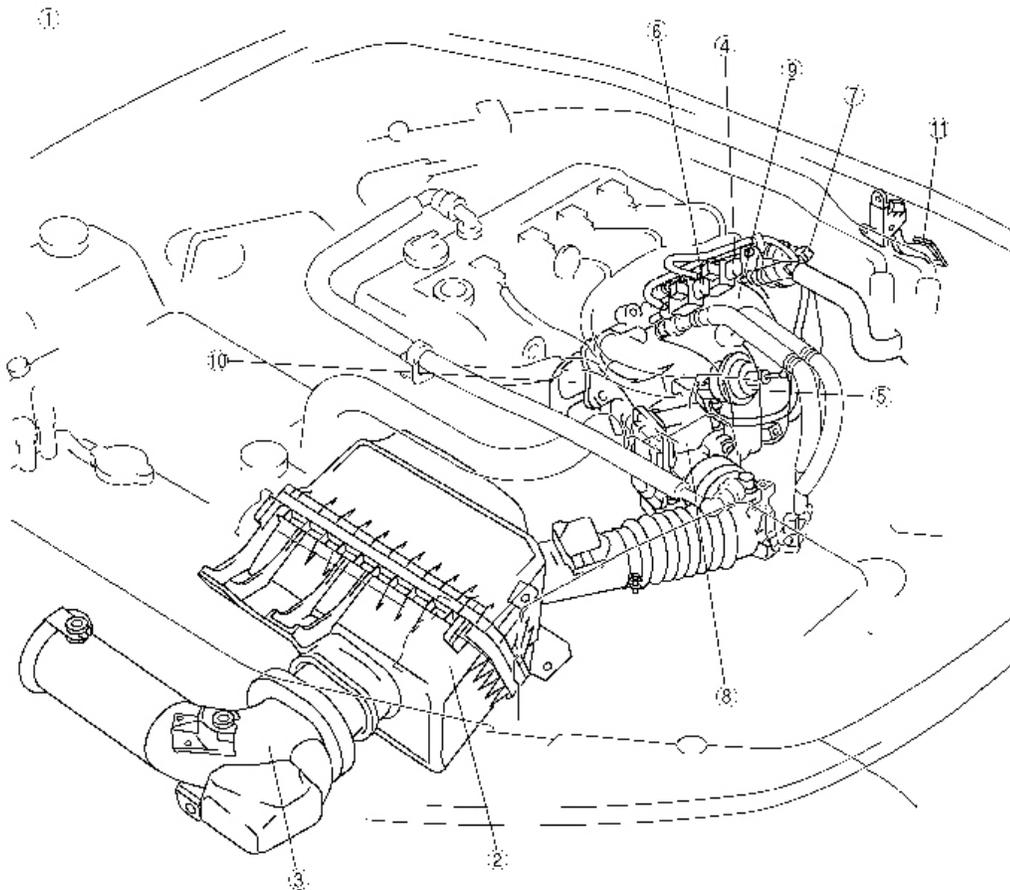


2008 ENGINE PERFORMANCE

Intake Air System - MX-5 Miata

INTAKE AIR SYSTEM LOCATION INDEX [LF]



**Fig. 1: Identifying Intake Air System Components**  
Courtesy of MAZDA MOTORS CORP.

**Intake Air System Location Index [LF]**

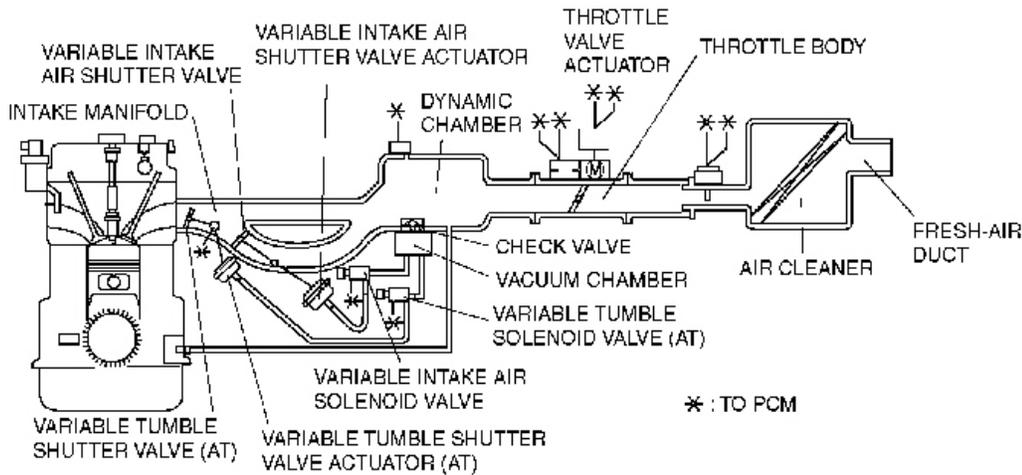
1	Intake-air system
2	Air cleaner
3	Fresh-air duct
4	Variable intake air solenoid valve
5	Variable intake air shutter valve actuator

## 2008 Mazda MX-5 Miata Grand Touring

### 2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata

6	Variable tumble solenoid valve (AT)
7	Variable tumble shutter valve actuator (AT)
8	Throttle body
9	Dynamic chamber
10	Intake manifold
11	Accelerator pedal

### INTAKE AIR SYSTEM DIAGRAM [LF]

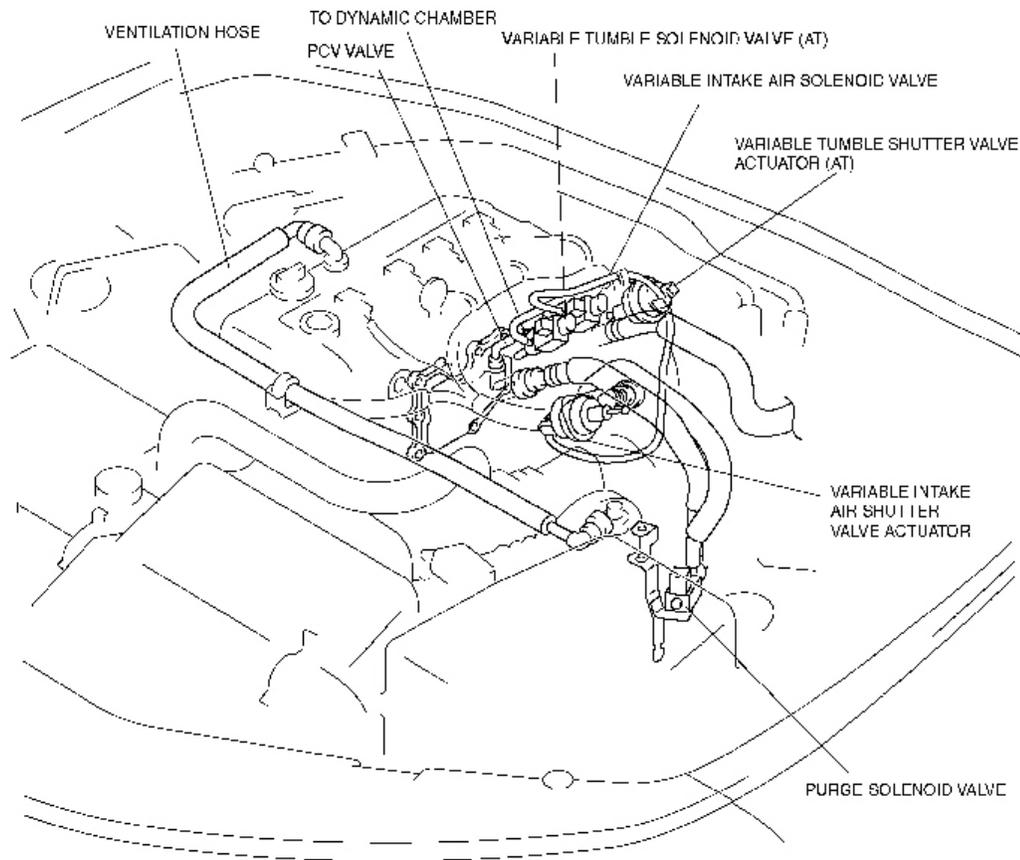


**Fig. 2: Intake Air System Diagram**  
 Courtesy of MAZDA MOTORS CORP.

### INTAKE AIR SYSTEM HOSE ROUTING DIAGRAM [LF]

## 2008 Mazda MX-5 Miata Grand Touring

### 2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata



**Fig. 3: Intake Air System Hose Routing Diagram**  
Courtesy of MAZDA MOTORS CORP.

## INTAKE MANIFOLD VACUUM INSPECTION [LF]

1. Verify that the intake air hoses are installed securely.
2. Disconnect the vacuum hose connecting the intake manifold and the purge solenoid valve (purge solenoid valve side) and install the vacuum gauge.
3. Warm up the engine.
4. Measure the intake manifold vacuum while idling (no load) using the vacuum gauge.
  - If not within the specification, perform the following inspections.
    - Compression pressure (See **COMPRESSION INSPECTION [LF]** .)
    - Air intake
      - Each hose installation part
      - Throttle body installation part

## 2008 Mazda MX-5 Miata Grand Touring

2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata

- Fuel injector installation part
- PCV valve installation part
- Dynamic chamber installation port
- Intake manifold installation part

### Standard

-60 kPa {-450 mmHg, -17.7 inHg} or more

## INTAKE AIR SYSTEM REMOVAL/INSTALLATION [LF]

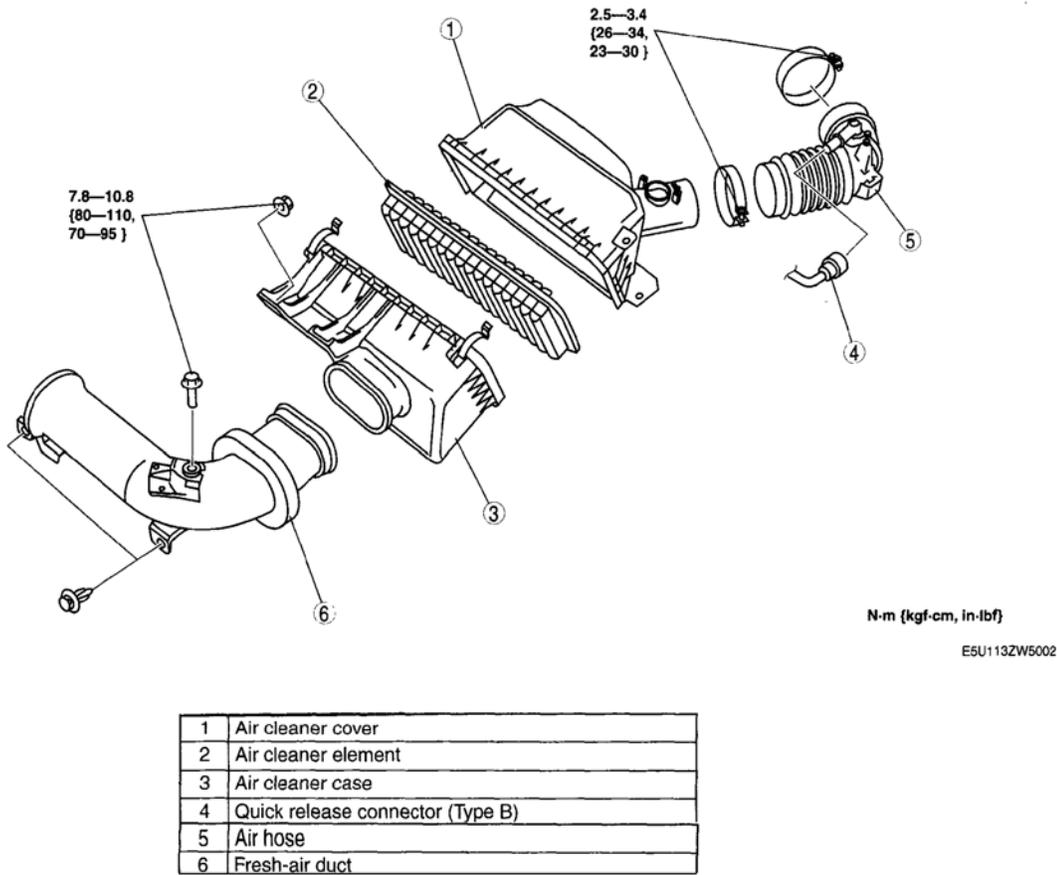
### WARNING:

- A hot engine and intake air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake-air system.
- Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION [LF]".

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See BATTERY REMOVAL/INSTALLATION [LF] .)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

# 2008 Mazda MX-5 Miata Grand Touring

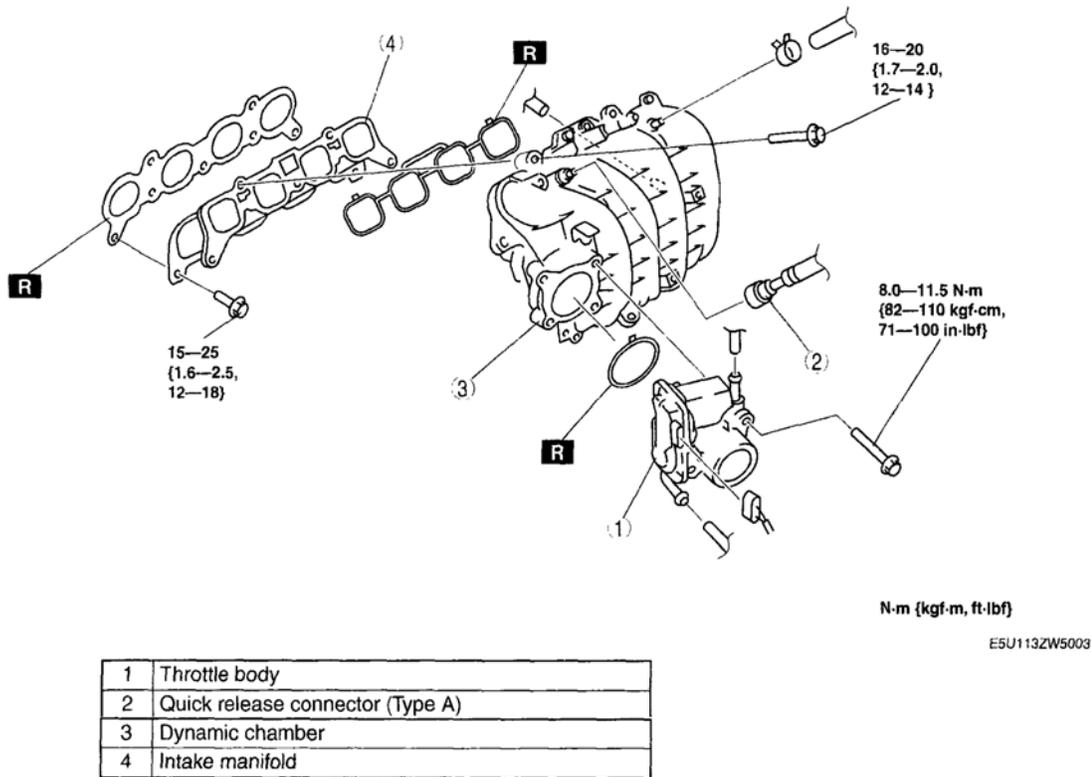
## 2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata



**Fig. 4: Identifying Removal Order Of Intake-Air System (Step 1) (With Torque Specifications)**  
Courtesy of MAZDA MOTORS CORP.

## 2008 Mazda MX-5 Miata Grand Touring

2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata



**Fig. 5: Identifying Removal Order Of Intake-Air System (Step 2) (With Torque Specifications)**  
Courtesy of MAZDA MOTORS CORP.

### AIR CLEANER COVER REMOVAL NOTE

1. Remove the MAF/IAT Sensor. (See MASS AIR FLOW (MAF)/INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/INSTALLATION [LF] .)

### AIR HOSE REMOVAL NOTE

1. Move the purge solenoid valve slightly out of the way. (See PURGE SOLENOID VALVE REMOVAL/INSTALLATION [LF] .)

### FRESH-AIR DUCT REMOVAL NOTE

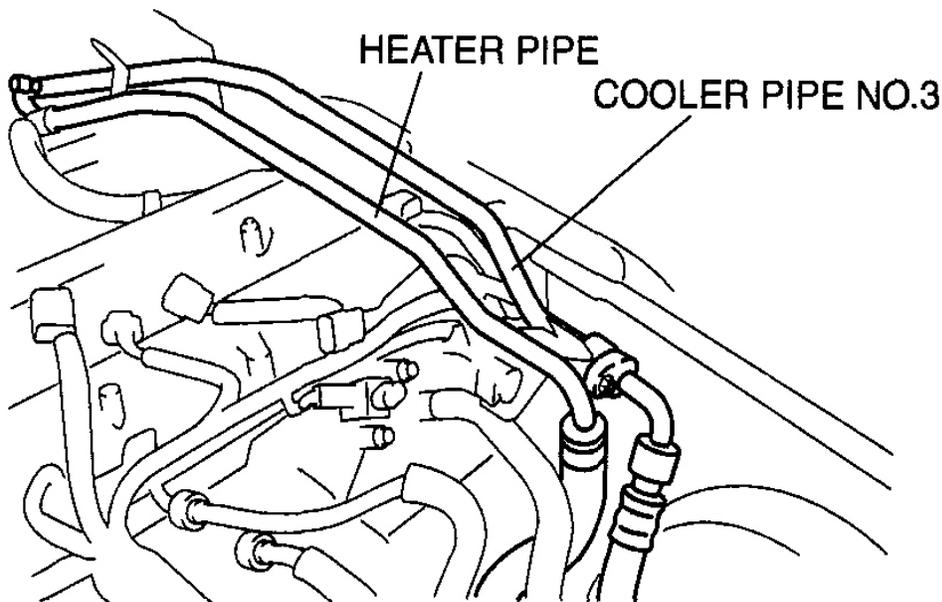
1. Remove the front bumper. (See FRONT BUMPER REMOVAL/INSTALLATION .)

### THROTTLE BODY REMOVAL NOTE

1. Drain the engine coolant. (See ENGINE COOLANT REPLACEMENT [LF] .)

### DYNAMIC CHAMBER REMOVAL NOTE

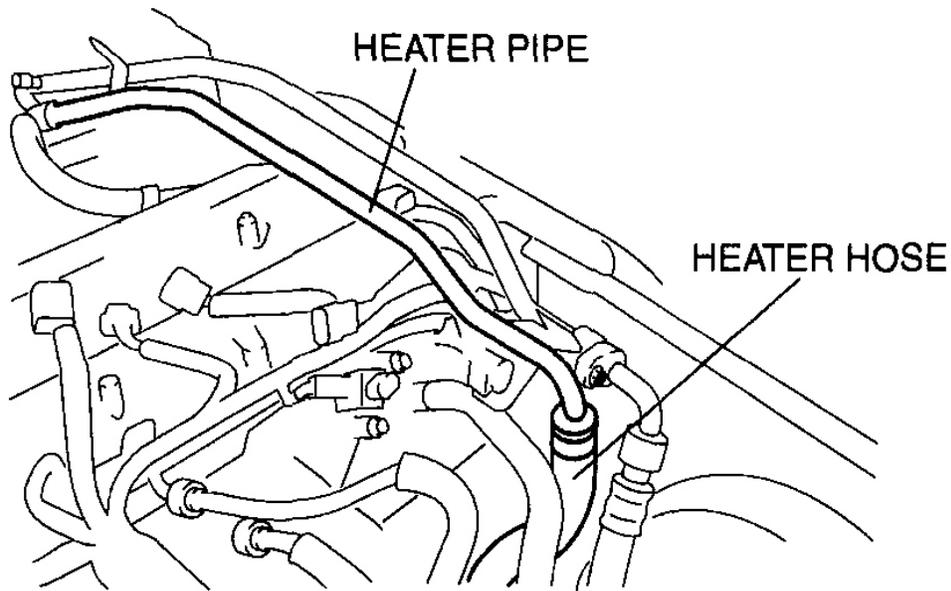
1. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
2. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
3. Remove the service hole cover.
  1. Remove the front suspension tower bar (joint), (right side) and (left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
  2. Remove the wiper arm. (See **WIPER ARM AND BLADE REMOVAL/INSTALLATION** .)
  3. Remove the cowl grille. (See **COWL GRILLE REMOVAL/INSTALLATION** .)
  4. Remove the side cowl grille. (See **SIDE COWL GRILLE REMOVAL/INSTALLATION** .)
  5. Move the cooler pipe No.3 and heater pipe slightly out of the way.
  6. Remove the service hole cover. (See **EGR VALVE REMOVAL/INSTALLATION [LF]** .)



E5U113ZW5016

**Fig. 6: View Of Cooler Pipe No.3 & Heater Pipe**  
Courtesy of MAZDA MOTORS CORP.

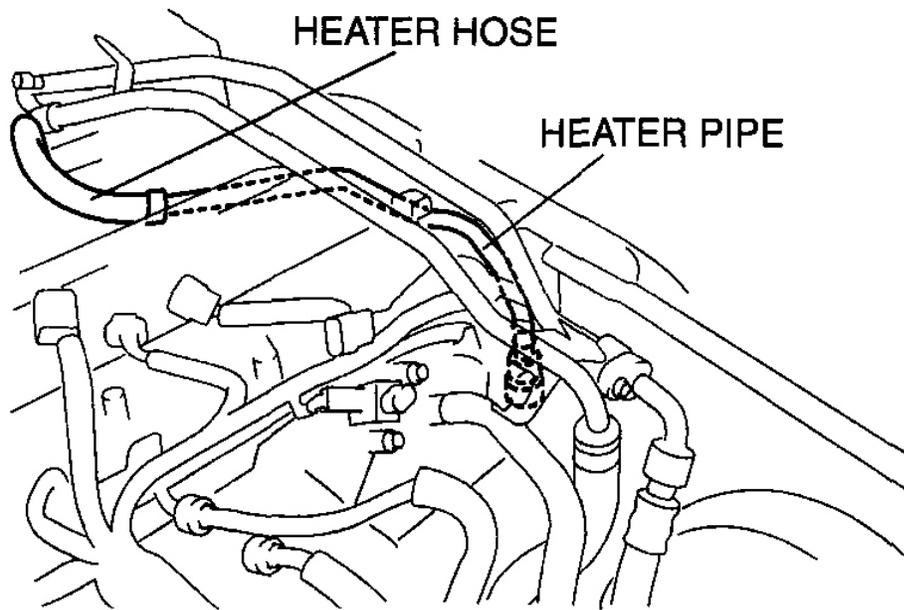
4. Disconnect the heater hose and move the heater pipe slightly out of the way.



E5U113ZW5017

**Fig. 7: View Of Heater Hose**  
Courtesy of MAZDA MOTORS CORP.

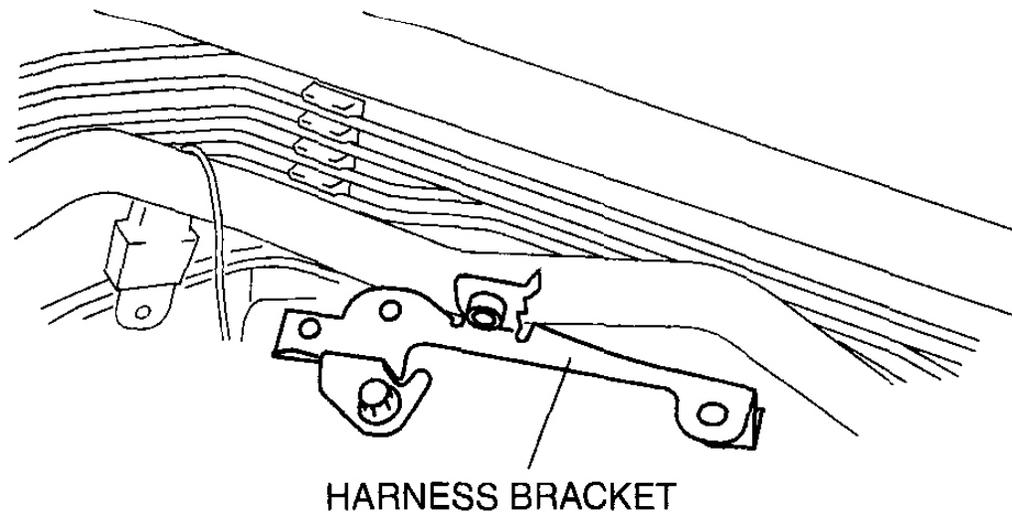
5. Disconnect the heater hose and move the heater pipe slightly out of the way.



E5U113ZW5018

**Fig. 8: Moving Heater Pipe**  
Courtesy of MAZDA MOTORS CORP.

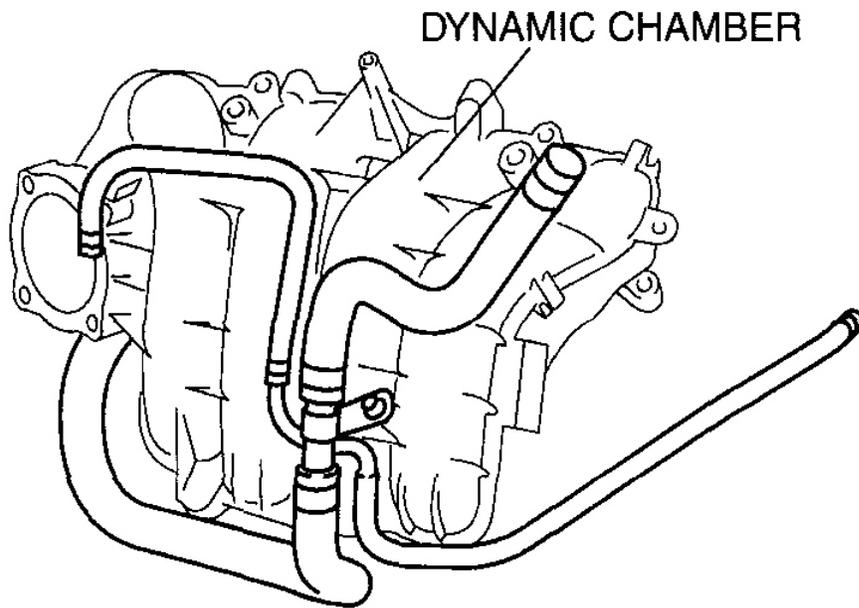
6. Remove the harness bracket.



E5U113ZW5021

**Fig. 9: View Of Harness Bracket**  
Courtesy of MAZDA MOTORS CORP.

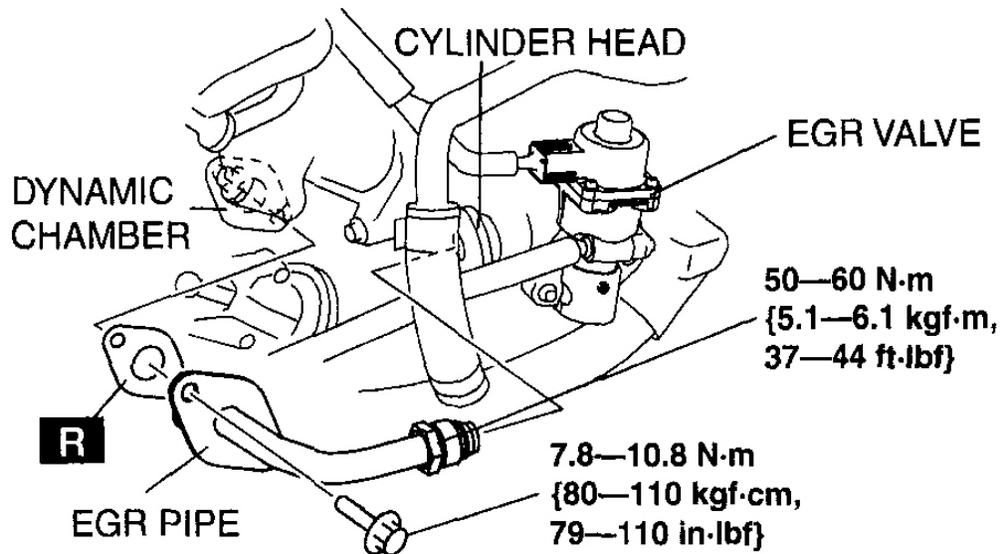
7. Remove the under cover. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
8. Disconnect the variable intake air solenoid valve connector, EGR valve connector, CMP sensor connector and PSP switch connector.
9. Disconnect the ignition coil connector and fuel injector connector and move the harness slightly out of the way.
10. Disconnect the quick release connector from the fuel distributor. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
11. Remove the fuel distributor. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
12. Disconnect the water hose from the EGR valve.
13. Disconnect two water hoses from the thermostat.
14. Remove the heater hose and heater pipe from the dynamic chamber.
15. Remove the variable intake air solenoid valve. (See **VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [LF]** .)
16. Remove the variable tumble solenoid valve. (See **VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [LF]**.)
17. Remove the dynamic chamber installation bolts.



E5U113ZW5020

**Fig. 10: View Of Heater Hose & Heater Pipe On Dynamic Chamber**  
Courtesy of MAZDA MOTORS CORP.

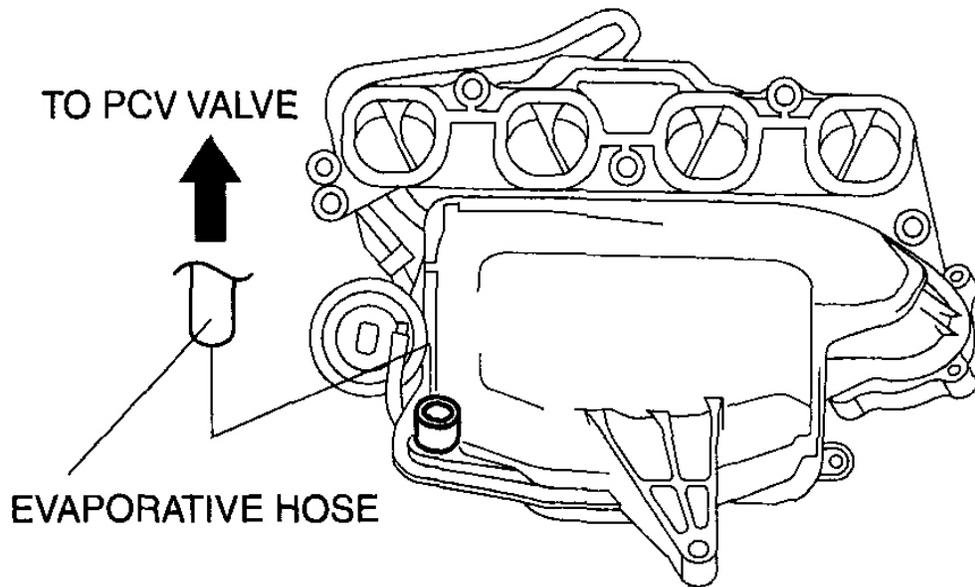
18. Remove the EGR pipe.



E5U116ZW5008

**Fig. 11: Identifying EGR Pipe (With Torque Specifications)**  
Courtesy of MAZDA MOTORS CORP.

19. Disconnect the connector from the A/C compressor.
20. Disconnect the knock sensor connector.
21. Move the vacuum hose between the purge solenoid valve and the charcoal canister slightly out of the way.
22. Move the clutch release cylinder slightly out of the way. (MT) (See **CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION** .)
23. Disconnect the evaporative hose with the dynamic chamber raised.



E5U113ZW5004

**Fig. 12: Disconnecting Evaporative Hose**  
Courtesy of MAZDA MOTORS CORP.

24. Remove the dynamic chamber.
25. Remove the variable intake air shutter valve actuator. (See **VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]** .)
26. Remove the MAP sensor. (See **MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR REMOVAL/INSTALLATION [LF]** .)

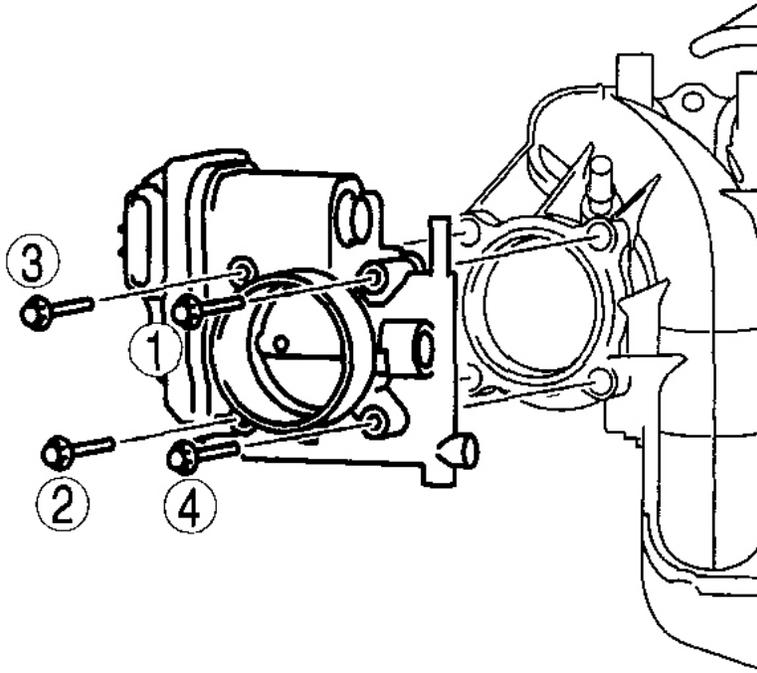
#### **INTAKE MANIFOLD REMOVAL NOTE (AT)**

1. Remove the intake manifold.
2. Remove the variable tumble shutter valve actuator. (See **VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]**.)

#### **THROTTLE BODY INSTALLATION NOTE**

1. Tighten the bolts in the order as shown in **Fig. 13** .

**Throttle body tightening torque 8.0-11.5 N.m {82-110 kgf.cm, 71-100 in.lbf}**



E5U113ZW5100

**Fig. 13: Identifying Tightening Sequence Of Throttle Body Bolts**  
Courtesy of MAZDA MOTORS CORP.

## AIR CLEANER ELEMENT INSPECTION [LF]

1. Remove the air cleaner element. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF] .)
2. Inspect the following items:
  - If there is any abnormality, clean or replace the air cleaner element.
    - Has the replacement interval come?
    - Is the air cleaner element soiled, damaged, or bent?
    - Are the air cleaner case and the air cleaner element correctly sealed?
    - Is the correct air cleaner element installed?

## THROTTLE BODY INSPECTION [LF]

**NOTE:**                   • Perform the following inspection only when directed.

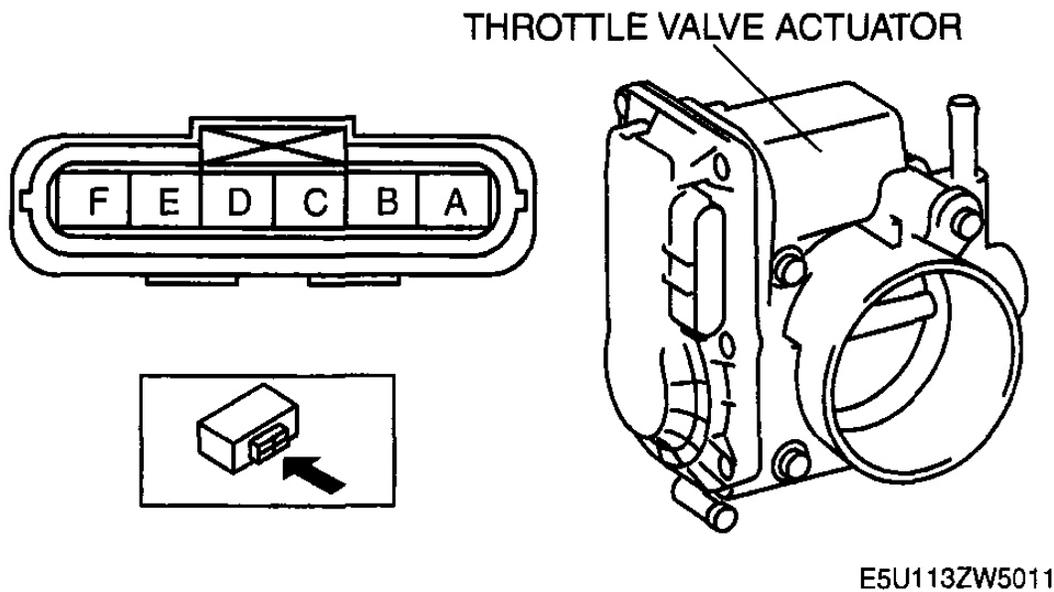
## RESISTANCE INSPECTION

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Disconnect the throttle body connector.
4. Measure the resistance between throttle actuator terminals A and B.
  - If not as specified, replace the throttle body. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
  - If as specified, carry out the **Circuit Open/Short Inspection** .

**Specification**

**AMBIENT TEMPERATURE SPECIFICATION**

Ambient temperature (°C {°F})	Resistance (ohm)
Approx. 20 {68}	0.3-100

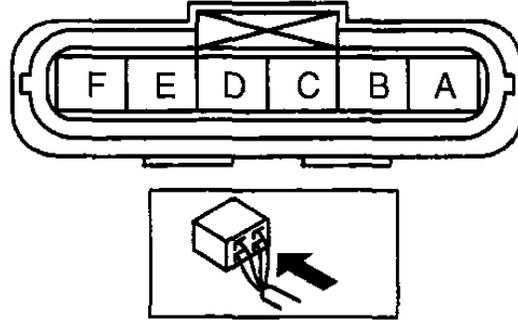


**Fig. 14: Identifying Throttle Actuator Connector Terminals**  
 Courtesy of MAZDA MOTORS CORP.

**CIRCUIT OPEN/SHORT INSPECTION**

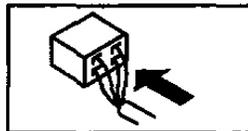
1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harnesses for open or short (continuity check).

THROTTLE VALVE ACTUATOR  
WIRING HARNESS-SIDE  
CONNECTOR



PCM  
WIRING HARNESS-SIDE CONNECTOR

2BE	2BA	2AW	2AS	2AO	2AK	2AG	2AC	2Y	2U	2Q	2M	2I	2E	2A
2BF	2BB	2AX	2AT	2AP	2AL	2AH	2AD	2Z	2V	2R	2N	2J	2F	2B
2BG	2BC	2AY	2AU	2AQ	2AM	2AI	2AE	2AA	2W	2S	2O	2K	2G	2C
2BH	2BD	2AZ	2AV	2AR	2AN	2AJ	2AF	2AB	2X	2T	2P	2L	2H	2D



E5U114ZW5013

**Fig. 15: Identifying Throttle Valve Actuator & PCM Connector Terminals**  
Courtesy of MAZDA MOTORS CORP.

**Open Circuit**

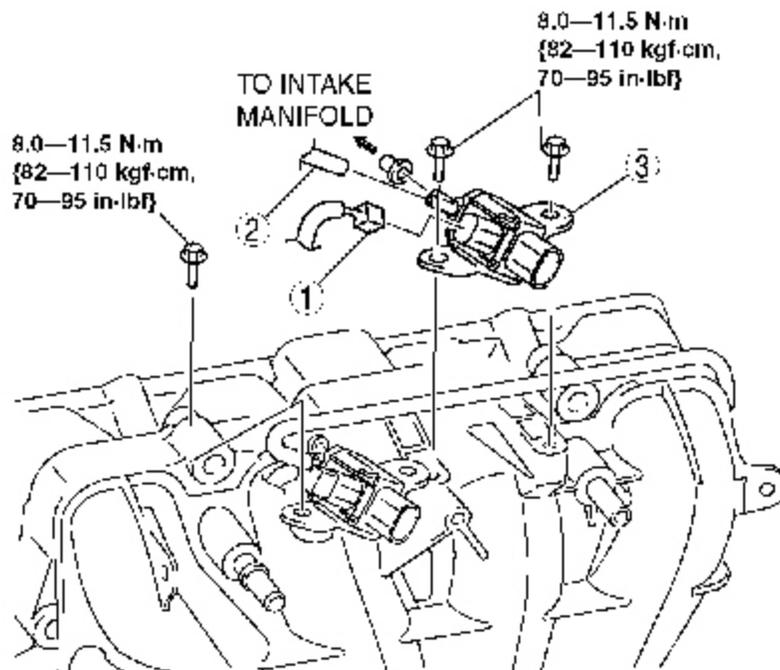
- If there is no continuity, the circuit is open. Repair or replace the wiring harness.
  - Throttle valve actuator terminal A and PCM terminal 2B
  - Throttle valve actuator terminal B and PCM terminal 2A

**Short Circuit**

- If there is continuity, the circuit is shorted. Repair or replace the wiring harness.
  - Throttle valve actuator terminal A and power supply
  - Throttle valve actuator terminal A and ground
  - Throttle valve actuator terminal B and power supply
  - Throttle valve actuator terminal B and ground

## VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [LF]

1. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
2. Remove the battery cover.
3. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
4. Move the variable tumble solenoid valve (AT), slightly out of the way. (See **VARIABLE TUMBLE SOLENOID VALVE REMOVAL/INSTALLATION [LF]**.)
5. Remove in the order indicated in the table. .
6. Install in the reverse order of removal.



**Fig. 16: Identifying Removal Order Of Variable Intake Air Solenoid Valve (With Torque**

**Specifications)**

Courtesy of MAZDA MOTORS CORP.

**Removal Order Of Variable Intake Air Solenoid Valve**

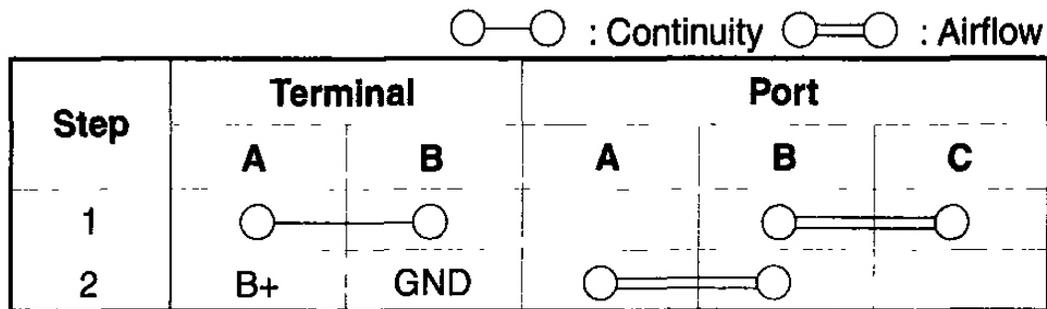
1	Connector
2	Vacuum hose
3	Variable Intake air solenoid valve

**VARIABLE INTAKE AIR SOLENOID VALVE INSPECTION [LF]**

**NOTE:**           • Perform the following inspection only when directed.

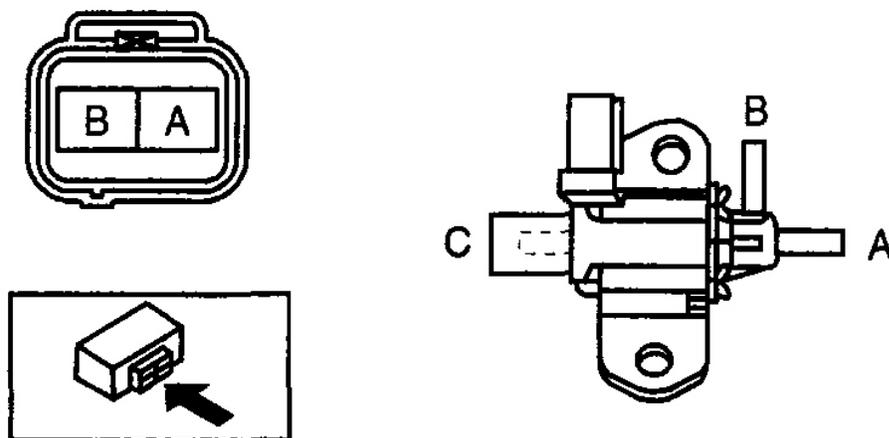
**AIRFLOW INSPECTION**

1. Remove the battery cover
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the variable intake air solenoid valve. (See **VARIABLE INTAKE AIR SOLENOID VALVE REMOVAL/INSTALLATION [LF]** .)
4. Inspect airflow between the ports under the following conditions.
  - If not as specified, replace the variable intake air solenoid valve.
  - If as specified, carry out the **Circuit Open/Short Inspection** .



C3U0113W011

**Fig. 17: Variable Intake Air Solenoid Valve Continuity Check Table**  
 Courtesy of MAZDA MOTORS CORP.



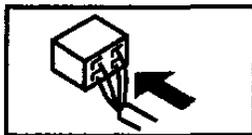
E5U113ZW5013

**Fig. 18: Identifying Variable Intake Air Solenoid Valve Ports**  
Courtesy of MAZDA MOTORS CORP.

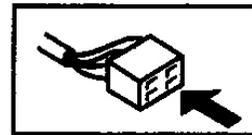
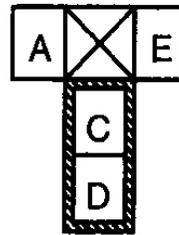
### CIRCUIT OPEN/SHORT INSPECTION

1. Disconnect the PCM connector. (See **PCM REMOVAL/INSTALLATION [LF]** .)
2. Inspect the following wiring harness for open or short (continuity check).

VARIABLE INTAKE AIR  
SOLENOID VALVE  
WIRING HARNESS-SIDE  
CONNECTOR

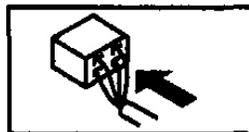


MAIN FUSE BLOCK  
(MAIN RELAY)



PCM  
WIRING HARNESS-SIDE CONNECTOR

2BE	2BA	2AW	2AS	2AO	2AK	2AG	2AC	2Y	2U	2Q	2M	2I	2E	2A
2BF	2BB	2AX	2AT	2AP	2AL	2AH	2AD	2Z	2V	2R	2N	2J	2F	2B
—————							—————							
2BG	2BC	2AY	2AU	2AQ	2AM	2AI	2AE	2AA	2W	2S	2O	2K	2G	2C
2BH	2BD	2AZ	2AV	2AR	2AN	2AJ	2AF	2AB	2X	2T	2P	2L	2H	2D



E5U113ZW5014

**Fig. 19: Identifying Variable Intake Air Solenoid Valve, Main Relay & PCM Connector Terminals**  
Courtesy of MAZDA MOTORS CORP.

**Open Circuit**

- If there is no continuity, the circuit is open. Repair or replace the wiring harness.
  - Variable intake air solenoid valve terminal B and PCM terminal 2J
  - Variable intake air solenoid valve terminal A and main relay

**Short Circuit**

- If there is continuity, the circuit is shorted. Repair or replace the wiring harness.
  - Variable tumble solenoid valve terminal B and power supply
  - Variable tumble solenoid valve terminal B and body ground
  - Variable tumble solenoid valve terminal A and body ground

## **VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [LF]**

1. Remove the service hole cover. (See **EGR VALVE REMOVAL/INSTALLATION [LF]** .)
2. Disconnect the vacuum hose from the variable tumble solenoid valve.
3. Connect a vacuum pump to the vacuum hose.

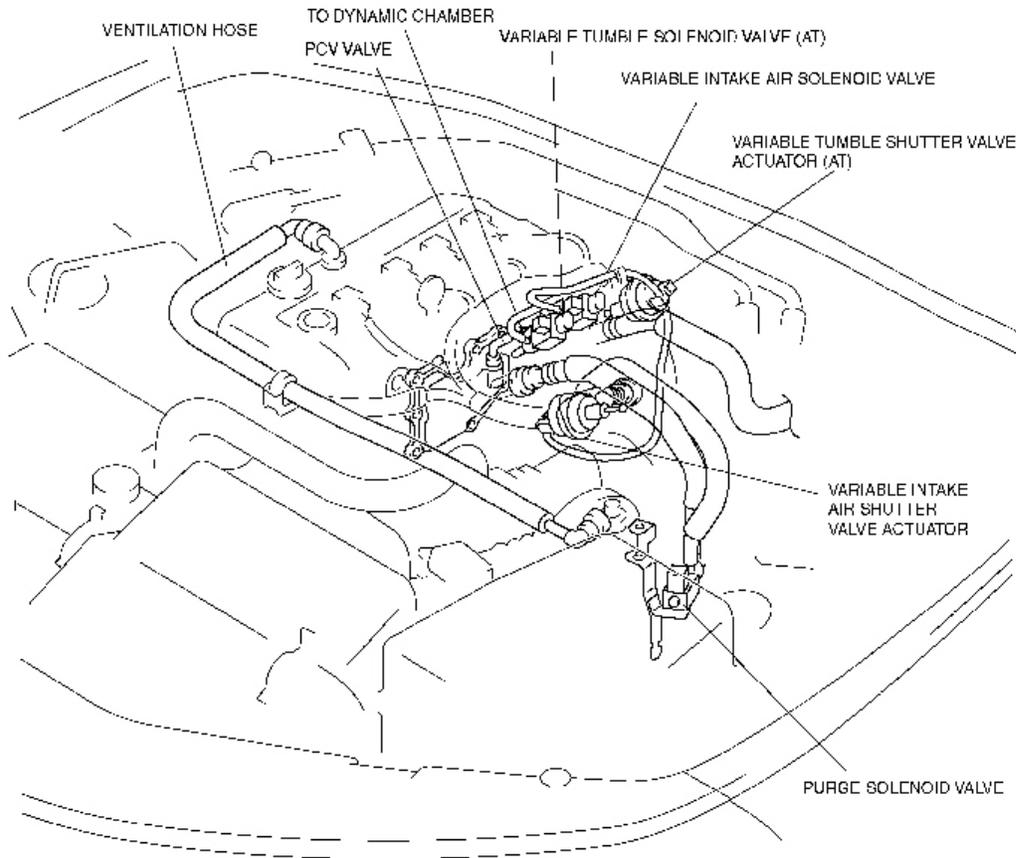
**NOTE:**

- **Verify that the variable tumble shutter valve actuator rod moves using a mirror.**

4. Apply vacuum and verify that the rod moves.
  - If the rod does not move, replace the variable tumble shutter valve actuator. (See **VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]** .)

## 2008 Mazda MX-5 Miata Grand Touring

2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata



**Fig. 20: View Of Variable Tumble Solenoid Valve & Actuator**  
Courtesy of MAZDA MOTORS CORP.

### VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR ROD OPERATION REFERENCE

Vacuum kPa {mmHg, inHg}	Rod movement
Below -2.7 {-21, -0.9}	Not operate
Above -33.4 {-251, -9.89}	Fully pulled

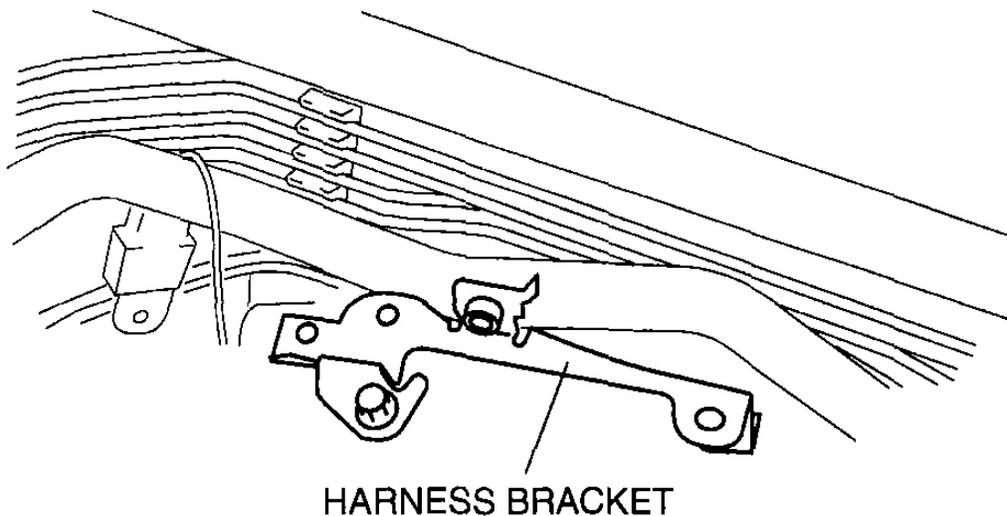
### VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [LF]

**WARNING:**

- A hot engine and intake-air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake-air system.
- Fuel line spills and leakage from the pressurized fuel system are

**dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION [LF]".**

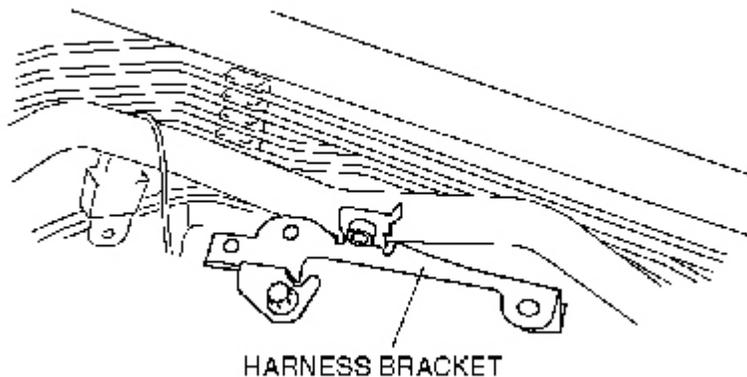
1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove the throttle body. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
4. Disconnect the quick release connector (Type A) (See **QUICK RELEASE CONNECTOR (EMISSION SYSTEM) REMOVAL/INSTALLATION [LF]** .)
5. Remove the plug hole plate. (See **PLUG HOLE PLATE REMOVAL/INSTALLATION [LF]** .)
6. Remove the service hole cover.
  1. Remove the front suspension tower bar (joint), (right side) and (left side). (See **FRONT SUSPENSION TOWER BAR REMOVAL/INSTALLATION** .)
  2. Remove the wiper arm. (See **WIPER ARM AND BLADE REMOVAL/INSTALLATION** .)
  3. Remove the cowl grille. (See **COWL GRILLE REMOVAL/INSTALLATION** .)
  4. Remove the side cowl grille. (See **SIDE COWL GRILLE REMOVAL/INSTALLATION** .)
  5. Remove the service hole cover. (See **EGR VALVE REMOVAL/INSTALLATION [LF]** .)
7. Remove the harness bracket.



E5U113ZW5021

**Fig. 21: Identifying Harness Bracket**  
Courtesy of MAZDA MOTORS CORP.

8. Follow "BEFORE SERVICE PRECAUTION" before performing any work operations to prevent fuel from spilling from the fuel system. (See **BEFORE SERVICE PRECAUTION [LF]** .)
9. Remove the under cover. (See **TRANSVERSE MEMBER REMOVAL/INSTALLATION** .)
10. Disconnect the quick release connector from the fuel distributor. (See **QUICK RELEASE CONNECTOR (FUEL SYSTEM) REMOVAL/INSTALLATION [LF]** .)
11. Remove the fuel distributor. (See **FUEL INJECTOR REMOVAL/INSTALLATION [LF]** .)
12. Move the clutch release cylinder slightly out of the way. (MT) (See **CLUTCH RELEASE CYLINDER REMOVAL/INSTALLATION** .)

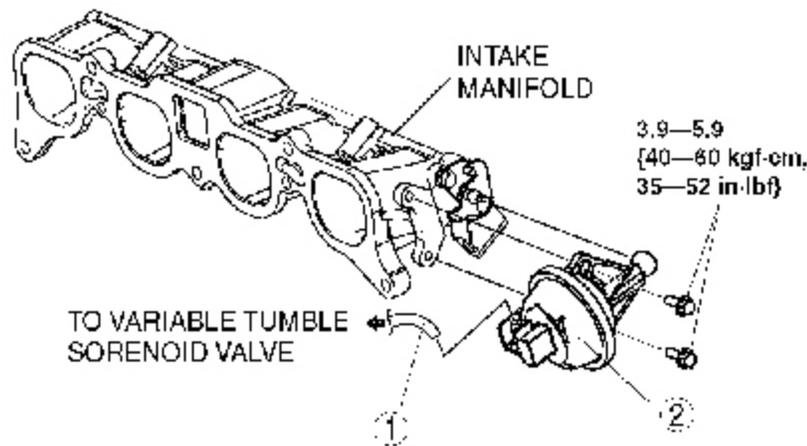


**Fig. 22: View Of Harness Bracket**  
Courtesy of MAZDA MOTORS CORP.

13. Remove the dynamic chamber. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [LF]** .)
14. Remove in the order indicated in the table. .

## 2008 Mazda MX-5 Miata Grand Touring

2008 ENGINE PERFORMANCE Intake Air System - MX-5 Miata



**Fig. 23: Identifying Removal Order Of Variable Intake Air Shutter Valve Actuator (With Torque Specifications)**

Courtesy of MAZDA MOTORS CORP.

### Removal Order Of Variable Intake Air Shutter Valve Actuator (With Torque Specifications)

1	Vacuum Hose
2	Variable Tumble Shutter Valve Actuator

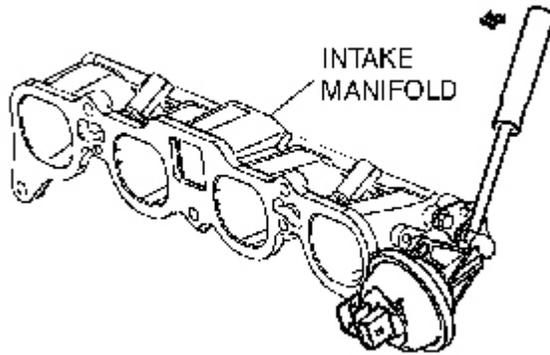
15. Install in the reverse order of removal.

### VARIABLE TUMBLE SHUTTER VALVE ACTUATOR REMOVAL NOTE

1. Disengage the variable tumble shutter valve actuator rod from the dynamic chamber on the opposite side using a suitable screwdriver or equivalent tool as shown in the figure. .

#### CAUTION:

- Do not remove the lever, otherwise the variable tumble shutter valve opening angle will deviate. To prevent removal of the lever when removing the variable intake shutter valve actuator, press the lever firmly to the dynamic chamber side by hand.



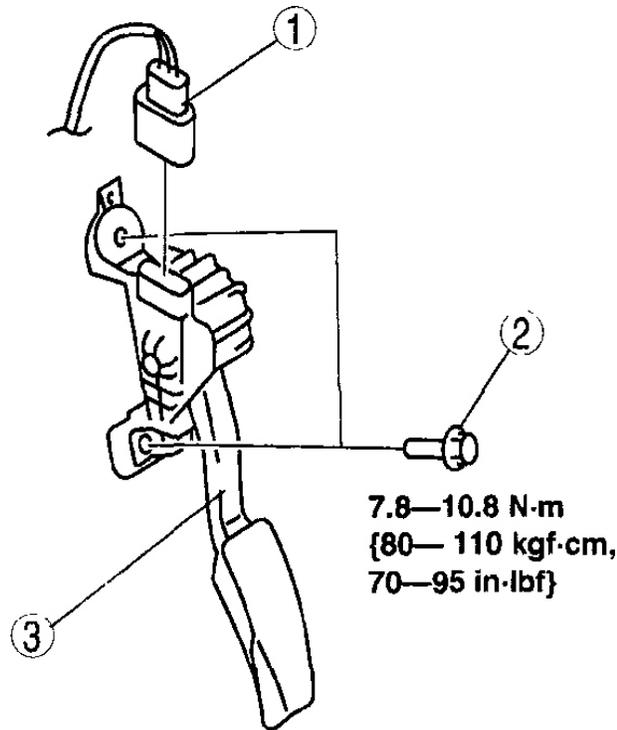
**Fig. 24: Disengaging Variable Intake Air Shutter Valve Actuator Rod From Dynamic Chamber**  
Courtesy of MAZDA MOTORS CORP.

#### **VARIABLE INTAKE AIR SHUTTER VALVE ACTUATOR INSTALLATION NOTE**

1. Press the variable tumble shutter valve actuator rod into the dynamic chamber on the opposite side until a click is heard, and install it.

#### **ACCELERATOR PEDAL REMOVAL/INSTALLATION [LF]**

1. Remove the battery cover.
2. Disconnect the negative battery cable. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3. Remove in the order indicated in **Fig. 25** .



E5U113ZW5005

1	Connector
2	Installation bolt
3	Accelerator pedal

**Fig. 25: Identifying Removal Order Of Accelerator Pedal (With Torque Specifications)**  
Courtesy of MAZDA MOTORS CORP.

4. Install in the reverse order of removal.