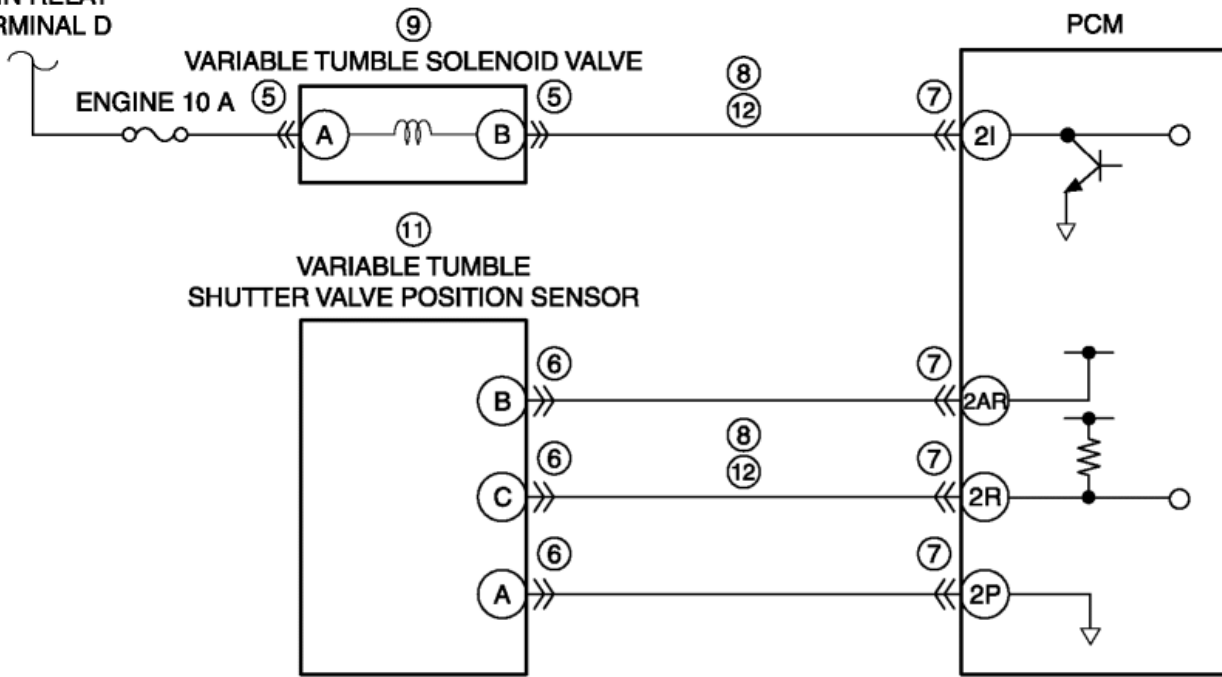


2012 - Mazda6 - Engine

DTC P2004:00 [MZR 2.5]

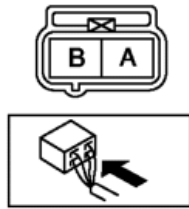
DTC P2004:00	Variable tumble shutter valve stuck open
DETECTION CONDITION	• The PCM monitors mass the variable tumble shutter valve position using the variable tumble position sensor. If the PCM turns the variable tumble solenoid valve on but the variable tumble position still remain open for 5 s (the variable tumble position sensor off), PCM determines that the variable tumble shutter valve has been stuck open. Diagnostic support note • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable tumble solenoid valve connector or terminal malfunction • Variable tumble shutter valve position sensor connector or terminal malfunction • PCM connector or terminal malfunction • Short to power supply in wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • Short to power supply in wiring harness between variable tumble shutter valve position sensor terminal C and PCM terminal 2R • Variable tumble solenoid valve malfunction • Variable tumble shutter valve actuator malfunction (stuck open) • Variable tumble shutter valve position sensor malfunction • Open circuit in wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • Open circuit in wiring harness between variable tumble shutter valve position sensor terminal C and PCM terminal 2R • Miss connecting or pull out the vacuum hose • PCM malfunction

MAIN RELAY
TERMINAL D

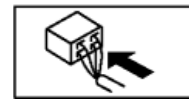
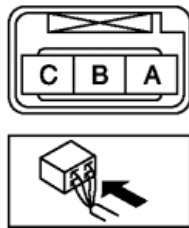


VARIABLE TUMBLE SOLENOID VALVE
WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR



VARIABLE TUMBLE SHUTTER VALVE POSITION
SENSOR WIRING HARNESS-SIDE CONNECTOR



Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA HAS BEEN RECORDED Has the FREEZE FRAME DATA (Mode 2)/snapshot data been recorded?	Yes Go to the next step. No Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step. No Go to the next step.

3	CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN - Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [MZR 2.5].) - Drive the vehicle under the following conditions: - Engine coolant temperature: below 60 °C { 140 °F } - Engine speed: below 3,750 rpm - Throttle opening angle is below as followings: - Engine speed—below 1,500 rpm : above 35 % - Engine speed—between 1,500—2,500 rpm : between 25—35 % - Engine speed—above 2,500 rpm : below 25 % - Perform the KOER self test. (See KOE0/ KOER SELF TEST [MZR 2.5].) - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the “INTERMITTENT CONCERN TROUBLESHOOTING”. (See INTERMITTENT CONCERN TROUBLESHOOTING [MZR 2.5] .)
4	VERIFY RELATED PENDING AND STORED DTC - Switch the ignition to off, then to ON (engine off). - Verify pending and stored DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Is the DTC P2010, P2088:00 or P2089:00 also present?	Yes	Go to the applicable DTC inspection. (See DTC P2010:00 [MZR 2.5] .) (See DTC P2088:00 [MZR 2.5] .) (See DTC P2089:00 [MZR 2.5] .)
		No	Go to the next step.
5	INSPECT VARIABLE TUMBLE SOLENOID VALVE CONNECTOR CONDITION - Switch the ignition to off. - Disconnect the variable tumble solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 14.
		No	Go to the next step.
6	INSPECT VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR CONNECTOR CONDITION - Disconnect the variable tumble shutter valve position sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 14.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR CONDITION - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 14.
		No	Go to the next step.
8	INSPECT VARIABLE TUMBLE SOLENOID VALVE AND VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY Variable tumble solenoid valve, variable tumble shutter valve position sensor and PCM connectors are disconnected.	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 14.
		No	Go to the next step.

	- Switch the ignition to ON (engine off). - Measure the voltage between the following terminals and body ground: - Variable tumble solenoid valve terminal B (wiring harness-side) - Variable tumble shutter valve position sensor terminal C (wiring harness-side) - Is there any voltage?		
9	INSPECT VARIABLE TUMBLE SOLENOID VALVE - Inspect the variable tumble solenoid valve. (See VARIABLE TUMBLE SOLENOID VALVE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the variable tumble solenoid valve, then go to Step 14. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5] .)
		No	Go to the next step.
10	INSPECT VARIABLE TUMBLE SHUTTER VALVE ACTUATOR - Inspect the variable tumble shutter valve actuator. (See VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the variable tumble shutter valve actuator, then go to Step 14. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5] .)
		No	Go to the next step.
11	INSPECT VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR - Inspect the variable tumble shutter valve position sensor. (See VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the variable tumble shutter valve position sensor, then go to Step 14. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5] .)
		No	Go to the next step.
12	INSPECT VARIABLE TUMBLE SOLENOID VALVE AND VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT - Variable tumble solenoid valve, variable tumble shutter valve position sensor and PCM connectors are disconnected. - Switch the ignition to off. - Inspect for continuity between the following terminals: - Variable tumble solenoid valve terminal B (wiring harness-side) and PCM terminal 2I (wiring harness-side) - Variable tumble shutter valve position sensor terminal C (wiring harness-side) and PCM terminal 2R (wiring harness-side) - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 14.
13	VERIFY CONNECTION OF VACUUM HOSE ROUTING - Verify that the vacuum hoses are connected properly. (See INTAKE MANIFOLD VACUUM INSPECTION [MZR 2.5].) - Are the vacuum hoses connected properly?	Yes	Go to the next step.
		No	Connect the vacuum hoses properly, then go to the next step.
14	VERIFY DTC TROUBLESHOOTING COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [MZR 2.5].) - Drive the vehicle under the following conditions: - Engine coolant temperature: below 60 °C { 140	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the PCM. (See PCM REMOVAL/ INSTALLATION [MZR 2.5] .)

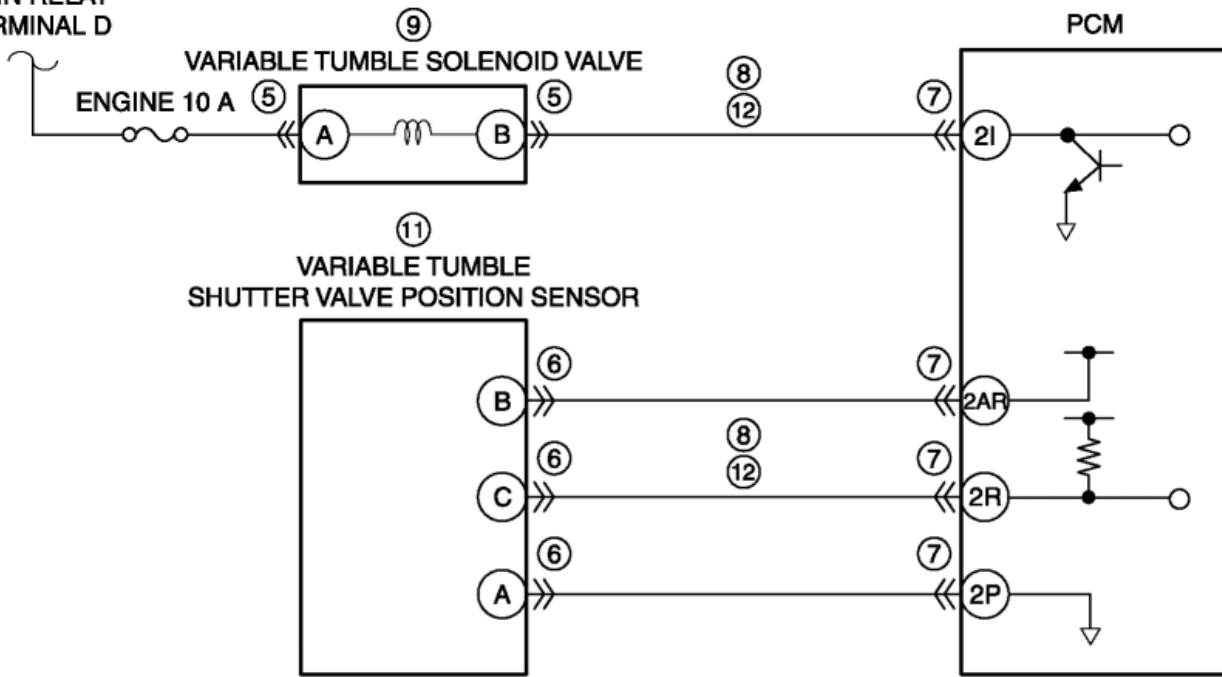
	°F} ▪ Engine speed: below 3,750 rpm ▪ Throttle opening angle is below as followings: • Engine speed—below 1,500 rpm : above 35 % • Engine speed—between 1,500—2,500 rpm : between 25—35 % • Engine speed—above 2,500 rpm : below 25 % • Perform the KOER self test. (See KOE0/ KOER SELF TEST [MZR 2.5].) • Is the PENDING CODE for this DTC present?	Go to the next step. No Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE • Perform the “AFTER REPAIR PROCEDURE”. (See AFTER REPAIR R PROCEDURE [MZR 2.5].) • Are any DTCs present?	YesGo to the applicable DTC inspection. (See DTC TABLE [MZR 2.5].) No DTC troubleshooting completed.

2012 - Mazda6 - Engine

DTC P2004:00 [MZR 2.5]

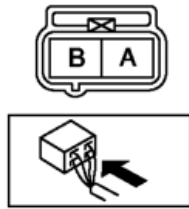
DTC P2004:00	Variable tumble shutter valve stuck open
DETECTION CONDITION	• The PCM monitors mass the variable tumble shutter valve position using the variable tumble position sensor. If the PCM turns the variable tumble solenoid valve on but the variable tumble position still remain open for 5 s (the variable tumble position sensor off), PCM determines that the variable tumble shutter valve has been stuck open. Diagnostic support note • This is a continuous monitor (CCM). • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Variable tumble solenoid valve connector or terminal malfunction • Variable tumble shutter valve position sensor connector or terminal malfunction • PCM connector or terminal malfunction • Short to power supply in wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • Short to power supply in wiring harness between variable tumble shutter valve position sensor terminal C and PCM terminal 2R • Variable tumble solenoid valve malfunction • Variable tumble shutter valve actuator malfunction (stuck open) • Variable tumble shutter valve position sensor malfunction • Open circuit in wiring harness between variable tumble solenoid valve terminal B and PCM terminal 2I • Open circuit in wiring harness between variable tumble shutter valve position sensor terminal C and PCM terminal 2R • Miss connecting or pull out the vacuum hose • PCM malfunction

MAIN RELAY
TERMINAL D

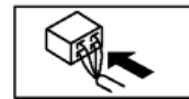
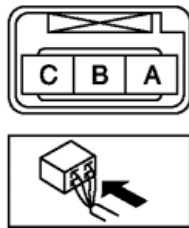


VARIABLE TUMBLE SOLENOID VALVE
WIRING HARNESS-SIDE CONNECTOR

PCM WIRING HARNESS-SIDE CONNECTOR



VARIABLE TUMBLE SHUTTER VALVE POSITION
SENSOR WIRING HARNESS-SIDE CONNECTOR



Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA HAS BEEN RECORDED Has the FREEZE FRAME DATA (Mode 2)/snapshot data been recorded?	Yes Go to the next step. No Record the FREEZE FRAME DATA (Mode 2)/snapshot data on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step. No Go to the next step.

3	CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN - Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [MZR 2.5].) - Drive the vehicle under the following conditions: - Engine coolant temperature: below 60 °C { 140 °F } - Engine speed: below 3,750 rpm - Throttle opening angle is below as followings: - Engine speed—below 1,500 rpm : above 35 % - Engine speed—between 1,500—2,500 rpm : between 25—35 % - Engine speed—above 2,500 rpm : below 25 % - Perform the KOER self test. (See KOE0/ KOER SELF TEST [MZR 2.5].) - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the “INTERMITTENT CONCERN TROUBLESHOOTING”. (See INTERMITTENT CONCERN TROUBLESHOOTING [MZR 2.5] .)
4	VERIFY RELATED PENDING AND STORED DTC - Switch the ignition to off, then to ON (engine off). - Verify pending and stored DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Is the DTC P2010, P2088:00 or P2089:00 also present?	Yes	Go to the applicable DTC inspection. (See DTC P2010:00 [MZR 2.5] .) (See DTC P2088:00 [MZR 2.5] .) (See DTC P2089:00 [MZR 2.5] .)
		No	Go to the next step.
5	INSPECT VARIABLE TUMBLE SOLENOID VALVE CONNECTOR CONDITION - Switch the ignition to off. - Disconnect the variable tumble solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 14.
		No	Go to the next step.
6	INSPECT VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR CONNECTOR CONDITION - Disconnect the variable tumble shutter valve position sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 14.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR CONDITION - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal and/or connector, then go to Step 14.
		No	Go to the next step.
8	INSPECT VARIABLE TUMBLE SOLENOID VALVE AND VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY Variable tumble solenoid valve, variable tumble shutter valve position sensor and PCM connectors are disconnected.	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 14.
		No	Go to the next step.

	- Switch the ignition to ON (engine off). - Measure the voltage between the following terminals and body ground: - Variable tumble solenoid valve terminal B (wiring harness-side) - Variable tumble shutter valve position sensor terminal C (wiring harness-side) - Is there any voltage?		
9	INSPECT VARIABLE TUMBLE SOLENOID VALVE - Inspect the variable tumble solenoid valve. (See VARIABLE TUMBLE SOLENOID VALVE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the variable tumble solenoid valve, then go to Step 14. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
10	INSPECT VARIABLE TUMBLE SHUTTER VALVE ACTUATOR - Inspect the variable tumble shutter valve actuator. (See VARIABLE TUMBLE SHUTTER VALVE ACTUATOR INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the variable tumble shutter valve actuator, then go to Step 14. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
11	INSPECT VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR - Inspect the variable tumble shutter valve position sensor. (See VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the variable tumble shutter valve position sensor, then go to Step 14. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
12	INSPECT VARIABLE TUMBLE SOLENOID VALVE AND VARIABLE TUMBLE SHUTTER VALVE POSITION SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT - Variable tumble solenoid valve, variable tumble shutter valve position sensor and PCM connectors are disconnected. - Switch the ignition to off. - Inspect for continuity between the following terminals: - Variable tumble solenoid valve terminal B (wiring harness-side) and PCM terminal 2I (wiring harness-side) - Variable tumble shutter valve position sensor terminal C (wiring harness-side) and PCM terminal 2R (wiring harness-side) - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to Step 14.
13	VERIFY CONNECTION OF VACUUM HOSE ROUTING - Verify that the vacuum hoses are connected properly. (See INTAKE MANIFOLD VACUUM INSPECTION [MZR 2.5].) - Are the vacuum hoses connected properly?	Yes	Go to the next step.
		No	Connect the vacuum hoses properly, then go to the next step.
14	VERIFY DTC TROUBLESHOOTING COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [MZR 2.5].) - Drive the vehicle under the following conditions: - Engine coolant temperature: below 60 °C { 140	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the PCM. (See PCM REMOVAL/ INSTALLATION [MZR 2.5].)

	°F} ▪ Engine speed: below 3,750 rpm ▪ Throttle opening angle is below as followings: • Engine speed—below 1,500 rpm : above 35 % • Engine speed—between 1,500—2,500 rpm : between 25—35 % • Engine speed—above 2,500 rpm : below 25 % • Perform the KOER self test. (See KOE0/ KOER SELF TEST [MZR 2.5].) • Is the PENDING CODE for this DTC present?	Go to the next step. No Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE • Perform the “AFTER REPAIR PROCEDURE”. (See AFTER REPAIR R PROCEDURE [MZR 2.5].) • Are any DTCs present?	YesGo to the applicable DTC inspection. (See DTC TABLE [MZR 2.5].) No DTC troubleshooting completed.