

HEATER, AIR CONDITIONER AND VENTILATION <AUTOMATIC A/C>

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HEATER, AIR CONDITIONER AND VENTILATION <AUTOMATIC A/C>

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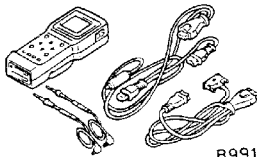
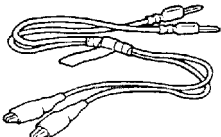

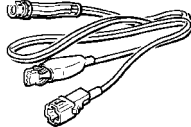


SERVICE SPECIFICATIONS

| Item | | | Standard value |
|--|---------------------------|-----------------------------------|---------------------|
| Resistance value of the potentiometer for the air mix damper (front A/C) kΩ | | | Approx. 0.96 - 5.76 |
| Resistance value of the potentiometer for the air outlet changeover damper (front A/C) kΩ | | | Approx. 0.96 - 5.76 |
| Resistance of the rear air conditioner switch (temperature control switch) <except rear heater (floor console)> kΩ | | | 0 - 3 |
| Resistance of the potentiometer for the air mix damper <Rear heater, dual A/C> kΩ | | | 1.2 - 4.8 |
| Resistance value of the resistor (rear A/C) Ω | Between terminals 1 and 6 | | 4.9 ± 7 % |
| | Between terminals 1 and 3 | | 1.25 ± 7% |
| Air compressor air gap mm | | | 0.35 - 0.65 |
| Idle speed r/min (N or P range) | Petrol | | 600 ± 50 |
| Idle-up speed r/min (N or P range) | Petrol | When the A/C is under low load | 700 ± 50 |
| | | When the A/C is under medium load | 800 ± 50 |
| | | When the A/C is under high load | 1,000 ± 50 |

LUBRICANTS

| Item | | Brand | Quantity |
|-------------------|--|------------------|--------------|
| Compressor oil ml | Single A/C <except vehicles with rear cooler> | DENSO OIL 8 | 120 \pm 20 |
| | Single air conditioner <vehicles with rear cooler>, dual air conditioner | DENSO OIL 8 | 140 \pm 20 |
| Pipe connections | | DENSO OIL 8 | As required |
| Refrigerant g | Single A/C <except vehicles with rear cooler> | R134a (HFC-134a) | 500 \pm 20 |
| | Single air conditioner <vehicles with rear cooler>, dual air conditioner | R134a (HFC-134a) | 780 \pm 20 |

SPECIAL TOOLS

| Tools | No. | Name | Application |
|---|--|---|---|
|  B991502 | MB991502 | MUT-II sub assembly | Front A/C check |
|  B991529 | MB991529 | Diagnosis code checking harness | Check of the full-automatic air conditioner by using a voltmeter |
| <div>A</div>  <div>B</div>  <div>C</div>  <div>D</div>  C991223 | MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 | Harness set A: Check harness B: LED harness C: LED harness adapter D: Probe | Continuity check and voltage measurement at harnesses or connector A: For checking connector pin contact pressure B: For checking the power supply circuit C: For checking the power supply circuit D: For connecting commercial tester |

TROUBLESHOOTING <FRONT A/C>

DIAGNOSIS TROUBLESHOOTING FLOW

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

DIAGNOSIS FUNCTION

METHOD OF READING DIAGNOSIS CODES

Connect the MUT-II to the 16-pin diagnosis connector.

(Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

METHOD OF ERASING DIAGNOSIS CODES

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

INSPECTION CHART FOR DIAGNOSIS CODES

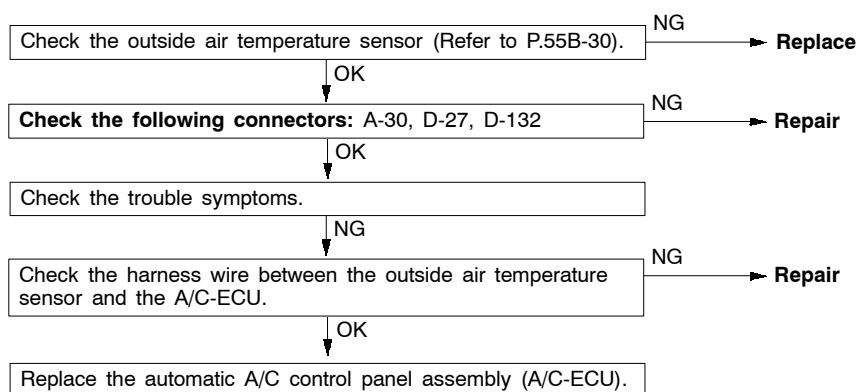
| Code No. | Diagnosis item | Reference page |
|----------|---|----------------|
| 11 | Inside air temperature sensor system (open circuit) | 55B-4 |
| 12 | Inside air temperature sensor system (short circuit) | 55B-4 |
| 13 | Outside air temperature sensor system (open circuit) | 55B-4 |
| 14 | Outside air temperature sensor system (short circuit) | 55B-4 |
| 15 | Heater water temperature sensor system (open circuit) | 55B-5 |
| 16 | Heater water temperature sensor system (short circuit) | 55B-5 |
| 21 | Air thermo sensor system (open circuit) | 55B-5 |
| 22 | Air thermo sensor system (short circuit) | 55B-5 |
| 31 | Potentiometer system for the air mix damper | 55B-6 |
| 32 | Potentiometer system for the air outlet changeover damper | 55B-7 |

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

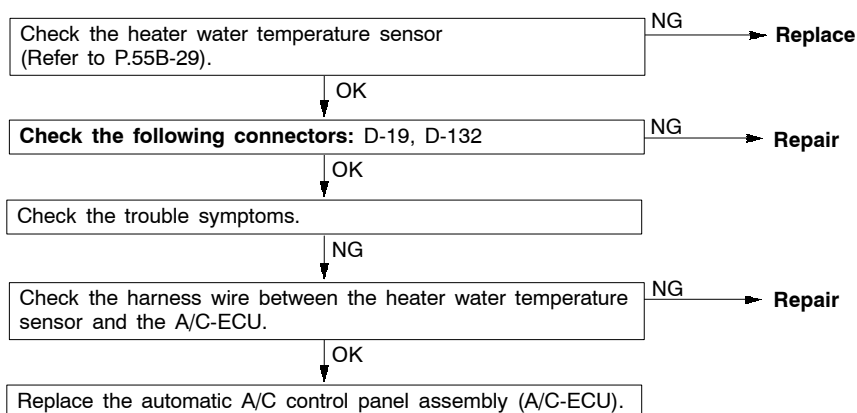
| Code No.11, 12 Inside air temperature sensor system | Probable cause |
|--|----------------------------|
| Code No.11 is set when the inside air temperature circuit inside the A/C-ECU is open. Meanwhile, code No.12 is set when it is short. | Malfunction of the A/C-ECU |

Replace the automatic A/C control panel assembly (A/C-ECU).

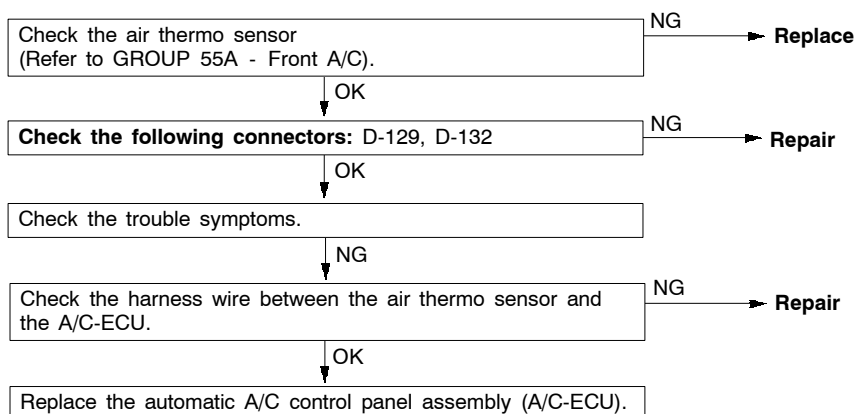
| Code No.13, 14 Outside air temperature sensor system | Probable cause |
|---|--|
| Code No.13 is set when the outside air temperature sensor circuit is open. Meanwhile, code No.14 is set when it is short. | <ul style="list-style-type: none"> Malfunction of the outside air temperature sensor Malfunction of connector or harness Malfunction of the A/C-ECU |



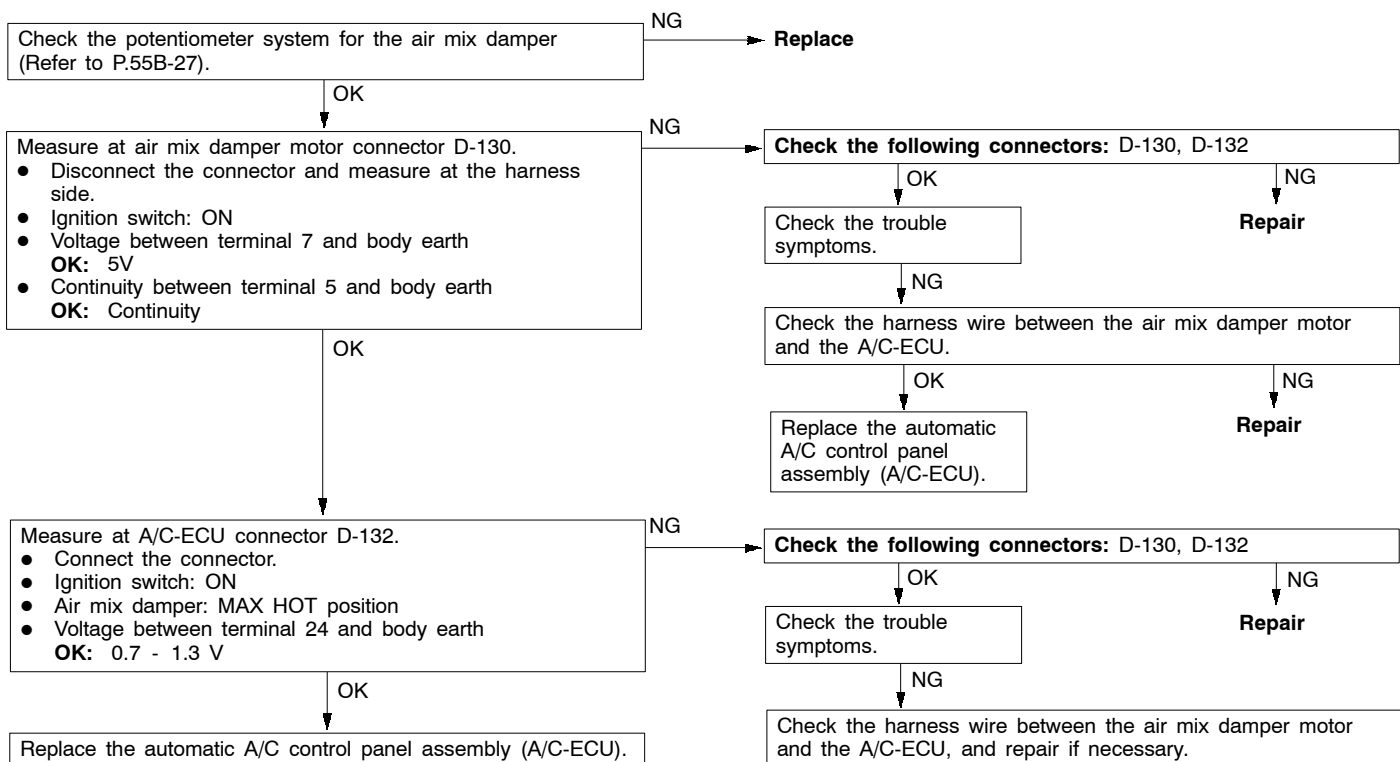
| Code No.15, 16 Heater water temperature sensor system | Probable cause |
|--|---|
| Code No.15 is output when the heater water temperature sensor circuit is open. Code No.16 is output when that circuit is short. | <ul style="list-style-type: none"> ● Malfunction of the heater water temperature sensor ● Malfunction of connector or harness ● Malfunction of the A/C-ECU |



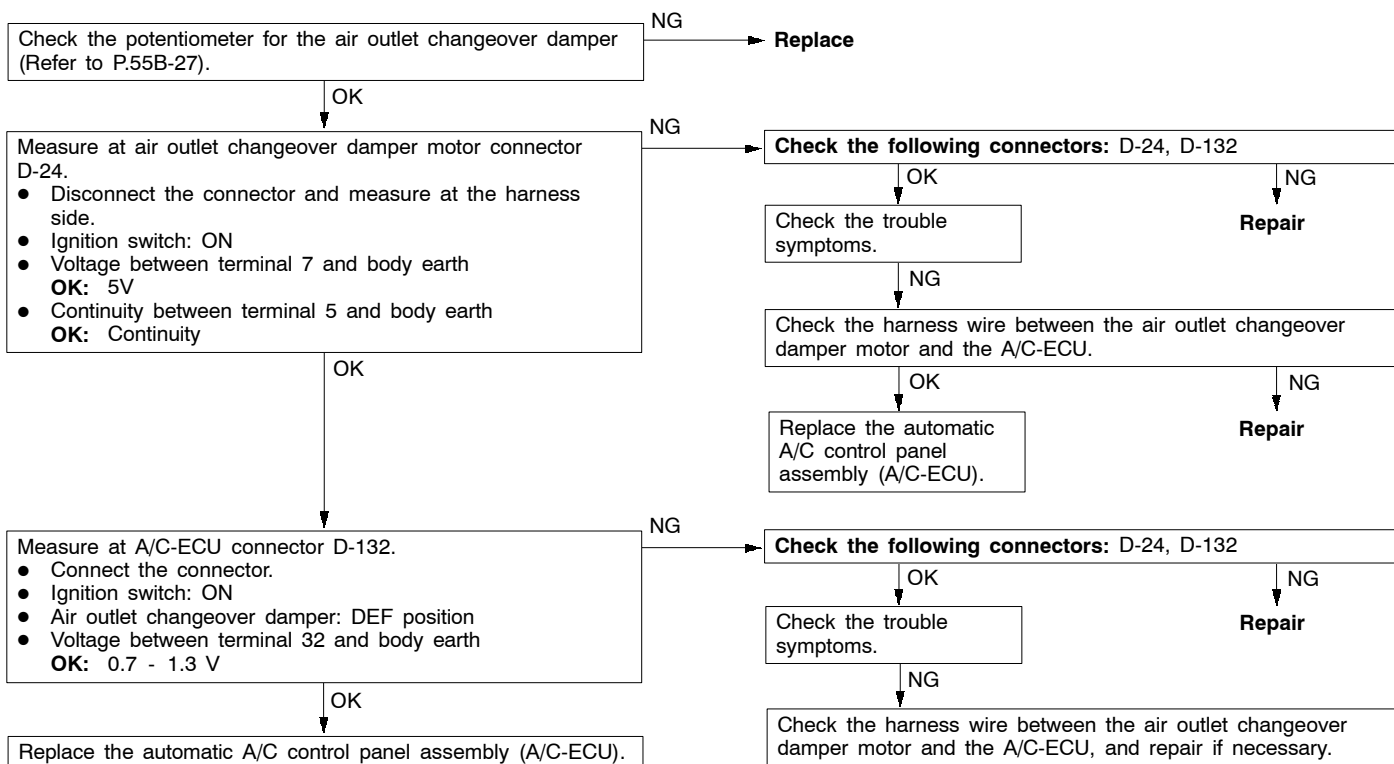
| Code No.21, 22 Air thermo sensor system | Probable cause |
|--|---|
| Code No.21 is set when the air thermo sensor circuit is open. Meanwhile, code No.22 is set when it is short. | <ul style="list-style-type: none"> ● Malfunction of the air thermo sensor ● Malfunction of connector or harness ● Malfunction of the A/C-ECU |



| Code No.31 Potentiometer system for the air mix damper | Probable cause |
|--|---|
| This diagnosis code is set when the potentiometer for the air mix damper does not send any signal to the A/C-ECU due to short or open circuit. | <ul style="list-style-type: none"> • Malfunction of the potentiometer system for the air mix damper • Malfunction of connector or harness • Malfunction of the A/C-ECU |



| Code No.32 Potentiometer system for the air outlet changeover damper | Probable cause |
|--|--|
| This diagnosis code is set when the potentiometer for the air outlet changeover damper does not send any signal to the A/C-ECU due to open or short circuit. | <ul style="list-style-type: none"> • Malfunction of the potentiometer for the air outlet changeover damper • Malfunction of connector or harness • Malfunction of the A/C-ECU |



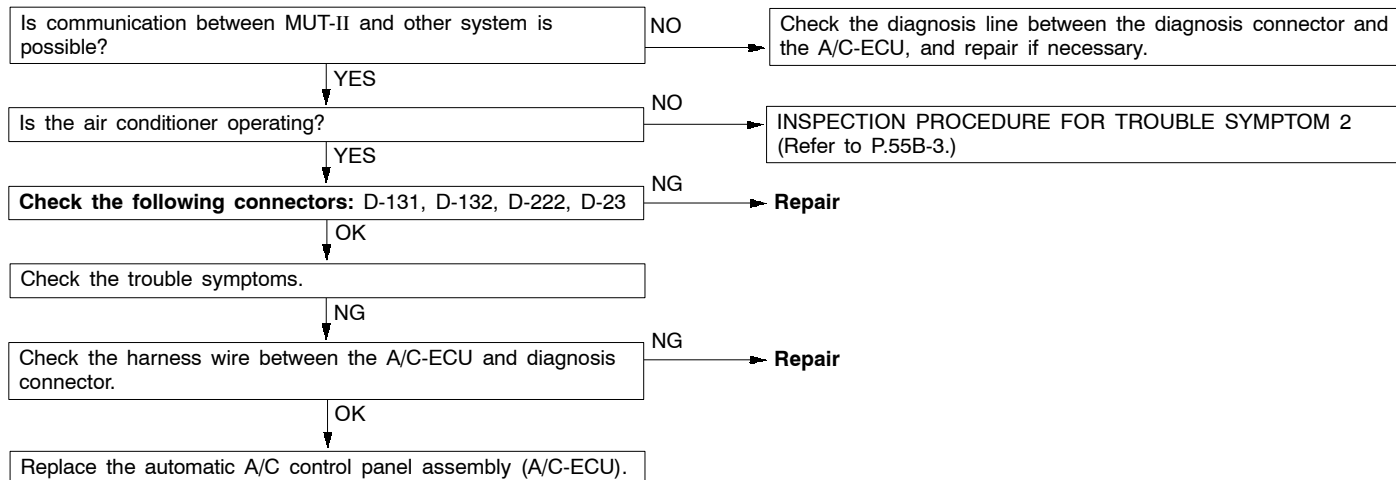
INSPECTION CHART FOR TROUBLE SYMPTOMS

| Trouble symptom | Inspection procedure No. | Reference page |
|---|--------------------------|----------------|
| Communication with MUT-II is impossible. | 1 | 55B-8 |
| The air conditioner does not operate at all. | 2 | 55B-9 |
| The air conditioner display does not appear on the center display screen. | 3 | 55B-9 |
| A/C outlet air temperature can not be set. | 4 | 55B-10 |
| The blower does not operate. | 5 | 55B-11 |
| The blower air volume can not be changed. | 6 | 55B-12 |
| Air outlet vent cannot be changed. | 7 | 55B-12 |
| Inside/outside air changeover is not possible. | 8 | 55B-13 |
| The rear defogger does not operate. | 9 | 55B-14 |
| The condenser fan does not operate <except 4D56>. | 10 | 55B-15 |
| The condenser fan does not operate <4D56>. | 11 | 55B-16 |

INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS

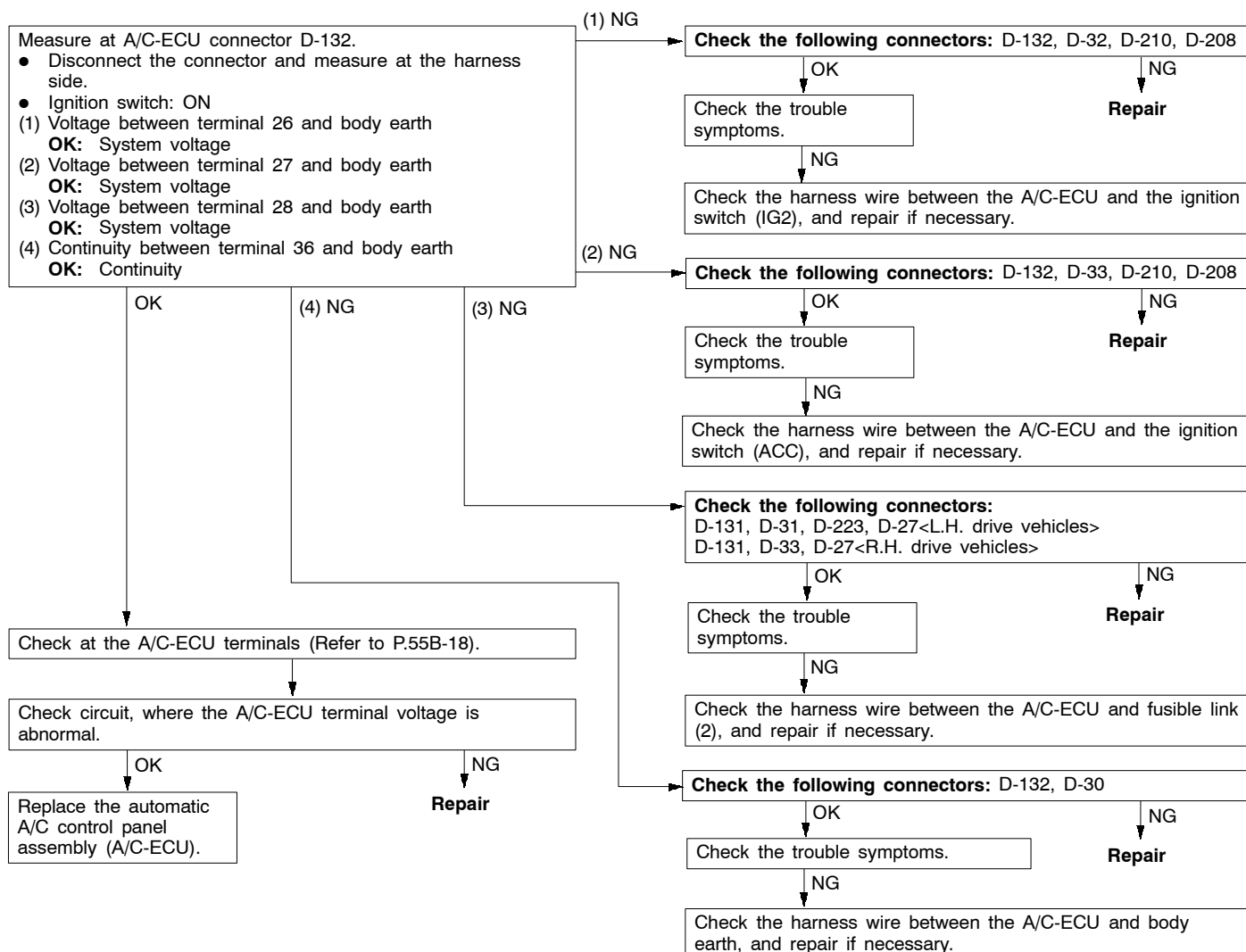
Inspection procedure 1

| Communication with the MUT-II is not possible. | Probable cause |
|--|---|
| If communication with all other systems is not possible, there is a high possibility that there is a malfunction of the diagnosis line. If only the A/C system can not communicate with the MUT-II, the diagnosis line between the diagnosis connector and the A/C-ECU may be defective. | <ul style="list-style-type: none"> • Malfunction of harness or connector • Malfunction of the A/C-ECU |



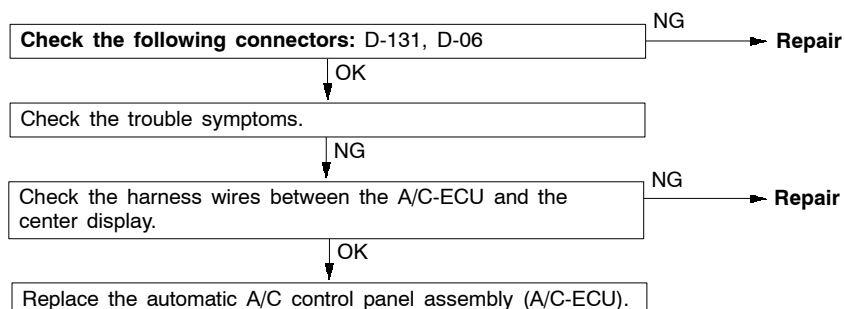
Inspection procedure 2

| The air conditioner does not operate at all. | Probable cause |
|---|---|
| The power supply system (including earth) for the A/C-ECU may be defective. In addition, the A/C-ECU may be inoperative due to a defective harness (such as short). | <ul style="list-style-type: none"> Malfunction of harness or connector Malfunction of the A/C-ECU |



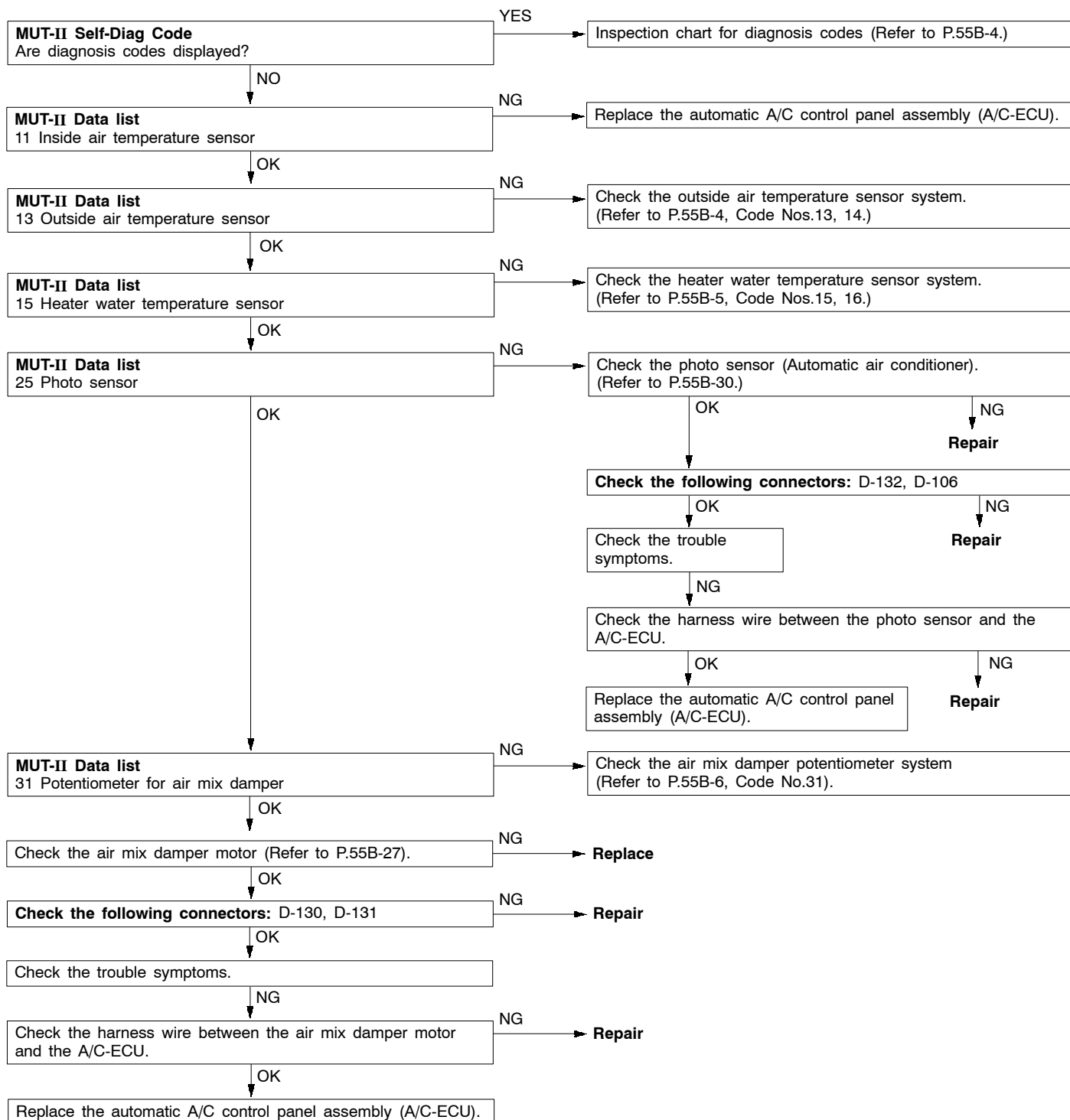
Inspection procedure 3

| The air conditioner display does not appear on the center display screen. | Probable cause |
|--|---|
| Check the harness wires between the A/C-ECU and the center display, and repair if necessary. | <ul style="list-style-type: none"> Malfunction of harness or connector Malfunction of the A/C-ECU |



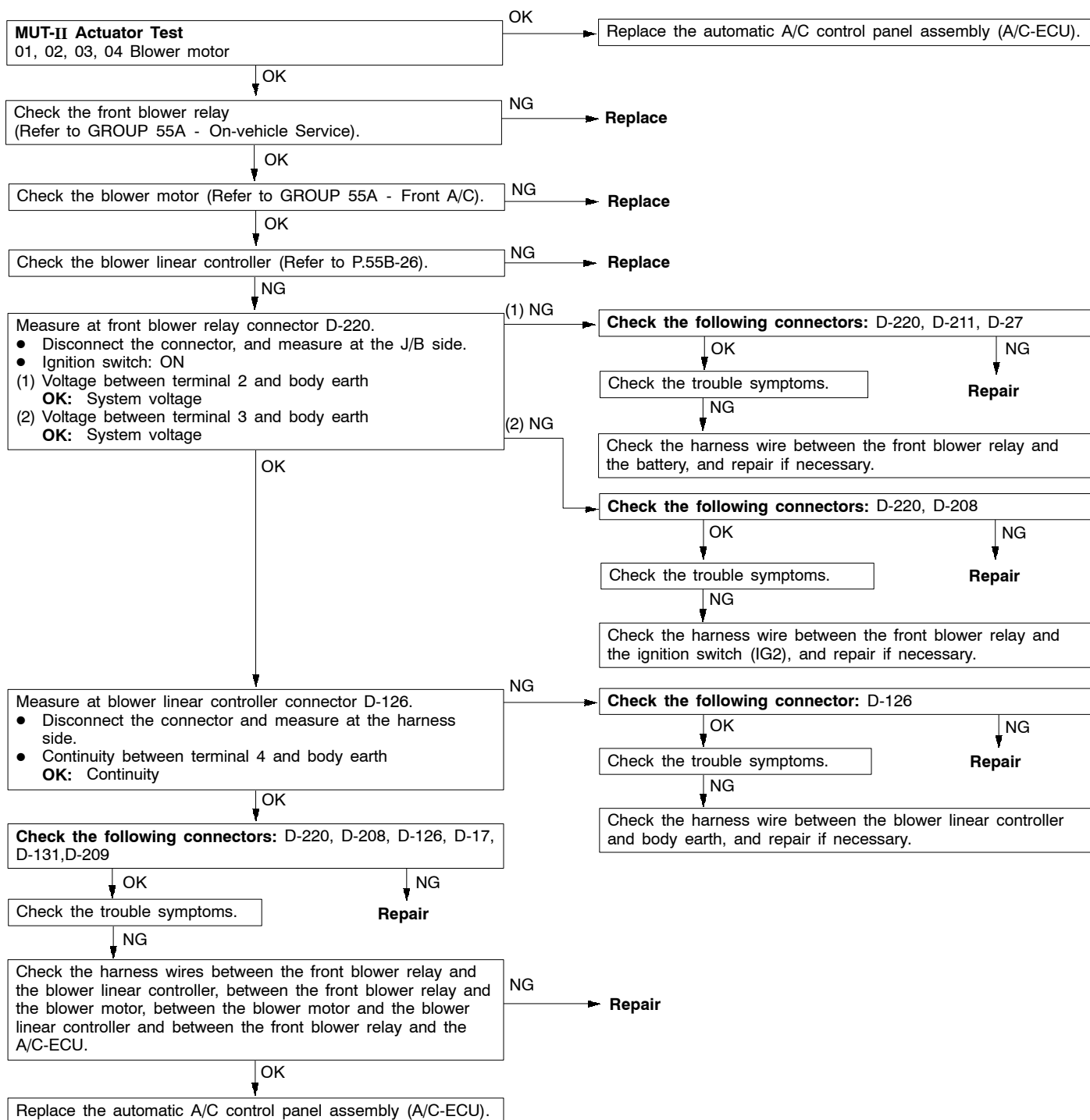
Inspection procedure 4

| A/C outlet air temperature can not be set. | Probable cause |
|--|---|
| If the air outlet temperature can not be changed after a A/C temperature is set, sensor(s) or the air mix damper may be defective. | <ul style="list-style-type: none"> • Malfunction of the inside air temperature sensor • Malfunction of the outside air temperature sensor • Malfunction of the heater water temperature sensor • Malfunction of the photo sensor • Malfunction of the electric motor for the air mix damper • Malfunction of harness or connector • Malfunction of the A/C-ECU |



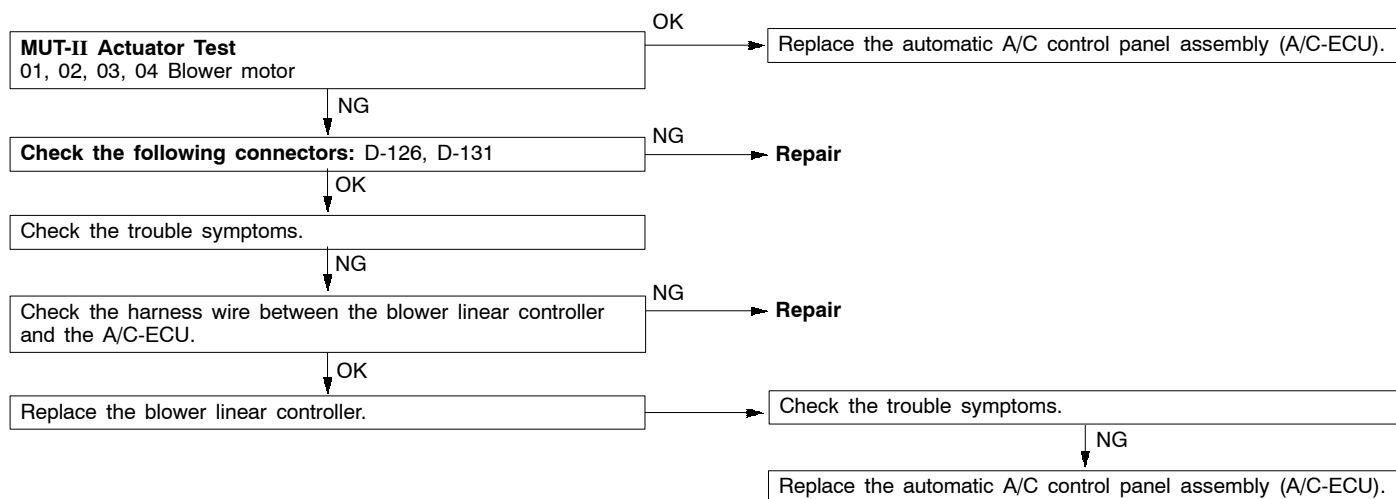
Inspection procedure 5

| The blower does not operate. | Probable cause |
|---|--|
| If no air comes out of the blower even though the blower switch is on, the cause is probably a malfunction of the front blower relay circuit. | <ul style="list-style-type: none"> • Malfunction of the front blower relay • Malfunction of the blower linear controller • Malfunction of the blower motor • Malfunction of harness or connector • Malfunction of the A/C-ECU |



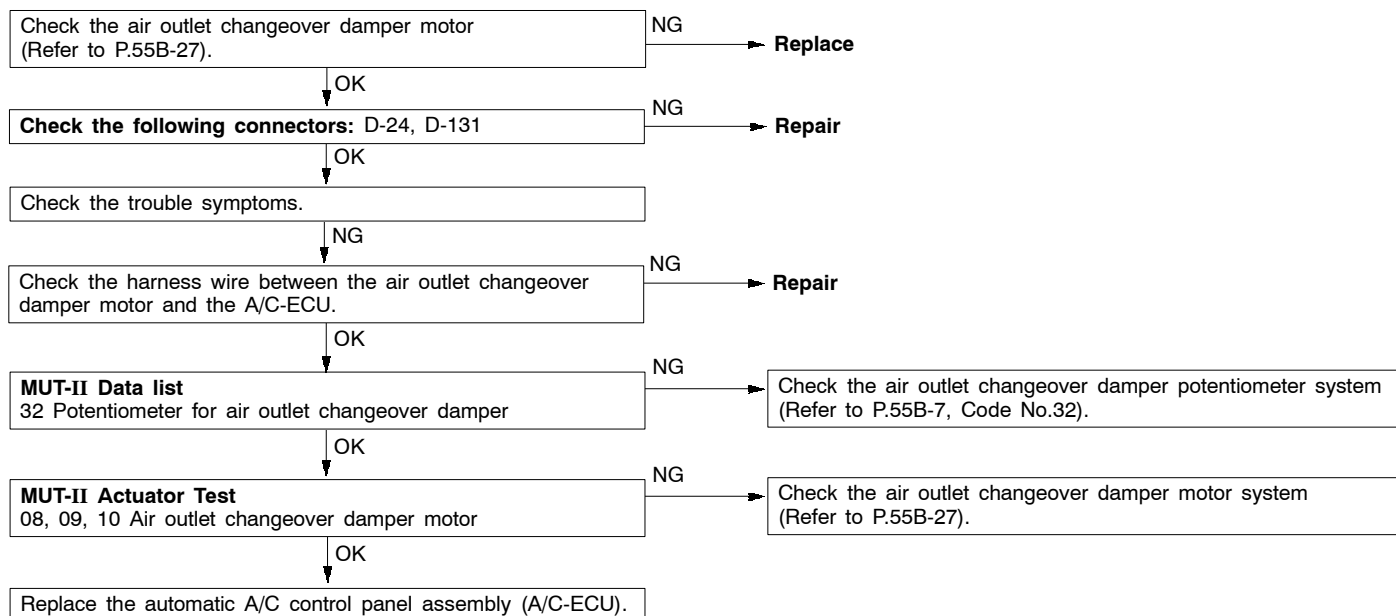
Inspection procedure 6

| The blower air volume can not be changed. | Probable cause |
|---|--|
| If the air volume can not be controlled, the blower linear controller circuit may be defective. | <ul style="list-style-type: none"> • Malfunction of the blower linear controller • Malfunction of harness or connector • Malfunction of the A/C-ECU |



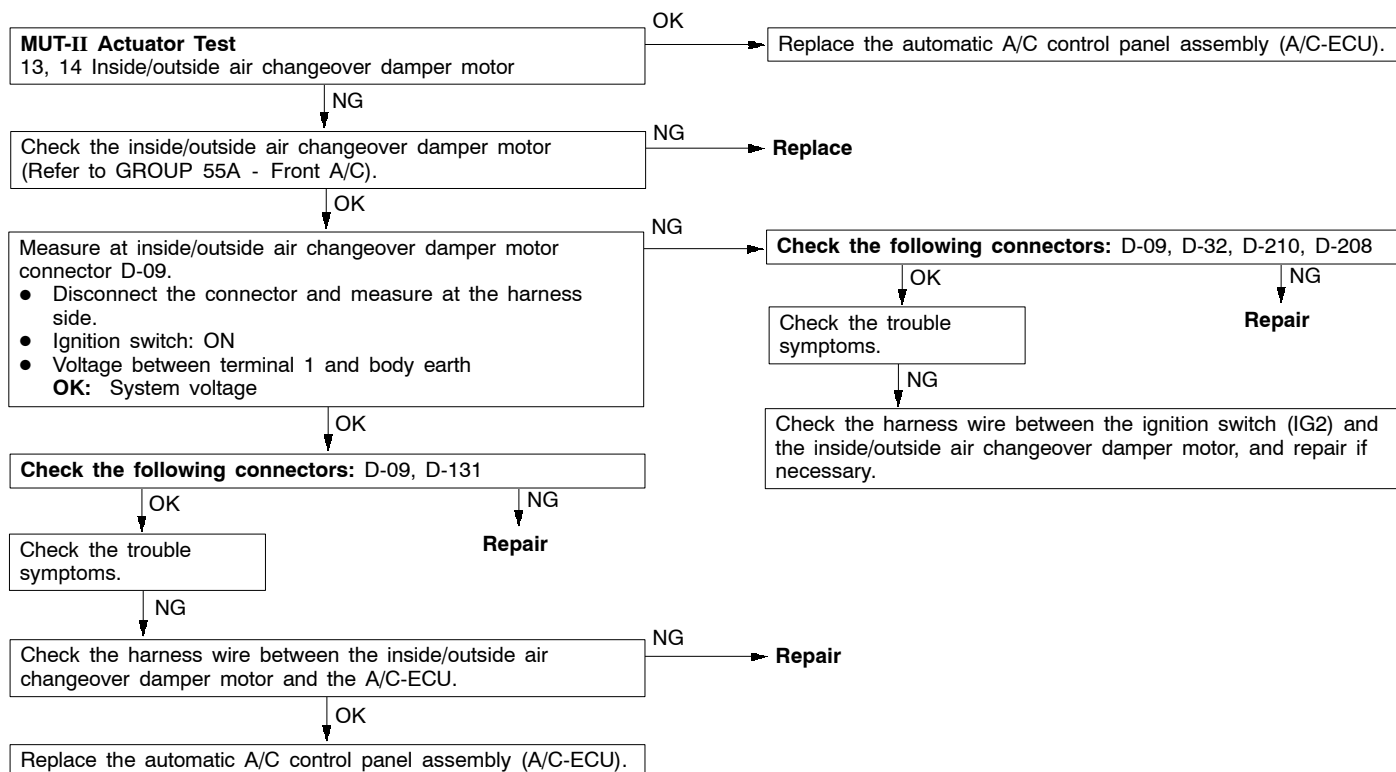
Inspection procedure 7

| Air outlet vent cannot be changed. | Probable cause |
|---|---|
| When the air outlet vents cannot be changed even if the changeover switch is operated, the air outlet changeover damper motor circuit may be defective. | <ul style="list-style-type: none"> • Malfunction of the electric motor for the air outlet changeover damper • Malfunction of harness or connector • Malfunction of the A/C-ECU |



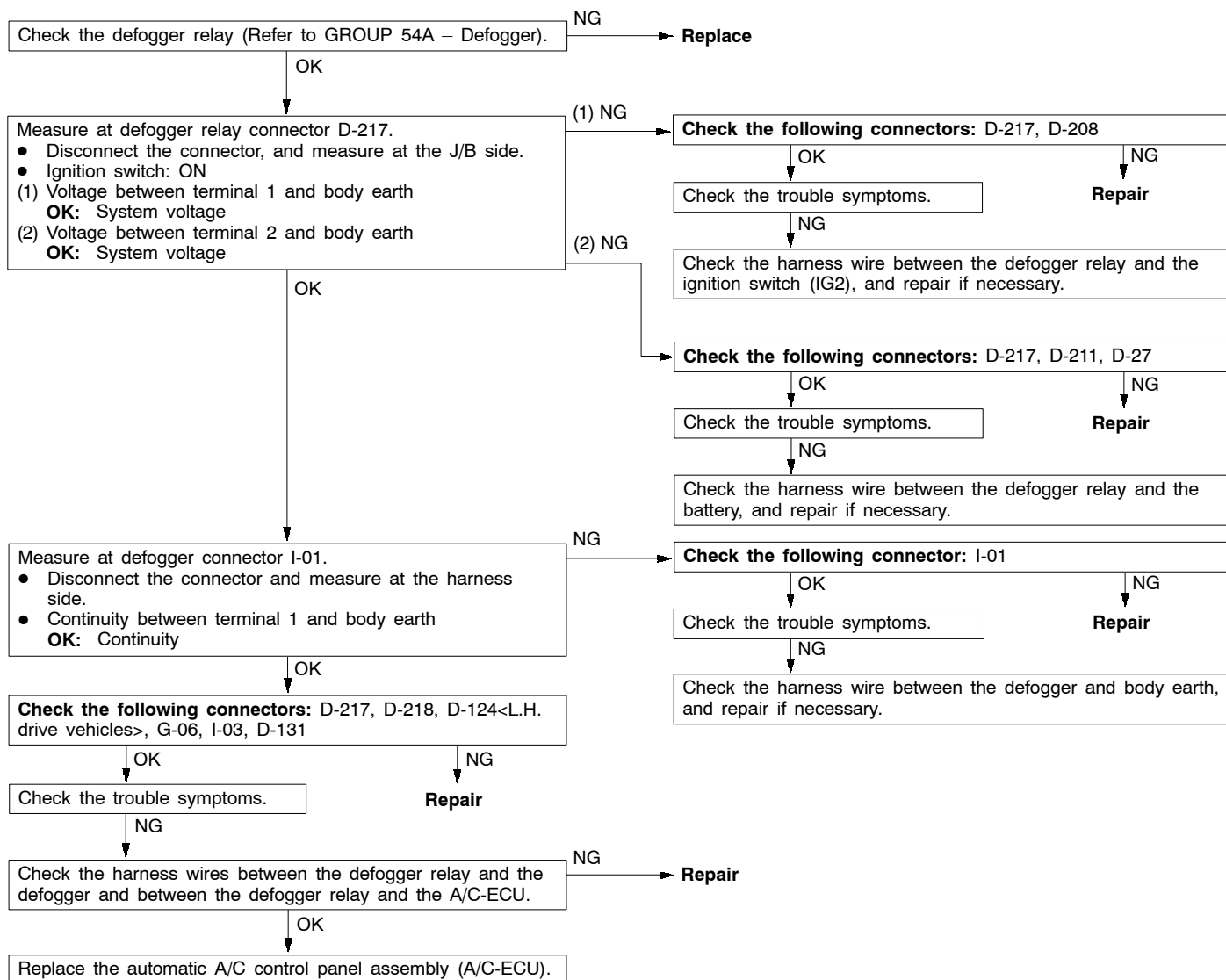
Inspection procedure 8

| Inside/outside air changeover is not possible. | Probable cause |
|---|--|
| When inside air cannot be changed to outside air or vice versa even if its changeover switch is on, the inside/outside air changeover damper motor system may be defective. | <ul style="list-style-type: none"> • Malfunction of the inside/outside air changeover damper motor • Malfunction of harness or connector • Malfunction of the A/C-ECU |



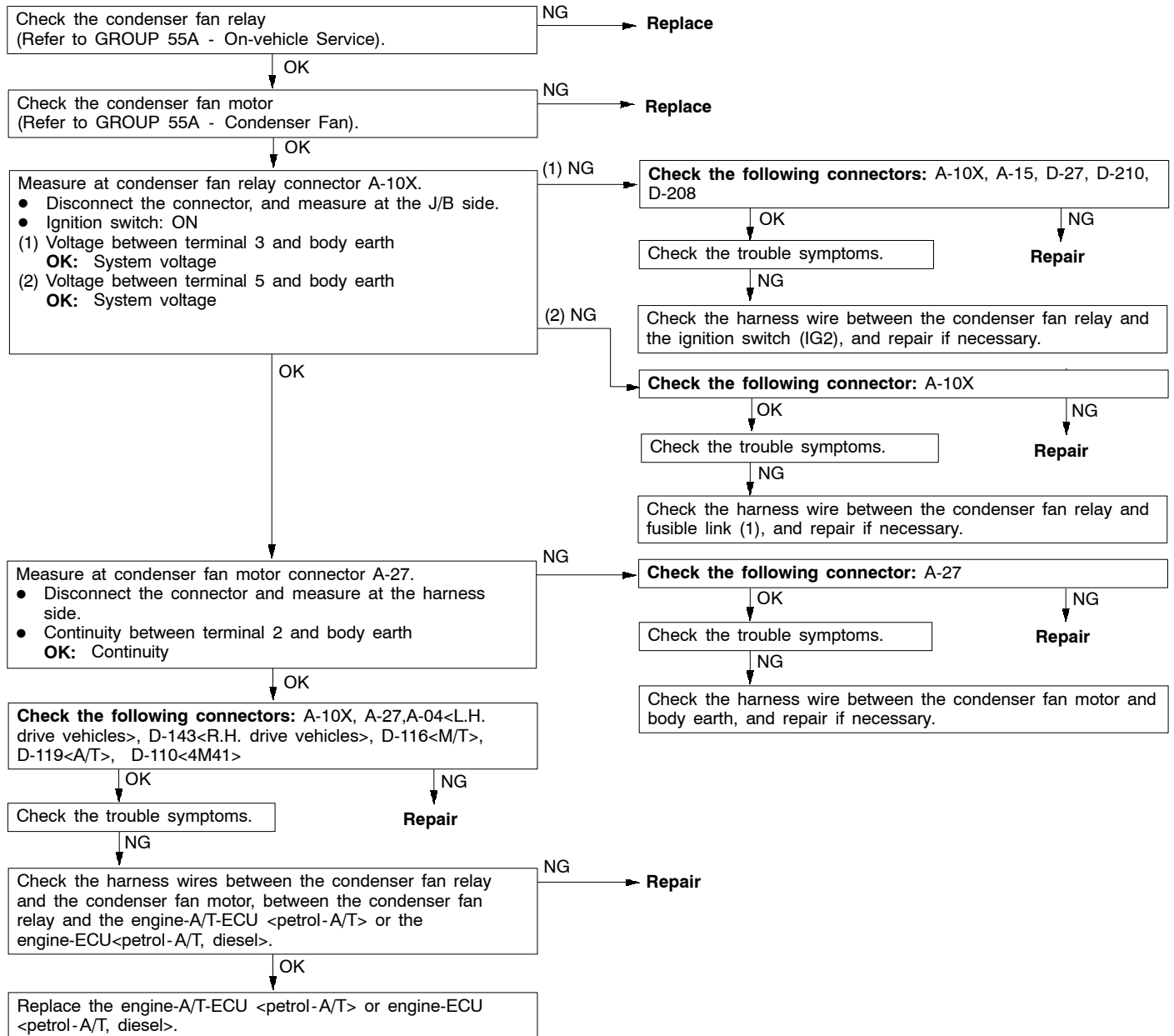
Inspection procedure 9

| The rear defogger does not operate. | Probable cause |
|---|--|
| When the rear defogger does not operate even if the rear defogger switch is on (the defogger remains on for twenty minutes due to a timer function), the rear defogger relay system may be defective. | <ul style="list-style-type: none"> • Malfunction of the defogger relay • Malfunction of harness or connector • Malfunction of the A/C-ECU |



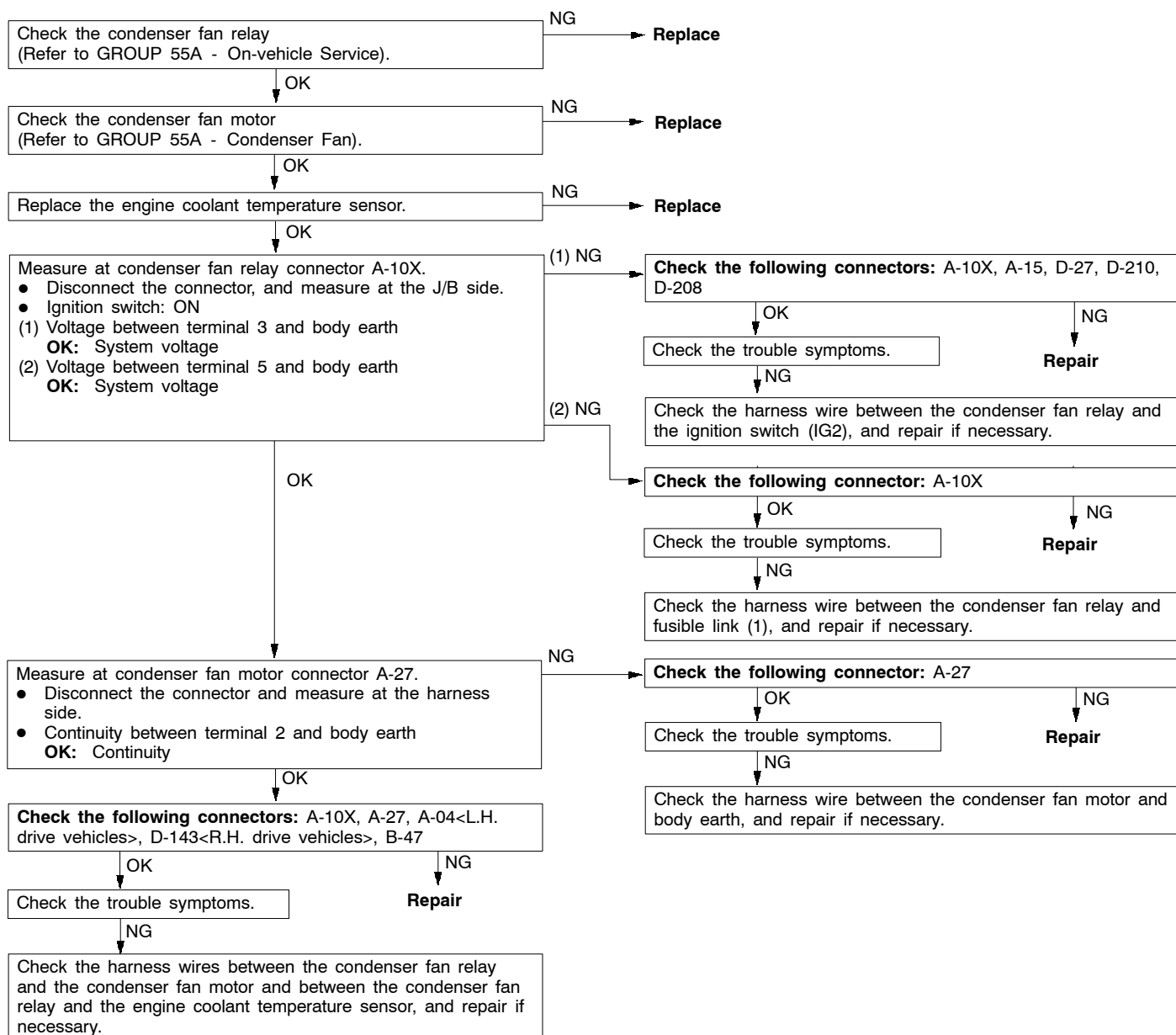
Inspection procedure 10

| The condenser fan does not operate <except 4D56>. | Probable cause |
|---|--|
| If the condenser fan does not operate, the condenser fan relay or motor may be defective. | <ul style="list-style-type: none"> • Malfunction of the condenser fan relay • Malfunction of harness or connector • Malfunction of the engine-A/T-ECU <petrol> or engine-ECU <diesel> |



Inspection procedure 11

| The condenser fan does not operate <4D56>. | Probable cause |
|---|--|
| If the condenser fan does not operate, the condenser fan relay or motor may be defective. | <ul style="list-style-type: none"> Malfunction of the condenser fan relay Malfunction of harness or connector Malfunction of the engine-A/T-ECU <petrol> or engine-ECU <diesel> |



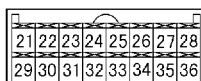
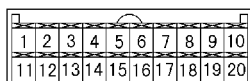
DATA LIST REFERENCE TABLE

| Item No. | Check item | Inspection contents | |
|----------|--|--|--|
| 11 | Inside air temperature sensor | Ignition switch: ON | Inside air temperature and temperature displayed on the MUT-II are identical. |
| 13 | Outside air temperature sensor | Ignition switch: ON | Outside air temperature and temperature displayed on the MUT-II are identical. |
| 15 | Heater water temperature sensor | Ignition switch: ON | Heater core surface temperature and temperature displayed on the MUT-II are identical. |
| 21 | Air thermo sensor | Ignition switch: ON | Evaporator outlet temperature and temperature displayed on the MUT-II are identical. |
| 25 | Photo sensor | Ignition switch: ON | Amount of incident light is proportional to voltage displayed on the MUT-II. |
| 31 | Potentiometer for the air mix damper | Ignition switch: ON Damper position: MAX HOT | Opening angle: Approximately 100% |
| | | Ignition switch: ON Damper position: MAX COOL | Opening angle: Approximately 0% |
| 32 | Potentiometer for the air outlet changeover damper | Ignition switch: ON Damper position: FACE | Opening angle: Approximately 0% |
| | | Ignition switch: ON Damper position: FOOT | Opening angle: Approximately 60% |
| | | Ignition switch: ON Damper position: FOOT/DEF | Opening angle: Approximately 80% |
| | | Ignition switch: ON Damper position: DEF | Opening angle: Approximately 100% |

ACTUATOR TEST TABLE

| Item No. | Check item | Drive Contents |
|----------|---|-----------------------------------|
| 01 | Blower motor | Stopped |
| 02 | | Low speed |
| 03 | | Medium speed |
| 04 | | High speed |
| 05 | Electric motor for the air mix damper | Opening angle: Approximately 0% |
| 06 | | Opening angle: Approximately 50% |
| 07 | | Opening angle: Approximately 100% |
| 08 | Electric motor for the air outlet changeover damper | FACE |
| 09 | | FOOT |
| 10 | | DEF |
| 11 | Compressor ON/OFF | OFF |
| 12 | | ON |
| 13 | Inside/outside air changeover damper motor | Outside air |
| 14 | | Inside air |

CHECK AT A/C-ECU TERMINALS



W0763AU

| Terminal No. | Check item | Check conditions | Normal condition |
|--------------|---|---|---|
| 1 | Electric motor for the air mix damper (MAX COOL) | When the damper flap is moving to the MAX COOL position. | 10 V |
| | | When the damper flap is moving to the MAX HOT position. | Faint voltage (0.5 V) |
| 2 | Electric motor for the air outlet changeover damper (FACE) | When the damper flap is moving to the FACE position. | 10 V |
| | | When the damper flap is moving to the DEF position. | Faint voltage (0.5 V) |
| 3 | Inside/outside air changeover damper motor (Inside air) | When the damper flap is moving to the inside air recirculation position. | Faint voltage (0.5 V) |
| | | When the damper flap is moving to the outside air induction position. | 10 V (when the motor is stopped) |
| 4 | Inside/outside air changeover damper motor (Outside air) | When the damper flap is moving to the inside air recirculation position. | 10 V (when the motor is stopped) |
| | | When the damper flap is moving to the outside air induction position. | Faint voltage (0.5 V) |
| 5 | Input signal from dual pressure switch | Dual pressure switch: OFF | 0 V |
| | | Dual pressure switch: ON | System voltage |
| 6 | Multi center display unit communication line | Ignition switch: ON | Hi: 4 - 5 V Lo: 0 - 1 V |
| 7 | Output to the engine-A/T-ECU <petrol> or engine-ECU <diesel>. | When the A/C is off. | 0 V |
| | | When the A/C is in operation (When compressor is operating) | System voltage |
| 9 | Input from lock sensor <petrol> | When the compressor is operating | 0 - 0.75 V (pulse signal) |
| 10 | Output to blower linear controller | When the blower is operating | 0 - 3.5 V (Effective alternating voltage) |
| 11 | Electric motor for the air mix damper (MAX HOT) | When the damper flap is moving to the MAX COOL position. | Faint voltage (0.5 V) |
| | | When the damper flap is moving to the MAX HOT position. | 10 V |
| 12 | Electric motor for the air outlet changeover damper (DEF) | When the damper flap is moving to the FACE position. | Faint voltage (0.5 V) |
| | | When the damper flap is moving to the DEF position. | 10 V |
| 13 | Engine-ECU <Diesel for cold zone> | Blower switch: ON Air outlet temperature: FOOT, FOOT/DEF, DEF Set temperature: MAX HOT (32°C) | System voltage |
| 14 | Blower relay | When the blower is stopped | System voltage |
| | | When the blower is operating | 0 V |

| Terminal No. | Check item | Check conditions | Normal condition |
|--------------|---|---|---|
| 15 | Rear defogger | Rear defogger: OFF | System voltage |
| | | Rear defogger: ON | 1.5 V or less |
| 16 | Multi center display unit communication line | Ignition switch: ON | Hi: 4 - 5 V Lo: 0 - 1 V |
| 17 | Multi center display unit communication line | Ignition switch: ON | Hi: 4 - 5 V Lo: 0 - 1 V |
| 18 | Multi center display unit communication line shield | At all times | 0 V |
| 19 | Diagnosis output | Ignition switch: ON | A voltmeter needle fluctuates between 0 and 12 V. |
| 20 | Input from A/C compressor relay | When the A/C is off. | 0 V |
| | | When the A/C is in operation (When compressor is operating) | System voltage |
| 21 | Power supply to potentiometer | At all times | 5 V |
| 22 | Input from outside air temperature sensor | Sensor temperature: 25°C (1.7 kΩ) | 1.9 V |
| 23 | Input from heater water temperature sensor | Sensor temperature: 25°C (5 kΩ) | 2.8 V |
| 24 | Input from potentiometer for air mix damper | When the damper flap is moving to the MAX HOT position. | 0.7 - 1.3 V |
| 25 | Power supply to illumination | Lighting switch: ON | System voltage |
| 26 | Power supply to ignition switch (IG2) | Ignition switch: ON | System voltage |
| 27 | Power supply to ignition switch (ACC) | Ignition switch: ACC | System voltage |
| 28 | Backup power supply | At all times | System voltage |
| 29 | Earth to sensor and potentiometer | At all times | 0 V |
| 30 | Input from air thermo sensor | Sensor temperature: 25°C (1.5 kΩ) | 2.2 V |
| 31 | Photo sensor (+) | During 800 kcal/m ² - h | 1 V |
| 32 | Input from potentiometer for the air outlet changeover damper | When the damper flap is moving to the DEF position. | 0.7 - 1.3 V |
| 33 | Diagnosis input | Ignition switch: ON | 0 V |
| 34 | Compressor lock signal (ignition signal) | Engine speed: 3 000 r/min | 0.3 - 3.0 |
| 35 | Illumination earth | At all times | Continuity |
| 36 | Earth | At all times | Continuity |

CHECK AT ENGINE-A/T-ECU OR ENGINE-ECU TERMINALS

Refer to GROUP 13A – Troubleshooting <petrol> or GROUP 13B – Troubleshooting <diesel>.

TROUBLESHOOTING <REAR A/C>

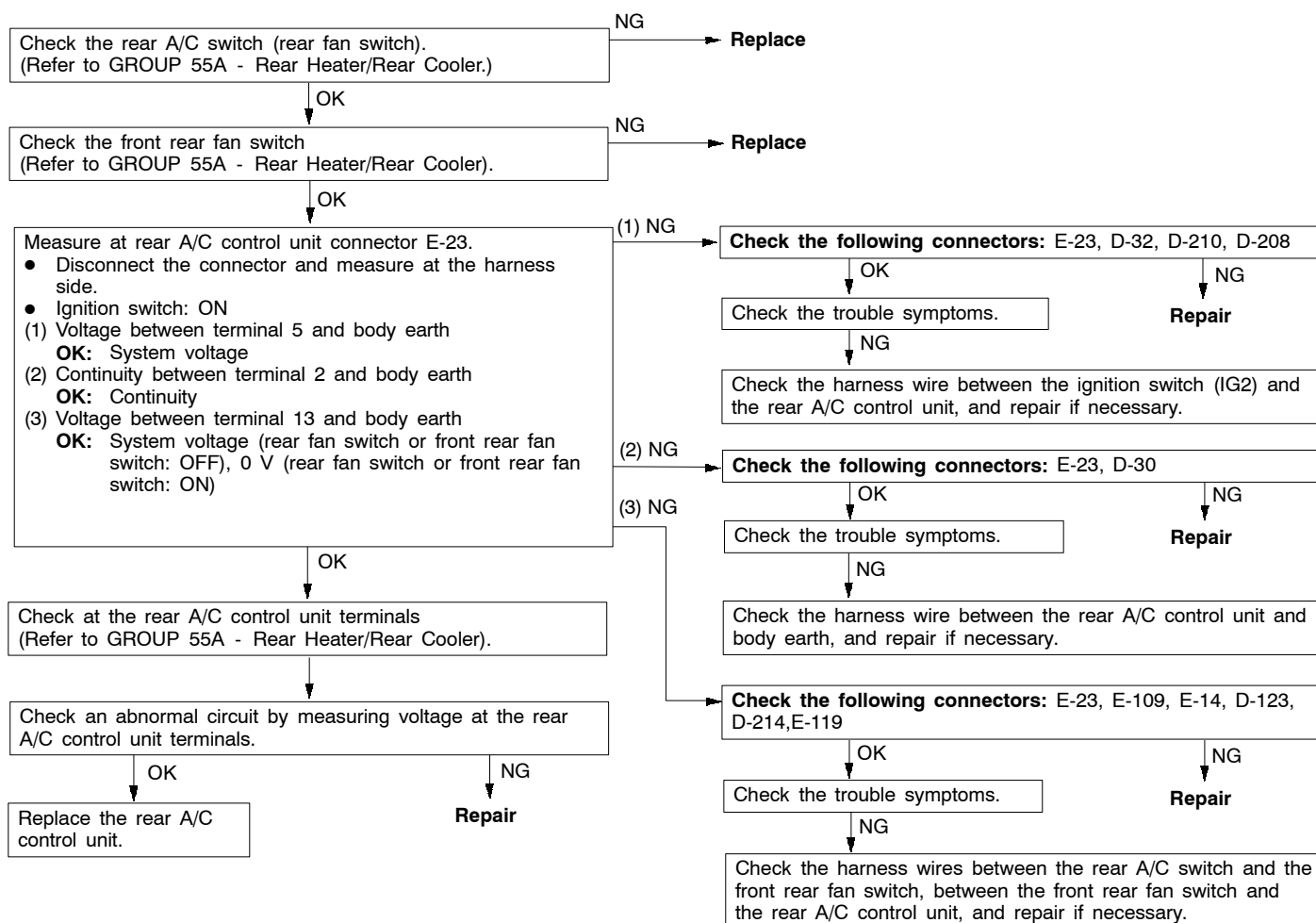
INSPECTION CHART FOR TROUBLE SYMPTOMS

| Trouble symptom | Inspection procedure No. | Reference page |
|--|--------------------------|----------------|
| The rear A/C does not operate at all. | 1 | 55B-20 |
| The rear A/C outlet air temperature can not be set. | 2 | 55B-21 |
| The rear blower does not operate. | 3 | 55B-22 |
| Rear blower air volume can not be changed. | 4 | 55B-23 |
| Air outlet vents can not be changed in proportion to the temperature adjusting switch. | 5 | 55B-23 |

INSPECTION PROCEDURES FOR TROUBLE SYMPTOMS

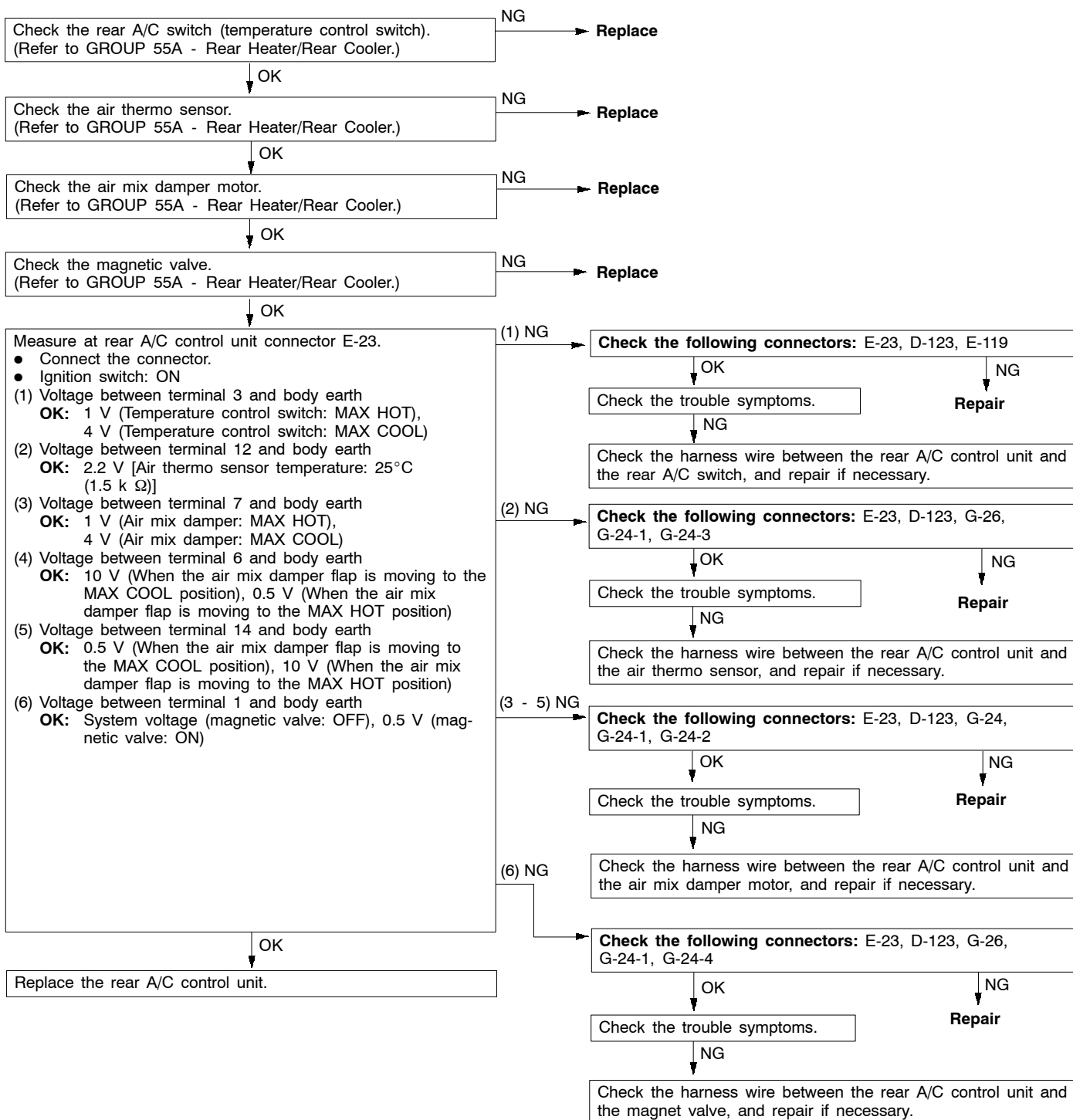
Inspection procedure 1

| The rear A/C does not operate at all. | Probable cause |
|---|---|
| The rear fan switch or front rear fan switch circuit, or the power supply system (including earth) for the rear A/C control unit may be defective. Besides that, the rear A/C control unit may not be operating correctly due to a defective harness (such as short circuit). | <ul style="list-style-type: none"> • Malfunction of the rear fan switch • Malfunction of the front rear fan switch • Malfunction of harness or connector • Malfunction of the rear A/C control unit |



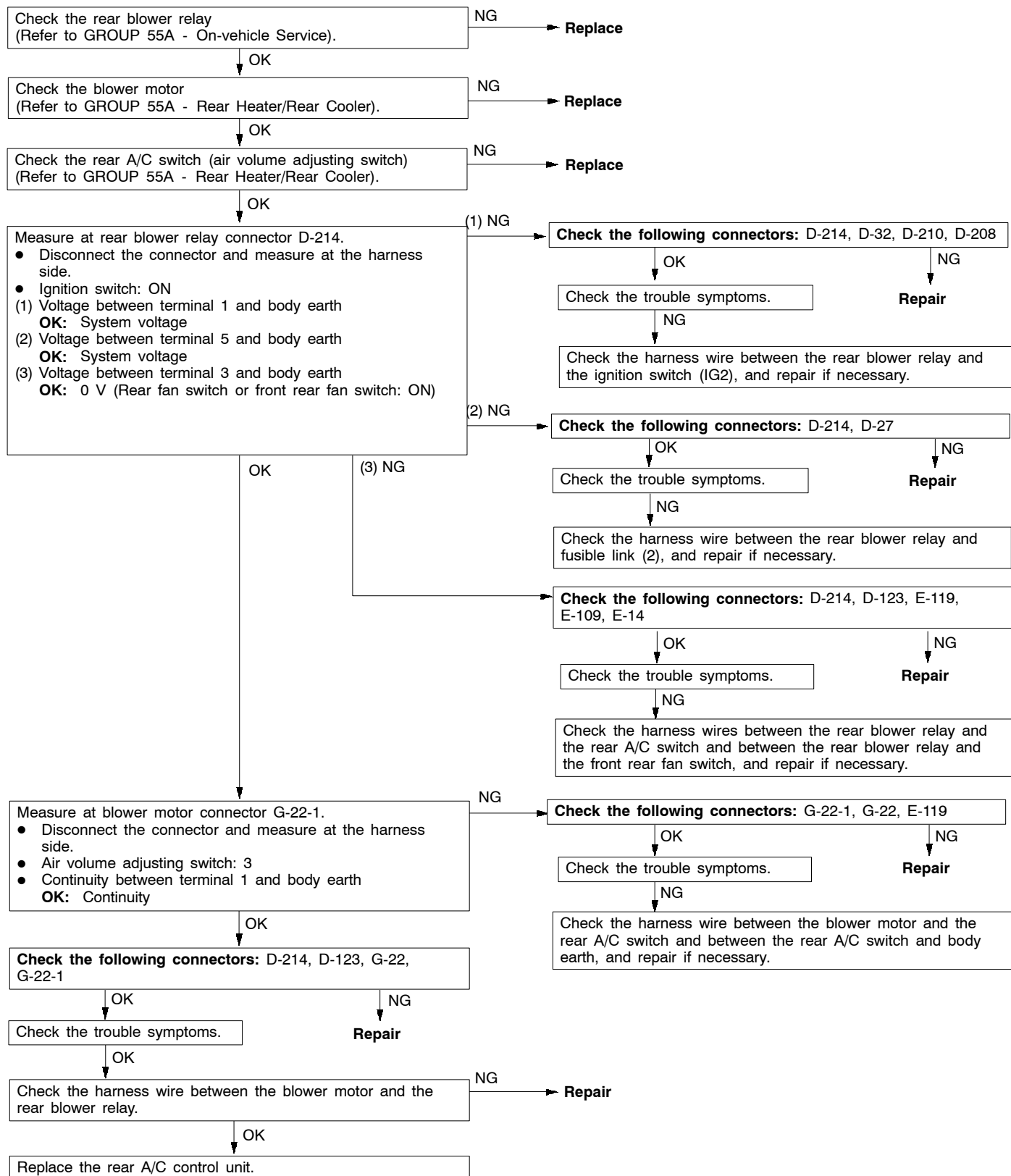
Inspection procedure 2

| The rear A/C outlet air temperature can not be set. | Probable cause |
|--|---|
| If the air outlet temperature can not be changed after a temperature control switch is operated, the temperature control switch, the air thermo sensor, the magnet valve or the air mix damper may be defective. | <ul style="list-style-type: none"> • Malfunction of the rear A/C switch • Malfunction of the air thermo sensor • Magnet valve • Malfunction of the electric motor for the air mix damper • Malfunction of harness or connector • Malfunction of the rear A/C control unit |



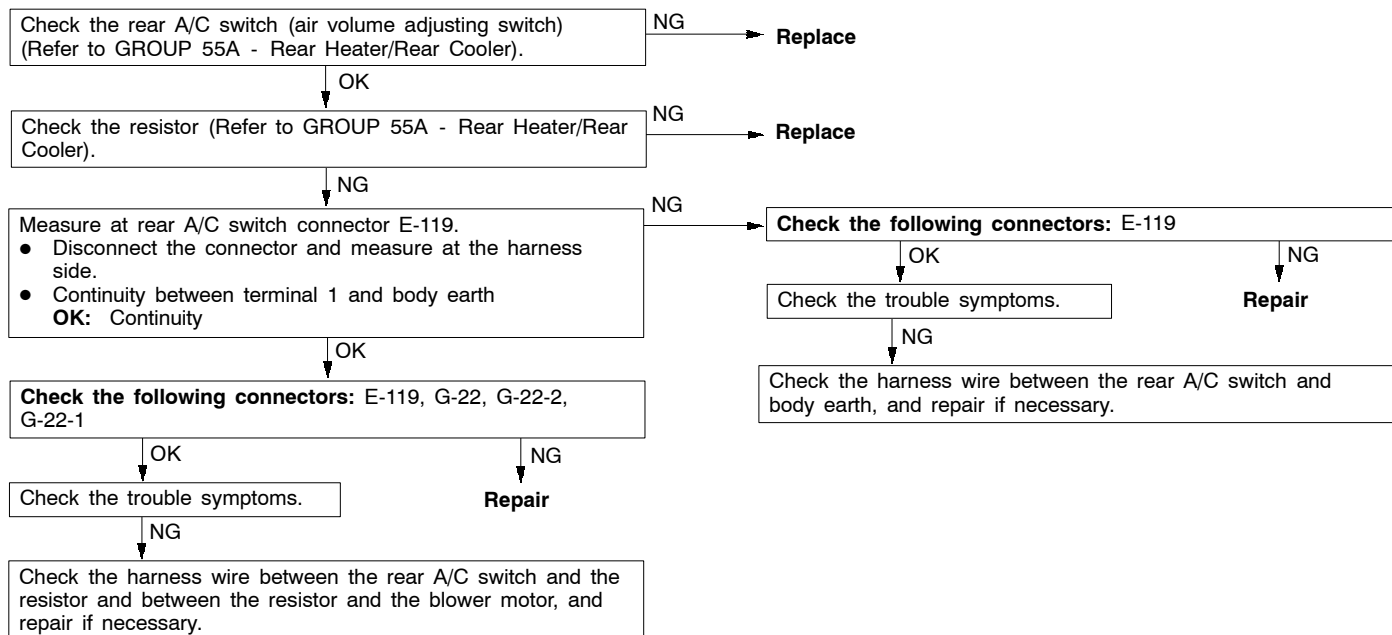
Inspection procedure 3

| The rear blower does not operate. | Probable cause |
|---|--|
| If no air comes out of the air vents even if the rear fan switch or the front rear fan switch is turned on, the rear blower relay circuit may be defective. | <ul style="list-style-type: none"> • Malfunction of the rear blower relay • Malfunction of the blower motor • Malfunction of the rear A/C switch • Malfunction of harness or connector |



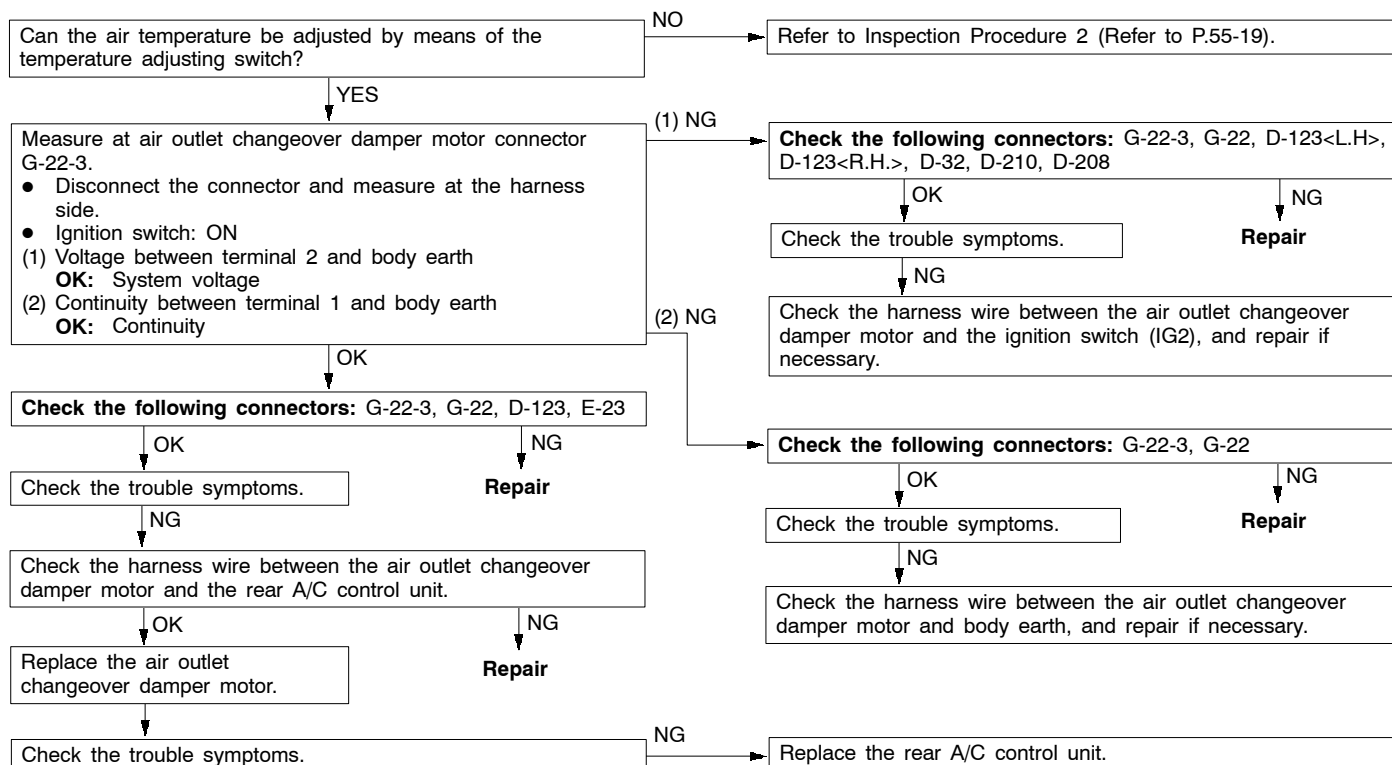
Inspection procedure 4

| The rear blower air volume can not be changed. | Probable cause |
|--|--|
| If the air volume can not be controlled, the air volume adjusting switch or the resistor may be defective. | <ul style="list-style-type: none"> • Malfunction of the rear A/C switch • Malfunction of the resistor • Malfunction of harness or connector |

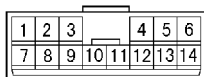


Inspection procedure 5

| Air outlet vents can not be changed in proportion to the temperature adjusting switch. | Probable cause |
|---|---|
| If the air outlet temperature can not be changed after a temperature control switch is operated, the air outlet changeover damper may be defective. | <ul style="list-style-type: none"> • Malfunction of the electric motor for the air outlet changeover damper • Malfunction of harness or connector • Malfunction of the rear A/C control unit |



CHECK AT REAR A/C CONTROL UNIT TERMINALS



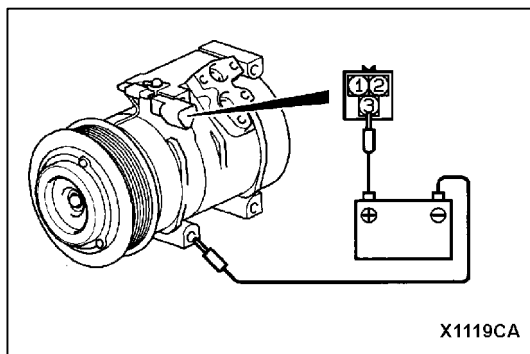
X1136CA

| Terminal No. | Check item | Check conditions | Normal condition |
|--------------|--|--|-----------------------|
| 1 | Magnet valve | Magnet valve: OFF | System voltage |
| | | Magnet valve: ON | Faint voltage (0.5 V) |
| 2 | Earth | At all times | Continuity |
| 3 | Input from temperature adjusting switch | Temperature adjusting switch: MAX HOT | 1 V |
| | | Temperature adjusting switch: MAX COOL | 4 V |
| 4 | Power supply to potentiometer | At all times | 5 V |
| 5 | Power supply to ignition switch (IG2) | Ignition switch: ON | System voltage |
| 6 | Electric motor for the air mix damper (MAX COOL) | When the damper flap is moving to the MAX COOL position. | 10 V |
| | | When the damper flap is moving to the MAX HOT position. | Faint voltage (0.5 V) |
| 7 | Input from potentiometer for air mix damper | Air mix damper: MAX HOT | 1 V |
| | | Air mix damper: MAX COOL | 4 V |
| 8 | Earth to sensor and potentiometer | At all times | 0 V |
| 9 | Signal from air outlet changeover damper motor | Ignition switch: ON | 0 - 12 V |
| 10 | Signal from air outlet changeover damper motor | Ignition switch: ON | 0 - 12 V |
| 11 | Signal from air outlet changeover damper motor | Ignition switch: ON | 0 - 12 V |
| 12 | Input from air thermo sensor | Sensor temperature: 25°C (1.5 kΩ) | 2.2 V |
| 13 | Input from rear fan switch and front rear fan switch | Rear fan switch or front rear fan switch: ON | 0 V |
| 14 | Electric motor for the air mix damper (MAX HOT) | When the damper flap is moving to the MAX COOL position. | Faint voltage (0.5 V) |
| | | When the damper flap is moving to the MAX HOT position. | 10 V |

ON-VEHICLE SERVICE

MAGNETIC CLUTCH TEST

1. Disconnect the connector (3-pin) 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.



X1119CA

IDLE UP OPERATION CHECK <Petrol>

1. Set the vehicle in the following condition:
2. Check that the idle speed is within the standard value.

Standard value: 700 ± 50 r/min

NOTE

- (1) The idle speed is controlled by the ISC system and should not be adjusted.
 - (2) Run the engine at idle, and wait for at least two minutes before the check.
3. The idle speed should be within the standard value when the A/C switch is turned on and the A/C is operating.

Standard value:

<While the A/C is under low load>

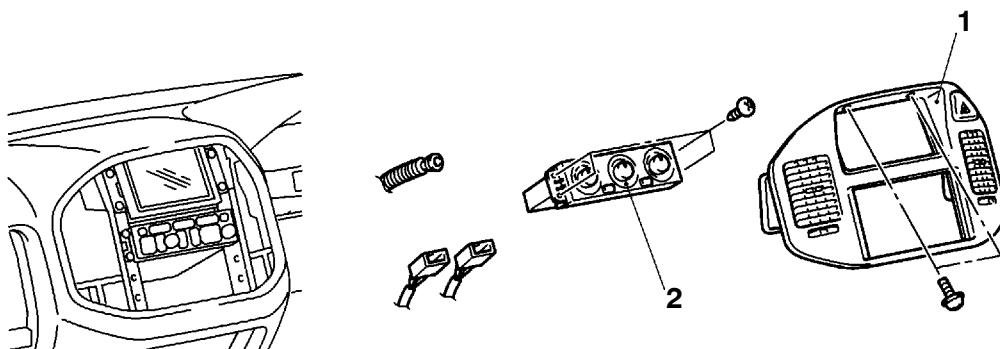
700 ± 50 r/min

<While the A/C is under medium load>

800 ± 50 r/min

<While the A/C is under high load>

1,000 ± 50 r/min

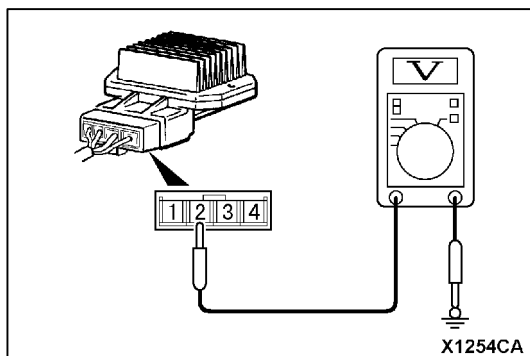
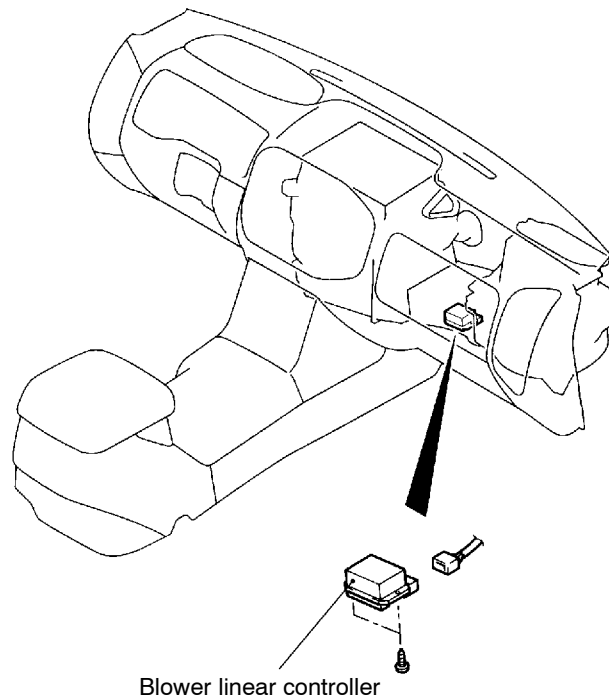
FRONT A/C**AUTOMATIC A/C CONTROL PANEL ASSEMBLY (A/C-ECU)****REMOVAL AND INSTALLATION**

AX1027CA

Removal steps

1. Center panel (Refer to GROUP 52A - Instrument Panel.)
2. Automatic A/C control panel assembly (A/C-ECU)

BLOWER LINEAR CONTROLLER REMOVAL AND INSTALLATION



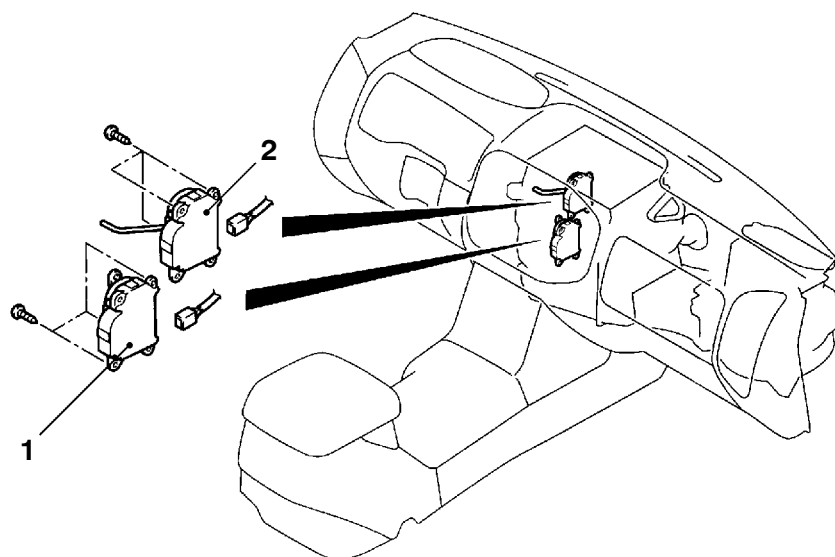
INSPECTION

BLOWER LINEAR CONTROLLER INSPECTION

When the connector is connected and the ignition switch is turned ON, the voltage at terminal 2 should meet the following table.

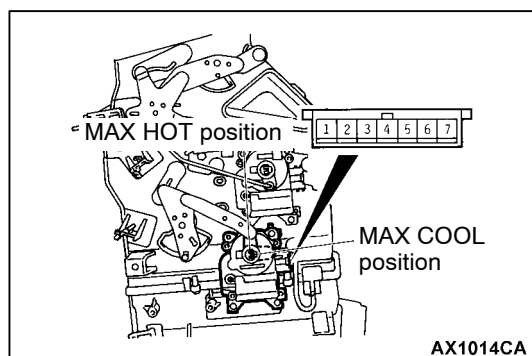
| Blower switch position | Voltage at terminal No.2 V |
|------------------------|----------------------------|
| Low speed | 4.0 |
| Medium speed | 7.9 |
| High speed | 13.7 |

AIR MIX DAMPER MOTOR AND AIR OUTLET CHANGEOVER DAMPER MOTOR REMOVAL AND INSTALLATION



Removal steps

- Under cover (Refer to GROUP 52A – Instrument Panel.)
- 1. Electric motor for the air mix damper
- 2. Electric motor for the air outlet changeover damper



INSPECTION

AIR MIX DAMPER MOTOR INSPECTION

Motor check

| Battery connection terminal | | Lever operation |
|-----------------------------|---|------------------------------|
| 1 | 2 | |
| + | - | Rotate to the HOT position. |
| - | + | Rotate to the COOL position. |

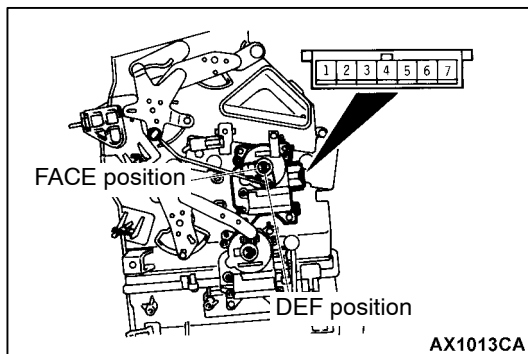
Caution

If the lever reaches the stop position, disconnect the battery voltage.

Potentiometer check

When the resistances between terminals 3 and 5 as well as terminals 3 and 7 are measured at the previous check, the resistance value should change gradually within the standard value.

Standard value: Approximately 0.96 - 5.76 k Ω

**AIR OUTLET CHANGEOVER DAMPER MOTOR CHECK****Motor check**

| Battery connection terminal | | Lever operation |
|-----------------------------|---|------------------------------|
| 1 | 2 | |
| ⊕ | ⊖ | Rotate to the DEF position. |
| ⊖ | ⊕ | Rotate to the FACE position. |

Caution

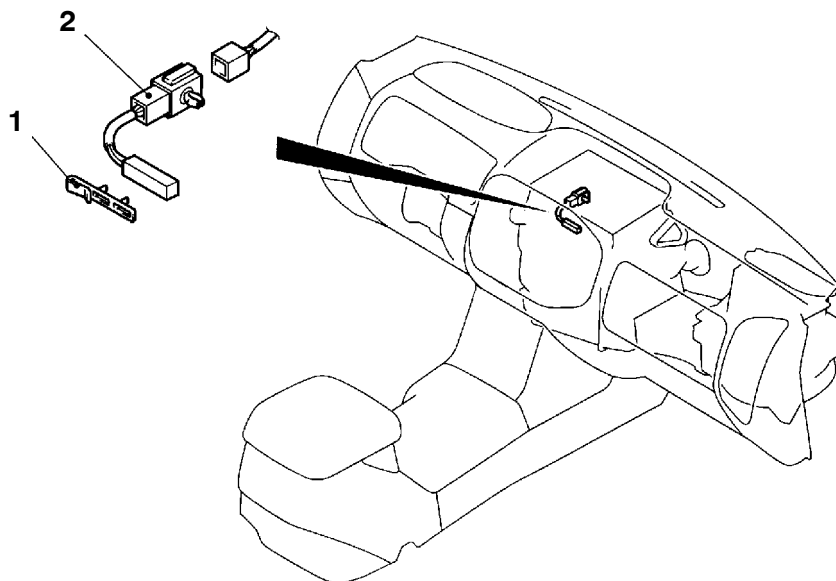
If the lever reaches the stop position, disconnect the battery voltage.

Potentiometer check

When the resistances between terminals 3 and 5 as well as terminals 3 and 7 are measured at the previous check, the resistance value should change gradually within the standard value.

Standard value: Approximately 0.96 - 5.76 k Ω

HEATER WATER TEMPERATURE SENSOR REMOVAL AND INSTALLATION



Removal steps

- Under cover (Refer to GROUP 52A – Instrument Panel.)

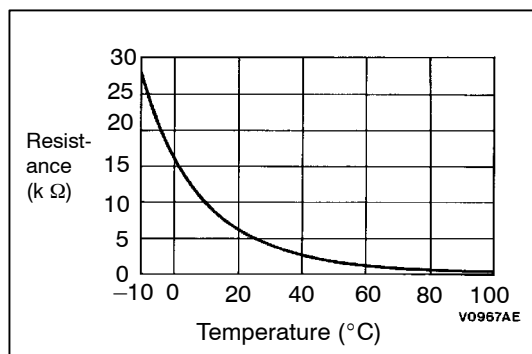
1. Heater water temperature sensor clip
2. Heater water temperature sensor



INSTALLATION SERVICE POINTS

►A◄ HEATER WATER TEMPERATURE SENSOR CLIP INSTALLATION

Insert the heater water temperature sensor into the mounting hole on the heater unit, and secure the sensor with the clip.



INSPECTION

HEATER WATER TEMPERATURE SENSOR CHECK

Measure the resistance between the sensor terminals under at least two temperatures. The resistance values should meet the left graph.

NOTE

The temperature should be within the shown range.

PHOTO SENSOR

REMOVAL AND INSTALLATION

(Refer to GROUP 54A – Headlamp.)

INSPECTION

PHOTO SENSOR CHECK

The blower speed should drop when the light-receiving section of the photo sensor is covered with your hand. If not, replace the photo sensor.

OUTSIDE AIR TEMPERATURE SENSOR

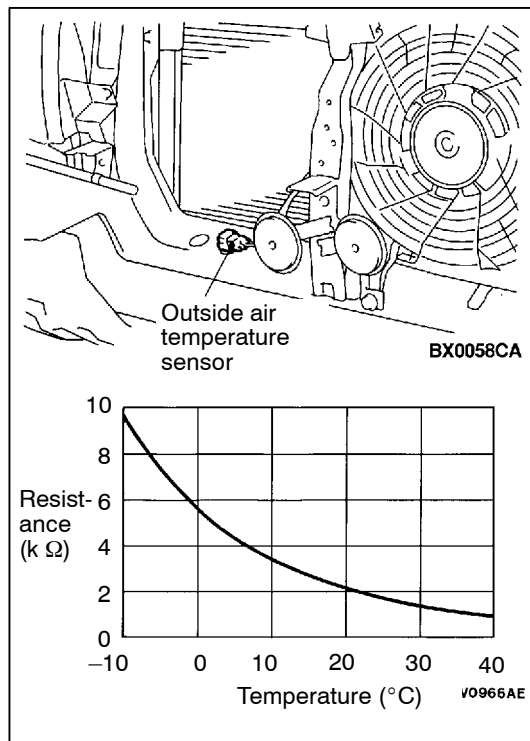
INSPECTION

OUTSIDE AIR TEMPERATURE SENSOR CHECK

Measure the resistance between the sensor terminals under at least two temperatures. The resistance values should meet the left graph.

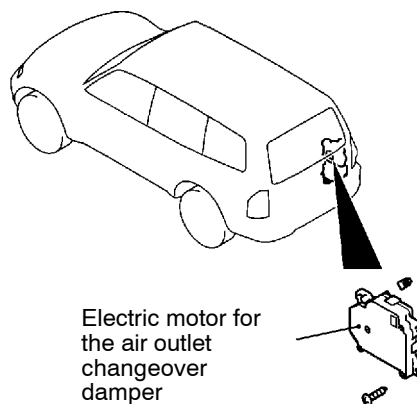
NOTE

The temperature should be within the shown range.



REAR A/C

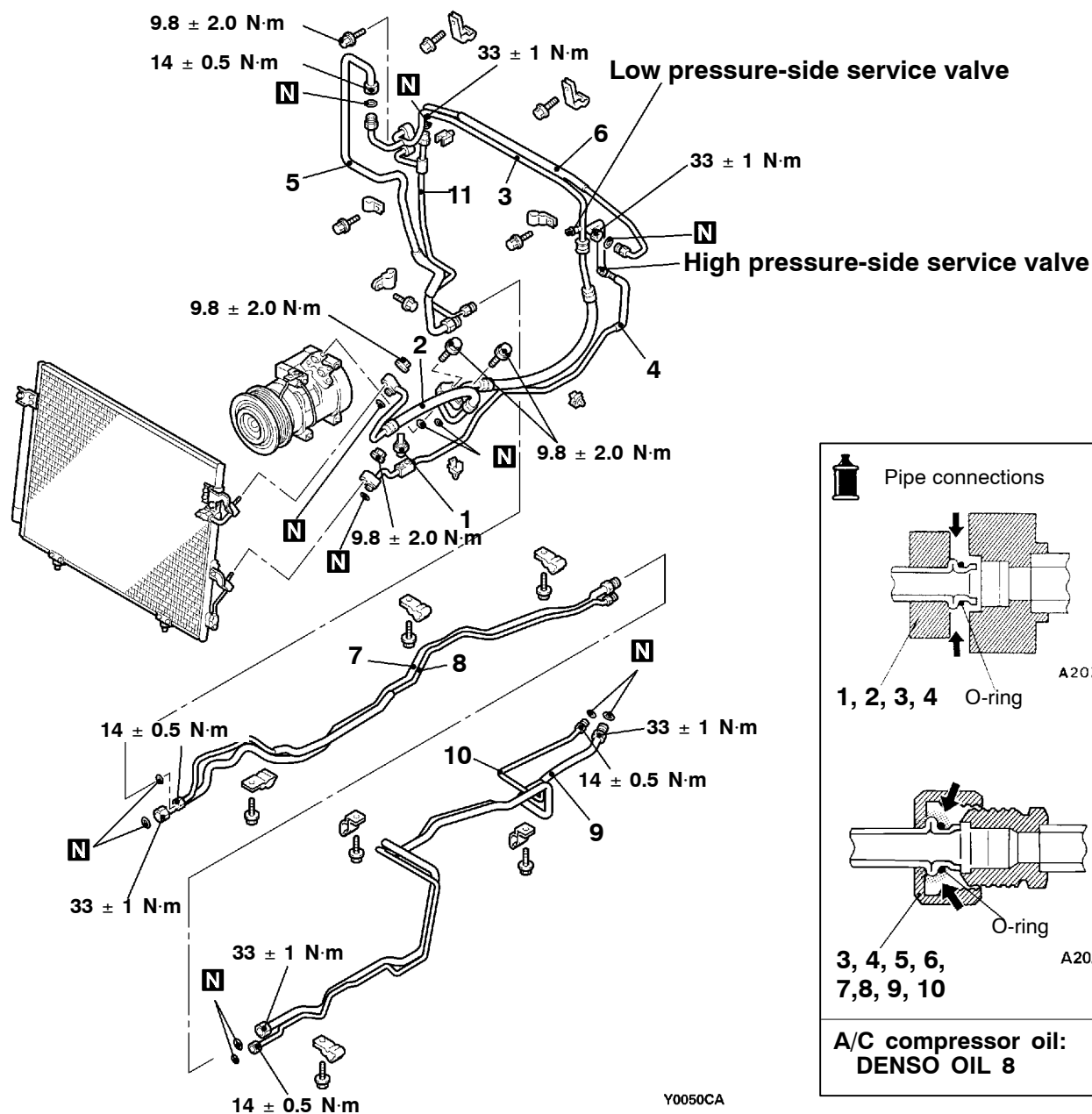
ELECTRIC MOTOR FOR THE AIR OUTLET CHANGEOVER DAMPER REMOVAL AND INSTALLATION



REFRIGERANT LINE <PETROL>

REMOVAL AND INSTALLATION <L.H. drive vehicles>

Dual A/C



Removal steps



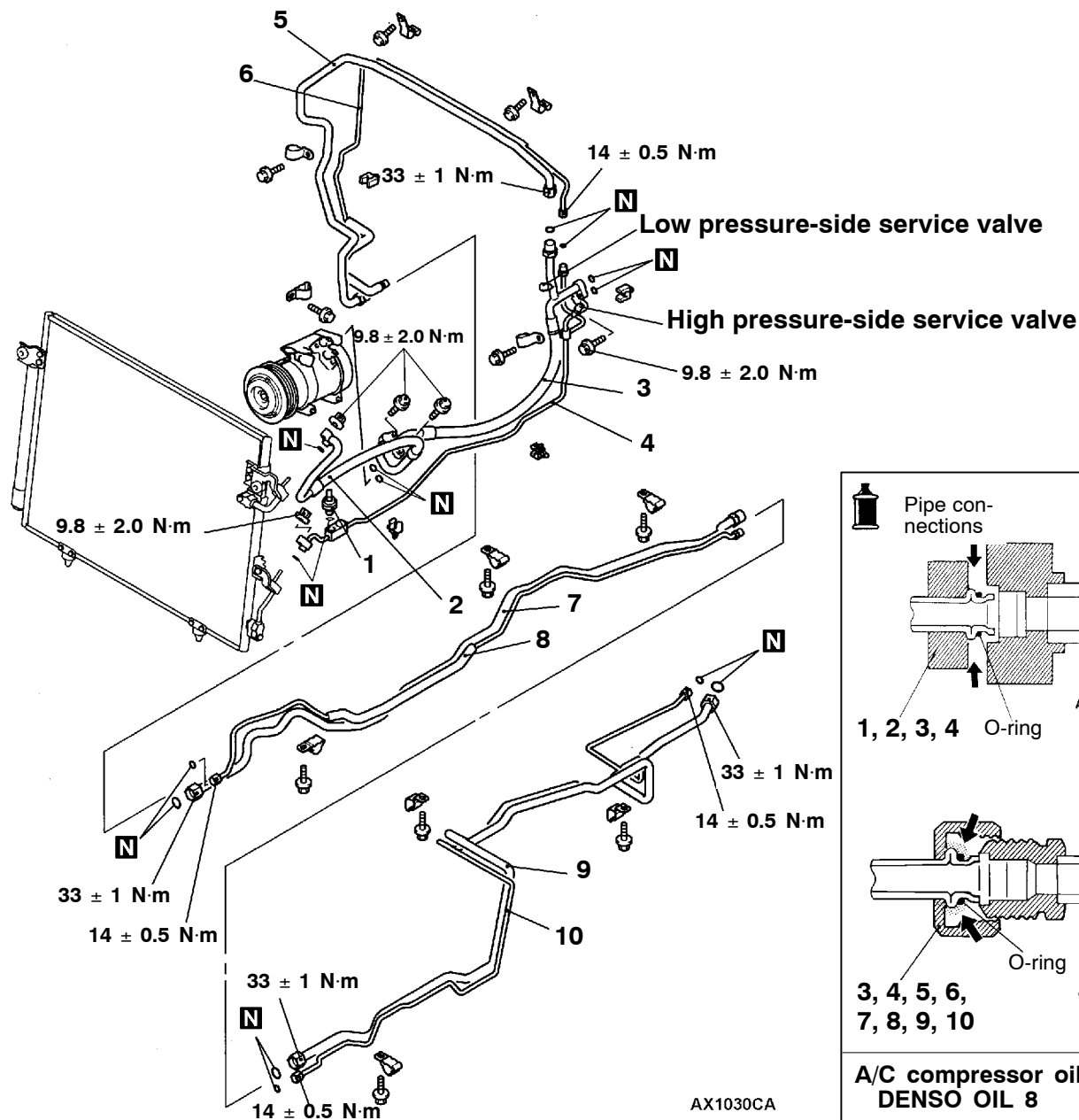
1. Dual pressure switch
2. Discharge flexible hose
3. Suction flexible hose
4. Liquid pipe A
5. Suction pipe A
6. Liquid pipe B



7. Suction pipe B
8. Liquid pipe C
9. Suction pipe C
10. Liquid pipe D
11. Liquid pipe E

<R.H. drive vehicles>

Dual A/C



Removal steps

1. Dual pressure switch
2. Discharge flexible hose
3. Suction flexible hose
4. Liquid pipe A
5. Suction pipe A



6. Liquid pipe B
7. Suction pipe B
8. Liquid pipe C
9. Suction pipe C
10. Liquid pipe D

REMOVAL SERVICE POINT

◀A▶ HOSE/PIPE DISCONNECTION

Plug the condenser, the compressor and the heater unit nipples to prevent system contamination.

Caution

Use a plug, which air does not penetrate through.
Compressor oil and receiver absorb moisture easily.

COMPRESSOR <petrol>

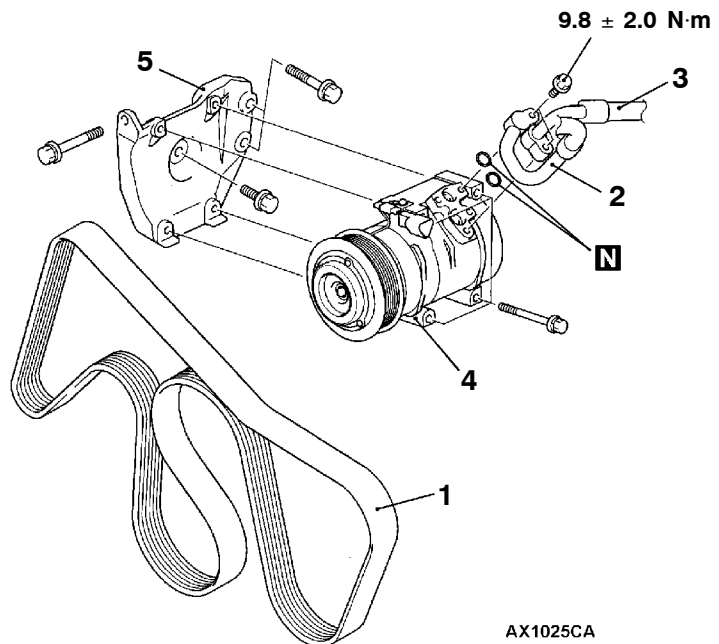
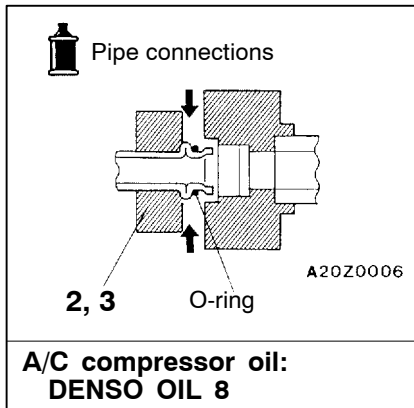
REMOVAL AND INSTALLATION

Pre-removal Operations

Refrigerant discharge
(Refer to GROUP-55A - On-vehicle Service.)

Post-installation Operations

- Refrigerant charge
(Refer to GROUP-55A - On-vehicle Service.)
- Drive belt tension check
(Refer to GROUP 11A, B - On-vehicle Service.)



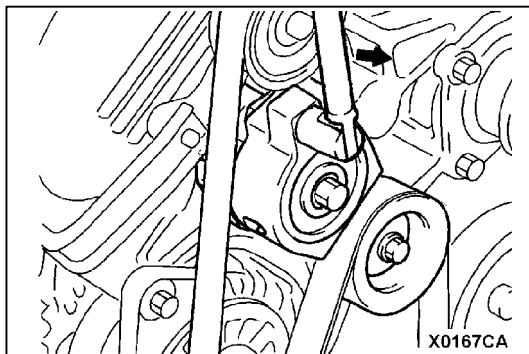
Removal steps



1. Drive belt
2. Discharge flexible hose connection
3. Suction flexible hose connection



4. Compressor
5. Compressor bracket



REMOVAL SERVICE POINTS

◀A▶ DRIVE BELT REMOVAL

Engage a socket wrench with the service square hole on the automatic tensioner, move the wrench to the shown direction to loosen the drive belt.

Caution

If the drive belt is reused, mark an arrow indicating rotation direction (clockwise direction) on the belt surface with a chalk.

◀B▶ DISCHARGE FLEXIBLE HOSE/SUCTION FLEXIBLE HOSE DISCONNECTION

Plug the disconnect hoses and the compressor nipples to prevent dust or foreign material from entering them.

Caution

Use a plug, which air does not penetrate through. Compressor oil and receiver absorb moisture easily.

◀C▶ COMPRESSOR REMOVAL

Be careful not to spill the compressor oil.

INSTALLATION SERVICE POINT

▶A◀ COMPRESSOR INSTALLATION

If a new compressor is installed, first adjust the amount of oil according to the procedures described below, and then install the compressor.

1. Measure the amount of oil within the removed compressor. (X ml)
2. Drain (from the new compressor) the amount of oil calculated according to the following formula, and then install the new compressor.

Single A/C <except vehicles with rear cooler>:

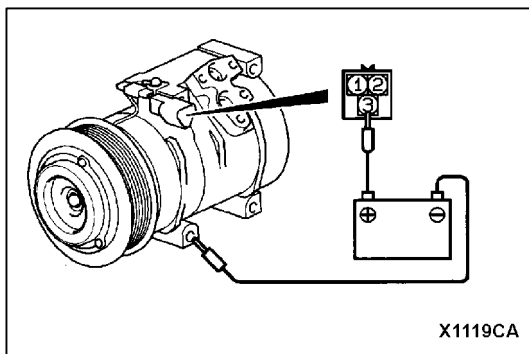
$$120 \text{ ml} - X \text{ ml} = Y \text{ ml}$$

Single A/C <Vehicles with rear cooler>, dual A/C:

$$140 \text{ ml} - X \text{ ml} = Y \text{ ml}$$

NOTE

- (1) The above amounts (120 ml and 140 ml) indicate the factory-charged amount inside a new compressor.
- (2) Y ml indicates the amount of oil in the refrigerant line, the condenser, the evaporator, etc.

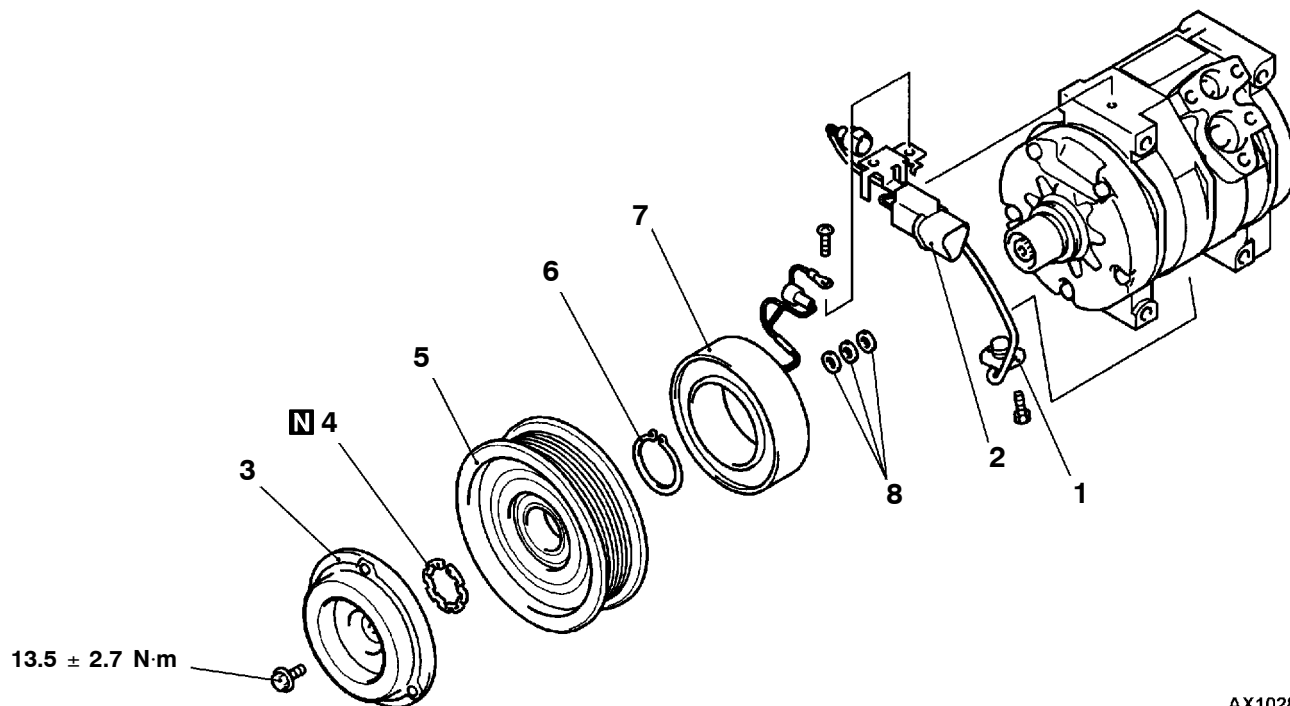


INSPECTION

COMPRESSOR MAGNETIC CLUTCH OPERATION INSPECTION

Connect the positive battery cable to compressor connector terminal No.3 or No.1 and negative battery cable to the compressor housing (earth). The magnetic clutch should click.

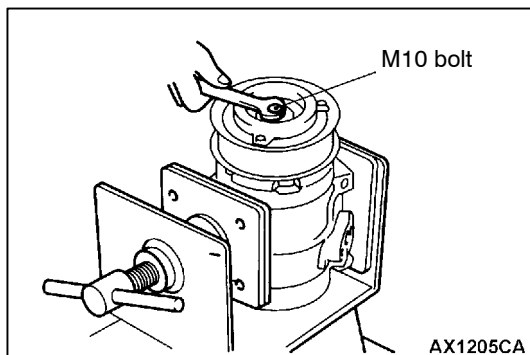
DISASSEMBLY AND REASSEMBLY



Disassembly steps

- Air gap adjustment
- 1. Lock sensor
- 2. Connector
- 3. Armature

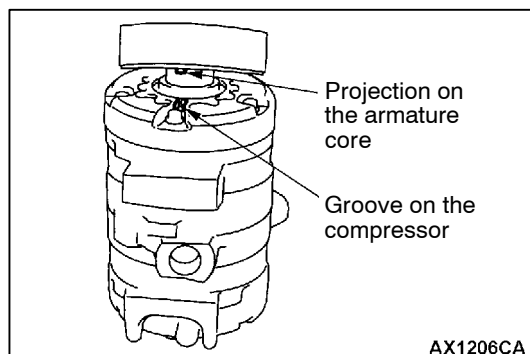
- B◄ 4. Snap ring
- 5. Rotor
- 6. Snap ring
- A◄ 7. Field core
- 8. Washer



DISASSEMBLY SERVICE POINT

►A◄ ARMATURE REMOVAL

1. Remove the armature mounting bolt.
2. Tighten the M10 bolt in the armature bolt hole to disengage the shaft from the armature serration.



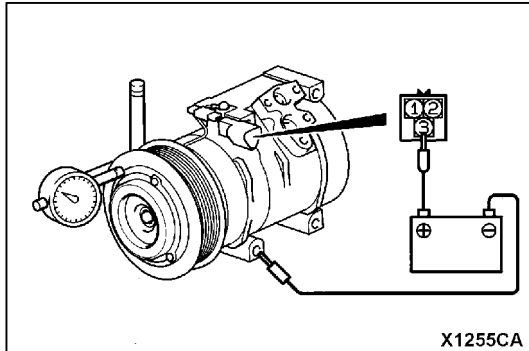
REASSEMBLY SERVICE POINTS

►A◄ FIELD CORE INSTALLATION

Align the compressor groove with the field core projection to install the field core.

►B◄ SNAP RING INSTALLATION

Be careful not to expand the snap ring excessively. If the inside diameter of the snap ring exceeds 30.5 mm due to excessive expansion, replace it.

**►C◄ AIR GAP ADJUSTMENT**

Apply battery voltage to the magnetic clutch, and check that the clutch air gap is within the standard value. If not within the standard value, adjust it by using washers.

Standard value: 0.35 - 0.65 mm

NOTE

The washers are available in three thicknesses (0.1 mm, 0.3 mm, 0.5 mm).