

## 2005 Mazda MX-5 Miata

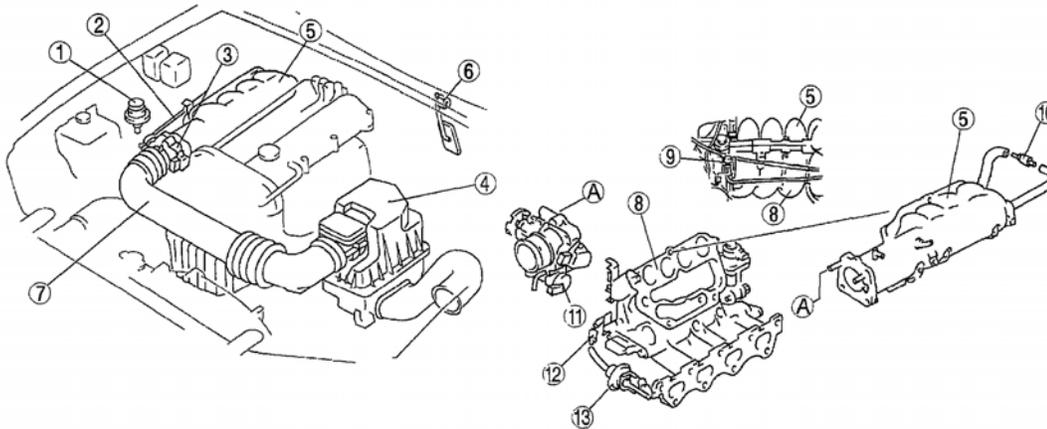
2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata

### 2005 ENGINE PERFORMANCE

#### Intake - Air System - MX-5 Miata

## INTAKE-AIR SYSTEM LOCATION INDEX (BP, BP WITH TC)

BP, BP WITH TC



1	VTCS vacuum switch (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) VACUUM SWITCH INSPECTION [BP, BP WITH TC])
2	Accelerator cable (See ACCELERATOR CABLE INSPECTION/ADJUSTMENT [BP, BP WITH TC])
3	Throttle body (TB) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP]) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC])
4	Air cleaner (ACL) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP]) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC])
5	Dynamic chamber (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP]) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC])
6	Accelerator pedal (AP) (See ACCELERATOR PEDAL (AP) REMOVAL/INSTALLATION [BP, BP WITH TC])
7	Air hose (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP])
8	Intake manifold (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP]) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [BP WITH TC])

9	VTCS solenoid valve (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE REMOVAL/INSTALLATION [BP, BP WITH TC]) (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION [BP, BP WITH TC])
10	VTCS check valve (one-way) (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION [BP, BP WITH TC]) (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION [BP, BP WITH TC])
11	IAC valve (See IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION [BP, BP WITH TC]) (See IDLE AIR CONTROL (IAC) VALVE INSPECTION [BP, BP WITH TC])
12	Delay valve (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION [BP, BP WITH TC]) (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION [BP, BP WITH TC])
13	VTCS shutter valve actuator (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION [BP, BP WITH TC]) (See VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION [BP, BP WITH TC])

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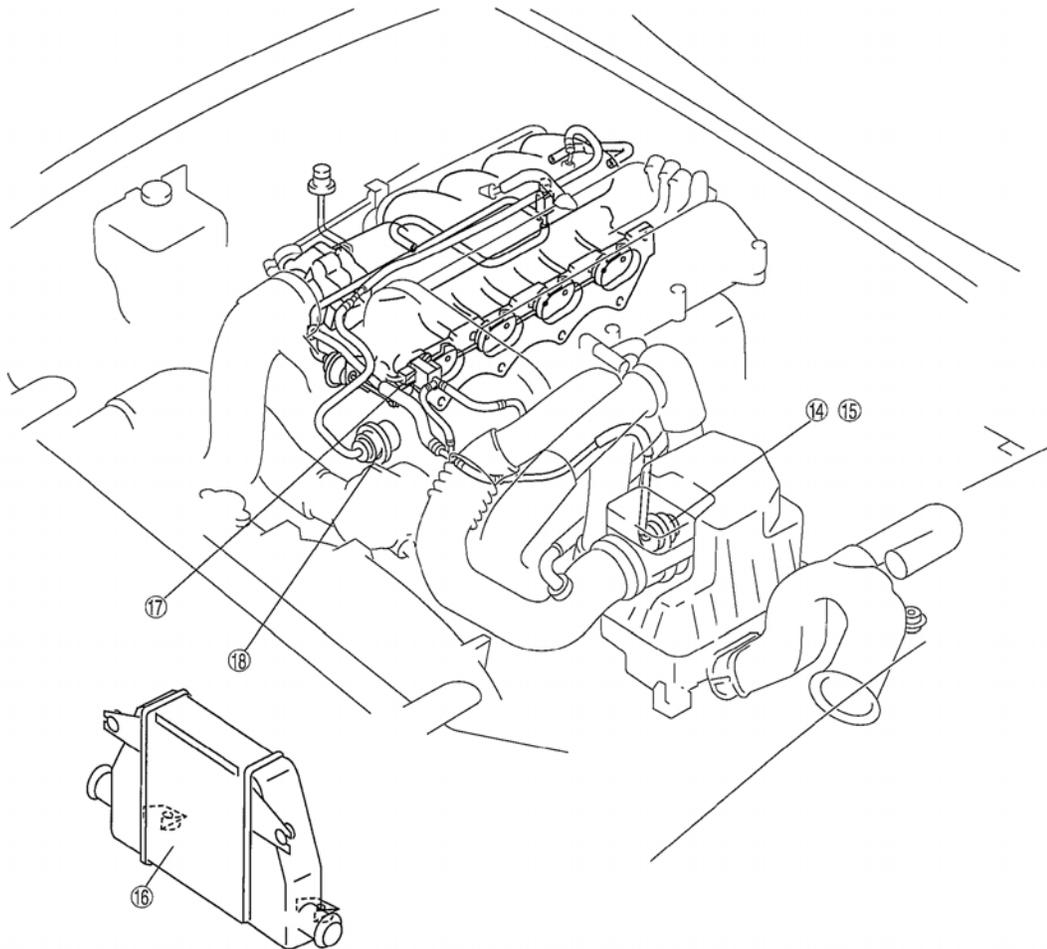
**Fig. 1: Identifying Intake-Air System Location Index (BP, BP With TC)**

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Courtesy of MAZDA MOTORS CORP.

BP WITH TC



14	Turbocharger (See TURBOCHARGER REMOVAL/INSTALLATION [BP WITH TC]) (See TURBOCHARGER INSPECTION [BP WITH TC])	16	Charge air cooler (See CHARGE AIR COOLER REMOVAL/INSTALLATION [BP WITH TC])
15	Wastegate actuator (See WASTEGATE ACTUATOR INSPECTION [BP WITH TC])	17	Turbocharger wastegate regulating valve (See TURBOCHARGER WASTEGATE REGULATING VALVE INSPECTION [BP WITH TC])
		18	Air bypass valve (See AIR BYPASS VALVE INSPECTION [BP WITH TC])

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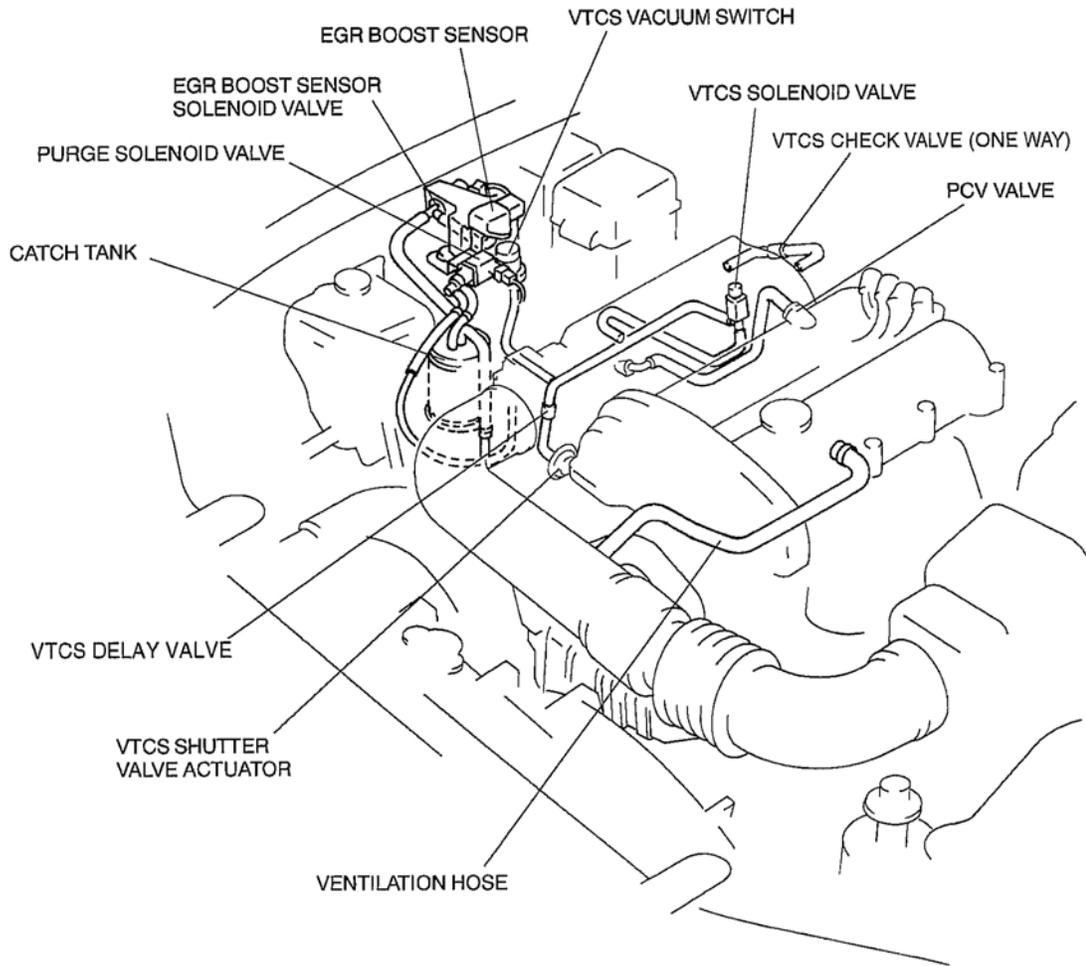
**Fig. 2: Identifying Intake-Air System Location Index (BP With TC)**

Courtesy of MAZDA MOTORS CORP.

**VACUUM HOSE ROUTING DIAGRAM (BP)**

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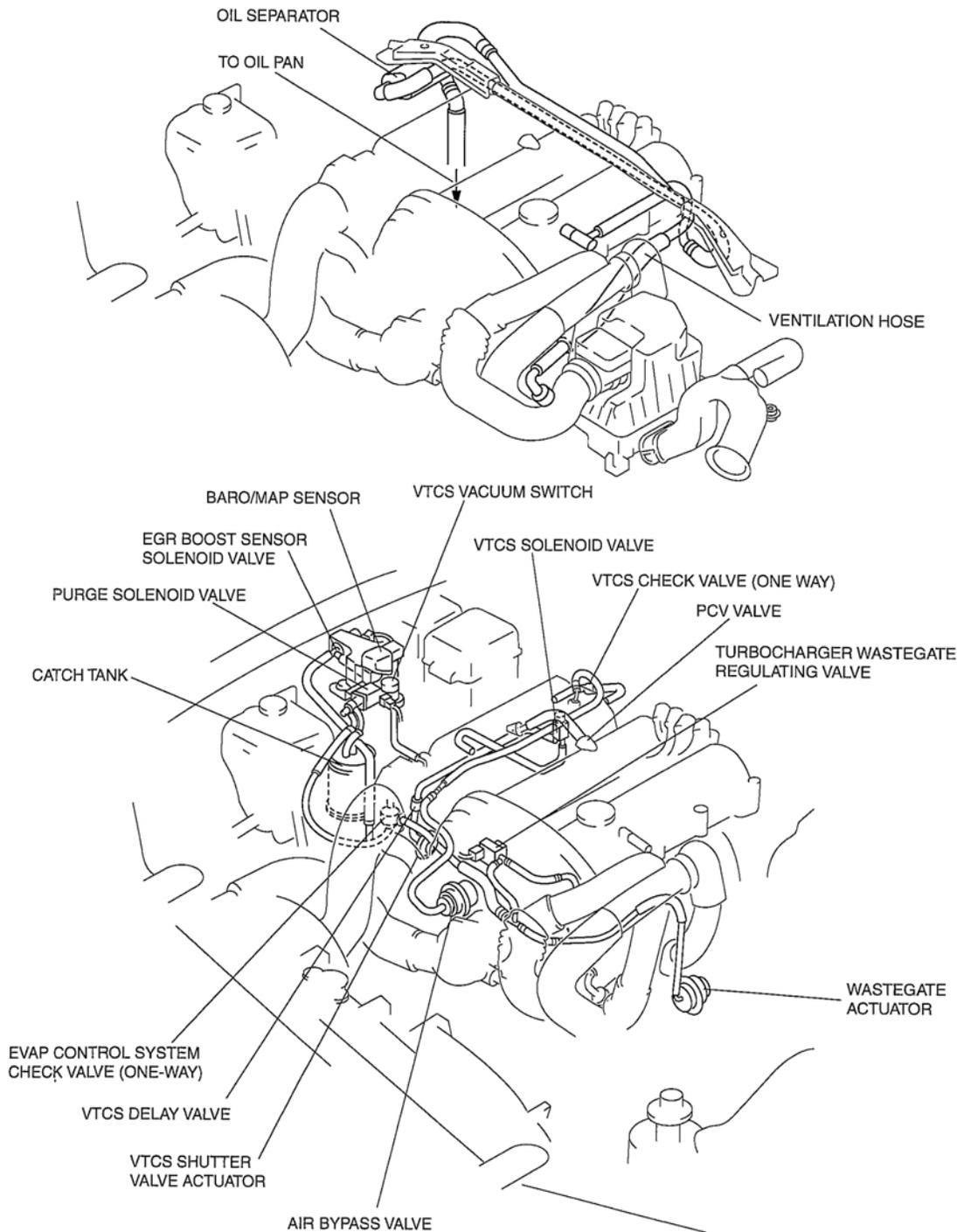
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**Fig. 3: Identifying Vacuum Hose Routing Diagram (BP)**  
Courtesy of MAZDA MOTORS CORP.

## VACUUM HOSE ROUTING DIAGRAM (BP WITH TC)

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**Fig. 4: Identifying Vacuum Hose Routing Diagram (BP With TC)**  
Courtesy of MAZDA MOTORS CORP.

### INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP)

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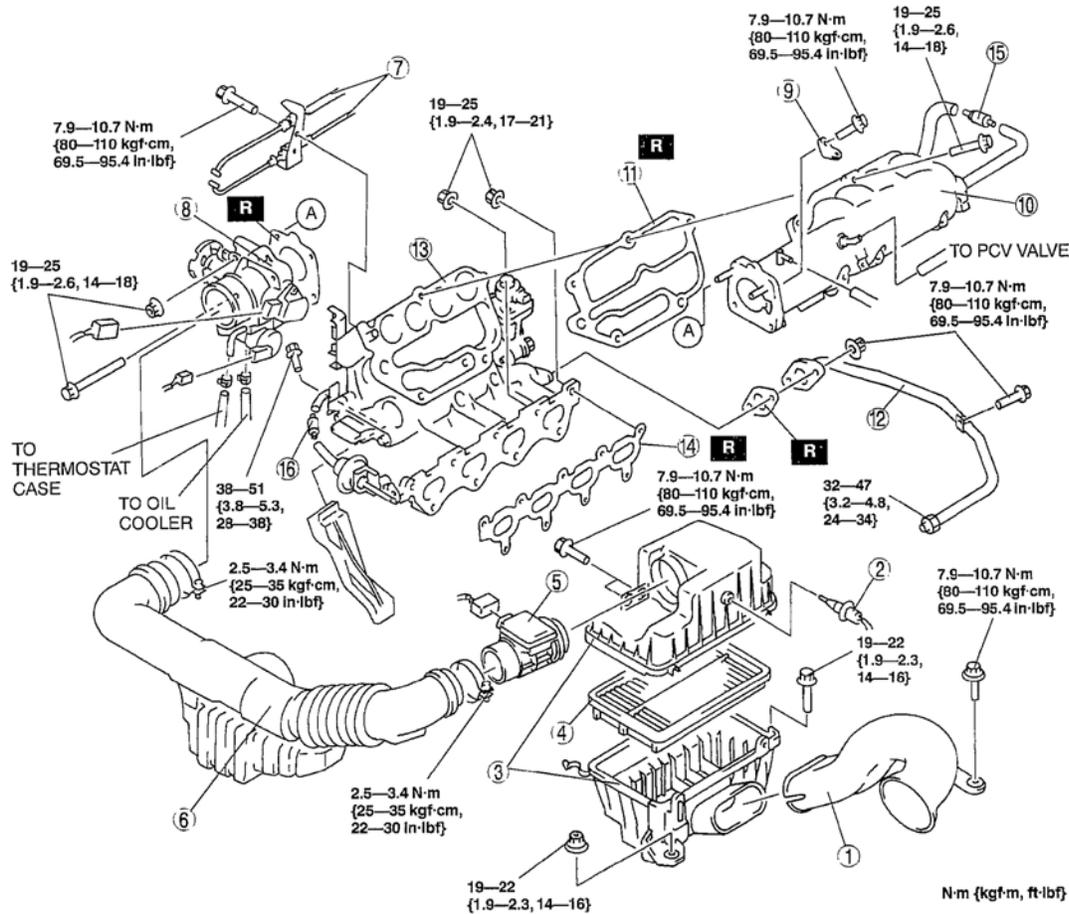
**WARNING:**

- **Hot engines and the intake-air system can cause severe burns. Turn off the engine and wait until it and the intake-air system are cool before removing the intake-air system.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant from the radiator. (See ENGINE COOLANT REPLACEMENT .)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Refill the radiator engine coolant. (See ENGINE COOLANT REPLACEMENT .)

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### 2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata



1	Fresh-air duct
2	IAT sensor
3	Air cleaner (ACL)
4	Air cleaner (ACL) element
5	MAF sensor
6	Air hose
7	Accelerator cable (and throttle cable (AT only))
8	Throttle body (TB)
9	Dynamic chamber bracket (See Dynamic Chamber Bracket Installation Note)

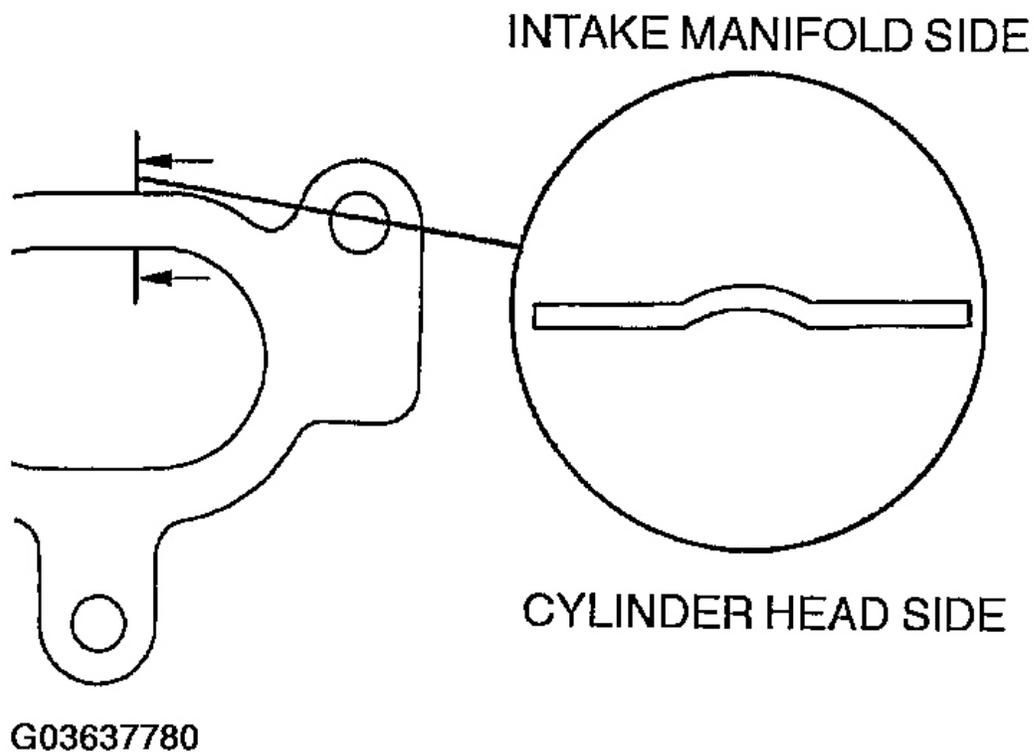
10	Dynamic chamber
11	Dynamic chamber gasket (See Dynamic Chamber Gasket Installation Note)
12	EGR pipe
13	Intake manifold
14	Intake manifold gasket (See Intake Manifold Gasket Installation Note)
15	VTCS check valve (one-way)
16	Delay valve

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**Fig. 5: Exploded View Of Intake-Air System (BP) & Torque Specifications**  
 Courtesy of MAZDA MOTORS CORP.

#### INTAKE MANIFOLD GASKET INSTALLATION NOTE

1. Install the intake manifold gasket with the convex side of the gasket facing the intake manifold side.

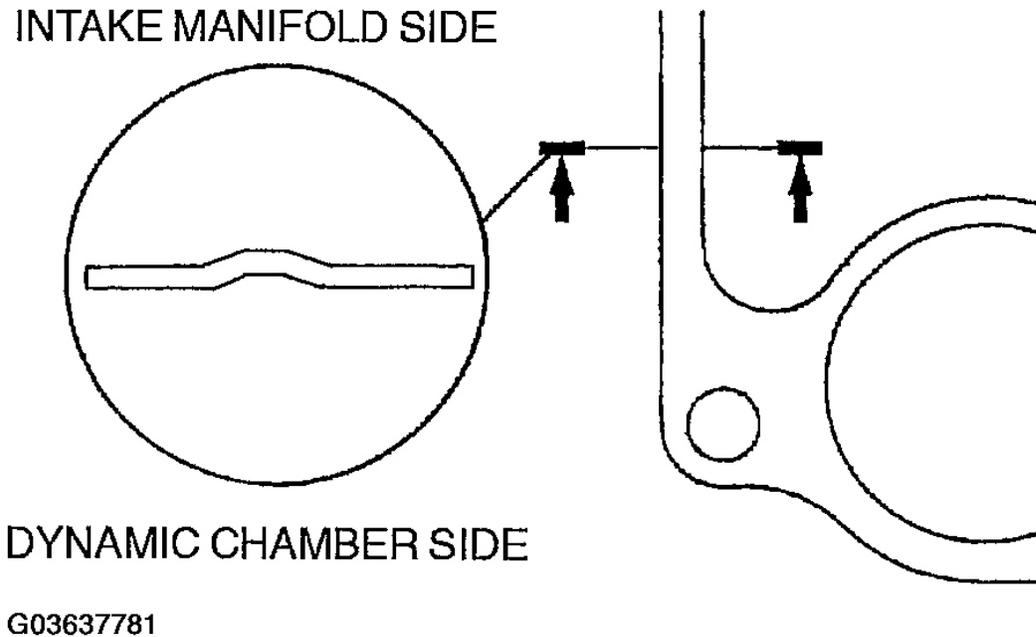


**Fig. 6: Installing Intake Manifold Gasket With Convex Side Of Gasket Facing Intake Manifold Side**

Courtesy of MAZDA MOTORS CORP.

**DYNAMIC CHAMBER GASKET INSTALLATION NOTE**

1. Install the dynamic chamber gasket with the convex side of the gasket facing the intake manifold side.



**Fig. 7: Installing Dynamic Chamber Gasket With Convex Side Of Gasket Facing Intake Manifold Side**

Courtesy of MAZDA MOTORS CORP.

#### DYNAMIC CHAMBER BRACKET INSTALLATION NOTE

1. Tighten the bolts firmly, then tighten the dynamic chamber side bolt before tightening the fuel distributor side bolt.

#### INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC)

##### WARNING:

- A hot engine and intake air system can cause severe burns. Turn off the engine and wait until all components 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". (See BEFORE SERVICE PRECAUTION (BP, BP WITH TC) .)

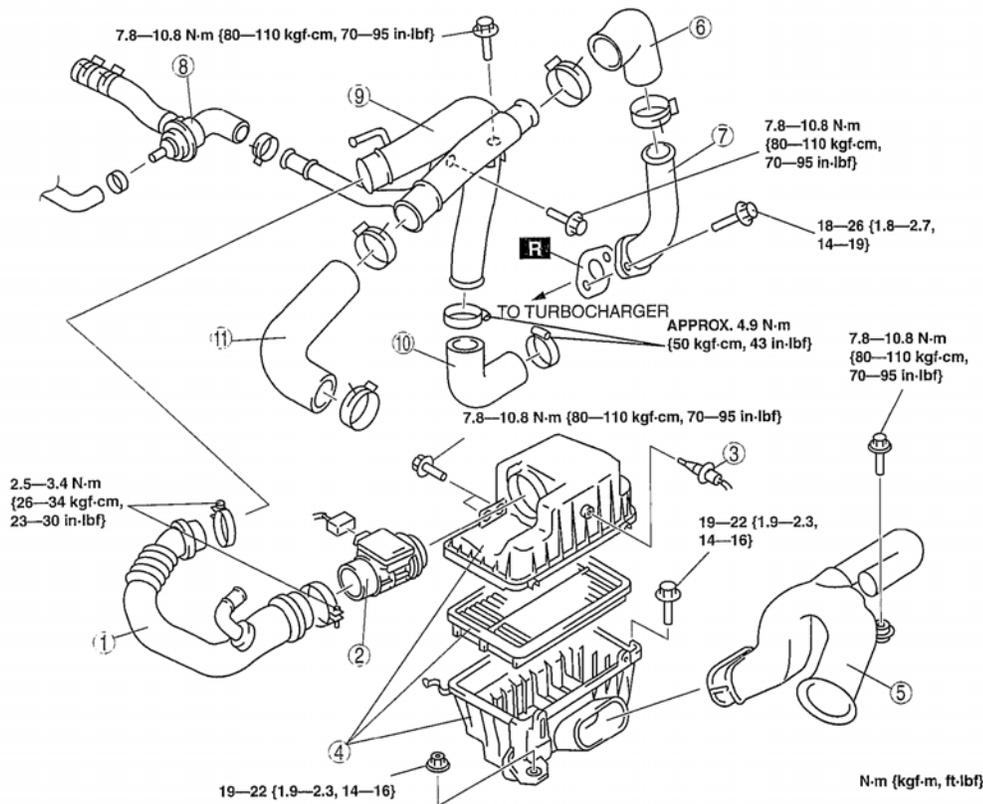
1. Disconnect the negative battery cable.
2. Drain the engine coolant from the radiator. (See ENGINE COOLANT REPLACEMENT .)
3. Remove the under cover.

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### 2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata

4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION (BP, BP WITH TC)** .)

#### STEP1



1	Air hose No.1
2	MAF sensor
3	IAT sensor No.1
4	Air cleaner
5	Fresh-air duct
6	Air hose No.3 (See Air Hose No.3 Removal Note.)

7	Air pipe No.2
8	Air bypass valve
9	Air pipe No.1
10	Air hose No.4
11	Air hose No.2

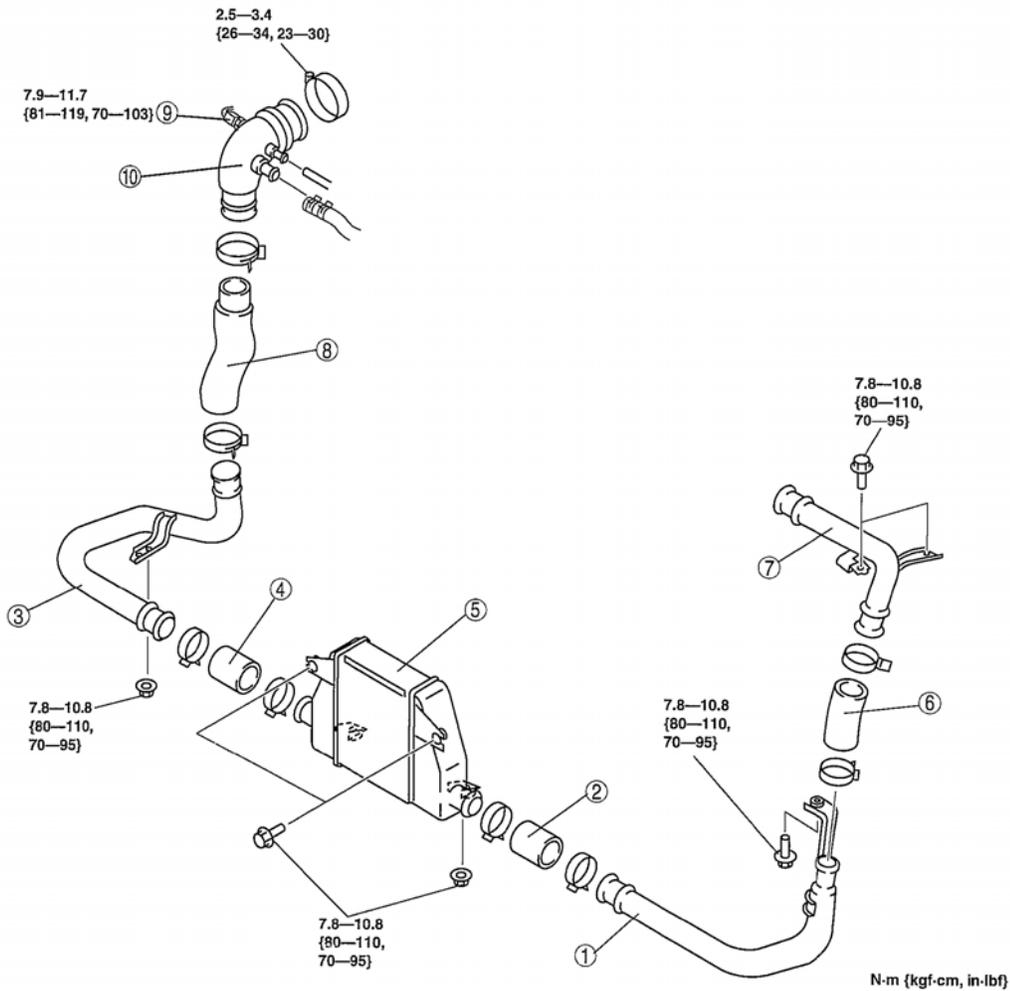
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**Fig. 8: Exploded View Of Intake-Air System (BP With TC) (Step1) & Torque Specifications**  
 Courtesy of MAZDA MOTORS CORP.

#### STEP2

# 2005 Mazda MX-5 Miata

## 2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata



1	Air pipe No.4
2	Air hose No.6
3	Air pipe No.5
4	Air hose No.7
5	Charge air cooler

6	Air hose No.5
7	Air pipe No.3
8	Air hose No.8
9	IAT sensor No.2
10	Air pipe No.6

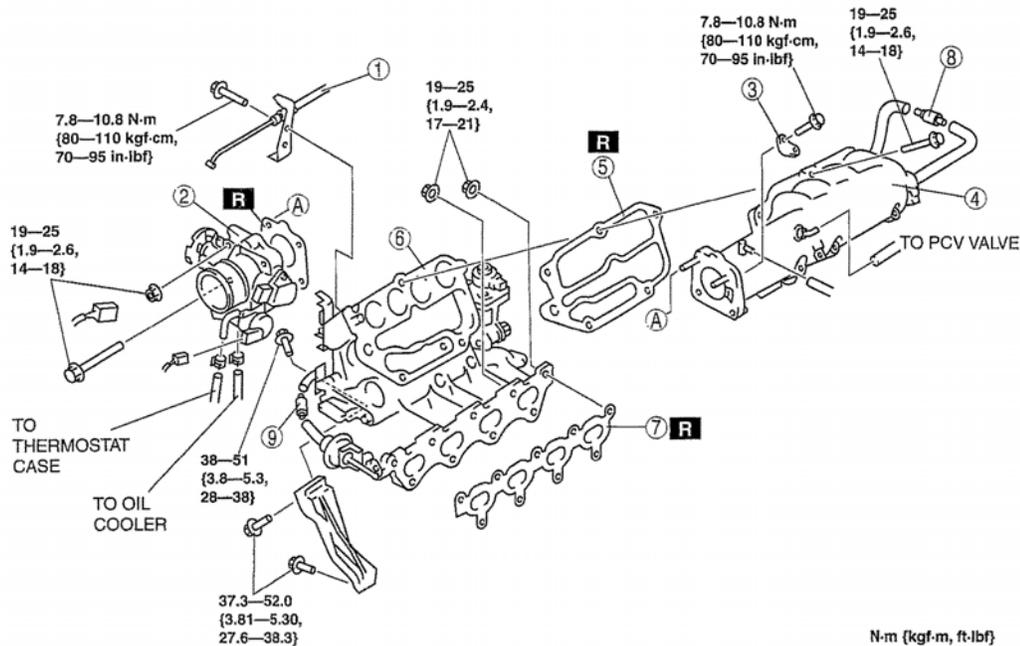
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**Fig. 9: Exploded View Of Intake-Air System (BP With TC) (Step2) & Torque Specifications**  
 Courtesy of MAZDA MOTORS CORP.

### STEP 3

## 2005 Mazda MX-5 Miata

### 2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata



1	Accelerator cable
2	Throttle body (TB)
3	Dynamic chamber bracket (See Dynamic Chamber Bracket Installation Note)
4	Dynamic chamber
5	Dynamic chamber gasket (See Dynamic Chamber Gasket Installation Note)

6	Intake manifold (See Intake Manifold Removal Note)
7	Intake manifold gasket (See Intake Manifold Gasket Installation Note)
8	VTCS check valve (one-way)
9	VTCS delay valve

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**Fig. 10: Exploded View Of Intake-Air System (BP With TC) (Step3) & Torque Specifications  
Courtesy of MAZDA MOTORS CORP.**

#### AIR HOSE NO.3 REMOVAL NOTE

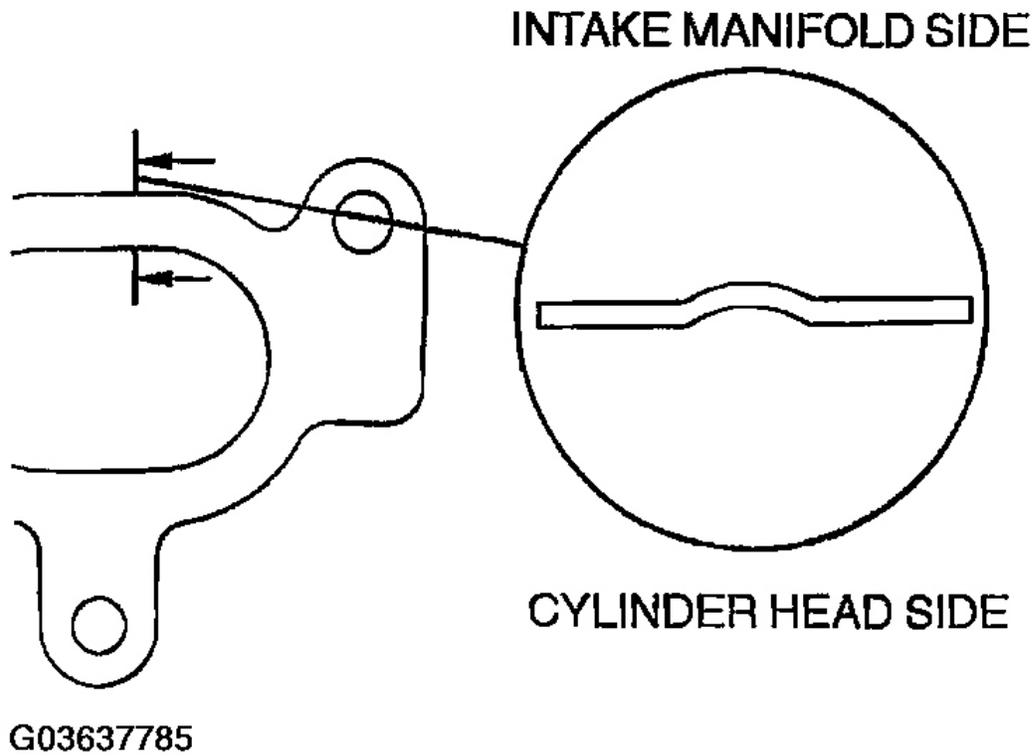
1. Position the windshield washer tank out of the way and remove the bracket. (See **WINDSHIELD WASHER TANK REMOVAL/INSTALLATION** .)

#### INTAKE MANIFOLD REMOVAL NOTE

1. Remove the EGR pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)

#### INTAKE MANIFOLD GASKET INSTALLATION NOTE

1. Install the intake manifold gasket with the convex side of the gasket facing the intake manifold side.



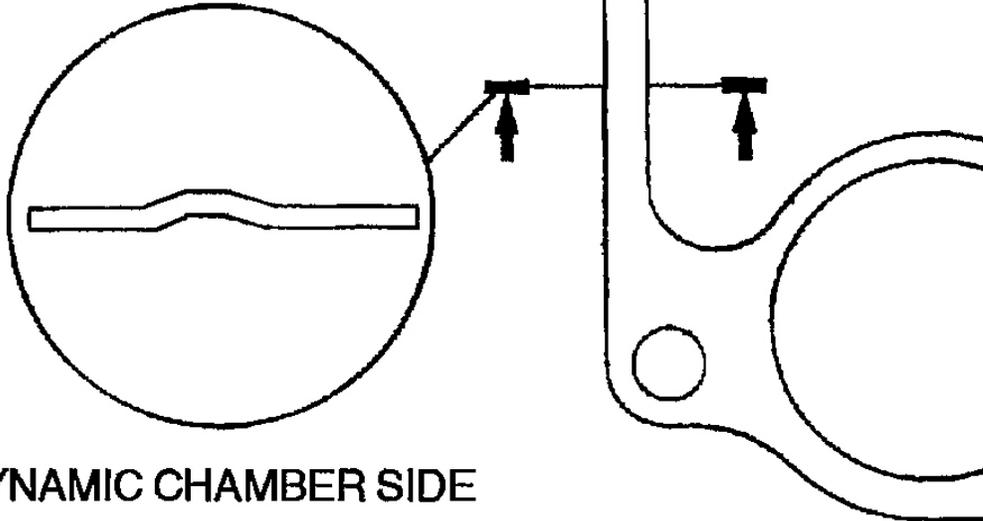
**Fig. 11: Installing Intake Manifold Gasket With Convex Side Of Gasket Facing Intake Manifold Side**

Courtesy of MAZDA MOTORS CORP.

#### **DYNAMIC CHAMBER GASKET INSTALLATION NOTE**

1. Install the dynamic chamber gasket with the convex side of the gasket facing the intake manifold side.

INTAKE MANIFOLD SIDE



DYNAMIC CHAMBER SIDE

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**Fig. 12: Installing Dynamic Chamber Gasket With Convex Side Of Gasket Facing Intake Manifold Side**

Courtesy of MAZDA MOTORS CORP.

#### DYNAMIC CHAMBER BRACKET INSTALLATION NOTE

1. Tighten the bolts firmly, then tighten the dynamic chamber side bolt before tightening the fuel distributor side bolt.

#### TURBOCHARGER REMOVAL/INSTALLATION (BP WITH TC)

##### WARNING:

- A hot engine and intake air system can cause severe burns. Turn off the engine and wait until all components 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". (See **BEFORE SERVICE PRECAUTION (BP, BP WITH TC)** .)

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See **ENGINE COOLANT REPLACEMENT** .)
3. Remove the under cover.

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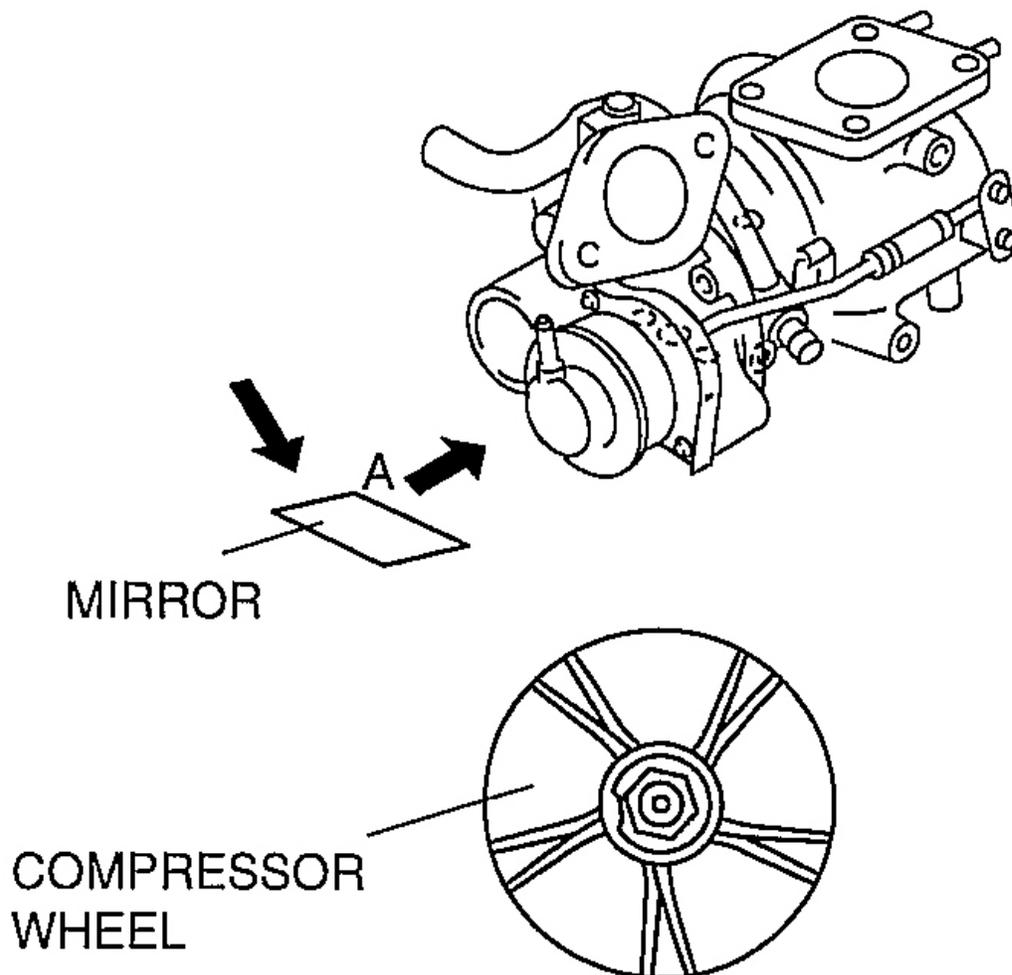
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4. Disconnect the MAF sensor connector.
5. Disconnect the IAT sensor No.1 connector.
6. Remove the air cleaner cover together with the MAF sensor and the IAT sensor No.1. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC)**.)
7. Remove the air cleaner case. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC)**.)
8. Remove the air hose No.3 and air pipe No.2. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC)**.)
9. Remove the air pipe No.1 together with the air bypass valve. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC)**.)
10. Remove the exhaust manifold insulator. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
11. Remove the turbocharger insulator. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
12. Remove the joint pipe insulator No.1. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
13. Remove the dipstick. (See **OIL PAN REMOVAL/INSTALLATION (BP WITH TC)** .)
14. Remove the HO2S (front). (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
15. Remove the joint pipe insulator No.2. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
16. Remove the HO2S (rear). (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
17. Remove the TWC. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
18. Remove the joint pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
19. Remove the oil pipe (oil in). (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
20. Remove the oil pipe (oil out) nuts. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
21. Remove the engine coolant pipe (engine coolant out). (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
22. Remove the EGR pipe. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
23. Remove the turbocharger bracket. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
24. Remove the turbocharger together with the exhaust manifold. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION (BP WITH TC)** .)
25. Install in the reverse of removal.
26. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION (BP, BP WITH TC)** .)

## TURBOCHARGER INSPECTION (BP WITH TC)

## COMPRESSOR WHEEL INSPECTION

1. Remove the air hose No.4.(engine compartment). (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC).**)
2. Visually inspect the compressor wheel from view A for the cracks, damage, or bending on all the compressor wheel blades.



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**Fig. 13: Inspecting Compressor Wheel From View Cracks, Damage, Or Bending On All Compressor Wheel Blades**  
Courtesy of MAZDA MOTORS CORP.

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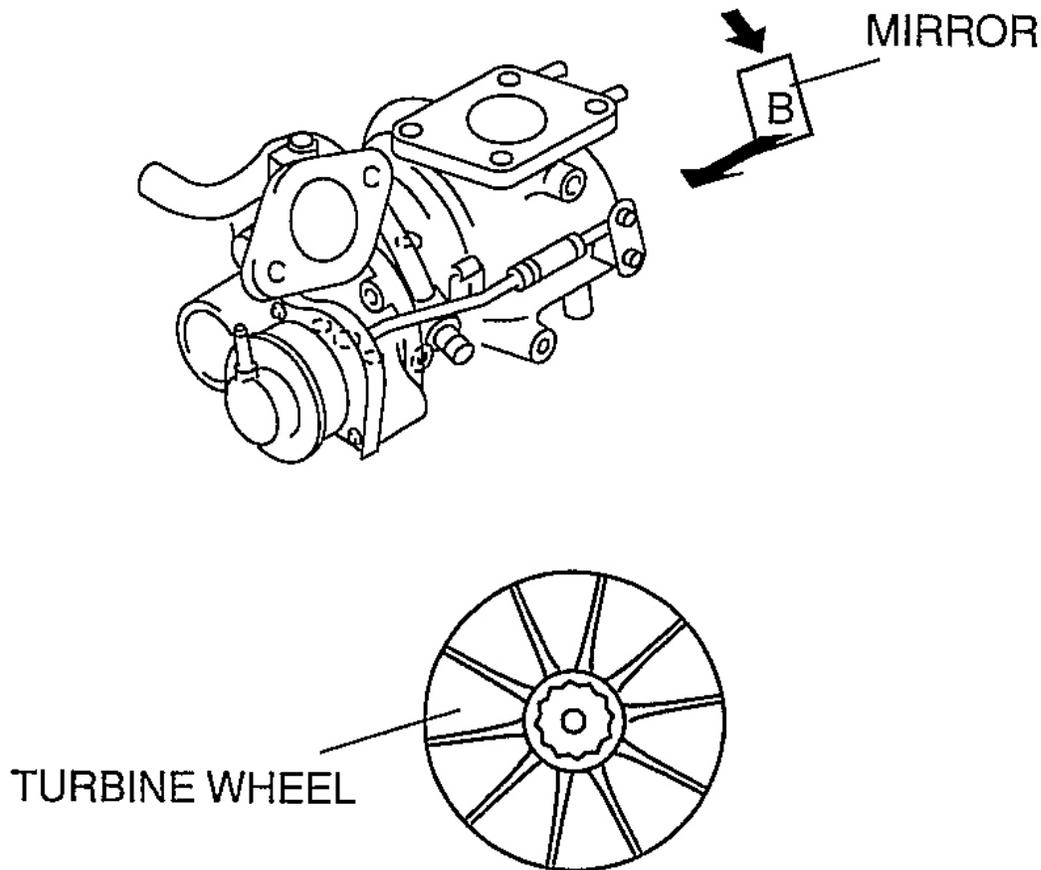
- If there are any cracks or damage, replace the turbocharger.

### NOTE:

- It is easier to inspect the compressor wheel by inserting a mirror at the position shown in Fig. 13 and illuminating the area using a pen light.
- If there is contact between the compressor wheel and compressor housing, there may be cracks, damage, or bending on the blade end area.
- If there are cracks, damage, or bending on the compressor wheel, verify the following after replacing the turbocharger.
  - Intake air/exhaust system related components
  - Oil pipe damage

### TURBINE WHEEL INSPECTION

1. Remove the joint pipe. (See TURBOCHARGER REMOVAL/INSTALLATION (BP WITH TC).)
2. Visually inspect the turbine wheel from view B for the cracks, damage, or bending on all the turbine wheel blades.



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**Fig. 14: Inspecting Turbine Wheel From View Cracks, Damage, Or Bending On All Turbine Wheel Blades**

Courtesy of MAZDA MOTORS CORP.

- If there are cracks, damage, or bending on the turbine wheel, replace the turbocharger.

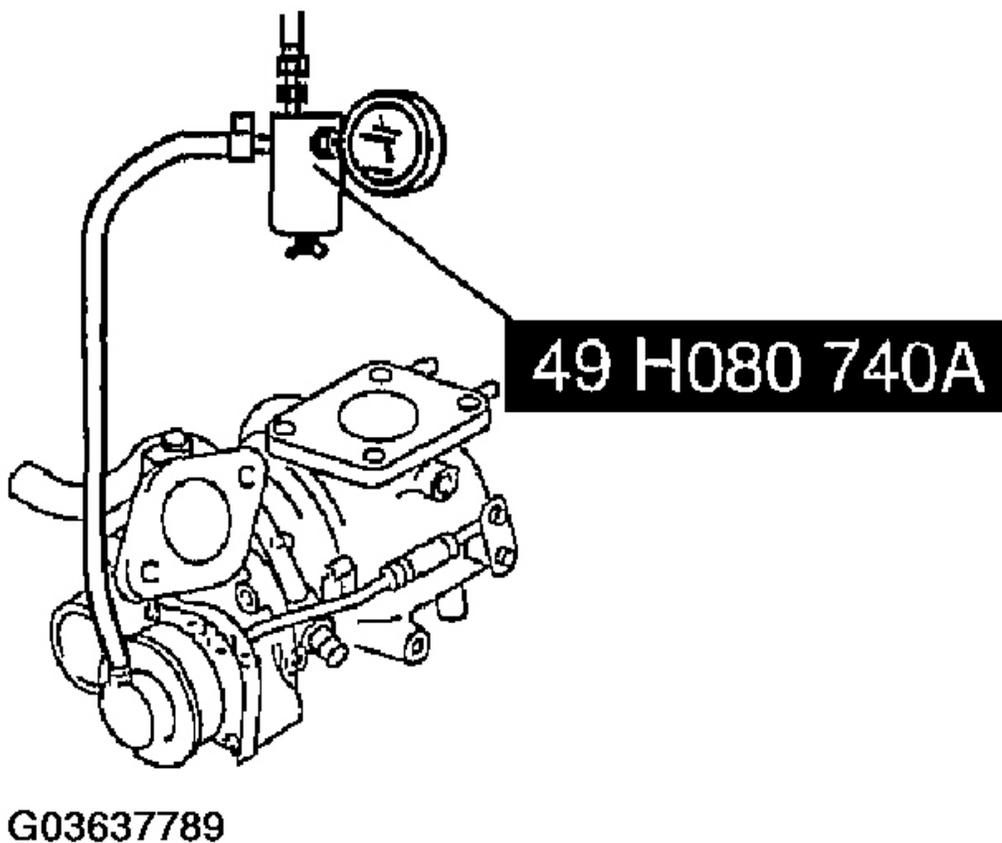
**NOTE:**

- It is easier to inspect the compressor wheel by inserting a mirror at the position shown in Fig. 14 and illuminating the area using a pen light.
- If there is contact between the turbine wheel and turbine housing, there may be cracks, damage, or bending on the blade end area.
- If there are cracks, damage, or bending on the turbine wheel, verify the following after replacing the turbocharger.

- Intake air/exhaust system related components
- Oil pipe damage

## WASTEGATE ACTUATOR INSPECTION (BP WITH TC)

1. Remove the vacuum hose connected to the wastegate actuator port.
2. Connect the **SST** to the wastegate actuator.



**Fig. 15: Connecting SST To Wastegate Actuator**  
Courtesy of MAZDA MOTORS CORP.

3. Check that the rod moves when supply compressed air.
  - If there is any malfunction, replace the turbocharger.
  - If there is no malfunction, verify that there is no malfunction such as incorrect connection or damage in the vacuum hose.

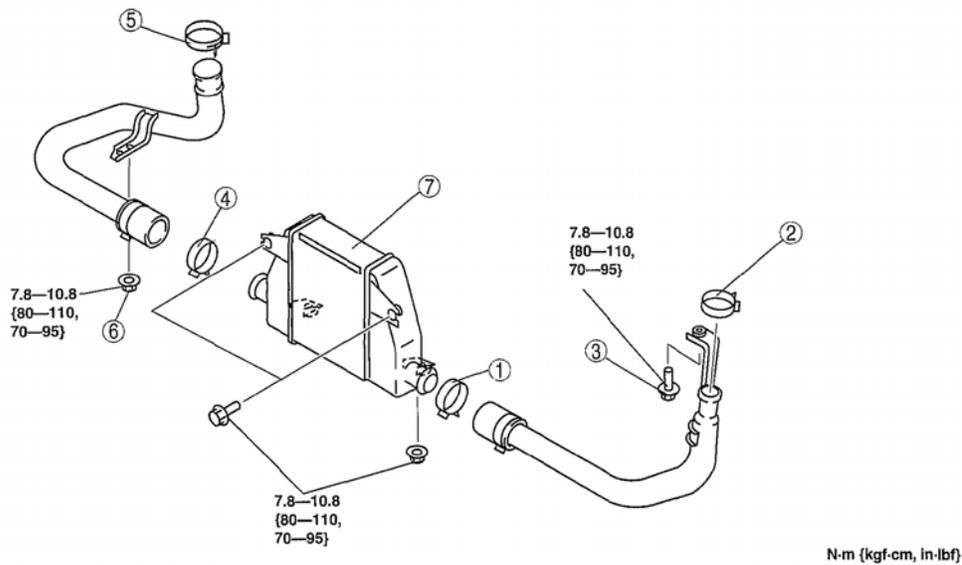
**Specification**

65-70 kPa {0.67-0.71 kg/cm<sup>2</sup>, 9.5-10.1 psi}

**CHARGE AIR COOLER REMOVAL/INSTALLATION (BP WITH TC)**

**WARNING:** • A hot engine and intake air system can cause severe burns. Turn off the engine and wait until all components are cool before removing the intake air system.

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove the cover with the charge air cooler bottom for easier access.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.



1	Clip
2	Clip
3	Bolt
4	Clip

5	Clip
6	Nut
7	Charge air cooler

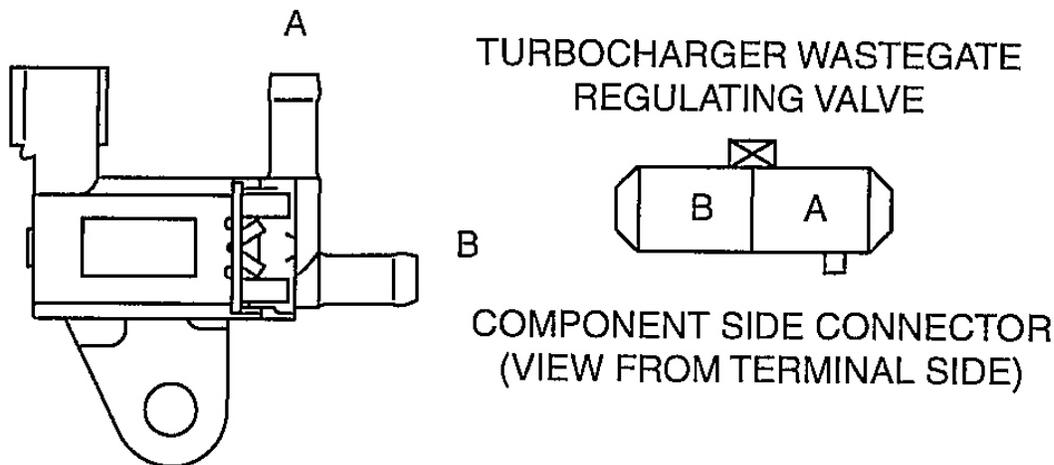
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**Fig. 16: Exploded View Of Charge Air Cooler (BP With TC) & Torque Specifications**  
 Courtesy of MAZDA MOTORS CORP.

**TURBOCHARGER WASTEGATE REGULATING VALVE INSPECTION (BP WITH TC)**

**CONTINUITY INSPECTION**

1. Remove the turbocharger wastegate regulating valve. (See **VACUUM HOSE ROUTING DIAGRAM (BP WITH TC.)**)



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**Fig. 17: Removing Turbocharger Wastegate Regulating Valve**  
Courtesy of MAZDA MOTORS CORP.

2. Verify that the airflow is as indicated in the table.

○—○ : Continuity    ○=○ : Airflow

Step	Terminal		Port	
	A	B	A	B
1	○	○	○	○
2	B+	GND	○	○

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**Fig. 18: Verify That Airflow Is As Indicated**  
Courtesy of MAZDA MOTORS CORP.

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- If there is any malfunction, replace the turbocharger wastegate regulating valve.
- If there is no malfunction, perform the **CIRCUIT OPEN/SHORT INSPECTION**.

### **CIRCUIT OPEN/SHORT INSPECTION**

1. Remove the PCM connector cover.
2. Disconnect the PCM connector.
3. Inspect the following wiring harness for open or short circuit (continuity check).

#### **Open circuit**

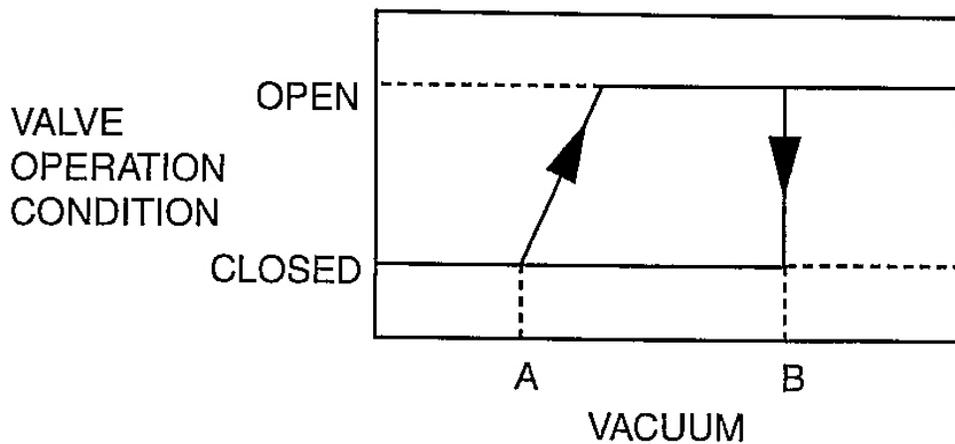
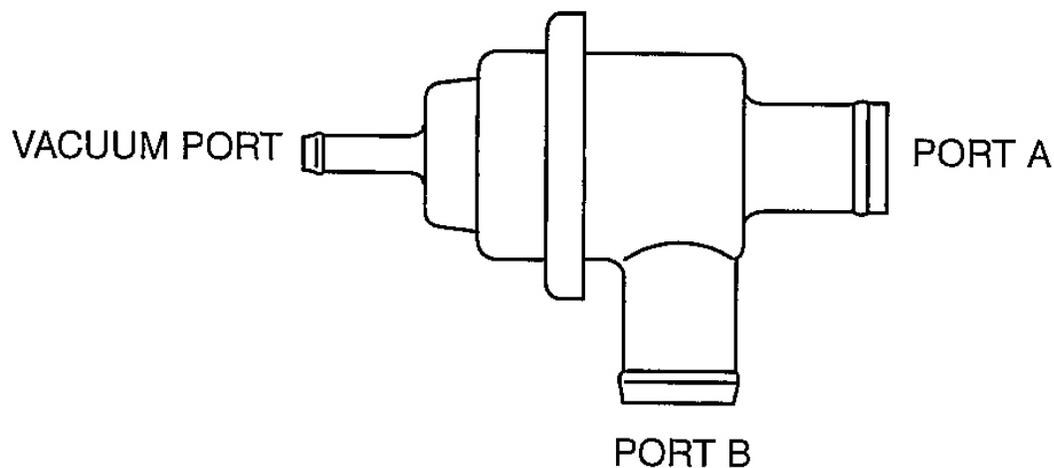
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - Turbocharger wastegate regulating valve terminal A and PCM terminal 4D
  - Turbocharger wastegate regulating valve terminal B and body GND

#### **Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - Turbocharger wastegate regulating valve terminal A and body GND

### **AIR BYPASS VALVE INSPECTION (BP WITH TC)**

1. Remove the air bypass valve. (See **VACUUM HOSE ROUTING DIAGRAM (BP WITH TC)**.)
2. Connect the vacuum pump to the vacuum ports of the air bypass valve.



A=-14— -22 kPa {-100— -170 mmHg, -4.0— -6.6 inHg}  
 B=APPROX. -37 kPa {-280 mmHg, -11 inHg}

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**Fig. 19: Connecting Vacuum Pump To Vacuum Ports Of Air Bypass Valve**  
 Courtesy of MAZDA MOTORS CORP.

3. Verify that the airflow is as indicated in the table.
  - If there is any malfunction, replace the air bypass valve.

**Connecting Vacuum Pump To Vacuum Ports Of Air Bypass Valve**

Vacuum (kPa {mmHg, inHg})	Valve operation condition	Airflow between port A-B
Approx.-37 {-280, -11}	Open	Yes

Less than -14 {-100, -4.0}

Closed

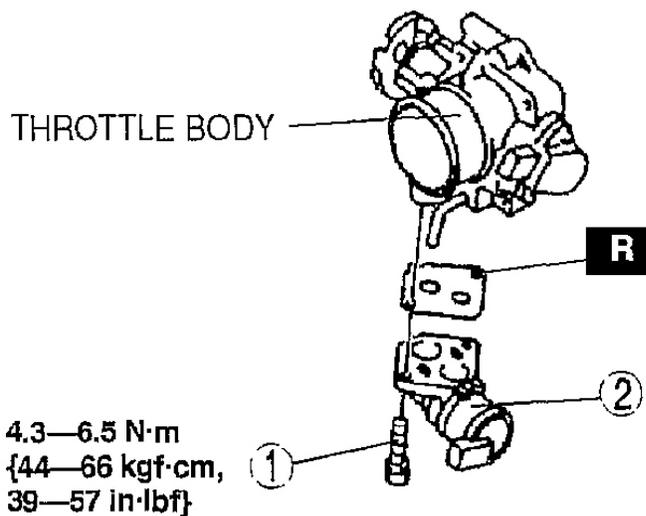
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## AIR CLEANER (ACL) ELEMENT INSPECTION (BP, BP WITH TC)

1. Remove the ACL element. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP).) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC).)
2. Verify that the ACL element surface is free of dirt.
  - If there is dirt present, use an air gun or similar tool to clean the element.
  - If the replacement time limit has passed, replace the element.

## IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)

1. Disconnect the negative battery cable.
2. Remove the air hose and the throttle body. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP).) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC).)



1	Bolt
2	IAC valve

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**Fig. 20: Removing Air Hose And Throttle Body & Torque Specifications**  
Courtesy of MAZDA MOTORS CORP.

3. Disconnect the IAC valve connector.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

## IDLE AIR CONTROL (IAC) VALVE INSPECTION (BP, BP WITH TC)

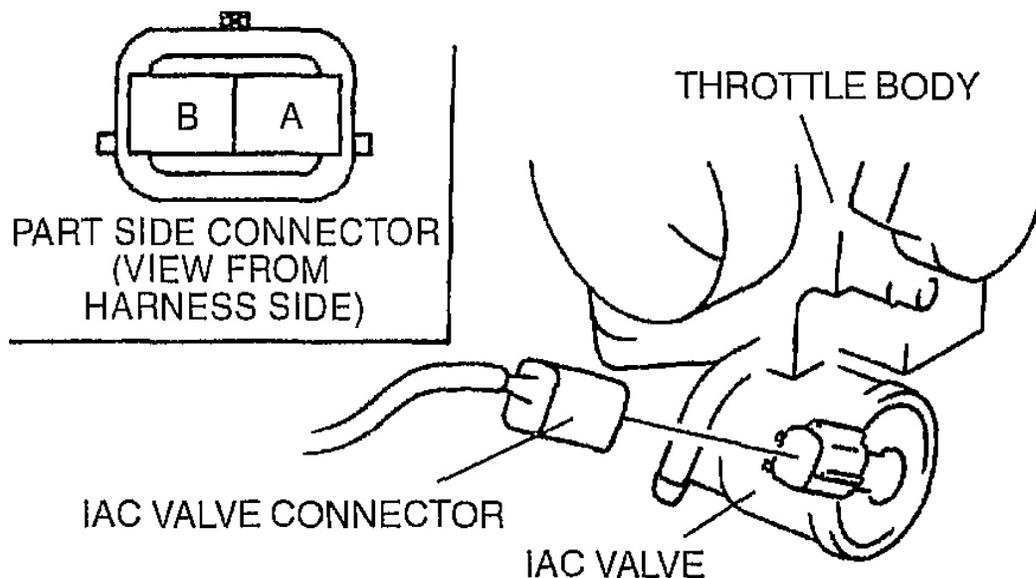
**NOTE:**           • Perform the following test only when directed.

### SIMULATION TEST

1. Carry out the "Idle Air Control (IAC) Inspection". (See **IDLE AIR CONTROL (IAC) INSPECTION** .)
  - If not as specified, perform a further inspection of the IAC valve.

### RESISTANCE INSPECTION

1. Disconnect the negative battery cable.
2. Disconnect the IAC valve connector.
3. Measure the resistance between the IAC valve terminals using an ohmmeter.



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**Fig. 21: Measuring Resistance Between IAC Valve Terminals Using An Ohmmeter**  
Courtesy of MAZDA MOTORS CORP.

- If as specified but the Simulation Test is failed, carry out the **CIRCUIT OPEN/SHORT INSPECTION**.
- If not as specified, replace the IAC valve. (See **IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)**.)

### Resistance

**8.7-10.5 ohms (24°C {75°F})**

4. Remove the IAC valve, and inspect it for any damage or clogging.
  - If not as specified replace the IAC valve. (See **IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)**.)

### CIRCUIT OPEN/SHORT INSPECTION

#### Open circuit

- Power circuit (IAC valve connector terminal A and PCM connector terminal 2P)
- GND circuit (IAC valve connector terminal B and PCM connector terminal 2Q)

#### Short circuit

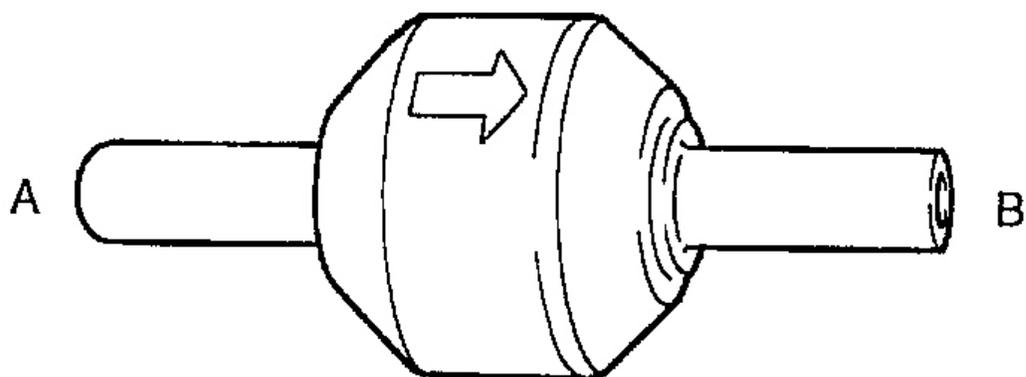
- IAC valve connector terminal A and PCM connector terminal 2P to GND

### VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)

1. Remove the VTCS check valve (one-way) or delay valve. (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP)**.) (See **INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC)**.)

### VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION (BP, BP WITH TC)

1. Remove the VTCS check valve (one-way) or delay valve. (See **VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)**.)
2. Blow through A and verify that the air flows from B.



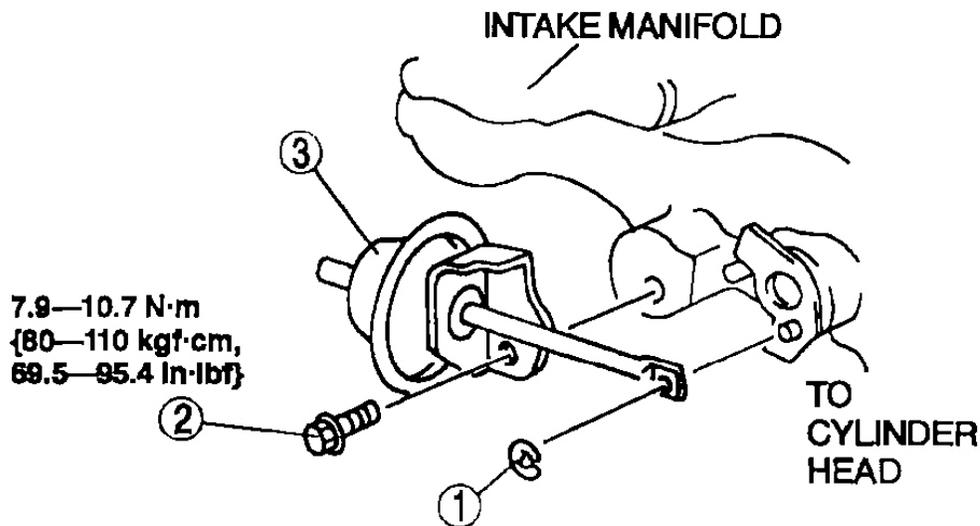
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**Fig. 22: Verify That Air Flows Through A From B**  
Courtesy of MAZDA MOTORS CORP.

3. Blow through B and verify that the air does not flow from A.
  - If not as specified, replace the VTCS check valve (one-way) or delay valve.

## **VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION (BP, BP WITH TC)**

1. Remove the air hose. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP).) (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION (BP WITH TC).)
2. Remove in the order indicated in the table.



1	E ring
2	Bolt
3	VTCS shutter valve actuator

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**Fig. 23: Removing Intake-Air System & Torque Specifications**  
Courtesy of MAZDA MOTORS CORP.

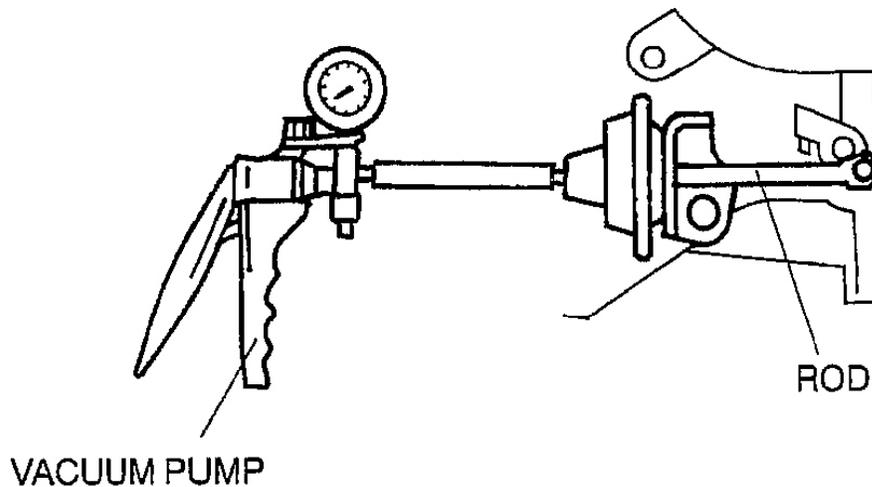
3. Install in the reverse order of removal.

## VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION (BP, BP WITH TC)

### NOTE:

- Perform the following test only when directed.

1. Disconnect the vacuum hose from the VTCS shutter valve actuator.
2. Connect a vacuum pump to the VTCS shutter valve actuator.
3. Apply vacuum slowly and inspect the rod movement of the VTCS shutter valve actuator under the following conditions:
  - If not as specified, replace the VTCS shutter valve actuator. (See **VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION (BP, BP WITH TC).**)
  - If as specified but the Simulation Test failed, inspect for the following:
    - Vacuum hose improper routing, kinks or leakage.



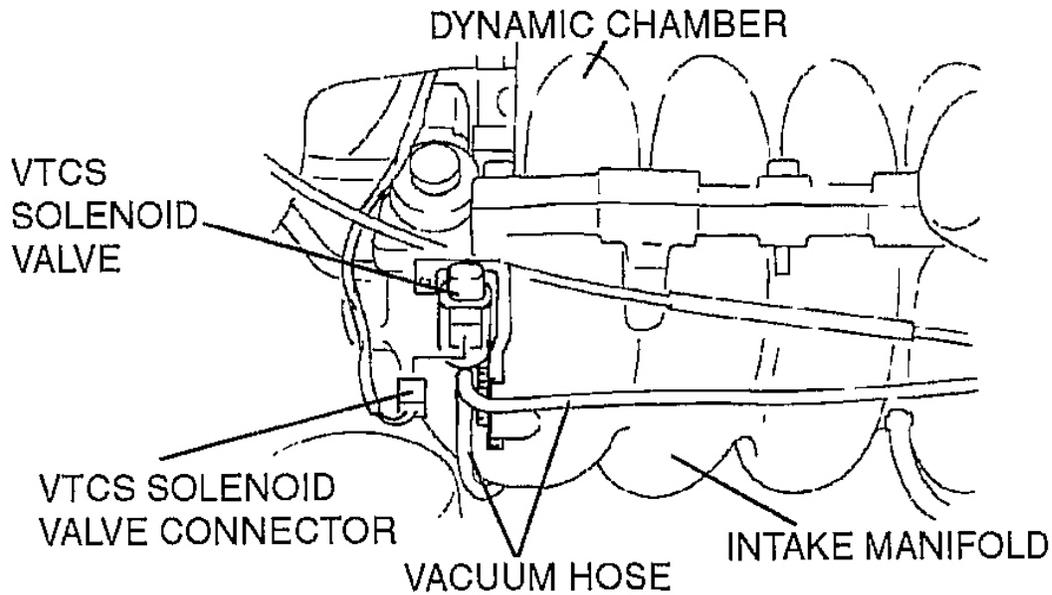
Step	Vacuum (kPa {mmHg, inHg})	Rod movement
1	Approx. -9.3 {-69.8, -2.7}	Starts to move
2	Below -34.7 {-260, -10.2}	Fully pulled
3	Above -6.7 {-51, -2.0}	Not pulled

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**Fig. 24: Connecting Vacuum Pump To VTCS Shutter Valve Actuator**  
 Courtesy of MAZDA MOTORS CORP.

## VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)

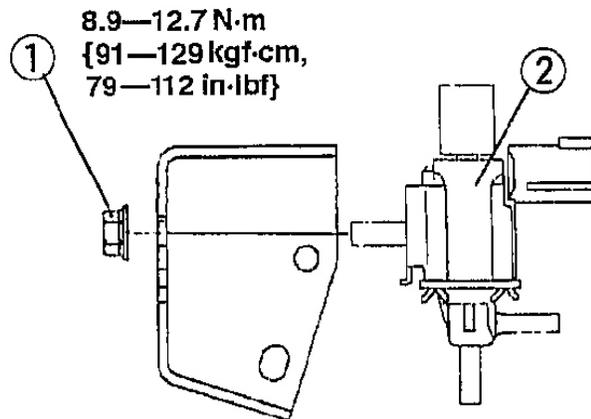
1. Disconnect the negative battery cable.
2. Disconnect the VTCS solenoid valve connector.
3. Disconnect the vacuum hose from the VTCS solenoid valve.



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**Fig. 25: Disconnecting Vacuum Hose From VTCS Solenoid Valve**  
Courtesy of MAZDA MOTORS CORP.

4. Remove in the order indicated in the table.



1	Nut
2	VTCS solenoid valve

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**Fig. 26: Removing Variable Tumble Control System (VTCS) Solenoid Valve & Torque Specifications**  
Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.

## VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION (BP, BP WITH TC)

### AIRFLOW INSPECTION

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

1. Remove the VTCS solenoid valve.
2. Inspect for airflow between each port under the following conditions:
  - If as specified but the Simulation Test is failed, inspect for the following and perform the **CIRCUIT OPEN/SHORT INSPECTION**:
    - Vacuum hose improper routing, kinks or leakage.
  - If not as specified, replace the VTCS solenoid valve. (See **VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE REMOVAL/INSTALLATION (BP, BP WITH TC)**.)

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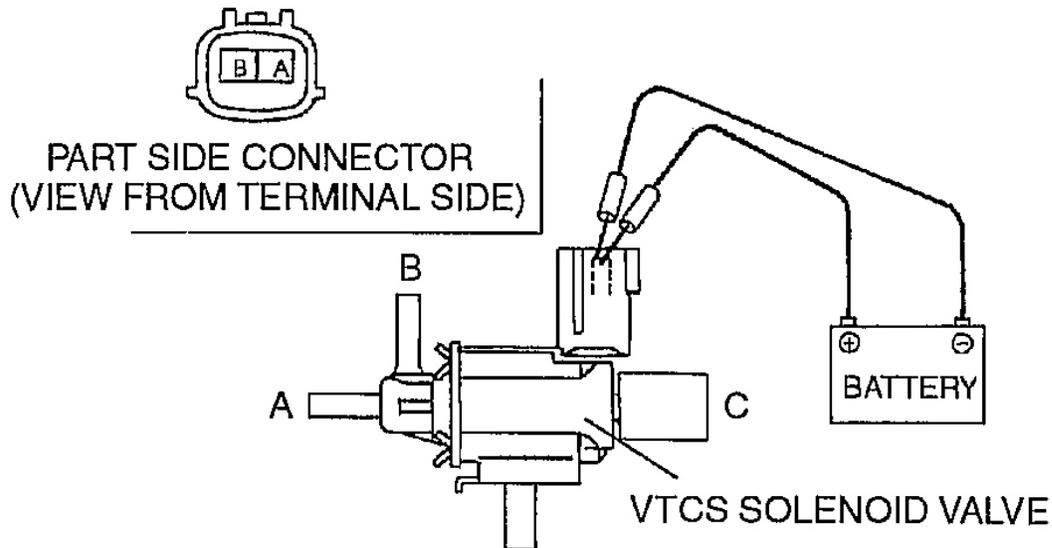
2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata

○—○ : Continuity    ○=○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○	○—○		○=○	○=○
2	B+	GND	○—○	○—○	

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**Fig. 27: Part Side Connector Terminal Chart**  
 Courtesy of MAZDA MOTORS CORP.



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**Fig. 28: Inspect For Airflow Between Each Port**  
 Courtesy of MAZDA MOTORS CORP.

**CIRCUIT OPEN/SHORT INSPECTION**

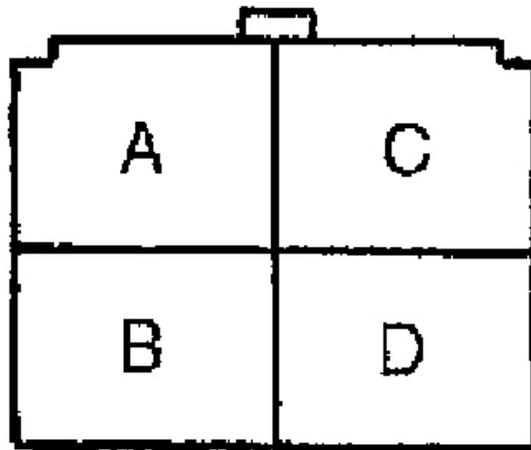
Open circuit

- Power circuit (VTCS solenoid valve connector terminal A and main relay connector terminal D through common connector)
- GND circuit (VTCS solenoid valve connector terminal B and PCM connector terminal 2N)

**Short circuit**

- VTCS solenoid valve connector terminal A and main relay connector terminal D through common connector to GND

**MAIN RELAY**



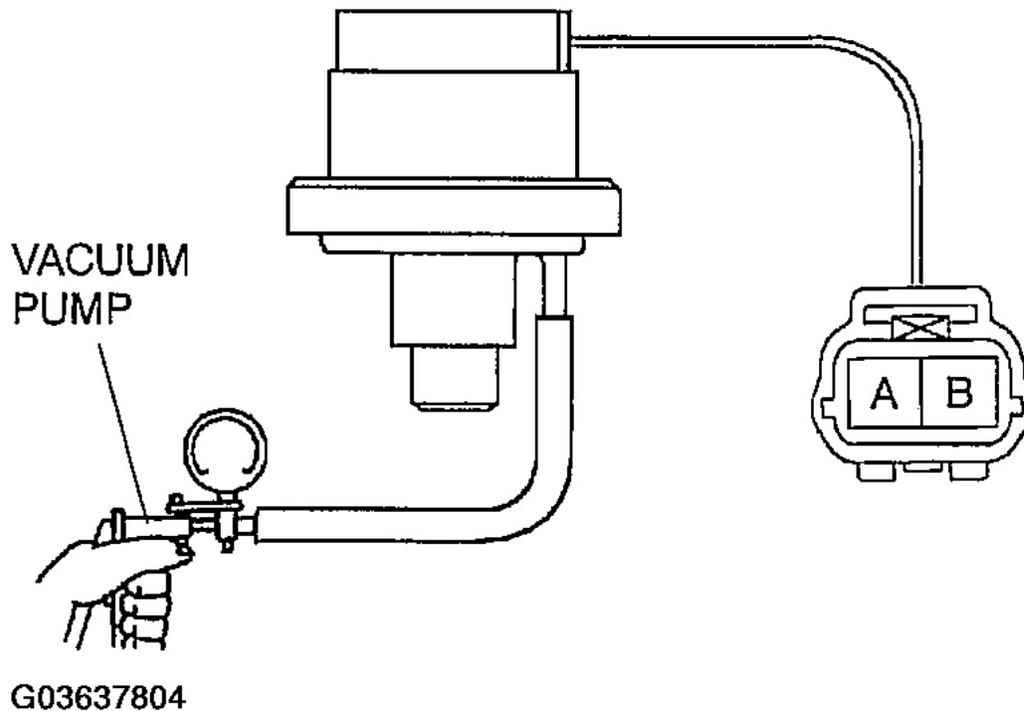
**HARNES SIDE CONNECTOR  
(VIEW FROM TERMINAL SIDE)**

**G03637803**

**Fig. 29: Identifying Hardness Side Connector**  
Courtesy of MAZDA MOTORS CORP.

**OPERATION INSPECTION**

1. Disconnect the negative battery cable.
2. Disconnect the vacuum hose from the VTCS vacuum switch.
3. Connect a vacuum pump to the VTCS vacuum switch.
4. Apply vacuum slowly and verify that continuity between the VTCS vacuum switch terminals changes as indicated in the table using an ohmmeter.
  - If not as specified, replace the VTCS vacuum switch.
  - If VTCS vacuum switch is okay but the PID value is out of specification, perform the **CIRCUIT OPEN/SHORT INSPECTION**.



**Fig. 30: VTCS Vacuum Switch PID Value Specification**  
 Courtesy of MAZDA MOTORS CORP.

**Connecting Vacuum Pump To VTCS Vacuum Switch**

Vacuum (kPa {mmHg, inHg})	Continuity
-36.0- -27.8 { -270- -208, -10.6- -8.2 }	From no continuity to continuity
-33.9- -27.3 { -254- -204, -10.0- -8.0 }	From continuity to no continuity

**CIRCUIT OPEN/SHORT INSPECTION**

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### Open circuit

- If there is no continuity and the circuit is open, repair or replace the harness.
  - Power circuit (VTCS vacuum switch connector terminal A and PCM connector terminal 4J through common connector)
  - GND circuit (VTCS vacuum switch connector terminal B and GND through common connector)

### Short circuit

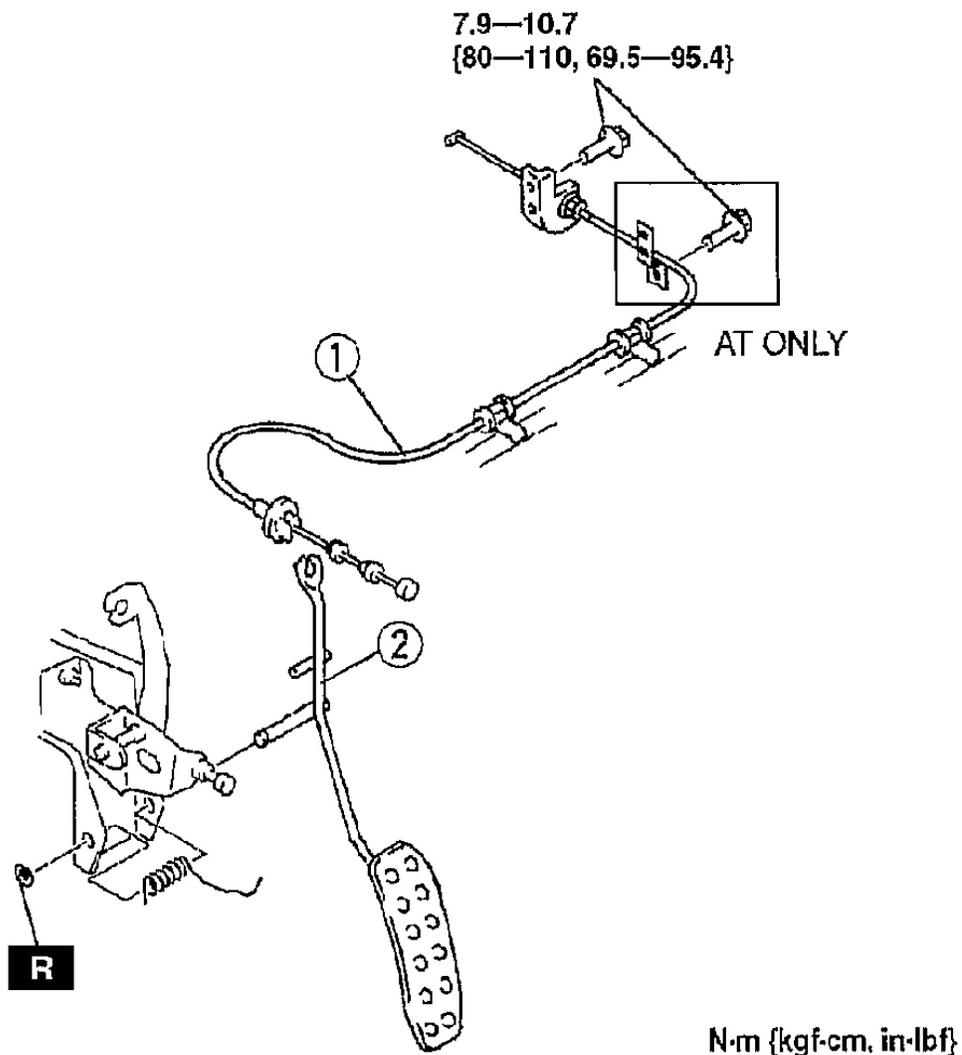
- If there is no continuity and the circuit is shorted, repair or replace the harness.
  - VTCS vacuum switch connector terminal A and PCM connector terminal 4J through common connector to GND

## ACCELERATOR PEDAL (AP) REMOVAL/INSTALLATION (BP, BP WITH TC)

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Intake - Air System - MX-5 Miata



1	Accelerator cable (See Accelerator Cable Installation Note)
2	AP

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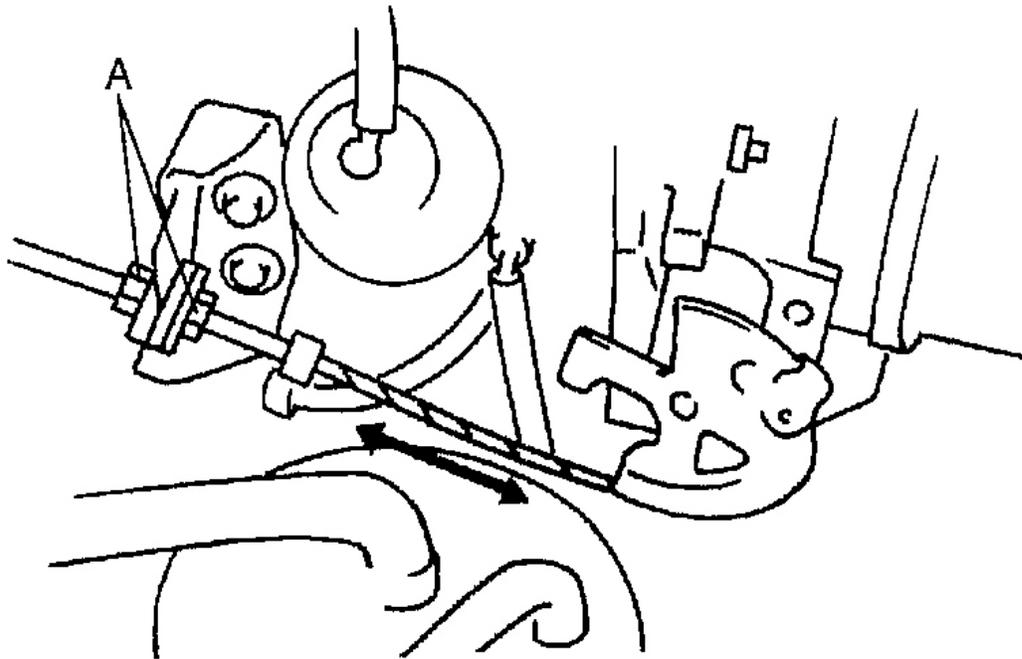
**Fig. 31: Exploded View Of Accelerator Pedal (AP) (BP, BP With TC) & Torque Specifications**  
 Courtesy of MAZDA MOTORS CORP.

### ACCELERATOR CABLE INSTALLATION NOTE

1. Perform the "**ACCELERATOR CABLE INSPECTION/ADJUSTMENT**" procedure after installing the accelerator cable.

## ACCELERATOR CABLE INSPECTION/ADJUSTMENT (BP, BP WITH TC)

1. Verify that the throttle valve is at the closed throttle position (TP).
2. Measure the free play of the accelerator cable.



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**Fig. 32: Measuring Free Play Of Accelerator Cable**  
Courtesy of MAZDA MOTORS CORP.

- If not within the specification, adjust by turning locknuts A.

### Free play

1-3 mm {0.04-0.11 in}

### Tightening torque

9.9-14.0 N.m {1.0-1.5 kgf.m, 7.3-10.0 ft.lbf}