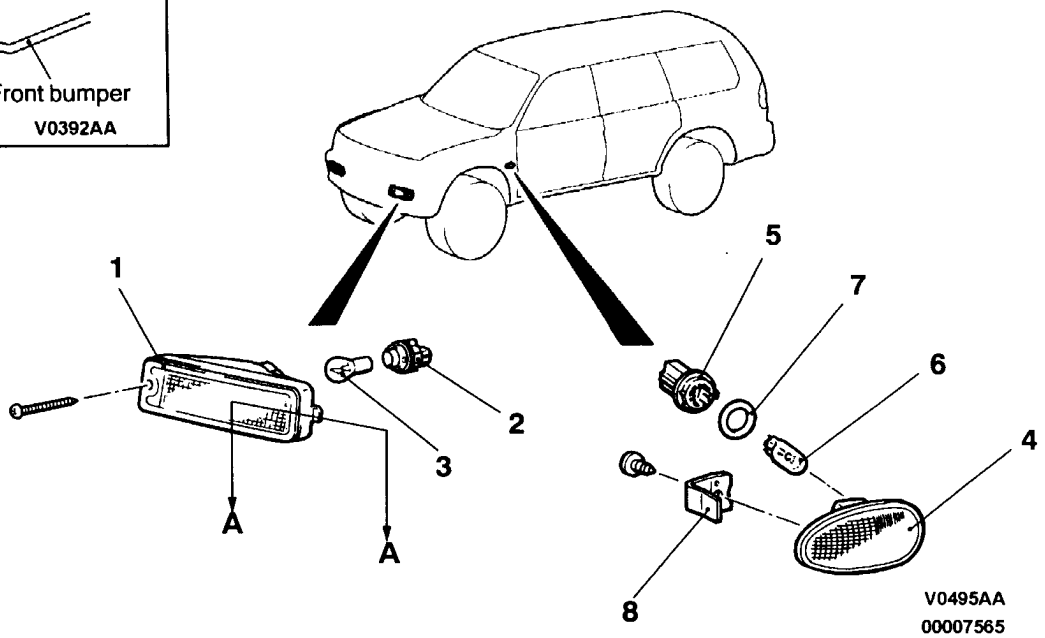


TURN-SIGNAL LAMP

54200330138

REMOVAL AND INSTALLATION





NOTE

For removal and installation of the column switch assembly (turn-signal switch), refer to GROUP 37A – Steering Wheel and Shaft.

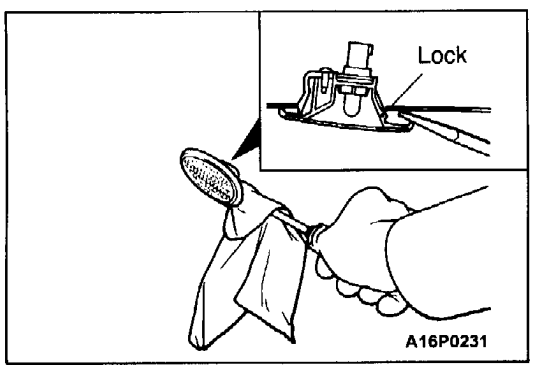
Front turn-signal lamp removal steps

1. Front turn-signal lamp
2. Bulb socket
3. Bulb

◀A▶

Side turn-signal lamp removal steps

4. Side turn-signal lamp
5. Bulb socket
6. Bulb
7. Packing
8. Hook



REMOVAL SERVICE POINT

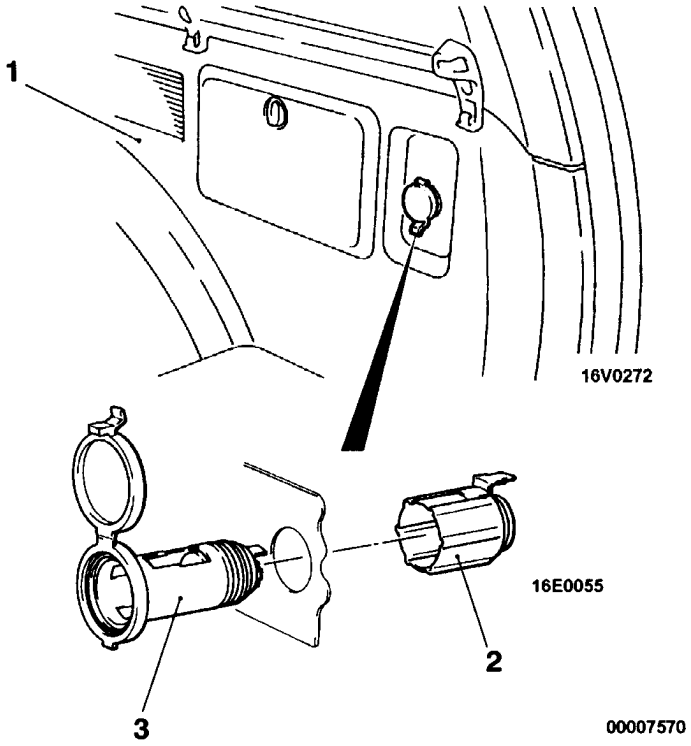
◀A▶ SIDE TURN-SIGNAL LAMP REMOVAL

Use a flat-tipped screw driver or similar tool to remove the lock from the fender panel, and then remove the side turn-signal lamp.

ACCESSORY SOCKET

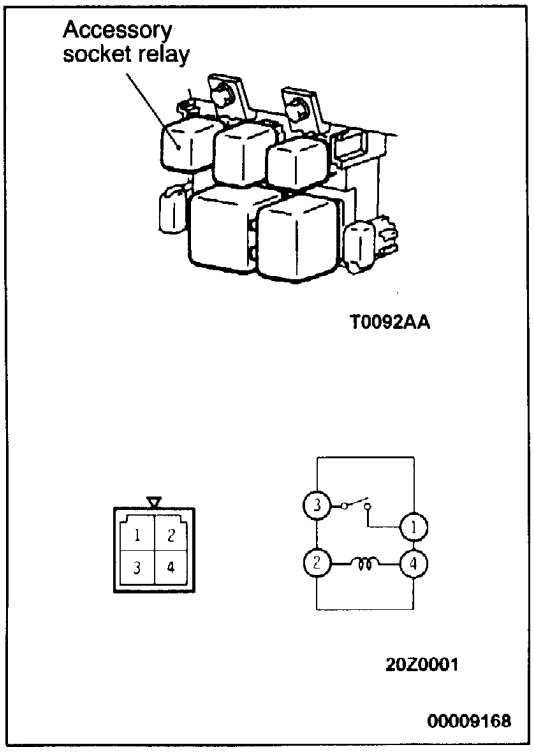
54300890059

REMOVAL AND INSTALLATION



Removal steps

1. Quarter trim, lower <R.H.> (Refer to GROUP 52A – Trims.)
2. Outer case
3. Socket



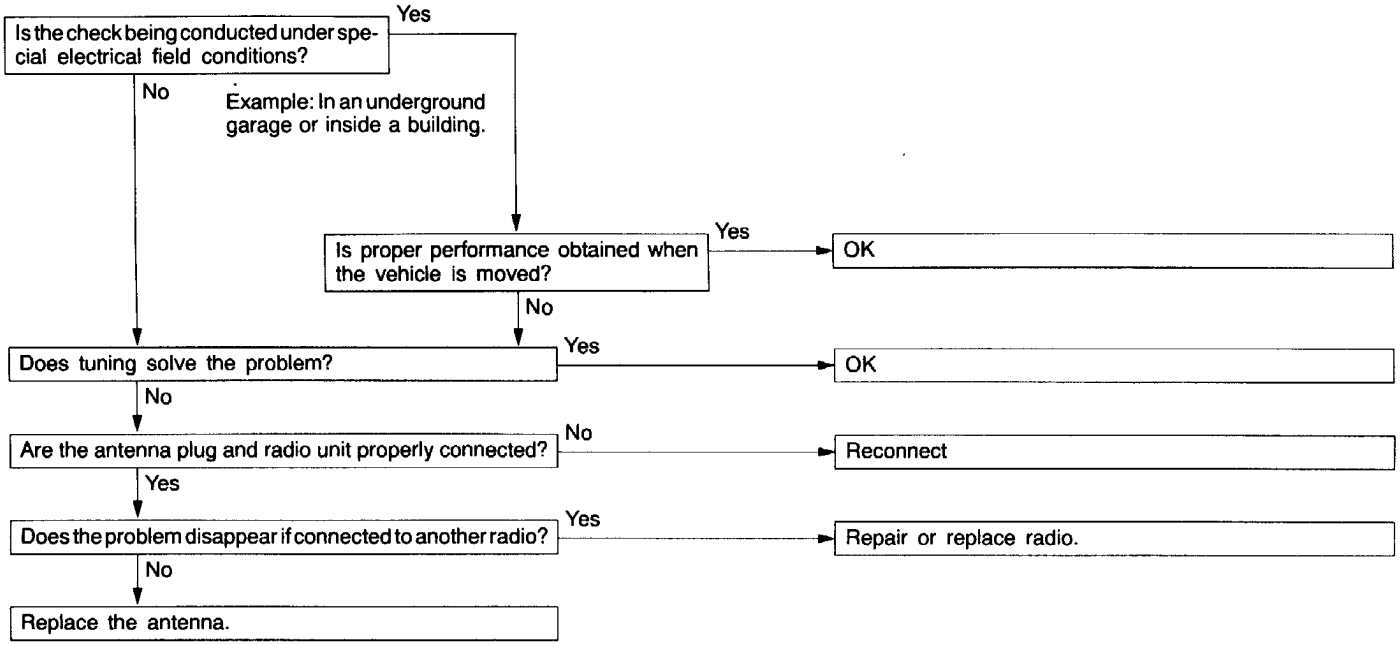
INSPECTION

54300900042

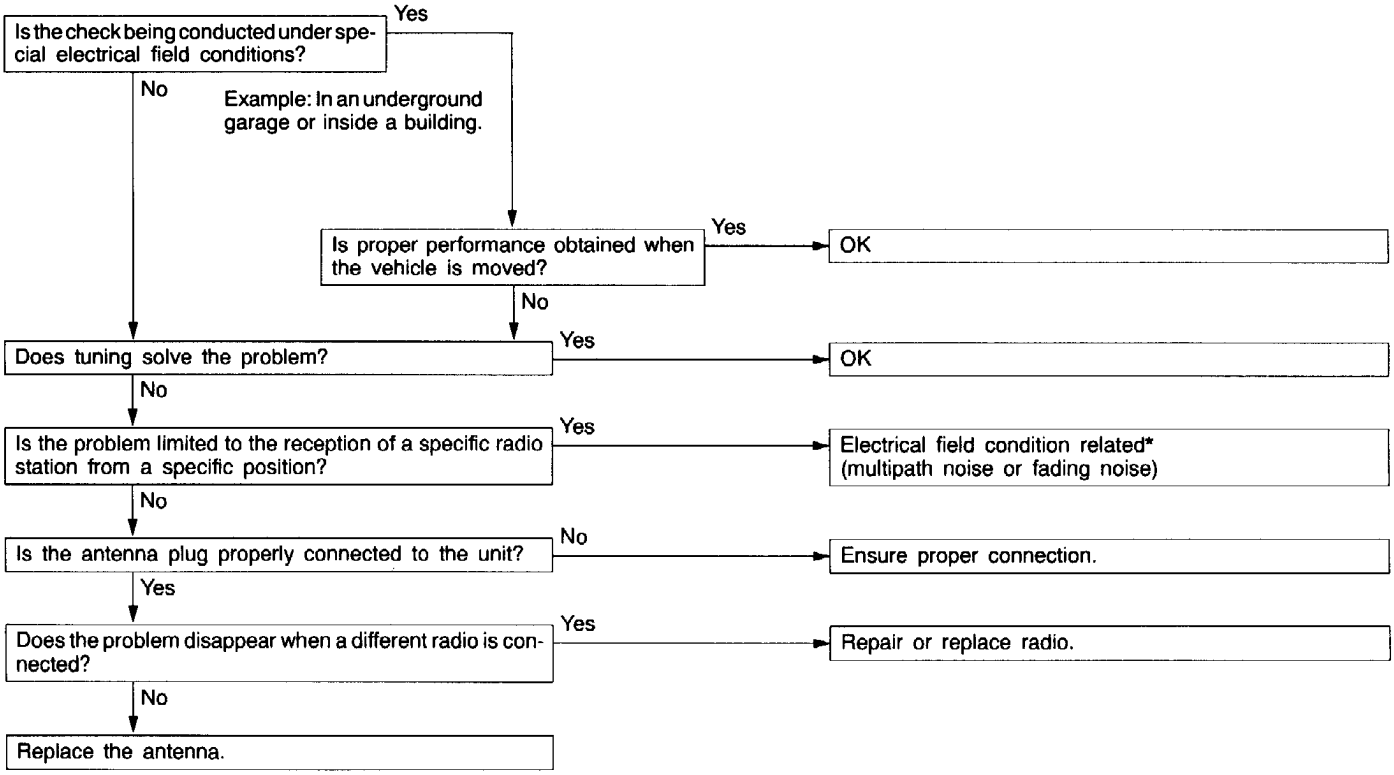
Accessory socket relay continuity check

Battery voltage	Terminal No.			
	1	2	3	4
Not supplied		○		○
Supplied	○	⊕	○	⊖

B-3 There is noise but no reception for both AM and FM or no sound from AM, or no sound from FM.



B-4 Insufficient sensitivity.

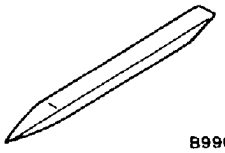


* For multipath noise and fading noise problems, refer to P. 54-72.

ANTENNA

54400060064

SPECIAL TOOL

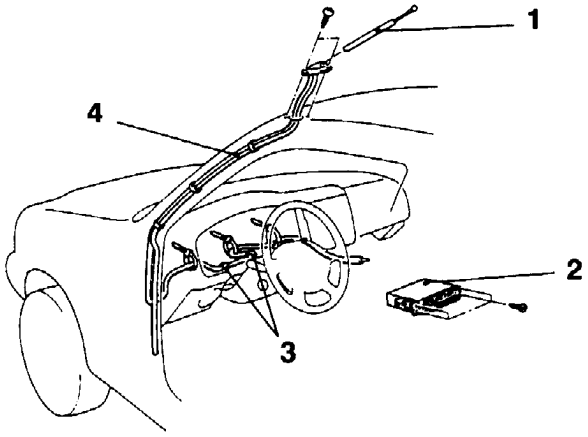
Tool	Number	Name	Use
 B990784	MB990784	Ornament remover	Meter bezel assembly removal

ANTENNA

54400290340

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Front Floor Console Assembly Removal and Installation (Refer to GROUP 52A.)
- Driver's Side Under Cover, Meter Bezel Assembly, Glove Box Assembly, Center Under Cover Removal and Installation (Refer to GROUP 52A – Instrument Panel.)



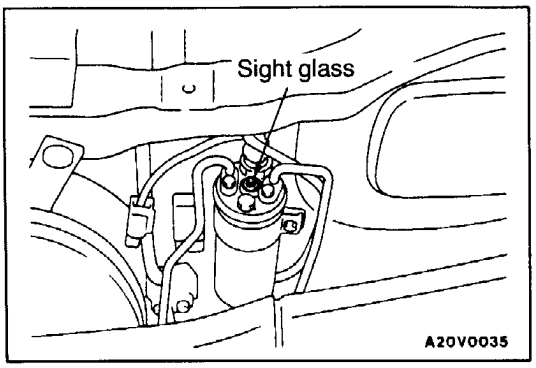
B16V0133

Removal steps

1. Pole
2. Radio and tape player
- Front scuff plate (driver's side), cowl side trim (driver's side) (Refer to GROUP 52A – Trim.)

◀A▶

3. Cable clipped portion
4. Antenna base



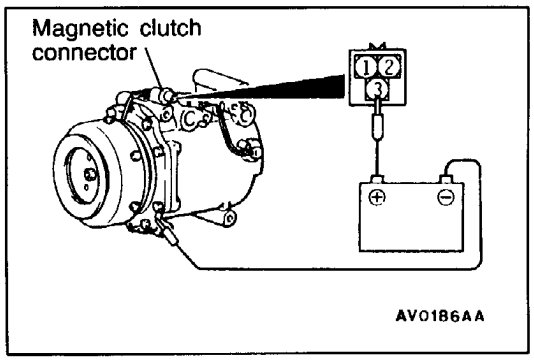
ON-VEHICLE SERVICE

55200840096

SIGHT GLASS REFRIGERANT LEVEL TEST

The sight glass is a refrigerant level indicator. To check the refrigerant level, clean the sight glass and start the vehicle engine. Push the A/C button to operate the compressor, place the blower switch to high and move the temperature control lever to max cool. After operating for a few minutes in this manner, check the sight glass.

1. If the sight glass is clear, the magnetic clutch is engaged, the compressor discharge line is warm and the compressor inlet line is cool; the system has a full charge.
2. If the sight glass is clear, the magnetic clutch is engaged and there is no significant temperature difference between compressor inlet and discharge lines; the system has lost some refrigerant.
3. If the sight glass shows foam or bubbles, the system could be low on charge. The system has to be recharged with refrigerant.



MAGNETIC CLUTCH TEST

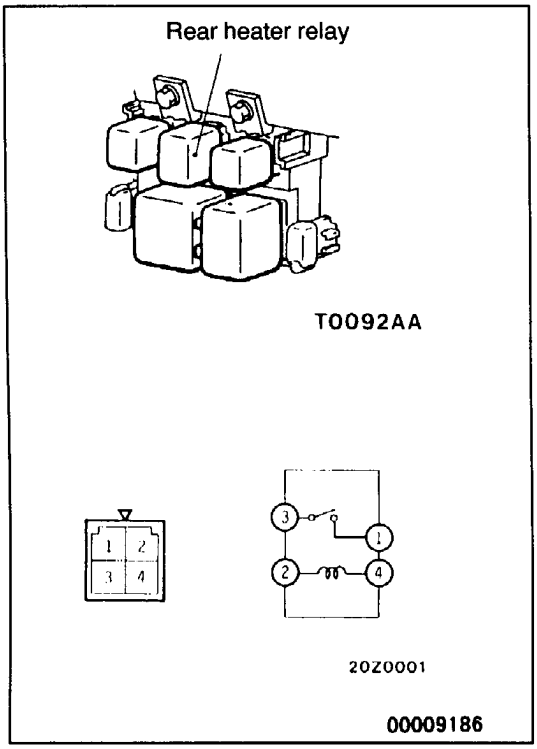
55200850280

1. Disconnect the magnetic clutch connector to the magnetic clutch.
2. Connect battery (+) voltage directly to the connector for the magnetic clutch.
3. If the magnetic clutch is normal, there will be "click". If the pulley and armature do not make contact ('click'), there is a malfunction.

RECEIVER DRIER TEST

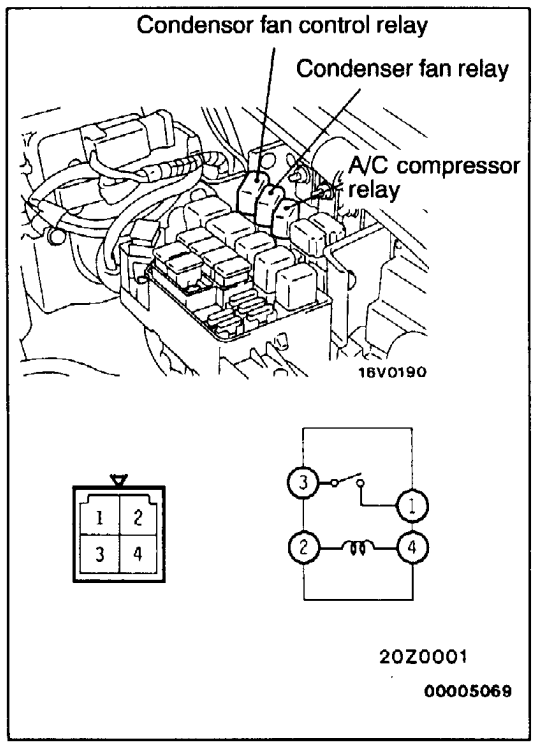
55200860139

Operate the unit and check the piping temperature by touching the receiver drier outlet and inlet.
If there is a difference in the temperatures, the receiver assembly is restricted.
Replace the receiver assembly.



REAR HEATER RELAY

Battery voltage	Terminal No.			
	1	2	3	4
Power is not supplied		○		○
Power is supplied	○	⊖	○	⊕



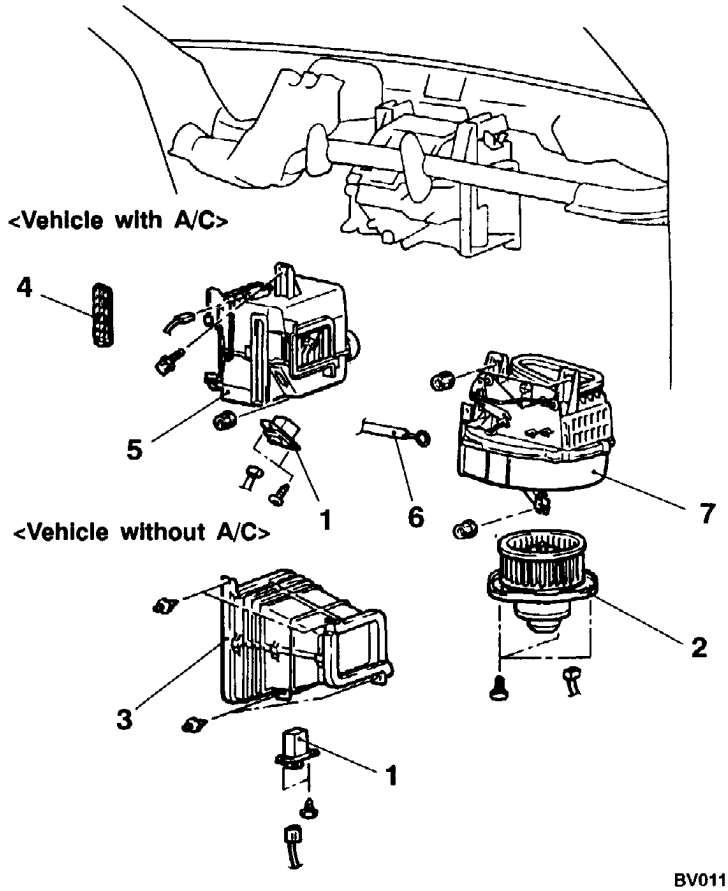
A/C COMPRESSOR RELAY, CONDENSER FAN RELAY, CONDENSER FAN CONTROL RELAY

Battery voltage	Terminal No.			
	1	2	3	4
Power is not supplied		○		○
Power is supplied	○	⊖	○	⊕

BLOWER ASSEMBLY AND RESISTOR

55100280314

REMOVAL AND INSTALLATION



BV0113AA

Resistor, blower fan and motor removal steps

- Under cover and glove box assembly (Refer to GROUP 52A – Instrument Panel.)

1. Resistor
2. Blower fan and motor

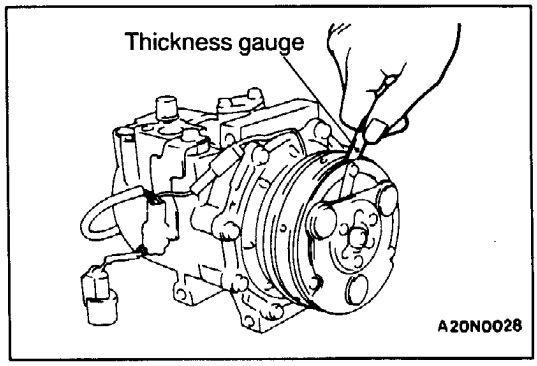
Blower case removal steps

- Instrument panel (Refer to GROUP 52A.)
- Glove box frame or center frame B (Refer to GROUP 52A – Instrument Panel.)

3. Joint duct <Vehicles without A/C>
4. Cover <L.H. drive vehicles, Vehicles with A/C>
5. Evaporator <Vehicles with A/C> (Refer to P.55-30.)

▶A◀ 6. Inside/outside air changeover damper cable connection

7. Blower case assembly



▶E◀ AIR GAP ADJUSTMENT

Check whether or not the air gap of the clutch is within the standard value.

Standard value: 0.3 - 0.5 mm

NOTE
If there is a deviation of the air gap from the standard value, make the necessary adjustment by adjusting the number of shims.