Your Ultimate Source for OEM Repair Manuals

FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

1999 MAZDA B Series / Bravo Dual Cab OEM Service and Repair Workshop Manual

Go to manual page

Item	Definition	Unit	Condition/Specification
VT_EX_ACT	Actual exhaust variable valve timing control • Retard amount from max advance position	° (deg)	• Displays actual exhaust variable valve timing−retard amount from max advance position
VT_EX_DES	Target exhaust variable valve timing control • Retard amount from max advance position	° (deg)	• Displays target exhaust variable valve timing−retard amount from max advance position
VT_IN_ACT	Actual intake variable valve timing control • Advance amount from max retard position	° (deg)	• Displays actual intake variable valve timing−advance amount from max retard position
VT_IN_DES	Target intake variable valve timing control • Advance amount from max retard position	° (deg)	• Displays target intake variable valve timing−advance amount from max retard position

Simulation item table

Item	Applicable component	Operation	Operation condition	
			Engine condition	Other condition
FP	Fuel pump	Select OFF/ON to forcibly drive/stop the fuel pump.	• Under the following conditions: — Ignition is switched ON (engine off) — Idle (no load)	Not applicable
INJ_1	Fuel injector No.1	Select OFF to forcibly stop the fuel injector No.1.	Not applicable	**Warning** **• Do not use the simulation function while the vehicle is being driven. Stopping the fuel ejection causes the engine to stall which may cause the brakes to not function.**
INJ_2	Fuel injector No.2	Select OFF to forcibly stop the fuel injector No.2.		
INJ_3	Fuel injector No.3	Select OFF to forcibly stop the fuel injector No.3.		
INJ_4	Fuel injector No.4	Select OFF to forcibly stop the fuel injector No.4.		

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: 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.

STEP	INSPECTION	RESULTS	ACTION
10	PURPOSE: VERIFY MAF SENSOR • Start the engine and idle it. • Access the MAF PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the MAF PID value normal?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 5.
11	PURPOSE: VERIFY MAP SENSOR • Start the engine and idle it. • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) — MAP — MAP_V • Are all items normal?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 7.
12	PURPOSE: VERIFY INTAKE VALVE TIMING • Start the engine and idle it. • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) — VT_IN_ACT — VT_IN_DES • Depress the accelerator pedal to increase the engine speed. • Does the monitor value of the PID item VT_IN_ACT conform to the VT_IN_DES PID value?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 8.
13	PURPOSE: VERIFY EXHAUST VALVE TIMING • Start the engine and idle it. • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) — VT_EX_ACT — VT_EX_DES • Perform the following: 1. Warm up the engine to allow the engine coolant temperature to reach 80 °C {176 °F} or more. 2. Shift to D position and rapidly accelerate the vehicle to 50 km/h {31 mph} (to operate hydraulic variable valve timing control). 3. Decelerate to idling. 4. Shift to D position and rapidly accelerate the vehicle to 50 km/h {31 mph} again. • Does the monitor value of the PID item VT_EX_ACT conform to the VT_EX_DES PID value?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 11.
14	PURPOSE: VERIFY A/F SENSOR • Access the O2S11 PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the O2S11 PID value normal?	Yes	Go to the next step.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 12.
15	PURPOSE: VERIFY DTC • Switch the ignition off, then ON (engine off). • Retrieve the PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.

STEP	INSPECTION	RESULTS	ACTION
13	PURPOSE: VERIFICATION OF VEHICLE REPAIR COMPLETION • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Implement the repeatability verification procedure. (See Repeatability Verification Procedure.) • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the PENDING CODE for this DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
2	PURPOSE: RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
3	PURPOSE: VERIFY CONNECTOR CONNECTIONS • Start the engine. • Access the ECT2_V PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Does the PID value fluctuate when the PCM and ECT sensor No.2 connectors are shaken?	Yes	Repair or replace the applicable connector parts. Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 8.
		No	Go to the next step.
4	PURPOSE: VERIFY ECT SENSOR No.2 INPUT SIGNAL • Access the ECT2_V PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the PID value within specification?	Yes	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 3.
		No	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

- Step 1–2
  - — Perform an ECT sensor No.2-related inspection.
- Step 3–5
  - — Perform an engine coolant-related inspection.
- Step 6
  - — Perform a unit inspection of the coolant control valve.
- Step 7
  - — Perform a thermostat inspection.
- Step 8–9
  - — Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: INSPECT INSTALLATION OF ECT SENSOR No.2 • Inspect installation of ECT sensor No.2. • Is the ECT sensor No.2 installed securely?	Yes	Go to the next step.
		No	Retighten the ECT sensor No.2, then go to Step 8. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
2	PURPOSE: DETERMINE INTEGRITY OF ECT SENSOR No.2 • Inspect the ECT sensor No.2. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the ECT sensor No.2, then go to Step 8. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.

DTC P2101:00 [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))]

SM2896973

id0102t370770

DTC P2101:00	Throttle valve actuator control motor circuit range/performance problem
DETECTION CONDITION	• The PCM turns the main relay on, but if the input voltage is 6.0 V or less, then the PCM determines that the main relay control circuit voltage is low. • There is a system error in the electrical throttle control system of the PCM. Diagnostic support note • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Restricts the upper limit of the engine speed. • Stops the drive-by-wire control (throttle valve is open at approx. 8 ° by return spring force).
POSSIBLE CAUSE	• Short to ground or open circuit in main relay power supply circuit: — MAIN 200 A fuse and/or ENG.MAIN 40 A fuse malfunction • Short to ground in wiring harness between the following terminals: — Main relay terminal C−PCM terminal 2BO — Main relay terminal C−PCM terminal 2BR — Main relay terminal E−PCM terminal 2B • PCM connector or terminals malfunction • Open circuit in wiring harness between the following terminals: — Main relay terminal C−PCM terminal 2BO — Main relay terminal C−PCM terminal 2BR — Main relay terminal E−PCM terminal 2B • Throttle valve actuator malfunction • PCM malfunction

STEP	INSPECTION	RESULTS	ACTION
4	**INSPECT MAIN RELAY POWER SUPPLY CIRCUIT FOR SHORT TO GROUND OR OPEN CIRCUIT** • Switch the ignition off. • Remove the main relay. (See RELAY LOCATION.) • Measure the voltage at the following terminals (wiring harness-side): — Main relay terminal D — Main relay terminal A • Is the voltage B+?	Yes	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
6	**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 connector and/or terminals, then go to Step 9.
		No	Go to the next step.
7	**INSPECT MAIN RELAY CIRCUIT FOR OPEN CIRCUIT** • Verify that main relay is removed. • Verify that the PCM connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side): — Main relay terminal C—PCM terminal 2BO — Main relay terminal C—PCM terminal 2BR — Main relay terminal E—PCM terminal 2B • Is there continuity?	Yes	Go to the next step.
		No	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • Main relay terminal C—PCM terminal 2BO • Main relay terminal C—PCM terminal 2BR • Main relay terminal E—PCM terminal 2B **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for an open circuit. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has an open circuit. Go to Step 9.
8	**INSPECT THROTTLE VALVE ACTUATOR** • Inspect the throttle valve actuator. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) (See THROTTLE BODY INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Replace the throttle body, then go to the next step. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)
		No	Go to the next step.
9	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Always reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Perform the KOEO self test. (See KOEO/KOER SELF TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Is the same Pending DTC present?	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Go to the next step.
		No	Go to the next step.
10	**VERIFY AFTER REPAIR PROCEDURE** • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
7	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	DTC troubleshooting completed.

STEP	INSPECTION	RESULTS	ACTION
3	**VERIFY RELATED PENDING CODE AND/OR DTC** • Switch the ignition off, then ON (engine off). • Perform the Pending Trouble Code Access Procedure and DTC Reading Procedure. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any other PENDING CODEs and/or DTCs present?	Yes	Go to the applicable PENDING CODE or DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	Go to the next step.
4	**INSPECT THROTTLE BODY CONNECTOR CONDITION** • Switch the ignition off. • Disconnect the throttle body connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 11.
		No	Go to the next step.
5	**INSPECT THROTTLE VALVE ACTUATOR CIRCUIT FOR SHORT TO GROUND** • Verify that the throttle body connector is disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Throttle body terminal E — Throttle body terminal F • Is there continuity?	Yes	Disconnect the PCM connector and inspect the wiring harness for short to ground. • If the short to ground circuit could be detected in the wiring harness: — Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • Throttle body terminal E–PCM terminal 1CQ • Throttle body terminal F–PCM terminal 1CR **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to ground. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to ground. • If the short to ground circuit could not be detected in the wiring harness: — Replace the PCM (short to ground in the PCM internal circuit). (See PCM REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Go to Step 11.
		No	Go to the next step.