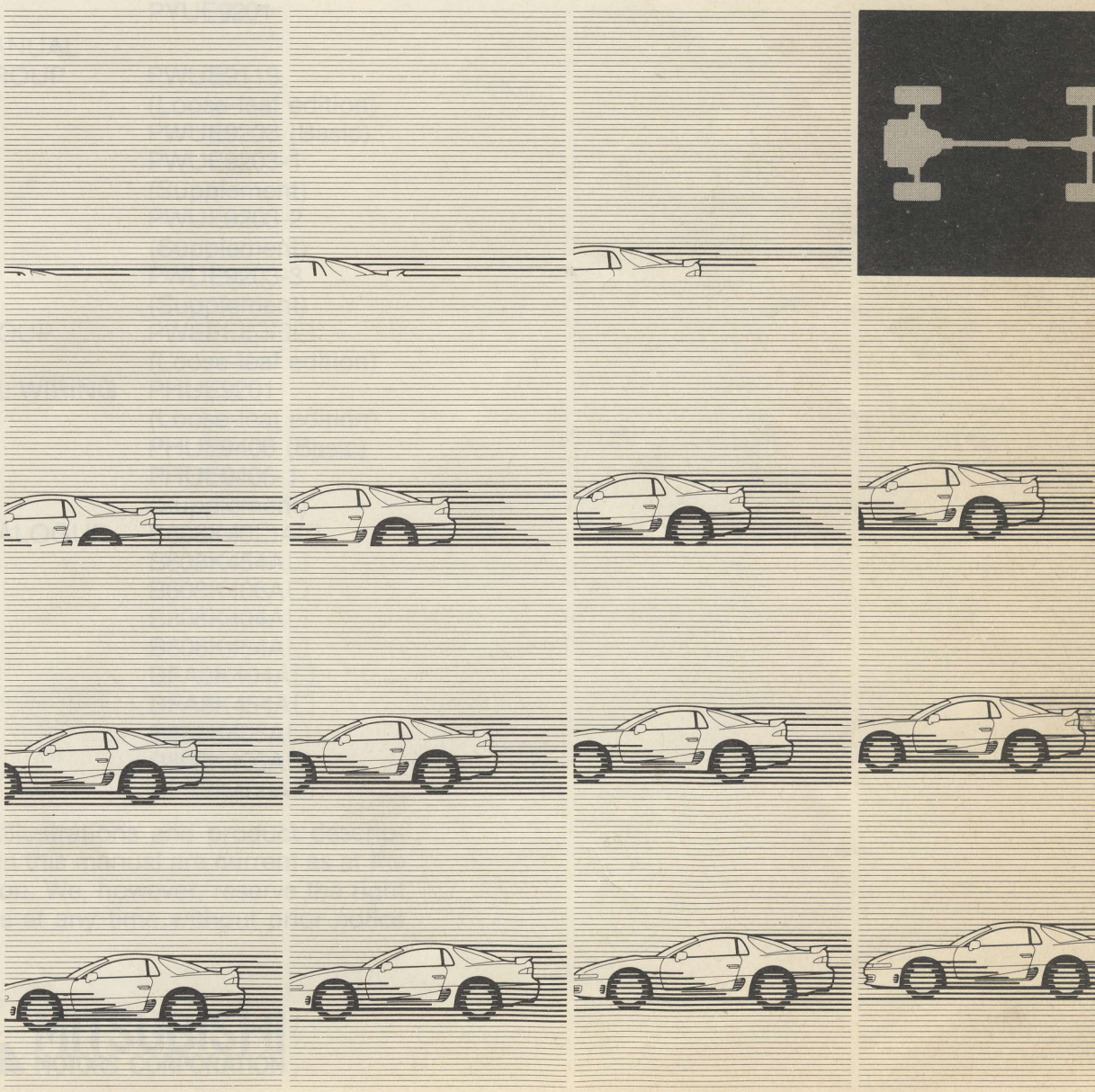
MITSUBISHI MOTORS

Workshop Manual

chassis

SUPPLEMENT

3000GT '96



Pub. No. PWUE9119-E
Pub. No. PWUE9203-4

MITSUBISHI
3000GT
WORKSHOP MANUAL
SUPPLEMENT
FOREWORD

This Workshop Manual contains procedures for removal, disassembly, inspection, adjustment, reassembly and installation, etc. for service mechanics. Use the following manuals in combination with this manual as required.

TECHNICAL INFORMATION MANUAL	
	PYUE9201
WORKSHOP MANUAL	
CHASSIS GROUP	PWUE9119 (Loose-leaf edition) PWUE9203 (Basic) PWUE9203-1 (Supplement) PWUE9203-2 (Supplement) PWUE9203-3 (Supplement)
ENGINE GROUP	PWEE□□□□ (Loose-leaf edition)
ELECTRICAL WIRING	PHUE9201 (Loose-leaf edition) PHUE9406 (Basic) PHUE9406-1 (Supplement)
PARTS CATALOGUE	B608K40□A□ B608K454A□ B608K406A□ B808K404A□ B808K454A□ BFA8K404A□ BFA8K454A□ B808K405A□ B808K406A□ BFA8K406A□

All information, illustrations and product descriptions contained in this manual are current as at the time of publication. We, however, reserve the right to make changes at any time without prior notice or obligation.

MITSUBISHI MOTORS CORPORATION

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Engine Electrical 16
Body 42
Chassis Electrical 54

WARNINGS REGARDING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

WARNING!

(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver (from rendering the SRS inoperative).

(2) If it is possible that the SRS components are subjected to heat over 93° C (200° F) in baking or in drying after painting, remove the SRS components (air bag module, SRS diagnosis unit, front impact sensors) beforehand.

(3) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.

(4) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS), before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

Section titles with asterisks (*) in the table of contents in each group indicate operations requiring warnings.

GROUP 00
GENERAL

VEHICLE IDENTIFICATION

MODELS

VEHICLES FOR EUROPE

Model code	Engine model	Transmission model	Fuel supply system
Z16AMNGFL6	6G72 (2,972 mℓ)	W5MG1	MPI
Z16AMNGFR6			
Z16AMJGFL6		W6MG1	
Z16AMJGFR6			

VEHICLES FOR GENERAL EXPORT

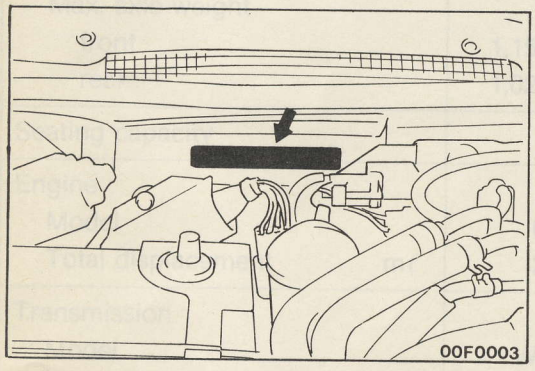
Model code	Engine model	Transmission model	Fuel supply system
Z16AMNGFL	6G72 (2,972 mℓ)	W5MG1	MPI
Z16AMNGFR			

VEHICLES FOR GCC

Model code	Engine model	Transmission model	Fuel supply system
Z16AMNGFLW	6G72 (2,972 mℓ)	W5MG1	MPI

VEHICLES FOR AUSTRALIA

Model code	Engine model	Transmission model	Fuel supply system
Z16AMNGFR8	6G72 (2,972 mℓ)	W5G1	MPI



CHASSIS NUMBER

The chassis number is stamped on the toeboard inside the engine compartment.

<VEHICLES FOR EUROPE AND AUSTRALIA>

⮝	J	M	B	M	N	Z16	A	P	Y	000001	⮝
	1	2	3	4	5	6	7	8	9	10	

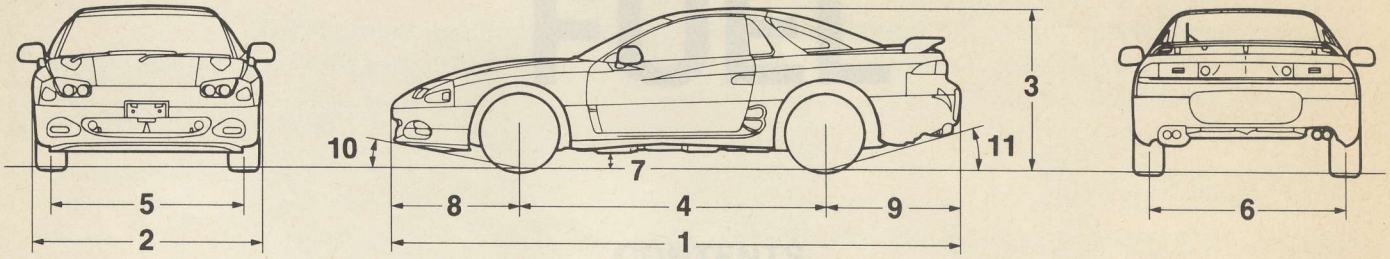
1. Asia
2. Japan
3. MITSUBISHI
   - A – For Europe, right hand drive
   - B – For Europe, left hand drive
   - F – For Australia, right hand drive
4. Body style
   - M – 2-door hatchback
5. Transmission type
   - N – 5-speed manual transmission
   - J – 6-speed manual transmission
6. Development order
   - Z16 – 2,972 mℓ (Full time 4WD)
7. Sort
   - A – Passenger car
8. Model year
   - P – 1993
   - R – 1994
   - S – 1995
   - T – 1996
9. Plant
   - Y – Ohe Motor Vehicle Works
10. Serial number

<VEHICLES FOR GENERAL EXPORT AND GCC>

C	M	N	Z16	A	P	Y	00001
1	2	3	4	5	6	7	8

1. MITSUBISHI
   - C – For General Export, right hand drive
   - D – For General Export or GCC, left hand drive
2. Body style
   - M – 2-door hatchback
3. Transmission type
   - N – 5-speed manual transmission
4. Development order
   - Z16 – 2,972 mℓ (Full time 4WD)
5. Sort
   - A – Passenger car
6. Model year
   - P – 1993
   - R – 1994
   - S – 1995
   - T – 1996
7. Plant
   - Y – Ohe Motor Vehicle Works
8. Serial number

MAJOR SPECIFICATIONS



00F0064

Items		Z16AMNGFL6 Z16AMNGFR6	Z16AMJGFL6 Z16AMJGFR6	Z16AMNGFL Z16AMNGFR Z16AMNGFLW	Z16AMNGFR8
Dimensions	mm (in.)				
Overall length	1	4,570 (179.9)	4,570 (179.9)	4,570 (179.9)	4,570 (179.9)
Overall width	2	1,840 (72.4)	1,840 (72.4)	1,840 (72.4)	1,840 (72.4)
Overall height (unladen)	3	1,285 (50.6)	1,285 (50.6)	1,285 (50.6)	1,285 (50.6)
Wheelbase	4	2,470 (97.2)	2,470 (97.2)	2,470 (97.2)	2,470 (97.2)
Track – front	5	1,560 (61.4)	1,560 (61.4)	1,560 (61.4)	1560 (61.4)
Track – rear	6	1,580 (62.2)	1,580 (62.2)	1,580 (62.2)	1,580 (62.2)
Ground clearance (unladen)	7	140 (5.5)	140 (5.5)	145 (5.7)	145 (5.7)
Overhang – front	8	1,030 (40.6)	1,030 (40.6)	1,030 (40.6)	1,030 (40.6)
Overhang – rear	9	1,070 (42.1)	1,070 (42.1)	1,070 (42.1)	1,070 (42.1)
Angle of approach degrees	10	11.0°	11.0°	12.0°	12.0°
Angle of departure degrees	11	17.6°	17.6°	17.4°	17.4°
Weight	kg (lbs.)				
Kerb weight		1,720 (3,792)	1,730 (3,858)	1,695 (3,737)	1,700 (3,748)
Gross vehicle weight		2,120 (4,674)	2,120 (4,674)	2,075 (4,575)	2,075 (4,575)
Max. axle weight					
front		1,150 (2,535)	1,150 (2,535)	1,150 (2,535)	1,150 (2,535)
rear		1,020 (2,249)	1,020 (2,249)	1,020 (2,249)	1,020 (2,249)
Seating capacity		4	4	4	4
Engine					
Model		6G72	6G72	6G72	6G72
Total displacement	mℓ	2,972	2,972	2,972	2,972
Transmission					
Model		W5MG1	W6MG1	W5MG1	W5MG1
Type		5-speed manual	6-speed manual	5-speed manual	5-speed manual

FUEL

CONTENTS

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Engine Control Unit Terminal Voltage Check 9

GENERAL

OUTLINE OF CHANGES

The following maintenance service points have been established to correspond to the addition of vehicles with immobilizer system.

- An engine-ECU has been added.
- Engine warning lamp illumination details and self-diagnosis items have been added.
- Inspection procedures have been added for the fuel pump, air conditioner switch and power relay and for terminal voltages.

SPECIFICATIONS

GENERAL SPECIFICATIONS

Items		Specifications
Engine control unit Identification model No.	Europe LHD 6 M/T – Vehicles with immobilizer system	E2T61481
	Europe LHD 5 M/T – Vehicles with immobilizer system	E2T61483
	Europe RHD 6 M/T – Vehicles with immobilizer system	E2T61482
	Europe RHD 5 M/T – Vehicles with immobilizer system	E2T61484
	Australia – Vehicles with immobilizer system	E2T61486

TROUBLESHOOTING

ENGINE WARNING LAMP (CHECK ENGINE LAMP)

ITEMS INDICATED BY THE ENGINE WARNING LAMP

Immobilizer system

SELF-DIAGNOSIS

Diagnosis Chart

Diagnosis item	Malfunction code		Check item (Remedy)
	No.	Memory	
Immobilizer system	54	Retained	(Inspect according to the troubleshooting procedures given in GROUP 54 – Ignition Switch and Immobilizer System.)

PROBLEM DIAGNOSIS CONTENT CHART

Malfunction code No.	Diagnosis item	Diagnosis contents	Probable cause	Remark (Trouble symptom, etc.)
54	Immobilizer system	Communication problem between the engine-ECU and the immobilizer-ECU	(1) Malfunction of communication wire between the engine-ECU and immobilizer-ECU (2) Malfunction of immobilizer-ECU (3) Malfunction of engine-ECU	• Starting is impossible

CHECK CHART CLASSIFIED BY PROBLEM SYMPTOMS

<Vehicles with immobilizer system>

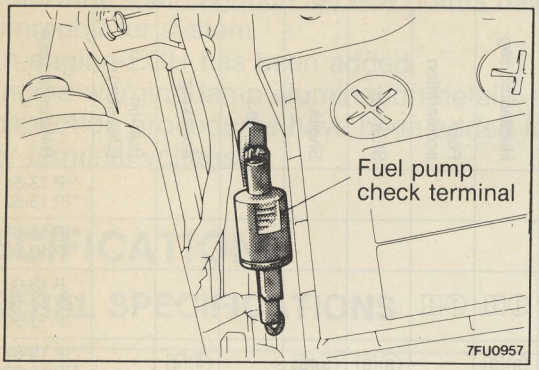
Problem symptoms / Check items	Starting		Idling stability			Driving						Stopping	Reference page
	Will not start	Starting problem	Idling instability (Rough idling)	Incorrect idling speed	Improper idling continuity	Hesitation, sag	Poor acceleration	Stumble	Shock	Surge	Knocking	Run-on (Dieseling)	
Power supply and ignition switch-IG	①1												*1P.13-54 *3P.13-52
Engine control unit power earth	②2												*1P.13-57 *3P.13-55
Fuel pump	③3	①1			①1	①1	①1						P.13-00 *1P.13-58 *3P.13-56
Air flow sensor					⑬11	⑨9		⑤5	⑤5		④4		*1P.13-64 *3P.13-62
Intake air temperature sensor			⑤			⑤5	⑥6				②2		*1P.13-69 *3P.13-67
Barometric pressure sensor			⑦			⑧8	⑧8				③3		*1P.13-72 *3P.13-70
Engine coolant temperature sensor			⑥5	①1	⑤5	⑦7	⑦7	④4		③3			*1P.13-74 *3P.13-72
Throttle position sensor						⑥6		③3	④4				*1P.13-77 *3P.13-75
Idle position switch			③3	②2	④4								*1P.13-80 *3P.13-78
Cam position sensor	⑤5	⑦7			⑧7				②2				*1P.13-82 *3P.13-80
Crank angle sensor	⑥6	⑧8			⑨ 8				③3				*1P.13-86 *3P.13-84
Ignition switch-ST	④4	③4											*1P.13-89 *3P.13-87
Vehicle speed sensor					⑥				⑥				*1P.13-90 *3P.13-88
Power steering fluid pressure switch				③									*1P.13-92 *3P.13-90
Air conditioner switch and power relay				④									P.13-00 *1P.13-94 *3P.13-92
Detonation sensor											①1		*1P.13-96 *3P.13-94
Electrical load switch				⑤									*1P.13-98 *3P.13-96
Fan motor relay (radiator fan, condenser fan)				⑥	⑪10								*2P.13-3 *3P.13-100-1
Oxygen sensor			⑩										*1P.13-100 *3P.13-98
Mixture adjusting screw (variable resistor)			⑪										*1P.13-106
Injectors	⑧8	②2	②2		③3	②2	②2	①1		①1		①	*1P.13-109 *3P.13-101
Idle speed control servo (stepper motor type)		④5	①1	⑦3	②2				⑧6				*1P.13-116 *3P.13-108
Ignition coil and power transistor	⑦7				⑩9		⑨9		①1		⑤5		*1P.13-121 *3P.13-113
Purge control solenoid valve			⑧										*1P.13-127 *3P.13-119
EGR control solenoid valve						④4		⑥6		④4			*1P.13-129 *3P.13-121
Fuel pressure control valve		⑥	⑨		⑫		④4						*1P.13-131 *3P.13-123
Waste gate control solenoid valve							⑤5						*1P.13-134 *3P.13-126
Anti-lock braking signal									⑦				*1P.13-138 *3P.13-130
Fuel pressure		⑤6	④4		⑦6	③3	③3	②2		②2			*1P.13-139 *3P.13-131

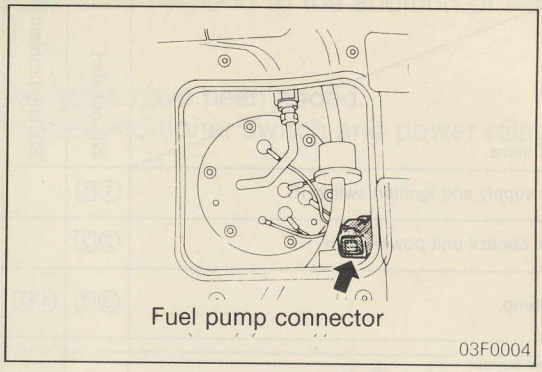
○ : Warm engine (number inside indicates check order)
□ : Cold engine (number inside indicates check order)

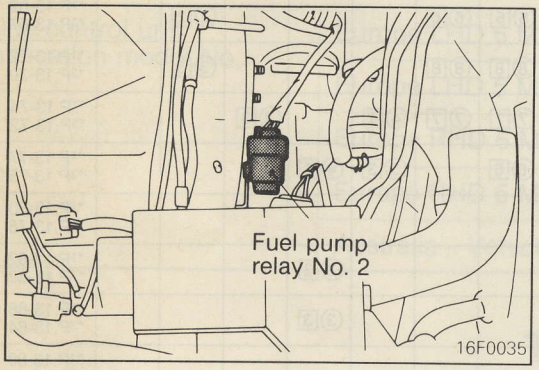
*1 : Refer to 3000GT '93 Workshop Manual (Pub. No. PWUE9203)
*2 : Refer to 3000GT '95 Workshop Manual (Pub. No. PWUE9203-3)
*3 : Refer to 3000GT Workshop Manual (Pub. No. PWUE9119-D)

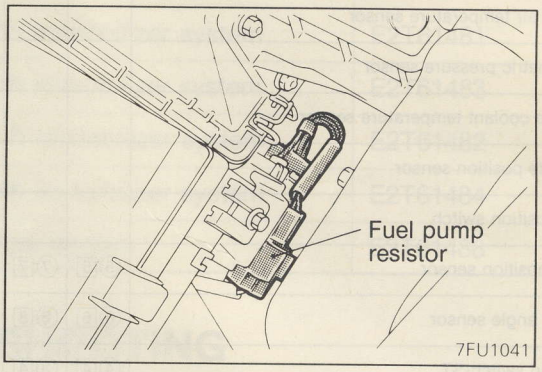
ON-VEHICLE INSPECTION OF MPI COMPONENTS

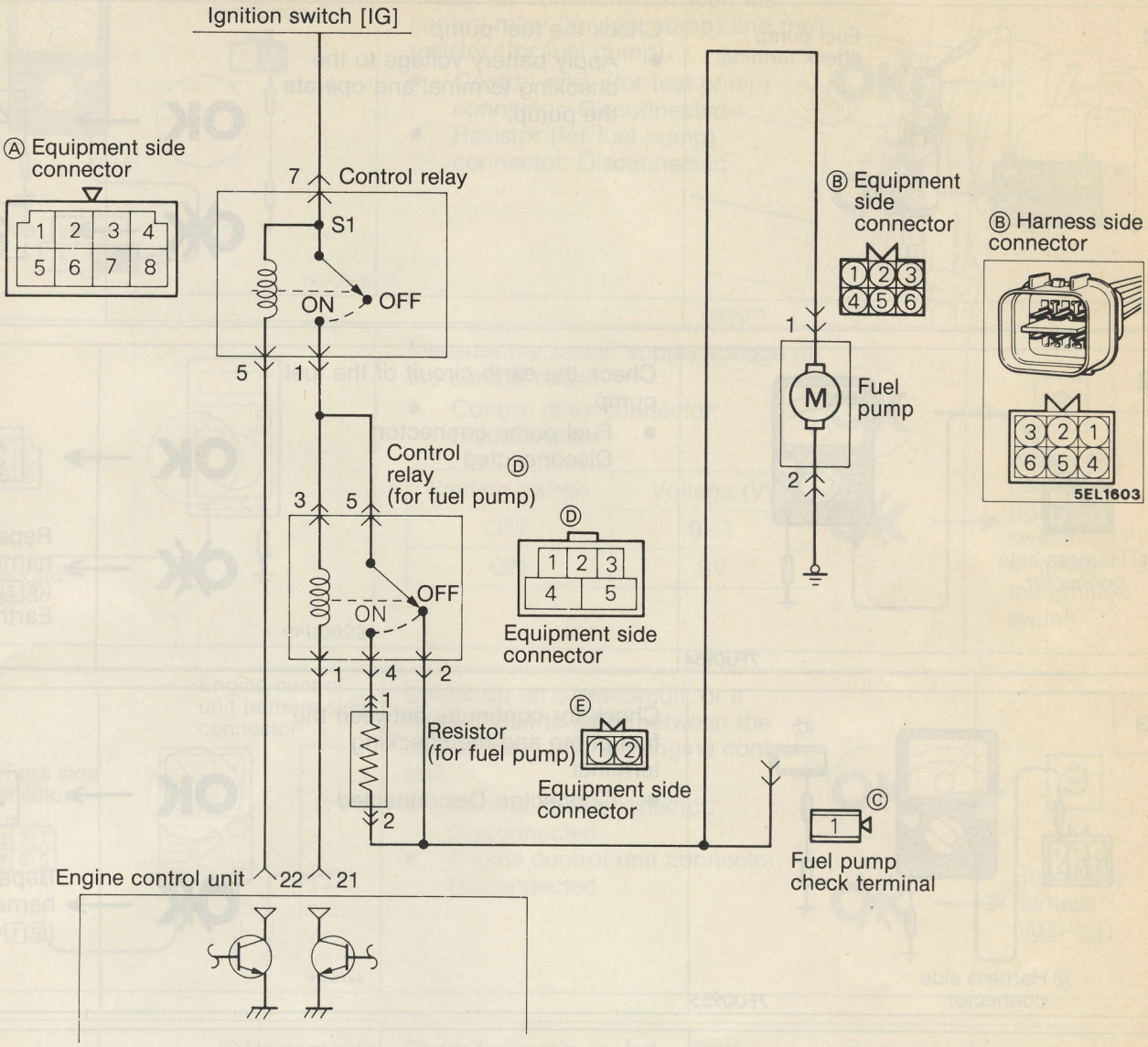
FUEL PUMP <Vehicles with immobilizer system>





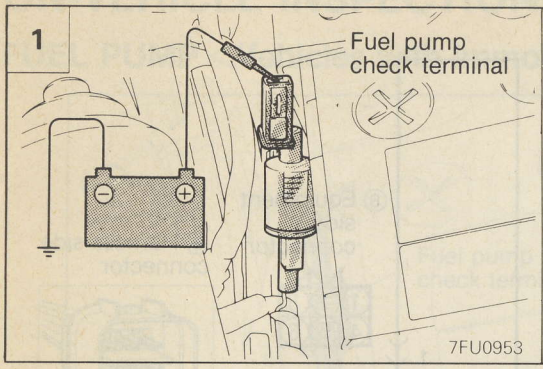





Ignition switch [IG]
Ⓐ Equipment side connector
1 2 3 4
5 6 7 8
7
Control relay
S1
ON
OFF
5
1
Control relay (for fuel pump)
Ⓓ
3
5
OFF
ON
1 4 2
Ⓓ
1 2 3
4 5
Equipment side connector
1
Resistor (for fuel pump)
2
Ⓔ
1 2
Equipment side connector
Ⓑ Equipment side connector
1 2 3
4 5 6
1
M
Fuel pump
2
Ⓑ Harness side connector
3 2 1
6 5 4
5EL1603
Ⓒ
1
Fuel pump check terminal
Engine control unit
22
21
7FU1352
Engine control unit connector
9FU0101

HARNESS INSPECTION

1

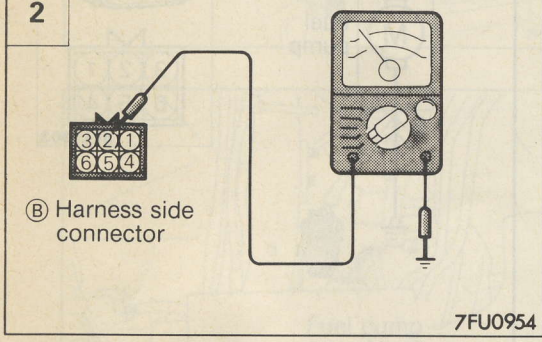


Check the fuel pump.
- Apply battery voltage to the checking terminal and operate the pump.

OK → 4

NG → 2

2

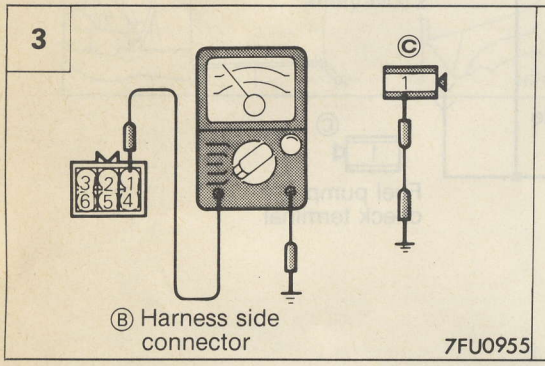


Check the earth circuit of the fuel pump.
- Fuel pump connector: Disconnected

OK → 3

NG → Repair the harness. (Ⓑ2 – Earth)

3

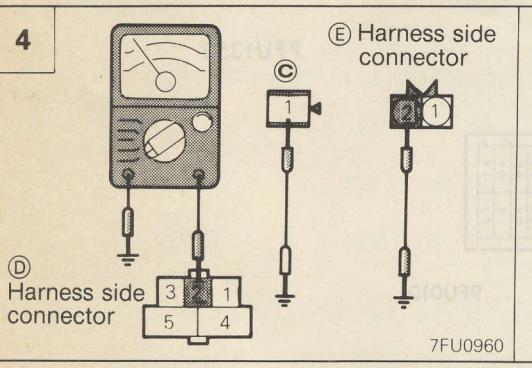


Check for continuity between the fuel pump and the checking terminal.
- Connector: Disconnected

OK → 4

NG → Repair the harness. (Ⓑ1 – Ⓒ1)

4

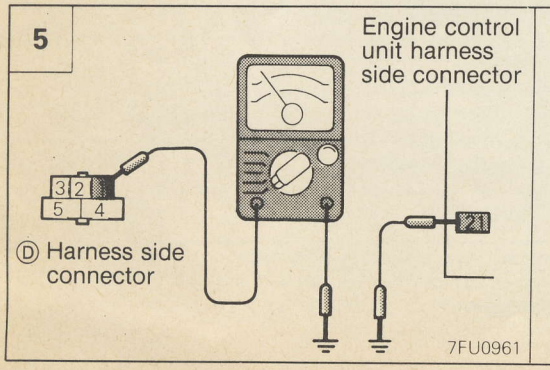


Check for continuity between the checking terminal and the control relay (for fuel pump), and between the resistor (for fuel pump).
- Control relay (for fuel pump) connector: Disconnected
- Resistor (for fuel pump) connector: Disconnected
- Fuel pump connector: Disconnected

OK → 5

NG → Repair the harness. (Ⓒ1 – Ⓓ2) (Ⓓ2 – Ⓔ2)

5

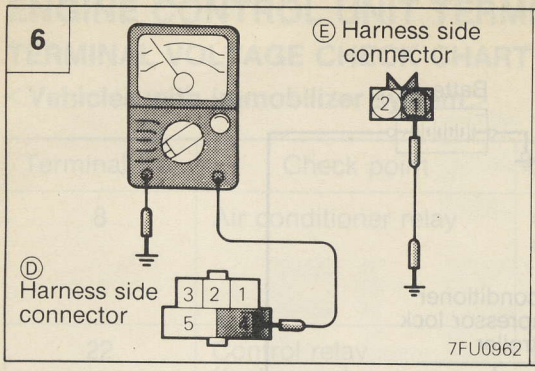


Check for an open-circuit, or a short-circuit to earth, between the control relay (for fuel pump) and the engine control unit.
- Control relay (for fuel pump) connector: Disconnected
- Engine control unit connector: Disconnected

OK → 6

NG → Repair the harness. (Ⓓ1 – 21)

6

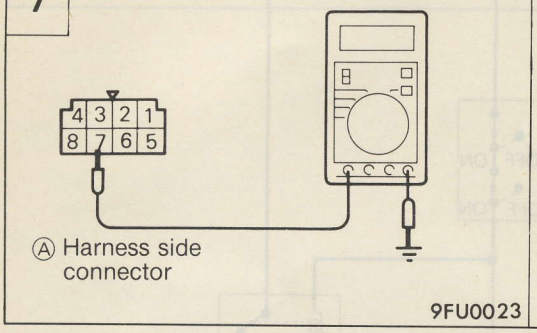


Check for continuity between the control relay (for fuel pump) and the resistor (for fuel pump).
- Control relay (for fuel pump) connector: Disconnected
- Resistor (for fuel pump) connector: Disconnected

OK → 7

NG → Repair the harness. (Ⓓ4–Ⓔ1)

7



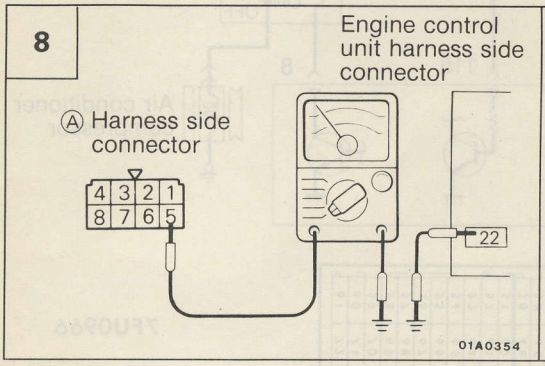
Measure the power supply voltage of the control relay.
- Control relay connector: Disconnected

Ignition switch	Voltage (V)
OFF	0 – 1
ON	SV

OK → 8

NG → Repair the harness. (Ignition switch–Ⓐ7) or check the ignition switch.

8

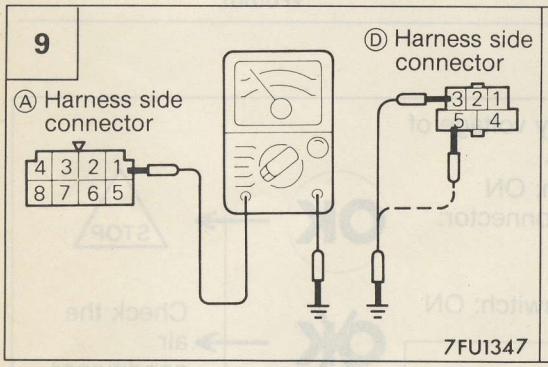


Check for an open-circuit, or a short-circuit to earth between the control relay and the engine control unit.
- Control relay connector: Disconnected
- Engine control unit connector: Disconnected

OK → 9

NG → Repair the harness. (Ⓐ5–22)

9

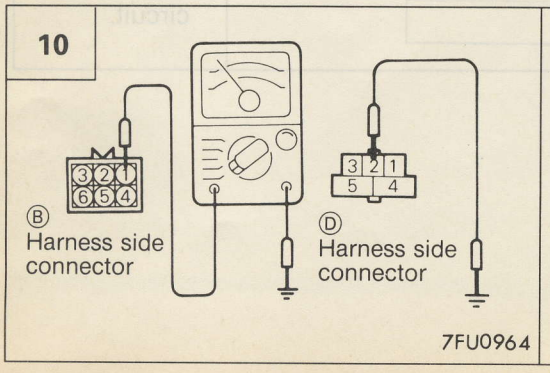


Check for continuity between the control relay and the control relay (for fuel pump).
- Control relay connector: Disconnected
- Control relay (for fuel pump) connector: Disconnected

OK → 10

NG → Repair the harness. (Ⓐ1–Ⓓ3) (Ⓐ1–Ⓓ5)

10

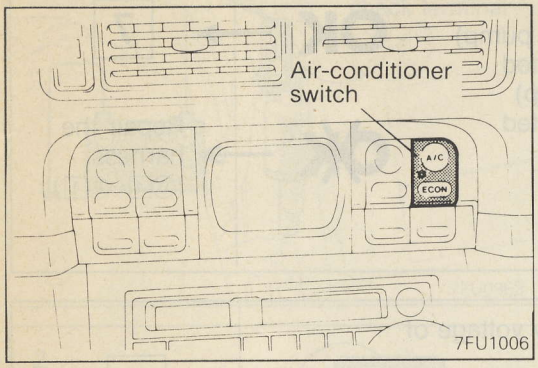


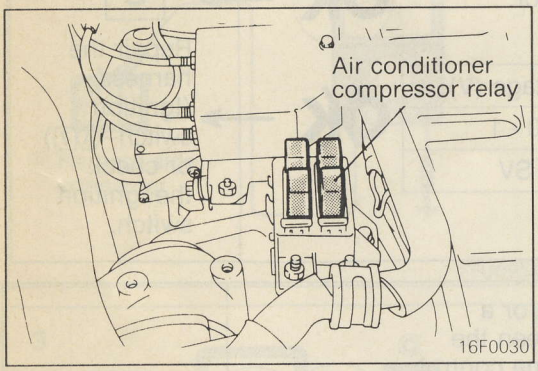
Check for an open-circuit, or a short-circuit to earth, between the control relay (for fuel pump) and the fuel pump.
- Control relay (for fuel pump) connector: Disconnected
- Fuel pump connector: Disconnected

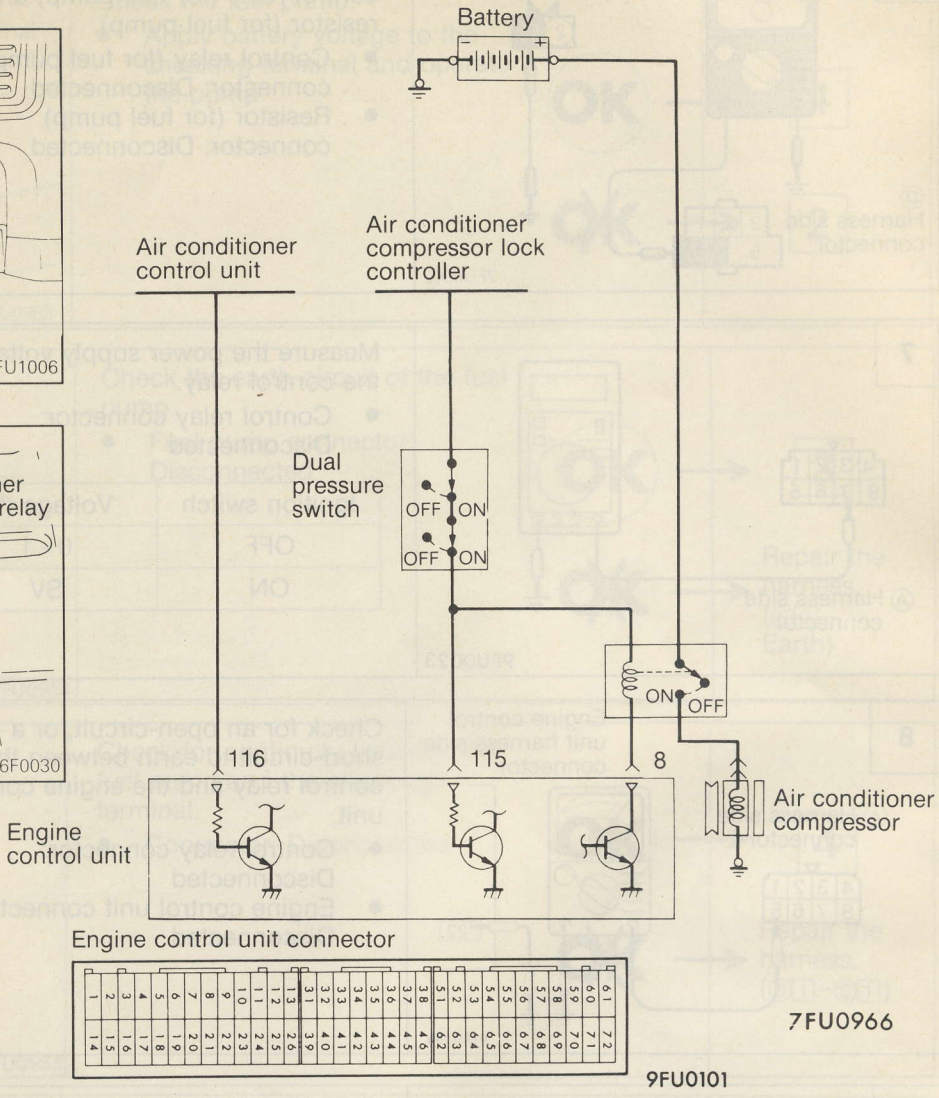
OK → STOP

NG → Repair the harness. (Ⓑ1–Ⓓ2)

AIR CONDITIONER SWITCH AND POWER RELAY
<Vehicles with immobilizer system>

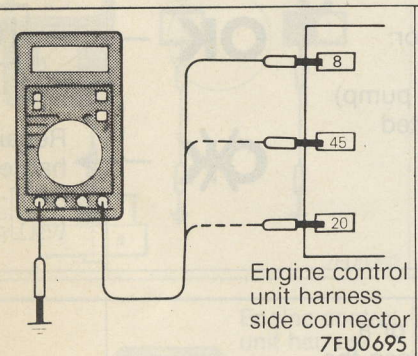






HARNESS INSPECTION

1



Measure the power supply voltage of the air conditioner circuit.

- Air conditioner switch: ON
- Engine control unit connector: Disconnected
- Ignition switch: ON
- Dual air conditioner switch: ON

Voltage (V)
SV

OK → STOP

NG → Check the air conditioner circuit.

ENGINE CONTROL UNIT TERMINAL VOLTAGE CHECK

TERMINAL VOLTAGE CHECK CHART

<Vehicles with immobilizer system>

Terminal No.	Check point	Check conditions (Engine conditions)	Standard value	Remarks
8	Air conditioner relay	• Engine: Running at idle • Air conditioner switch: OFF → ON (Air compressor in driven state)	SV or 6V or more for a moment → 0 – 3V	
22	Control relay (fuel pump)	Ignition switch: ON	SV	
		Engine: Running at idle	0 – 3V	

ENGINE ELECTRICAL

CONTENTS

GENERAL **2**
Outline of Change 2

SPECIFICATIONS **2**
Service Specifications 2

SERVICE ADJUSTMENT PROCEDURES **2**
Output Current Test 2

GENERAL

OUTLINE OF CHANGE

- The nominal output of the alternator has been changed from 110A to 95A in vehicles for Australia and General Export. One of the service specification values has been changed to correspond to this.

SPECIFICATIONS

SERVICE SPECIFICATIONS

ALTERNATOR <Vehicles for Australia and General Export>

Item	Specifications
Limit Output current A	66.5

SERVICE ADJUSTMENT PROCEDURES

OUTPUT CURRENT TEST <Vehicles for Australia and General Export>

Inspection service points are the same as before.

Output current
Limit: 66.5A

GROUP 42
BODY

GENERAL
OUTLINE OF CHANGE
- A power tilt and outer sliding sunroof has been provided as an option in vehicles for Europe.

SPECIFICATIONS
SERVICE SPECIFICATIONS

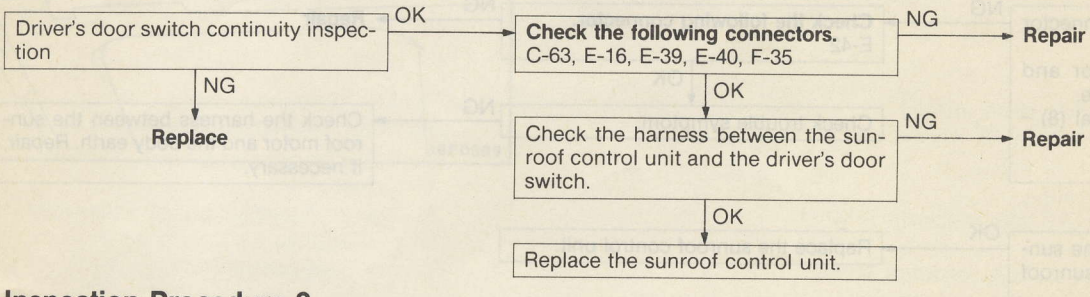
Items	Standard value
Roof lid sliding resistance N	147 or more
Sunroof motor clutch slippage force N	39 – 49

TROUBLESHOOTING
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure
Sunroof does not operate within 30 seconds after driver's door is opened.	1
Sunroof does not operate at all.	2

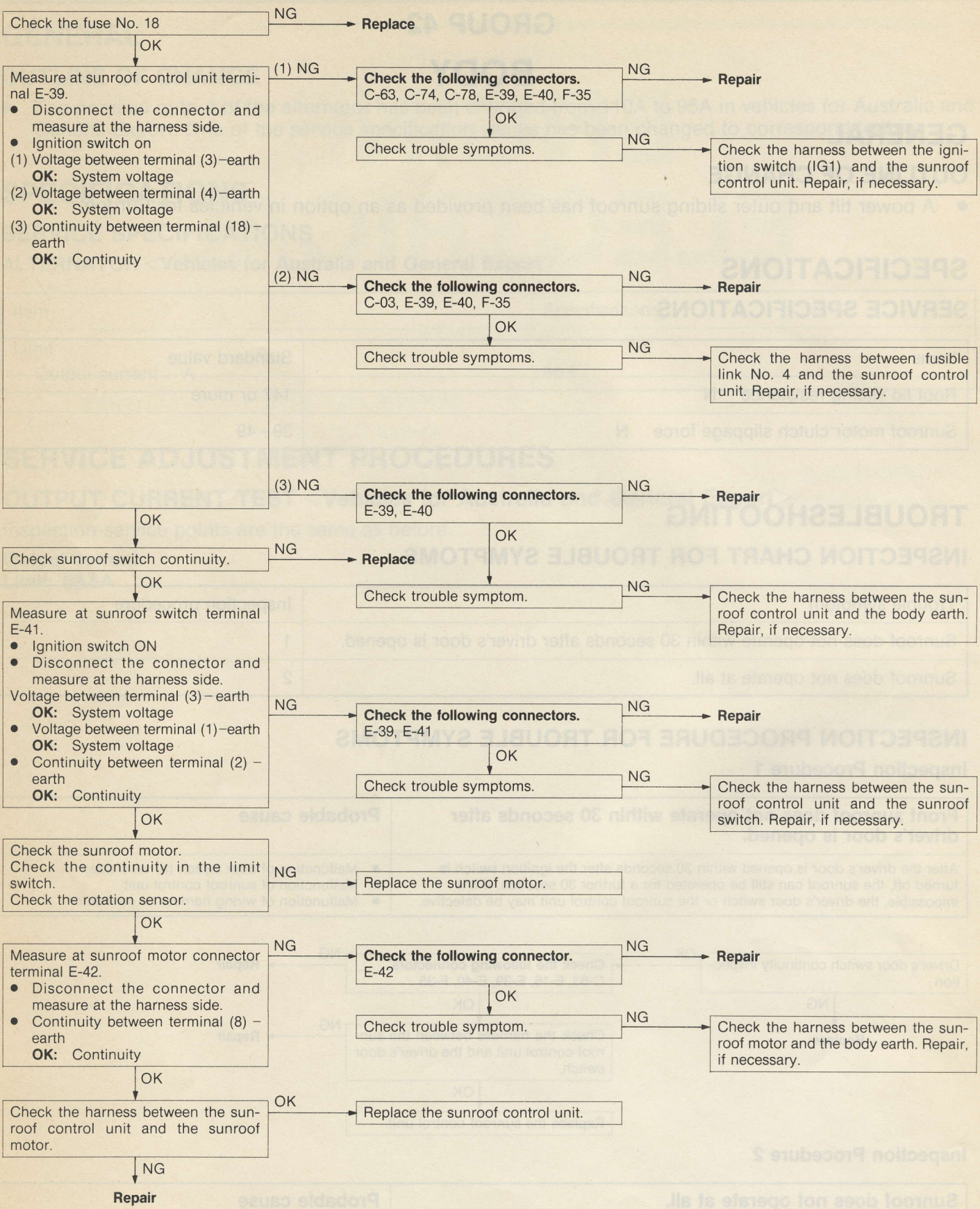
INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS
Inspection Procedure 1

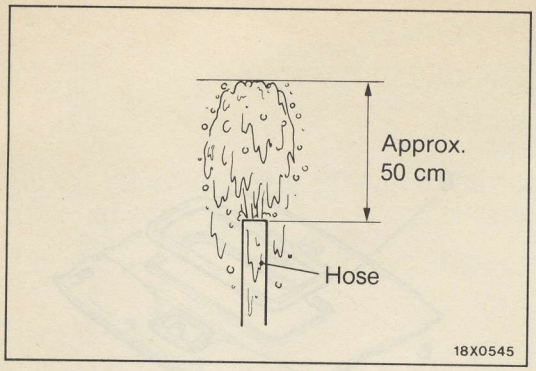
Front sunroof does not operate within 30 seconds after driver's door is opened.	**Probable cause**
After the driver's door is opened within 30 seconds after the ignition switch is turned off, the sunroof can still be operated for a further 30 seconds. If it is impossible, the driver's door switch or the sunroof control unit may be defective.	• Malfunction of door switch (driver's side) • Malfunction of sunroof control unit • Malfunction of wiring harness or connector

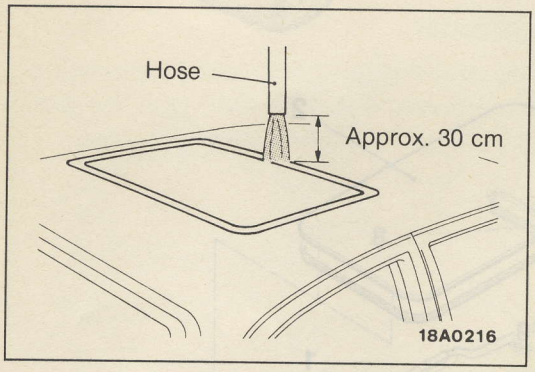


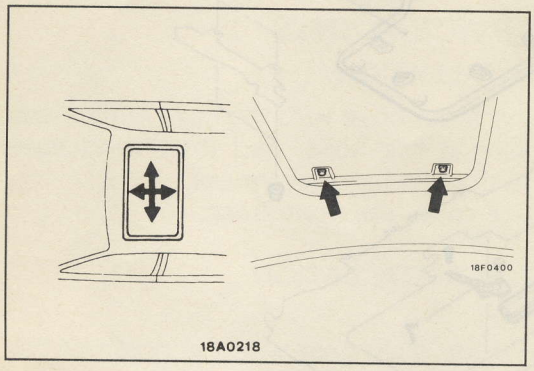
Inspection Procedure 2

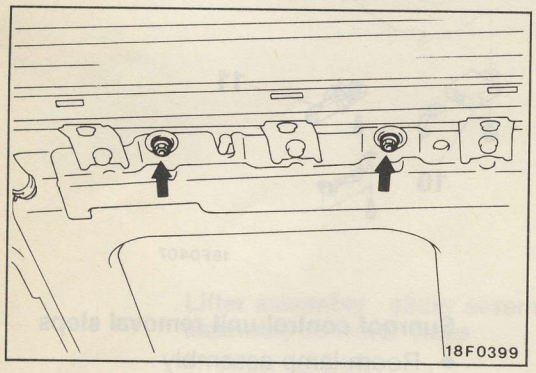
Sunroof does not operate at all.	**Probable cause**
One of the following items may be defective. Sunroof switch Sunroof motor Sunroof control unit Power supply circuit (including the fuse)	• Malfunction of sunroof switch • Malfunction of sunroof motor • Malfunction of sunroof control unit • Malfunction of wiring harness or connector


Check the fuse No. 18
NG
Replace
OK
Measure at sunroof control unit terminal E-39.
• Disconnect the connector and measure at the harness side.
• Ignition switch on
(1) Voltage between terminal (3)–earth
OK: System voltage
(2) Voltage between terminal (4)–earth
OK: System voltage
(3) Continuity between terminal (18) – earth
OK: Continuity
(1) NG
Check the following connectors.
C-63, C-74, C-78, E-39, E-40, F-35
NG
Repair
OK
Check trouble symptoms.
NG
Check the harness between the ignition switch (IG1) and the sunroof control unit. Repair, if necessary.
(2) NG
Check the following connectors.
C-03, E-39, E-40, F-35
NG
Repair
OK
Check trouble symptoms.
NG
Check the harness between fusible link No. 4 and the sunroof control unit. Repair, if necessary.
(3) NG
Check the following connectors.
E-39, E-40
NG
Repair
OK
Check trouble symptom.
NG
Check the harness between the sunroof control unit and the body earth. Repair, if necessary.
OK
Check sunroof switch continuity.
NG
Replace
OK
Measure at sunroof switch terminal E-41.
• Ignition switch ON
• Disconnect the connector and measure at the harness side.
Voltage between terminal (3) – earth
OK: System voltage
• Voltage between terminal (1)–earth
OK: System voltage
• Continuity between terminal (2) – earth
OK: Continuity
NG
Check the following connectors.
E-39, E-41
NG
Repair
OK
Check trouble symptoms.
NG
Check the harness between the sunroof control unit and the sunroof switch. Repair, if necessary.
OK
Check the sunroof motor.
Check the continuity in the limit switch.
Check the rotation sensor.
NG
Replace the sunroof motor.
OK
Measure at sunroof motor connector terminal E-42.
• Disconnect the connector and measure at the harness side.
• Continuity between terminal (8) – earth
OK: Continuity
NG
Check the following connector.
E-42
NG
Repair
OK
Check trouble symptom.
NG
Check the harness between the sunroof motor and the body earth. Repair, if necessary.
OK
Check the harness between the sunroof control unit and the sunroof motor.
OK
Replace the sunroof control unit.
NG
Repair









SERVICE ADJUSTMENT PROCEDURES

SUNROOF LEAKAGE INSPECTION

Check if there are any leaks in the sunroof by the following procedure.

(1) Fully close the roof lid glass.
(2) Adjust the water pressure so that water comes out of the hose to a height of approximately 50 cm when the hose is held vertically facing upwards.

(3) Hold the end of the hose about 30 cm above the roof and let the water run onto the weatherstrip for 5 minutes or more.
(4) While doing this, check if any water leaks through into the passenger compartment from around the roof lid glass.

SUNROOF WORKING CHECK

1. Longitudinal and lateral direction adjustment

(1) Remove the roof lid trim.
(2) Fully close the roof lid.
(3) Loosen the four roof lid mounting nuts and adjust the position of the roof lid so that the clearances at the front and rear and at the left and right are the same.

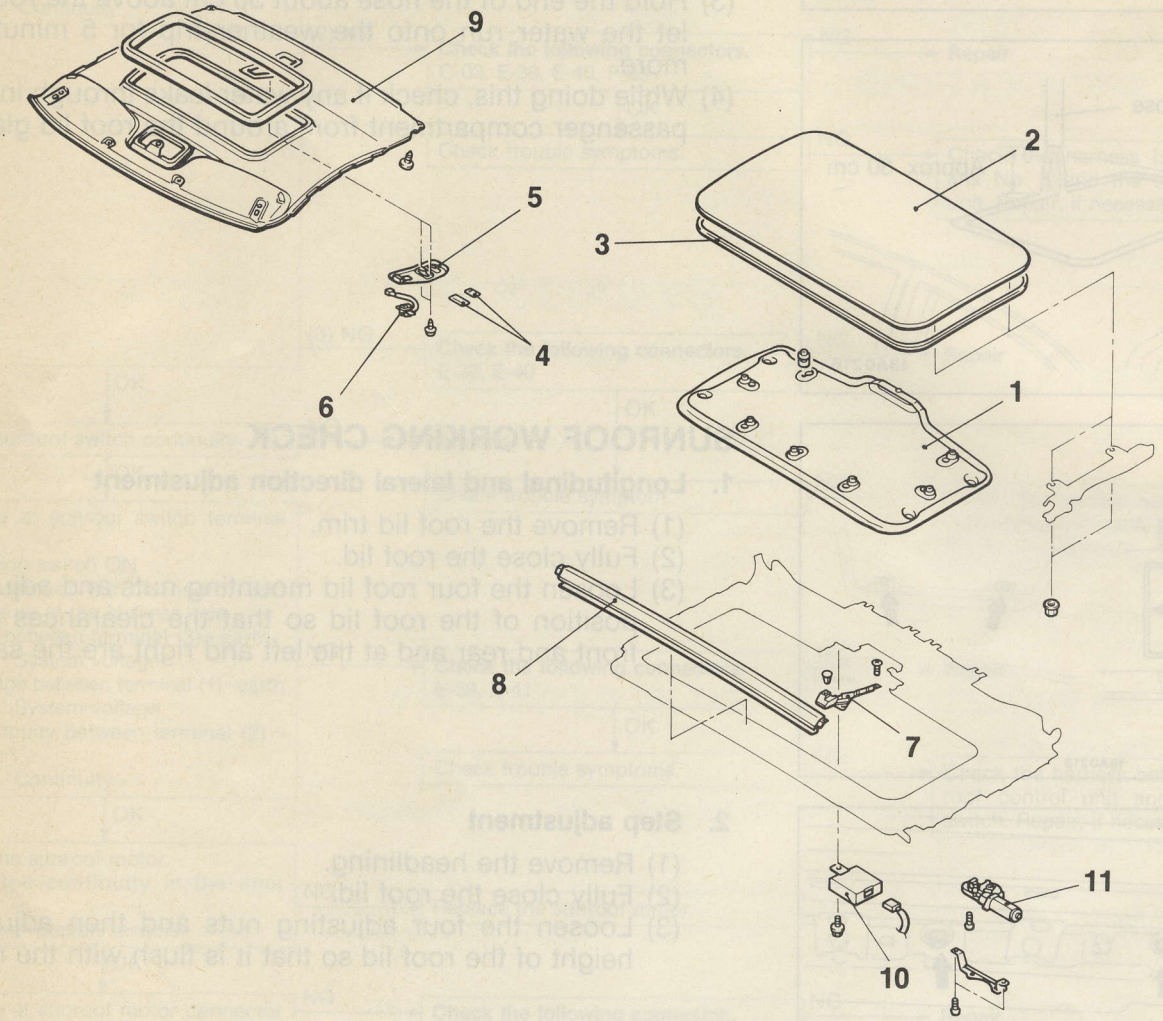
2. Step adjustment

(1) Remove the headlining.
(2) Fully close the roof lid.
(3) Loosen the four adjusting nuts and then adjust the height of the roof lid so that it is flush with the roof.

SUNROOF <POWER SLIDING TYPE>

REMOVAL AND INSTALLATION

Post-installation Operation
- Sunroof Leakage Inspection
- Sunroof Fit Adjustment



Roof lid removal steps

◀A▶ 1. Roof lid trim
◀A▶ 2. Roof lid
3. Roof lid weatherstrip

Sunroof switch removal steps

4. Cover
5. Sunroof switch panel assembly
6. Sunroof switch

Deflector assembly removal steps

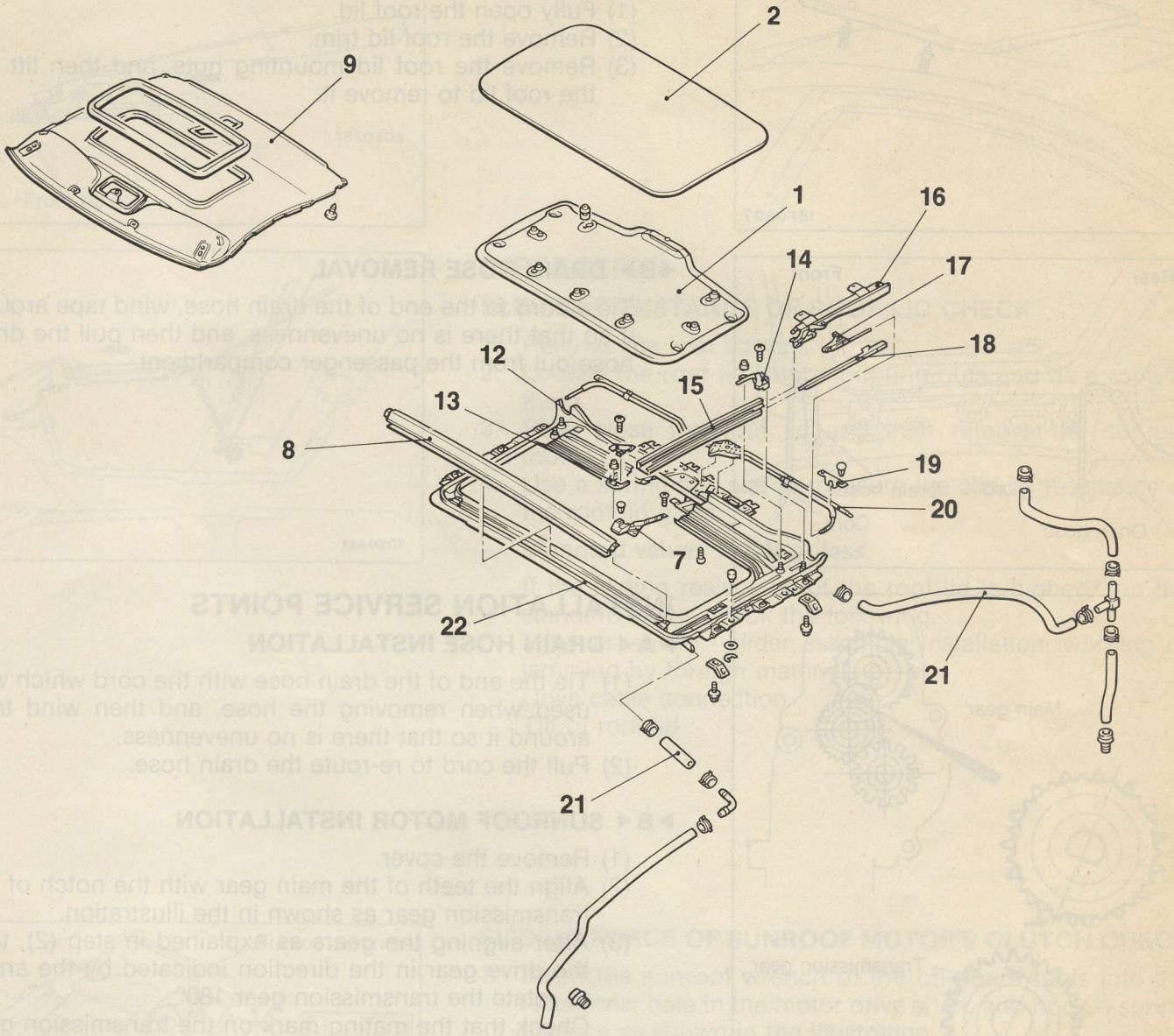
- While roof lid is opened fully
7. Link assembly
8. Deflector assembly

Sunroof control unit removal steps

- Room lamp assembly
4. Cover
5. Sunroof switch panel assembly
9. Headlining
10. Sunroof control unit

Sunroof motor removal steps

- Room lamp assembly
4. Cover
5. Sunroof switch panel assembly
9. Headlining
▶B◀ 11. Sunroof motor



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Lifter assembly · slider assembly/drive unit assembly removal steps

◀A▶ 1. Roof lid trim
◀A▶ 2. Roof lid
12. Front corner panel
13. Front holder
14. Rear holder
15. Slid rail
16. Lifter assembly
17. Slider assembly
18. Rear timing
19. Tube cover
20. Drive unit assembly

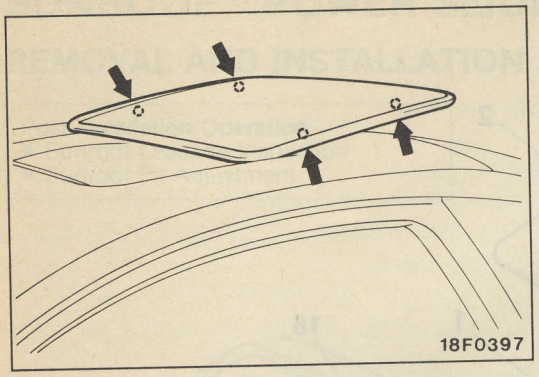
Frame assembly removal steps

1. Roof lid trim
2. Roof lid
7. Link assembly
8. Deflector assembly
- Room lamp assembly
4. Cover
5. Sunroof switch panel assembly
9. Headlining
21. Drain hose connection
22. Frame assembly

Drain hose removal steps

- Front splash shield
- Rear side trim

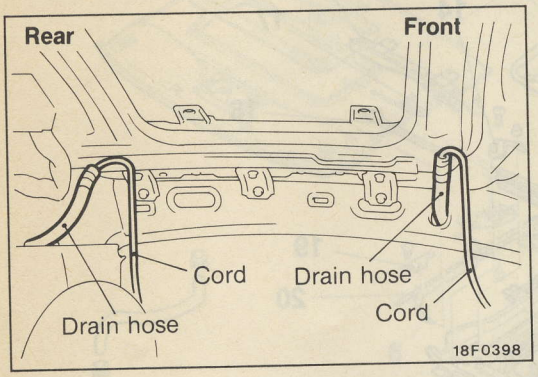
◀B▶ ▶A◀ 21. Drain hose



REMOVAL SERVICE POINTS

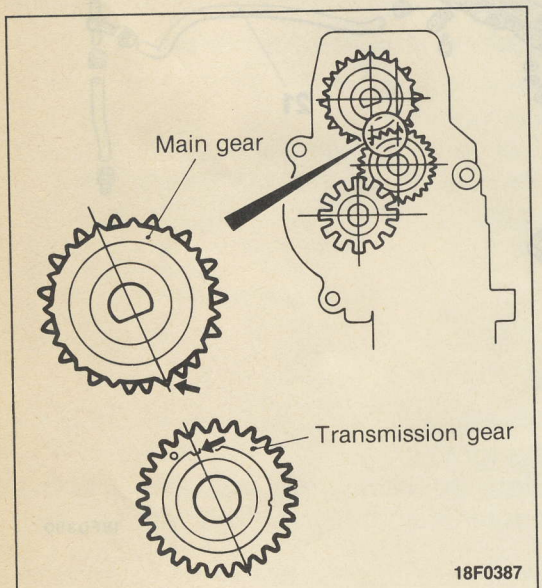
◀A▶ ROOF LID TRIM/ROOF LID REMOVAL

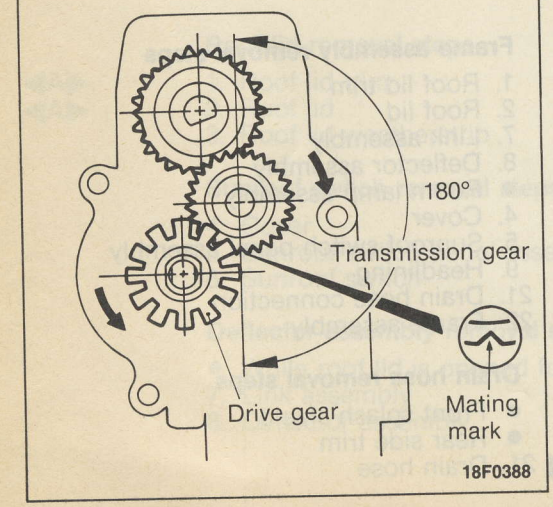
(1) Fully open the roof lid.
(2) Remove the roof lid trim.
(3) Remove the roof lid mounting nuts, and then lift up the roof lid to remove it.



◀B▶ DRAIN HOSE REMOVAL

Tie a cord to the end of the drain hose, wind tape around it so that there is no unevenness, and then pull the drain hose out from the passenger compartment.





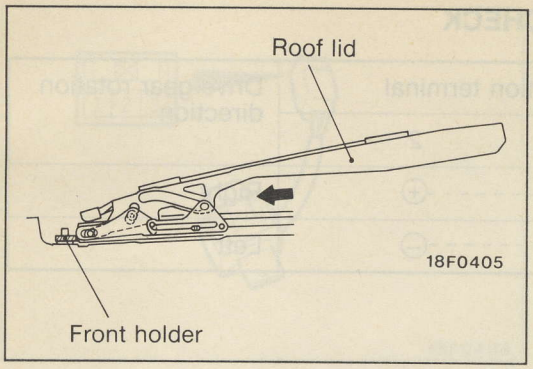
INSTALLATION SERVICE POINTS

▶A◀ DRAIN HOSE INSTALLATION

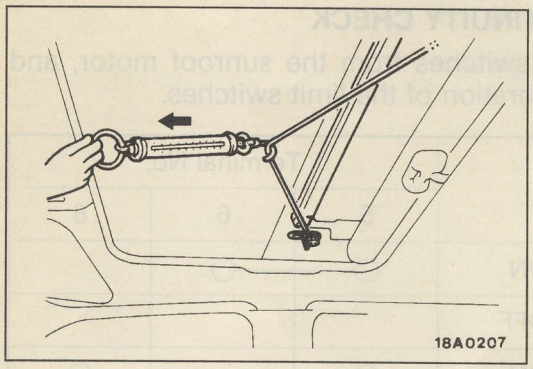
(1) Tie the end of the drain hose with the cord which was used when removing the hose, and then wind tape around it so that there is no unevenness.
(2) Pull the cord to re-route the drain hose.

▶B◀ SUNROOF MOTOR INSTALLATION

(1) Remove the cover.
(2) Align the teeth of the main gear with the notch of the transmission gear as shown in the illustration.
(3) After aligning the gears as explained in step (2), turn the drive gear in the direction indicated by the arrow to rotate the transmission gear 180°.
Check that the mating mark on the transmission gear is vertically below the centre of the transmission gear.



(4) Tilt up the roof lid and move it so that it is against the front holder.
(5) Install the sunroof motor.



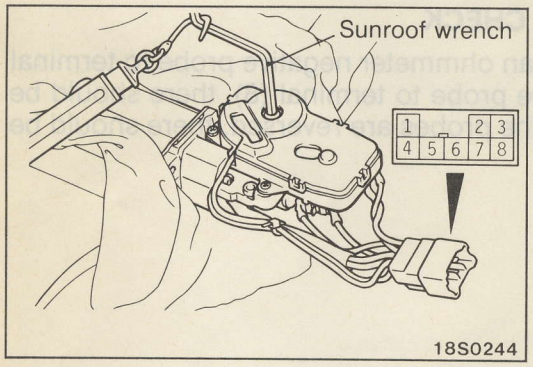
INSPECTION

SLIDING RESISTANCE OF ROOF LID CHECK

1. Remove the roof lid trim.
2. Loosen the roof lid front mounting nuts and tie a rope to them.
3. Fully close the roof lid and then remove the sunroof motor.
4. Use a spring balance to measure the sliding resistance of the roof lid glass.

   Standard value: 147 N or less

   If the sliding resistance of the roof lid is higher than the standard value, check the following.
   Lifter assembly · slider assembly installation, warping or jamming by foreign materials
   Drive cable connection
   Tilt of roof lid

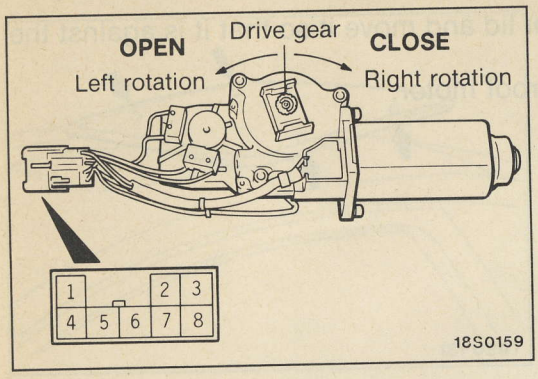


SLIDING FORCE OF SUNROOF MOTOR'S CLUTCH CHECK

1. Insert the sunroof wrench of the on-board tools into the hexagonal hole in the motor drive shaft, and hook a spring balance as shown in the illustration.
2. Apply battery voltage between terminals (1) and (2) of the sunroof motor connector to operate the motor.
3. Measure the load on the spring balance at the point where the rotation torque of the motor matches the spring force of the spring balance.

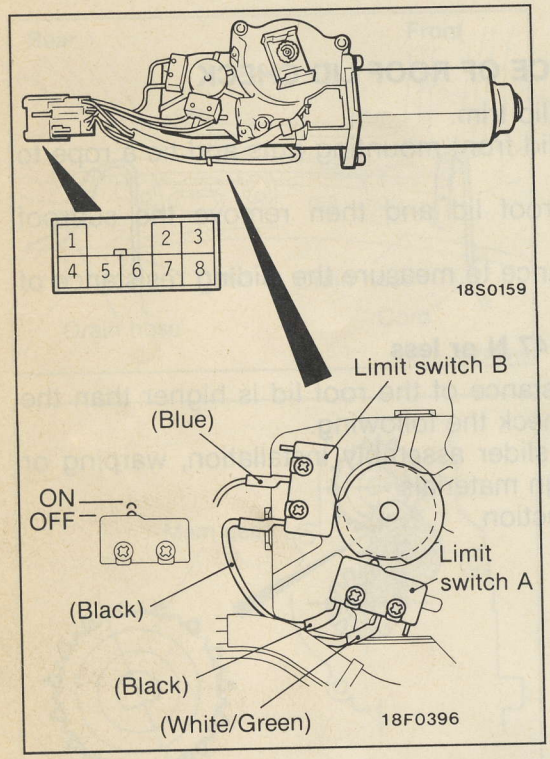
   Standard value: 39 – 49 N

   Caution
   1. The spring balance should be kept a right angle to the sunroof wrench.
   2. If a wrench other than that in the on-board tools is used, the value for the clutch sliding force will be different, so only the on-board tool should be used.
4. If the clutch sliding force is outside the standard value, replace the sunroof motor.



SUNROOF MOTOR CHECK

Battery connection terminal		Drive gear rotation direction
1	2	
⊖	⊕	Right
⊕	⊖	Left

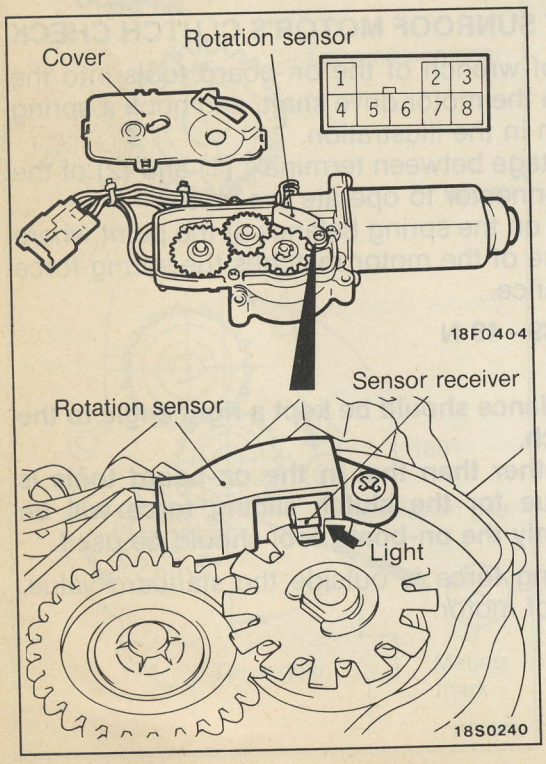


LIMIT SWITCH CONTINUITY CHECK

1. Remove the limit switches from the sunroof motor, and then check the operation of the limit switches.

Switch		Terminal No.		
		5	6	8
Limit switch A	ON	○	○	
	OFF			
Limit switch B	ON	○		○
	OFF			

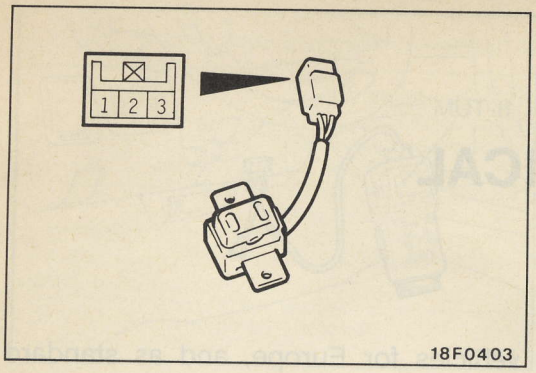
2. Check the identification colors. Then install the limit switches as shown in the illustration.



ROTATION SENSOR CHECK

1. When connecting an ohmmeter negative probe to terminal (3) and the positive probe to terminal (8), there should be continuity. When the probes are reversed, there should be no continuity.

2. Remove the cover, and then check that there is no continuity when connecting the negative probe to terminal (7) and the positive probe to terminal (8). Also check that there is continuity when the probes are connected to the same terminals and light is shined onto the sensor receiver.



SUNROOF SWITCH CONTINUITY CHECK

Switch position	Terminal No.		
	1	2	3
Open	○	○	
OFF			
Close		○	○

GROUP 54
CHASSIS ELECTRICAL

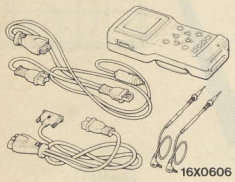
GENERAL

OUTLINE OF CHANGE

- An immobilizer system has been provided as an option in vehicles for Europe, and as standard equipment in vehicles for Australia.

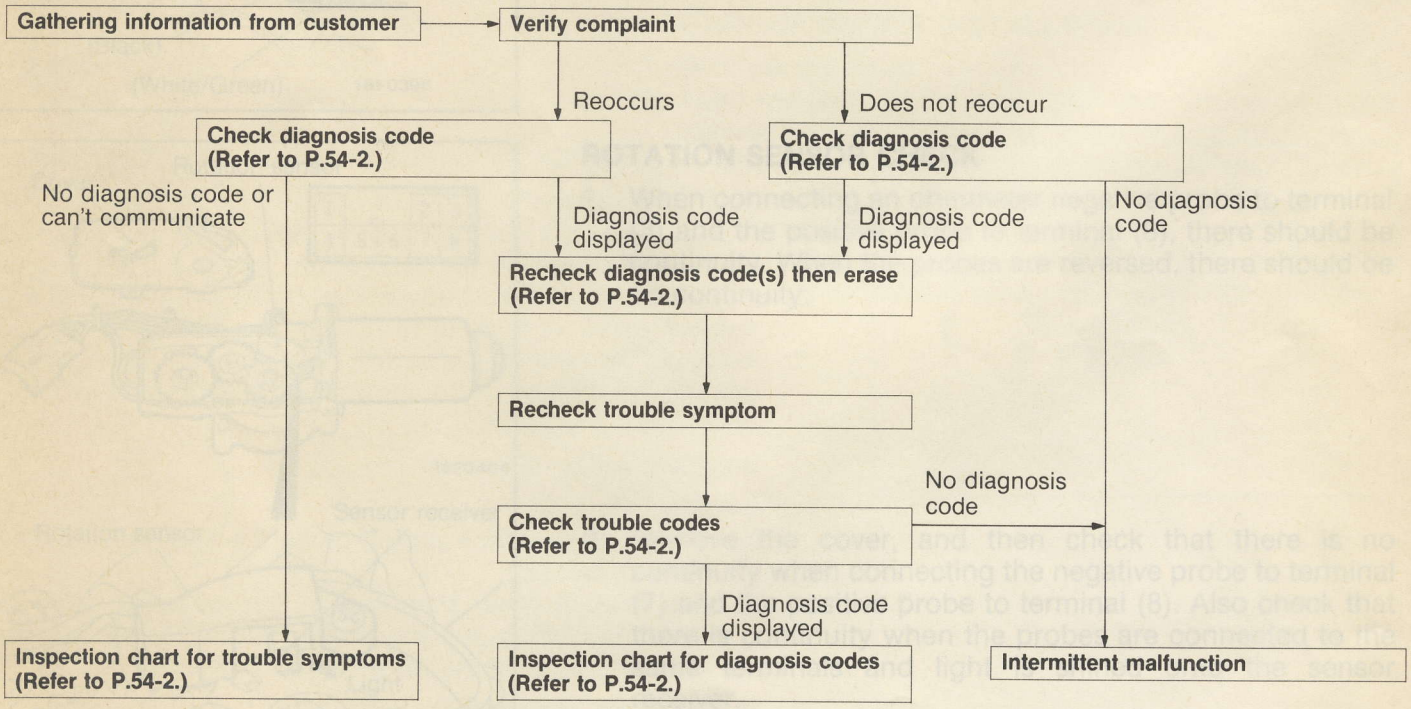
IGNITION SWITCH AND IMMOBILIZER SYSTEM

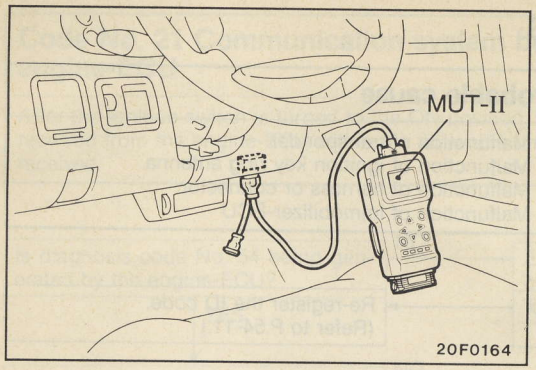
SPECIAL TOOL

Tool	Number	Name	Use
 16X0606	MB991502	MUT-II sub assembly	• Checking the immobilizer system (diagnosis display using the MUT-II) • Registering ID codes for the immobilizer system

TROUBLESHOOTING

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING





DIAGNOSIS FUNCTION

DIAGNOSIS CODES CHECK

Connect the MUT-II to the diagnosis connector (16-pin) at the lower of the instrument under cover, then check diagnosis codes.

ERASING DIAGNOSIS CODES

Connect the MUT-II to the diagnosis connector (16-pin) then erase the diagnosis codes.

Caution
The diagnosis trouble codes which result from disconnecting the battery cables cannot be erased.

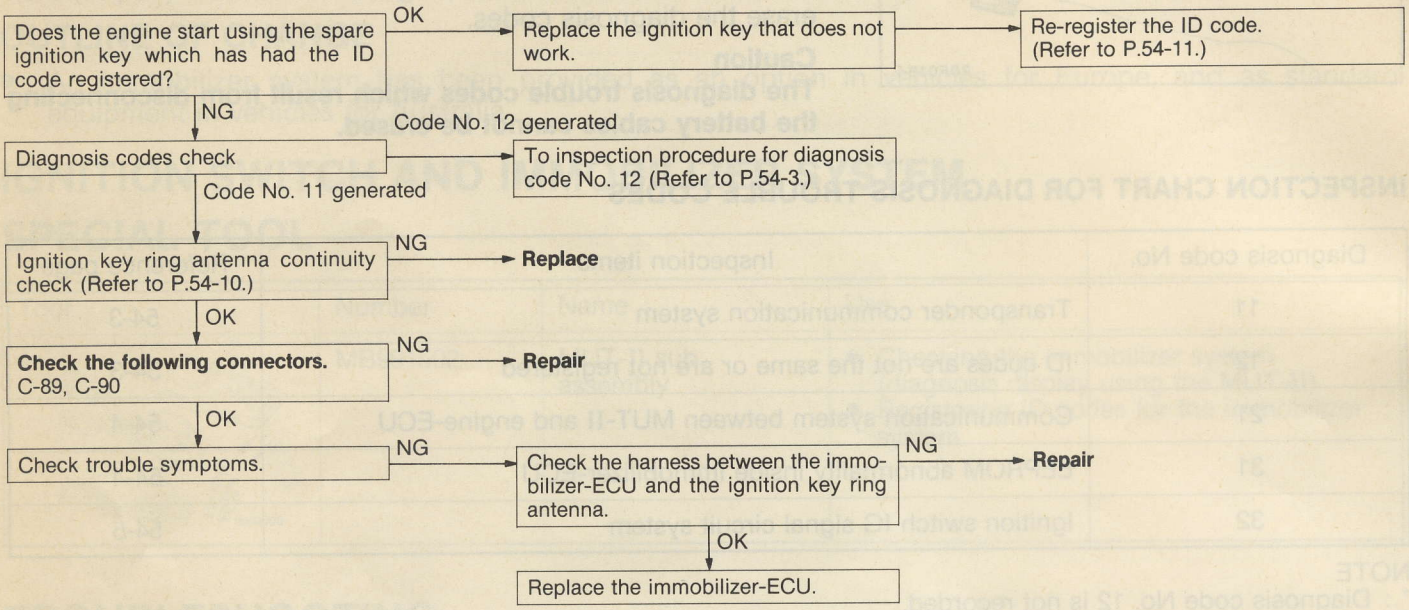
INSPECTION CHART FOR DIAGNOSIS TROUBLE CODES

Diagnosis code No.	Inspection items	Reference page
11	Transponder communication system	54-3
12*	ID codes are not the same or are not registered	54-3
21	Communication system between MUT-II and engine-ECU	54-4
31	EEPROM abnormality inside immobilizer-ECU	54-4
32	Ignition switch IG signal circuit system	54-5

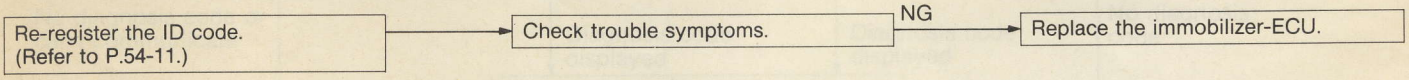
NOTE
* : Diagnosis code No. 12 is not recorded.

INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE CODES

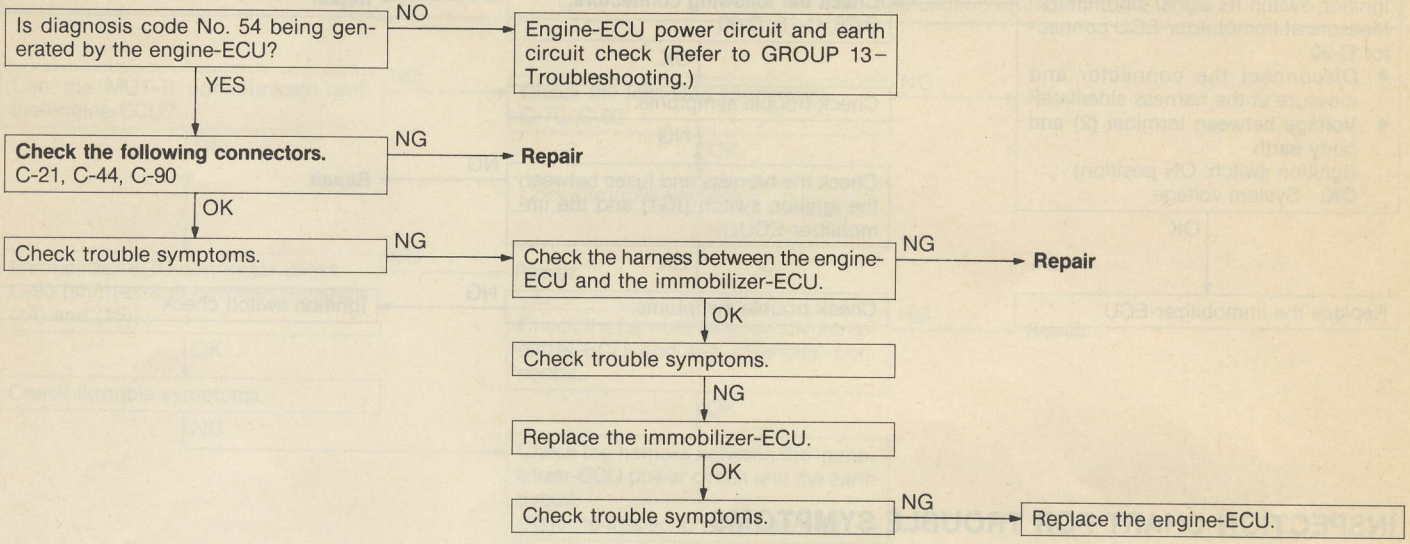
Code No. 11 Transponder communication system	Probable cause
The ID code of the transponder is not sent to the immobilizer-ECU immediately after the ignition switch is turned to the ON position.	• Malfunction of transponder • Malfunction of ignition key ring antenna • Malfunction of harness or connector • Malfunction of immobilizer-ECU



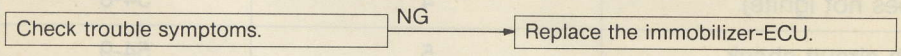
Code No. 12 ID codes are not the same or are not registered	Probable cause
The ID code which is sent from the transponder is not the same as the ID code which is registered in the immobilizer-ECU.	• The ID code in the ignition key being used has not been properly registered. • Malfunction of immobilizer-ECU



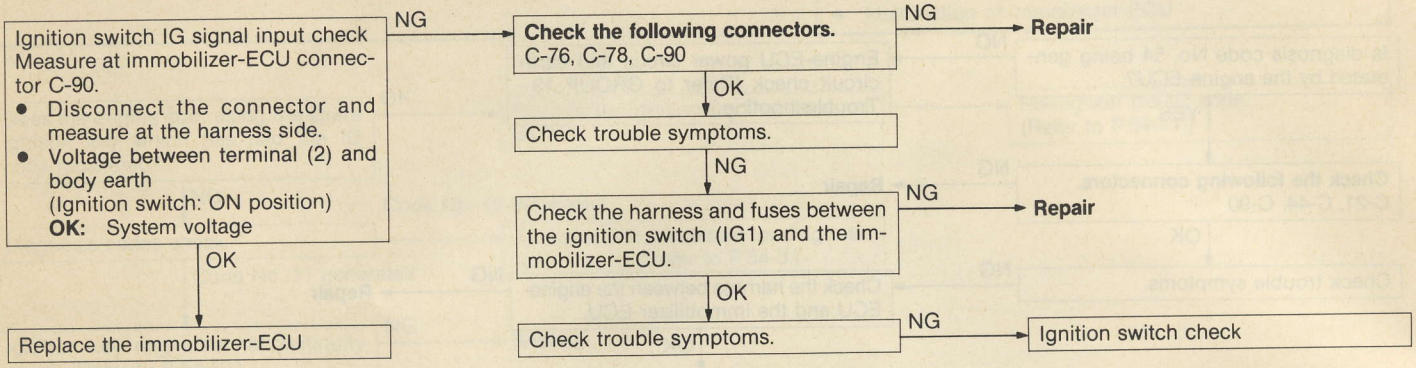
Code No. 21 Communication system between MUT-II and engine-ECU	Probable cause
After the ignition switch is turned to the ON position, the confirmation code is not received from the engine-ECU within the allowable time, or an abnormal code is received.	• Malfunction of harness or connector • Malfunction of engine-ECU • Malfunction of immobilizer-ECU



Code No. 31 EEPROM abnormality inside immobilizer-ECU	Probable cause
No data has been written to the EEPROM inside the immobilizer-ECU.	• Malfunction of immobilizer-ECU



Code No. 32 Ignition switch IG signal circuit system	Probable cause
The ignition switch signal is not being input to the immobilizer-ECU.	• Malfunction of harness or connector • Malfunction of ignition switch • Malfunction of immobilizer-ECU



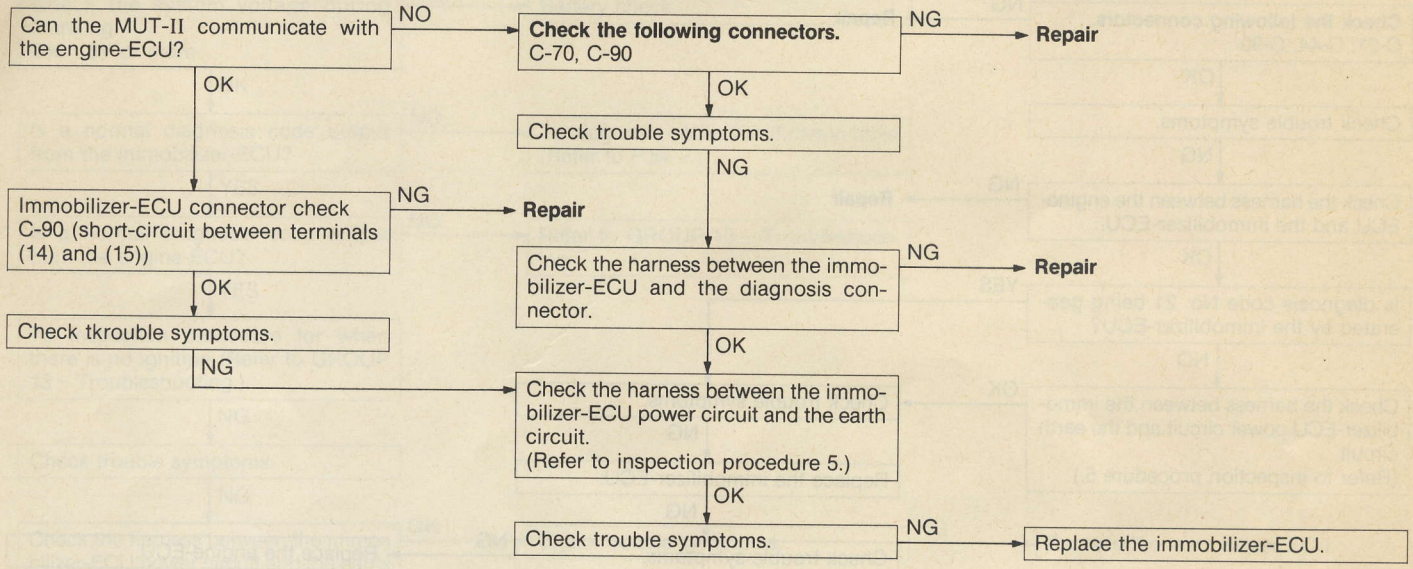
INSPECTION CHART FOR TROUBLE SYMPTOMS

Trouble symptom	Inspection procedure No.	Reference page
Communication with the MUT-II is not possible	1	54-6
Diagnosis code No. 54 has been generated by the engine-ECU	2	54-7
ID code cannot be registered using the MUT-II	3	54-7
Engine does not start (turns over but does not ignite)	4	54-8
Immobilizer-ECU power circuit and earth circuit check	5	54-9

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

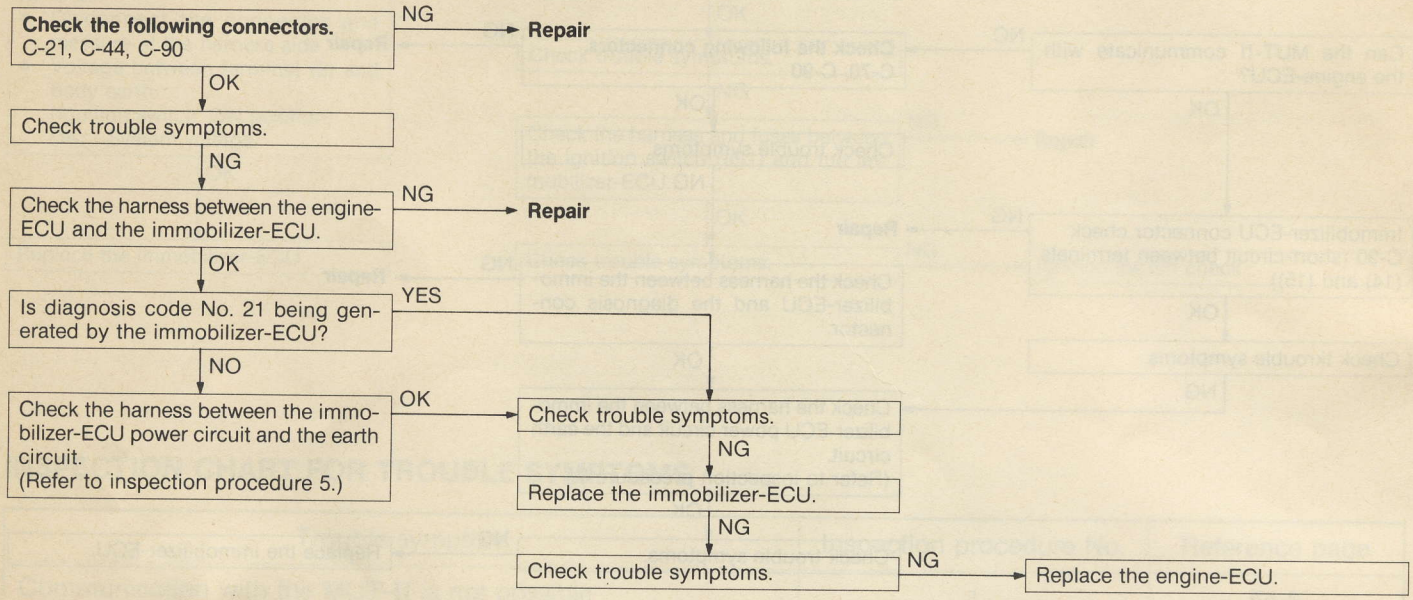
Inspection Procedure 1

Communication with the MUT-II is not possible.	Probable cause
The cause is probably a malfunction of the diagnosis line or the immobilizer-ECU is not functioning.	• Malfunction of diagnosis line • Malfunction of harness or connector • Malfunction of immobilizer-ECU



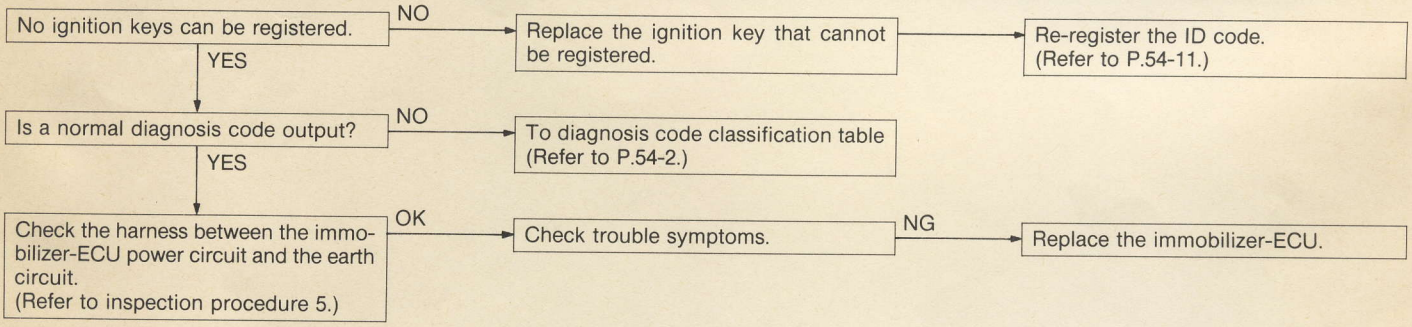
Inspection Procedure 2

Diagnosis code No. 54 has been generated by the engine-ECU.	Probable cause
There is a problem with communication between the engine-ECU and the immobilizer-ECU.	• Malfunction of harness or connector • Malfunction of immobilizer-ECU • Malfunction of engine-ECU



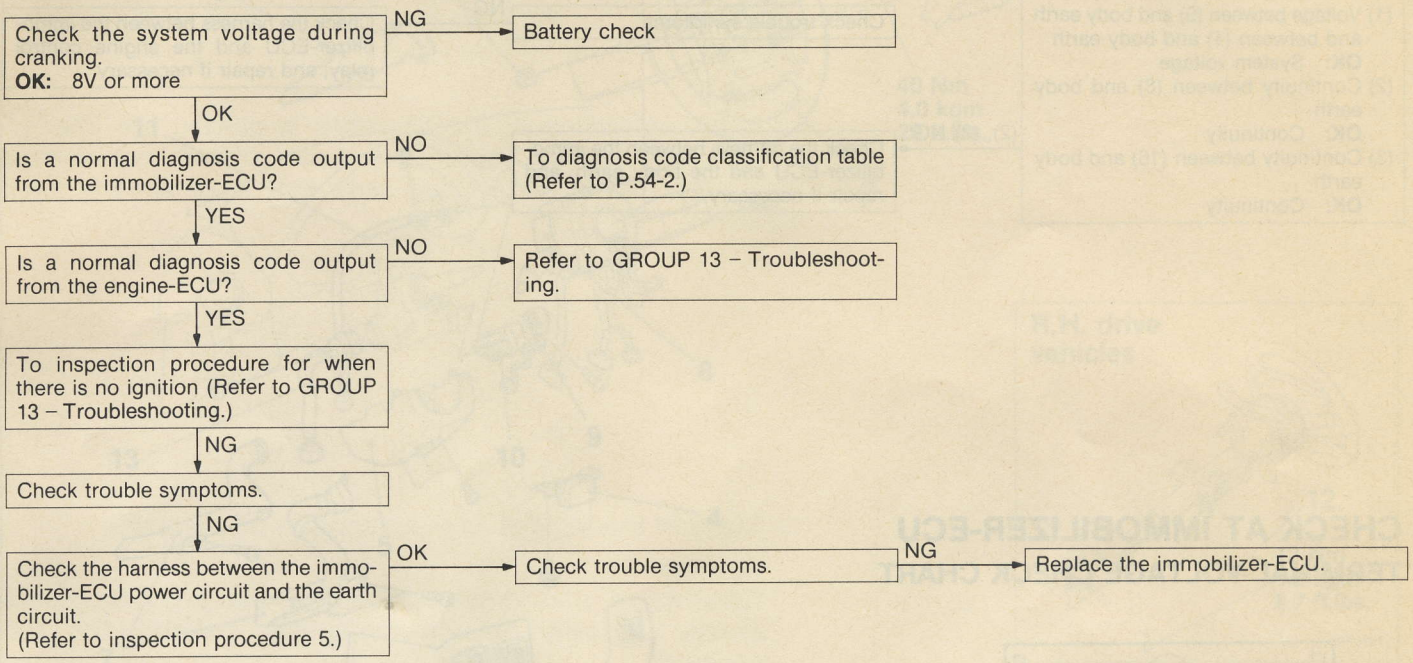
Inspection Procedure 3

ID code cannot be registered using the MUT-II.	Probable cause
The cause is probably that the immobilizer-ECU cannot read the ID code, or there is a malfunction of the immobilizer-ECU.	• Malfunction of transponder • Malfunction of ignition key ring antenna • Malfunction of harness or connector • Malfunction of immobilizer-ECU



Inspection Procedure 4

Engine does not start (turns over but does not ignite)	Probable cause
If the fuel injectors are not operating, there might be a problem with the MPI 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 MPI system • Malfunction of immobilizer system



Inspection Procedure 5

Immobilizer-ECU power circuit and earth circuit check

Measure at immobilizer-ECU connector C-90.
- Disconnect the connector and measure at the harness side.

(1) Voltage between (9) and body earth and between (1) and body earth
OK: System voltage
(2) Continuity between (8) and body earth
OK: Continuity
(3) Continuity between (16) and body earth
OK: Continuity

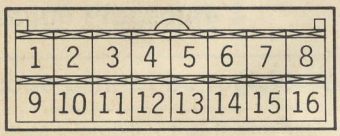
(1) NG → **Check the following connectors.** C-21, C-60, C-90 → NG → **Repair**

Check the following connectors. C-21, C-60, C-90 → OK → Check trouble symptoms. → NG → Check the harness between the immobilizer-ECU and the engine control relay, and repair if necessary.

(2), (3) NG → Check the harness between the immobilizer-ECU and the body earth, and repair if necessary.

CHECK AT IMMOBILIZER-ECU

TERMINAL VOLTAGE CHECK CHART



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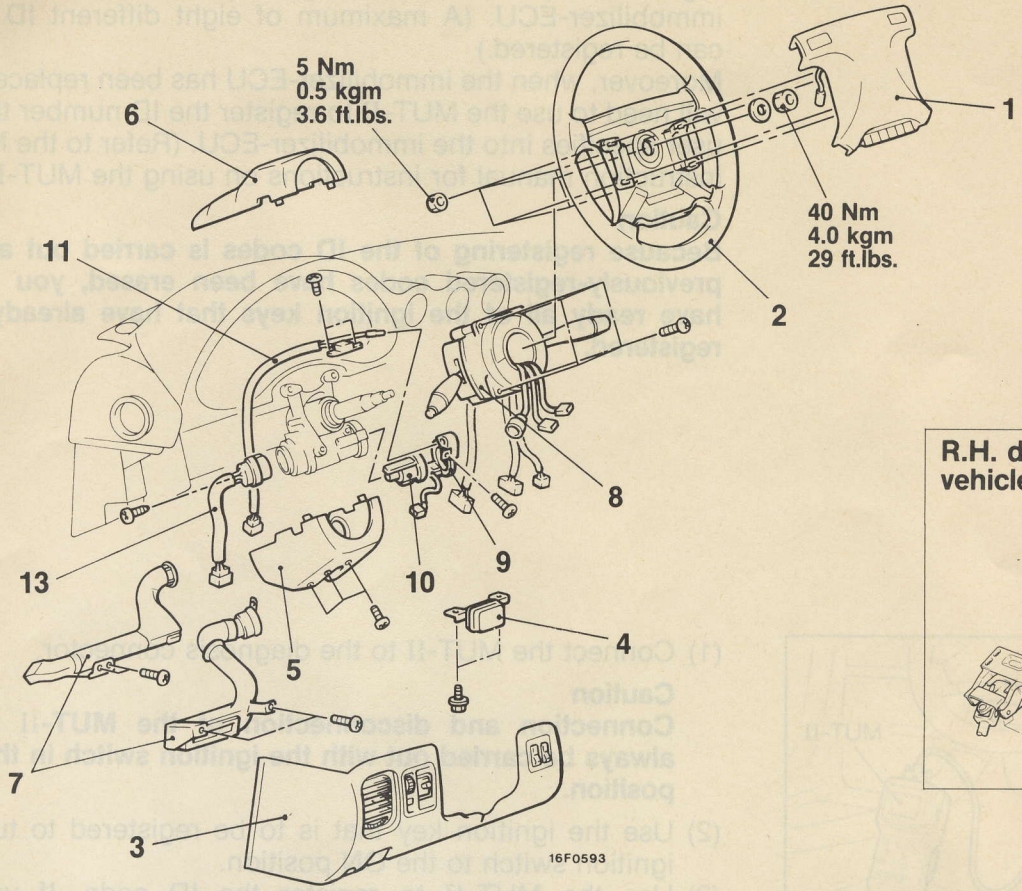
Terminal No.	Signal	Check requirements	Terminal voltage
1	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
2	Ignition switch-IG	Ignition switch: OFF	0V
		Ignition switch: ON	System voltage
8	Immobilizer-ECU earth	—	0V
9	Immobilizer-ECU power supply	Ignition switch: ON	System voltage
16	Immobilizer-ECU earth	—	0V

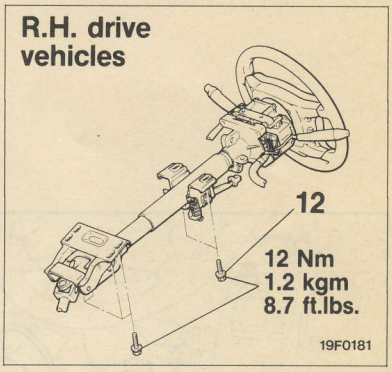
IGNITION SWITCH

REMOVAL AND INSTALLATION

CAUTION: SRS
Before removal of air bag module, refer to GROUP 52B – SRS Service Precautions and Air Bag Module and Clock Spring.

L.H. drive vehicles





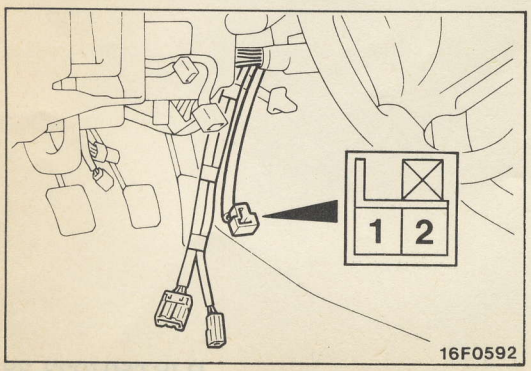
Ignition switch segment removal steps

3. Knee protector (Refer to GROUP 52A – Instrument Panel.)
4. Immobilizer-ECU
5. Column cover lower
6. Column cover upper
7. Lap cooler duct and foot shower duct
11. Key reminder switch segment
12. Steering column mounting bolt*2
13. Ignition switch segment

Steering lock cylinder removal steps

1. Air bag module*1 (Refer to GROUP 52B – Air Bag Module and Clock Spring.)
2. Steering wheel*1
3. Knee protector (Refer to GROUP 52A – Instrument Panel.)
5. Column cover lower
6. Column cover upper
7. Lap cooler duct and foot shower duct
8. Column switch and clock spring assembly*1
9. Ignition key illumination ring
10. Steering lock cylinder

NOTE
(1) *1 : Removal for LH drive vehicles only
(2) *2 : Removal for RH drive vehicles only
(3) Removal and installation service points are the same as before.



INSPECTION

Items other than the one below are the same as before.

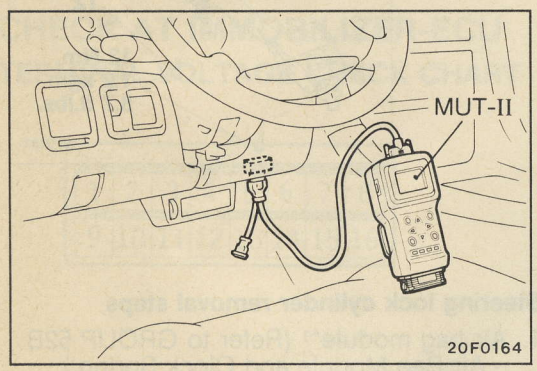
IGNITION KEY RING ANTENNA CONTINUITY CHECK

Use a circuit tester to check the continuity between the terminals.

ID CODE REGISTRATION METHOD

If using an ignition key that has just been newly purchased, or if the immobilizer-ECU has been replaced, you will need to register the ID codes for each ignition key being used into the immobilizer-ECU. (A maximum of eight different ID codes can be registered.)
Moreover, when the immobilizer-ECU has been replaced, you will need to use the MUT-II to register the ID number that the user specifies into the immobilizer-ECU. (Refer to the MUT-II instruction manual for instructions on using the MUT-II.)

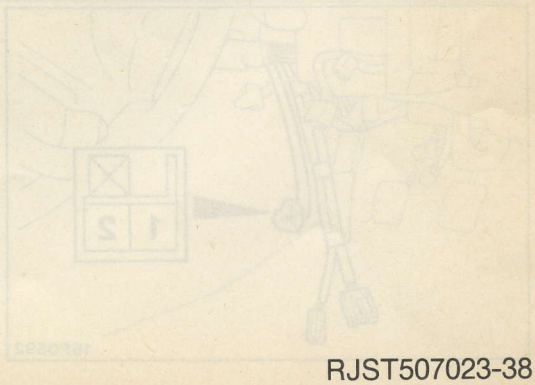
Caution
Because registering of the ID codes is carried out after all previously-registered codes have been erased, you should have ready all of the ignition keys that have already been registered.



(1) Connect the MUT-II to the diagnosis connector.

Caution
Connection and disconnection of the MUT-II should always be carried out with the ignition switch in the OFF position.

(2) Use the ignition key that is to be registered to turn the ignition switch to the ON position.
(3) Use the MUT-II to register the ID code. If you are registering two or more keys, use the next key to be registered to turn the ignition switch to the ON position without disconnecting the MUT-II.
(4) Disconnect the MUT-II. This completes the registration operation.



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